

PC WORLD

LOTUS EDITION

April 1994 \$3.95

TRIPLE SPEED

Faster Than a DX2-66 **Cheaper** Than Pentiums

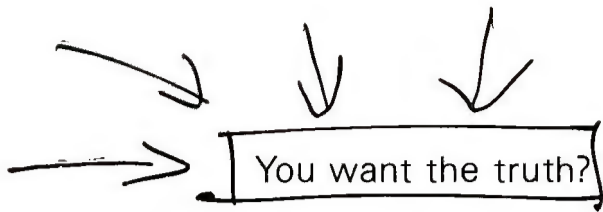
Will Tripled 486s
Be Your Best Buy
PCs in 1994?

Plus:
20 Top Tricks for
Lotus SmartSuite
Teamwork

A Complete Guide
to Big Monitors



1-2-3 MODEL OF THE MONTH:
LEASING VERSUS BUYING



You want the truth? Here it is. NEC's new MultiSpin® 3X CD-ROM readers are the best-performing readers on the market.

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We also cut our access time to less than 200 milliseconds, added a 256-Kbyte continuous-flow cache and a SCSI 2 interface.

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with a long list of numbers and specs. But, what does it all mean?

Well, it means you can get your information three times faster than you can with standard readers, see smoother animation and video.

And then there are the really important questions. Like is our CD-ROM reader easy to use;



NEC MultiSpin 3Xp and 3Xe

← OK. It's fine print, but it's just trademark stuff. Honest.

how much is it going to cost me; and, will it look good on my desk? The answers are: Yes; around the same that it will cost you for a 2X; and you'd better believe it.

Our new MultiSpin CD-ROM readers are not only fast but interactive and intuitive to your needs, with control and display features on the front panel that tell you exactly what's going on (or not going on) at all times. They also have stand-alone audio controls so you can play music CDs without a



computer. And there's a complete line of NEC interfaces, which include easy-to-use installation software. So you won't spend half your life trying to hook your reader up.

They're compatible with Macs and PCs, as well as Kodak Multisession Photo CDs. And they come with the longest commitment in the industry – a 2-year limited warranty.

For more information on our new MultiSpin 3X CD-ROM

readers, call 1-800-NEC-INFO now. Or, for immediate details via fax, call NEC FastFacts™ at 1-800-366-0476, request document #23768.

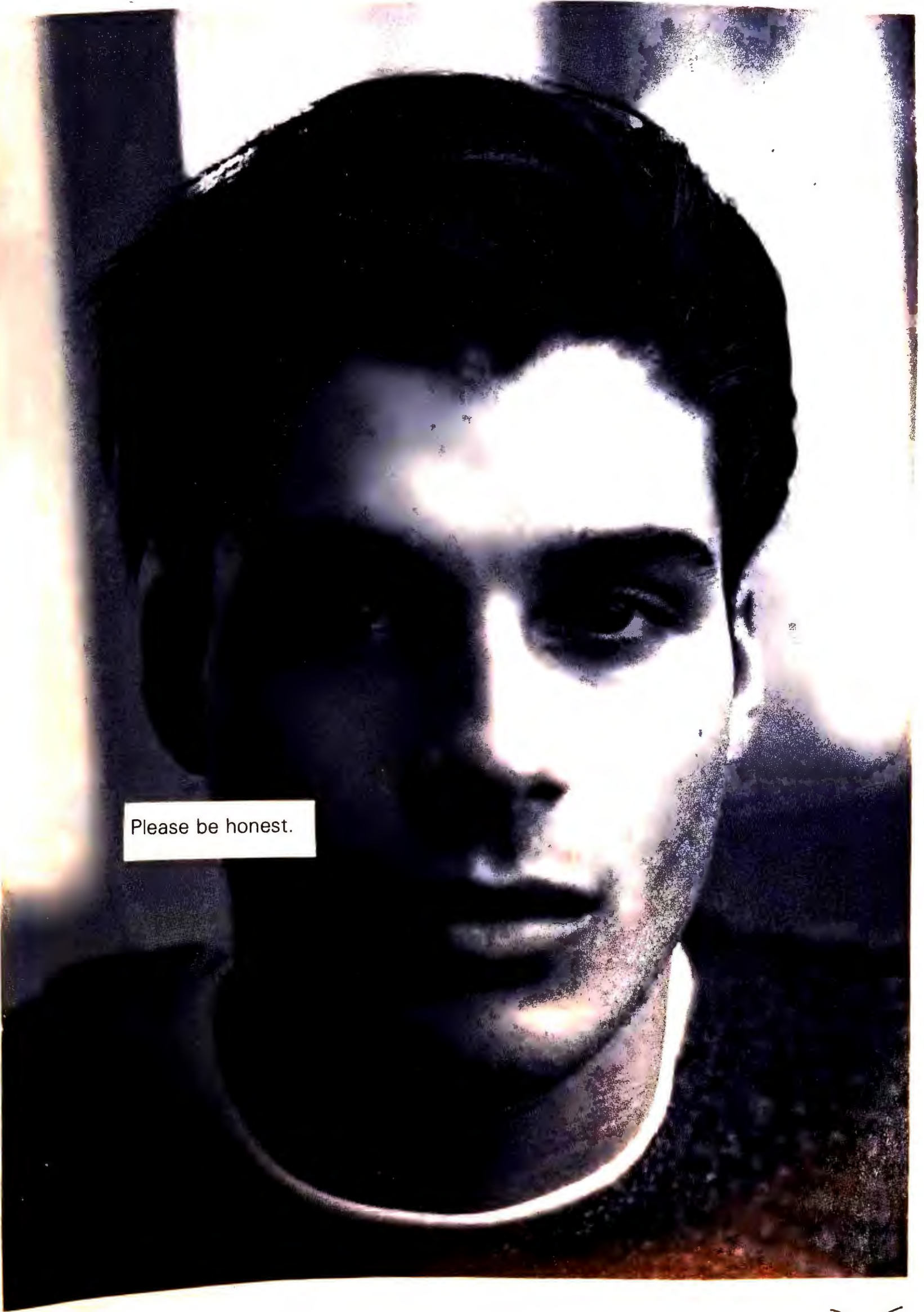
We'll answer any questions you may still have about CD-ROM. And (this is the best part) you'll actually get to have an honest conversation for a change.

NEC

Circle 187 on reader service card



Don't lie to me.



Please be honest.

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PC WORLD

LOTUS EDITION



Lotus: Get the Most From the Lotus Suite

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When a job requires more than 1-2-3, Lotus's other Windows applications stand ready to help—if you know how to approach them correctly. Here are some tips to get more mileage out of SmartSuite.

118-L10 1-2-3 Database Management Made Easy

Get acquainted with release 4.x for Windows' friendly Data Query Assistant, which dramatically simplifies database work. Working through dialog boxes makes acquiring information a snap.

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Cover photograph by Stan Musilek, digital composition by TX Unlimited/San Francisco

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“ZEOS[®] lowest price for power.”

-PC World, February 1994



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

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**CONS:
None.”**

-PC World, Feb 94



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- 486DX-33**\$1395
Lease \$59/month
- 486DX2-50**\$1495
Lease \$63/month
- 486DX2-66**\$1595
Lease \$58/month
- 486DX4-75**\$1795
Lease \$65/month
- 486DX4-100**\$1995
Lease \$72/month

- Intel Verified: for the Pentium™ OverDrive™ Processor
- 2MB high-speed RAM
- 107MB local bus hard drive w/32K cache
- 3.5" 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
- MS-DOS 6.2 w/Tools

PACKAGE 2

- 486SX-25**\$1395
Lease \$59/month
- 486DX-33**\$1595
Lease \$58/month
- 486DX2-50**\$1695
Lease \$61/month
- 486DX2-66**\$1795
Lease \$65/month
- 486DX4-75**\$1995
Lease \$72/month
- 486DX4-100**\$2195
Lease \$79/month

- Intel Verified: for the Pentium™ OverDrive™ Processor
- 4MB high-speed RAM
- 214MB local bus hard drive w/32K cache
- 3.5" 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
- Microsoft Mouse
- MS-DOS 6.2 w/Tools, Windows for Workgroups 3.11

PACKAGE 3

- 486SX-25**\$1795
Lease \$65/month
- 486DX-33**\$1995
Lease \$72/month
- 486DX2-50**\$2095
Lease \$76/month
- 486DX2-66**\$2195
Lease \$79/month
- 486DX4-75**\$2395
Lease \$87/month
- 486DX4-100**\$2595
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- Two VESA local bus, five 16-bit and one 8-bit expansion slots
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- Microsoft Mouse
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Lease \$87/month
- 486DX2-50**\$2495
Lease \$90/month
- 486DX2-66**\$2595
Lease \$94/month
- 486DX4-75**\$2795
Lease \$101/month
- 486DX4-100**\$2995
Lease \$108/month

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- 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
- Microsoft Mouse
- MS-DOS 6.2 w/Tools, Windows for Workgroups 3.11
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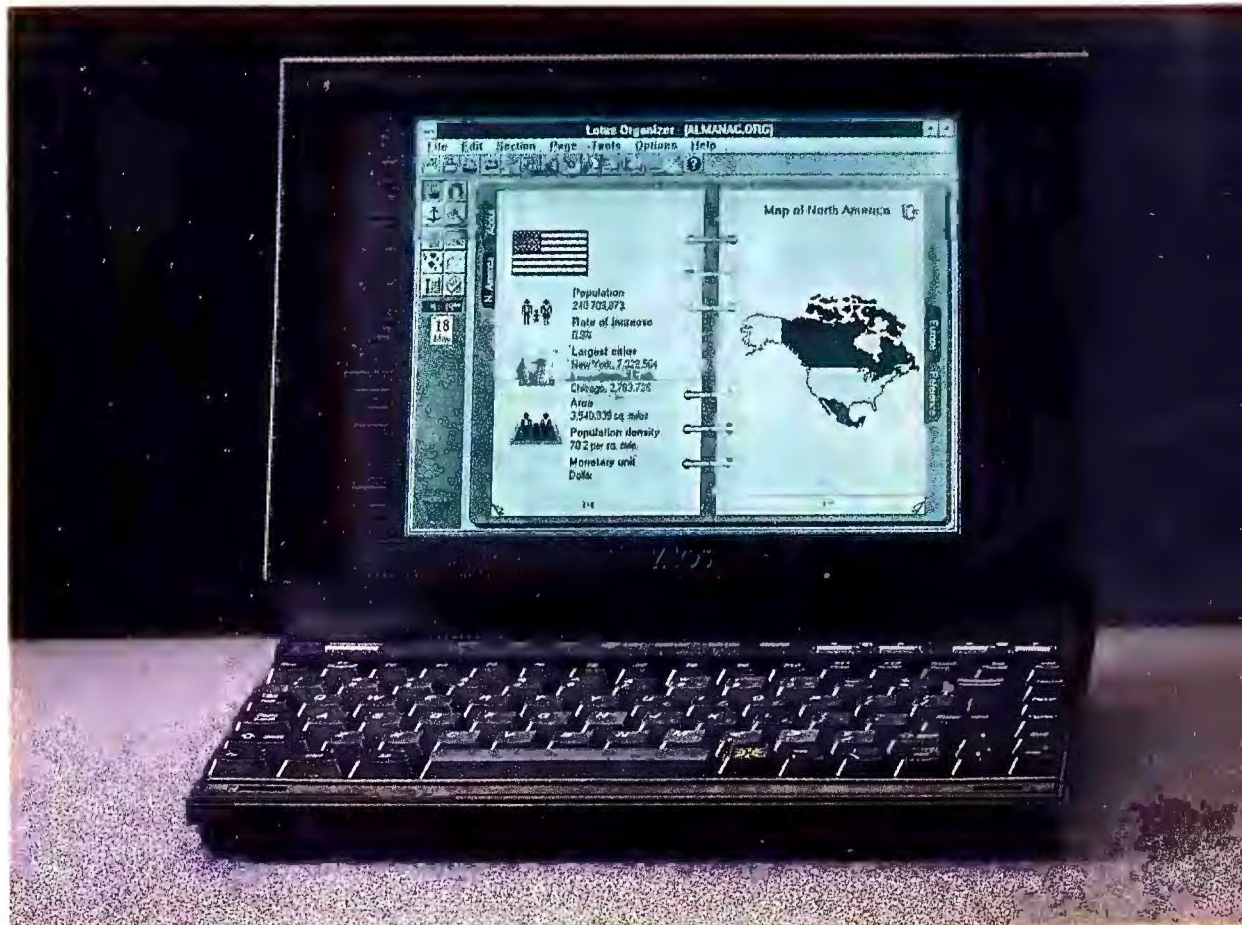
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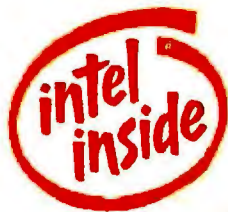
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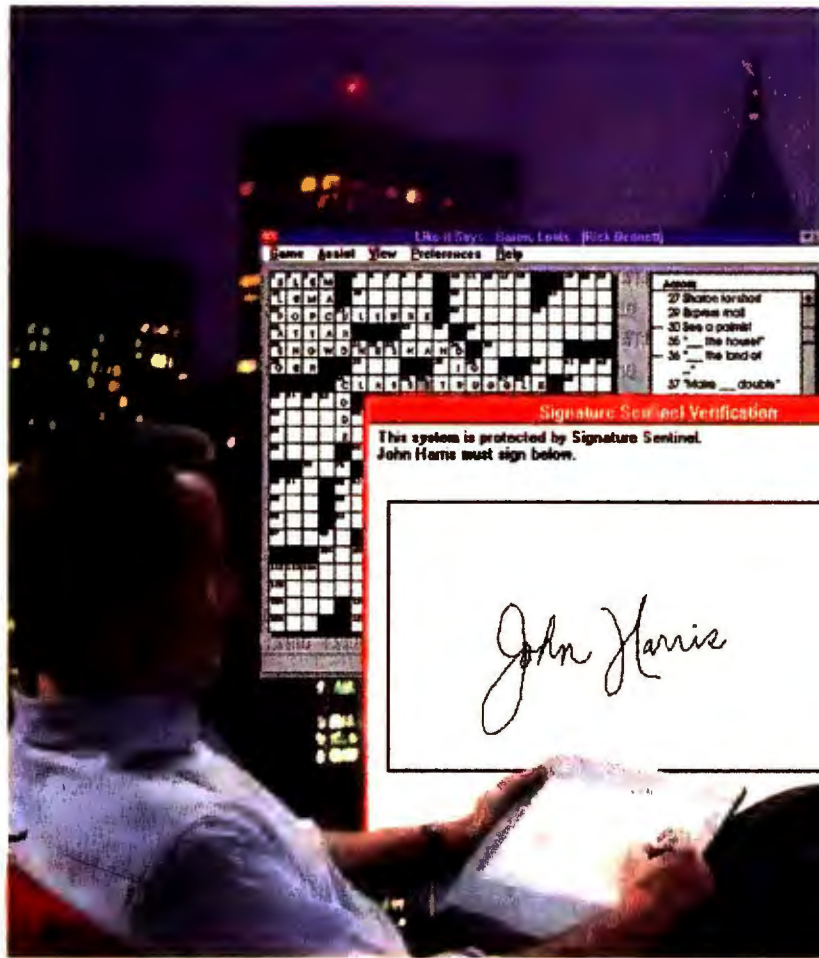
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The DX4: Harbinger of Pentiums for Peanuts



Intel's new DX4 processor brings Pentium-class performance to PCs that will cost about \$500 less than comparably equipped Pentium systems. The lead

story in this month's *Top of the News* shows how the DX4—a new version of the 486 that doubles cache size and speeds up the processor's internal clock—actually performs in the first desktop and mobile PCs to exploit it.

The advent of the DX4 raises several questions and reveals much about what PC buyers can expect for the balance of 1994 and 1995. Questions include: Why didn't Intel simply cut Pentium prices to deliver the same price/performance? If the DX4 is as fast as a 60-MHz Pentium for most purposes, won't the Pentium now lose the mystique that Intel has built around it? If a new version of the 486 achieves Pentium performance for less, why all the fuss about Pentium in the first place? Understanding Intel's motives should help reduce confusion about the proliferation of processor and system choices.

Why the DX4?

The rationale for the DX4 rests not on technology but on Intel's need to fend off rapidly mounting competition. Watching Intel's profits soar while their own are squeezed or vanish, major PC companies have decided to strike back. IBM alone has retaliated on several fronts: relinquishing rights to manufacture the Pentium and announcing its intention to make more of its own 486s under license from Intel; agreeing to manufacture 486-compatible chips for Cyrix; moving into volume production on its PowerPC joint venture with Apple and Motorola; and continuing to push its Blue Lightning chip and other variants of Intel designs. Compaq

stunned the industry by agreeing to use AMD's 486 compatibles in large volume for the first time, breaking a taboo against use of non-Intel processors by major players. Digital Equipment agreed to manufacture 486 compatibles for AMD at a plant in Scotland.

Add to all this Intel's recent setbacks in litigation to restrain competitors, highlighted by the payment of a multi-million-dollar settlement to Cyrix, and suddenly all the major barriers that have kept many PC companies from buying AMD or Cyrix chips are gone. Intel's opponents now have fewer legal battles to fight, deeper pockets for legal fees, and, perhaps

most important, dramatically increased manufacturing capacity. Cyrix and AMD can fill large orders that Cyrix in particular has been unable to bid on. Moreover, Cyrix and AMD have new, higher-performance chips in the wings.

The DX4 is the beginning of Intel's counterthrust: Fill every socket at such attractive prices that no new competitor can prosper. For the rest of 1994, a family of new Pentiums will strive to fend off RISC-based PCs at the high end until Pentium's successor arrives, years earlier than planned, before the end of 1995. In the second half of 1994, Intel expects entry-level Pentium systems priced at \$2500, DX4s at \$2000, and DX2-66s at \$1500. It doesn't take a genius to see that 486SX-33 prices will plunge still further, or that Intel's forthcoming low-end SX2 could push consumer computing down toward VCR price levels. In short, we'll be buying Pentiums for peanuts sooner than anyone dreamed and buying 486 compatibles at fast-food prices.

The proliferation of new processors heightens the value of *PC World's* new approach to PC reviews—the PC World Top 20. More than ever, you need comparisons of systems using different

processors. The monthly updates of the PC World Top 20 will quickly show you where DX4 systems fit into the spectrum of price, performance, and value.

Top 20 Mobile PCs: 10 Power, 10 Budget

This issue inaugurates the PC World Top 20 Mobile PCs. The Top 10 Power Mobile PCs, headed by IBM's ThinkPad 750C and Toshiba's T4700CT, are dominated by systems based on the

In the second half of 1994, Intel expects entry-level Pentiums priced at \$2500, DX4s at \$2000, and DX2-66s at \$1500.

486SL and 486DX2-50. PC World Test Center's benchmarks of the forthcoming TI TravelMate 4000E, presented in *Top of the News*, make it clear that DX4s will quickly become performance leaders among mobile PCs. Expect at least one DX4 to break into the Top 20 in May.

How Suite Is It?

Five strong applications come in Lotus's SmartSuite for Windows, but each has its own way of going about business. You can get them to share data in the proper format and even swap tools between applications, but it takes considerable work to get them really working together. In "20 Tricks for Suite Teamwork," Associate Editor Andrea Powers guides you through the suite labyrinth. And we're kicking off *Model of the Month*, a new department that offers a simple, practical 1-2-3 model or utility. In this go-around, you'll find a way to compare the costs of leasing a car versus buying.

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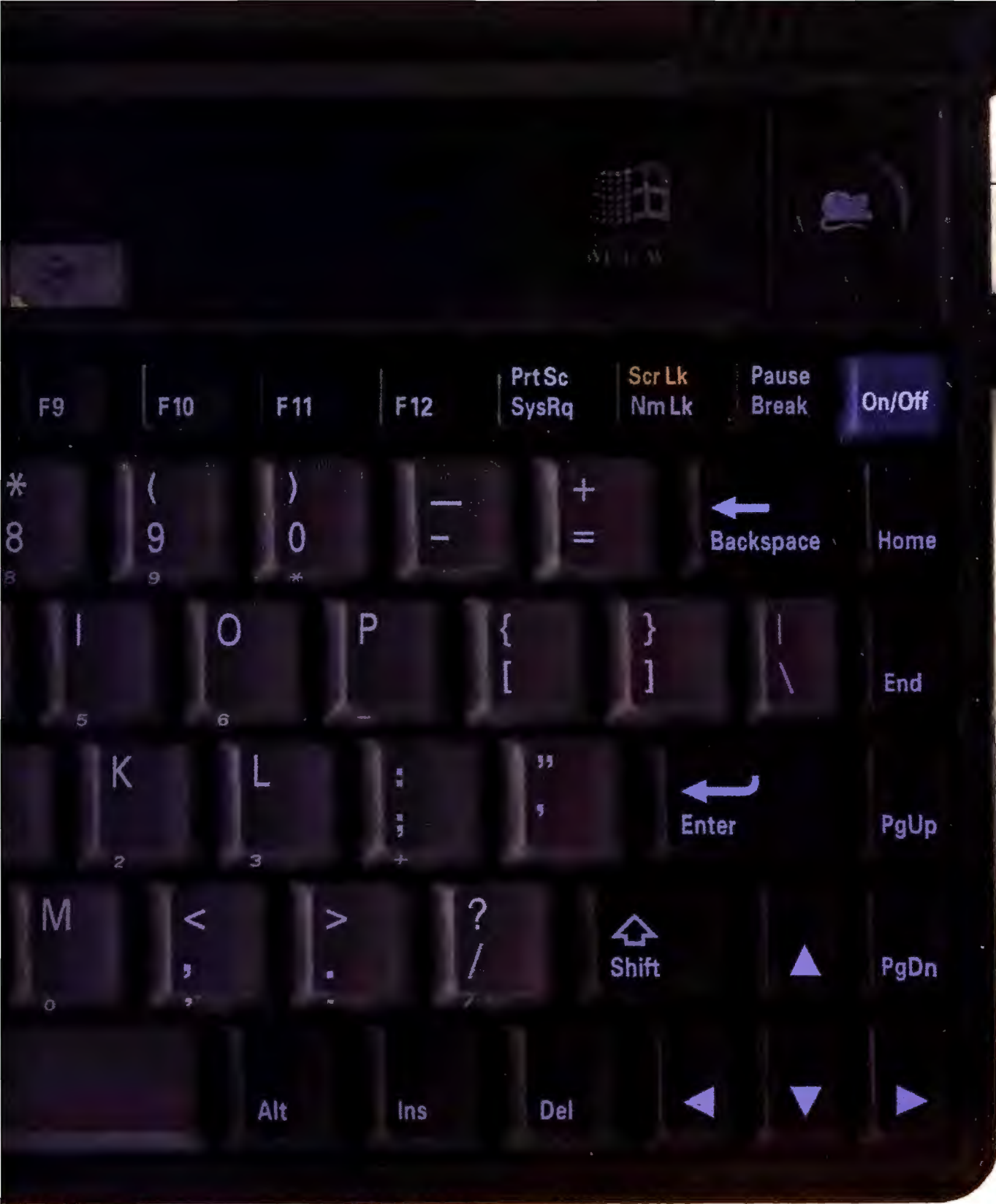


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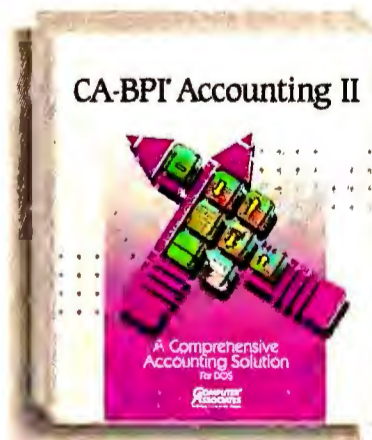
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Circle 39 on reader service card

DOS Trailblazer, Why Johnny Can't Click, Debunking Straw Polls

Undersold DOS

In "DOS vs. DOS vs. DOS" [January 1994], Brett Glass's sidebar says "many incompatibilities I found in Novell DOS turned out to be intentional." Come on, now, be fair: Novell isn't responsible for those incompatibilities, Microsoft is. DR DOS (now Novell DOS) introduced memory management and included MOVE, XDEL, and RENDIR long before Microsoft bothered to add such useful features. I've used it for two years because of its richer command and feature sets.

The computer press has never portrayed DR DOS fairly. DR DOS's use of memory management was ignored, but once Microsoft incorporated memory management into its operating system, it was called indispensable. When DR DOS 6 added numerous tools, including disk compression, it was described as "DOS with a bunch of utilities you could get elsewhere." When MS-DOS 6.0 included those tools, it was touted as a "smart upgrade."

Now Novell DOS 7 is once again being underplayed by the press, despite its multitasking capabilities. I expect that when Microsoft gets around to adding preemptive multitasking, computer publications will suddenly bill that feature as indispensable.

Jeff Clinard, Internet

The Shell That Would Not Die

January's "DOS vs. DOS vs. DOS" says that MS-DOS 6.2 does not have the DOS Shell. I use this shell extensively, and I recently upgraded from 5.0 to 6.2. I didn't specify during installation to keep the shell, and I deleted OLDDOS. Not only do I still have the shell, but my personalized menu structure remains intact. If 6.2 doesn't have DOSSHELL, how is this possible?

Mark Maisonnewe, Internet

Editor's response: The MS-DOS 6.2 installation program copies everything in your DOS directory to an OLDDOS

directory to be uninstalled. However, some files from your earlier version of DOS remain in the DOS directory. The DOSSHELL files are among these.
—*Lincoln Spector*

OS/2 Redemption

I have been badly burned by Microsoft. I no longer trust anything that the people in Redmond claim or promise. I lost six months' work in one case and two months' in another because Microsoft's software and operating systems weren't ready for prime time.

If you folks had not included the OS/2 section in the January issue of *PC World*, I would not have renewed my subscription. OS/2 works nicely with my DOS software and other stuff. It's a joy to see help for OS/2 users in your fine publication.

Richard B. Greenfield, Boston

Borrowed Strategies

January's *Consumer Watch* raves about how CDs let you try software on for size as if that were a new concept. Shareware authors have sold their software successfully for years using this marketing method. This move by the big commercial houses is nothing new—it's simply a strategy to move in on the shareware market.

Andrew Rawls, Anchorage, Alaska

Quicken Keeps the Sequence

January's "Sound Investments: Personal Finance Software" states that "three-to-a-sheet laser checks allow you to print checks only in multiples of three, so if you use them, resign yourself to an incomplete number sequence

in your check register when you destroy the odd-number check."

Quicken for Windows 3.0 lets you print in multiples of one, two, or three (three is the default). All you need to do is click the appropriate number on the check-printing screen.

*Peter H. Johnson,
Billerica, Massachusetts*



Backing the Underdog

In response to your January review of personal finance software: My choice is the package you rated lowest—MoneyCounts for Windows 1.0a—even though it's quite slow at certain operations, such as file backup. I never studied accounting, but I find MoneyCounts very easy to use. I use it strictly for tracking personal expenses.

I never use transaction forms; instead I use the registers for all entries. Regardless of the software, if enough explicit categories (income, asset, liability, checking, and expense) are not used, one is likely to end up with large blocks of expenditures that are not sufficiently accounted for. In MoneyCounts I use 10 income, 3 checking, 1 savings, 9 liability, 12 asset, and 107 expense-account listings. To do that with Quicken or CA-Simply Money would be difficult and perhaps not even practical.

*Robert N. Bachelder,
Myrtle Creek, Oregon*

Reading, Writing, and Number Crunching

Thanks for the article that discussed recycling computers by giving them to public schools [*Consumer Watch*, December]—but frankly, schools don't want your used XTs, 286s, Commodores, or TRS 80s. Schools need the same machines you need, and for the same reasons.

The teachers at our high schools don't have enough time with students, nor access to all the up-to-date technology we need in

order to teach them. Your donations would have instructors teaching Lotus 1A and other old favorites. Maybe they should also run CP/M? Memorable products to be sure, but hardly the tools that will make today's students employable.

Let me suggest to *PC World* readers that the next time you purchase a 486 system for your business, consider buying another 486, along with the same software, for your local school. When you have a training session to

show your staff how to use the new software and hardware, you might want to invite someone from the school's teaching staff to attend. Or you could even send a trained employee of your company to the school for a day to help students and teachers learn the new skills.

Tax benefits apply to donating new (as well as used) hardware and software. Students will benefit, and so will the businesses that eventually will employ them.

Bob Vrbka, Seward, Nebraska

That's About the Size of It

Maybe I can clear up some of the confusion about monitor screen sizes ["Glar-ing Deficiency," *Letters*, January].

Originally, all cathode-ray tubes were round. They were measured by the outside diameter of the tube. The television sets of the time masked off the top and bottom and sometimes the sides of the tube to show a picture that was approximately rectangular. About 1948, rectangular-face tubes were developed. To compare the rectangular-tube sizes to the old round-tube sizes, the industry specified the diagonal measurement of the tube as its size. This then became the standard way of describing tube sizes and eventually computer monitor sizes.

For today's consumer, using the maximum visible horizontal length of the monitor screen as a measure makes much more sense than using the outside diagonal of the CRT. This method also makes more sense when comparing the sizes of CRT monitors with those of today's liquid-crystal flat monitor displays.

Marshall Byer, Vista, California

World Class Cop-Out

Your December World Class Awards ["Top 200 Products"] were a cop-out. People don't want a popularity poll, they want expert opinions. Look what happens with a poll—the top five laser printers are all Hewlett-Packards, and the top five monitors are all NECs. The poll actually measures marketing success. People vote for what they use—they don't have ten printers to compare.

Next year, offer some real meat. But if you insist on using the bean-counting method, at least give us some expert opinion on the winners rather than quoting

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all those Joe Blows. If we wanted their opinions, we could ask our colleagues and skip buying the magazine.

*Bob Evans,
Saint Thomas, Ontario, Canada*

Where's the Beef?

When I see a "grabber" on *PC World's* cover, such as December's "10 Hottest Products for 1994," I immediately look through the table of contents to locate the article. The December table of contents has no mention of any such article. I suppose that this means the feature is buried in some other article, and I have to find it. Well, I haven't so far. This is not user friendly; this is user surly.

J. R. Cairns, Dearborn Heights, Michigan

Editor's response: Cover lines usually highlight whatever a magazine's editors and publishers deem most exciting, whether it's a whole article or part of one. In this case, the cover line referred to the sidebar on page 157, "Looking Ahead: The World Class Winners of Tomorrow." Sorry it was so difficult to find.

Here's How to Make a Profit

I subscribe to *PC World* primarily for the *Here's How* section—I cut it out of the magazine in case I need certain hints or tips later. But when you pile up how-to's from three computer magazines, you amass a lot of paper, and searching through it is tedious.

I have a suggestion that not only will help me but will provide additional revenue for you. At the end of a year, why not beat your competitors to the punch and compile all the how-to's into an indexed book? This would be a cost-effective way to offer readers an extremely valuable resource.

Hale K. Darling, Waukegan, Illinois

Editor's response: Hmmm, we'll have to give this some thought. In the meantime, you can order our 1993 index for a small fee (see page 248, February). For a searchable reference, consider copying each month's how-to files from *PC World Online* on America Online or CompuServe.

Corrections and Clarifications

We printed an incorrect phone number for Zeos Int'l in February's "The PC World

Top 20." The correct phone numbers are 800/554-5220 and 612/633-4591 (sales).

In February's "The Best of Business Shareware," we listed an incorrect number and name for the BBS we called Fedlinx ALIX II. The correct name is Fedlink ALIX II, and the phone number is 202/707-4888 (2400 bps). *PC World* regrets the errors.

PC World welcomes your responses and ideas. See page 12 for contact information. ■

POWER TIP no. 298

Edit a Quattro Pro Block Name

In *Quattro Pro* for DOS, when you press <F2> to edit a formula containing a block name, the block name on the input line changes to the current cell reference. If you need to work with the block name, just press <F4> while still in edit mode.

**Jim Roberts
Wyandotte, Michigan**

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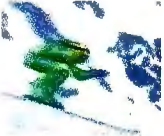
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PC Week November 1, 1993 page 21. Winstone 94 measures overall system performance, using one script for each 12 popular Windows applications. It computes the amount of time each script takes to finish, and uses those times to produce an overall score. Timed results are weighted based on the relative market share of each 12 applications.

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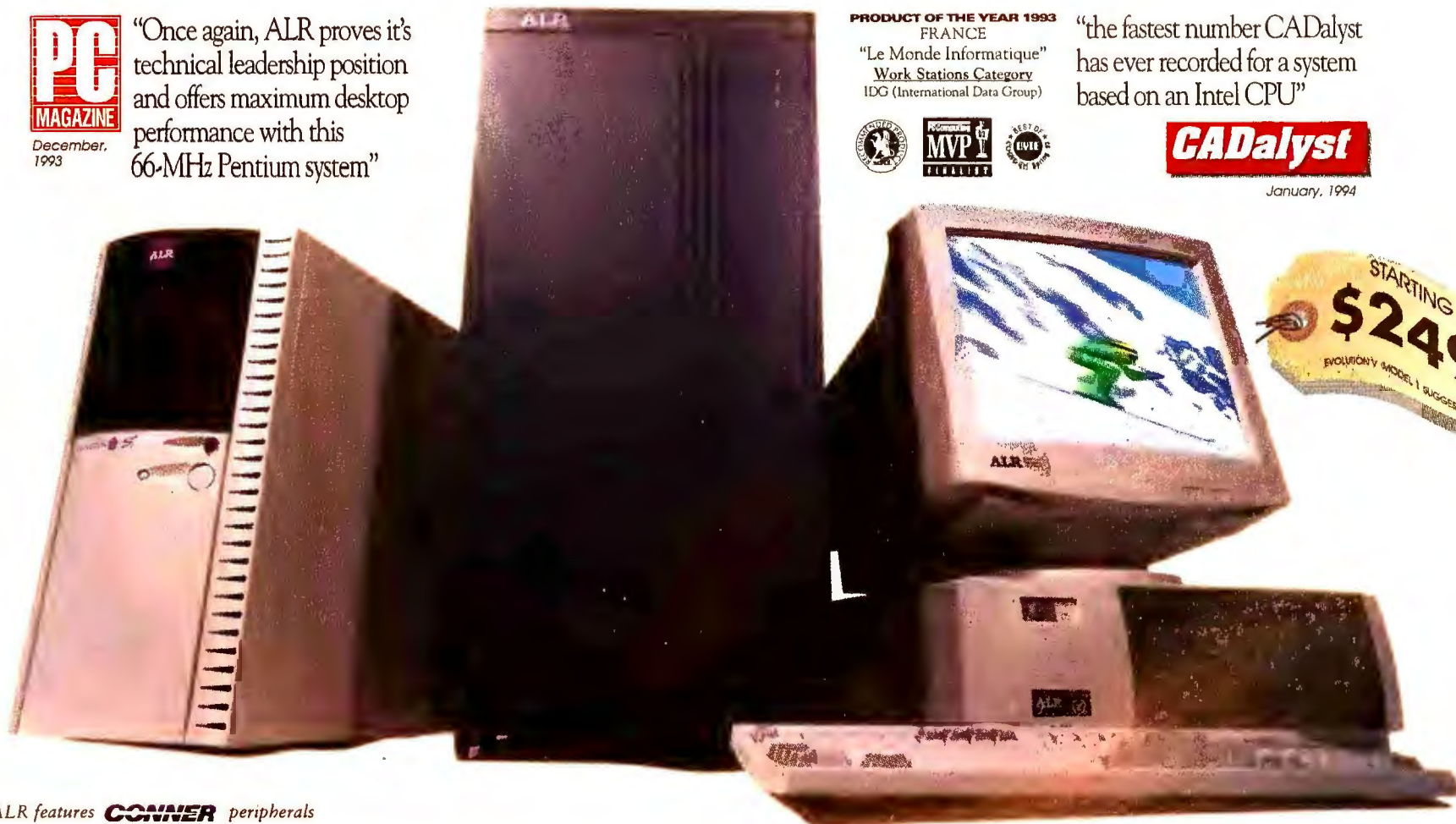
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Shipping Delays, Tech Support Problems Frustrate Customers



Whenever a new personal computer company appears on the scene, *Consumer Watch* gets calls from buyers looking for information about the newcomer. That

was certainly the case with one of the newest kids on the block—MediAge, a Walnut, California, mail-order firm that sells PCs under the Professional Technologies and Opusis brand names. Here's one of the letters we received, together with the information we gathered about the firm.

Order Snafus

In mid-November I ordered a multimedia computer system from MediAge that was advertised in several magazines. After placing the order, I decided I wanted to increase the hard drive size and have a fax-modem installed. At the same time, I changed my order from cash to a credit card since it was more convenient. I was told it would take some time to make the changes, and that the system would be shipped after Thanksgiving.

I called the company at the end of November and was told the system wasn't ready yet, but that I would be notified when it was ready for sending. At the end of December, the computer was delivered by United Parcel Service (UPS). But the price on the packing slip was different from what I was supposed to pay (\$1479 instead of \$1729), and it didn't seem to be my system. Also, the UPS delivery person said I had to pay in cash. When I called MediAge, the person I spoke with said I should send the system back and that the correct system wouldn't be delivered to me for a few weeks.

I'm sure there are good reasons why it

took two months to supply the ordered system, why the price of the first system was different than what I ordered, and why I had to pay by cash instead of credit card. But the situation does not look encouraging, and if I had anticipated this I would never have ordered the system from this company.

Alex Evako, Syracuse, New York

Editor's note: To get more information about this new company and clear up questions surrounding outstanding customer orders, we spoke with Richard Mabry, director of marketing for MediAge, and Charles Huang, director of operations for Digitech Research. Here's what we found out.

MediAge is a division of Digitech Research, and both are located in Walnut, California. The company sells systems manufactured by Solomon Technologies and Digitech. MediAge handles all advertising, sales, and support.

One of the first things we discovered when researching these consumer queries is that MediAge is extremely

difficult to reach. We called numerous times in late January and encountered repeated busy signals. According to Mabry, MediAge is adding additional phone lines, including a separate technical support line that was expected to be operational in February.

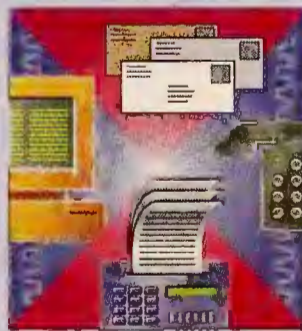
The problems getting through, as well as many of the problems customers encountered late last year and early this year, were the result of a dramatic increase in sales the company experienced after placing ads in national magazines, according to Mabry.

"In October and November we had only a small amount of credit card sales," says Mabry. Then, after the advertisements hit, the firm charged a total of \$1.2 million in sales in ten days. At the time, MediAge was processing credit card sales using Digitech's authorization privileges, which were limited to retail sales. The sudden increase in sales worried the company's credit card bank, which stated it couldn't process any more charges and froze the compa-

Times are tough online, report users of America Online. The Vienna, Virginia, firm went on an aggressive marketing campaign last fall to get new subscribers, and succeeded in doubling its user base. The problem? The equipment can't keep up with the heavy traffic. Users report difficulties logging on during peak use hours

and slow performance, with the system taking as long as a minute to update after they type in messages. AOL is aware of the problem and says it should have the new equipment and software in place to correct the problems by the end of April... Businesses with a heavy investment in Microsoft software might want to consider the company's TechNet CD, which includes utilities, patches, training materials, and other resources

KEEPING UP



on a range of Microsoft products. Single user licenses for a year's worth of monthly CD updates and quarterly drivers and patches are \$295; a server license (for unlimited users) costs \$695 a year. Both come with a 90-day money-back guarantee (800/344-2121 ext. 561, orders)...

Wondering how to pay for your child's college education? Well, Electronic Arts and several affiliated companies are sponsoring a contest in which kids ages 3 to 14 write about their ideas for a computer game. The grand prize winner from each of two age groups (3 to 7, 8 to 14) gets a \$25,000 scholarship to the college of his or her choice. To obtain an entry form, write to: Electronic Arts, College Scholarship, 1450 Fashion Island Blvd., San Mateo, CA 94404.

By Roberta Furger

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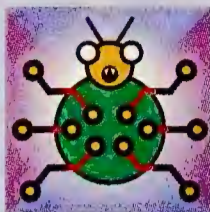


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BUG WATCH



Quattro Pro 5.0 for Windows

A beheading by Borland? Users report that when they print spreadsheets with headers to a laser printer, only those

characters that appear in both the header and the spreadsheet will print in the header. A Borland spokesperson said the problem occurs only under specific memory and BIOS conditions and is a high-priority fix for the company. In the meantime, Borland suggests entering and printing the header from a spreadsheet cell.

Borland Technical Support
800/524-8420 (automated), 800/822-4269 (fax)

Norton Desktop 3.0 for Windows

You may experience random lockups, reboots, or drops to the C> prompt if you've enabled expanded memory. Norton repre-

sentatives say the cause may be a conflict between the Norton Anti-Virus TSR program and another driver or TSR. They suggest disabling expanded memory. Norton also recommends the following for efficient use of the program: When running Windows for Workgroups 3.11, make sure 32-bit file access is disabled; otherwise the Windows versions of Norton Disk Doctor, Speed Disk, and SmartErase may not work. When using Norton's FileAssist feature to save Word for Windows 6.0 documents, be sure to select the necessary filters before hitting the OK button. If you don't, files may not be saved in the specified format.

Symantec Technical Support
503/465-8420

—Sarah Klein

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.

Sarah Klein is an editorial intern for PC World.

ny's account, preventing the firm from issuing further credits to customers. The only way for customers to obtain credit for returns was to file a request with their own banks to charge the amounts back to MediAge, delaying the process considerably. MediAge has since obtained a different credit card bank.

Where's the Technical Support?

In *PC World's* glowing review of the Comtrade EISA VL-Bus Professional 66 (see "PCs for the Power Hungry: Pentiums vs. 486DX2-66s," January 1994), you stated that Comtrade has "responsive, toll-free tech support 12 hours a day, six days a week." My experience with that company paints a completely different picture.

I purchased a Comtrade in August 1993. From the time I bought the system, getting through to Comtrade's technical support number was just about impossible. Dialing the company's toll-free number countless times, I almost always got either a recording requesting my name and phone number, a recording instructing me to call back, or a busy signal. Leaving my name and number was fruitless—no one from Comtrade's technical support staff ever responded to

any of my messages. Of the many times I called, I reached a person only twice, and only once did I get an answer to my hardware problem.

After reading your review, I decided to see if things had improved at Comtrade. I called the tech support department every five minutes for two hours between 9 a.m. and 5 p.m. The next day I called every five minutes for two different hour-long periods. In all, I made about 50 calls in two days. The result? Without exception, all I got was a busy signal.

Jerrold Kaufman, Flushing, New York

Editor's note: According to our reviewers, our research calls last September got through to Comtrade technicians as reported. By the time the review hit newsstands in mid-December, however, numerous readers had faxed back our monthly *Service and Support Monitor* to complain about Comtrade's unresponsiveness. As a result, we downgraded Comtrade's ongoing support score in subsequent reviews.

We've also received a handful of letters about the problems with Comtrade's support, and we've forwarded those along to the company for a response. As of press time, we haven't heard back.

THIS PRESENTATION MAY BE TOO GRAPHIC FOR POWERPOINT AND HARVARD GRAPHICS.



Software Digest
July 1993

Freelance Graphics 2.0 ★★★★★
PowerPoint 3.0 ★★★
Harvard Graphics 1.03 ★★



Computer Reseller News
January 1994

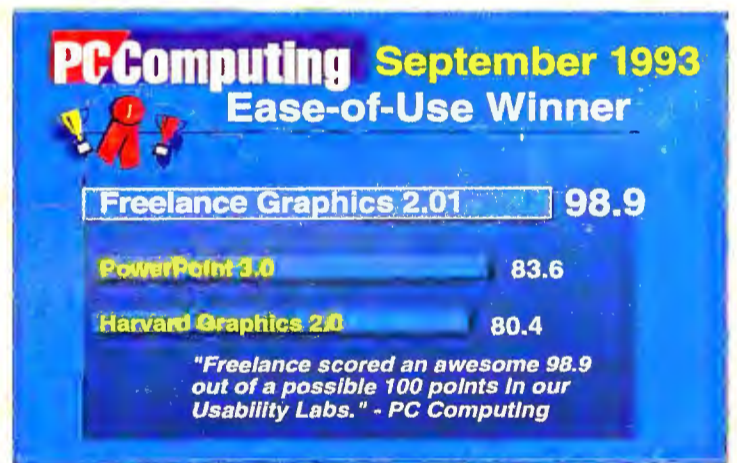
"As for Freelance Graphics... Lotus has little to fear [from PowerPoint 4.0]."



PC WORLD
December 1993

Winner, World Class Award
Presentation Graphics:
Freelance Graphics 2.01

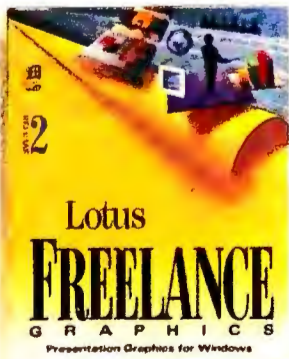
"Freelance is much easier to use [than Harvard], and sexier than anything I run."
- Amy Wohl



PC Computing September 1993
Ease-of-Use Winner

Freelance Graphics 2.01	98.9
PowerPoint 3.0	83.6
Harvard Graphics 2.0	80.4

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Still a Best Buy Without the ATI?

In your December 1993 issue you awarded a Best Buy to the Ambra D466BL. I was particularly interested in the article since I am in the market for my first computer. When I tried to purchase that computer the saleswoman told me the article was wrong. She said Ambra could not sell the D466BL for \$1979 (the price listed in the article) because *PC World* had added the ATI VLB Mach 32 card with two megabytes of RAM, and the card alone costs \$400. I called back again and was told by another salesperson that the \$1979 price listed in *PC World* did not include a monitor. (I am a neophyte with computers, but how do you evaluate a computer system without a monitor?) When I called a third time I was told again that the ATI board was listed in error and would cost an additional \$199. I was also told that Windows for Workgroups does not come with the system.

I wonder how many other readers attempted to purchase this system based on your Best Buy evaluation. I also wonder if the D466BL would have been your pick as Best Buy if Ambra had sent the system with different components.

Frank Mirigliano,
Fort Lauderdale, Florida

Editor's note: You weren't the only person to ask about the pricing and configuration confusion surrounding Ambra's D466BL. According to Craig Conrad, Ambra's director of marketing communications, the questions were the result of confusion about the exact system sent to *PC World* for review.

Ambra shipped *PC World* one of the first available D466BL units just after the new company debuted last August. What *PC World* received, however, was a demonstration unit, which included both the ATI card and Windows for Workgroups—items that were not part of the standard configuration Ambra would eventually sell. When *PC World* contacted Ambra to verify pricing and configuration, Ambra officials "did not note the difference in configuration," according to Conrad—hence the discrepancy between the unit's published and actual price. (The mention of Windows for Workgroups as part of the standard configuration was *PC World's* error.)

Ambra has contracted with Insight Development to handle all sales calls, according to Conrad, who says he informed the sales

The Apple Report On PowerPC

NUMBER 3 — APPLICATIONS ACCELERATED FOR POWERPC

If you buy a Macintosh today, can you upgrade it tomorrow? In many cases, yes. Just look for the "Ready for PowerPC upgrade" sticker on the box.

On average, a Macintosh with PowerPC technology achieves two to four times the performance of 68040 and 80486 machines running the same programs.

If you use applications that do floating-point mathematical calculations, your performance levels could be up to ten times those of the same program running on a 68040 machine — and several times faster than the fastest Pentium system — based computers.

A Macintosh with PowerPC offers unprecedented compatibility between Macintosh, MS-DOS and Windows, thanks to an emulation program called SoftWindows, which licenses Windows code from Microsoft.

For more information about Macintosh with PowerPC, call 1-800-732-3131, ext. 150. We'll send you a free copy of *PowerPC Technology: The Power Behind the Next Generation of Macintosh Systems*. In Canada, call 1-800-665-2775, ext. 910.

The new family of Macintosh® computers with PowerPC™ chips will run virtually all Macintosh system-based software and most current programs for MS-DOS and Windows operating systems.* So no matter what computing environment you're working in now, you can migrate to a more powerful desktop computer without losing your investment in your current software.

But the real benefit of PowerPC technology will be seen with new applications optimized to take advantage of the chip's advanced capabilities.

These applications, often called native applications, will offer two to four times the performance of programs available for the fastest Macintosh computers today. Developers writing native applications say that these applications perform at levels better than their Windows counterparts running on Intel Pentium system-based computers.

Major developers on board.

Right now, the world's leading developers are updating their most popular and memory-intensive programs to take full advantage of PowerPC technology.

In fact, Apple has been working closely with more than 200 major third-party developers since 1992 to create powerful new versions of their applications.

And since software development kits became widely available in January, hundreds of additional developers have begun the move to PowerPC.

PowerPC technology enables them to incorporate new levels of speed and functionality into their applications for the Macintosh system. Developers everywhere are eager to exploit these new capabilities.



Do more in less time.

What will the advanced capabilities of native applications mean to you? You'll spend significantly less time waiting for your computer to redraw or recalculate or re-anything. That means you'll have more time to create and refine your work, to apply new concepts, to test options.

You can also expect to see new kinds of applications — software that is both more intelligent and easier to use.

Developers will be exploring new features in areas such as intelligent help, 3-D design, video, animation, speech recognition and text-to-speech conversion.

Many of these new functions simply wouldn't be practical without the superior processing capabilities of a RISC chip and innovative Macintosh technology.

Why RISC?

The new generation of Macintosh computers will be the first personal computers with RISC (Reduced Instruction Set Computing) chips — ultra high performance chips that were previously available only in workstations.

(In fact, many workstation developers are now writing applications for the Macintosh platform for the first time.)

RISC chips are smaller and less complex than comparably powered CISC chips, so they cost less to produce — which means that Macintosh computers with PowerPC technology can offer a significant price/performance advantage. But more important, they'll give you an unprecedented

new kind of power.
The power to be your best.®

What programs will be ready?

While a Macintosh with PowerPC technology will run virtually all of your existing Macintosh system-based programs, the real benefit of PowerPC will be with applications optimized to take advantage of the chip's advanced capabilities. More than 50 of these native applications will be available in the first half of 1994. Here are some of them:

ACI 4th Dimension	Frame FrameMaker
Adobe Dimensions	Insignia Solutions SoftWindows
Adobe Illustrator	Microsoft Excel
Adobe Photoshop	Microsoft Word
Adobe Premiere	Specular Infini-D
Aldus FreeHand	Strata StudioPro
Aldus PageMaker	VideoFusion VideoFusion
Alias Sketch!	Virtus WalkThrough
Claris ClarisWorks	Wolfram Mathematica
Fractal Design Painter	WordPerfect WordPerfect



*Adding SoftWindows from Insignia Solutions Inc. lets you run MS-DOS and Windows on Macintosh with PowerPC. Apple will offer some configurations with SoftWindows bundled and ready to run. If you choose a model without SoftWindows, you can purchase the program later and add it then. © 1994 Apple Computer, Inc. All rights reserved. Apple, the Apple logo, Macintosh and "The power to be your best" are registered trademarks of Apple Computer, Inc. PowerPC and the PowerPC logo are trademarks of International Business Machines Corporation, used under license therefrom. MS-DOS is a registered trademark of Microsoft Corporation.



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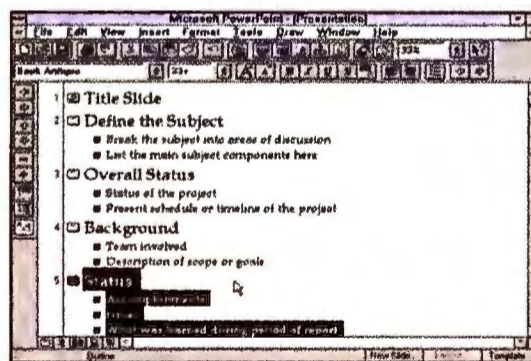
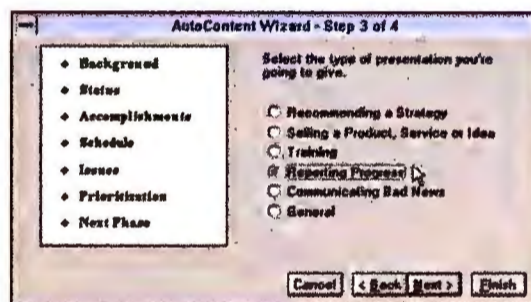
Introducing Microsoft PowerPoint 4.0.

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The fact is, PowerPoint 4.0 is so easy to use, you may already know how. Why? Over 100 PowerPoint tasks are done exactly the same way in Microsoft Excel and Word. And now with OfficeLinks, turn a Word 6.0 document into a presentation in PowerPoint with a click.

All told, new PowerPoint 4.0 makes it easy to give more effective presentations. So you'll once again master the art of show-and-tell. Visit a reseller or to find one near you call (800) 695-2850, Dept. KZ8.



team immediately of the problem with the ATI card. He added that Ambra has changed its procedure for sending out review units to prevent similar problems in the future.

Upgrade Takes a Bite

I operate a small company of 12 employees, and I've bought every upgrade of Intuit's Quicken and QuickPay since they were first released. Quicken has been a big help to

me—the latest Windows version is a real bargain at about \$30.

I'm disappointed, however, that I just had to shell out more than \$40 for a file to calculate withholding for 1994 using QuickPay. If Intuit can sell Quicken for \$30 and Chip-Soft can upgrade TurboTax for \$30, then \$40 for a withholding file is ridiculous.

I must conclude that Intuit figures its regular customers will pay up rather than find another payroll module. I, for one, am will-

ing to replace the whole set with one that lets me edit my own withholding formulas.
Bob Marsh, Fredericksburg, Texas

Editor's note: We contacted Intuit about the pricing question, and spokesperson Catherine L. Mundt told us that the \$39.95 fee for QuickPay's Tax Table Update Service gives far more than a one-time withholding file. "In addition to providing federal and state withholding tables, the service monitors any payroll tax changes that affect the states in which a user has employees," says Mundt. "States can and do change their tax withholdings at any time, and subscribers are automatically sent an update disk at no additional charge if a tax change affects them during the 12-month subscription period. With QuickPay 3.0, the service also includes updated W-2 formats." According to Mundt, other companies charge up to \$129 a year for similar services, and the industry average is about \$70.

Zeos-CompuAdd Union: Service Changes in Store?

With the word that Zeos International is talking with CompuAdd about a possible acquisition (the two companies signed a letter of intent early this year), one question that comes up is what will happen to CompuAdd customers if the union goes through.

Spokespersons for both CompuAdd and Zeos emphasized that the two companies are still in the negotiation stage, so it's too early to talk about specifics. CompuAdd spokesperson John Pope, however, indicated that because the two companies have very different customers, it's possible they will continue to sell the two brands. But Pope offers this assurance for CompuAdd customers: "Whatever form the deal takes, continuity of service and support is the highest priority. You can't build a business without that."

Qualitas Means Quality Service

I would like to comment on the outstanding support offered by Qualitas for its 386MAX version 7.0 program. I recently decided to use a memory manager for my system and settled on 386MAX.

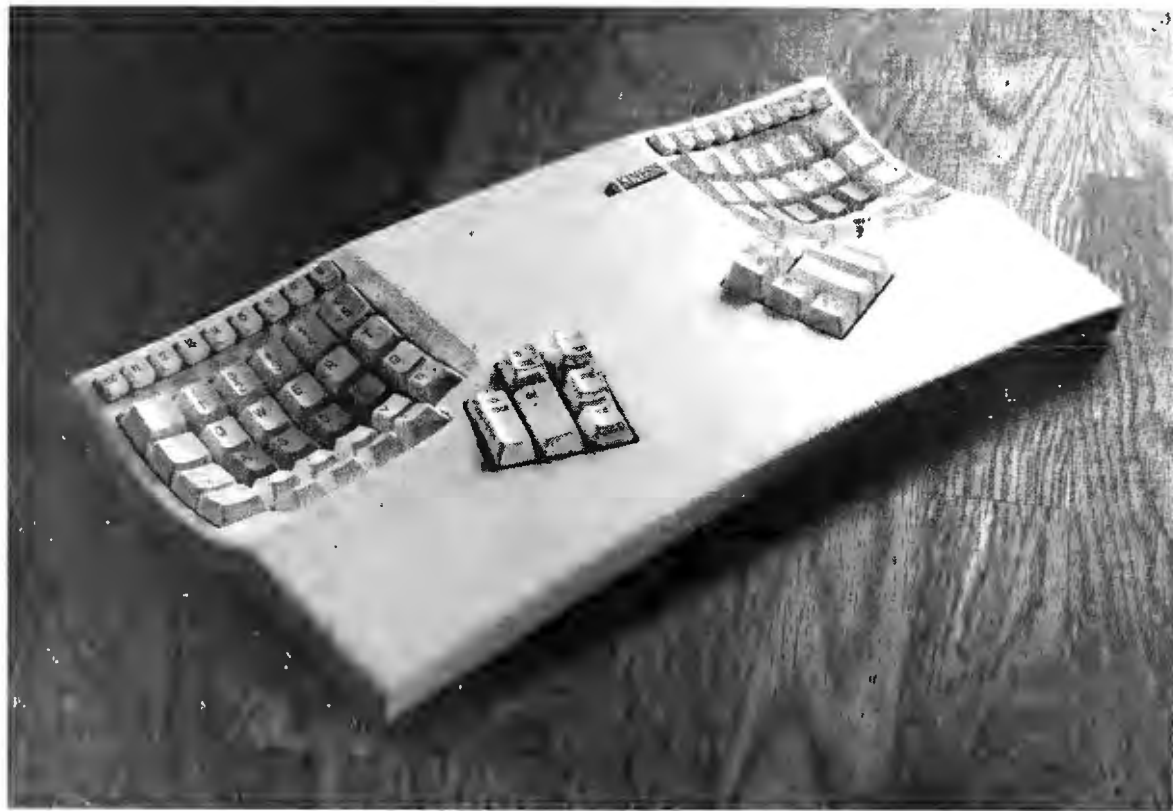
After the installation (which was totally painless), I found that one of my DOS programs wouldn't run. I contacted Qualitas via telephone prior to registering the program. The person I spoke with registered me over

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"Highest user satisfaction ratings of the top 3 Windows spreadsheets"
—Computerworld, Jan. 1994

"Outscores 1-2-3 in performance, ease of learning and use, and quality of output"
—PC Week, Nov. 1993

Breakthrough technology you have to see to believe

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doors to external

databases, and

the Data

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the phone, and I was then connected to a technical representative without any delay. The representative was friendly and extremely knowledgeable, and solved my problem promptly.

I was astonished by all of Qualitas's available routes of support, from fax and telephone service to CompuServe, America Online, MCI messaging, and even the company's own BBS system. Other software companies should take note of Qualitas's

performance and provide the same type of superior support.

Donald Lisk, Kittery, Maine

If It Sounds Too Good to Be True...

I regard the advertisement for CA-Simply Tax in your January and February issues as a scam of the first magnitude.

I was not especially bothered by the ridiculous \$9.95 fee for shipping and handling, although my post office tells me that

the postage cost for the package was probably \$1.05, so the handling charge was, in fact, \$8.90—and it's nonrefundable.

The product Computer Associates sent is worthless. The ad promises a copy of CA-Simply Tax, offering "a complete, hassle-free program." But the product sent is clearly marked as an "early bird" edition that needs to be updated by another "free" edition late in January 1994. The second time, free means that Computer Associates will charge \$3.95 for shipping and handling. Since the postal rates have not increased, how did the company manage to get the handling charges down to \$2.90?

Having been a sucker once, I will not be taken a second time for an updated version, or a third time for a state program (at \$19.95 plus shipping and handling).

*Edmund M. Buras, Jr.,
Silver Spring, Maryland*

Editor's note: Several readers called or wrote to complain that the full-page Computer Associates ad detailing the software offer never stated that the software is an "early bird" version, or that the final version would cost extra. Although it's common practice among tax software developers to ship an early version without final forms, many consumers are unaware of the practice—and have responded angrily when they found out. For example, earlier this year the Massachusetts Department of the Attorney General fined Meca, developer of TaxCut for Windows, for failing to identify its package as a "head start" edition.

When first contacted, Computer Associates seemed unaware of the problem. Hours later, however, a company spokesperson called to say he was "unaware" CA had changed its policy. Everyone responding to the CA-Simply Tax offer will be shipped the final version free of charge. Those who paid the \$3.95 will get refund checks. Customers who responded to the offer after February 1 received the final version of the program.

Roberta Furger is a senior editor at PC World. Research for this column was provided by Sarah Klein, Peggy Nauts, and 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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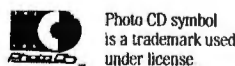


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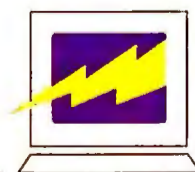


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- 14" SVGA Monitor
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Genesis 486DX-33

- 4 MB RAM, 128 KB L2 Cache
- 212 MB Hard Drive
- 1 MB Local Bus Windows™ Accelerator for 1024x768
- 14" NI SVGA Monitor
- 5 16-bit ISA Slots

Premier 486DX2-50

- 8 MB RAM, 128 KB L2 Cache
- Sony Double-spin CD-ROM Drive
- 425 MB Hard Drive
- Diamond Stealth 32™ VL-Bus Windows Accelerator with 2MB
- 15" NI SVGA Monitor
- 2 VL-Bus and 5 ISA 16-bit Slots
- Softbank "On Hand™" CD-ROM sampler disk

Premier P5-60

- Intel Pentium™ Processor
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First, the good news: Austin Direct just lowered the price of our most popular desktop systems, so you can move up in power and performance for much less than you expect.

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Pick and choose from a complete lineup of Austin computer systems that includes low-priced, high performance 486-based desktops. A blazing Pentium™ processor-powered desktop system, just awarded PC World's "Best Buy" award. An affordable monochrome and dual scan color notebook. And a no-holds-barred color TFT active-matrix notebook, to name but a few.

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Austin 425C

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- 127 MB Hard Drive
- 32-bit Local Bus Video and Windows Accelerator
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Austin 466C

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- 1 MB Video RAM
- Two PCMCIA Slots
- Front-and-center Trackball
- Dual Scan Color Display

Austin 466T

- 486DX2-66 Processor
- 8 MB RAM
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Circle 159 on reader service card

Managing E-Mail Overload

Legend has it Alexander Graham Bell once said he'd never have a telephone in his house. He probably anticipated the disruption that his invention would cause. How would he feel if he saw the modern working world, in which we are slaves not only to the phone but also to E-mail? Besides our work, most of us must answer phones, attend meetings, and read and respond immediately to dozens of E-mail messages. This month Adam Strack, customer and online support manager for U.S. Robotics, a data communications company in Skokie, Illinois, tells us how he got out from under the E-mail pile. —Ed.

Grappling With the Glut

Which is worse, sorting out the bills from the junk mail, or reading and answering your E-mail? Both are time-consuming chores that the majority of us would happily live without. Fortunately, we need to go through our postal mail only once a day. But with E-mail there's always a nagging fear that if we don't go through all of our messages immediately, we'll miss that important note from the boss.

As manager of customer and online support, I receive an average of 65 messages a day. I get urgent mail via Internet, CompuServe, and other bulletin board services from customers as well as from other employees.

Not long ago I was buried alive under this virtual mountain of E-mail. Although many messages were frivolous and didn't require immediate attention, others—such as customer requests for information or clarification of policy—took me 4 to 5 hours a day to answer. A single message could require up to 10 minutes of my time, especially if I had to type a long response or look up information from a database or other source.

I spent a lot of my day in meetings and putting out fires, so I didn't have much time to answer E-mail. As a

result, I was forced to answer most messages from home after work, on cc:Mail Remote. It didn't take long before my 8-hour workday became 14 hours long. That didn't leave me much time to spend with my 3-year-old.

We promise our customers that we will respond within a work week to online questions. Because of the nature of our business, however, some customers want an even quicker response. And the in-house employees expect a snappier response still. If people don't get the answers they need, I'm responsible.

Besides all the customer and employee questions, my boss often uses E-mail to arrange urgent meetings. If something prevents me from reading his notes in time, I can find myself scrambling at the last minute to make it to the meeting.

Taxing the Network

I wasn't the only manager in the company dealing with E-mail overload; others were answering E-mail from home too. This heavy use of remote mail required our already-busy network administrator to install and maintain more resources, such as telephone lines and server hardware.

As the number of users increased, so did the amount of mail on the over-burdened server. Our administrator was always reminding us to delete messages, and he was spending an extra hour a day just to take care of us remote users. (I knew things were getting heavy when he started wearing a pager.)

The situation improved considerably in early 1993, when we got hold of



Adam Strack,
customer and online
support manager for
U.S. Robotics

cc:Mail for Windows version 2.0. (The remote Windows version, cc:Mail Mobile, should be out by the time you read this.) The new version includes a Rules feature—a rare but brilliant idea that, fortunately, more and more E-mail vendors are building into their systems.

In a nutshell, Rules lets me program the mail system to perform tasks if certain events occur, such as if I receive a message from my boss. I simply make a selection from the Rule menu, which has a list of 17 common rules, such as "Archive messages older than February 4th" and "Notify me if I receive a message from the boss." Now when a message arrives, the system checks the sender name and subject heading. If it's my boss sending me mail, my PC sounds a bell.

I've also programmed Rules to let me know if I get a note from any of my other supervisors or from a customer via Internet. In addition to the options that come standard with the program, we've built a few extras to meet our specific

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needs. For example, to keep private messages confidential, we've created a rule to file any correspondence marked private in the manager's mailbox, rather than forwarding it to someone else (such as an administrative assistant).

The Rules-based system also enables me to filter noncritical messages. For example, I know that almost all the messages I receive from the human resources department are about a policy or benefit change, so I created a rule to file those messages into a folder named HR.

I've been able to automate responses that I used to type repeatedly. For example, if a customer wants to return a unit for repair, the E-mail system automatically sends him or her the requirements we need to process the repair order. In this manner, the customer receives an immediate response, and we can repair the unit more quickly. Similarly, if I'm out of the office for an extended period, the system will notify anyone who sends me E-mail that I'm gone, as well as tell them who they should contact in my absence.

The new Rules feature also saved our system administrator's sanity. Because the mail system automatically responds to some messages and files others, managers now have to deal only with the most critical messages, which means they don't use the remote system as much. And instead of storing messages with huge file attachments on the mail server and eating up huge amounts of disk space, the system automatically stores messages larger than 250K on our hard drives. As a result, the system administrator doesn't have to fret about disk space on the server and doesn't send nearly as many reminders to delete old messages.

With Rules-based E-mail I have a life again. I'm usually home from work in time for dinner and I even have time to play with my kid. I also do my job better: If a user has a problem and needs an answer, I can get back to him or her much more quickly. And, as all of us in the business world know, those with the best service and support win.

Edited by Bronwyn Fryer

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

PC Buyer C'mon Down!



Get A Fortune Of Value

PC buyers jump for joy! You're entering the exciting and competitive game of computer buying! We know you want to finish first with high-performance PCs and prize-winning service at the most affordable prices in the industry. It's no contest – with Gateway 2000™ you'll always be the big winner!

The Champ

And here are the stars of our show, Gateway's Pentium™-based systems! Starting from \$2,495 you get stupendous features. New lightning-fast hard drive systems! Screaming new graphics controllers on our two high-end P5 systems! Along with the most powerful Intel® processors available today! And (*drum roll please*) – all this at 486 prices!

Now in all four Gateway 2000 P5 systems, a new PCI/IDE controller allows the hard drive to transfer data *up to twice as fast* as non-PCI-based systems. The PCI/IDE controller is a major enhancement to Gateway's Intel Pentium processor and PCI local bus. Now you can access data faster than ever before!

Our P5-66 and top-of-the-line P5-60 now include high-end graphics controllers. So you can really take advantage of the performance-boosting PCI bus for virtually unbeatable graphics performance! These graphics controllers are also available as an upgrade option for all Gateway's PCI-based systems.

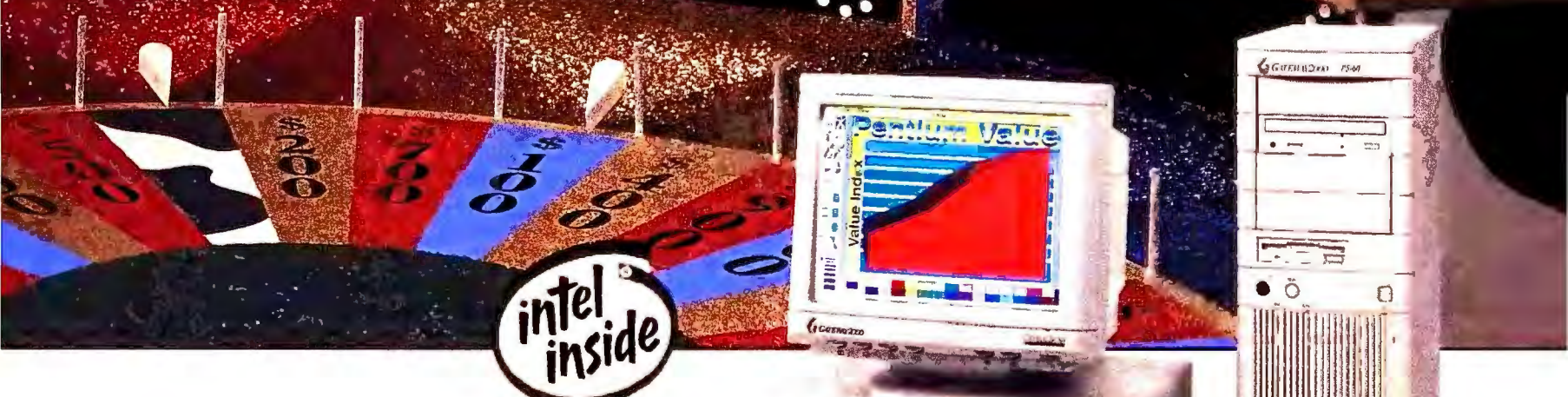
The standard graphics system on other Gateway PCI-based machines is another sure winner. You get 2MB standard graphics memory giving you 64,000 colors at 1024 x 768 resolutions. This graphics system uses a high-performance interface to graphics memory that achieves 16 million colors, true 24-bit, in VGA.



Been spinning your wheels on how to get tomorrow's technology today and still pay 486 prices? The puzzle is solved. With a price tag between \$2,495 and \$3,995, you'll hit the jackpot when you buy a Pentium-based system from Gateway 2000!

We also offer a full line of 486 PCI local-bus and integrated desktops systems. All are upgradable to a Pentium OverDrive™ Processor for the power you'll need in the future.

With Gateway 2000!



The Home Version

pentium
PROCESSOR

Fun and games are only part of what you get with the Gateway 4DX2-50 Family PC™. This special system includes full multimedia capabilities and software choices for the whole family. The Family PC brings productivity, education *and* entertainment into your home.

 **GATEWAY2000**
"You've got a friend in the business."®

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"X" Marks The Spo

Looking for the perfect portable PC? You'll get a celebrity performance when you choose Gateway 2000™ for the most value-packed portable PCs in the industry!



Gateway has all the right answers for incredible values with the ColorBook! Performance-enhancing features ... fast 486 processors and an incredibly big 10.3-inch screen on the DX4 model! ... make the ColorBook an undisputed champion.

Introducing the ColorBook DX4-75 with a faster-than-ever processor! This substantial power boost has made the DX4-75 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 now standard on the DX4. You won't find anyone else with a 10.3-inch screen at a better price.

All ColorBook models – 486SX-33, DX-33, DX2-50 and DX4-75 – have a host of great features. Weighing less than 5.7 pounds and measuring an ultra-thin 1.77 inches, the ColorBook supports simultaneous video; an easy-to-use, built-in trackball; two PCMCIA 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 HANDBOOK® 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."



The HandBook is a real PC with a 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.



"You've got a friend in the business."®

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The Surveys Say...

WHY GATEWAY 2000?

Five empty rectangular boxes stacked vertically, intended for handwritten survey responses.



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.



All the talented people appearing in this ad are Gateway 2000 employees.



World Class Winning

PC World's 1993 World Class Awards found readers honoring Gateway 2000 with top honors in five categories including Best Service 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* was quoted in *PC World*: "Gateway has discovered an amazing secret, give people more for less and they are going to like you." We knew our secret wouldn't be safe for long!



Good Answers!

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 PC vendors." Thanks *Shopper* readers!



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.

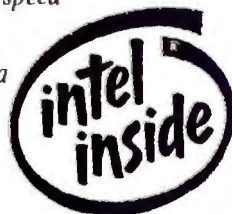
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Gateway 2000 also makes it easy for our neighbors in Canada and Puerto Rico to buy Gateway systems. You get the same award-winning technical support, CSA approvals, and on-site service that is available in most Canadian and Puerto Rican locations. 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 CrystalScan monitor, 101-key keyboard, double-speed CD-ROM, sound card, speakers, joystick, fax/modem and multimedia software. You choose one software option from five great Family PC multi-title packages.



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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 transactions, you



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PORTABLES

HANDBOOK® 486

- Weight: 2.94 Lbs.
- Dimensions: 9.75" x 5.9" x 1.6"
- SL Enhanced Intel® 486 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
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- MS Works for Windows™ 3.0
- MS-DOS 6.2, WFW 3.11 & Serial Transfer Cable

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With 25MHz 486SX CPU,
4MB RAM and 80MB
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HANDBOOK 486DX2-40
With 40MHz 486DX2 CPU, 8MB
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**HANDBOOK
486SX-25**
With 25MHz 486SX CPU, 8MB
RAM, 130MB Hard Drive, and
Leather Carrying Case
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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**
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Diskette Drive:

- HandBook external 1.44MB. **\$99**

Cases:

- ColorBook **\$49**, HandBook **\$55**

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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
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- 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

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With 75MHz DX4 CPU, 8MB RAM,
250MB Hard Drive and 10.3" LCD
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With 33MHz 486SX CPU,
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COLORBOOK DX-33
With 33MHz DX CPU,
4MB RAM, 170MB Hard Drive
and 9.4" LCD
\$2495

COLORBOOK DX2-50
With 50MHz DX2 CPU,
8MB RAM, 250MB Hard Drive
and 9.4" LCD
\$2995

COLORBOOK PACKS

Traveler's Packs:

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



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,™ Publisher,™ Money™ & games)
 - Borland Paradox® database and Quattro® Pro for Windows spreadsheet
 - Borland Paradox® and C++ With desktop and selected portables you also get the following software and extras at no additional charge:
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- Systems with CDs also include:
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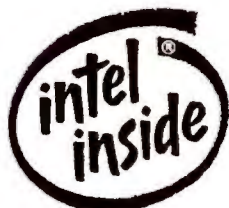
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- Lifetime Toll-Free Technical Support
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- FaxBack Automated Fax Service

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.



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- Intel® 33MHz 486SX CPU
- 4MB RAM
- 212MB 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

\$1295

4DX-33

- Intel 33MHz 486DX CPU
- 4MB RAM
- 212MB 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™
- EPA Energy Star Compliant

\$1495

4DX2-50 FAMILY PC™

- Intel 50MHz 486DX2 CPU
- 8MB RAM, 128KB Cache
- 212MB 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 CrystalScan 1024NI
- Mini Desktop Case
- 5 16-Bit ISA Slots
- 101-Key Keyboard, MS Mouse & Joystick
- Choice of Family PC Software
- EPA Energy Star Compliant

\$1995

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Here's everything you need to add multimedia to any Gateway desktop PC. You won't find a better price anywhere!

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- Double-Speed CD-ROM
- 2 Labtec® Speakers
- Microsoft Encarta & Corel Photo CD Software

\$299

486 VESA & PCI SYSTEMS

4SX-33V

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- 212MB 13ms IDE Hard Drive
- VLB™ Graphics with 1MB
- Local Bus IDE Interface
- 5.25" & 3.5" Combo Drive
- 14" Color CrystalScan® 1024NI
- Baby AT Case
- 5 ISA & 2 VESA®/ISA Slots
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- Choice of Application Software

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P5-66

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- Double-Speed CD-ROM
- PCI Fast IDE Interface
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- Double-speed CD-ROM drive, tray-loading, compatible with music CDs, multisession photo CDs and CD-ROM titles
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- Microsoft® Encarta Multimedia Encyclopedia
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Manufactured by 3Com for Gateway.
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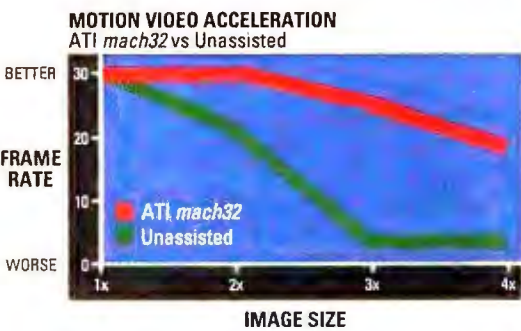
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- TelePath II Fax/Modem
- 1 Parallel Cable
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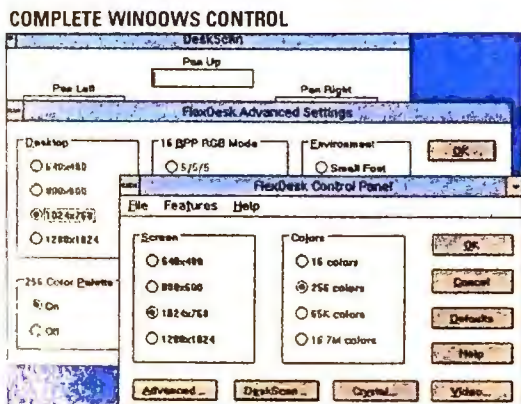
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sex, lies, and multimedia



Why is it that every piece of multimedia software seems to think it's the only software that I ever intend to run? How else can I explain software that only runs if my CD ROM drive is designated D:? Or that partitions off large sections of the hard drive for its use alone, and doesn't clear the space properly when it's done? Or that mucks around with my AUTOEXEC.BAT and CONFIG.SYS files and doesn't restore them? Or that requires a specific video driver not included on the CD?

Those are just some of the complaints that I and Lisa Halliday, who helps test products for my newsletter, have documented over and over again as we've added multimedia titles to our collection. Perhaps 50 percent of the CD ROM titles we've looked at have these problems. For a while, I thought it was something about us—or our systems—that turned multimedia into a software Sasquatch, leaving Bigfoot-size tracks across our hard drives.

Dirty Secret

You won't find many mentions of this problem in the multimedia magazines or reviews. Somehow, ease of installation (if the title even works properly at all!) has become multimedia's dirty little secret, something users have come to accept as a shared punishment.

Hardware, of course, is even worse. There are two options: One is to add multimedia to your existing machine; the other is to buy a preassembled multimedia PC. In the first case, you're likely to spend a day—and I mean a full day—dealing with hardware and software conflicts. This would be solved if the PC vendor sent the machine pre-

configured. True enough, until you add modems and other devices.

That PC and software vendors don't admit to this is not surprising. The industry is composed of pathological liars. It's not that they're trying to lie, it's just that they can't help themselves. Once you tell a first-time buyer a PC is "easy to use," you're hooked. And after the first lie, the others come easier.

My friend Walt Mossberg, who writes a weekly computer column in the *Wall Street Journal*, has challenged me to take a pledge *not* to review favorably any multimedia title that doesn't behave itself. I'm taking the pledge—right here, on this page—and I'm asking you to do the same.

The Sex Part

When someone tells you how great a multimedia program is, ask what it took to get it running. A special boot disk? Hours of fiddling? If so, spin that silver disk Frisbee-style right out of there. Then find the disk (you'll feel better for having tossed it) and demand your money back from the publisher. Software companies need to understand that our machines belong to us, not

them. At the same time, we need to understand that multimedia is yet another layer of impossible software added to our computers.

I say impossible software because it was hard to imagine, back when MS-DOS was in its infancy, that we'd still be using the same basic operating system after more than a decade. That Windows and networks actually function—much less that they work pretty well—never fails to amaze me. But at some point, doing the impossible becomes, well, difficult, even for the Microsoft wizards. And that's where we are today, with our systems simply unable to provide what multimedia needs to work properly.

That isn't supposed to be our problem. We want software that works the way it's supposed to and works on our machines. If we all take the pledge, that's the kind of software we'll get.

As for the sex part, well, didn't I warn you about computer industry lies?

Contributing Editor David Coursey edits P.C. Letter. He can be reached on PC World Online (see page 12 for contact information).

By David Coursey

With Newton and Zoomer in troubled waters, Compaq has become the most public of the hardware companies to back away from pen-based systems. All the majors had pen plans in the works—many based on Microsoft's WinPad—and most are now on perpetual hold...

Sure, Insignia Solutions' Windows emulation software, SoftWindows, isn't as good as the real thing. It doesn't run the enhanced mode, for example. But on a PowerPC it looks really good...If you don't live in the Bay Area you miss two persistent threats: quakes, and those ads Borland runs

LOOKING AHEAD



late nights on cable tout-ing Quattro Pro for Windows...Software Product of the Month: Adaptive Software's Adaptive PeopleScheduler, a cool, but not perfect way to build personnel schedules under Windows...Hardware Product of the Month:

Media Vision's Portable CD ROM Player: Reno, a soon-to-be-released Diskman-style CD ROM player that also plays music into headphones...The betting on the street is that Windows 4.0 (Chicago) won't really ship until year-end, although some cynics have started picking dates well into 1995.

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The Desktop Application Director (DAD) makes it easy to switch between applications and commonly-used tasks.

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TRIPLE SPEED: 100-MHZ

Intel kicks in the application burners with the DX4. Systems will rival Pentium PCs in performance, according to our benchmarks of DX4 PCs from AST, Dell, and Micron.

If psychologists were to diagnose the new IntelDX4 processor, they might declare it a textbook case of schizophrenia. How else can you classify a processor with multiple personalities—one that performs somewhere between a 66-MHz 486DX2 and a 60-MHz Pentium?

Then there's the chip's name. Contrary to folklore, known laws of the universe, and accepted naming conventions for microprocessors, Intel's newest and fastest 486 processor is *not* a clock-quadrupled CPU. It is at best a clock tripler: The processor's internal speed is up to three times faster



Edited by Russell Glitman

COMPUTING

than the rest of the system. Intel officials say the 4 in DX4 refers to the 486 processor and not to the chip's performance. Also, the numerical 486 label has been dropped from the chip's name, so the processor is called the IntelDX4 rather than the Intel486DX4.

What is clear is that at its top speed of 100 MHz, the DX4 is a barn burner. Running the PC World Test Center's Windows application benchmarks, three preproduction 100-MHz DX4 systems from AST, Dell, and Micron performed in the league of

many 60-MHz Pentiums that we've tested (see Test Report). In its least powerful configuration, 75 MHz (designed for notebooks), the DX4 was dramatically faster than comparable DX2-50-equipped notebooks in our tests.

Initially, you'll find 100-MHz DX4 desktops with list prices in the \$2500 to \$3500 range—about what you'd pay for a Pentium system. DX4 notebooks will start at more than \$3000. While AST's and Dell's list prices for DX4 systems are comparable to

their prices for Pentium systems, the Pentium prices offer more for the money:

PCI, larger hard drives, better video systems, as well as longer warranty periods. Micron took a different approach by undercutting its comparably equipped Pentium tower systems by hun-



DX2 dethroned: The ultimate 486—the DX4—drives AST's Bravo LC 4/100t, \$2800 (sans monitor), Micron's \$3100 4100PCI Magnum, and Dell's \$2999 OptiPlex 4100/L.



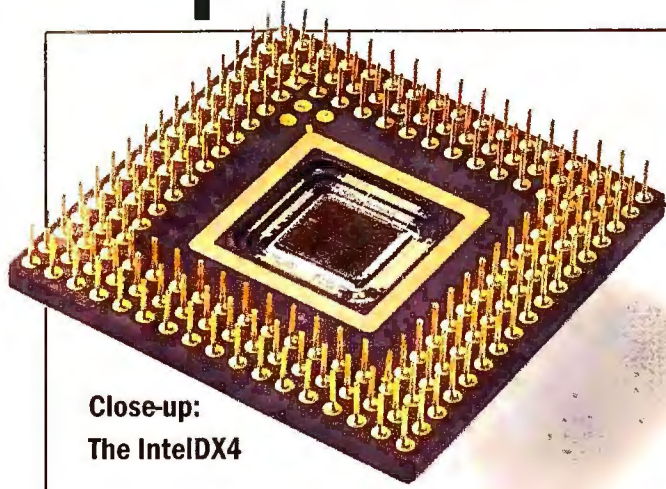
News Monitor

HEALTH PLAN ON A DISK: In the debate over President Clinton's health care reform proposal, you've heard a lot of hype and a lot of politicking. How about some facts? For \$99, IBM offers **The Health Care Reform Bookshelf**, which provides the text of Clinton's Health Security Act of 1993, plus explanations and budget predictions from the President's staff.

The Bookshelf also features five competing pieces of legislation, including the Cooper plan. The set of five disks uses IBM's BookManager software, which puts the text on screen in booklike pages, and has a table of contents and an index. You can buy **The Health Care Reform Bookshelf** from IBM by calling 800/776-8284. It's also available through the Internet, from Counterpoint Publishing (health@counterpoint.com).

WIRING THE BUDGET: Citing the "new spirit of the federal government," the Office of Management and Budget and the U.S. Department of Commerce teamed to make the President's new budget available electronically and on CD ROM. The latter version uses Adobe's Acrobat portable document technology to reproduce searchable budget documents, formatted the way they were submitted to Congress. The CD is available for \$30 at 800/782-8872. Internet users can retrieve the budget from gopher.esa.doc.gov, and it is available for downloading from DOC's Economic Bulletin Board at 202/482-3870 (2400 bps) or 202/ (continued on page 63)

Top of the News



**Close-up:
The IntelDX4**

dreds of dollars and using a desktop case.

So what makes the DX4 such a steal? Like past 486 processors, it is available in a variety of clock speeds—75 MHz, 100 MHz, and (later this year) 83 MHz—which gives users a range of performance to choose from. Vendors like the DX4 because it's an energy-saving processor that works with 486 motherboards running at 25 MHz, 33 MHz, and 50 MHz. As a result, the DX4 can operate as a clock doubler (50/100 MHz), a clock tripler (25/75 MHz, 33/100 MHz), or a clock two-and-a-halfer (33/83 MHz). And because the DX4 is pin-compatible with existing 486 processors, PC manufacturers can modify their 486 designs to build DX4-based systems quickly—a fact demonstrated by the number of systems we were able to test for this article.

While the DX4 isn't a radical departure from its 486 predecessors, it's more than just a faster 486—which is also why you'll like its performance. The chip's 16K on-board cache is twice as large as the 8K cache in all other 486 chips. The DX4 includes an integrated math coprocessor (like all 486DX and 486DX2 models). Its power-saving, 3.3-volt architecture runs cooler than Intel's traditional 5-volt design, letting the DX4 operate at speeds of up to 100 MHz—performance that might cause a Chernobyl-like meltdown in a 5-volt chip.

To be on the safe side, some system manufacturers have taken extra precautions to keep the chip from overheating. For instance, Micron's new 100-MHz DX4 desktop, the 4100PCI Magnum, includes two fans to circulate air throughout the case, as well as a miniature CPU fan that sits atop a heat sink on the DX4. And Compaq's LTE Elite notebook, which features a 75-MHz DX4, has a small fan to cool the system—very unusual for a notebook. However, the Compaq notebook also includes an integrated AC adapter, which generates some of the system's internal heat.

The DX4 also features Intel's energy-efficient SL-enhanced technology, which en-

ables the processor to power down to 0 MHz during idle times. (All Intel 486 processors now feature these power-management features, enabling 486-based systems to meet the U.S. Environmental Protection Agency's Energy Star guidelines.)

Pentium-Class Performance

"You're getting the same performance [as a 60-MHz Pentium] at a lower price point," says Sean Burke, Dell's director of product marketing and planning in Austin, Texas. Burke, along with other computer-industry officials and analysts, expects the DX4 systems to cut into sales of Pentium PCs.

"It depends on how much people care about floating-point performance," says Michael Slater, editor of *Microprocessor Report* in Sebastopol, California. The Pentium is much faster for computation-intensive applications, such as computer-aided design and three-dimensional modeling, that rely heavily on the CPU's floating point unit (FPU). The Pentium's FPU is more advanced than the 486's—it includes more transistors and has dedicated multiply, add, and divide units and other enhancements that speed performance.

TEST REPORT

Preproduction DX4 System Performance Pushes Up Against Pentiums

System	RAM (MB)	Secondary cache (K)	Application performance (in minutes:seconds)
AST Bravo LC 4/100t DX4-100	16	256	1:42 1:20 2:17 n/a ¹ 1:52 1:31 2:22
Dell OptiPlex 4100/L DX4-100	8	128	1:31 1:03 1:20 2:00 1:54 1:27 2:00
Micron 4100PCI Magnum DX4-100	16	256	1:27 1:07 1:26 1:39 1:45 1:33 2:00
TI TravelMate 4000E (notebook) DX4-75	4	0	1:37 2:35 3:04 2:46 6:03 2:16 2:37
Fastest Pentium desktops ² Pentium 60	8	256	1:21 :56 1:28 1:12 1:14 1:21 1:55
Average of 7 Pentium desktops Pentium 60	8 or 16	256 or 512	1:29 1:14 1:34 1:43 2:03 1:33 2:33
Fastest DX2-66 desktops ² DX2-66	16	128 or 256	1:21 :58 1:31 1:48 1:40 1:22 2:06
Average of 12 DX2-66 desktops DX2-66	8 or 16	0 to 256	1:43 1:31 2:00 2:18 2:38 1:46 3:26

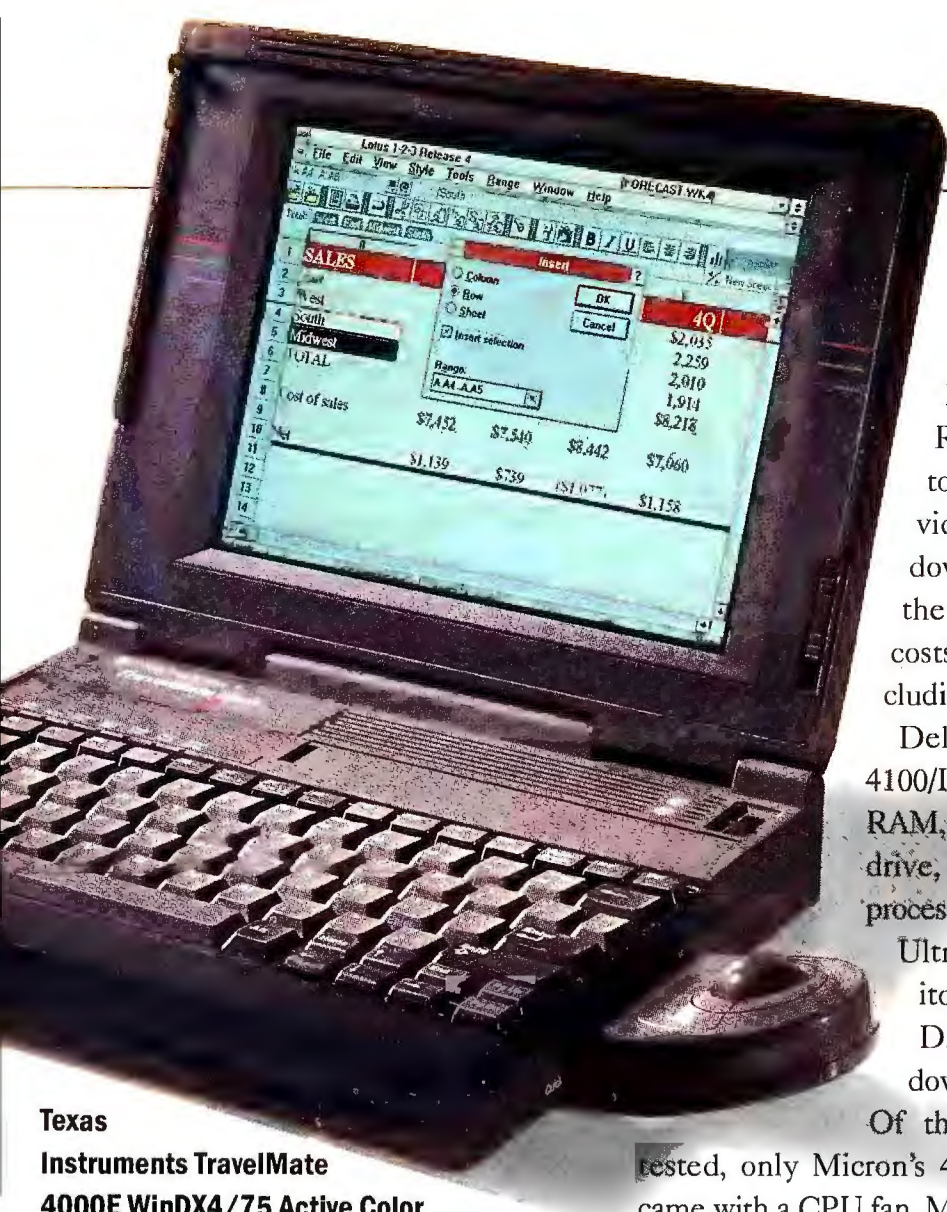
Shorter times are better.

Time in minutes 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21

1-2-3 release 3.4 Excel 4.0 Freelance Paradox 3.5 Paradox for Windows 1.0 Word for Windows 2.0 WordPerfect 6.0 for DOS

¹ Unable to complete test; hard disk too small.

² Top performance scores for systems configured similarly to the preproduction DX4 models tested for this article.



Texas Instruments TravelMate 4000E WinDX4/75 Active Color

Analysts speculate that to create a greater performance gap between the DX4 and Pentium, Intel may consolidate its current Pentium line and introduce high-end 75-MHz and 100-MHz processors.

In all fairness, we should point out that a 60-MHz Pentium running applications recompiled specifically for that chip would be significantly faster than a DX4. However, few—if any—recompiled programs are shipping, and software vendors have thus far been cool to the idea of creating applications specifically for the small but growing Pentium market.

100 MHz Is for Desktops

All three preproduction DX4 desktops from AST, Dell, and Micron featured a DX4 running internally at 100 MHz—three times the speed of the 33-MHz motherboard. Other than the DX4 processor and a power regulator (to supply the chip with 3.3 volts of power instead of the 5 volts required for other 486 chips), these systems were identical to other 486 models. The systems we tested range in list price from less than \$3000 to \$3500.

AST's Bravo LC 4/100t, a member of AST's revised Bravo series, features VESA local bus graphics, five drive bays, one VL bus slot, and four ISA bus slots. Configured

with a 340MB hard drive, 8MB of RAM (expandable to 64MB), 1MB of video DRAM, Windows, and a mouse, the Bravo LC 4/100t costs about \$2800, excluding the monitor.

Dell's \$2999 OptiPlex 4100/L includes 8MB of RAM, a 170MB hard drive, a 128K external processor cache, a 14-inch UltraScan color monitor, 2MB of video DRAM, DOS, Windows, and a mouse.

Of the three desktops tested, only Micron's 4100PCI Magnum came with a CPU fan. Mounted atop a heat sink on the DX4, this miniature fan is designed to keep the chip cool—a feature common in Pentium systems. The Micron system has two additional fans to circulate air throughout the case. The \$3199 Micron DX4 features 16MB of RAM (expandable to 128MB), a 256K secondary cache, a Diamond Viper or Matrox PCI video board with 2MB of VRAM, a 540MB hard drive, a double-speed CD ROM drive, four ISA, two PCI, and one ISA/PCI slots, a 15-inch color monitor, and Microsoft Office.

The 75-MHz DX4: For Notebooks Only

The 75-MHz DX4 offers a dramatic performance boost over the 50-MHz DX2, and its power-saving design makes it a logical choice for the next generation of high-end notebooks—particularly since Intel doesn't sell a 3.3-volt, 66-MHz DX2. You can expect to see a flood of 75-MHz DX4 notebooks this spring—and perhaps even a few 100-MHz DX4s. Unfortunately, this extra performance will cost you: Intel estimates that DX4 notebooks should start at around \$3000 on the street by summer. Initial street prices, however, ranged from \$4500 on up. In contrast, prices for DX2-66 notebooks with passive color started at just over \$4000 at the beginning of the year.

We were able to run the PC World Test Center suite on a preproduction model of



News Monitor

(continued from page 61)

482-2167 (9600 bps). Coming up: the National Economic, Social and Environmental Data Bank on CD ROM, which will include more than 100,000 documents on economic, social, and environmental concerns and public interest topics such as the National Performance Review and health care reform. The NESE will be published quarterly for \$360 a year.

A NEW PIM FROM POLARIS: Polaris Software, known for its PackRat personal information manager, plans to roll out a simple, low-cost PIM in March. Called Polaris Advantage, this basic PIM will sell for \$79 on the street, according to Polaris product manager Sal Viveros. That's well below PackRat 5.0's \$199 to \$279 street price. The sophisticated PackRat is like a fancy stereo: It's full of high-end features you may never use. Polaris Advantage is a no-frills package designed for beginners. Advantage uses the familiar folder metaphor to help you organize files and applications on your desktop. It provides the PIM essentials: a phone book, calendar, and to-do list. However, it lacks the customizable forms, customizable reports, OLE support, and macro language of PackRat 5.0

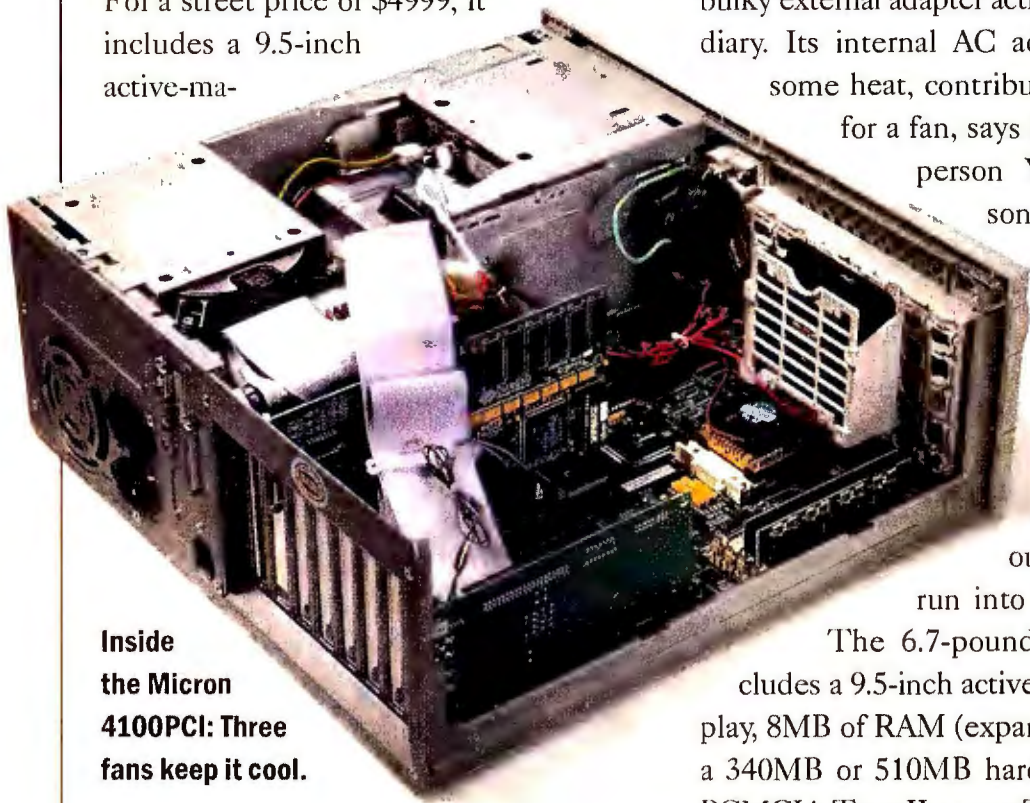
TEMBLOR TELECOMMUTERS: It took an earthquake to make Los Angelenos avoid their cars and consider telecommuting. Available space in the few pilot suburban telecommuting centers—which provide offices, modem hookups, fax machines, and comput-

(continued on page 65)

Top of the News

Texas Instruments' TravelMate 4000E WinDX4/75 Active Color and a comparably equipped production model of the DX2-50 TravelMate. The performance improvements were spectacular, ranging from 10 percent (in the Freelance for Windows test) to 80 percent (in Word for Windows).

The TravelMate 4000E WinDX4/75 Active Color comes in two configurations. For a street price of \$4999, it includes a 9.5-inch active-ma-



Inside the Micron 4100PCI: Three fans keep it cool.

trix color display, a 455MB hard drive, 4MB of RAM, and a Microsoft Ballpoint trackball that clips onto the right side of the TravelMate. The \$4499 model (street price) has a smaller (8.4-inch) active-matrix color display, a 340MB hard drive, 4MB of RAM, and a BallPoint trackball. According to TI,

the 6.3-pound DX4 notebooks should run for 3 to 4 hours on battery power.

Compaq's new DX4 notebook, the LTE Elite, wasn't available for testing, but it should be shipping by the time you read this. Besides its 75-MHz DX4 processor and internal fan, the LTE E/75's claim to fame is its integrated AC adapter. The LTE Elite plugs into an AC outlet without a bulky external adapter acting as an intermediary. Its internal AC adapter generates some heat, contributing to the need for a fan, says Compaq spokesperson Yvonne Donaldson. "However, the chip set is also going to be hot. We think anyone who incorporates this new chip set [in notebooks] without a fan is going to run into heat problems."

The 6.7-pound LTE Elite includes a 9.5-inch active-matrix color display, 8MB of RAM (expandable to 24MB), a 340MB or 510MB hard drive, and two PCMCIA Type II or one Type III slot. The DX4 LTE E/75 costs \$6299.

Toshiba's first DX4 notebook, the 6.9-pound T4800CT Performance Notebook Computer, is priced at \$6499 and includes a 9.5-inch active matrix color display, a 500MB hard drive, and 8MB of RAM (expandable to 24MB). Designed for multi-

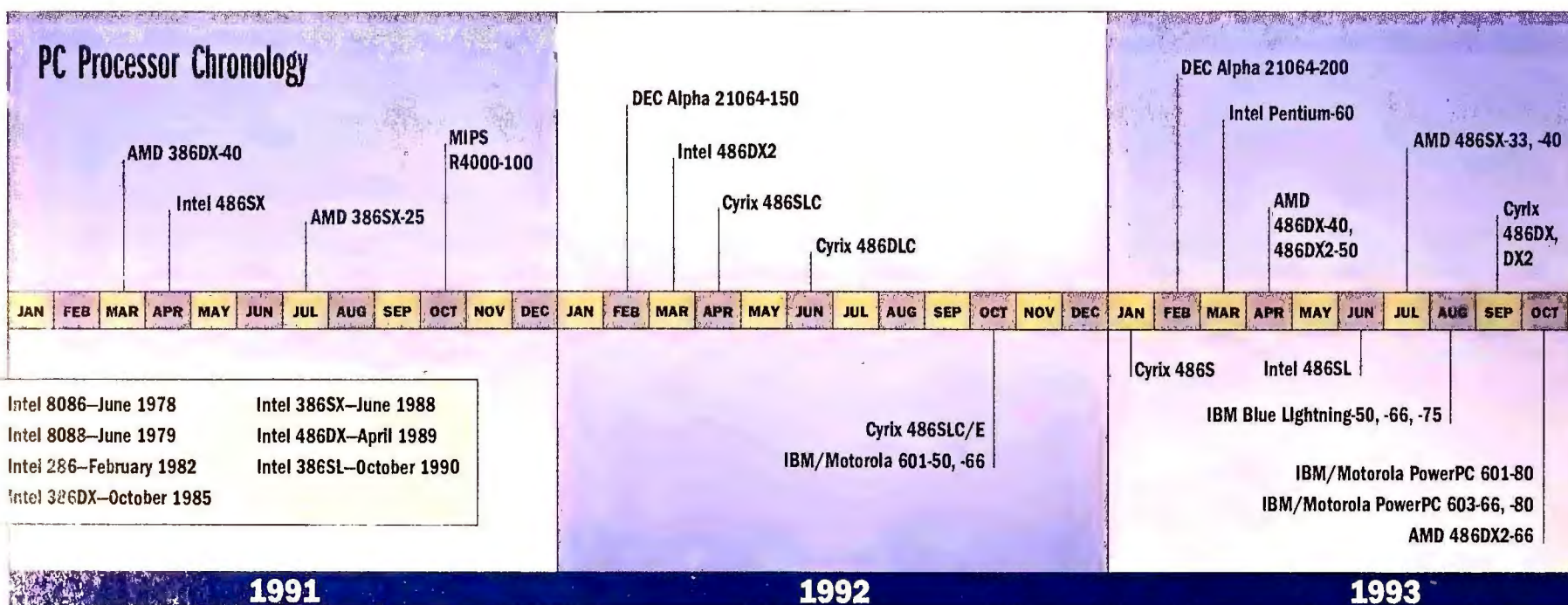
media presentations, the 4800 includes built-in 16-bit audio and external speaker jacks. According to Toshiba, the 4800's nickel-metal-hydride battery provides 2-plus hours of useful computing.

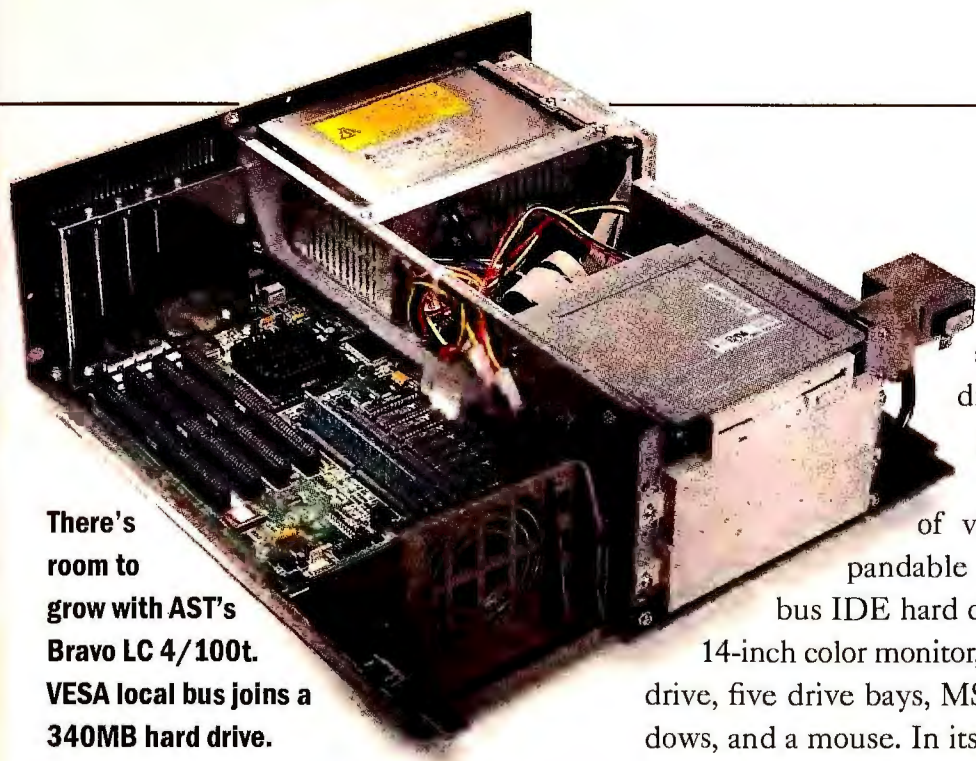
The Future

With prices and performance overlapping between Pentium and DX4 systems, it's more important than ever to compare the components in a prospective system—even among systems from the same vendor. Or you could wait another month or two—DX4 system prices are expected to drop rapidly, reaching today's DX2-66 system price levels by mid-1994. A key impetus for the price drop will come from Intel: By June, the company will charge vendors only about \$95 more for a Pentium-60 than for a DX4-100 (\$675 versus \$580). A DX2-66 will cost about \$360—compared with \$440 in the first quarter of 1994.

The DX4 chips are just the opening salvo from Intel as it fights to retain its hold on the PC processor market and prevent such defections as Compaq's recent announcement that it will use AMD processors in upcoming systems. To keep up the competitive pressure, Intel has pledged to double the performance of its processors by the end of 1994. A slew of CPUs are expected from Intel this spring, including clock-doubled 486SX chips and faster Pentiums. A successor to the Pentium, with up to three times the performance, is said to be due next year.

As a possible preview of things to come,





There's room to grow with AST's Bravo LC 4/100t. VESA local bus joins a 340MB hard drive.

Intel recently demonstrated a 3.3-volt, 150-MHz processor that is based on Pentium technology. According to Intel, however, no chips based on this design will ship in the near future.

Among the likely DX4 competitors, the most readily available is IBM's Blue Lightning processor. This 100-MHz, clock-tripled CPU has a 16K internal cache; but unlike the DX4, the Blue Lightning uses a slower 386 bus interface and lacks a math coprocessor. (If a vendor wants a math chip on the motherboard, IBM will add one. This will probably increase the PC price by about \$100.) Initially, IBM will position the Blue Lightning 100 as a competitor to Intel's DX2-50, and system prices this spring will range from \$2000 to \$2500.

Not surprisingly, the first system to incorporate IBM's 100-MHz Blue Lightning is from Ambra, IBM's mail-order subsidiary. Priced at \$2160, the Ambra Lightning 100 includes a 128K secondary cache, 8MB of

RAM (expandable to 64MB), a 540MB hard drive, a local bus graphics accelerator with 1MB of video RAM (expandable to 2MB), a local bus IDE hard drive controller, a 14-inch color monitor, a 3½-inch floppy drive, five drive bays, MS-DOS 6.2, Windows, and a mouse. In its \$2599 multimedia configuration, the Ambra Lightning 100 comes with a double-speed CD ROM drive, a 16-bit sound card, speakers, and a 15-inch color monitor.

Due to its 386 bus interface, however, the Blue Lightning will be slower than a DX4 with programs that require plenty of screen updates, such as animation and database applications, says analyst Dean McCarron of Mercury Research in Scottsdale, Arizona. But for mainstream business applications such as word processing, users probably won't see much difference.

A future version of the Blue Lightning is likely to emerge as the true competitor to the DX4. Scheduled to debut in fall 1994, the Blue Lightning-2 uses a faster 486 bus interface, but it still lacks a math coprocessor. The Blue Lightning-2 will be 10 percent to 20 percent faster than the original Blue Lightning 100, according to Kevin Dawson, IBM Microelectronics' X86 marketing manager in Burlington, Vermont. Blue Lightning-2 systems will also cost



News Monitor

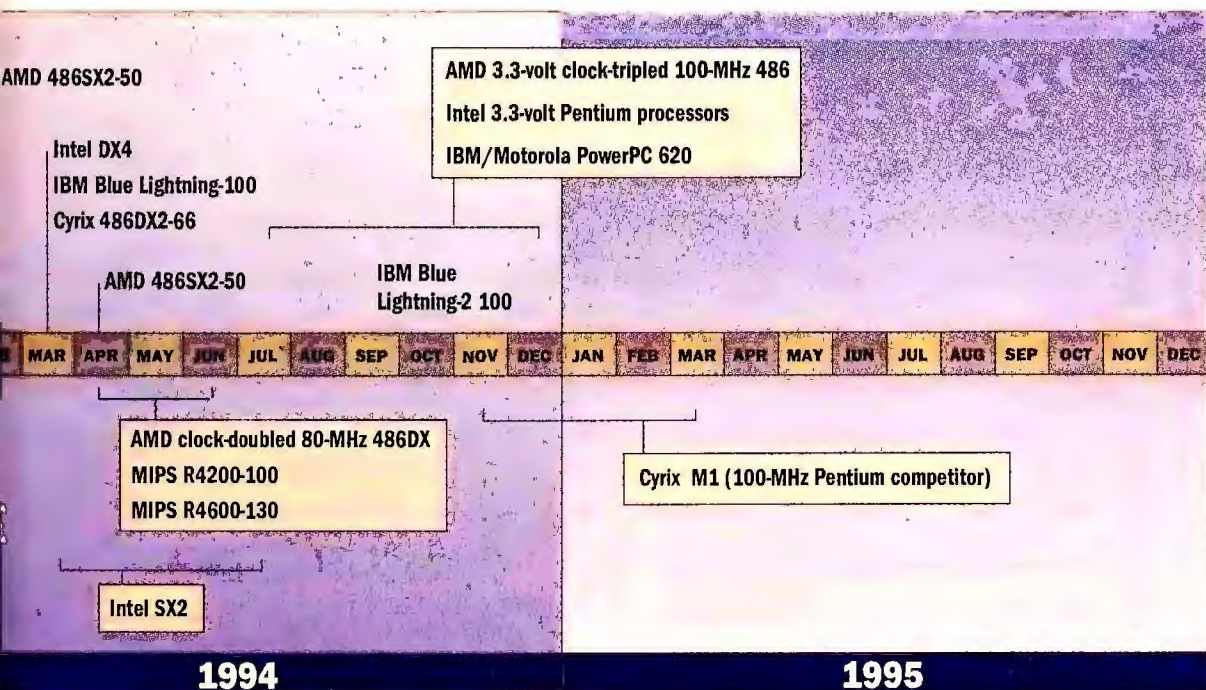
(continued from page 63)

ers—was snapped up by earthquake victims who faced commutes extended by hours. Los Angeles mayor Richard J. Riordan included telecommuting in his plan to manage traffic problems caused by the earthquake. Caltrans and other groups have subsidized many telecommuting centers, while local telephone companies offered discounts such as free phone-line connection to subscribers requiring new services. AT&T offered complete computer hardware systems, teleconferencing, and fully equipped office space. Government officials pledged to open freeways by year's end, so it remains to be seen whether Angelenos abandon their sacred autos for modems.

CD ROM PRICE DROP: You can expect prices for double-speed CD ROM drives to fall below \$200 this year. That's the word from Dataquest senior analyst Patty Chang in San Jose, California. Chang also expects multimedia upgrade kits—a CD ROM drive, sound card, and three or more CD titles—to fall to about \$300. In addition, sales of multimedia PCs will continue to climb: In 1995, PCs with preinstalled CD ROM drives and sound cards will finally outsell upgrade kits, Chang predicts. However, prices should remain high for new triple-speed and quadruple-speed drives, targeted at software developers who need the highest performance.

Edited by Russell Glitman

Contributors: Joe Abernathy, Jeff Bertolucci, Mark Brownstein, and Laurianne McLaughlin



between \$2000 and \$2500, while systems that are based on the Blue Lightning 100 chip are likely to drop in price to around \$1500, Dawson predicts.

Under IBM's licensing agreement with

Intel, Big Blue is only permitted to sell its 86-compatible processors as part of an IBM motherboard. For this reason, it's doubtful you'll have many non-IBM Blue Lightning systems to pick from.

Still, with IBM and others vying with Intel to build better processors, it's hard not to smile through the confusion. In this game of Monopoly, we're all winners.

—Jeff Bertolucci

The Chip Challengers Present Intel Alternatives

You're going to see a long parade of processors this year—and not just from Intel. New entries are showing up from IBM, AMD, Cyrix, Motorola, Digital Equipment, and MIPS Technologies. While these choices may make the PC market appear even more confusing, the bottom line, say analysts, will be lower PC prices. "Higher-performance processors will come down to mainstream sweet-spot prices," says Richard Zwetchkenbaum, research manager for PC Systems at International Data Corporation.

When the Chips Come Rolling In

AMD and Cyrix plan to introduce at least five 486-compatible processors by year-end. PCs using Cyrix's 66-MHz chip, the CX486DX2-66, should hit the streets early this spring for about \$1700, according to Cyrix. AMD was due to release its Am486SX2-50, slated for PCs in the \$1250 to \$1400 range, in February. (It purportedly provides DX2-50 level performance on apps such as word processing but lacks a math coprocessor.) A more powerful clock-doubled, 80-MHz DX from AMD is expected in PCs by late spring.

In the last quarter of 1994, PCs with AMD's 3.3-volt clock-tripled DX-33 will arrive. Prices for PCs based on the 100-MHz AMD, IntelDX4, and IBM Blue Lightning-2 chips should start at around \$2000. Analysts expect the AMD- and IBM-based machines to be priced slightly lower than comparable Intel-based machines. And PC prices should become more competitive across the board, so that the difference in street price between a 100-MHz 486 equivalent and a Pentium machine may be only \$150. You'll have to look beyond the sticker, however, since many components—including the size of the hard drive and video memory, the bus type, and the length of warranty—may differ dramatically.

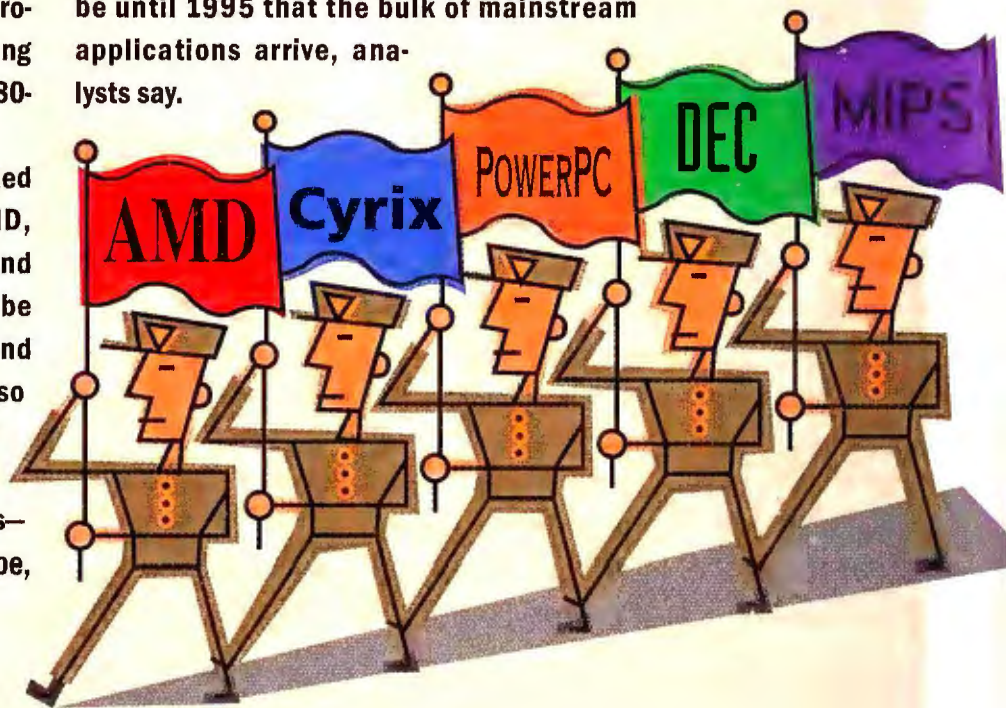
Pentium Competitors: Cyrix M1 and PowerPC

By late 1994, Cyrix's Pentium competitor, code-named M1, is expected to debut in systems at 100 MHz. An M1 system should perform a hair faster than a Pentium-based PC running today's software at the same clock speed, according to Cyrix. (To achieve the Pentium's full performance benefit, current software will have to be recompiled, and so far, little recompiling has been done.)

PowerPC, the RISC processor made by Motorola and IBM in a consortium with Apple, also has the strength to fight Pentium. Motorola and IBM have announced four PowerPC chips. The first, the 601 (running native applications), offers almost a 40 percent performance boost over 60-MHz Pentiums in floating-point-intensive applications such as desktop publishing and graphics, says Phil Pompa, vice president of marketing for PowerPC at Motorola. The 601 is available in 50-MHz, 66-MHz, and 80-MHz speeds.

For business users, 1994 will be a "wait-and-watch year" on PowerPC, says Dean McCarron, analyst at Mercury Research. In the second half of 1994, IBM Power Personal Systems will release two desktop PCs and a notebook based on the PowerPC 603, a 3.3-volt, 80-MHz chip. The IBM systems should sell for between \$2500 and \$5000. Motorola plans two more chips—the 604 (aimed at workstations) and the 620 (for servers). These processors will show up by mid-1995 in machines from various vendors, says Pompa.

The main drag on PowerPC is software. PowerPC machines need native software to attain peak speed. They run today's Windows applications only through emulation, which means you get the equivalent of 486DX-33 to 386DX-33 performance. This year Motorola expects applications for Windows NT and IBM's Workplace OS, the operating system that will replace OS/2, but it won't be until 1995 that the bulk of mainstream applications arrive, analysts say.



Options for NT Machines: Alpha and MIPS Processors

This spring, new RISC chips from Digital and MIPS will move into desktops and servers for the NT and UNIX markets, according to product managers from Digital and MIPS. Digital's 166-MHz 21066-166 chip will appear in \$3000-range NT desktops. And this summer, Digital's 225-MHz Alpha 21064A-225 will come to market in \$4000 systems, followed in the fall by the 275-MHz Alpha 21064A-275, which will appear in \$5000-range systems. MIPS's processors, which are made by its semiconductor partners, are used in NT systems from vendors such as NEC and Acer. Its new MIPS R4200, a low-power chip in 80-MHz and 100-MHz speeds, will be used in NT systems this summer.

—Laurianne McLaughlin



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cc:Mail for Windows Goes Mobile

TEST DRIVE

The long-awaited Windows version of cc:Mail Remote is a full-featured and surprisingly versatile package that supports today's mobile professional. It's designed for people who work with E-mail from a number of locations: home, remote offices, airports, places where wired connections aren't available, and the main office.

Unfortunately, though, like many Windows applications, cc:Mail Mobile is complex and resource hungry compared to its DOS predecessor. In cc:Mail Remote for DOS (which is still available), 500K of hard disk space gives you plenty of room for the application, a big mailbox, and many messages. But cc:Mail Mobile requires at least 10MB. Then there's the Windows learning curve, which is no problem for an experienced deskbound user of cc:Mail for Windows. However, if you're used to the lean and mean (albeit limited) interface of cc:Mail Remote for DOS, you'll



cc:MAIL MOBILE FOR WINDOWS lets you set up customized profiles for multiple locations and log directly into the LAN.

need to make a shift to the wonderful world of icons.

The biggest improvements have to do with ease of use and customizability. One irksome problem with cc:Mail Remote for DOS was that every time you changed a location, you had to change communications options and prefix settings. That's been fixed in cc:Mail Mobile. You can set up multiple location "profiles" with individual icons and choose the one you want at log-on.

There are now two lines of defense to reduce connect time. Click the Message button while remotely receiving mail to choose whether to accept or reject each incoming message based on a summary—author, date, size, and subject. For the truly serious, rule-based message filtering lets you set criteria for the type of mail you want to receive, including the size.

One other distinctive advantage to cc:Mail Mobile's Windows environment is that you can let it run in the background. A unique docking mode keeps

separate LAN and mobile post offices synchronized. Last but not least, Lotus deserves a word of praise for licensing cc:Mail Mobile on a per-person rather than per-PC rate.

You can connect cc:Mail Mobile for Windows to any flavor of cc:Mail server, and it's relatively simple to install. It supports both remote and direct-to-LAN connectivity, a boon for those who use LAN-equipped portable computers for direct hookup in the office. cc:Mail Mobile also supports TCP/IP, X.25, ISDN, PBX, and cellular modem connections.

While the Windows interface of the late beta version I used took some getting used to—I've lived and breathed the DOS world of cc:Mail Remote—Lotus has done an excellent job of balancing functionality and usability in cc:Mail Mobile for Windows. If your portable computer has the hard disk space to accommodate this version, the \$95 upgrade price from the DOS cc:Mail is a steal.

—Stan Miastkowski

How to Prepare for Disaster

The Northridge, California, earthquake reminded many users to ensure that their PCs can survive a disaster.

In preparing for a disaster, remember that you're not just trying to protect your hardware but also your data and software. Regular, complete backups are a must. Store at least one set of backups off-site. To prepare for an earthquake, attach your equipment securely to a desk or counter-top (this tactic should also deter theft).

After a catastrophe, turn off and unplug everything, then bring components back up one at a time. A device with a problem should make itself known quickly. Start your PC from a boot floppy. Hard drives tossed around in a quake may read correctly but be unable to write. Make sure your hard drive is backed up before you do anything else. Then copy a test file from one directory to another to verify the drive's integrity. Until you are confident of your hard drive's health, don't load Windows. Windows writes to the disk as it loads and may not detect write errors until it has changed your FAT.



Lotus cc:Mail Mobile for Windows

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9	0	1000 or more	45-54 year	\$75,000
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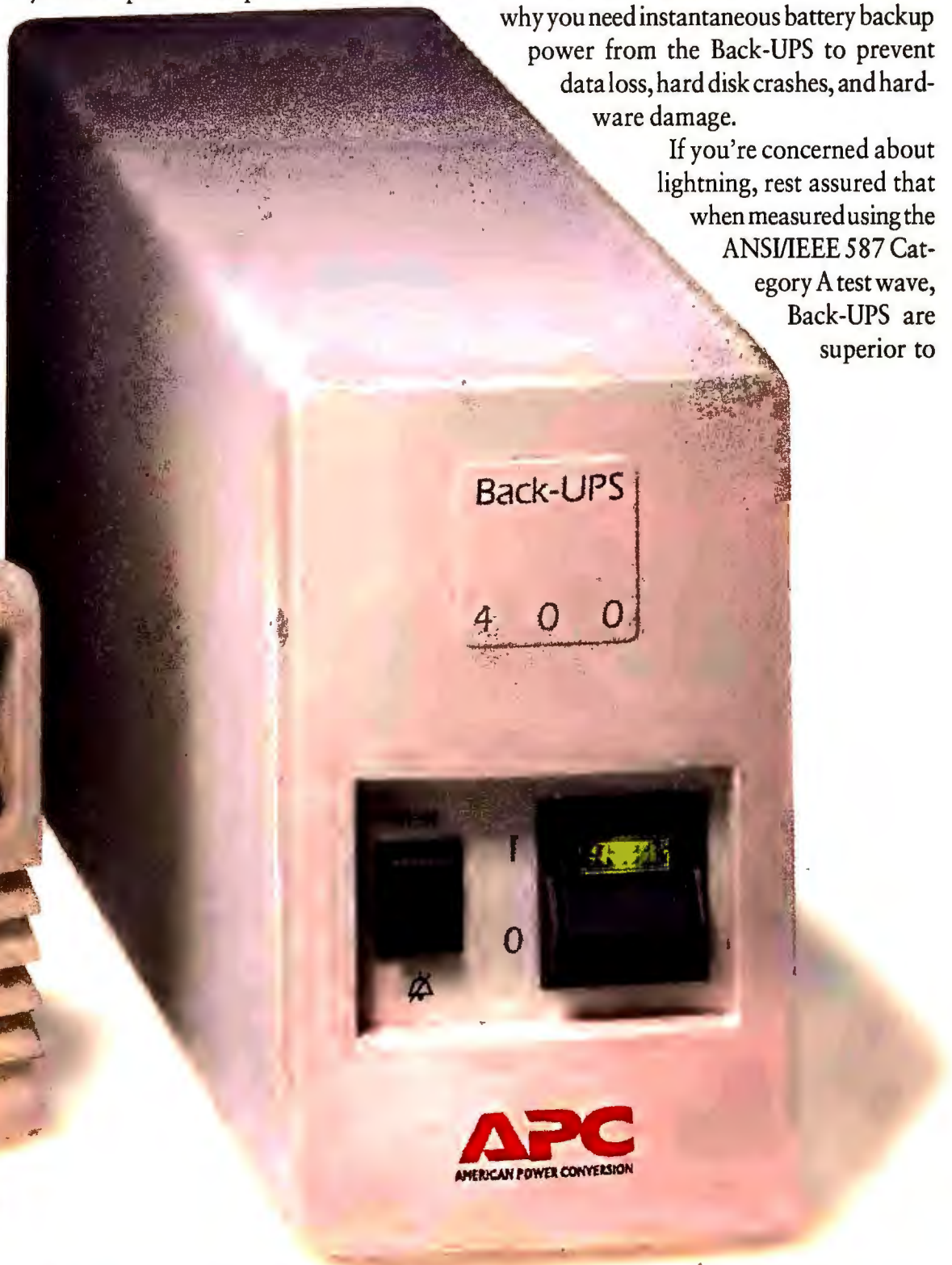
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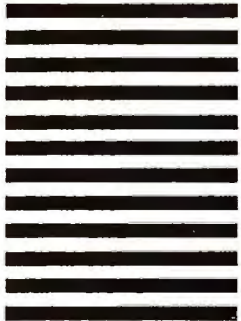


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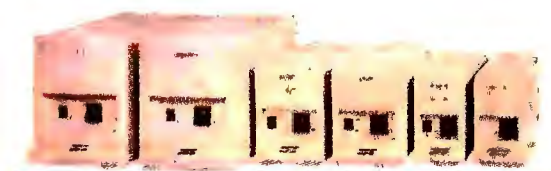


Andrew Wargo, Manager at Baxter Land Company, tried two other brands before Back-UPS. "One lasted a few days, a second one went up in smoke after 48 hours, a third lasted less than 24 hours! I then bought my Back-UPS for less than half of what I had paid for the others. We've purchased three more Back-UPS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

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

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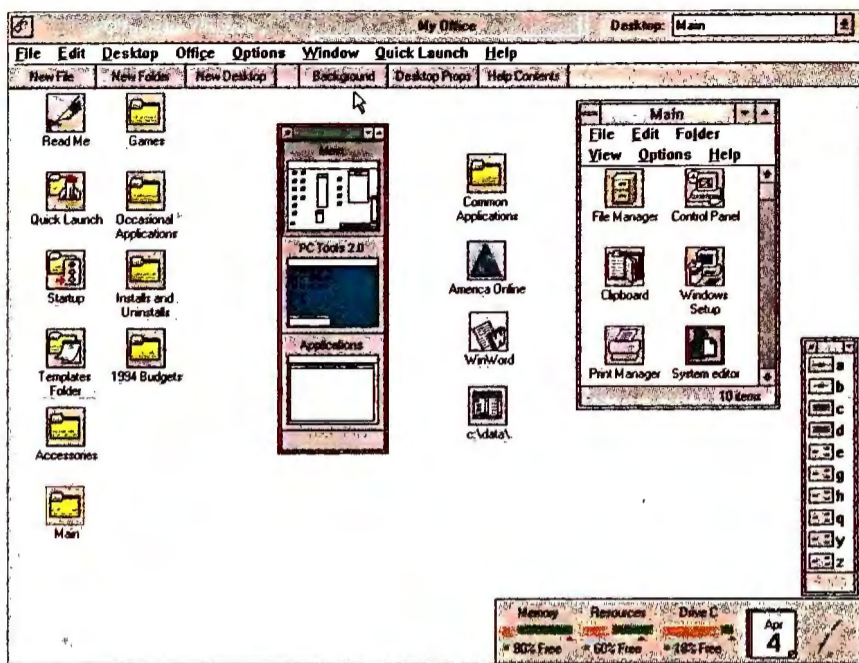
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PC Tools for Fixing Windows



PC TOOLS FOR WINDOWS 2.0 lets you put multiple tools on multiple desktops and warns you when resources are getting low.

TEST DRIVE

PC Tools for Windows 2.0 from Central Point Software makes working in Windows about as easy and safe as it gets. Along with the program and file management improvements, backup and antivirus programs, and other tools in 1.0, Central Point has added goodies to make working with Windows faster and more stable. I looked at a late prerelease version

of PC Tools for Windows 2.0.

PC Tools for Windows is an extensive collection of utilities built around an interface that replaces both Program Manager and File Manager. The PC Tools shell allows you to set up multiple desktops, each of which can contain running programs, folders reminiscent of Program Manager's groups, icons resembling Program Manager's items, and file manage-

ment windows (which can also be made into icons). The collection comes with disk fix and recovery programs, a disk optimizer, an icon editor, a scripting tool, and complete versions of two *PC World* Best Buys, Central Point Backup and Central Point Anti-Virus, each of which is also sold separately.

So What's New?

The most obvious addition is CrashGuard, an information bar that sits in the bottom right corner of your screen and lets you know if your system is getting dangerously crowded. CrashGuard shows you the percentage of memory, system resources, and hard drive space you're using, and it sounds an alarm when any percentage gets too high. When system resources—two small areas of RAM that Windows reserves to store vital information—get full, they can cause trouble (when Windows tells you that it's out of memory, it probably is out of resources). CrashGuard also displays the time and date and lets

you set alarm clocks in it.

System Consultant, the system information program that came with version 1.0, is considerably improved. In addition to telling you how your computer is set up, it recommends changes to improve performance or reliability. Then, with your consent, it makes those changes itself. And you can now use System Consultant to edit your WIN.INI and SYSTEM.INI files. The INI editor allows you to move through the files' sections easily.

As with the last version, you can place icons for launching a program, similar to Program Manager items, anywhere on the desktops. This includes placing icons in folders, similar to Program Manager Groups but more versatile. You can place folders anywhere on the desktops, and, unlike with Program Manager, you can place folders within folders.

With version 2.0, you can also set up folders with

More for Less, and Less for More:

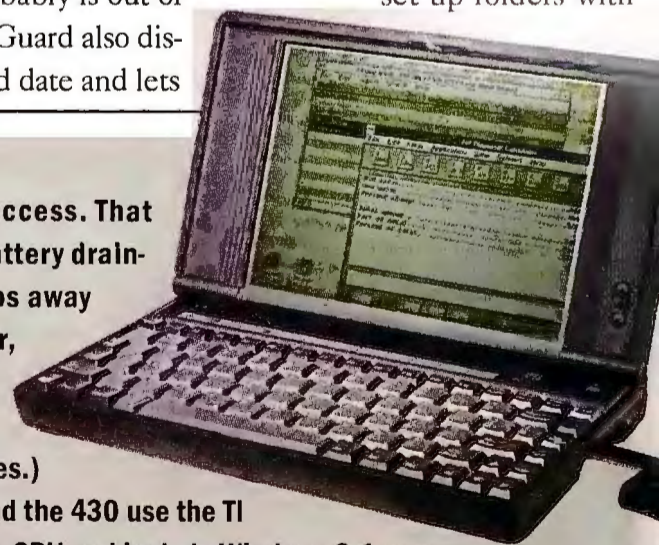
Hewlett-Packard's OmniBook 430 is—more or less—the same ultrasmall, ultrathin notebook computer as the OmniBook 425. What's more about the 430 is its bigger hard disk (105MB vs. the 425's 40MB), additional RAM (4MB versus 2MB), extra DOS memory (about 550K versus 435K) and ability to run Windows in enhanced mode.

What's less about the 430 is that HP does not include the ROM-based programs built into the 425—Microsoft's Excel and Word for Windows. The reason: With more storage and RAM capacity and without the Microsoft ROM applications (read: no royalty fee), the 430 costs less than the 425. The 430 is \$1399; the 425 40MB HD model is \$1795. The 10MB flash memory 425 is \$2095.

Unfortunately, we also got less battery life from a preproduction version of the 430, rated by HP at 4.5 hours. Unlike the 425, whose efficient PCMCIA flash memory storage and ROM-based programs let it run for up to 8 hours, the 430 relies on its internal hard disk

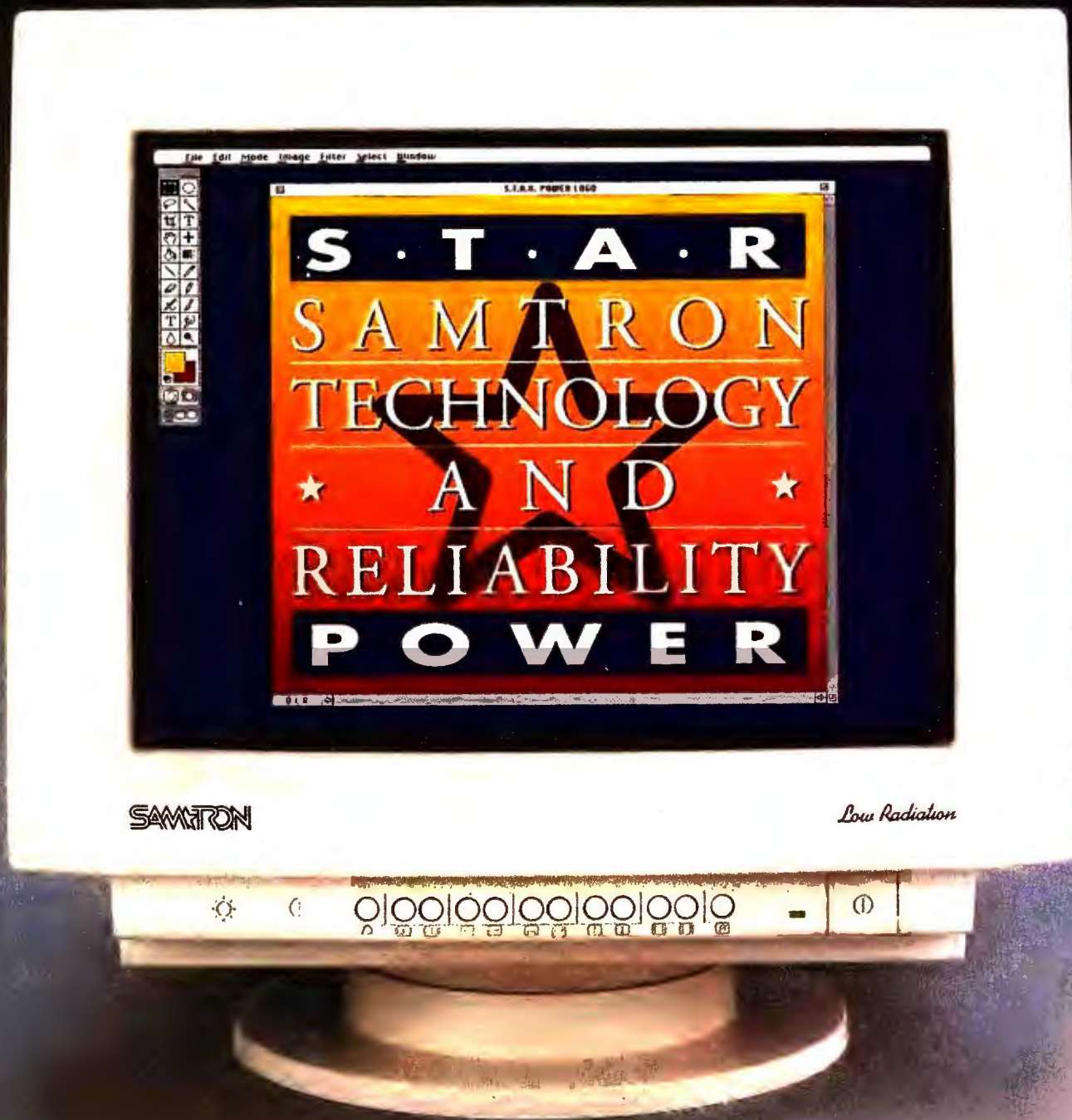
for storage and access. That means quicker battery drainage. (On long trips away from the charger, the 430 is capable of running on lithium AA batteries.)

Both the 425 and the 430 use the TI 25-MHz 486SLC/e CPU and include Windows 3.1 on a ROM card, a sharp 640 by 480 VGA reflective LCD screen, a full-size keyboard, three I/O ports (serial, parallel, and infrared), a 2400/9600 internal modem port, and a PCMCIA Type II slot. Like the 425, the 430 has a pop-out "floating" mouse, HP appointment and contact software, and LapLink Remote for sharing files with desktop PCs, and it weighs just under 3 pounds. The 430 should be available when you read this. Reader service no. 871



A STAR IS BORN.

Samtron
SC-428UXL
14" High
Resolution (75Hz)
Color Monitor



- Multi-Scan
- 1,024 x 768 (75 Hz) High Resolution
- Super Fine 0.28 Dot Pitch
- Digital Controls
- Power Saving
- VGA; SVGA, XGA VESA Compatible
- Flicker-Free
- Low Emission, MPR II
- Non-Interlaced
- 3-year Limited Warranty

Starpower. It is a quality that makes some shine brighter than others. It is a word reserved for describing those who lead their peers. It is what symbolizes Samtron's commitment to building monitors that incorporate leading-edge technology with the reliability necessary to meet the demands of day-to-day use. ★ Samtron now introduces the new SC-428UXL 14" Color Monitor, the first of the new StarPower™ line. Designed for users of Windows™ and other leading business applications, it features 1,024 x 768 (75 Hz) High Resolution, Digital Controls, Power Saving, and Low Emission Protection. Like other Samtron Color Monitors, it is VGA, SVGA and VESA compatible, as well as complying to the United States EPA Energy Star™ standards. ★ Thousands of users depend upon Samtron monitors because of their accuracy, reliability, and value. Samtron's new SC-428UXL will make you a star. Call your Reseller today.

SAMTRON
MONITORS WITH STARPOWER™

Continued from page 72

file-searching parameters; PC Tools then puts any files that match those parameters into the folders. For instance, if you create a folder for all files matching *.DOC or BUDGET??.* within your C:\DATA directory and its subdirectories, the folder will update itself as you add new files to the directories. The search options aren't spectacular, however; you can't set up a

PC Tools for Windows 2.0

WINDOWS This comprehensive utilities collection helps ward off Windows crashes.

Key Features: Warns you if resources are low • Helps configure system • Folders automatically add files that match set criteria • PKZip 2.0 support • File manipulation from within apps

Pricing: \$179.95, upgrades \$49.95

Availability: Immediate
Central Point Software
800/964-6896, 503/
690-8090

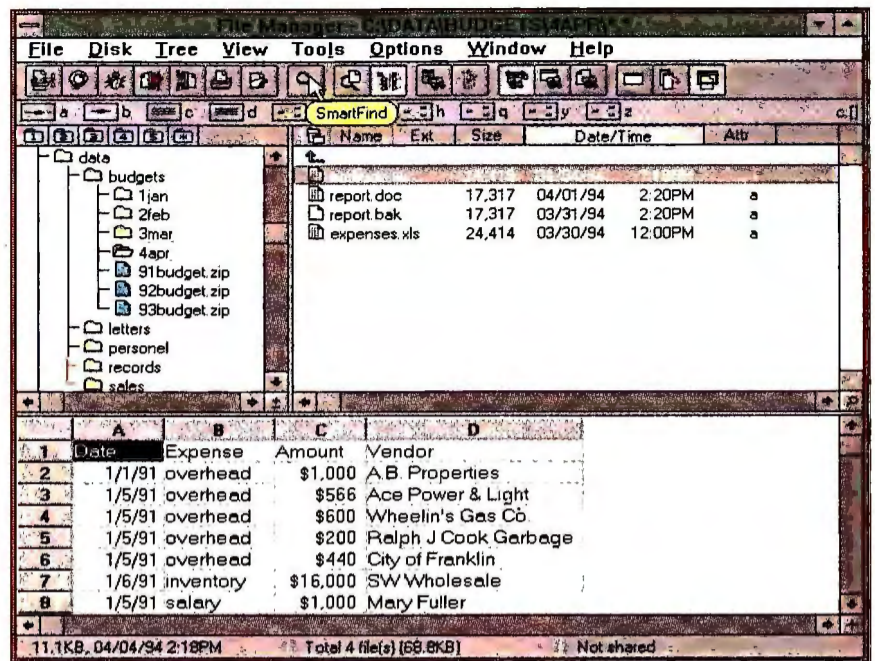
Reader service no. 872

folder to include all files matching *.DOC or BUDGET??.* that also contain a certain text string or were created on a certain date. For that you would have to use the SmartFind tool in PC Tools' File Manager.

Speaking of managing files, Central Point has made some improvements in that area, too. The file viewers now support over 100 file formats (although Word for Windows 6.0 and Excel 5.0 won't be among them initially), and you can copy text and graphics from the viewers to the clipboard for pasting in your documents. The program supports PKZip 2.0, and you can add a file to an existing ZIP file by dragging and dropping.

Version 2.0 gives you added file capabilities within your applications. When you run PC Tools as your shell, it puts an extra icon in the title bar of all of your File•Open and File•Save dialog boxes, giving you instant access to options for everything from compressing a file to creating a directory.

Among other improvements to PC Tools, both the disk optimizer and repair programs now



NOT SURE WHAT AN ICON MEANS in PC Tools' File Manager? Hold the mouse cursor over it for a second, and the program will tell you.

work with any DoubleSpace volume—but alas, they contain no Stacker support. Central Point has also added a screen capture utility, although it was not working properly in my pre-release version.

Central Point has improved the user interface. In the File Manager, if you start typing a file or directory name, the program finds it for you. If you don't know what a button does, just hold the mouse cursor over it for a second and you get a

description. You can now select multiple objects on the desktop. And thankfully, PC Tools no longer puts the Central Point logo on the title bar of every program you run.

Despite a few annoyances, PC Tools for Windows 2.0 is a great collection of utilities fronted by one of the best Windows shells around. And it even has the one feature all Windows programs should have but few do: an uninstall option.

—Lincoln Spector

Aero to Your Heart:

In yet another sign that the computer market is evolving from the nerd to the consumer stage of development, Compaq has introduced a product whose name makes it sound like it came from Detroit or Tokyo. Fortunately, business travelers can expect better performance from the Contura Aero subnotebook than from most subcompacts.

With a 7.8-inch passive color screen, 33-MHz 486SX, and 250MB hard drive, the Aero lists for under \$2500. The monochrome 25-MHz 486SX model has an 8-inch backlit screen, 84MB and 170MB hard drive options, and a list price starting under \$1500. The monochrome unit should weigh as little as 3.5 pounds. Each Aero comes with 4MB of RAM expandable to 12MB and a Type II PCMCIA slot that you can use to attach (via a cable) Compaq's new \$179, 3½-inch 1.44MB floppy



drive. DOS, Windows, Lotus Organizer, and WinLink, a file transfer program from East Coast Software, are included.

The preproduction versions had great keyboards and crisp, responsive screens. The company claims screens will be as bright as current Contura displays and will use less power. The sleek, rounded design includes a palm rest with a built-in minitrackball. Two mouse buttons are on the right side.

The monochrome unit with an optional enhanced battery, standard in the color version, should run 4 to 6 hours, the company claims. The Aeros come with a 6-ounce power supply, parallel and serial ports, and a docking port.

An optional docking base for the Aero, with mouse and keyboard ports, video out, and serial and parallel connectors, will be available for under \$100. For \$35, you can get a port enhancer with video out and mouse and keyboard ports. Reader service no. 873

6 steps to healthy computing

1. Curtis Glass Filter Plus —
Relieves eye strain and fatigue, cuts glare up to 99%, and reduces VLF radiation up to 98%.

2. Curtis Monitor Arm —
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3. Curtis Keyboard Organizer —
Keeps supplies in reach and relieves tired, aching wrists with built-in wrist rest. (Wrist rest also available separately.)

4. Curtis Clip —
Holds copy next to monitor to reduce eye fatigue and neck strain by eliminating constant refocusing from desktop to monitor.

5. Curtis Wrist Rest —
Supports wrists at a more comfortable height to help reduce pain and fatigue.

6. Curtis Mouse Pad Organizer —
Built-in wrist support relieves sore, tired wrists. Pad improves pointing accuracy and pen/pencil tray organizes supplies.

Curtis offers many practical and low cost accessories that can reduce everyday physical stress and strain from computing.

Long periods of highly routine computing can harm your physical and mental well-being. That's why Curtis offers an entire family of ergonomic accessories to improve your computing health and comfort.

Choose from eye-saving Copy Clips and Glare Filters, wrist-saving Keyboard Organizers with Wrist Rests, and posture enhancing Monitor Arms. In no time, you'll be able to feel the difference these

innovative Curtis accessories make in your personal computing comfort and well-being.

So why wait any longer? Six simple steps you can take today can mean more energy, greater productivity, and more job enjoyment tomorrow.



For more information, call Curtis at 1-800-955-5544, Ext. 240.
Ask for your free "Healthier Computing Guide" brochure.

Manufacturing Company, Inc.
CURTIS

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The image features two computer monitors, a larger one in the foreground and a smaller one behind it, both with a brushed metal finish. They are set against a lush, green background of ferns and other tropical plants. The lighting is dramatic, highlighting the texture of the monitors and the vibrant green of the foliage. The monitors have a dark screen and a small logo on the bottom bezel.

DX17F
GREEN ENERGY
MONITOR

DX15F
GREEN ENERGY
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IT'S A JUNGLE OUT THERE! LET'S KEEP IT THAT WAY.

MAG
INNOVISION



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Online, On the Go With Wireless Envoy

Motorola's Envoy is a personal communicator designed to appeal to on-the-go executives and Internet junkies who want to stay in touch at all times, at all costs. Capable of sending and receiving E-mail messages and other data via radio frequency (RF) broadcast, the Envoy's in- and out-boxes are always active.

The sleek, black 1.9-pound Envoy is about the size and shape of a paperback novel, but it costs a lot more: \$1499 list. But the product offers a quantum improvement in communications functions and usability over prior hand-held personal digital assistants, such as Tandy's Z-PDA and Apple's Newton, that rely on handwriting recognition and focus on personal information management.

The Envoy opens to reveal a 3-by-4.5-inch LCD (480 by 320 resolution with four shades of gray) that is both stylus and touch sensitive. It folds neatly back onto the unit

9600/2400-bps fax/data modem to a phone line; two Type II PCMCIA slots; an infrared (IR) transceiver for sharing information with other IR-capable devices from 3 meters away; and a power adapter port for unit power and battery charging. Motorola claims that the Envoy runs for 8 hours on a single charge in standby, ready-to-receive mode. Three LED indicators (for power, radio in range, and messages received) are embedded in the unit's outside edge for easy monitoring when it is snapped shut. Inside, a 16-MHz Motorola 68349 processor runs the show. Memory consists of 1MB of DRAM for data storage and 4MB of ROM for apps and the operating system. The unit's second, built-in



WIRELESS IS A REALITY with Motorola's Envoy.

Magic for the operating system and GUI stuff: Magic Cap, a graphical user interface and operating system, and Telescript, a communications toolbox (see "Let Your Agent Do the Walking," *Top of the News*, February 1994). Sending a wireless message is a snap: Open a

blank postcard, fill in the address using the pick lists or a software keyboard, type a note, and click the send button. When you receive a

message, the unit's yellow LED flashes and your in-box shows an envelope icon, which you tap once to open the message. In the preproduction unit I used, text messages appeared in 8-to-18-point type on index-card-size postcards.

As with buying a cellular phone, you'll need to plunk down your credit card to open one or more services accounts, such as RadioMail's RadioMail or AT&T's PersonaLink Service, before you can use the Envoy as a wireless communicator. RadioMail lets you send

and receive wireless messages across popular networks and services. PersonaLink, using a town center metaphor, delivers wired and wireless messaging, daily news, shopping, and Skytel paging. It will be the first service to take full advantage of General Magic's agent technology. Both services are expected to be available by summer but hadn't set a price by press time.

—Joe Hutsko

Motorola Envoy Wireless Personal Communicator

The first hand-held device to use General Magic's Magic Cap and Telescript user interface and communications technologies.

Key Features: Compact design • Wireless communications • PCMCIA • Modem • Magic Cap software • Provides feedback on printing progress

Pricing: \$1499

Availability: Second quarter Motorola Wireless Data Group, 708/576-1600

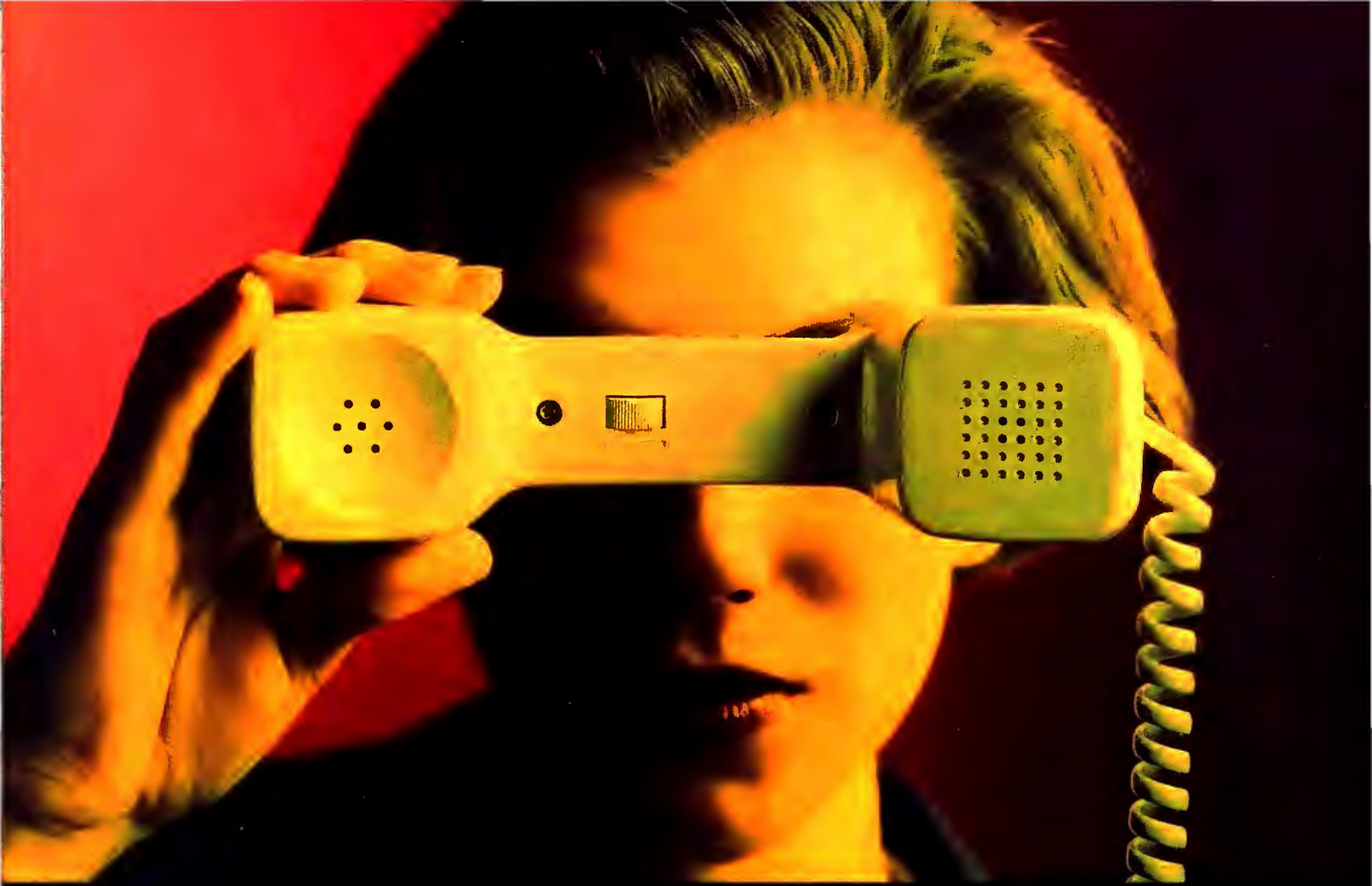
Reader service no. 874

OPEN AND SHUT CASE: The Envoy's screen folds back for easy portability. LED gauges keep you apprised of power status, radio in range, and messages received.

so you can hold it like a clipboard. For wireless communications the Envoy has a rotating whip antenna like those on walkie-talkies. I/O ports include a serial bus for attaching high-speed peripherals; a modem port for connecting the internal

RF modem, which enables the Envoy to send and receive wireless transmissions and send faxes, operates at 4800 bps; in cities where the RDLAP wireless protocol is available, the Envoy transmits at 19.2 kbps.

Motorola turned to General



With a phone, you can't see the big picture.



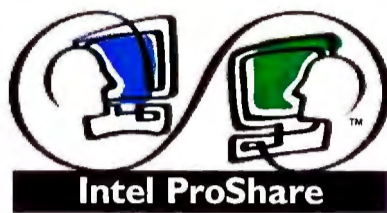
With Intel ProShare™ Personal Edition
do it all with simultaneous



nal Conferencing, you can
s sight, sound and screen.



PC Power. One-on-One Communications.



Introducing ProShare™ Personal Conferencing—a family of communications products that will revolutionize the way you work with others. By adding the power of your PC to your one-on-one communications, you'll be able to simultaneously share ideas. Even when you're far apart.

Eliminate the evils of communications.

See no message. Hear no message. Speak no message. Until now, communication tool limitations made it impossible to get your whole message across. But with Intel ProShare Personal Conferencing, you can communicate clearly through sight, sound and screen.

It's as easy as picking up your phone and turning on your PC. You and a colleague can discuss ideas and concepts while you interact in the same PC document.



Meetings can be held one-on-one, right at your desktop. And you'll get immediate feedback so you can make quicker decisions—whether you and your associate are across the hall. Or across the globe.

You and a colleague can interact simultaneously.

The family of ProShare products is designed to let you and a partner have dis-

cussions within any Windows* document. That means both of you can see changes and comments on your screens as they are made. Just copy your document onto the shared ProShare screen. Then pick any tool—pens,

Communication Tool Comparison Chart

Which communication tools let you share info and work together...	Overnight Mail	Phone	Fax, E-Mail	Room or Workstation Video Conf.	ProShare™ Personal Conferencing
From your PC			•		•
From your office		•	•		•
With your data	•		Limited	Limited	•
On your schedule		•	•		•
Interactively		Limited		•	•
Face-to-face in color				•	•
Audibly		•		•	•

highlighters, or pointers—to edit, emphasize and annotate while you discuss. You can type your comments right onto the shared screen. Write personal notes in your own private space. Update objects with OLE (Object Linking and Embedding). Even copy and paste from other documents. And you both see the changes simultaneously.

Take advantage of the power already on your desktop.

By having your meetings right at your desk, all the files and applications on your PC and the information in your office are immediately accessible. And because you'll use your existing PC and all your own Windows applications, you'll be working in an environment you're already familiar with.

Work together even if your colleague doesn't have ProShare software.

ProShare products let you communicate with anyone—whether they own ProShare software or not. A feature called Jump Start enables you to download ProShare software over a modem so your associate can accept a ProShare Personal Conferencing call. It's that easy. Just initiate the call with ProShare software, and you're ready to collaborate.

Enhance your document conferencing with video.

If you want to meet face-to-face, try the ProShare Personal Conferencing Video System. With video and audio added to document processing, you can communicate with all your powers of expression in order to fully make your point.

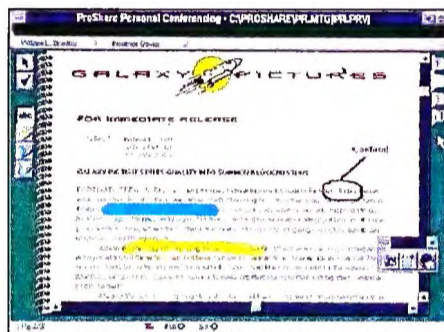
The images you'll see will be sharp and clear thanks to Intel's Indeo™ video compression technology. And the video system is interoperable with all ProShare products.

So you can get it now. Or start out with ProShare document conferencing and add video capabilities later.

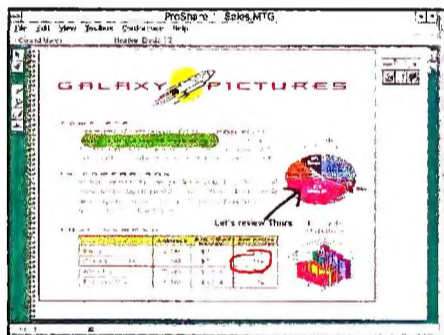
ProShare Personal Conferencing works with established technology.

With ProShare products, you can connect with an associate over a LAN, telephone line, or Integrated Services Digital Network (ISDN) line.† So ProShare conferencing works with technologies that are established and available.

ProShare products use a familiar Windows interface. The video products take advantage of Indeo technology, so you can record high-quality video to your hard disk or play and record Windows business audio (.WAV). And since ProShare products take advantage of these as well as other PC standards, you can start using personal conferencing immediately with the technology you have—and will have in the future.



Interact simultaneously within a shared ProShare screen.



Update OLE-enabled objects easily.



Upgrade easily to video capabilities.

Try ProShare software FREE for 60 days.

We'll send you a free Time-Out version just for the asking. See the back panel for details. And call **1-800-538-3373, ext. 184.**

intel®

†An ISDN line is required for video conferencing only. Check with your local phone company for availability.



With e-mail, you can't sit up and listen.





With a faxmodem, you can't speak your mind.





The ProShare family of personal conferencing products includes a range of features to fit your needs and budget, from document conferencing to more full-featured video systems. And all ProShare products have a built-in growth path, so you can start with just document conferencing and add video later. All levels have a common user interface and will interact smoothly with other ProShare products.

The safe choice because it's from Intel.

With PC technology, tremendous strides have been made in the way you work. And at Intel, we want to extend that technology into advancing the way

you communicate with others. By establishing industry standards, advancing personal conferencing technologies and creating alliances with domestic and international communications leaders, we're ready to pave the way for the next technological revolution—the Personal Conferencing revolution.

ProShare™ Personal Conferencing	System Requirements	Connection Requirements
Standard Edition Software <ul style="list-style-type: none"> • On-screen multi-page notebook • Document import and snapshot • Mark-up tools • Jump Start • Shared OLE • Save and print • Works with any Windows application 	<ul style="list-style-type: none"> • 386-based PC (or higher) • 4MB RAM (8MB recom.) • 8MB hard disk space • DOS 3.3 plus Windows 3.1 (or higher) • VGA or higher monitor 	<ul style="list-style-type: none"> • Novell Netware 3.11 or greater, NetBIOS (e.g. Windows for Workgroups 3.x, LANtastic 5.0) OR <ul style="list-style-type: none"> • 9600 bps modem (or higher) • 2 phone lines (1 for data, 1 for voice)
Video System 200 <ul style="list-style-type: none"> • All features above PLUS Audio and video recording • Capture and share high-res stills • Simultaneous local/remote view windows • Wide-angle/close-up video option • Sleek camera and unobtrusive earpiece with microphone • Analog video playback capability 	<ul style="list-style-type: none"> • 486-based PC (or higher) • 8MB RAM • 7MB hard disk space • Windows 3.1 • VGA/SVGA with 256 colors (or higher) 	<ul style="list-style-type: none"> • Basic rate ISDN phone line—2B channels and 1D channel • S/T interface or U interface with NT-1 converter • Modem required to use Jump Start • Modem required for personal conferencing without video



Try ProShare™ document conferencing software FREE for 60 days. We'll send you a free Time-Out version or more information. Call 1-800-538-3373, ext. 184.



Hewlett-Packard's Hot New Ink Jets: Enhanced Resolution and Color

To paraphrase Woody Allen, PC printer makers are like sharks: They either keep moving or they die. Hewlett-Packard is the largest survivor in the PC printer pond, which is why its recent movements in the ink jet market bear notice.

HP's latest DeskJets, the 520 and the 560C, replace the venerable 500 and 550C, two of the most popular ink jets in the world. The 500 and 550C have been around for a couple of years—a lifetime in the PC business—and time has not been kind to them. In *PC World's* January 1994 review of ink jet printers, the 500 could not compete with recently introduced products from Canon and Texas Instruments. In the color arena, Canon's BJC-600 gained a step on the 550C by offering 360-by-360-dot-per-inch (dpi) resolution, compared with the 550C's more standard resolution of 300 dpi.

Advances in Resolution

The 520 and 560C both print 600 by 300 dpi, twice the resolution of their predecessors. To bolster the higher dpi, HP has added resolution enhancement technology (RET). This en-

hancement means the printers position the dots to make edges appear sharper and reduce jaggies. The higher resolution and RET go hand in hand: At 300 dpi, the dots are so big they negate the effects of RET; at 600 by 300, dots are smaller, so sharper edges are not wiped out.

The other big improvement is a new color-rendering technology that HP calls ColorSmart. Let's say you have a page containing some text, a bar chart, and a scanned image. For best results, each element should be printed in a slightly different manner. Text should be sharp, so the printer should lay the ink down lightly. Bar charts, on the other hand, need to be bright and vibrant, so you want the colors to be applied thickly. Scanned images require *dithering*, which subtly mixes the three primary inks to approximate complex hues. While most color printer drivers render the page to optimize for either text, a chart, or an image, ColorSmart can render each element of the page separately in the most appropriate way.

If you want, you can override ColorSmart's decisions. HP uses the analogy of an auto-focus camera: You can figure out the shutter speeds and focal lengths yourself, or you can let the machine do it for you. While the technology is now available only for the 560C, HP will also



THE NEW DESKJET 560C features HP's ColorSmart technology, which renders each element of the page separately for best color results.

make ColorSmart drivers for the PaintJet XL300 and the DeskJet 500C, 550C, and 1200C printers.

Like the 550C, the 560C uses two ink cartridges—one for black, the other containing cyan, magenta, and yellow. Fortunately, it can use both cartridges on each page, so you get true, not processed, blacks.

Sweating the Details

Both printers have other, smaller enhancements. Both have an improved Windows interface, so when you open Print Setup, it's much more graphical and easier to use (a nod toward the burgeoning small office/home office market). The new interface supports rudimentary bidirectional capabilities. While not as robust as in the LaserJet 4s, the

bidirectionality gives you quick status reports on print jobs.

Both printers also sport an automatic envelope sensor, which tells the printer when you've stacked envelopes (up to 20 at a time) in the paper tray. (Canon's popular BJ-200 requires you to flip a switch when printing envelopes to adjust the printer for the thicker paper.) The HP printers also exceed the EPA's Energy Star requirements for low-power usage. They don't have a sleep mode or anything fancy; it's just that ink jets don't consume a lot of electricity.

Fortunately, one thing hasn't changed from the last generation of DeskJets: The 520 lists for \$365, just like the 500; and the 560C lists for \$719, just like the 550C.

—Dan Miller

Hewlett-Packard DeskJet 520 and 560C

New ink jet printers from the biggest ink jet vendor in the world.

Hewlett-Packard
800/752-0900

List price: DeskJet 520 \$365,
DeskJet 560C \$719; Post-
Script option for 560C \$249

Reader service no. 786

Lexmark's Better Keyboards for Faster Typing

Speed typists and mouse haters will like Lexmark's new group of keyboards. These well-designed products feature on-board pointing devices and a conveniently placed <Backspace> key that keep your fingers off the mouse and near the home row.

Perhaps the most interesting of the keyboards, the Classic Touch 101-Key features a pointing stick, previously found only on keyboards for notebooks such as IBM ThinkPads. This small round button, located below the G and H keys, can be manipulated with either index finger. The harder you press, the faster the cursor goes. Two mouse-click buttons sit beneath the <Space> bar. This keyboard also sports an Erase-Eaze key, next to the <Space> bar, which lets you backspace without taking your right hand off home row. An additional <Backspace> key sits in the traditional spot in the upper-right corner. Currently, this keyboard is available only with a PS/2 connection. Lexmark plans to introduce pointing stick models with AT and PS/1 connections but didn't have a firm release date at press time.

For now, those who don't own

Classic Touch 101-Key and Enhanced QT Keyboards

These new keyboards offer combinations of on-board pointing sticks, trackballs, and a <Backspace> key next to the <Space> bar.

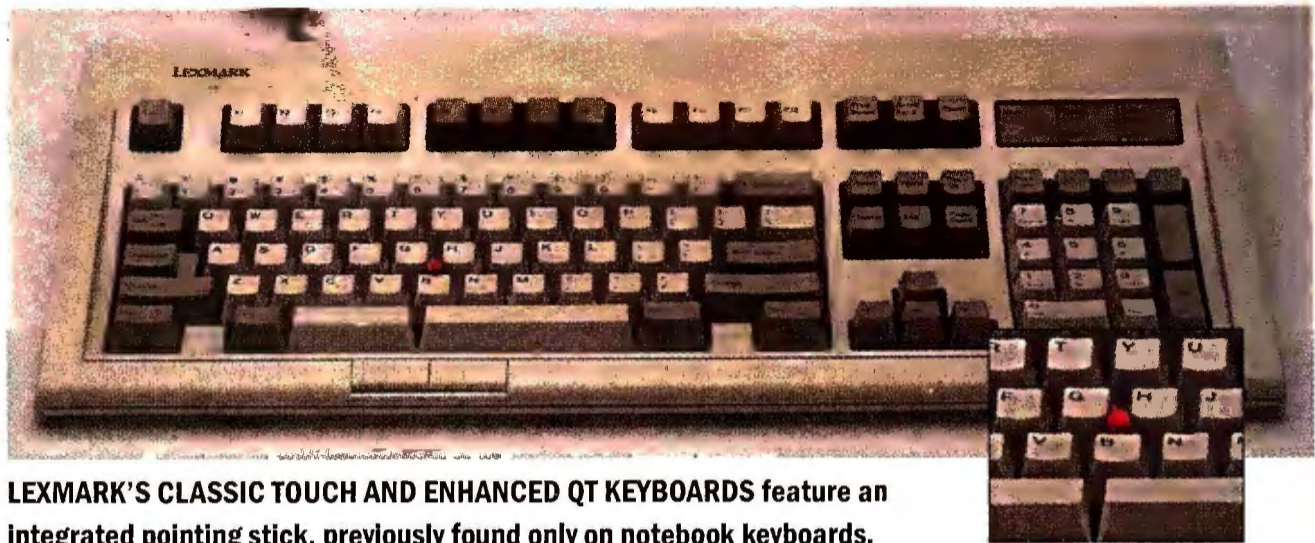
Lexmark Int'l

800/438-2468,

606/232-2000

List price: \$129 to \$149

Reader service no. 790



LEXMARK'S CLASSIC TOUCH AND ENHANCED QT KEYBOARDS feature an integrated pointing stick, previously found only on notebook keyboards.

PS/2s can opt for Lexmark keyboards with a trackball and the erase key or with just the erase key. All the keyboards are avail-

able in two styles of key response. The Classic Touch keys produce a firm response and a click; Enhanced QT keys give a

softer response. With all these options, you can pick a keyboard that's just right for you.

—Laurianne McLaughlin

AT&T 3227: Small Footprint, Low Price

When selecting a PC, you naturally lust for power, features, and expandability. But many people don't need a souped-up system in order to do their jobs. They can be sated with far less—say, a small, solid, reasonably priced system with enough power to run Windows and network applications. Like the AT&T 3227.

We examined a \$1695 model with a 25-MHz 486SX CPU, 8MB of RAM, a 160MB hard drive, and a 14-inch SVGA color monitor. The system unit was ruggedly built; its metal case should survive day-to-day rigors without cramping anyone's style or office. The device requires about a square foot of desk space, or about half as much space as a desk blotter occupies. This is one of the most compact systems in its price range, according to AT&T. In cramped quarters, you can stand the 3227 vertically.

To keep the system petite,

AT&T had to make some sacrifices. The product comes with only one expansion slot, which you'll most likely use for a network card. The 3227 also includes a VL bus Cirrus 5426 Windows accelerator integrated into the motherboard with 1MB of VRAM (the VRAM cannot be expanded). The chip displays up to 16.8 million colors at a resolution of 800 by 600 and provides a maximum noninterlaced resolution of 1024 by 768 with 256 colors.

Still, the AT&T 3227 offers a modicum of expandability. The base configuration includes 4MB of RAM and can be expanded to 32MB. To the system's credit, its 16-bit expansion slot and SIMM and CPU upgrade sockets were easily accessible once we had removed the cover.

The system and monitor are Energy Star compliant, meaning each can be set to power down to consume less than 30

AT&T 3227

If you want a network workstation for a cramped office, don't overlook this product.

AT&T Global Information Solutions

800/637-2600

List price: \$1695

Reader service no. 787

watts of electricity after a user-defined time period.

My only beef was with the keyboard. As someone who types a lot, I'm no fan of membrane keyboards such as the 3227's. These keyboards are typically mushy, and the AT&T's was no exception.

AT&T offers the product in a variety of configurations; CPUs range from a 25-MHz 486SX to a 66-MHz DX2. For the average Windows user, this system, with its many options, should prove more than adequate.

—Randy Ross

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Of sweet things to come...

What's Cooking? in Marketing

The following article was printed in a recent edition of "Today's Entrepreneur" and features an informative look at the future of Three Peppers Catering.

Three Peppers Revs Up Catering Market

In early 1991, armed with a few thousand dollars and a slew of her grandmothers' authentic Mexican recipes, Amy Silva launched Three Peppers Catering, the city's first Mexican and Mexican-inspired catering company.

the development of a new direction for the company. It serves customers ranging from small private parties and corporate events to large banquets and weddings.

with the device packaged food is easy to move around without having to be carried. One might be tempted to think that the device would be used with closed packages.

recently use the device for the Three Peppers Catering. It's a great place to start a new business.

Highlight key information using automatic table generation. Even rotate text for creative headings.

Preserve the visual impact of your document by anchoring graphic frames to relevant text.

Easily create structured documents using the automatic generation of page numbers, running headers and footers.

THREE PEPPERS NEWSLETTER

A message from the president...

Greetings Three Peppers customers! Welcome to the first edition of Three Peppers News. Since I had so much fun using CorelDRAW to design my corporate identity materials and advertising, I decided to use Corel Ventura to create this new newsletter.



Our President, Amy Silva, looks like fun.

New Year, New Menu

The success of our traditional Mexican and southwestern menus has prompted us to continue to develop new recipes and menus for you to enjoy.

Multimedia Menus Makes Decision Making Easy!

Talk about show and tell! Three Peppers Catering has a new multimedia menu that bound to make your mouth water.

A Taste for Trivia

What is chili spice made of? Call or E-mail your guess to the Daily Salsa... It is a hot one!

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PowerViewer

It's 9:00, Monday morning and you've just 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 PowerViewer™ for Windows™, 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.

Create Stunning Reports.

templates that enable you to create stunning 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.

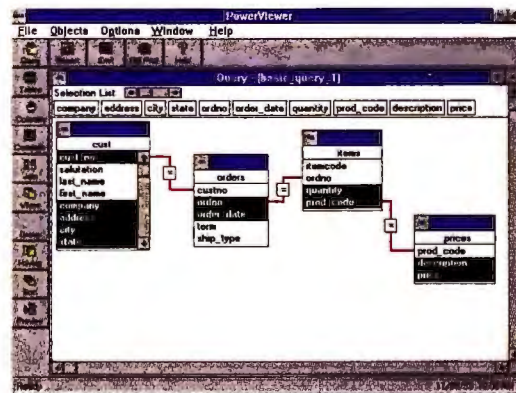
PowerViewer, Just \$99.*

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.

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. Click. Now you're ready to create your report. You select one of the many built-in QuickStyle

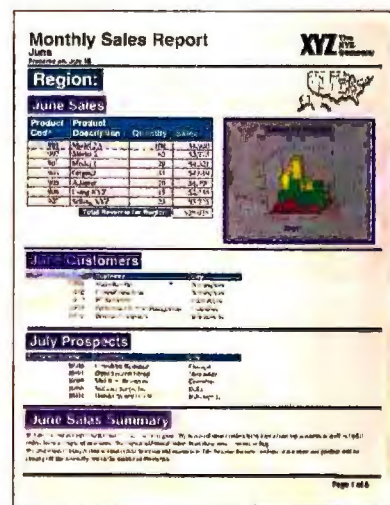
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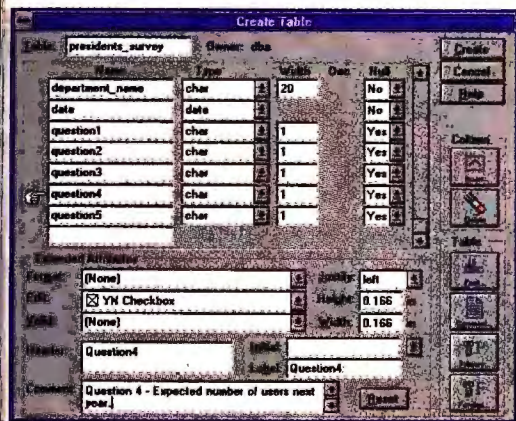


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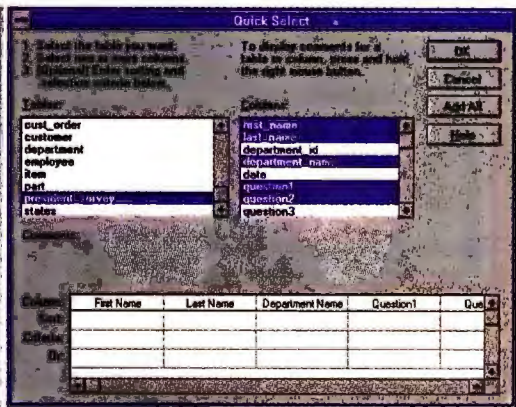


* Prices valid on orders placed between March 1 and May 31, 1994 and do not include sales tax, shipping or handling. All trademarks and registered trademarks are property of their respective owners.

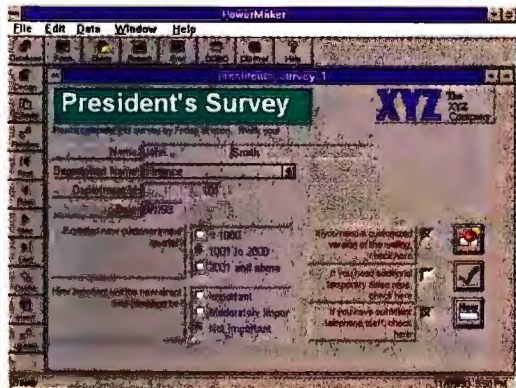
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Click. Next, you access the Form Painter. Another touch of the mouse links your database to the survey form you're about to create. Then, just like when you created your report earlier, you simply choose a QuickStyle form template, layout your survey and customize it in seconds. Edit text. Rearrange questions. Add toolbars. Bring in all the bells and whistles. In minutes, you've created your very own Windows application.

PowerMaker, Just \$199.*

Click. Now, it's time to distribute your application to the world. PowerMaker not only enables you to share your applications with everyone on your network; it lets you do it without any user runtime fees. So you just put your "President's Survey" on the network and tell your colleagues it's coming. They simply click open the icon and fill in the blanks. Your

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. **P**owerMaker 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. **A**nd 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 satisfaction guarantee. **T**o order 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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Managing Your Money Offers Electronic Banking

Using Managing Your Money for Windows 1994, you can organize your checkbook, plan to buy a house, keep tabs on spending, and analyze retirement funds. You won't find many \$80 investments that perform as well as this one. The first Windows version of Meca Software's popular personal finance program provides an appealing interface, an improved checkbook register, new graph and report galleries, and helpful financial advice.

Banking by Modem

You may like this product even more when tax time comes. Starting in April, Meca Software, in partnership with specific banks, will sell companion disks that let you bank electronically. Electronic banking is in its infancy but will soon become a must-have for software vendors and banks. This technology allows you to perform many financial transactions via modem. For example, to move \$500 from savings to checking, you click an icon in Managing Your Money, call your bank via modem, and order the transfer. Meca wouldn't announce its partner banks or companion disk prices at press time, but plans to do so during the year.

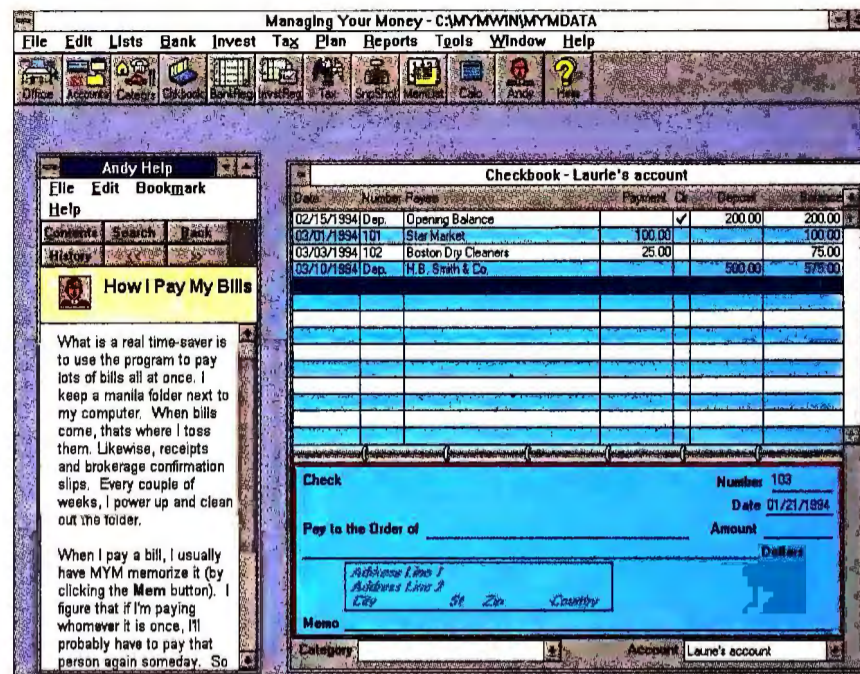
Microsoft was the first to

introduce an electronic banking feature. Its personal finance program, Money 1.0, allows electronic banking with three regional banks. Now Meca wants to provide the same convenience.

Home Office Interface

Managing Your Money for Windows boasts many strengths, led by its new Windows interface. If you're new to personal finance software, you will appreciate how easy it is to get started with this program. The opening screen shows a picture of a home office, with labeled parts. Click the labels to access the various software modules, such as investments, checkbook, and reports.

You start by setting up accounts, such as checking and savings. Each account has a register in which you enter payments, deposits, and charges. One notable improvement in the Windows version is the checkbook. The DOS version of Managing Your Money shows the checks and the register on separate screens. The Windows version shows them both on one screen, just like a paper checkbook. You can order checks from Meca and print them on your dot matrix, ink jet, or laser printer.



MANAGING YOUR MONEY for Windows 1994 provides a convenient checkbook screen and financial tips from Andrew Tobias.

For help with long-term financial issues, check out the Plan feature. This tool provides what-if scenarios and advice on topics such as life insurance, tuition, and retirement planning. Want specific advice? The Windows version makes it easy to find. While the DOS version of Managing Your Money includes tips on various subjects from financial expert Andrew Tobias, you have to press <F1> and scroll through a long menu to find them. In the Windows version, you just click the Andy icon (you'll see his mug at the top of the screen).

The investments module is another Managing Your Money for Windows strength. It helps you create and maintain records of your stock portfolio, real estate holdings, and other investments. It also helps you set up hypothetical accounts when you're trying to decide whether to make an investment. The program offers specialized calculators that figure bond yields, savings yields, and compound interest. They can help you decide if specific in-

vestments are worthwhile and if current investments are paying well. New report and graph galleries help you do your own financial analyses.

MYM can also get you organized for tax time. It will estimate what you owe in federal taxes, collect the necessary data, then export your tax information to Andrew Tobias' TaxCut or any other tax program that supports the TXF file format.

With all this financial work humming along easily, you'll have free time to think about fun things. Like spending.

—Laurianne McLaughlin



A HOME OFFICE INTERFACE makes it easy to access MYM's features.

Managing Your Money for Windows 1994

WINDOWS Windows version of popular personal finance program offers electronic banking, an easy-to-use interface, and plenty of financial advice.

Meca Software
203/256-5000

List price: \$79.95

Reader service no. 605

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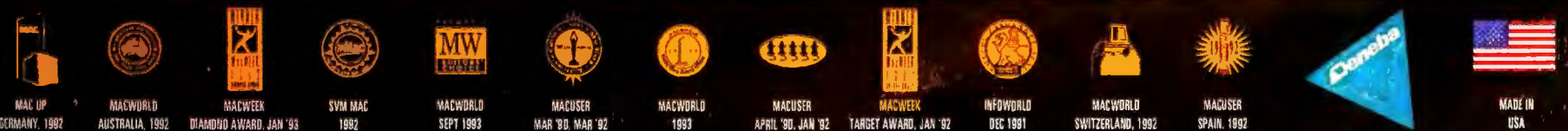
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Data and Development Tools for Novices and Experts

After releasing a major upgrade of CA-Realizer, its BASIC-based visual programming tool, Computer Associates is preparing to release a program with more universal appeal: CA-Visual Express, a querying tool designed for end users and programmers alike.

According to the company, CA-Visual Express offers several ways to query your data. For novices, there's the Quick Query tool, which sets up your query by walking you through a series of simple dialog boxes. More experienced users may prefer the Paradox-like Query by Example tool. But if you're comfortable writing SQL statements, you can simply type out your statement or use a dialog box of command options to help you with the syntax. Or you can design a query with Quick Query or Query by Example, then pop up and edit the resulting SQL statement. You'll also be able to design canned queries for other users.

CA-Visual Express

WINDOWS This something-for-everyone data access tool is designed for novices, programmers, and everyone in between.

List price: \$495

Reader service no. 606

CA-Realizer 2.0

WINDOWS Visual BASIC programming tool not from Microsoft comes with Windows and OS/2 compilers.

List price: \$247

Reader service no. 607

Computer Associates

800/225-5224,

516/342-5734 (fax)

To help reduce network traffic, CA-Visual Express lets you save the results of your query as a personal database on your desktop PC. That way, you can examine results and prepare reports without slowing down other LAN users. A personal database can be in any format CA-Visual Express supports.

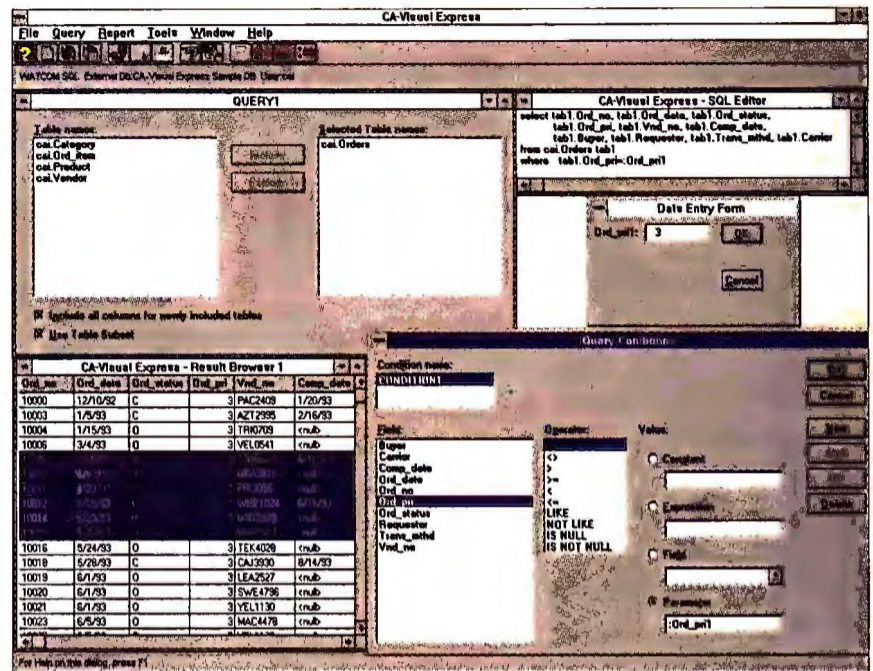
CA-Visual Express employs Q&A's implementation of Microsoft's Open Database Connectivity (ODBC) standard for near-universal data access, and comes with more than 20 drivers, including ones for dBASE, Paradox, Excel, and Oracle and Sybase SQL servers. The program will contain all the reporting capabilities of CA-RET, Computer Associates' data reporting tool.

Computer Associates has also added ODBC support to CA-Realizer, the company's BASIC-based graphic application environment. With CA-Realizer 2.0, you can create BASIC programs that access ODBC drivers (CA-Realizer doesn't come with the drivers), as well as programs that import and export dBASE data.

Unlike CA-Visual Basic, CA-Realizer's graphical form designer generates BASIC code, allowing you to design a window visually, edit it as code, then bring it back into the designer for more visual adjustments. Version 2.0 also adds right-click property inspectors (click an object to get information about it and menu options for changing its properties).

CA-Realizer 2.0 comes with two compilers in the same box, so you can create both 16-bit Windows and 32-bit OS/2 applications from the same code.

—Lincoln Spector



COMPUTER ASSOCIATES' CA-VISUAL EXPRESS offers multiple ways to query data—some for the novice, some for the database professional.

Baarns Simplifies Excel Tasks

The new release of The Baarns Utilities, an add-in for Microsoft Excel, is just the thing for any Excel user who's been heard to exclaim, "Gee, I just wish it would..."

As in "I wish there was a quick way to make a column of text appear in uppercase." You could do it yourself with the UPPER() function, but it's a lot easier to click the Baarns button and choose from upper- or lowercase, initial caps, sentence format, and so on.

Baarns can do a lot more. How about path aliases and extended file names to help organize your worksheet files, and descriptive names for directories? Or Baarns's enhanced auto-save command that (unlike Excel's auto-save add-in) creates a BAK file instead of overwriting your worksheet? If you bill your Excel hours, a timer can record your time.

The Template wizard helps you set up a worksheet as a

read-only template. The File New command, reminiscent of Microsoft Word, offers a menu of templates to serve as the basis for your new workbook.

The fit and finish of these add-ins is impeccable, and at \$89.95 The Baarns Utilities 5.0 is a cost-effective accessory for the serious Excel user. These utilities have attitude, to boot. How can you resist a dialog box that candidly offers you this option: 'Procrastinate'?

—Richard Scoville

The Baarns Utilities 5.0

WINDOWS Excel add-in simplifies routine tasks and improves worksheet management.

The Baarns Consulting Group Inc.

800/377-9235,

818/364-6148

List price: \$89.95

Reader service no. 608



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*John Craig
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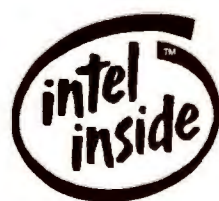
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ScreenCam is Lotus's unique multimedia program that lets you capture sound and Windows screen activities such as display, cursor, and mouse movements. By recording these Windows-based activities and adding voice instructions, you create "movies" that teach fellow computer users how to perform certain activities on a PC.

ScreenCam

WINDOWS To easily demonstrate software tasks to PC users, record on-screen functions and add voice instructions with this utility.

Lotus Development

800/343-5414

List price: \$79, also included in upcoming multimedia version of 1-2-3

Reader service no. 609

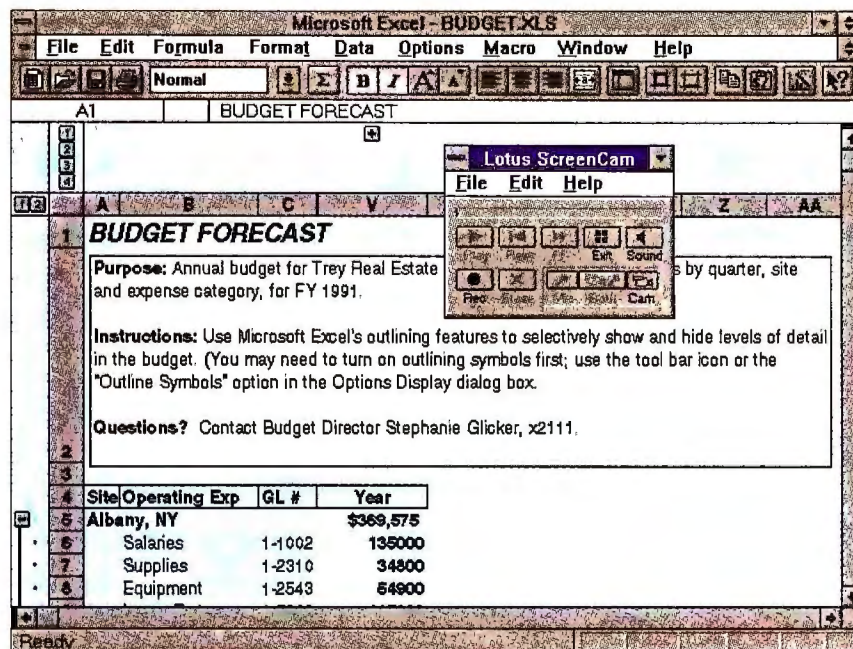
Say you design a new report form or expense sheet for your sales team. You could create a ScreenCam movie that demonstrates how to fill out the form, with your voice explaining each step. The product also lets you share and demonstrate ideas with other users. If you want to show a client a new logo and collateral pieces, you could create a movie that describes what you've done and why.

It's easy to create and play ScreenCam clips. First you load the application you want to record. Then start ScreenCam, return to the other application, click *Record* on ScreenCam's on-screen recorder, and do what you want to do. By moving the mouse, entering keystrokes, and speaking into a microphone connected to your sound board, you can capture and explain anything that happens on

screen. After pressing the Stop button, you can save the clip as a ScreenCam file or as an executable file that includes the clip and a run-time player so even people without ScreenCam can play your movie.

ScreenCam clips are relatively small in size. The vendor claims that they consume only a fraction of the disk space required by a video product capturing the same screen activity.

—Randy Ross



MAKING SCREENCAM MOVIES is incredibly easy. Simply click the Record button on the ScreenCam interface, and you're ready to capture screen activity and voice annotations.

CrossTies: Sophisticated Information Management

CrossTies for Windows is not a PIM. It's not a database, and it isn't an operating environment. It's all three. CrossTies for Windows links related files—no matter what format—and integrates them in an object-oriented database.

Geared for business people, such as lawyers, salespeople, and real estate agents, whose work is client based, CrossTies for Windows creates a database object for each client's name, linking documents, E-mail messages, faxes, spreadsheets, and other information to the name. The advantage to using CrossTies, as opposed to Windows' File Manager, is that each CrossTies object can contain a

program, a file, and a directory folder. You can group related data into folders—and you don't have to keep track of file names and extensions. Plus, you can create object names 256 characters long.

To begin a project, click the Open dialog box and type in a new client's name. You then link the client to existing projects by clicking Related Fields icons, which represent activities such as E-mail and fax.

Say you're typing a memo to Bob Jones about the company picnic. You can name the object "Memo to Bob Jones about the company picnic." By clicking the Link icon, you can associate the memo with any other infor-

mation you have about the company picnic, such as a spreadsheet detailing expenses, E-mail on who's carpooling, and a calendar showing the date.

A single file, CROSSTIE.ODB, contains all the CrossTies objects. An object can be displayed as an icon or as a window. You can also delete objects and unlink them. The undelete feature allows you to restore objects along with their original links.

CrossTies for Windows lists for \$149 and eats up 11MB of disk space. It can use Microsoft Mail and Lotus's cc:Mail to transport E-mail across a LAN, but you must view and send your messages exclusively via

CrossTies. You need a fax-modem to take advantage of CrossTies' fax and automatic phone dialing features. Improved E-mail and network integration are planned for the next release of CrossTies, according to the vendor.

—Caroline Jones

CrossTies for Windows 1.0

WINDOWS An object-oriented database to link all your related files.

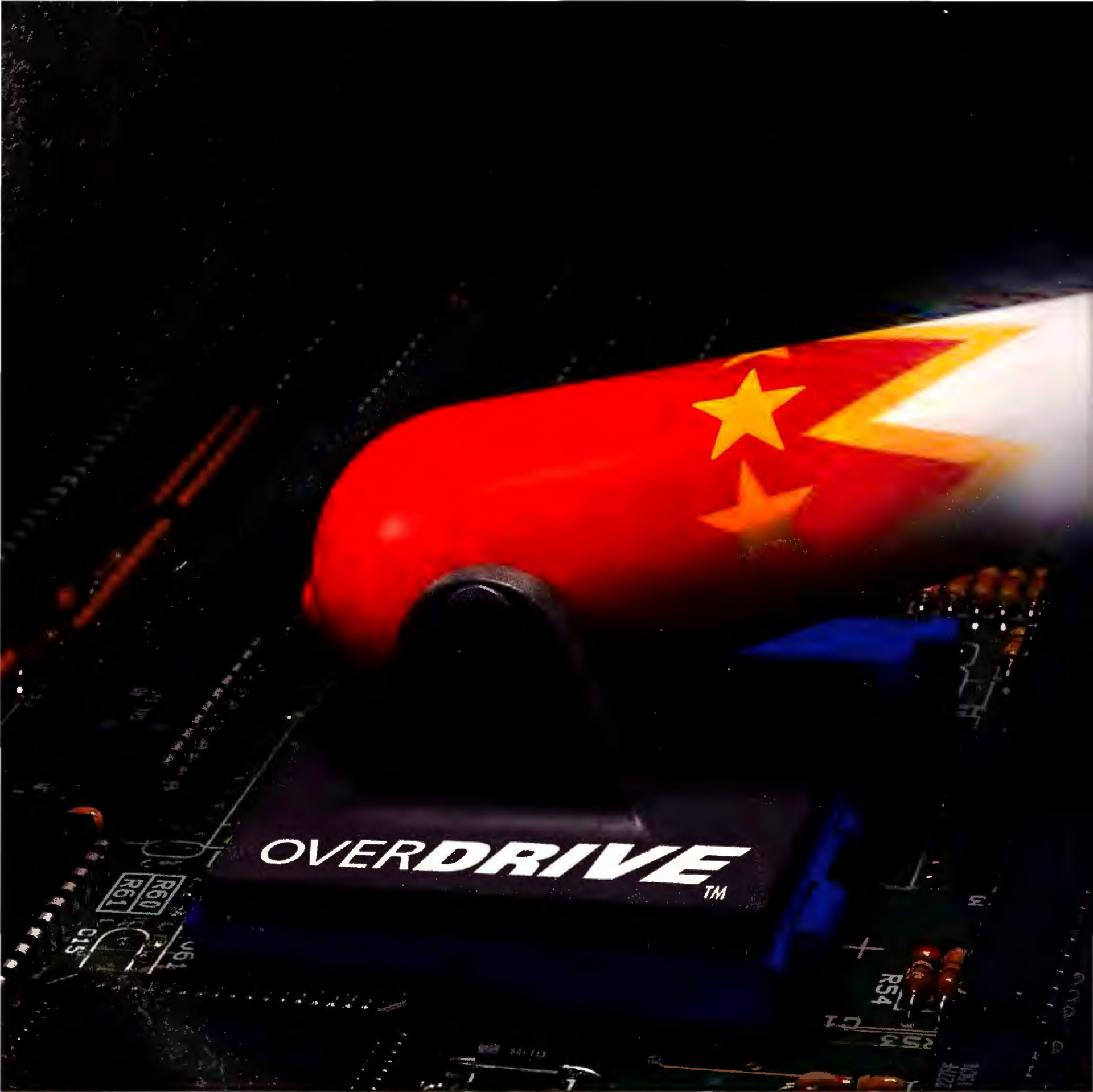
CrossTies Software Corp.

800/955-8437,

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List price: \$149

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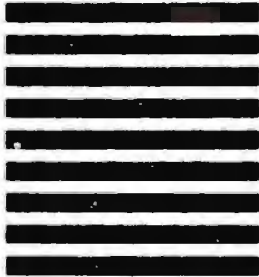
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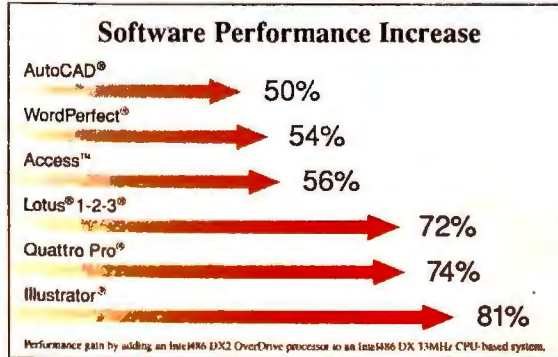


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mance of your software, call 1-800-354-3112, Ext. 5730,* for a free demo disk. It could be the greatest show on earth.

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Art 101: Dabbler for Windows

Dabbling in the arts? Fractal Design's \$99 how-to-paint program is for novices of any age who want to learn to paint without the mess. Combining Walter Foster's *How-to-Draw* manual with on-screen tutorials, Dabbler for Windows teaches you to create compelling art. You follow step-by-step lessons that cover such topics as casting color nuances and shadowing, and take advantage of Dabbler's powerful 16-bit color painting effects.

Dabbler's intuitive menu scheme is image-based, sporting easy-to-identify icons and task-oriented sound cues—as opposed to obscure menu lists and dialog boxes. To select an option, simply touch a drawer handle and open drawers that contain a variety of paper textures, colors, pencils, chalks, crayons, erasers, pens, and watercolor brushes. You can enhance your artwork using special effects, too, including motion blur, glass distortion, and brush strokes that mimic famous artists.

Aspiring artists can create paintings by drawing over photographs using a variety of tools, or pay homage to Seurat or Van Gogh by recreating their effects on your images. Once you've applied the chosen effects to your masterpiece,

you remove the original image and save the remaining "painting" in one of several formats, including PCX, TIFF, RIFF, BMP, or EPS. You can also open files in Dabbler's older cousin, Fractal Design Painter, for more complex projects.

System requirements are modest: You'll need at least a 386, 4MB of RAM, and 256 colors for unhindered performance. Although a regular mouse will work, pressure-sensitive tablets are recommended for optimal drawing effects. (Note: goatee not included).

—John Goddard



LEARN TO PAINT with Fractal Design's Dabbler, an inexpensive paint program that guides beginners through step-by-step lessons.

LAN and E-Mail Support Bolster Act 2.0 for Windows

A longtime leader in contact management software, Act 2.0 for Windows offers several noteworthy enhancements to its very popular DOS and Windows predecessors. These include network support for NetWare 2.11 and later, LANtastic 4.0 and later, and Windows for Workgroups 3.11 and later; integrated mail messaging for popular E-mail software including cc:Mail and Microsoft Mail; and enhanced calendar and address book printing.

Version 2.0's new network capabilities let you or a designated supervisor create specific privileges for your work group's contact database. You can assign individual passwords, log-in IDs, and up to five levels of security for read-write access to a database and to any user-definable subgroup. For example, a supervisor could prevent inexperienced sales folks from accessing a contact database that covers clients that have

special financial requirements.

If you've ever had to switch from Act just to send a mail message, the new messaging capabilities will seem a godsend. You set up mail addresses by selecting Mail in a drop-down menu. You can even broadcast messages to dissimilar E-mail systems.

The final major enhancement to Act 2.0 is calendar and address book printing. Options now include printing calendars and address books in several sizes in Day-Runner, Day-Timer, FiloFax, Franklin, and Avery formats.

The program still provides a detailed forms-based presentation of contact facts in 70 fields (most customizable) in two screens. There's a powerful word processor, a report generator, a configurable icon bar, a handy status bar, and very flexible search capabilities.

We experimented with a very stable prerelease version of Act

Act 2.0 for Windows

WINDOWS Added network support, E-mail, and enhanced printing features make this popular contact manager among the best in its class.

Symantec

800/441-7234,

503/334-6054

List price: \$279.95, upgrade

\$69.95, four-node net pack

\$799, four-node upgrade

\$179.95

Reader service no. 612

2.0 for Windows. Our only complaint is that the abundance of features might confuse a new user—short definitions of button functions would be helpful. Nonetheless, if you're a longtime Act user or if you're choosing a contact manager for the first time, Act 2.0 for Windows is worth a serious look.

—Gene Smarte

Dabbler for Windows

WINDOWS Dabbler's easy-to-learn drawer interface makes learning to paint fun.

Fractal Design Corp.

800/297-2665

Suggested retail price: \$99

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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.

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New Titles

A Great PIM for Work and Play



THE PLANIT SERIES USES AN ELECTRONIC notebook-planner metaphor, spiced up with sound, photos, and video.

If your boring personal information manager (PIM) is putting you to sleep, take a look at the new Personal Daily PlanIt series from Media Vision. The PlanIt series uses the familiar electronic notebook-planner metaphor but includes hundreds of photos, videos, and stereo sounds with entertainment options to keep you perky for every event.

You can choose from a number of modules in the series, each featuring theme-related multimedia material based on its title, plus voice recognition capabilities. For example, PlanIt Earth contains photos and video footage of wildlife, while PlanIt Adrenaline (the copy we evaluated) offers skiing, surfing, rock-climbing, and other rad adventures.

PlanIt's interface features nine configurable launcher buttons programmed for trivia, jokes, fortunes, motivators, fun quotes, a daily learn-a-word feature, birthdays of the rich and famous, a file manager, and a slide show that displays full-screen images of PlanIt's great photographs. You also can pro-

gram the launcher buttons to start applications of your choice. You can import photos and assign them to specific days, weeks, months, and years, so you're not locked into using only the images PlanIt provides.

PlanIt is available in CD ROM and disk versions. The \$59 CD ROM requires a minimum 15MB of hard disk space, or a whopping 32MB if you want to install all the features. The \$49 floppy version requires 10MB and has all of PlanIt's features, but fewer images. In either case, we think that you will find the PlanIt series a refreshing change from the business-as-usual PIM.

—Gene Smarte

Personal Daily PlanIt

WINDOWS This entertaining information manager offers business users a multimedia extravaganza.

Media Vision

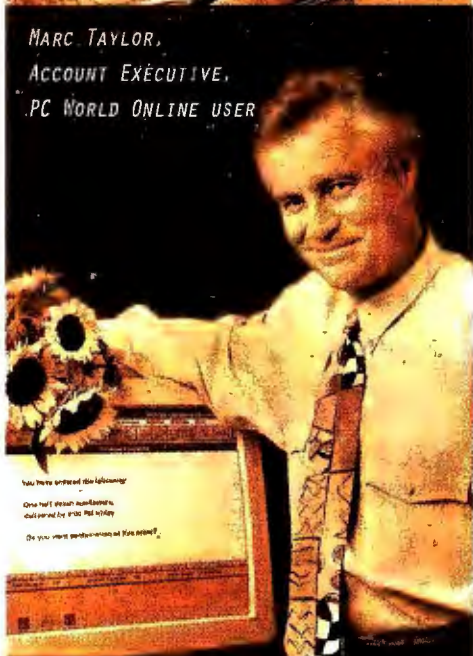
800/845-5870

List price: CD ROM \$59; disks \$49

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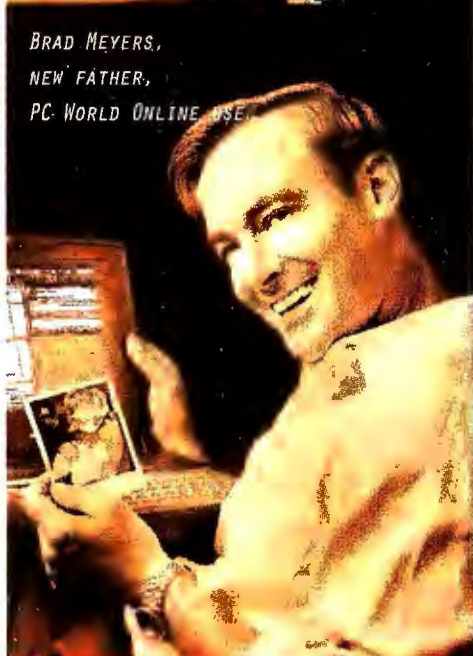


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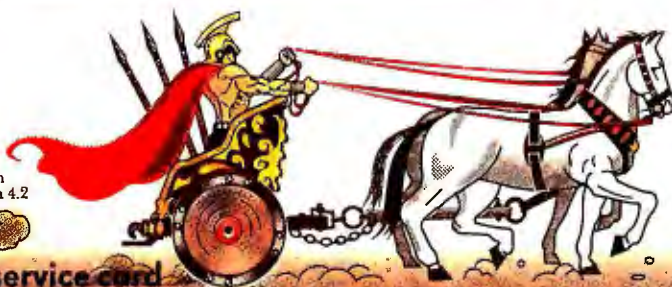
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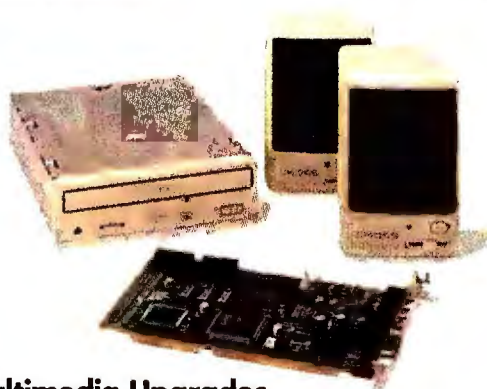
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Quicken on CD: More Than Just Check-Writing

Your first question when you hear about the CD ROM edition of Quicken for Windows might be, What's the point? But Intuit's latest release is more than just a repackaging of its best-selling personal finance package. It's a comprehensive resource that covers a

Quicken for Windows CD ROM Deluxe Edition

The best-selling personal finance package is supplemented with video and interactive articles designed to demystify financial issues.

Intuit

800/624-8742

List price: \$124.95

host of financial matters, from paying your bills to figuring out how to finance your child's college education or retire when you're 50.

The Deluxe Edition includes the current versions of both Quicken for Windows and Quicken Companion, an add-on that includes home inventory tracking, a tax estimator, and online stock information. Intuit is the first personal finance software developer to jump on the CD ROM bandwagon, but what makes this package really unique is the educational material included with the software.

Upstart rival Computer Associates introduced the concept of educating users when it released CA-Simply Money with

financial advice from the editors of the *Kiplinger Letter*. Intuit has taken a different approach with the Quicken for Windows CD ROM Deluxe Edition: Instead of incorporating the advice into the core application, Intuit has kept the educational component separate.

Teaming up with the *Wall Street Journal*, Intuit has put together a package that uses interactive articles and full-motion video to explain and simplify a variety of financial matters. Items range from a guided tour of the stock exchange to articles on investing, mortgage refinancing, and college tuition planning. And once you read about a financing strategy that interests you, click

on an icon to complete a worksheet using your personal financial information.

The package includes summary information on more than 6000 stocks, including trend graphs, profit-to-earnings ratios, and yields. The CD ROM also contains the full text from a variety of U.S. government publications on personal finance, covering such topics as retirement planning, life insurance, and tips for choosing financial professionals.

The Deluxe Edition carries a suggested retail price of \$124.95 and a street price ranging from \$60 to about \$75. You can also buy Quicken directly from Intuit for \$84.95.

—Roberta Furger



It's about time a computer company listened to my needs. Not just tell me what they think I need.

Microcom's LANexpress Simplifies Remote Computing

If ever magic crystals and good-luck charms should be required equipment for PCs, it's when running remote control software. Using a remote package can be extremely frustrating. Incompatibilities are rampant: DOS remote packages may not fully support Windows applications; Windows packages are notoriously slow, even with 9600-bps modems and data compression software; and if the remote software doesn't fully support your "Hayes-compatible" modem, you're a candidate for system crashes and lost phone connections.

Microcom's new LANexpress Remote may not solve all the problems of remote computing, but it does add some worthy

enhancements to the genre. Most notable is the mixing of *remote node* and *remote control* capabilities. While different vendors define these terms in different ways, for our purposes *remote node* refers to a PC that dials into a network from off-site and receives the same rights and privileges as any other node on the LAN. By comparison, *remote control* refers to the ability of a remote PC to control a network node. With LANexpress, a single phone call lets you run both *remote node* and *remote control* applications.

Hard to Set Up, Easy to Use

While LANexpress succeeds in simplifying remote computing

for Windows users, installing the program should be left to the experts. The product consists of the LANexpress Server, which is a turnkey system that includes an ethernet or token-ring network card, a hard drive, a 3½-inch floppy drive, and up to four expansion cards, each of which holds two Microcom V.fast (28.8-kbps) modems.

For end users, the most significant component is the LANexpress Remote software, which is installed on your remote PC. Even with assistance from Microcom's technical support, I found installing this software to be an arduous chore, particularly because it requires a knowledge of network node addresses, interface cards,

LANexpress

Microcom combines remote node and remote control capabilities in one program.

Microcom

800/822-8224,

617/551-1021 (fax)

List price: \$3499 to \$8899

Reader service no. 715

and other LAN esoterica. This is a job best left to the LAN administrator.

However, using LANexpress is much easier. When you load the program, the LANexpress Remote window appears. This window consists of two rows of "push buttons," which are oversized icons that you click to per-



Our new 75MHz notebook gives you

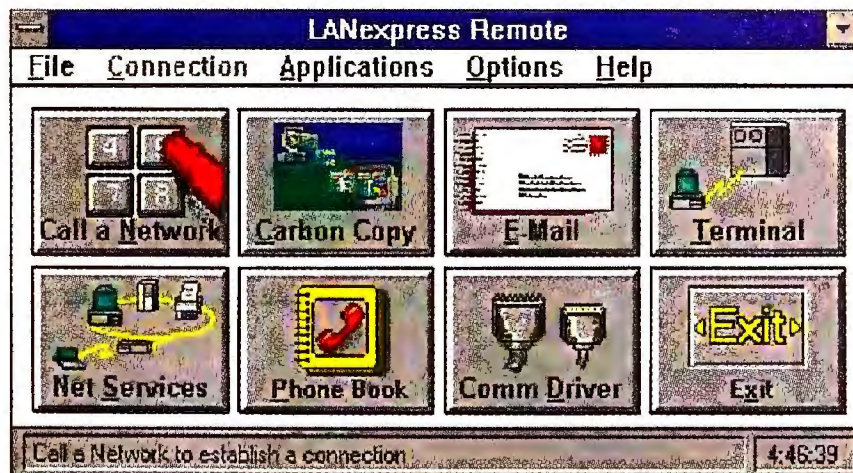


form tasks such as connecting to a remote server, accessing E-mail, or configuring your communications, network, and modem settings.

Since a copy of Microcom's Carbon Copy for Windows remote control software is integrated into LANexpress, you can access remote node and remote control features from the same interface. For instance, if you're running a word processor on your notebook and you need a document that's stored on the LAN in your office, you can use LANexpress's remote node capabilities to access the document. However, if you need to run an application that's loaded on your office PC, remote control is your best bet.

The Faster the Better

To run LANexpress with a minimal amount of delay and frustration, you'll want the fastest modem that you can afford. Even with a 14.4-kbps connection, I found the program's remote control capabilities too sluggish for graphics-intensive applications. For instance, running a PowerPoint presentation was a drag—literally—as graphical images of medium complexity scrolled slowly across my remote PC's screen. The PowerPoint slide show was significantly faster when run at 24 kbps (using Microcom's DeskPorte modem, which operates at speeds of up to 28.8 kbps). However, many mainstream business applica-



EASY REMOTE COMPUTING: MICROCOM'S LANexpress features a convenient icon-based interface that combines remote node and remote control capabilities in one simple-to-use package.

tions, such as word processing and electronic mail, should work fine at 14.4 kbps.

LANexpress is available in two-port, four-port, and eight-port server versions, with prices ranging from \$3499 to \$8899.

Licenses for the LANexpress Remote software range from \$25 to \$50 per copy. Microcom also sells its 28.8-kbps DeskPorte Fast and TravelPorte Fast modems for \$499 each.

—Jeff Bertolucci

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. And that's why we've created a new way for you to save time and increase productivity — with the TravelMate 4000E WinDX4/75 notebook.

You'll find a lightning-fast 75MHz IntelDX4 processor inside. Combined with our innovative system architecture, your TravelMate notebook will scream with speed. And with 3 to 5 hours of battery life, you can be more productive even when you're on the go.

something that's hard to come by—more time.

But the 75MHz IntelDX4 processor is only the beginning of a great performance story. You also have your choice of hard disk drives and active color matrix displays. For example, our powerhouse combines a large 9.5" display with a 455MB hard disk drive. With it, who needs a desktop PC? The TravelMate 4000E WinDX4/75 does it all.

Finally, a notebook that not only helps you beat the clock, it helps you be more productive: the TravelMate 4000E WinDX4/75 from Texas Instruments.



ti TEXAS INSTRUMENTS

Network Faxing From Delrina

Networked offices that have light to moderate faxing requirements can get to the facts fast—and inexpen-

WinFax Pro for Networks

WINDOWS Companies with light to moderate faxing requirements can save a bundle with this new product from the purveyor of the most popular fax software.

Delrina Corp.

800/268-6082,

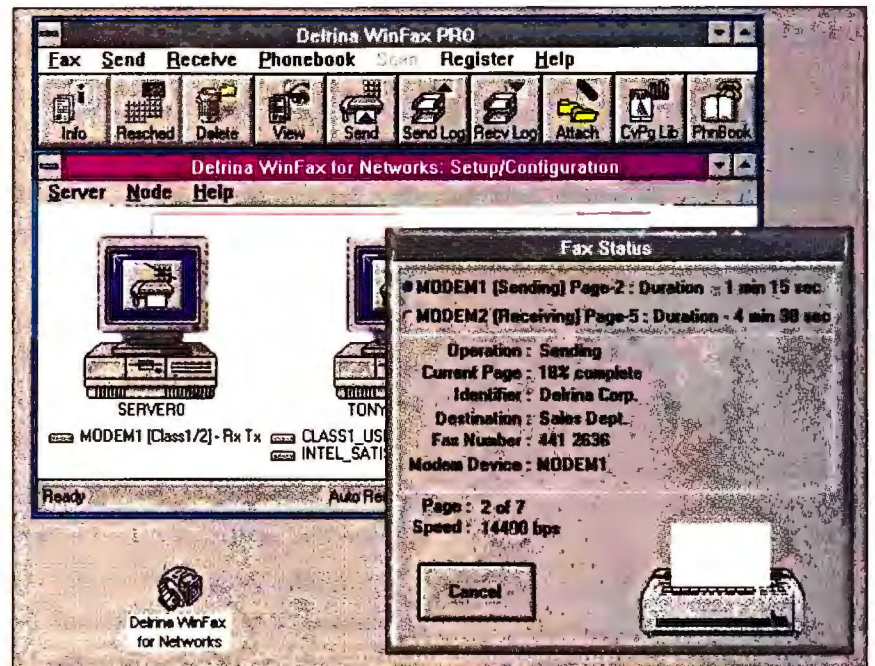
408/363-2345

List price: \$399 for WinFax Pro for Networks server and two clients; additional user packs \$999 for ten users

Reader service no. 716

sively—with WinFax Pro for Networks. While fax-modem setups are about as reliable as English sports cars (that is, they're likely to go up in flames at any given moment), it's hard to argue with the convenience and price of a network-based package that gives everyone in the office a "fax machine" for about \$100 per user.

WinFax Pro for Networks is built around the leading Windows fax package on the market—WinFax Pro 3.0—and works in most popular small-office network environments, including NetWare, LANtastic, and Windows for Workgroups. Overlooked is support for UNIX, Macintosh OS, and Windows NT, environments



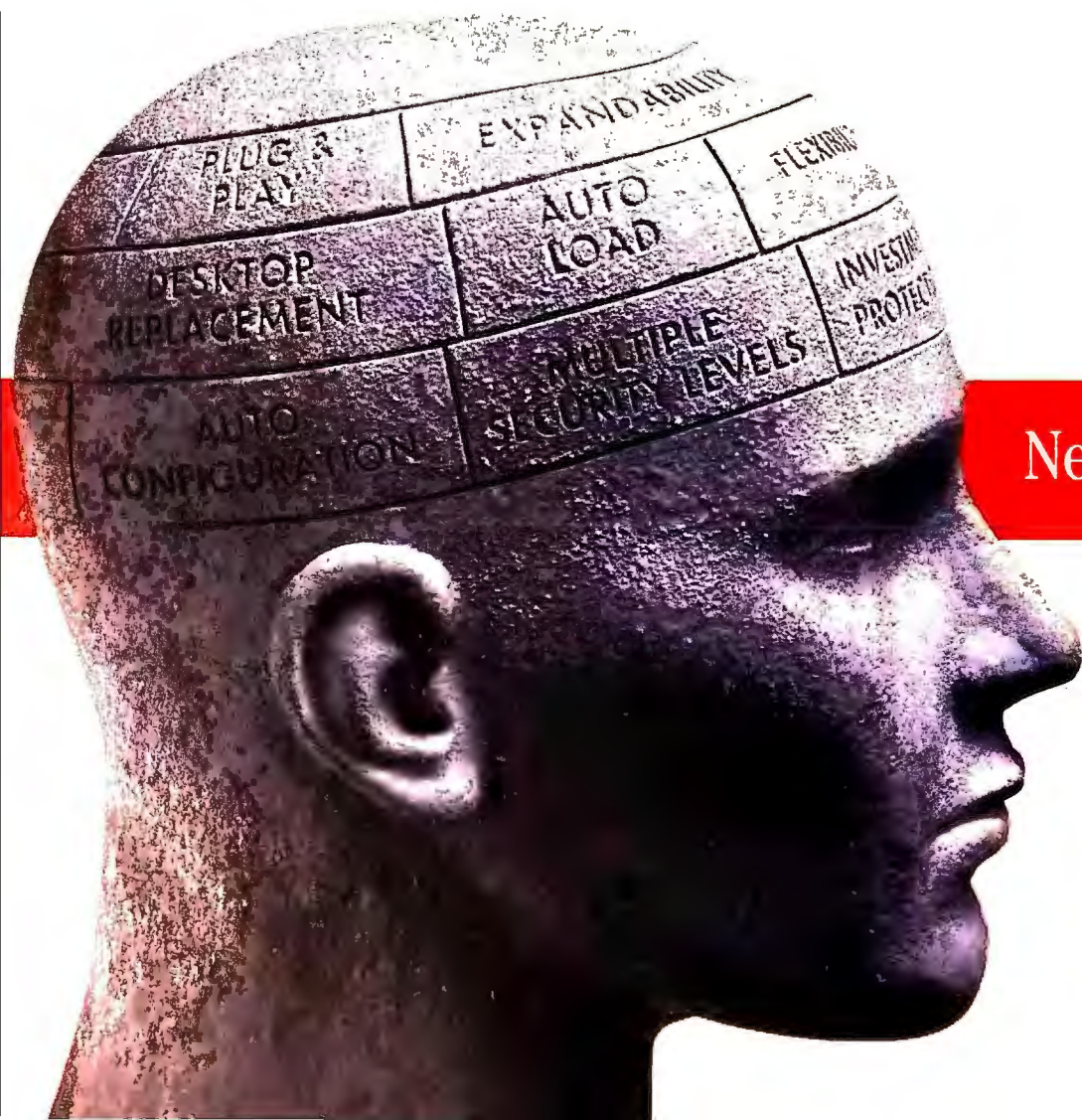
PRESENTATIONS AND WHITE-BOARD DISCUSSIONS are accessible by all participants via network or modem connections.

likely to be found in corporate America, which presumably can afford real fax machines.

WinFax Pro for Networks allows users to access up to four fax-modems on four servers. It

provides all of the standard WinFax Pro features, such as optical character recognition, fax markup, archiving, forwarding, and cover pages.

—Joe Abernathy



New Intelligent Docking: So smart it



Documents to Go, With Styles in Tow

The problem with sending formatted documents across E-mail or on disk is that while the document may get there, the format may not. Your carefully crafted document may get an unwanted face-lift—with different typefaces, and unviewable graphics.

Fortunately a handful of new programs let you move documents between platforms without losing the design or having to pack your fonts and graphics files along for the ride.

ElseWare's \$129.95 Font Works takes the nasty font surprises out of moving documents between Windows PCs, Macintoshes, and even some pen-based systems. When Font Works is installed on your sys-

tem, it identifies each typeface in a document and generates the closest match from its library of 150 fonts. Font Works substitutes look-alikes for up to 2500 fonts and matches line endings for the 500 most common ones.

No Hands Software's Common Ground 1.0 for Windows goes a step further. Like Adobe's Acrobat, it lets you shuttle replicas of your documents between Windows PCs and Macintoshes. Unlike Acrobat, which uses PostScript-like code to describe the look of a document, Common Ground takes snapshots of each page—two low-resolution copies for screen display, plus 200-dpi and 300-dpi versions for faxing and

printing—and stores an ASCII version of your text for doing word searches. The result is more accurate than Acrobat's sometimes less than faithful font recreations.

Common Ground lacks some of Acrobat's handy navigation tools and its hypertext links, electronic Post-it notes, and support for DOS and UNIX platforms. On the other hand, Common Ground offers everything you need for creating high-quality electronic documents at an introductory price of \$100. You can even attach a self-launching miniviewer to each document, so other users won't need a copy of Common Ground to view the file.

—Daniel Tynan

Font Works, Common Ground 1.0 for Windows

Two low-cost packages create documents that retain their fonts and formatting when moved between Windows PCs and Macs.

ElseWare Corp.

206/448-9600,

206/448-7220 (fax)

List price: \$129.95

Reader service no. 717

No Hands Software

800/598-3821,

415/802-5800,

415/593-6868 (fax)

List price: \$189.95 (\$99.95 through June)

Reader service no. 718

An industry first from Texas Instruments: Automatic load and system configuration.

We call it the ultimate desktop replacement. You'll call it remarkable. It's our new TravelMate™ Intelligent Docking System⁺. And by listening to the needs of notebook users, we've created the industry's most advanced docking system available. It's also the most complete.

Just insert any TI TravelMate 4000E notebook computer into the auto-loading mechanism, push a button, sit back and watch the docking system do the rest. Expansion is a snap too, with six ISA and two PCMCIA card slots and four drive bays.

Now you know if your TI notebook is coming or going.

Our Intelligent Docking System makes the transition from notebook to desktop replacement fast and easy. When you dock, it knows whether you have an external monitor, keyboard or internal modem. Meaning you don't have to reconfigure each time you insert your TravelMate. When you're ready to hit the road, simply click an icon and the system knows to save the file you're working on, close Windows™ and eject your TravelMate. Then away you go. That's true desktop replacement. From the one notebook company who listens.

 **TEXAS
INSTRUMENTS**



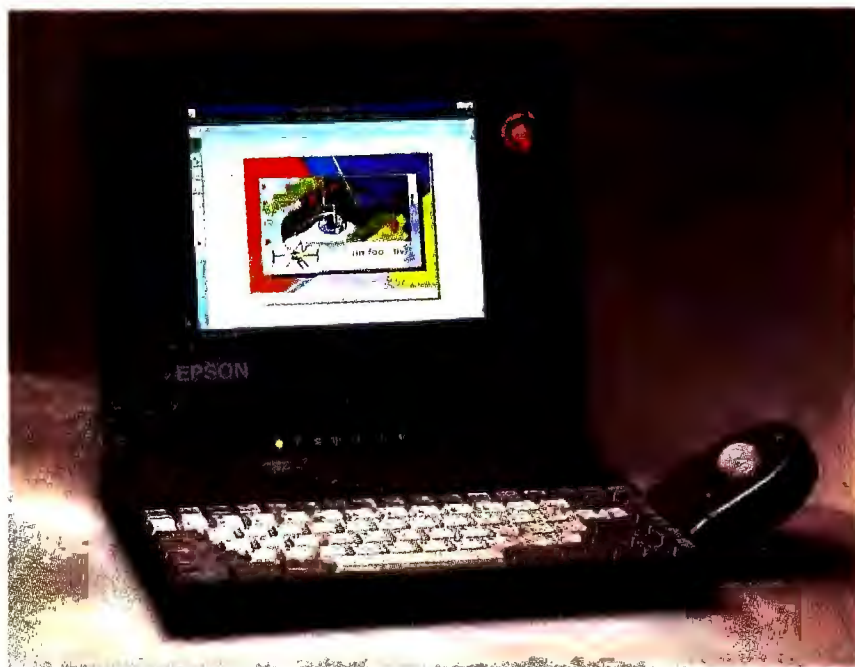
*Color monitor shown above not included with Intelligent Docking System.

Quick Takes

Epson ActionNotes

Epson's new color notebooks won't break the bank—or your back. With its sub-\$2000 street price, the ActionNote 500C is one of the most affordable color notes around. Powered by a Cyrix 50-MHz 486SLC2 processor, the 500C features an 8.2-inch passive color display, local bus video, 4MB of RAM (expandable to 8MB), and an 80MB, 120MB, or 180MB fixed hard drive. Including its battery pack, the ActionNote 500C weighs only 5.5 pounds. It also comes with the Logitech TrackMan clip-on trackball, as well as DOS and Windows.

The Action Note 700 series features 33-MHz 486DX processors, local bus video, and removable hard drives in 120MB, 170MB, 210MB, and



COLOR FOR LESS: Street-priced under \$2000, Epson's new ActionNote 500C features an enhanced passive color screen and local bus video.

260MB sizes. The color model, the 700C, comes with a 9.5-inch passive color screen and is street-priced from \$2600 to \$2800. The 700CX has an 8.5-inch active-matrix color screen

and will sell for \$3300 to \$3600. Both models measure 8.7 by 11 by 1.6 inches and weigh 4.9 pounds with the battery pack. The 700 series also sports an integrated trackball on the front

of the keyboard, a PCMCIA Type II slot, and a built-in fax-modem. Epson, 800/289-3776, 310/782-0770.

Sidebar

WINDOWS Hate spending the time to use Windows' Program Manager and File Manager? Consider replacing them with Sidebar, Quarterdeck's new Windows utility. This flexible program displays up to 15 icons of your choice at VGA resolution in a small tool bar, the "sidebar," which runs down the left or right side of your screen. (You can add more icons, but you have to scroll to see them.) The icons can launch applications or a particular document in conjunction with an application, such as an expense document you launch with Quicken.



We're listening. We're learning.



You can do many file management operations with a simple click and drag. Sidebar lists for \$59.95. Quarterdeck, 800/354-3222, 310/314-3222.

Reader service no. 806

ReachOut Remote Control 4.0

WINDOWS Ocean Isle Software made some seaworthy changes to its remote control program, improving its ease of use and compatibility. While version 4.0 of ReachOut Remote Control works in both DOS and Windows, it is now fully Windows based—this allows you to maintain a remote session in one window and a local session in another and switch between them with <Alt>-<Tab>. You can, for example, watch what a remote

user is doing in a spreadsheet or database, then snap back to your word processor to take notes. You can also drag and drop between local and remote systems using the ReachOut Windows File Manager (similar to the Windows File Manager). Reach Out Remote Control 4.0 is \$199 (\$295 for the network version). Ocean Isle Software, 800/677-6232, 407/770-4777.

Reader service no. 807

PowerSync for Windows

WINDOWS Nobody likes to play version roulette. If you work on a desktop PC and a portable, you want to keep the same versions of your files on both hard drives. Linkpro's PowerSync for Windows provides an affordable way to keep files synchronized. This versa-

tile program uses MS-DOS 6's Interlink utility to transfer information between two PCs—but needs to be installed on only one system. PowerSync works across standard parallel or serial port connections, and you can use it across a LAN, according to the vendor.

With its Analyze feature, PowerSync carefully examines files to see which need to be updated. It marks changed files in red and displays an empty folder icon to indicate a missing file. You can use the mouse to highlight files you want to synchronize, or you can use a macro to perform this task automatically whenever you launch Windows or PowerSync. The program lists for \$89.95 (\$69.95 through March). Linkpro Inc., 800/449-7962, 714/854-3322.

Reader service no. 808

Altec Lansing Computer Speaker

Audiophiles, listen up. Altec Lansing, a well-known name in stereo speakers, has expanded its line of multimedia products with the Multimedia ACS3, a lower-end version of its ACS300 computer speakers. The ACS3 consists of two self-powered shielded speakers and a powered subwoofer. The product is designed for use by individuals or small groups. (The ACS300 was designed for larger groups of, say, 100 people.) The ACS3 speakers, which are about the size of a human hand, each contain a tweeter and share an amplifier. The subwoofer, about the size of a shoebox, features two 4-inch woofers, an amplifier, and extended low-frequency response for more dramatic ▶

The most comprehensive line of 486 notebooks designed specially to meet your needs.

When it comes to listening to your notebook computer needs, at Texas Instruments we hear what you're saying. And it shows in our TravelMate™ 4000E Series. After all, we offer a wide range of 486-based notebooks plus an Intelligent Docking System with your needs in mind.

You'll find the entire high-performance lineup, from our economical monochrome WinSX™/25 to our all-new super-fast active matrix color WinDX4™/75 powerhouse, is ideal for both portable and desktop needs. The critics agree. To start with, Texas Instruments notebooks are the only products in any category ever to win five *PC Magazine* Editor's Choice Awards in a single issue.* And that's just the beginning.

But there's really only one way to find out if a TravelMate 4000E is right for you. Try one!

We're delivering.

TRAVELMATE 4000E SERIES NOTEBOOKS

DISPLAY	PROCESSOR	MEMORY†
Active Matrix Color (9.5")	IntelDX4-75MHz	4MB RAM/455MB HDD
Active Matrix Color	IntelDX4-75MHz	4MB RAM/340MB HDD
Active Matrix Color	486DX2-50MHz	4MB RAM/200MB HDD
Dual Scan Color	486DX2-50MHz	4MB RAM/200MB HDD
Color	486DX2-40MHz	4MB RAM/200MB HDD
Color	486SX-25MHz	4MB RAM/120MB HDD
Monochrome	486DX2-50MHz	4MB RAM/200MB HDD
Monochrome	486SX-25MHz	4MB RAM/120MB HDD

TRAVELMATE INTELLIGENT DOCKING SYSTEM

COMPATIBILITY	EXPANSION	INTERFACES
TI TM4000E Series Notebooks	Six 16-bit ISA slots, two PCMCIA Type III slots, four drive bays	Parallel/2 Serial, VGA, Mouse, keyboard, game port and RJ-11 jack

† RAM expandable to 20MB with optional memory.

Then decide if indeed we have been listening. Learning. And delivering. Simply call **1-800-TI-TEXAS** (1-800-848-3927) to find the TravelMate dealer nearest you.

EXTENDING YOUR REACH WITH INNOVATION™

 **TEXAS INSTRUMENTS**

Circle 242 on reader service card

* Five Editor's Choice Awards in August 1993 issue of *PC Magazine*. TravelMate, WinDX2, WinDX, WinSX, WinDX4, BatteryPro and "Extending Your Reach With Innovation" are trademarks of Texas Instruments. The Ready-to-Run logo and Windows are trademarks of Microsoft Corporation. IntelDX4 is a trademark and the Intel Inside logo is a registered trademark of Intel Corp. © 1994 TI.



Quick Takes

bass. Multimedia ACS3 has a list price of \$200. Altec Lansing, 800/258-3288.

Reader service no. 809

CD Essentials

WINDOWS This handy utility from Phoenix Technologies makes it easier for multimedia PC users to install and use CD ROM applications. CD Essentials loads from the Windows start-up group and remains minimized as an icon until you place a disk in the CD ROM drive (or access the program directly). CD Essentials senses when there's a CD ROM in the drive and automatically runs it. If CD Essentials doesn't recognize the CD ROM, it will initiate the disk's installation procedure. The program also contains its own media player for

audio and video clips, as well as audio and photo CDs. CD Essentials has a list price of \$49, with street prices around \$30. Phoenix Technologies, 800/452-0120, 617/551-4000.

Reader service no. 810

WordScan Plus 3.0

WINDOWS Version 3.0 of Calera's popular OCR software now offers improved integration with office application suites; recognizes small, 4-point text; and supports Hewlett-Packard's AccuPage 2.0 technology. WordScan Plus 3.0 can emulate the interface of word processors from the three major office suites—Microsoft Office, Borland Office, and Lotus SmartSuite—once you tell it which package you are using. You can select an area on a document in

WordScan Plus and move it to your word processor, and character recognition will occur automatically. WordScan Plus now fully supports OLE 2.0, according to Calera. Its support for AccuPage 2.0 improves recognition on stained documents when you use WordScan Plus with an HP scanner. The product lists for \$595. WordScan Plus 2.0 users can upgrade for \$119, and users of other WordScan versions pay \$149. Calera Recognition Systems, 800/422-5372, 408/720-8300.

Reader service no. 811

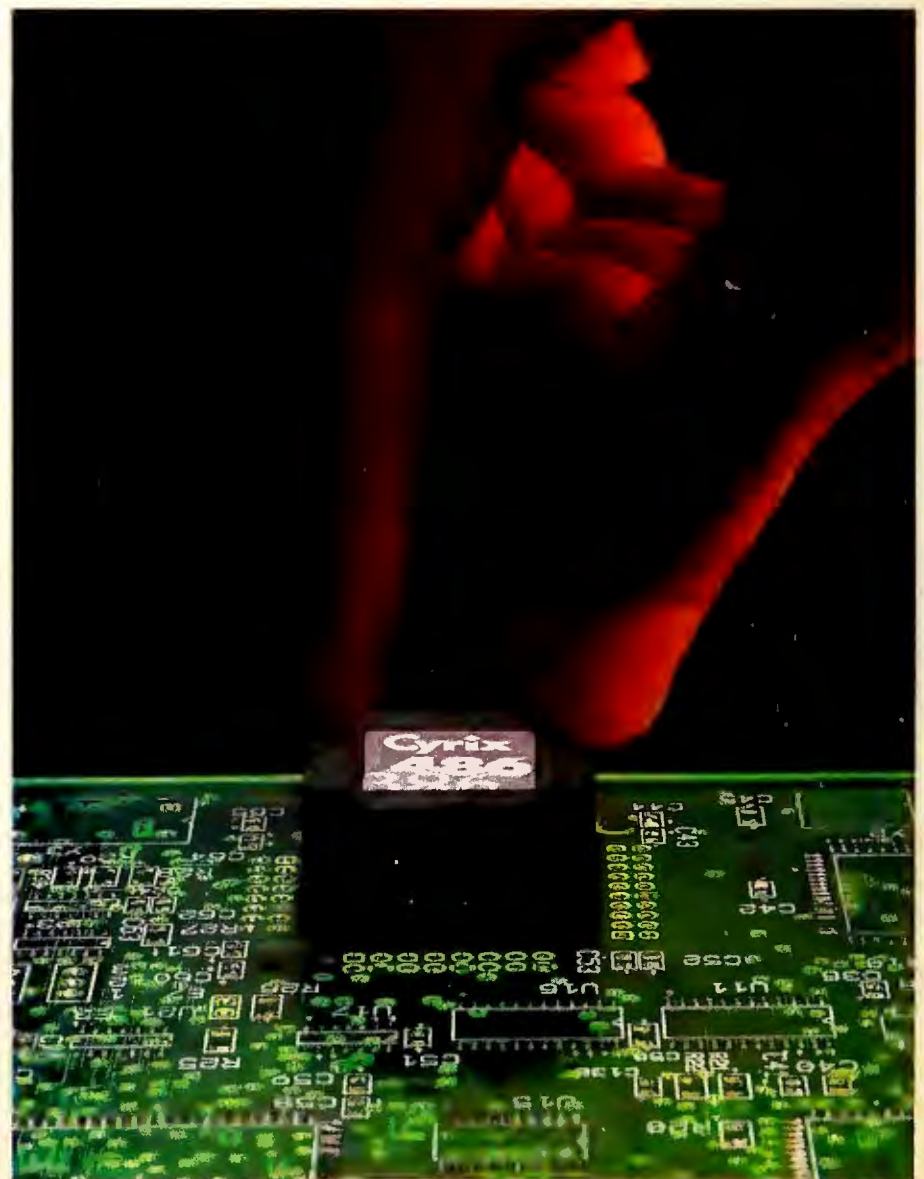
Tapedisk 6.1

WINDOWS Here's an opportunity to transform gigabytes of low-cost archived tape storage into low-cost online tape storage. Tapedisk 6.1 enables a

DAT or QIC tape drive to emulate a hard drive so that you can create, view, open, edit, and save files directly to tape without first having to move the files to a hard drive. According to Tapedisk Corporation, Tapedisk 6.1 features an average access time of approximately 15 seconds for files on a 1GB tape, which makes the program impractical for running applications. Tapedisk is compatible with DOS 5.0 and later versions, Windows, and Windows for Workgroups and requires a 386 or higher CPU. The \$249.95 program supports many SCSI tape drives from Colorado, Conner, Exabyte, Hewlett-Packard, Legacy, Tandberg, and WangDAT. Tapedisk Corp., 800/827-3372, 715/235-3388, 715/235-3818 (fax).

Reader service no. 812

**To
make
your 386
run like
a 486,
just push
here.**



Planix Home

WINDOWS Now you can build your virtual dream home with Foresight Resources' Planix Home software. This attrac-

tive and easy-to-use Windows program lets you create and modify architectural layouts using drag-and-drop operations to draw walls, position doors and windows, and place furni-

ture, wiring, and shrubbery. The program includes a library of over 800 objects to let you customize your house without having to draw and define everything yourself, as well as 20 sample floor plans to help you get started. The program lets you import and export standard DXF (AutoCAD format) files, so the data can be used by professional architects. Planix Home lists for \$99. Foresight Resources, 800/231-8574.

Reader service no. 813

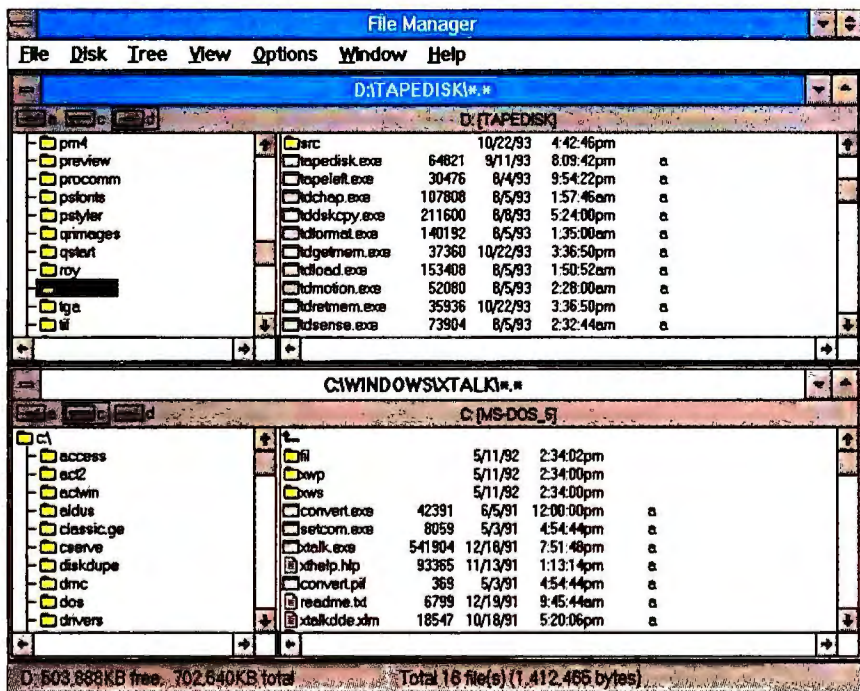
Orchid Vidiola

Orchid's Vidiola line of ISA-based video capture and playback cards is designed to please everyone—from home enthusiasts to corporate users. The base model Vidiola lists for \$399 and captures video at 30 frames

per second in a 160-by-120-pixel window (using compression software supplied with Video for Windows). The \$599 Vidiola Pro/C and \$699 Vidiola Pro/D add an NTSC output encoder for transferring digitized or overlaid analog video to a VCR or TV; the Pro/D includes Adobe Premiere and other software for creating presentations. For corporate and high-end users, the \$899 Vidiola Premium features a daughter-card with Motion JPEG compression to squeeze video files down to one-fiftieth of their original size. Orchid Technology, 800/767-2443.

Reader service no. 814

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



TAPEDISK 6.1 lets a tape drive function as a hard drive. An HP Jet-Store 2000 tape drive appears as drive D: in this File Manager screen.

To your applications, it's more like a shove. Because in one simple, economical and quick operation, an anemic 386 can now run like a brand new, screaming 486.

Amazing? Yes. Smart? Of course. Break-through? Absolutely.

But we prefer to call it the Cyrix® 386-to-486 Upgrade Microprocessor.™ And you'll want to call us because your applications will run faster than ever possible on a 386.

You get increased throughput, more end-user productivity and with Clock Doubling, internal cache and enhanced 486 technology, even applications running under Windows are no match.

And all without having to invest in new machines.

So, you see, your 386 computers can be spared. But at what price?

Well, starting at \$269, certainly not a high one. Especially when compared to the cost of buying a 486 computer.

And not only do you get to hold on to your computers, you get to hold on to your software. Our upgrade is fully compatible with DOS, OS/2, UNIX, Windows and even Windows NT.

And of course, it's certified software compatible in Novell, Banyan and LAN Manager nodes. Installation couldn't be easier. The Cyrix 386-to-486 Upgrade Microprocessor simply snaps on top of, or plugs in instead of, your current 386 microprocessor—depending on which model you require.

All in all, it takes about fifteen minutes. Who needs downtime? Can we back all this up? Absolutely.

With our limited lifetime warranty and toll-free telephone support, we've



Performance Benchmarks		
(figures indicate relative performance)	Intel i386	Cyrix 486 Upgrade
MS Excel 3.0	1.0x	2.1x
MS Word 2.0	1.0x	2.8x
Micrografx Designer 3.1	1.0x	2.6x

Benchmark tests run on IBM PS/2 Model 70/20MHz.

What kind of performance boost will you get? Depends on the 386 model you have, and your applications. But tests show performance ranges from 30% to well over 100%. As the lawyers say, your actual mileage may vary.

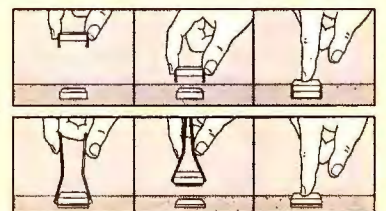
got all the bases, and soon all the chips, covered. So what are you waiting for? Your applications to open?

To get your hands on our Upgrade Microprocessor, just call any dealer. If they don't have it, they can order it. Or call us directly at 1-800-46-CYRIX for the dealer nearest you.

A quick recap: You get to keep your computers.

Virtually double their speed. At one fifth the cost of replacement. There. Another smarter alternative from Cyrix. The smarter microprocessor company.

And a push in the right direction for 386 computers everywhere.



On DX versions, use the chip removal tool (included) to take out the existing chip, and plug in the Cyrix Upgrade Microprocessor. On an SX, just snap into place right over the existing chip. All in all, it takes just 15 minutes—roughly the same amount of time as a coffee break.

Cyrix® instead™

Samsung

A new point of view.



SyncMaster 14GL



SyncMaster 15GL



SyncMaster 17GL

First impressions are important. So take a good look at the new SyncMaster™ GL Series monitors. You'll find they're easy on your eyes and even easier on your pocketbook.

Samsung took for granted you wanted bright, crisp clear images that don't flicker. You're also concerned about things like safety and energy conservation, so they're standard on the whole series.

Life should be as hassle-free as possible, so we added new ideas like On-Screen Display, and all SyncMaster GL Series monitors come with a two-year warranty.

Look at what it takes to satisfy your monitor needs. Samsung did. And came up with a whole new point of view. For more information, Call 1-800-933-4110.

TECHNOLOGY
THAT WORKS
FOR LIFE



©1994 Samsung Electronics America Inc. The EPA Energy Star Logo is not to be considered a product endorsement. Image on SyncMaster 14GL courtesy of Intergraph. Image on SyncMaster 17GL courtesy of American Business.

SyncMaster	14GL	15GL	17GL
Size	14"	15"	17"
Dot Pitch	.28	.28	.28
Maximum Resolution	1024 x 768	1024 x 768	1280 x 1024
Maximum Refresh Rate at Maximum Res (Hz)	76	76	60
MPR-II (Low radiation)	•	•	•
Power Management	•	•	•
Flat Square Screen		•	•
On-Screen Programming			•
Warranty	2 Years	2 Years	2 Years

Circle 198 on reader service card

LOTUS

GET THE MOST FROM THE LOTUS APPLICATION SUITE

What We Cover, and Why

Lotus keeps churning out new flavors of 1-2-3, each with its own idiosyncrasies. We'd like to give advice that covers every one, but since there are now more than a dozen, that's just not possible. So we continually add new versions to our coverage and drop older versions.

Right now we cover releases 2.3 and higher and 3.1 and higher for DOS, and release 4.0 and higher for Windows.

Why drop the earlier Windows releases? Most of our readers who've switched to Windows have also switched to release 4.0. And our best tip to 1.x users is: Do the same. No matter what your budget, the benefits far outweigh the costs and hassles of making the upgrade.

If you're moving up to 4.0, tell us how it goes. Drop me a line at 77 Franklin St. #300, Boston, MA 02110, or fax 617/426-0235, or PC World Online on America Online (EBENDER) or on CompuServe (71154,443).

Eric Bender

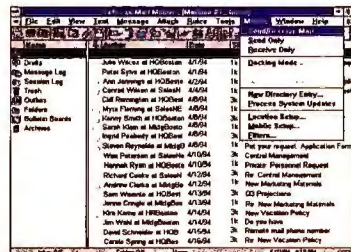
Eric Bender, Executive Editor

20 Tricks for Suite Teamwork

L4 It's not always easy to move data between Lotus's Windows applications. The packages share a family resemblance, but sometimes they don't want to share data the way you'd expect. Here's a guide that will help smooth the way.

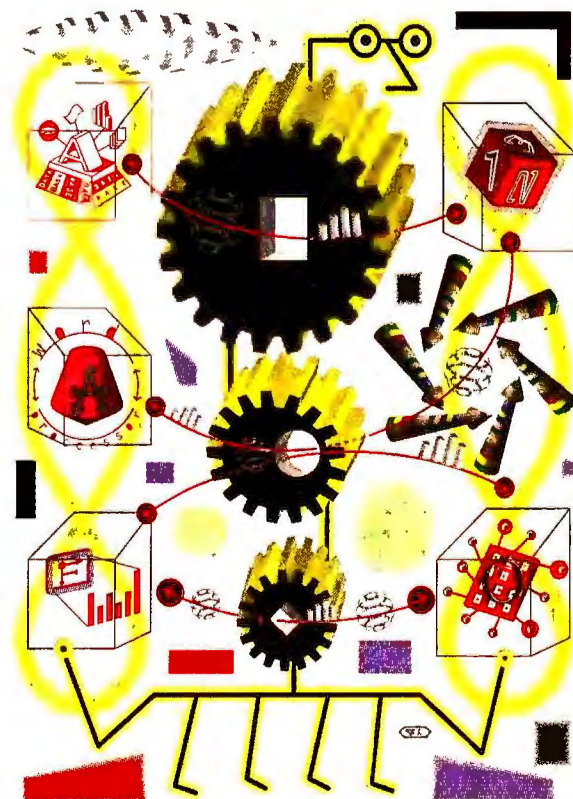
1-2-3 Database Management Made Easy

L10 Until last year, 1-2-3's powerful database management capabilities were hidden behind a clumsy interface. Release 4.0 for Windows' friendly Data Query Assistant removes the criteria ranges and cryptic formulas to make data retrieval a snap.



News


L2 Lotus finally releases a Windows version of cc:Mail Remote, aimed primarily at traveling professionals. And while SmartSuite for OS/2 is now shipping, you might be better off running the Windows version under OS/2.



Improving Your Skills

L18 Let Backsolver Find the Answer 

Model of the Month

L20 To Lease or Not to Lease 

1-2-3 Tips

L22 Deciphering Common Error Messages

Macros

L24 Create FOR Loops to Repeat Actions 

Q&A

L27 Use Default Templates to Set Preferences 

Suite Success

L30 Overcome Ami Pro Annoyances

L32 Manage Your Mail With cc:Mail Rules

Improvisation

L33 Enhance Printouts With Headers and Footers

COMING IN MAY

- ▶ Find the 1-2-3 Macro You Need
- ▶ Make Data Modeling Work for You

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

Hit the Road With cc:Mail Mobile

For years, cc:Mail Remote for DOS has served its users efficiently with an absolute minimum of features and frills. But since cc:Mail for Windows arrived, we've grown accustomed to amenities like a friendly interface, message filtering, and file viewing. Now we can take them all on the road with cc:Mail Mobile for Windows.

cc:Mail Mobile is fully integrated with cc:Mail for Windows 2.0. It offers most of the latter's features plus capabilities specific to the mobile user. The only immediately

pages sent, received, and filtered, and descriptions of possible connection failures.

LAN mode addresses the increasing number of mobile users who return to the office and attach their portable PCs to a network. In LAN mode, you're essentially working in cc:Mail for Windows 2.0, with all its resources available.

cc:Mail Mobile comes with a Docking Assistant that lets you easily move messages back and forth between LAN and Mobile modes. However, some important capabilities available on the network version, like access to bulletin boards and mailing lists, are still missing from Mobile mode. And cc:Mail Mobile offers no way to retrieve your previously read messages when you're on the road, a surprising lack in a program that otherwise has the remote E-mail access paradigm so well worked out.

Filter the Flow

Minimizing connect time is critical on the road, and Mobile mode lets you manually reject or automatically filter out messages you don't need to see immediately. You can choose to preview a message's summary (author, date, size, and subject) and then decide whether to download it.

Or you can turn to the easy-to-use Filter option. Just check a few boxes or type a few words in a dialog box, and cc:Mail applies the filters to every incoming message until you disable them; you can filter messages by priority, date sent, message size, author, and subject. The messages remain in your Inbox, so you can download them later, or read them when you're in LAN mode. Click

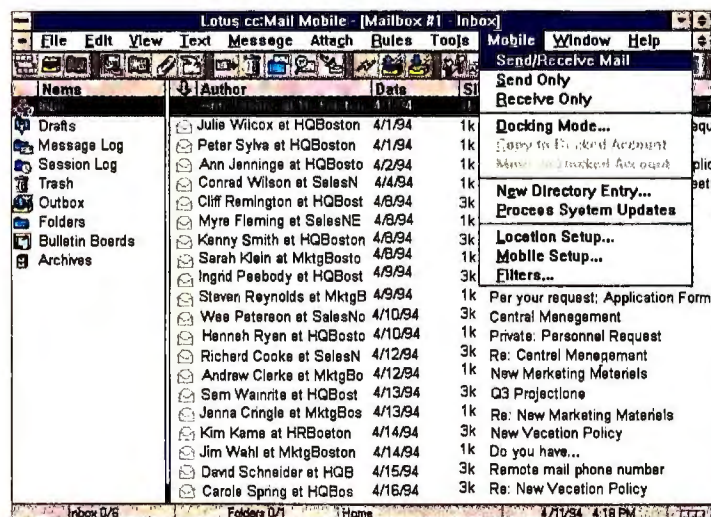
More in the Filters dialog box if you want to establish Rules that create more complex filters or instruct cc:Mail to perform certain actions automatically. For example, you could create a rule that sorts all your messages by subject and then sorts them into separate subject folders.

Location Rotation

Whether you visit a particular place frequently or infrequently, you can use the Location Setup box to create a profile that will dial your E-mail number correctly—a very slick solution to a nagging problem. You don't have to remember to add a prefix to dial an outside line from a hotel, for example, and then remember to take it out when you go to your mother-in-law's. Each location gets a separate profile, ready to be selected from the status bar or the Location Setup box when you arrive.

And you don't have to be a technical wizard to create the Dialing Rule or set up a modem. cc:Mail Mobile gives you over a dozen preconfigured dialing rules—covering local calls, long distance calls, and calling card calls, for example—and eight different communication methods, including wireless connections. —Nicole Pappas

Nicole Pappas runs an in-house computer user group for a major western utility.

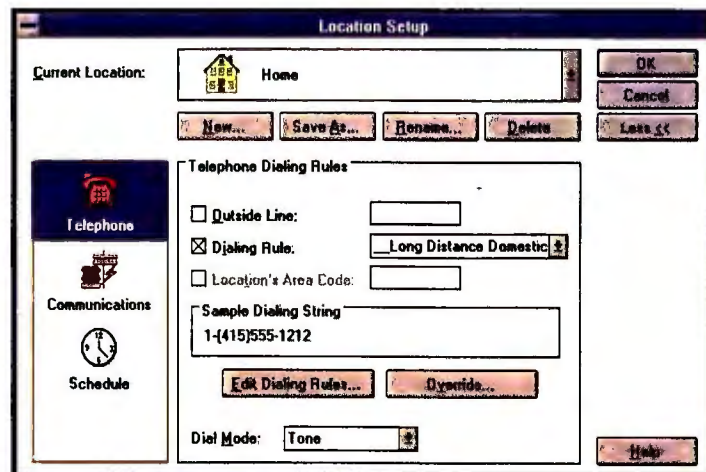


MOBILE-SPECIFIC FEATURES are consolidated under one menu and in two new containers, Session Log and Outbox.

apparent difference is the new Mobile menu located between the Tools and Window menus. cc:Mail Mobile for Windows sells for \$195; it runs \$95 if you're upgrading from cc:Mail Remote.

Mail à la Mode

You log in to cc:Mail Mobile in Mobile or LAN mode. Mobile mode lets you work anywhere you can connect via modem. As with the DOS version, the messages you create are stored in an Outbox until you dial in, when they are sent in a batch; cc:Mail Mobile lets you receive your messages in the background while working in cc:Mail or other applications. You also get a new Session Log that stores a record of each remote connection, including a summary of mes-



A LOCATION PROFILE contains the Dialing Rule (such as credit card number or country code) and the appropriate communication method for a particular remote location.

SmartSuite Shuffles Into OS/2

With SmartSuite for OS/2, Lotus rolls out the first and only suite of business applications for IBM's powerful alternative to Windows. Unfortunately, the OS/2 bundle is not quite ready for Broadway.

cc:Mail for the Workplace Shell may be the OS/2 application of the year, but the three other components of the suite—1-2-3, Freelance Graphics, and Ami Pro—aren't garnering the rave reviews earned by their Windows kin. Also, this version of the suite doesn't include Approach or Organizer. It requires at least 12MB of memory and a 486 for good performance.

The \$795 package, which comes bundled with OS/2 2.1, delivers the usual advantages of a suite—a common interface and easy data exchange. And OS/2 features such as memory protection, nonpreemptive multitasking, multithreading, 32-bit processing, and an object-oriented desktop enhance the way the apps work together.

OS/2 Brings Real Power to the Suite

For many users, OS/2's stability is an enormous advantage. Protected memory and nonpreemptive multitasking let you open all the suite applications and switch back and forth between them without crashing. In the Windows suite, the applications sometimes step on each others' memory.

Multithreading lets you perform several tasks simultaneously within an application. You can run a process-intensive 1-2-3 operation, such as Solver, in the background while you edit your worksheet. You can repaginate one Ami Pro document while editing another. In Freelance, multithreading lets you start to print graphics while you continue to work on your presentation.

The object-oriented desktop and support of drag-and-drop file operations also aid productivity. Desktop objects represent files, programs, and external devices such as printers. You can drag file objects, which look like program icons, to the printer or the shredder for quick output or disposal.

You can also drag related file objects into the same folder icon. For example, Ami Pro documents, 1-2-3 worksheets, and a Free-

lance presentation related to one project could be collected in one folder. When you get a cc:Mail message about the project, you can drag the message into the folder, too.

OS/2 Versions Lag Behind

While the centerpiece of the Windows suite is 1-2-3, it's the weakest part of the OS/2 suite. 1-2-3 for OS/2 hasn't been updated in over a year. Because it's based on old technology, it lacks release 4.x's work-group fea-



RELATED OS/2 OBJECTS CAN BE COLLECTED in one folder, including a 1-2-3 worksheet, an Ami Pro document, a Freelance presentation, and a cc:Mail message.

tures and slick interface, and it doesn't even accept WK4 files. Lotus plans to ship a performance upgrade for 1-2-3 for OS/2 by the time you read this.

Freelance for OS/2 lacks a number of enhancements that are available in the latest Freelance for Windows, such as the outliner, organization charting features, and multimedia support.

Ami Pro for OS/2 has one stunning trait: It's so slow that it's just about unusable. Lotus has acknowledged the problem and plans to release a free performance upgrade, which should boost speed by 25 percent, by the time you read this. Ami Pro for OS/2 boasts some features that ought to be in the Windows version, like the capability to add stick-on notes to your documents. And its macro language supports IBM's REXX cross-platform language, offering complete integration on the platform.

The star of SmartSuite for OS/2 is cc:Mail, which is completely melded into OS/2. When you click on the cc:Mail object, you get a window containing yet another collection of objects representing the components of cc:Mail. You can drag the objects to the desktop so you manage your mail directly from OS/2.

If Lotus can bring Ami Pro for OS/2 up to a comfortable speed and successfully update 1-2-3 and Freelance Graphics, the next OS/2 version of the SmartSuite should be a killer. Until then, you may be better off running the Windows versions of those three applications under OS/2. —Andrea Powers

Notes Casts a Wider Net

You can exchange E-mail and share databases with remote Notes sites and with folks on other E-mail systems by dialing into the WorldCom network, recently launched by Wolf Communications in Houston. WorldCom lets subscribers send messages to users on more than 100 public E-mail systems, share Notes databases, and receive live news feeds without worrying about servers, routers,

gateways, or communications protocols.

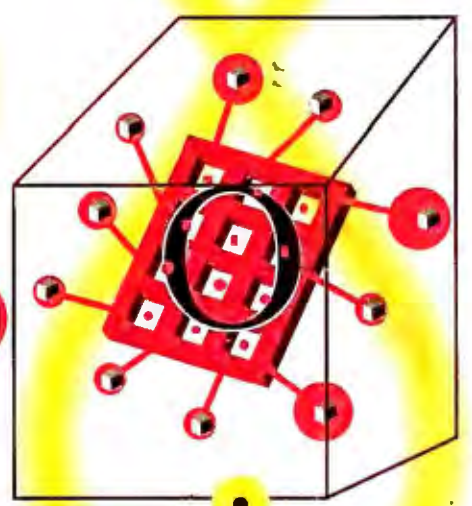
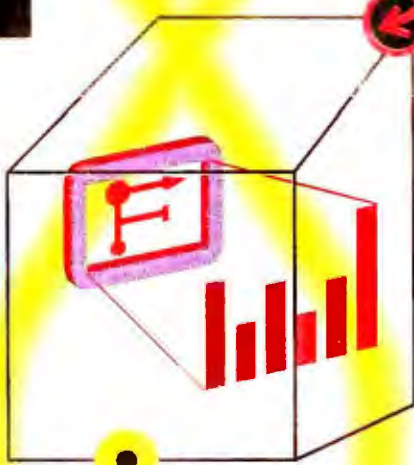
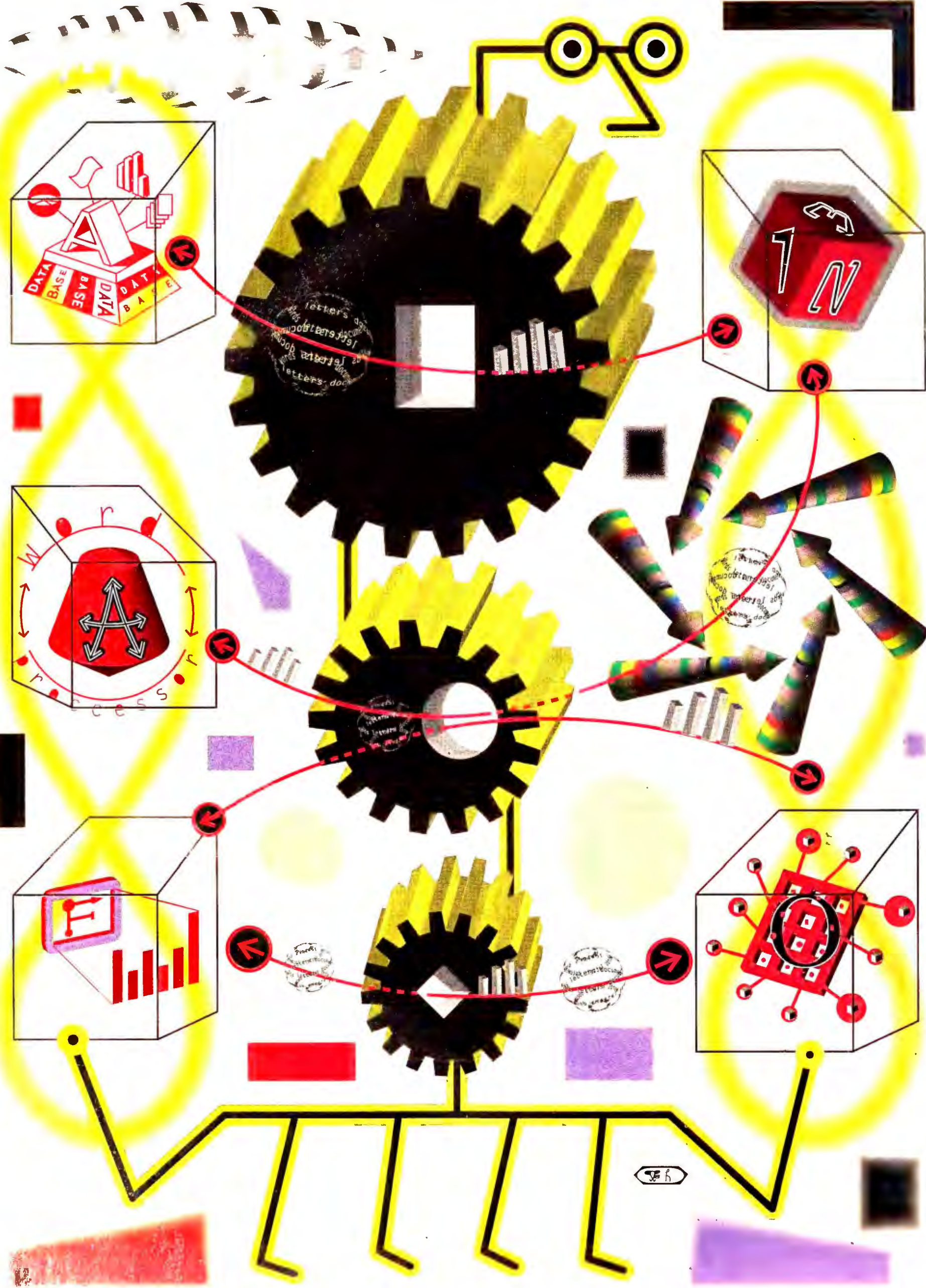
To help you address E-mail messages, WorldCom provides forms for several major systems, such as AT&T EasyLink, CompuServe Mail, MCI Mail, and the Internet. Once you've composed and saved a user's address, you address subsequent messages by simply typing the user's name. You can also attach formatted files to Notes and cc:Mail messages instead of having to convert the files

to ASCII for transmission.

Any database that you want to share with users outside your LAN can be stored on a server at WorldCom. You retain full control over access privileges.

WorldCom also delivers live news and financial feeds to Notes databases from such services as AP and Dow Jones. The service will compete with similar public Notes servers offered by CompuServe and IBM subsidiary Advantis.

—Ann Kremers



20 TRICKS

Here's a guide to swapping data and

FOR SUITE

tools among Lotus's Windows applications.

TEAMWORK

BY ANDREA POWERS

WHEN YOU'RE JUGGLING WORK between Windows applications, it's all too easy to drop some balls because the applications act differently and don't talk well to one another. Application suites promise to overcome this problem. Toward that end, Lotus SmartSuite members share SmartIcons, a status bar, menus, and many file formats so you can execute basic tasks the same way in each program.

But getting 1-2-3, Ami Pro, Approach, Freelance Graphics, and Organizer *really* to work together takes some finagling. Take the example of the Working Together Bonus Pack, a slick bunch of features built on Ami Pro macros. The most useful of these allow one package to tap the functionality of another application transparently—but some Bonus Pack features simply don't function properly unless you fiddle with the way you've set up your applications. So while Lotus works feverishly to forge tighter links between its offerings, here are some tricks that will help you get more mileage out of SmartSuite now.

General Guidelines

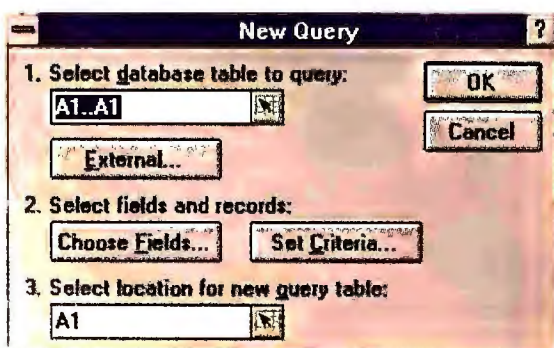
1 Do not install Ami Pro first. If you install Ami Pro before you install the other applications in the SmartSuite, the spelling directory path and other LOTUS.INI settings will be incorrect. Lotus promises to fix this complication in the next release of the Suite.

2 Convert files to dBASE format for easy transfer. All applications in the Suite can read DBF files; 1-2-3, Organizer, and Approach can also create DBF files. You save a file in dBASE format by using the commands File•Save As (in Approach) or File•Export (in Organizer).

Before you convert a 1-2-3 file to dBASE format, make sure the data is structured as a database table—that is, with field names across the first row, and the records below, one record per row. The field names cannot contain internal spaces or nonalphabetic characters. Also, each field in the first record must have an entry.

Next, highlight the data range, select *Tools•Database•Create Table*, select a driver, and click *Continue*. Select or enter the directory where you want the DBF file, and click *Continue*. Select or enter a database table name for the DBF file, and click *Continue*. In the next dialog box, check *Insert Records from Model Table*, and click *OK*.

To get a dBASE file from Approach or Organizer into your 1-2-3 worksheet, select the 1-2-3 command *Tools•Database•New Query*. Click *External*, select a dBASE driver, and click *Continue*. Specify the directory that contains the DBF file, and click *Continue*. Specify the database table, and click *Continue*. Specify a temporary name for the database, and click *OK*. Click *Choose Fields*,



AN APPROACH OR ORGANIZER FILE SAVED IN dBASE format can easily be transferred to 1-2-3. When you click *External* in this dialog box, 1-2-3 asks you to specify the appropriate dBASE driver and the external file name.

and select the fields you want to import. (To select more than one field, hold down the <Ctrl> key as you click each field name.) Click *OK*. Click *Set Criteria*, and click *Clear* to get all fields. Click *OK*. Then specify a location in the current worksheet for the data, and click *OK*.

3 Learn the power keys. The Suite's three leading applications—1-2-3, Ami Pro, and Freelance—share a set of <Ctrl>-key combinations for assigning styles to text. Using these combinations is much faster than using the menus, and once you know them in one application, you've learned them for all. Here they are:

<Ctrl>-L	Left-justifies a paragraph
<Ctrl>-E	Centers a paragraph
<Ctrl>-R	Right-justifies a paragraph
<Ctrl>-B	Sets text in bold
<Ctrl>-I	Sets text in italics
<Ctrl>-U	Underlines text
<Ctrl>-N	Sets text normal

Bonus Pack Tricks

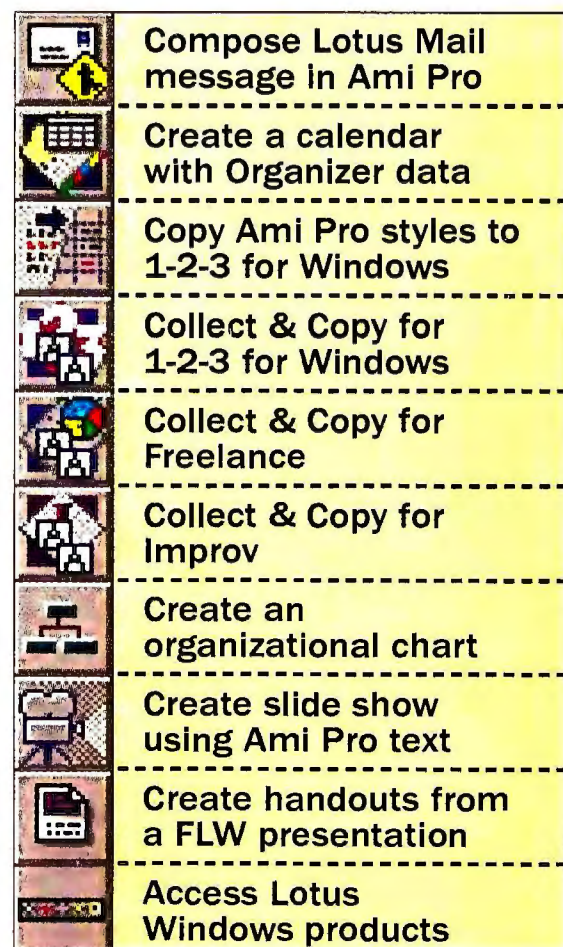
The Ami Pro Working Together Bonus Pack lets you tap other applications without leaving Ami Pro. To use it, click the *SmartIcon* button on the status bar, and select the *Bonus Pack* palette. As with all SmartIcons, you may well want to pick those you think will prove helpful and add them to your standard SmartIcon palette or palettes. Some of the Bonus Pack SmartIcons are shown in the figure at right.

If you're having trouble with the Bonus Pack macros, first check the on-line help file. Select *Help•Contents* from the Ami Pro menu, then select *File•Open*, change to the Ami Pro directory, specify *HELPPACK.HLP*, and click *OK*. If that doesn't help, call Ami Pro Technical Support at 404/399-5505. They may offer a work-around.

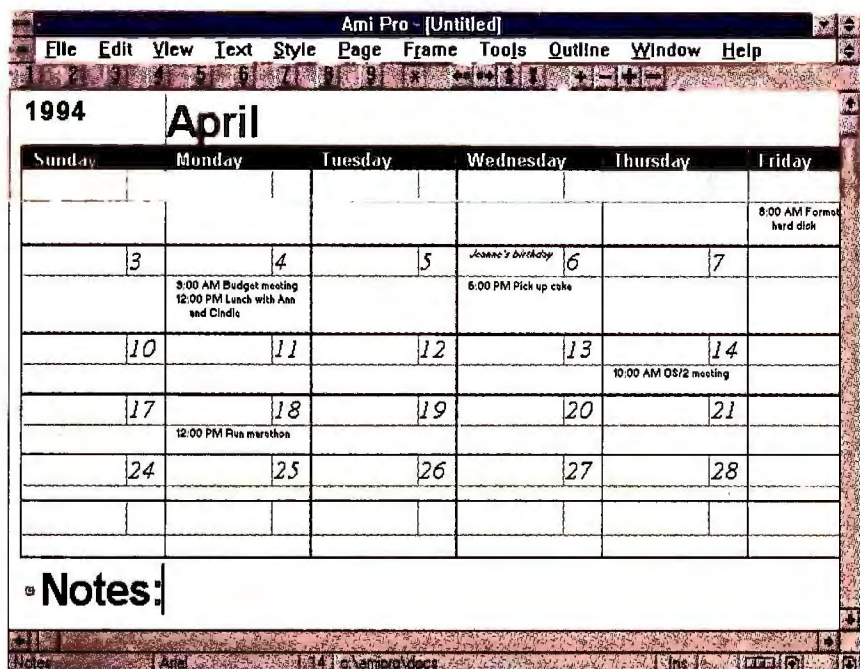
4 Use Ami Pro as the text editor for Notes or cc:Mail. You can send anything you've written in Ami Pro through Notes or cc:Mail without switching to those applications. Just type your message in Ami Pro, and click the *Compose Lotus Mail Message* SmartIcon. In the Confirm Mail to Send dialog box, enter the name of the recipient and the subject (you can also attach a file), and click *OK*. The message will be sent out on Notes or cc:Mail.

5 Give your Ami Pro document and 1-2-3 worksheet the same style. Establishing a standard style for all your company's documents promotes a strong image. Why not extend that standard to your worksheets? One of the Ami Pro macros in the Bonus Pack lets you do just that. Open the 1-2-3 worksheet to which you want to apply Ami Pro styles, and open the Ami Pro document from which you want to take the styles. Make sure you're in Layout mode in Ami Pro: Select *View•Layout Mode*. Click the *Copy Ami Pro Styles to 1-2-3 for Windows* SmartIcon, and select the styles you want to use. To apply an Ami Pro style to a 1-2-3 range, preselect the range, select *Style•Named Style*, and pick the style. Note: The Bullet and Number List styles do not translate to 1-2-3.

6 Combine 1-2-3 data with an Ami Pro document. Keep the report you created in Ami Pro in sync with the spreadsheet data it's based on by using *Collect & Copy*. First, make sure you're in Ami Pro's Layout mode. Then click the *Collect & Copy for 1-2-3 for Windows* SmartIcon. If you aren't already running 1-2-3, *Collect & Copy* will start it. A small box with buttons and instructions will appear in the lower right corner of the 1-2-3 worksheet.



THE BONUS PACK enhances Ami Pro's Integration with the other applications in the SmartSuite, but it's not easy to get some of these features to work right.



PRINT YOUR ORGANIZER SCHEDULE IN AMI PRO'S CALENDAR STYLE with one of the Bonus Pack macros.

You can open an existing worksheet file or create a new one. If you create a new file, be sure to save it before proceeding with Collect & Copy. Highlight the cells that you want to copy to Ami Pro, and then click *Copy to Ami Pro*. When you have copied all the worksheet ranges you need, click *Done*. In the next box, click *Switch to Ami Pro*.

Collect & Copy is also available for Freelance and for Improv.

7 Export Organizer's Calendar data into an Ami Pro calendar. If you keep your schedule in Organizer but want it printed in Ami Pro's monthly calendar style (since Organizer doesn't print months), open Organizer, open the appropriate file, then open Ami Pro and select the *Create a Calendar with Organizer Data* SmartIcon. The Ami Pro macro will prompt you for the month and year for the Calendar and will export your Organizer Calendar data and then import it into Ami Pro.

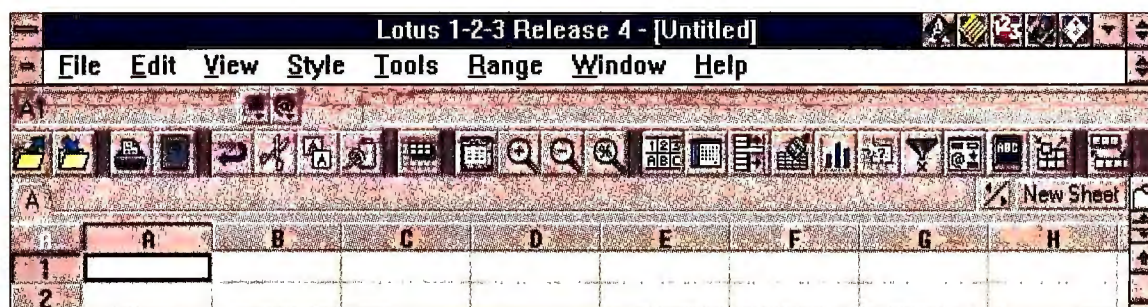
8 Switch quickly between programs with the Lotus Application Manager. The Lotus Application Manager (LAM) lets you switch easily to any other Lotus Windows application you've installed on your computer, including Improv, Notes, cc:Mail, and SmartPics. To activate the LAM, select the *Access Lotus Windows Products* SmartIcon. Five icons should appear in the top right corner of your screen.

Click one of the five icons, and the LAM will switch to or launch the selected application if it's installed on your machine. (Note: The LAM looks in the LOTUS.INI file for

the application's program path. If you get an error message indicating the file cannot be found, check the LOTUS.INI file and make sure the path is correct.) To remove the LAM, click the LAM icon again.

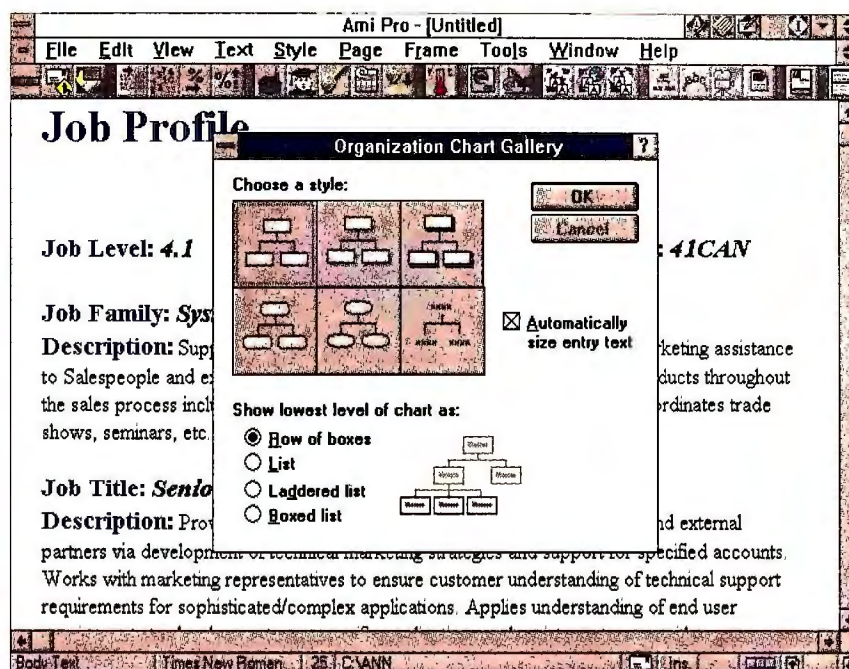
The icons will stay on the screen in the same place as you go from application to application—and their placement in the top right corner frees up space on the SmartIcon palette for other icons. You will, however, have to activate them each time you fire up Ami Pro.

The LAM can be configured with your five favorite Lotus applications, including Improv and Notes but not Approach, because Approach was introduced into the Suite after the Bonus Pack was developed.



THE LOTUS APPLICATION MANAGER stays in the top right corner of your workspace in each application, making it easy to switch between programs.

To remove an icon, just place the mouse pointer on an icon you want to replace, hold down the **<Ctrl>** key and the left mouse button, and drag the icon off the LAM. The icon for another application will appear on the right of the LAM bar. Keep going until you've got what you want; you can move visible icons by holding down **<Ctrl>** and dragging the icon with the mouse.



BORROW FREELANCE GRAPHICS' CHARTING TOOL to create an organization chart in Ami Pro.

9 Create a Freelance organization chart in an Ami Pro document. You could create an organization chart in Ami Pro, but why not outsource it to Freelance? The *Create an Organizational Chart* SmartIcon opens up Freelance and brings up the Organizational Chart Gallery. When you've finished creating your chart, click *OK*, and it will appear in your Ami Pro document (make sure that you are in Layout mode).

10 Create handouts by combining Freelance slides with an Ami Pro document. To keep the audience's attention, supplement your presentation with handouts, recommends graphic design guru and author Edward Tufte. Freelance by itself will print the slides

11 Slip Ami Pro text into your Freelance slide show. Likewise, you can put blocks of Ami Pro text into a Freelance slide show. Select the text you want on a slide, click the *Create Slide Show Using Ami Pro Text* SmartIcon, select the desired SmartMaster background, quickly choose the page layout, and Freelance does the rest.

Back to the Clipboard

If you just want to move small amounts of data from one application to another, the fastest way is through the Windows Clipboard. Selecting *Edit•Copy* (or *<Ctrl>-C*) places the data onto the Clipboard, and selecting *Edit•Paste* (or *<Ctrl>-V*) or *Edit•Paste Special* pastes the contents of the Clipboard into the target application. Here are a few tips for traveling that route.

12 Paste Ami Pro text into a 1-2-3 text box. If you want to get a lot of text into 1-2-3, it's easier to write it in Ami Pro and then bring it into 1-2-3: Highlight the text in Ami Pro, select *Edit•Copy*, and switch to 1-2-3. Select *Tools•Draw•Text*, draw a text box with the mouse, place the pointer inside the box, and select *<Ctrl>-V* (*Edit•Paste* doesn't work here). You can resize the block with the mouse, and the text will wrap to fill the size of the block.

13 Paste 1-2-3 data into an Ami Pro document as text, not as a table. If you're creating reports that contain financial results, you may want to bring your spreadsheet data into your

word processor. If you copy a 1-2-3 range and then paste it into Ami Pro, you get a table. If you don't want your worksheet data to appear as a table, or if you don't want the 1-2-3 styles and formatting to be transferred, when you're ready to paste from the Clipboard, select *Edit•Paste Special* and then select *Text*. The 1-2-3 data will appear in the default Ami Pro font and format.

14 Paste graphics from 1-2-3 into Ami Pro in Layout mode. When pasting a 1-2-3 graph into Ami Pro, make sure you're in Layout mode.

15 Paste graphics into Approach Picture Plus fields in Browse mode. When adding a graphic to a Picture Plus field, you must first go into Approach's Design mode and add the field to the form. When you're ready to paste the graphic from the Clipboard, you must switch to Browse mode. Then click the Picture Plus field and select *Edit•Paste*, *Edit•Paste Special*, or *Edit•Paste from File*. If you don't paste from Browse mode, the graphic will just float on top of the Approach form.

16 Mix and match graphics files. Each application comes with graphics files that you can copy to the Clipboard, then paste into other applications. That means you have hundreds of images at your disposal in any application.

Directories of Suite Graphics Files

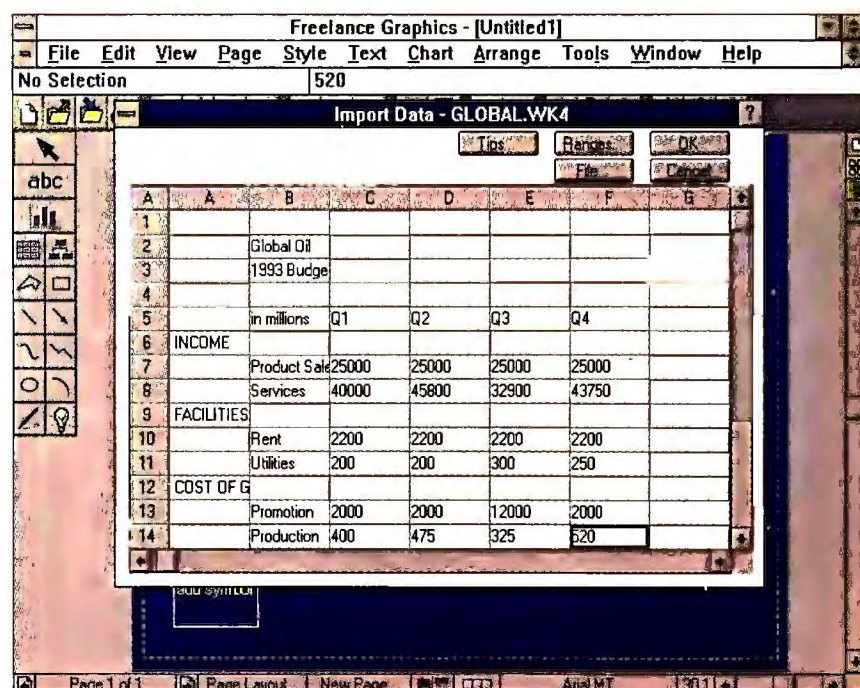
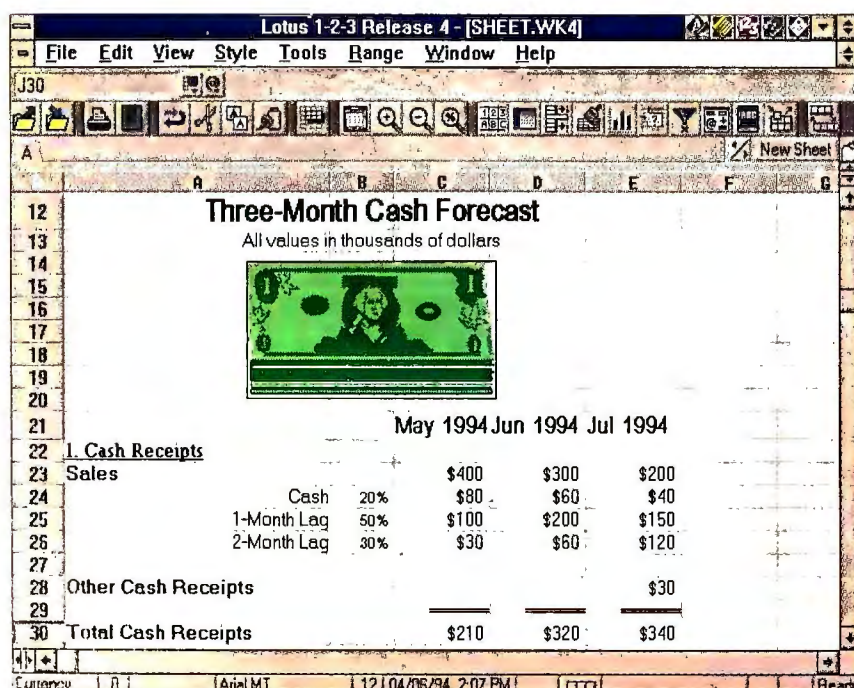
1-2-3 SmartIcons (bit maps): 123R4W\PROGRAMS\SHEETICO*.BMP
 Ami Pro SmartIcons: AMI PRO\ICONS*.BMP
 Ami Pro Draw Symbols: AMI PRO\DRAWSYM*.SDW
 Approach Sample Graphics: APPROACH\EXAMPLES*.BMP
 Freelance SmartMasters: FREELANCE\MASTERS*.MAS
 Freelance Symbols: FREELANCE\MASTERS*.SYM
 Organizer Sample Graphics: ORGANIZE\SAMPLE*.BMP

For example, to use a Freelance picture in a 1-2-3 worksheet, click the light-bulb icon in Freelance to add a picture to a page (any page), choose a picture from the Add Symbol to Page dialog box, and select *Edit•Cut*. Switch to 1-2-3, place the cell pointer where you want the picture to appear, and select *Edit•Paste*. Resize the picture as needed.

If you installed the Suite properly with Lotus's suggested directory names, you'll find these graphics files in the directories shown in the chart above.

Transporting Entire Files

When you're transferring snippets of information or graphics files, the Clipboard is the way to go. But when you're exchanging complete text files or entire worksheets, it's easier to import or export. *File•Save As* and *File•Export* let you save one application's files in a format accepted by other applications. Conversely, *File•Open* and *File•Import* allow you to open another application's file in its native format. (In both 1-2-3



EXPAND 1-2-3'S ART GALLERY by borrowing from Freelance Graphics (shown here) or other applications.

IMPORT WORKSHEET DATA INTO FREELANCE by using this dialog box to select the data you want imported.

and Ami Pro, you must use the File•Save As and File•Open commands instead of File•Export and File•Import.)

17 Import 1-2-3 data into a Freelance presentation. In Freelance, select a SmartMaster set and the current page layout and press <F6> to call up the Import Data File dialog box. Specify the directory and the 1-2-3 worksheet in the File Name box, and click *OK*. Freelance will bring the worksheet into another dialog box, where you can select the ranges that you want to copy to the Clipboard and then paste them into the Freelance presentation.

18 Create an Approach database from an Ami Pro merge data file. Once you've performed a mail merge in Ami Pro, you might want to save the merge data file in a database program such as Approach. To do this, you must delete the first two lines of the merge file—that is, the line that contains the field delimiter ~ (a tilde) and the record delimiter | (a pipe), and the line that contains the field names—then delete the record delimiter from the end of each line. Next, save the Ami Pro file as an ASCII file. In Ami Pro select *File•Save As*, and click *ASCII* in the List Files of Type drop-down box. Click the *ASCII Options* button, select the *CR/LF at paragraph ends only* and *8-bit PC ASCII* buttons, and click *OK*. Specify the complete path and file name (a TXT extension works best), and click *OK*.

In Approach, select *File•New* to create a new database, and then add field names for the incoming data. Select *File•Import Data*, select *Text files (*.TXT)* from the List Files of Type drop-down box, and in the pop-up Text Field Options box, select *Other* for the field delimiter. Then type a tilde in the box and click *OK*. Specify the directory and file name, and once again click *OK*. Map the Ami Pro fields to the appropriate Approach field names, and click *OK* to import the data. You may find that you get an extra blank record at the end of the Approach database. Just delete it.

19 Convert a 1-2-3 database into an Approach database. 1-2-3 does a creditable job handling database operations, especially in release 4.x, but sometimes Approach can do better. To copy your 1-2-3 database into Approach, first make sure the data is organized in standard database format—that is, with field names across the first row, and the

Can You Get There From Here?

A FEW EXTERNAL FILE FORMATS IN EACH SUITE APPLICATION

APPLICATION	FORMAT	COMMANDS
1-2-3	ASCII	File • Open File • Save As
	dBASE	Tools • Database
	Metafile (CGM)	File • Open
Ami Pro	ASCII	File • Open File • Save As
	BMP, Metafile, and Lotus PIC	File • Import Picture
	dBASE	File • Open
	Organizer	File • Open
	WK*	File • Open
	Approach	ASCII
Approach	BMP, WMF, PCX, and TIF	Edit • Paste from File
	dBASE	File • Open File • Import Data File • Export Data
	WK*	File • Import Data File • Export Data
	Freelance	ASCII
Freelance	BMP, Metafile, and PCX	File • Import File • Export
	1-2-3 PIC	File • Import
	Organizer	ASCII
Organizer	dBASE	File • Import File • Export

records below, one record per row. Keep in mind that field names cannot contain internal spaces or nonalphabetic characters. Also, each field in the first record (first row of data) must have an entry. None of the fields in this row can be blank.

Select the commands *Tools•Database•Create Table*, highlight *DBASE_IV*, and click *Continue*. Specify the directory and click *Continue* again. Replace [New Table] with the desired table name, including the DBF extension, and click *Continue* once again. In the Model Table box, specify the entire database range, including the field names, and click *OK*.

In Approach, select *File•Open*, select *DBASE_IV* from the List Files of Type

box, specify the directory and name of the dBASE file you created above, and click *OK*. Select the *List* view and *Browse* mode to see all the records in the database.

20 Import 1-2-3 files into Approach. If you want to combine 1-2-3 data into Approach, first delete the top row of field names in 1-2-3. Next, create an Approach form with the appropriate type and number of fields, and then select *File•Import Data*. Select *Lotus 1-2-3* as the file type, and specify the directory and file name. Then map the field names and click *OK*.

Andrea Powers is an associate editor for PC World Lotus Edition.



Seth Ishem ©

1-2-3 Database Management MADE EASY

Release 4.x for Windows'

friendly Data Query Assistant

makes data retrieval a snap.

Although 1-2-3 has never been an ideal database program, it has always provided a convenient way to manage and manipulate data in simple list form.

Release 4.x for Windows doesn't add much raw power to its database functionality, but it does make it easier to work with databases through the graphically oriented Data Query Assistant. Now you can get the information that you need from your database by working through easy-to-understand dialog boxes, instead of wrestling with cryptic formulas and criteria ranges.

What follows is a refresher course on the most common data-management tasks and techniques and how to perform them with release 4.x's Data Query Assistant.

You'll learn how to properly set up a usable 1-2-3 database, what fields and records are, and how to specify criteria. You'll also discover how to link multiple criteria using the words *And* and *Or*, and how the arrangement of criteria affects the records to be selected. In addition, you'll discover how to find records that match criteria, how to delete records, how to add new records to an existing data-

SETH JABEN

BY RICHARD
CRANFORD

base, how to extract particular records to query tables, and how to modify the information in a database.

Some Database Basics

To follow the discussion, create a sample database by entering all the labels shown in **FIGURE 1**, then save your worksheet. This database lists by title the films produced in the last 12 years by Mogul Pictures, and contains information about the stars, directors, length of each film (in minutes), cost to produce (in millions of dollars), year released, and gross earnings for the first ten weeks of release.

All 1-2-3 databases have the same column-and-row construction. Each column in the database represents a *field*, and each row contains a separate *record*. A field is a category of information within the database. In our database, for example, all of the movie titles are stored in the Title field, the names of directors are stored in the Director field, and so on.

When you design and build a database, consistency is paramount. If you record your friends' names, addresses, phone numbers, birthdays, and so forth, on a stack of index cards, it doesn't matter if you put the address just below the name on some cards and the phone number below the name on others, because you know the difference between these two values. But in a comput-

er database (whether in a spreadsheet or database program), each field must contain the same type of information. For example, in the movie database, we've put all the release years in the Year field in column B, never in any other column.

A record is a collection of field entries for a single item in the database. The labels and values in range A2..H2 of the worksheet make up the complete record for Movie A. The content of a particular field within a record, whether it's a label or a number, is called its *value*. For example, the value of the Title field in the first record is

When you design and build
a database in 1-2-3,
consistency is paramount.

Movie A. The value of the Director field in the Movie D record is Coppola.

The top row of a 1-2-3 database always holds the field names, which are labels that describe the information contained in each field. Use only *one* row for each field name. If you need to use a long field name but don't want to make the columns wider, you can use release 4.x's ability to rotate or wrap

the text within a single cell. Finally, make sure that each one of the field names assigned is unique.

Finding Records

A common database task is locating a specific record or group of records for analysis. In 1-2-3 the first step is to select the database range—the range of records that you want to search. To do this, either use the mouse to highlight range A1..H27, or press the <F4> key and enter A1..H27. Then choose *Tools•Database•Find Records*. This will display the dialog box shown in **FIGURE 2**.

Note the text box labeled 'Find records in database table' at the bottom of the Find Records dialog box. If the database range isn't indicated or is incorrect, click the arrow button next to the text box and highlight the range with the mouse, or type the range address.

Defining the Who, What, and Where

The next step in locating records is to tell 1-2-3 the criteria it should use to locate a record or group of records. For example, you might tell 1-2-3 to find all records in which the Director field contains the name Coppola. You do this in the Criteria box of the Find Records dialog box. When you first open the dialog box, it already contains a default criterion expression, which compares the first field in the database to the first value in that field using the default operator, the equal sign. Figure 2 shows that 1-2-3 is set to find the records in which the Title field equals Movie A, the first record.

Let's change this default criterion so that 1-2-3 finds all the movies directed by Coppola. First, click the arrow next to the Field list box in order to display a list of all the fields in the database. Select *Director*. Leave the Operator list box alone for now. Next, you click the Value box to display all the names in the Director field. Even though there are 26 records and thus 26 entries in the Director field, you see only the four unique names in the list. Select *Coppola*. The Criteria box should now contain the expression 'Director=Coppola'.

Click *OK*. The dialog box disappears, and several of the records between rows 2 and 27, the ones with Coppola in column E, are highlighted. At this point in earlier releases

	A	B	C	D	E	F	G	H
1	Title	Year	Actor1	Actor2	Director	Length	Cost	Gross
2	Movie A	1993	Stallone	Close	Scorsese	122	60	67
3	Movie B	1992	Hoffman	Baldwin	Scorsese	187	45	74
4	Movie C	1990	Sarandon	Baldwin	Scorsese	92	50	72
5	Movie D	1993	Sarandon	Foster	Coppola	113	89	38
6	Movie E	1990	Hoffman	DeNiro	Howard	98	76	53
7	Movie F	1986	Connery	Close	Howard	189	58	88
8	Movie G	1990	Sarandon	Baldwin	Coppola	150	62	86
9	Movie H	1985	Hannah	Pacino	Coppola	181	58	76
10	Movie I	1991	Stallone	Pacino	Spielberg	139	51	63
11	Movie J	1985	Davis	DeNiro	Spielberg	127	57	46
12	Movie K	1989	Sarandon	Pacino	Spielberg	194	68	106
13	Movie L	1984	Connery	Foster	Scorsese	122	43	59
14	Movie M	1988	Hoffman	Streep	Coppola	164	81	48
15	Movie N	1990	Connery	Foster	Howard	192	54	63
16	Movie O	1983	Sarandon	Pacino	Coppola	159	40	93
17	Movie P	1984	Stallone	DeNiro	Scorsese	155	70	85
18	Movie Q	1984	Davis	Streep	Scorsese	109	61	85
19	Movie R	1990	Stallone	Streep	Howard	142	43	92
20	Movie S	1983	Connery	Foster	Scorsese	193	61	97
21	Movie T	1983	Davis	DeNiro	Coppola	198	43	58
22	Movie U	1989	Sarandon	Close	Scorsese	137	64	65
23	Movie V	1989	Sarandon	Close	Scorsese	91	41	98
24	Movie W	1989	Hannah	Foster	Coppola	147	69	97
25	Movie X	1981	Connery	Baldwin	Scorsese	166	71	77
26	Movie Y	1986	Hoffman	Pacino	Scorsese	144	78	101
27	Movie Z	1993	Stallone	DeNiro	Howard	157	75	107

FIGURE 1: IN A 1-2-3 DATABASE each column represents a field, and each row, a record.

of 1-2-3, you were switched to a find mode where you would jump from one selected record to the next by pressing <Down> and <Up>. You could move from field to field within a record with <Left> and <Right>. If you're familiar with this operation, resist the urge to press any of the arrow keys; doing so will deselect all the records. Instead, press <Ctrl>-<Enter> to advance to the next record, or <Shift>-<Ctrl>-<Enter> to go to the previous record. Press <Enter> to move to the next field within a record, or <Shift>-<Enter> to move to the previous field.

Connecting Criteria

Let's try another search, but this time with more complex criteria. Highlight range A1..H27 and select *Tools•Database•Find Records*. This time, let's look for only those Coppola films that were released after 1984. Click the Field box and select *Director*; leave the Operator list unchanged; then click the Value box and select *Coppola*. Again the expression in the Criteria box changes to 'Director=Coppola'.

Next, click the *And* button on the right side of the dialog box. Click the Field box and select *Year*; click the Operator box and select > (the greater-than symbol), then double-click inside the Value box and type **1984**. You can alternatively select *1984* from the drop-down list. Now the Criteria box contains two expressions connected by the word *and* (see the small figure shown above).

This formula tells 1-2-3 to select only those records in which Director equals Coppola, and Year is greater than 1984. Click *OK*, and 1-2-3 highlights the rows that have Coppola in column E and a number larger than 1984 in column B.

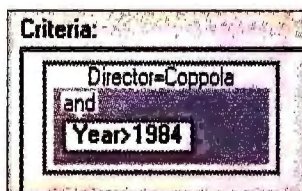
Connecting two criteria with *Or* gives a different result. When *And* is the connector, 1-2-3 finds only those records for which both expressions are true. When *Or* is the connector, 1-2-3 finds those records for which at least one of the two expressions is true. Compare the formula that you just created with the expression 'Director=Coppola or Year>1984'. This expression tells 1-2-3 to select a record if Coppola is the director (regardless of the year) or if the year is greater than 1984 (regardless of the direc-

tor). 1-2-3 highlights all the movies Coppola directed plus any other post-1984 movies—not a very meaningful collection of records. So it is important to know exactly what a criteria formula will do and exactly what you want to find. This is especially important when you

are writing criteria to delete records (which we'll show you how to do a bit later).

Let's try a couple more examples of criteria-based searches. Highlight the database and again select *Tools•Database•Find Records*. This time we'll define a set of criteria that use the same field. Select *Director* from the Field list and *Spielberg* from the Value list, click *Or*, then select *Director* from the Field list and *Scorsese* from the Value list. The resulting formula tells 1-2-3 to select a record if the Director field equals Spielberg or if the Director field equals Scorsese.

What's ironic about this formula is that if you were to state it in plain English, you would say "select Spielberg's movies *and* Scorsese's movies." Sometimes a task that contains the word *and* when described in conversational English requires an *Or* in a



Before you define criteria,

 it's important to know what

 it is you want to find.

criteria formula. A moment's thought reveals that you couldn't use the *And* connector here. If 1-2-3 encountered the expression 'Director=Spielberg and Director=Scorsese', the program wouldn't select any records at all. After all, there are no records in the database in which the Director field is both Spielberg and Scorsese.

Conversely, you'd use *And* to look for

records that fall within a range. Let's find all records in which the Gross field is greater than or equal to 55 million, and less than or equal to 65 million. First, click the *Clear All* button to get rid of the previous criteria. Now, click the Field box and select *Gross*. Select >= (the greater-than-or-equal-to symbol) from the Operator list. Then type **55** in the Value box. Click *And*. Select *Gross* from the Field box, click <= (the less-than-or-equal-to symbol), and type **65** in the Value box. This expression tells 1-2-3 to select all records in which Gross is greater than or equal to 55 million, and less than or equal to 65 million. If you used *Or* here, 1-2-3 would select all of the records in the database. In the less likely case that you want to select records that fall outside of a specified range, you would use *Or*, as in the expression 'Gross<=55 or Gross>=65'.

Click *Clear All*. Select *Actor1* from the Field list and select *Hoffman* from the Value list. Click *Or*. Select *Year* from the Field list, select < (the less-than sign) from the Operator list, and type **1988** in the Value box. You now have a formula that tells 1-2-3 to select all films starring Hoffman and all other pre-1988 films. Suppose that this is a mistake—you meant to connect the criteria with *And*. This is easy to fix. Just move the mouse pointer to the expression 'Year<1988' (the mouse pointer changes to a hand), click and hold down the mouse button (the hand closes), and drag the expression to the Actor1=Hoffman box. Now both expressions are located in one box and are connected by *And*.

Click *Or*; select *Director* from the Field list, select = (the equal sign) from the Operator list, and select *Howard* from the Value

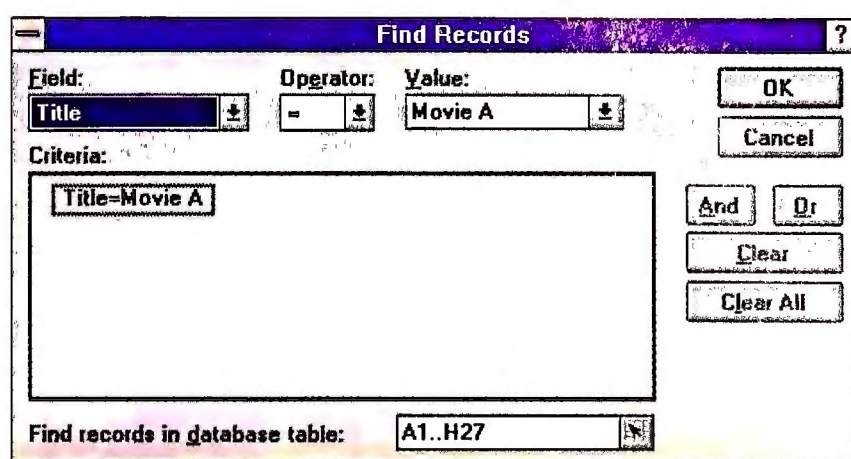
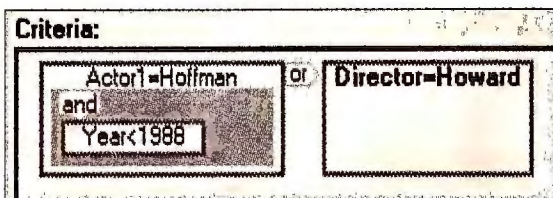
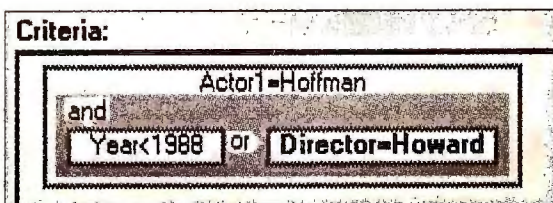


FIGURE 2: THE DATA QUERY ASSISTANT'S graphical approach to designing criteria makes it easy to locate records in your database.



list. You should now see all three criteria inside a box and the second and third inside a shaded area, as in the top figure above.

The physical arrangement of the expressions helps to clarify which records will be selected: movies starring Hoffman that are either pre-1988 or directed by Howard. Drag the expression 'Director=Howard' outside the box. It should now look like the lower figure above.

Even though there's still one And and one Or, the selection criteria are different. This formula tells 1-2-3 to select Hoffman's pre-1988 films plus any films directed by Howard.

Drag the three expressions around to form different arrangements, and try to guess what set of records each arrangement will select. When you're done experimenting, click *OK* to find the records or click *Cancel* to cancel the search.

Deleting Records

When the time comes for you to remove records from your database, use the *Tools*•*Database*•*Delete Records* command. This command is similar to the *Find Records* command. You define the criteria it should use to locate the records to delete.

Let's try deleting all films released in 1983 and earlier. Highlight the database range and select *Tools*•*Database*•*Delete Records*. This displays the same dialog box shown in Figure 2, except that the title bar reads 'Delete Records'. Select *Year* from the Field list, select <= (the less-than-or-equal-to sign) from the Operator list, and type **1983** in the Value box. Then click *OK*.

This removes any record whose Year field is less than or equal to 1983. You won't see a confirmation prompt as you do in earlier 1-2-3 releases. Furthermore, the only way that you can restore the records is to issue

the *Edit*•*Undo* command right after you delete them, or to close the file without saving it and reopen it in its former state. So take extra care when deleting records.

Adding Records

1-2-3 makes it easy to add new records to a database: You simply type the field values in the appropriate columns at the bottom of the database range or append records from another area of the worksheet.

If you're using the first method, you must remember to redefine any range names you may have assigned to encompass the new records. The second method allows you to transfer data from another worksheet range

A query table lets you work with a subset of records without damaging the database.

to the database, even if the other range isn't identical to the database range. All that's necessary is that the range to be added to the database begin with a row of field names and that at least one of the field names be from the database. 1-2-3 will only transfer those values whose field names are found in both of the databases.

To try this out, set up the block of labels and numbers shown in **FIGURE 3**. This range represents an input area in which new film projects are entered. As you can see, there's currently a title and a director but no stars, and of course we will not know the cost until the project is completed, or the gross earnings until after the film is released. We do have a Bud-

get field, but as you'll see, 1-2-3 will ignore that when you add the new information to the database, because it doesn't have an equivalent field in the database.

Highlight range J1..M2 and select *Tools*•*Database*•*Append Records*. A small dialog box appears. The correct range already appears in the *Append Records From* text box. Click the arrow button next to the *To Database Table* box, press the <Home> key, then select the database range with the mouse. When the dialog box returns, click *OK*. Even though the fields in the appended range aren't in the same order that they are in the database, 1-2-3 added the number '1994' to the Year field, the title 'Alien 4' to the Title field, and the name 'Burton' to the Director field.

Changing the Data

Earlier we saw how to find records that match certain criteria and how to move through the selected records and fields. If you need to modify or update any of the records in the database, you could do it while browsing the entries, but there's a better way: Create a

query table (a subset of database records and fields), change its contents, then send the changed data back to the database from which it came. You can also use query tables to generate reports from your database.

Highlight the database range (be sure to include the new record for Alien 4), then

	J	K	L	M
1	Year	Title	Budget	Director
2	1994	Alien 4	60	Burton

FIGURE 3: ONE WAY TO ADD RECORDS TO YOUR DATABASE is to enter them into an input range, then issue the *Append Records* command.

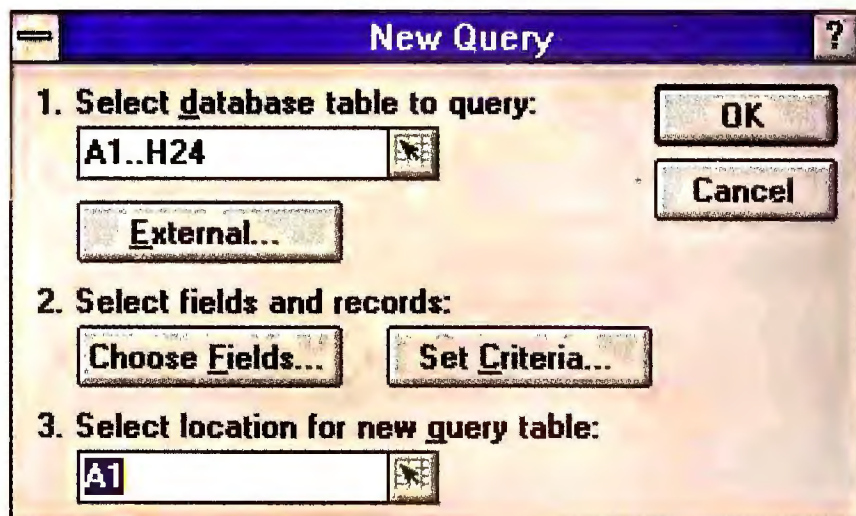


FIGURE 4: THE NEW QUERY DIALOG BOX provides a simple step-by-step approach for defining the data to use in a query table.

select *Tools • Database • New Query*. As you can see, the resulting dialog box, shown in **FIGURE 4**, breaks the task of creating a query table into three steps. You've already completed the first step by preselecting the database range. If you didn't preselect the range, you can do it now by clicking the arrow next to the upper text box.

The second step is to select the fields and records that should appear in the query table, because as a rule you won't want to include all the records from the host database in the query table.

To select which fields should appear, click the *Choose Fields* button. This displays the dialog box shown in **FIGURE 5**, which lists all the fields in the database. You can either take away the ones that you don't want to use, or you can clear all the fields from the list and add back the ones you do want. We'll create a query table that includes only the Title, Actor1, Actor2, and Cost fields. To eliminate the other fields, you simply click the *Year* field, then hold down the **<Ctrl>** key and click *Director*, *Length*, and *Gross*. Then click the *Clear* button.

Of course, you can restore any field you cleared by mistake: Click the *Add* button, select the field from the resulting Add Fields list, and click *OK*.

The arrows at the bottom of the Choose Fields dialog box let you determine the order of the fields in the query table. For example, if you want the Title field to appear to the right of the Actor1 and Actor2 fields, click that field, then click the down arrow button twice to move Title to the second and then the third position in the list.

When you've chosen the fields you want and put them in order, click *OK* in the Choose Fields dialog box. Then click the *Set Criteria* button, define the criteria as 'Year>=1993', and click *OK*.

The third step is to specify a location for the query table. Enter **J6** in the 'select location for new query table' text box. Then click *OK*. Your worksheet should now have a small block of entries that make up the query table, as in **FIGURE 6**.

Two-Way Links

Although the individual entries of the query table reside in the cells the table occupies, the table is actually an object (in much the same way a drawn shape or a chart is an object) with properties of its own, the most

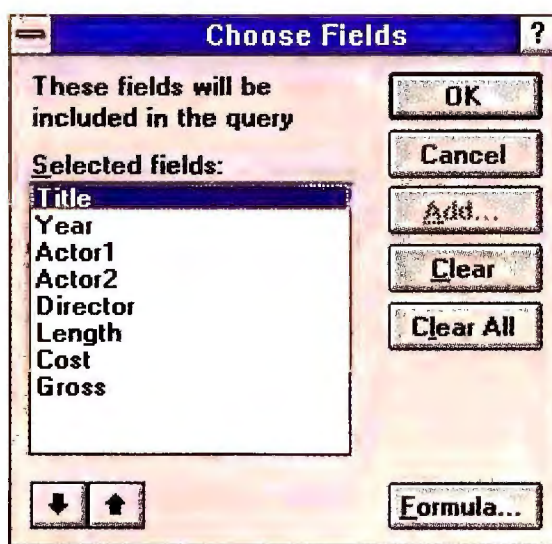


FIGURE 5: PICK THE FIELDS THAT YOU WANT TO APPEAR in the query table from the Choose Fields dialog box.

important being its two-way link to the database from which it was pulled.

Notice that when a query table is selected—that is, when small black handles appear on the outline of the table—the Query command replaces the Range command in the menu bar. Select *Query* to display the drop-down menu of commands. You've already used the first two in the menu: the Set Criteria command, which recalls the Criteria dialog box; and the Choose Fields command, which redisplay the Choose Fields dialog box that you accessed from the New Query dialog box. Use these commands whenever you need to adjust the records or the fields that appear in an existing query table. Press **<Esc>** to clear the menu.

To demonstrate the link between the database and the extracted query table, move the pointer to the last row of your database, the one containing the record for Alien 4. Enter **70** in the Cost field.

Move back to the area containing the query table and click its frame. Choose *Query • Refresh Now*. The number '70' appears in the query table's Cost field for the Alien 4 record. The query table now reflects the change that you made to the record in the database.

Now let's reverse the flow, entering data in the query table and sending it back to the database. To do that, you must turn off a safety feature that

was designed to keep you from changing the database accidentally. With the query table selected, choose *Query • Set Options*, click the check box that says 'Allow updates to database table', and click *OK*. A warning message appears to remind you that you've enabled updates; click *OK*.

Enter the names **Weaver** and **Hopkins** in the Actor1 and Actor2 cells in the Alien 4 row of the query table. Then reselect the query table and choose *Query • Update Database Table*. This sends the two names to the appropriate fields of the Alien 4 record in the database, and it disables updates to the query table. If you want to change any of the entries in the query table and post the changes back to the database, you must reenable the Allow Updates feature.

Working with a query table means you don't have to worry about damaging the structure or integrity of the database. Keep this technique in mind when you're making major modifications to a database.

Tame Your Data

Release 4.x's database commands provide an easier-to-use front end for maintaining and querying databases than any other release of 1-2-3. You can now control database operations, in many cases using just your mouse, in a comfortable graphical environment—no more defining criteria ranges and setting up complex Boolean formulas, as in the older releases.

You can also use release 4.x to work with databases that are stored on disk or databases that are accessible through networks, and you can join two or more database tables to create relational databases. We will be looking at these more advanced database techniques in an upcoming article.

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

	I	J	K	L	M
4					
5					
6					
7		Title	Actor1	Actor2	Cost
8		Movie A	Stallone	Close	60
9		Movie D	Sarandon	Foster	89
10		Movie Z	Stallone	DeNiro	75
11		Alien 4			

FIGURE 6: USE A QUERY TABLE when you want to work with a subset of records. The query table is updated when the source data changes.



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Four!



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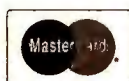
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Let Backsolver Find the Answer



Back in late-night television's Golden Age, one of the highlights was Carnac the Magnificent, the mystical seer who knew all. Dressed in a turban, Johnny Carson would intone the answer to an unknown question. Then Ed McMahon would hand him an envelope, which contained an amusing question that fit the answer Johnny had given.

1-2-3 can't do a Carnac act, but it can work backward: You start with the answer you want, and 1-2-3 produces an appropriate question.

More specifically, set up your question in the form of a worksheet model that contains one or more formulas. If your spreadsheet returns a result you don't like, decree your desired solution and ask 1-2-3 to change variables in the model until it gets the correct result.

The key to this process is the Backsolver, an add-in found in 1-2-3 releases 2.4, 3.1+, and 3.4 and in 1-2-3 release 4.x for Windows. Although Backsolver can work backward through one or more sophisticated formulas, it's one of 1-2-3's simplest add-ins. This article illustrates the use of Backsolver by tackling a common but tricky financial-planning problem: How much do you need to save monthly to meet a specific goal?

The Model, Please

The model in **FIGURE 1** illustrates a simple monthly savings plan. You enter the amount you'll save each month, the number of years you'll stick with the plan, and the anticipated appreciation you'll get each year in range B3..B5. Build the model by entering the amounts shown in the figure, along with the identifying labels. Widen column A to accommodate the labels. Assign the Currency 2 format to cells B3 and B7 and the Percent 2 format to cell B5.

The formula in cell B7 calculates the amount you'll have at the end of your savings program. Enter the formula $@FV(B3,(1+B5)^(1/12)-1,B4*12)*(1+(1+B5)^(1/12)-1)$ in cell B7. Widen column B so you can see the formula's result.

The inputs in the example are our first crack at a savings plan: If, starting now, you invest \$250 per month in a savings plan that you anticipate will return 7 percent per year, you'll have \$43,004.72 at the end of ten years.

That's impressive, but suppose you estimate you'll need \$50,000 to pay for a trip you're planning for your silver anniversary. How much will the monthly savings, the estimated annual return, or the length of the savings plan have to increase to meet the goal?

One way to answer that question is to pick a variable and start plugging away. You could start entering higher numbers for the monthly savings variable (in cell B3) until the savings total in cell B7 exceeded the \$50,000 mark. You could then work backward, plugging in smaller numbers until you arrived at the correct answer.

It's easier to get the answer with Backsolver. When you activate it, you specify a formula, tell 1-2-3 what result you want that formula to return, and specify which variable you want 1-2-3 to change.

Before you use Backsolver, note one important consideration. Backsolver will replace your original inputs with the amount required to reach the

goal you specify. If you want to toggle back quickly to your original inputs, make sure 1-2-3's Undo utility is enabled. You can also employ release 4.x's Version Manager to keep track of different value sets. (See "Turn Your Worksheet Into a Team Player" in the September 1993 issue for more on Version Manager.) This capability is helpful when you want to use Backsolver several times to experiment with different variables. It's also a good idea to save a copy of your original model before you use Backsolver.

In the DOS releases, you activate the Undo utility by selecting */Worksheet • Global • Default • Other • Undo • Enable*. To apply this change to the current session only, select *Quit*; to keep Undo active in future sessions, select *Update • Quit*. In release 4.x, Undo is enabled by default. If you aren't certain Undo is enabled, choose *Tools • User Setup* and see if the Undo check box is selected. After Undo is enabled, you can use it by pressing **<Alt>-<F4>** in 1-2-3/DOS, or **<Ctrl>-Z** in release 4.x (or select *Edit • Undo* in release 4.x).



You can also click the Undo icon, shown at left, in all releases except 3.1+.

Invoking Backsolver

In the DOS versions of 1-2-3, Backsolver is an add-in, so it's not automatically available. To attach it, first press **<Alt>-<F10>**. In release 2.4, select *Attach*, then select *BSOLVER.ADN* from the list that appears. In releases 3.1+ and 3.4, select *Load*, and *BSOLVER.PLC* from the list of add-ins. Then, in both releases 2.x and 3.x, select *No-Key*. Now select *Invoke* and specify *BSOLVER*.

	A	B
1	Savings Plan	
2		
3	Monthly Savings	\$250.00
4	Years Saved	10
5	Estimated Annual Return	7.00%
6		
7	Amount Saved	\$43,004.72

FIGURE 1: TEST BACKSOLVER by creating this sample savings plan worksheet.

Formula-Cell	Value	Adjustable	Solve	Quit
Specify the formula cell to be set to the target value				
	A	B	C	D
1	Savings Plan			
2				
3	Monthly Savings	\$250.00		
4	Years saved	10		
5	Estimated annual return	7.00%		
6				
7	Amount saved	\$43,004.72		
8				

FIGURE 2: IN RELEASES 2.4, 3.1+, AND 3.4, you specify Backsolver's inputs via this menu.

If the add-in BSOLVER (with an ADN or PLC file extension) doesn't appear on the list, the Backsolver add-in wasn't installed with 1-2-3. You must run the Install program again to copy the necessary files onto your hard drive. In 1-2-3/DOS start the Install program from the original floppy disk. In release 4.x start Install by double-clicking the 1-2-3 Install icon in the Lotus Applications program window.

Invoking Backsolver in release 4.x is easier than in the DOS releases. Just select *Range • Analyze • Backsolver*.

You're ready to go. In 1-2-3/DOS the Backsolver menu appears in the control panel, as shown in **FIGURE 2**. In release 4.x the Backsolver dialog box appears, as shown in **FIGURE 3**.

Using Backsolver involves four steps:

1. Indicate the cell that contains the formula whose result you want to change. In 1-2-3/DOS select *Formula-Cell* and specify cell *B7*. In release 4.x indicate cell *B7* in the Make Cell box.

2. Specify the result you want to appear in the formula cell (or Make Cell). In 1-2-3/DOS select *Value* and enter **50000**. In release 4.x type **50000** in the Equal to Value text box.

3. Specify the variable (or adjustable) cell—the cell you want 1-2-3 to change to get the result. You must select a cell that is related, either directly or indirectly, to the formula cell that you specified. The variable cell should contain a value or be blank. Here, you want to determine the monthly payment required to meet the \$50,000 goal, so cell *B3* is the variable cell to change. In 1-2-3/DOS select *Adjustable* and specify cell *B3*. In release 4.x indicate cell *B3* in the By Changing Cell(s) text box.

4. Run Backsolver. Select *Solve* in 1-2-3/DOS, or click *OK* in release 4.x.

Backsolver places the monthly amount needed to reach the goal, \$290.67, in cell *B3* and recalculates the formula in cell *B7* to \$50,000.

Questions Galore

If a \$290.67 monthly payment is more than you can afford, you may want to experiment with the other variables. For example, you may try extending the horizon of the savings plan. Now that you've set up the problem and already run Backsolver once, this is a simple task. First, select Undo (**<Alt>-<F4>** in 1-2-3/DOS, **<Ctrl>-Z** in release 4.x) to return to your original inputs (in release 3.4, a menu appears asking if you want to undo the most recent modifications—select *Yes*).

Invoke Backsolver again, and specify a new adjustable cell: In 1-2-3/DOS select *Adjustable* and specify cell *B4*; in release 4.x indicate cell *B4* in the By Changing Cell(s) text box. Make sure the Formula-Cell (or Make Cell) is still set to cell *B7*. Then select *Solve* in 1-2-3/DOS or click *OK* in release 4.x. Backsolver tells you that given both the original monthly payment and the estimated return, it will take approximately 11.14 years to reach your savings goal of \$50,000.

Backsolving in Releases 3.4 and 4.x

Both release 3.4 and release 4.x for Windows let you specify several variable cells. When you do, Backsolver changes each input by the same percentage to reach the goal.

In the savings example, you might decide to meet the \$50,000 goal not just by changing the monthly contribution or the length of the savings plan but by changing both variables equally. Before you try to do this, make sure that your model looks like the one in Figure 1. Then enter **B3..B4** as the Adjustable argument (in release 4.x, enter **B3..B4** in the By Changing Cell(s) text box).

When you select *Solve* or *OK*, 1-2-3 places the new values for the two variables in their respective cells. (In the example, 1-2-3 changes the monthly contribution to \$266.28, and it changes the length of the savings plan to 10.65 years, increasing each of the original variables by 6.5 percent.)

In addition, once you have analyzed a problem by using Backsolver, you can save solutions as scenarios within Version Manager.

By using the Undo utility and the Backsolver add-in together, you can quickly determine the change needed in any of your variable inputs to reach

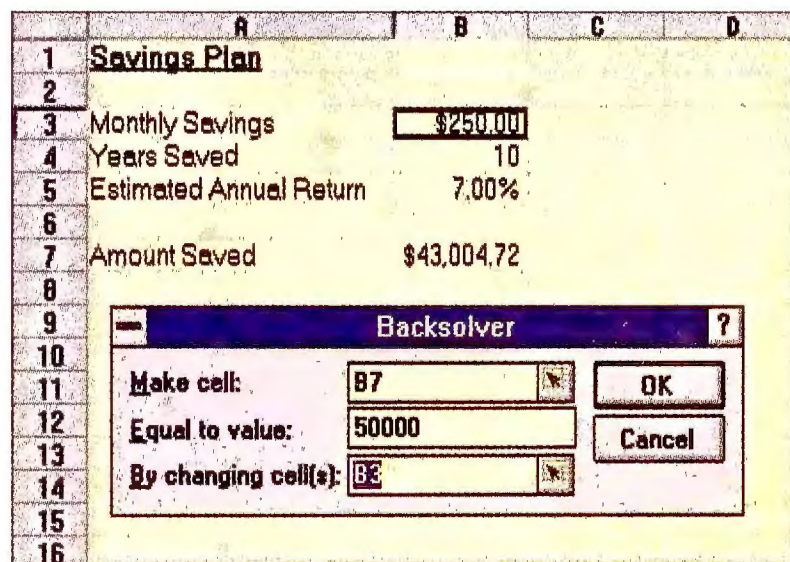


FIGURE 3: IN 1-2-3 RELEASE 4.X FOR WINDOWS, you fill in the blanks in this dialog box for easy Backsolving.

the goal you specify. It isn't terribly mystical, but it beats the old trial-and-error method—and it's safer than asking Carnac the Magnificent.

By Kelly R. Conatser

Kelly R. Conatser is a frequent contributor to PC World Lotus Edition and a consultant who specializes in spreadsheet application design.

Models on Disk includes the models, macros, and formulas contained in this article. To order, call 800/824-5520 or write to **PC World Lotus Edition, Models on Disk, P.O. Box 1743, Salisbury, MD 21802-9830. Individual disks are \$9.95. A full year's subscription is \$89.95. This material is also available on CompuServe and from PC World Online; see page 12 for more information about PC World Online.**

To Lease or Not to Lease



Starting this month we'll be presenting small 1-2-3 models that you can put to good use right away. The model showcased here, which works in all releases of 1-2-3, helps you decide between leasing a car and buying one. It shows you how each payment plan affects your cash flow, and it compares total costs.

Before You Sign...

You've seen the ads boasting about the benefits of leasing. But before you sign on the dotted line, take a moment to weigh the pros and cons of leasing. If you don't want the hassle of owning a car at the end of the term, you might just want to go ahead and sign. But if you think that by leasing a car you'll make out better financially in the long run, there are a few things to consider. In spite of the low monthly payment, you may end up spending quite a bit more on a leased car and have nothing to show for it in the end.

Build the Model

To create the model, begin by entering the labels shown in column A and in range B8..D8 of the figure on the next page. Assign the Currency 2 format to

the worksheet: In release 4.x for Windows, choose *Style • Worksheet Defaults*, select *Currency* from the Number Format drop-down menu, and click *OK*. In 1-2-3 for DOS, select */Worksheet • Global • Format • Currency* and press **<Enter>** to accept the default, two decimal places.

Next, assign the General format to range B16..C16: In 1-2-3/W 4.x, preselect range B16..C16, click the *Format* button on the status bar, and select *General*. In 1-2-3/DOS, select */Range • Format • General* and then specify range B16..C16.

Assign the Percent 2 format to range B5..B6: In 1-2-3/W 4.x, highlight range B5..B6, click the *Format* button on the status bar, and then select *Percent* from the list. In 1-2-3/DOS, select */Range • Format • Percent*, press **<Enter>** to accept the default of two decimal places, and indicate range B5..B6.

Set the width of column A to 25 and the width of columns B, C, and D to 11. For example, in 1-2-3/W 4.x, position the pointer in column A, choose *Style • Column Width*, type **25**, and click *OK*. In 1-2-3/DOS, position the pointer in column A, select */Worksheet • Column • Set-Width*, type **25**, and press **<Enter>**.

Enter the following formulas in the cells indicated.

CELL	FORMULA
B11	+B4*B6
B13	@SUM(B9..B12)
Copy cell B13 to cell C13.	
B17	@PMT((B4-B9),B5/12,B16)
B19	@SUM(B17..B18)
Copy cell B19 to cell C19.	
B25	@SUM(B22..B24)
B28	+B13
B29	+B19*B16
B30	+B25
Copy range B28..B30 to cell C28.	
B31	+B28+B29-B30
C17	+C9
C18	+C17*B6
C25	+C22-C23
C31	@SUM(C28..C30)
D13	+B13-C13

Copy cell D13 to cell D19 and to range D28..D31. Before continuing, save the file.

Comparing Costs

After building the worksheet model, the next step is to gather all the information you need to compare loan and leasing costs. (To make it easier for you

This model shows you how leasing and buying affect your cash flow, and it compares total costs.

to see what data is required, we've unprotected the cells that contain input values and displayed them in blue.) You can obtain most of this data from your lending institution and car dealership.

Our example compares the cost of buying a \$16,000 car with the cost of leasing the same car over three years. To see how the model works with our data, enter **16000** in cell B4. When you're entering your own data, be sure to include such costs as rust protection and additional warranties in the price of the car. The interest rate in our example is 7.8%, so enter **.078** in cell B5. Enter **.05**, the sales tax for this particular state, in cell B6.

Next, enter the costs incurred at the start of the term. For this loan, a down payment of 20% is required by the lender, so enter **3200** in cell B9 (if you plan to pay for the car in full, enter the same amount you entered in cell B4).

If you lease a car, the first monthly payment is usually required up front, so enter **280**, the monthly payment for this lease, in cell C9. Some leases also require that you make a down payment of 10% or more of the car's value. If this is true in your case, add that value to the amount in cell C9.

Enter any fees you'll pay up front in row 10. In the model, we used the same amount for both buying and leasing, but you may have different costs for different purchase options. Enter **80** to cover

fees, licenses, and other registration costs in cells B10 and C10. The sales tax amount in row 11 is applicable only when you purchase the car, and this amount will vary by state. In this case, the formula in cell B11 returns \$800. Enter **N/A** in cell C11. The final up-front cost includes any other fees that may be applicable. In this case, a refundable security deposit is required by the lease agreement, so enter **N/A** in cell B12 and enter **300** in cell C12.

The next section of the model calculates the monthly expenses for both finance and lease options. Enter **36**, the term of both the loan and the lease in months, in cells B16 and C16. The monthly sales tax amount in row 18 is calculated for the lease payment only, so enter **N/A** in cell B18.

The final inputs are termination costs and the value of the car at the end of the term. Most lease agreements include a termination fee and may also charge for the general wear and tear on the car. (Pay close attention to your lease agreement. If you're not careful, you could end up paying a significant amount for "excessive use of the car.") In this case, enter **N/A** in cell B22 and enter **400** in cell C22.

Another cost that you may incur at the end of the lease is for mileage. For most leases, you're allowed to drive the car only a certain number of miles during the course of the lease, and you may be charged 10 to 15 cents for each mile you drive over that limit. You should base your estimate of mileage on past experience. If you know that you'll exceed the allowed mileage, you may be able to work out the difference in the monthly payment with the car dealership. Otherwise, you must include this amount in cell C22.

The refundable costs in cell C23 are the amounts you'll receive at the end of the term. In this case, enter **N/A** in cell B23 and enter **300** as the expected refund of the security deposit in cell C23. The amount in cell B24 is the expected value of the vehicle at the end of the term. Do some research to come up with an estimate for your target auto. For example, find out how well previ-

ous years' models have held their value. In our model, we estimate the car to be worth \$11,200 at the end of the term. Enter **11200** in cell B24, and enter **N/A** in cell C24.

Formulas Find the Bottom Line

The Analysis section of the model summarizes the costs required by the finance and lease options. The total up-front costs in row 28 show that you'll save \$3420 when you lease rather than finance the car.

The total monthly costs formula in row 29 calculates the total of all your monthly payments. The formulas in cells B29 and C29 multiply the total monthly costs by the number of months to return the total cash outflow. The value in cell B29 shows that after three years, you will have spent \$14,397.32 toward the purchase of the car or \$10,584.00 toward the lease, a difference of \$3813.32.

The formulas in row 30 calculate the value of the vehicle or the costs incurred at the end of the term. In the leasing case, the \$400 termination fee is offset by the \$300 refundable security deposit, so a balance of \$100 is required at the end of the lease.

The formulas in the Difference column help you decide between the buy and lease options on a cash flow basis. The formula in cell D13 calculates the difference between the cash you'll put down if you buy the car and the cash you'll need to lease it. Usually, you'll put down much more if you purchase the car than if you lease it. The formula in cell D19 calculates the difference in total monthly costs. Again, if you purchase the car, you'll probably be spending more each month than if you lease.

And the Winner Is...

The total costs of buying and leasing are shown in cells B31 and C31. The amount in cell D31 shows that, in this case, you'll save money if you buy the car, but that the savings comes directly

	A	B	C	D
1	LEASE VS. BUY			
2				
3	General Information			
4	Price	\$16,000		
5	Loan rate	7.80%		
6	Sales tax rate	5.00%		
7				
8	Up-front costs	Buy	Lease	Difference
9	Down payment	\$3,200.00	\$280	
10	Fees, license	\$80.00	\$80.00	
11	Sales tax	\$800.00	N/A	
12	Refundable costs	N/A	\$300.00	
13	Total up-front costs	\$4,080.00	\$660.00	\$3,420.00
14				
15	Monthly costs			
16	Term	36	36	
17	Monthly payment	\$399.93	\$280.00	
18	Monthly sales tax	N/A	\$14.00	
19	Total monthly costs	\$399.93	\$294.00	\$105.93
20				
21	End-of-term costs			
22	Termination costs	N/A	\$400.00	
23	Refundable costs	N/A	\$300.00	
24	Value of vehicle	\$11,200.00	N/A	
25	Total end-of-term costs	\$11,200.00	\$100.00	
26				
27	Analysis			
28	Total up-front costs	\$4,080.00	\$660.00	\$3,420.00
29	Total monthly costs	\$14,397.32	\$10,584.00	\$3,813.32
30	Total end-of-term costs	\$11,200.00	\$100.00	\$11,100.00
31	Total cost	\$7,277.32	\$11,344.00	(\$4,066.68)
32				

SHOULD YOU BUY OR SHOULD YOU LEASE? Construct this simple 1-2-3 model to weigh both of those options.

from the value of the car at the end of the term. If you buy the car but don't maintain it, the value of the vehicle may be significantly lower than you estimated; it may then cost you more to buy than to lease.

If the lease you're considering has more detail than this model allows, insert rows in the appropriate sections of the model.

By Catherine Kenny

Send us your models! If you've got a favorite 1-2-3 or Improv model that you would like to share with other readers, copy it to a floppy disk and send it to: Submissions Editor, PC World Lotus Edition, 77 Franklin St. #300, Boston, MA 02110. Be sure to include an explanation of the model, along with your name, address, and daytime telephone number.

Models on Disk includes the models, macros, or formulas that are contained in this article. See page L19 for details. This material is also available on PC World Online on America Online and CompuServe.



Deciphering Common Error Messages

You're working along in 1-2-3, probably under the gun, and BOOM! The computer beeps and displays an error message. What do you do? How do you get back to your data entry screen or resume your macro? 1-2-3 tells you what the problem is, but it doesn't tell you how to fix it. In this article, we present some of the most common error messages and tell you how to fix the problems that cause them so you can get right back to work.

1 Worksheet or Memory Full. You try to insert a few columns in 1-2-3 release 2.x, 3.x, or 4.x for Windows, and the error message 'Worksheet full' pops up as in **FIGURE 1**. You try to insert a row, and you

highlight the range of data you want to keep, select *File*•*Save As*, check *Selected range only*, specify a new file name, and click *OK*. In DOS releases of 1-2-3, select */File*•*Xtract*•*Formulas*, specify a new file name, and specify the data range.

Retrieve the new file. If you still get the message 'Worksheet full' or 'Memory full', check to see if other programs are loaded in memory, and remove them to free up RAM. If you're working in release 2.x or 3.x, check your AUTOEXEC.BAT file for ASSIGN or MODE commands and for spoolers.

2 Part of File Is Missing. This error appears when you retrieve a damaged file. The damage can be caused by static or a power surge when the file was being saved, a bad or damaged DOS, or a bad sector on the disk the file was being saved to. Many times the portion of the file that contains the end-of-file marker is missing. You can attempt to recover the file with a recovery utility, or just use a backup copy of the file. You do back up your files, don't you?

3 Not a Valid Worksheet File. This error and 'Worksheet File Revision is Out of Date' have many possible causes.

The file may be damaged, so the best solution is to use a backup copy of the file. If you don't have a backup copy, try to recover the damaged file using a utility or a recovery program such as Rescue Plus from Intex Solutions.

The file may have been created in a more recent release of 1-2-3. If you're working in release 2.x, you can't retrieve a file with a WK3 extension. You'll have to load the higher release, then resave the file with a WK1 extension.

The file may have been compressed using DOS's BACKUP command.

You'll have to decompress the file with DOS's RESTORE command before you can retrieve it in 1-2-3. If you used another compression utility such as Symantec's SQZ, you'll have to "un-squeeze" the file.

The file may be in ASCII or some other non-1-2-3 format. If you're using 1-2-3/DOS, you can use the Translate utility to convert the file into a Lotus file format; if it's in ASCII format, you can use the *File*•*Import* command.

If you're using release 4.x for Windows, you can bring in an ASCII file by using the *File*•*Open* command and specifying the Text file type (TXT, PRN). You can also open several other types of files in release 4.x: 1-2-3 picture files (1-2-3 PIC), ANSI metafiles (CGM), Excel worksheets (XLS), Symphony worksheets (WRK and WR1), Notes shared files (NS4), and files from all versions of 1-2-3 (WKS, WK1, WK3).

4 Unrecognized Key/Range Name. When 1-2-3 can't recognize a macro command, it returns this message. Check your commands for misspellings, too many spaces, and missing blank spaces.

5 Invalid Range. This error crops up in all releases of 1-2-3 when you attempt to use an unassigned range name within a macro command, or when you reference

In release 2.x you can't retrieve a WK3 file. You'll have to load the higher release, then resave the file with a WK1 extension.

get the message 'Cannot Move or Copy data beyond worksheet boundaries'. Or you're entering data and 'Memory full' appears. What's going on with your spreadsheet?

These errors usually occur when memory (RAM) has been allocated inadvertently to a range of cells outside the worksheet's active area. A far corner of the worksheet may contain forgotten data, or cells that you thought were blank may still be assigned formatting or range names. Keep in mind that formatted cells consume a minimum of 4 bytes of memory, while range names use 33 bytes.

It's time to clean up your worksheet. First, press <Home> to move the cell pointer to cell A1, then press <End> <Home> to move the cell pointer to the last active cell in the worksheet. The solution is clear if the cell pointer lands in the boondocks, in a blank cell, or in data you don't need.

Salvage your data by extracting it to a new file. In release 4.x for Windows,

	Series 1	Series 2	Series 3	Series 4
2	3.30	3.67	4.04	4.40
3	3.35	3.71	4.08	4.45
4	3.39	3.76	4.13	4.50
5	3.44	3.81	4.17	4.54
6	3.48	3.85	4.22	4.59
7	3.53	3.90	4.27	4.63
8	3.58	3.94	4.31	4.68

Worksheet full -- Press HELP (F1)

FIGURE 1: THE CAUSE OF THE 'WORKSHEET FULL' ERROR may not be immediately apparent. Check all parts of the worksheet for forgotten data and unnecessary formatting.

a deleted range name within a command.

It also occurs in release 2.x when you leave a required argument or argument separator out of a command.

6 Invalid Cell or Range Address. When you refer to a cell address or range name that doesn't exist, you get this message. You may have destroyed a range name by moving the contents of one cell on top of another cell that 1-2-3 considers to be the anchor to a range name. Anchor cells are the upper-left cell and the lower-right cell of a named range.

Although it doesn't necessarily signal a macro error, the message 'Invalid cell or range address' can also appear while a macro is running. Unfortunately, the error message doesn't tell you what cell the error occurred in, but it usually signals that the macro has come across unrecognizable keystrokes.

7 Syntax Error in Macro Key/Range. If you get this error, start by looking at the macro command in the cell address specified in the error message. One of the most common mistakes, visible in **FIGURE 2** in the specified cell, is entering a close parenthesis in a command where a curly brace belongs.

8 Install Program Prompts for Disk 6. If you're installing the SmartSuite on a network server, you'll find that 1-2-3's Install program asks for a disk labeled Disk 6 (3½-inch) or the ATM disk (5¼-inch). Don't worry. You aren't missing any disks. The program is actually looking for the Adobe Type Manager Install disk. You will find that SmartSuite comes with two ATM disks. The 1-2-3 Install program won't use either one.

To solve this problem, you have to reinstall 1-2-3 and deselect the Adobe Type Manager check box in the Features to Install list.

Once you've completed installing release 4.x, exit to DOS and use the XCOPY command to copy the contents of the two ATM disks into a subdirectory. Lotus recommends creating an ATM subdirectory within the 123R4W subdirectory. For example, place the first ATM disk in drive A: and enter `XCOPY A:*.* C:\123R4W\ATM /S`.

The /S parameter copies everything from the ATM disk, even the hierarchy of subdirectories and the files contained within them.

9 Error Reading File. A co-worker in an office across town sends you a 1-2-3 worksheet file via modem. You try to load the file into release 4.x, and this message appears. What's the problem?

This problem is linked to the way data is sent by the communications software. Some communications software sends file information in packets of equal size. For example, XMODEM sends information in packets of 512 bytes. If the last set of file information is less than 512 bytes, XMODEM pads the end of the file with null characters to make 512 bytes. When release 4.x reads the file into memory, it first looks at the end of the file. If the communications package padded the end of the file, release 4.x can't read it. You can check for this problem by comparing the file lengths of the original file and the sent file: They'll be different.

The solution is to either compress the file with a ZIP utility or use a communications protocol (like Kermit) that doesn't add padding.

10 Cannot Find WYSIWYG.DLL. You're working in release 4.x and trying to open a file that was saved in release 3.1+ or 3.4, and you get the message 'File Error—Cannot find WYSIWYG.DLL'. When you click on the only option you have—*Close*—another error box pops up: 'MAIN123W—An error has occurred in your application'. If you choose *Ignore*, save your work in a new file. If you choose *Close*, you'll close the application, and a third error message will appear: 'Application Error—MAIN123W caused a General Protection Fault in module MAIN123W.EXE at 0003:24EE'. When you select *Close*, the only option you have, 1-2-3 closes, and you're back in Windows' Program Manager.

If you attempt to reload release 4.x, you may receive the message 'Application Error—MAIN123W caused a General Protection Fault in module

USER.EXE at 0001:3AB0'. Your only choice is to go into other open applications, save your work, restart your computer, reload Windows, and reload release 4.x.

To avoid this frustrating and time-consuming scenario, just change a few simple settings in release 3.x or 4.x. The

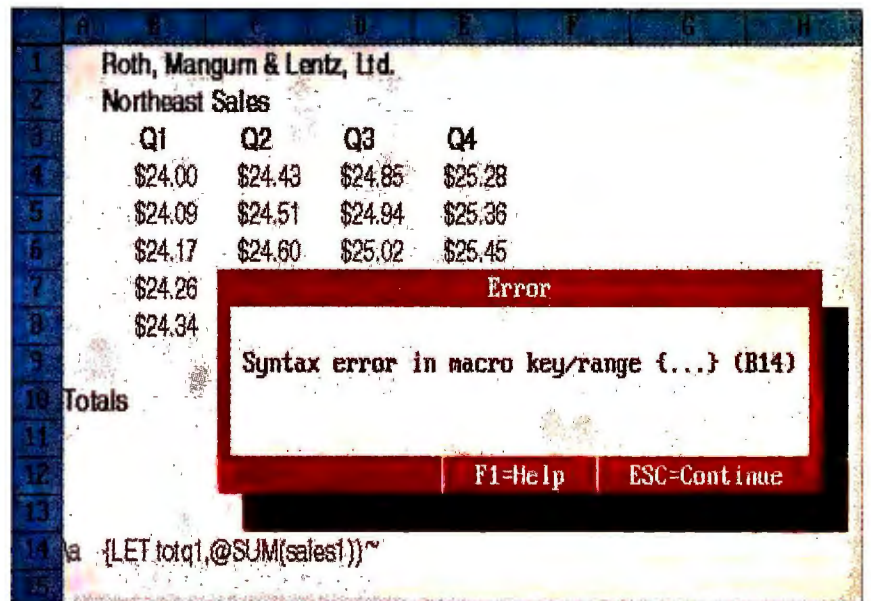


FIGURE 2: THE MACRO IN CELL B14 isn't working. It's time to take a close look at parentheses and curly braces.

error occurs when release 4.x attempts to load the WYSIWYG.DLL file because release 3.x for DOS was set to automatically load Wysiwyg for this specific file. You or someone else pressed <Alt>-<F10>, selected Settings•File•Set, selected WYSIWYG.PLC, and then selected Yes so release 3.x would automatically load Wysiwyg when you retrieved this file. You also are using a computer that has both release 3.x and 4.x on it, so release 4.x did find 3.x's WYSIWYG.PLC file.

To retain the Wysiwyg formatting, load release 3.x, retrieve the file, press <Alt>-<F10>, select Settings•File•Cancel•Wysiwyg•Quit•Quit, and resave it.

If you don't have access to release 3.x, in release 4.x select File•Open, type the file name in the File name box, click on Combine, select Entire File in the Read section of the dialog box, select Replace Values in the Effect in Current File section, and click OK. The file loads without any previous formatting.

By Carrie Thomas

Carrie Thomas is a senior associate editor for PC World Lotus Edition.



Create FOR Loops to Repeat Actions

Last month we saw how efficient it is to separate a portion of a macro into a subroutine that is run only under certain conditions or that is called at various points in a program. And we saw how to get 1-2-3 to repeat instructions by creating a simple loop with the {BRANCH} command. This month we'll look at more precise looping with the {FOR} command.

{FOR counter,start,stop,step,routine} tells 1-2-3, "For all values of counter beginning with start, increasing by step, and ending with stop, run routine." This command lets you control exactly how many times a subroutine is executed.

calls the routine named Nul. (In this example, the called subroutine merely passes control back to the instruction that called it. Later we'll see more functional routines.) Next, the {FOR} instruction adds 1 to Pause and calls Nul again. It repeats this process until Pause contains the value 1001. Then the macro proceeds to the next instruction, in cell B4, which clears the message from the top of the screen.

Breaking Out of the Loop

While the preceding example illustrates the workings of the {FOR} command, keep in mind that you could also make your macro pause with the {WAIT}

You can use a {FOR} loop to pause the macro until the counter reaches its stop value or until the user presses a key, whichever comes first. This lets users clear messages immediately when they become more familiar with the macro. The key to this trick is {FORBREAK}, which ends a {FOR} loop before its stop value is reached.

FIGURE 2 shows how to apply this. Edit cell B1, adding {BLANK kpress} to the existing {BEEP} command. Replace the contents of cell B8 with the label shown in cell B8 in the figure, and enter the labels shown in cells B9 and A11. Assign the name kpress to cell B11.

Run the macro again by pressing <Ctrl>-M or <Alt>-M. Once again, the message appears in the title bar or the mode indicator. If you wait, the message goes away by itself, but pressing any key clears it.

Don't confuse {FORBREAK} with {RETURN}. {FORBREAK} puts an end to the called routine, but it also ends the process of counting from the start value to the stop value. {RETURN}, on the other hand, ends the called routine, but it does not affect the counting process. If the routine that's called by a {FOR} command processes a {RETURN} command, control passes back to the {FOR} command, which then changes the counter value and calls the routine again (unless the stop value has been reached).

	A	B	C	D	E	F	G	H
1	\m	{BEEP}						
2		{INDICATE "A new set of assumptions has been saved to disk"}						
3		{FOR pause,0,1000,1,nul}						
4		{INDICATE}						
5								
6	pause							
7								
8	nul	{RETURN}						

FIGURE 1: THE {FOR} COMMAND IN CELL B3 displays a message in the mode indicator (the title bar in release 4.x) for as long as it takes the computer to count to 1001.

The simplest use for a {FOR} loop is to make the program pause while it counts to a certain number. FIGURE 1 shows an example. Enter the labels in the figure, remembering to begin cell A1 with an apostrophe. Assign the labels in column A as names for the cells in column B. In releases 2.x and 3.x, select /Range•Name•Labels•Right and specify range A1..A8. In release 4.x for Windows, preselect range A1..A8, select Range•Name, click the Use Labels button, and click OK.

Now try out the macro by pressing <Ctrl>-M (<Alt>-M in 1-2-3/DOS). The computer beeps; the macro displays a message in the title bar in release 4.x or in the mode indicator in 1-2-3/DOS, and then clears the message.

The {FOR} command in cell B3 puts the value 0 in the cell named Pause and

command. For example, the command {WAIT @NOW+@TIME(0,0,5)} pauses the program until the system clock's time is 5 seconds later than when the command was issued.

	A	B	C	D	E	F	G	H
1	\m	{BEEP}{BLANK kpress}						
2		{INDICATE "A new set of assumptions has been saved to disk"}						
3		{FOR pause,1,1000,1,nul}						
4		{INDICATE}						
5								
6	pause							
7								
8	nul	{LOOK kpress}						
9		{IF kpress<>"">{GET kpress}{FORBREAK}						
10								
11	kpress							

FIGURE 2: GIVE THE USER MORE CONTROL with the {FORBREAK} command, which displays a message until a counter reaches 1001 or until the user presses a key.

Flexible FOR Loops

There are many uses for {FOR} loops, but take care not to use them when a simpler solution would do. Suppose, for example, that you're devising a scheduler macro and you want it to put today's date and the next six dates in a column of cells. You could create a {FOR} loop to enter a date value, format the cell, move the pointer down a row, and repeat the operation six times. However, a faster approach would be to have the macro preselect a range of seven cells and issue the menu commands Data•Fill (or in release 4.x, the {FILL} command) to fill the range with date serial numbers instantly.

You're more likely to need {FOR} loops to move the cell pointer around. **FIGURE 3** shows a macro that adds a green background to every other row of a range. Set up the macro and try it out.

Entering the Macro

The macro in Figure 3 works in releases 2.3 and 2.4 with Wysiwyg attached. It doesn't work exactly the same in all DOS releases because each uses a different mechanism for capturing the coordinates of the range to format. If you're using release 2.3 or 2.4 with Wysiwyg, enter the labels in the figure (beginning cells J1 and K9 with apostrophes), then select */Range•Name•Labels•Right* and specify range J1..J14.

If you're using release 3.1+ or 3.4 with Wysiwyg attached, enter the labels that are shown in rows 1 through 12 of Figure 3 (beginning cells J1 and K9 with apostrophes). Then enter the labels in **FIGURE 4**, but skip cell K17. Begin the label in cell K14 with an apostrophe. Select */Range•Name•Labels•Right* and specify range J1..J23. Then in cell K17, enter the formula `@IF(kpress="~", "~ (ESC) (BRANCH grdone)", kpress)`.

In release 4.x, enter the labels shown in rows 1 through 12 of Figure 3. Begin cells J1 and K9 with apostrophes. The instruction in cell K9 will work as is, but you may wish to change it to {STYLE-INTERIOR 68}. Then in cell J14, enter the name `getrange`, and in cell K14 enter `{LET tablerange,@INFO("selection")}`. Preselect range J1..J14, select *Range•Name*,

	J	K	L	M	N	O	P	Q	R
1	\s	{getrange}							
2		{IF @ROWS(@@(tablerange))<3}{QUIT}							
3		{GOTO}{tablerange}~							
4		{FOR counter,0,@ROWS(@@(tablerange))-1,2,shade}							
5									
6	counter								
7									
8	shade	{ABS}{R @COLS(@@(tablerange))-1}~							
9		:FCBG							
10		{ESC}{D 2}							
11									
12	tablerange								
13									
14	getrange	{ABS}{LET tablerange,@CELLPOINTER("address")}							
15		{LET tablerange,tablerange&".."&CELLPOINTER("address")}-{ESC}							

FIGURE 3: COLOR EVERY OTHER ROW GREEN with this version of Getrange for releases 2.3 and 2.4.

click *Use Labels*, and then click *OK*.

Now in all releases of 1-2-3, fill a range with some entries. It doesn't matter what you enter, as long as the range is more than three rows deep.

To use the macro in releases 2.3 and 2.4, preselect the range you want to add green stripes to and press **<Alt>-S**. In releases 3.1+ and 3.4, move the pointer to the top left corner of the range, press **<Alt>-S**, and specify the range to color at the 'Enter table range' prompt. In release 4.x preselect the range and press **<Ctrl>-S**. The macro should color every other row in the specified range green.

How It Works

The {FOR} command in cell K4 is what moves the pointer through the range

exactly enough times to color every other row. The start value of the command is 0, but its stop value, instead of being a value, is a formula that returns a value that's one less than the number of rows in Tablerange. If you select a range that's 10 rows deep, the {FOR} command's stop value is 9, and if you select a range that's 101 rows deep, the command's stop value is 100.

Most of the time, you'll use a step value of 1 in a {FOR} command. Here the step value is 2. Because the instruction in cell K10 moves the pointer down two cells before applying a background color to a row, the {FOR} command has to get to its stop value twice as fast so that it doesn't paint several rows below the range you select.

	J	K	L	M	N	O	P	Q
14	getrange	/DT1{BS}.						
15	grloop	{GET kpress}						
16		{RECALC keyout}						
17	keyout	~{ESC}{BRANCH grdone}						
18		{IF @INFO("mode")=3}1{BS}						
19		{BRANCH grloop}						
20								
21	kpress							
22								
23	grdone	{LET tablerange,@CELLPOINTER("address")}						
24		{LET tablerange,tablerange&".."&CELLPOINTER("address")}						
25		{BREAK}						

FIGURE 4: COMBINE THIS GETRANGE ROUTINE with the labels in rows 1 to 12 of Figure 3 to color every other row green in releases 3.1+ and 3.4.

Counting Backwards

Sometimes you may want to use a negative value as the counter. To see why, create a macro that collapses a column of entries with some gaps in it, moving everything up so the entries fill a contiguous range. We can keep a lot of the same code created for the color-every-other-row-green macro—especially the Getrange subroutine. Save the file to keep that macro. Then save the worksheet again using a different name.

To modify the macro, erase ranges K2..K4 and K8..K10. Delete the range name Shade. Enter **collapse** in cell J8, then assign the name **collapse** to cell K8. Enter the labels in ranges K2..K3 and K8..K9 of **FIGURE 5**. Remember to precede cell K9 with an apostrophe and to leave the Getrange routine intact.

Enter some labels or numbers separated by empty cells in one column. In releases 2.3 and 2.4, preselect the column of entries and press **<Alt>-S**. In releases 3.1+ and 3.4, press **<Alt>-S** and

	J	K	L	M	N	O	P	Q
1	\s	{getrange}						
2		{GOTO}{tablerange}~						
3		{FOR counter,@ROWS(@@(tablerange)),1,-1,collapse}						
4								
5								
6	counter							
7								
8	collapse	{IF @CELLPOINTER("type")<>"b"}{D}{RETURN}						
9		/M{BS}{D}. {D counter-2}--						

FIGURE 5: COLLAPSE A COLUMN THAT CONTAINS EMPTY CELLS into one contiguous range with this macro and the appropriate version of the Getrange subroutine.

specify the range of entries at the prompt. In release 4.x preselect the column of entries and press **<Ctrl>-S**. The macro moves everything up, closing any spaces between the entries, and places this contiguously filled range into the upper cells of the specified range.

We used a negative step value (-1), so the macro counts backwards, from the number of rows in the range you selected, to 1. That's because we want the

macro to select a range that's as many rows deep as the amount remaining in the counter—several rows at the beginning of the process, fewer near the end.

Richard Cranford

 **Models on Disk includes the models in this article. See page L19 for details. This material is also available from PC World Online via America Online and CompuServe.**

ADVANCED CLASS

Simulating Traditional Languages

Some macro programmers use zero as a step value. If you think a {FOR} loop that steps by zero would never end, you're right—unless the routine called by the {FOR} command includes a {FORBREAK} that ends the loop when a condition is met.

The figure shows a macro fragment containing a {FOR} loop with a zero step value. These instructions make up the Getage subroutine, called by a main routine elsewhere in the worksheet, whose purpose is to prompt for an age and to repeat the prompt if the user's entry can't be treated as a value. The {FOR} command in cell R41 calls the Prompt routine, which uses {GETNUMBER} to display a prompt and receive input. If you respond to a {GETNUMBER}

	Q	R	S	T	U	V
41	getval	{FOR gvcount,1,1,0,prompt}				
42						
43	gvcount					
44						
45	prompt	{GETNUMBER "Enter your age ",age}				
46		{IF #NOT#@ISERR(age)}{FORBREAK}				
47						
48	age					

THIS INFINITE LOOP runs until a specified condition is met.

prompt by entering a label, the command stores ERR in the target cell. If that happens here, the {FORBREAK} command in cell R46 is not triggered, and the {FOR} command, because it hasn't advanced the counter, calls Prompt again.

Who thought of organizing a macro like this? Someone who was used to a command called

DO WHILE found in other programming languages. DO WHILE runs a routine until a condition is met. The program fragment in the figure does the same thing; it prompts for an age until the user enters a proper value.

Most of us, myself included, would skip the {FOR} command and the counter cell and use the {GETNUMBER} command as the

first instruction in Getage and follow it with {IF @ISERR(age)} {BRANCH getage}. But some macro programmers would rather pull their fingernails out than use a {BRANCH} command. Too unstructured, they say.

Nonsense, I say. Using a {BRANCH} command to loop back one or two lines doesn't make the sky fall, and I'd rather use two lines of code instead of three if it gets the job done. Still, if you're a seasoned programmer and you want to simulate DO WHILE in your macros, using zero as your step value and a conditional {FORBREAK} will do the trick.

Subroutines let you reuse a passage of code from several points in the same program. {FOR} loops let your programs use a passage of code several times in succession until a particular job is done.

Use Default Templates to Set Preferences

Paint It Red

Q I work in 1-2-3 release 4.0 for Windows, and I'd like to show negative numbers in red without having to use the Style•Worksheet Defaults command and check 'Negative values in red' each time I create a new worksheet.

Dawn Wilson, Fort Wayne, Indiana

A You still can't set this item as a default, but there is an easy work-around. Create a worksheet containing all the features you want as defaults, and use this worksheet as a template for all your new worksheets.

If you want to protect your template from change, select *File•Protect*, check the *Seal file* box, click *OK*, enter a password in the Password and Verify text boxes, and click *OK*.

Save the worksheet with the name **template.wk4**. Now go to the Windows Program Manager, select the *1-2-3/W 4.x* icon, and select *File•Properties*. Add the name of the worksheet, including its full path, to the end of the Command Line, as shown in the figure at the right.

When you start 1-2-3, the template file will come up automatically instead of the untitled worksheet. If you protected the template, turn off the protection (you will need your password). Save the file under another name. All your defaults will be there to work with.

To automate saving the file, enter **{FILE-SAVE-AS?}** in a cell in the template, and name this macro **\0** so it will run when you open the template. Type a new file name and click *OK*, and the macro will save the file under that new name. To retrieve another worksheet, click *Cancel* and select *File•Open*.

Test for Existence of a Range Name

Q I need a release 4.x formula that will test whether a range exists in another worksheet. If the range name exists, I want the formula to return the value in that range. If the range name does not

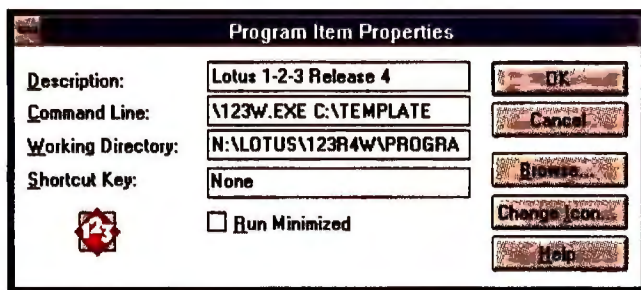
exist, I want the formula to return a zero. I tried the @IF and @ISERR functions without any luck. What other @functions could I use to make a formula determine whether a range exists in another worksheet?

Ed Hansberry, Nashville

A You need a formula that combines @IF with @ISNUMBER, as in the following:

@IF(@ISNUMBER(«SOURCE»test),«SOURCE»test,0)
 @ISNUMBER returns a zero if the range name Test does not exist in the file named SOURCE or if Test contains text. If @ISNUMBER returns zero, the formula returns zero. @ISNUMBER returns a one if Test does exist in SOURCE and contains a value. If @ISNUMBER returns one, the formula displays whatever value is in Test.

Note that if you delete the range name, the formula will use the cell address of the range and continue to return the value.



All Numbers Display as Zeros

Q I'm having a mysterious problem with 1-2-3 release 3.1. Whenever I try to enter a number, 1-2-3 displays a zero. Can you tell me what's going on?

Therese Beth Reneau, Whitinsville, Massachusetts

A You are probably using a system with a 486SX processor. The 486SX, unlike the 486DX and 486DX2 processors, lacks a math coprocessor. However, 1-2-3 assumes that you're using a math coprocessor unless you type **123 -s** to start up the program.

A release 3.1 upgrade lets you start 1-2-3 without the -s parameter. To request a copy of this upgrade, call Lotus customer service at 800/343-5414.



Display Hidden Columns

Q I know that you can hide columns by using the mouse and Wysiwyg, but how do you display hidden columns with the mouse?

Pam Walther, Kokomo, Indiana

A You hide a column by clicking and dragging that column's right border in the worksheet frame to the left until the column is obscured.

To redisplay the column in Wysiwyg, hold down **<Shift>** and click the line that marks the first hidden column. In 1-2-3 for Windows, drag the line to the right using the mouse. You will display one hidden column every time you do this.

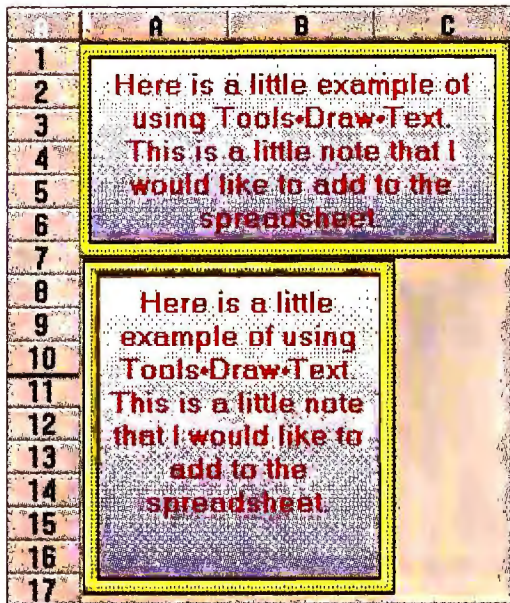
Use a Text Block

Q In 1-2-3 releases 2.x and 3.x with Wysiwyg, :Text•Edit adjusts line lengths of text to fit the specified range. How do I get release 4.x to wrap text?

Rory Parness, New York

A Put your text in a text block. Select *Tools•Draw•Text*, or click on the *Text Block* SmartIcon and highlight a range with the mouse. As you type in the block, the text will wrap to fit.

After you finish typing text, you can change the dimensions of the text box by selecting it with the mouse and drag-



ging a handle. The text will rejustify to fit the new dimensions, as shown in the figure above.

You can also move the box around the worksheet. Just click anywhere on the box except on a handle, and drag with the mouse. To edit the text within a box, double-click on it and type away.

You can change the font, alignment, and size of text in a text box, and you can change the style, color, and pattern of the frame and background. Just click on the text block, click the right mouse button, and select *Font & Attributes* or *Lines & Color*.

Formatting Headers and Footers

Q When I used 1-2-3 release 2.4, I was able to use the Wysiwyg control codes to print different font sizes and

formats in headers and footers. How do I assign fonts to my headers and footers in release 4.x for Windows?

Harold Turchin, Coconut Creek, Florida

A You assign fonts and formats in the 1-2-3 Windows release by using the <Alt>-<F1> key combination with compose sequences. For example, select *File•Page Setup*, and click on a Header or Footer edit box. If you then press <Alt>-<F1> and type **ba** (for *begin attribute*), 1-2-3 will display a thick vertical bar as shown in the figure below. Enter the code for the font or format that you want to assign, type the text that you want in the header or footer, and then click *OK*.

For example, press <Alt>-<F1> and type **babBALANCE SHEET ACCOUNT** to get **BALANCE SHEET ACCOUNT** in bold in the header.



Here's a list of header and footer compose sequences:

For styles you assign these letters: *b* for bold, *d* for subscript, and *i* for italics. (The letters in the compose sequence must be lowercase.)

For colors use *1c* for the default color, *2c* for red, *3c* for green, *4c* for dark blue, *5c* for cyan, *6c* for yellow, and *7c* for magenta. (The letters in the compose

sequences must be lowercase.)

For Wysiwyg fonts use *1F* for font 1, *2F* for font 2, *3F* for font 3, *4F* for font 4, *5F* for font 5, *6F* for font 6, *7F* for font 7, and *8F* for font 8. (The *F* following the font number must always be an uppercase letter.)

For Lines assign *1_* for single underline, *2_* for double underline, *3_* for wide underline, *4_* to draw a box around the characters, and *5_* for the strike-through mode.

These formatting sequences were inherited from the Wysiwyg releases of 1-2-3, and the current documentation for release 4.x doesn't mention them. When you're assigning more than one attribute at a time, press <Alt>-<F1> and type **ba** before each code.

Not Enough Memory to Run Install

Q I have just purchased 1-2-3 release 3.4 and am trying to install it on my hard disk. I keep getting the error message 'There is not enough memory available to run install. Remove all memory resident programs and start install again'. What should I do?

Schuyler White, Charlestown, Massachusetts

A The install program for 1-2-3 release 3.4 requires 440K or more of conventional memory. You are probably loading some RAM-resident programs before trying to run install, which is eating up memory.

To remove these utilities, rename the **AUTOEXEC.BAT** and **CONFIG.SYS** files in your root directory: At the DOS prompt, type **ren autoexec.bat origexec.bat** and **ren config.sys orig.sys**. Reboot your system and run the 1-2-3 install program. When you've finished installing 1-2-3, return your files to the original names by typing **ren origexec.bat autoexec.bat** and **ren orig.sys config.sys**. Then reboot again.

Attach a Macro to a SmartIcon

Q How do I write a release 4.x macro that will import a bit map of my company logo into a worksheet, and how do I attach the macro to a Smart-Icon so I can include the logo in any document just by clicking a button?

Ajay K. Vonkarey, Dallas

GOOD IDEAS



Create a Clipboard File

If you use the *Edit•Copy* and *Edit•Paste* commands over and over again to copy the same data, you may want to save the data in a Windows Clipboard file instead. For example, suppose you have data that you include in each report you create. You can't use a template because the information won't be in the same location in each report. You could use the *File•Combine* command, but then you wouldn't be able to bring the data into another Windows application, such as *Ami Pro* or *Lotus Notes*.

Here's how to create a Clipboard file. First copy the data to the Clipboard by

highlighting it and selecting *Edit•Copy*. Then open the Clipboard. (It's usually in the Main program group.) Select *File•Save As*, type a file name, and specify the drive and directory, if necessary. Make sure that you specify the Clipboard file type (***.CLP**), and click *OK*.

The next time you're working in 1-2-3 (or any other Windows application) and you want to include the data you saved to the Clipboard, open the Clipboard, select *File•Open*, and specify the file name. Return to the application, position the cell pointer (or cursor) where you want the data to appear, and select *Edit•Paste*.

Andrea Powers, PC World Lotus Edition

A Copy the logo to the Windows Clipboard with the *Edit•Copy* command. Paste the logo into the worksheet by selecting *Edit•Paste Special* and choosing *Bitmap* or *Picture* from the dialog box. Save the worksheet in a file named **logoblk.wk4**.

To create the macro, enter the following instructions in another worksheet:

{FILE-OPEN "C:\LOGOBLK.WK4";;"Yes";"After"}

{SELECT "<BITMAP>";;"Draw"}

{EDIT-COPY}

{FILE-CLOSE}

{EDIT-PASTE}

Replace the C:\ with the location of your worksheet drive and directory.

The first two lines of the macro open the file and select the bit-map logo. The third line copies the bit map to the Windows Clipboard, and the fourth line closes the file opened in line one. The

last instruction pastes the logo into the current worksheet cell.

To attach the macro to a SmartIcon, select the entire macro with the mouse, and select *Edit•Copy* to copy it to the Clipboard.

Follow these steps exactly: Select *Tools•SmartIcons* and click the *Edit Icon* button. In the Edit Icon dialog box, click the *New Icon* button and enter a name for the new icon—for example, **logo**. Click the *Paste Macro* button, then press <Ctrl>-<Esc> or <Alt>-<Tab> to switch to the program that contains your logo, and copy the logo to the Clipboard. Switch back to 1-2-3, click the *Paste Icon* button, then click *OK* to get back to the SmartIcons dialog box. Scroll to the bottom of the Available Icons list, and drag your new icon over to an icon set. Click *OK*—you're done.

Starting this month, we will no longer cover 1-2-3 for Windows release 1.x. If you haven't yet upgraded to release 4.x for Windows, call Lotus Development Corporation at 800/343-5414 and press 2 for sales. We'll continue to cover 1-2-3 releases 2.3, 2.4, and 3.x for DOS.

Your questions and ideas are important to us. Send your letters, including your address and daytime telephone number, to Q&A/Good Ideas, PC World Lotus Edition, 77 Franklin St. #300, Boston, MA 02110. We pay \$60 for each letter that we publish. Sorry, we cannot acknowledge any unpublished materials.

Models on Disk includes the models, macros, or formulas contained in this article. See page L19 for details. This material is also available on CompuServe and on PC World Online.

GOOD IDEAS



Don't Print That Row

Here's how to eliminate rows from a print range in 1-2-3 release 3.x and 1-2-3 release 4.x for Windows. For example, the worksheet in the figure below contains sales results for the month of April. Let's assume that you don't want to print any of the rows that display sales of less than \$12,000.

Enter the labels and values in the figure. Set the width of column B to 11. Assign the Currency 0 format to range B2..B8. With the cell pointer in column A, insert a column (pushing the names over to column B, and so on) and then set the width of column A to 1. Enter two split vertical bars in cell A10, and enter **12000** in cell B10. Then enter the formula **@IF(C2<B\$10,A\$10,"")** in cell A2 and copy it

	A	B
1	Name	April Sales
2	Smith	\$11,908
3	Johnson	\$20,955
4	Masa	\$13,420
5	Daniels	\$17,645
6	Griffin	\$10,000
7	Adams	\$9,292
8	Reggis	\$19,954

Name	April Sales
Johnson	\$20,955
Masa	\$13,420
Daniels	\$17,645
Reggis	\$19,954

to range A3..A8. The formula first tests whether the value that's now in column C is less than the value in cell B10. If it is, the formula returns two split vertical bars in column A, and if not, it returns a blank. When the leftmost cell of a row in a print range contains two split vertical bars, 1-2-3 doesn't print that row.

Finally, specify range A1..C8 as the print range and print the report. Your printout should look like the figure above. Make sure you include column A when you specify the print range.

If you want to use a different criterion to eliminate rows from the print range, change the value in cell B10. For example, if you enter 15000 in cell B10, 1-2-3 will print only the rows that contain sales greater than \$14,999.

Earl Ray, Winnipeg, Manitoba, Canada

Editor's note: This technique automatically determines which rows to eliminate from your print range, but you can manu-

ally assign multiple print ranges in 1-2-3 release 3.x or in 1-2-3 release 4.x for Windows. You can specify multiple print ranges just by typing a semicolon after each range address. For example, in the first figure, the print range would be **A1..B1;A3..B5;A8..B8**.

In release 4.x you can also specify multiple print ranges by using the mouse. After you have highlighted the first range with the mouse, hold down <Ctrl> and highlight all the other ranges that you want to print.

Whether you type the range addresses or use the mouse, 1-2-3 prints the ranges directly below one another.

Save Your Formatting

If you use the Wysiwyg add-in for 1-2-3 release 2.x or 3.x to format your worksheet, don't forget to save the file before you detach Wysiwyg; otherwise you'll lose all the formatting. When you save a file with Wysiwyg attached, 1-2-3 automatically saves the Wysiwyg formats in a separate format file. This file has the same name as the worksheet file, but it has an FMT (release 2.x) or FM3 (release 3.x) extension.

Casey Drometer, Austin, Texas



Overcome Ami Pro's Annoyances

Seems to me that if Ami wants to remain the best word processor on the market, it needs to get better at handling certain small but common tasks. Whether it's simple, like creating a new document, or slightly more complicated, like setting tabs, we want to get the job done easily and without getting peeved. Here, in no particular order, are some of Ami Pro's annoyances—and ways to work around them.

1 When you assign a paragraph style, nothing changes. Ami Pro provides two levels of formatting: the formatting you apply to a paragraph by assigning it a style, and the formatting you apply by using Text menu commands. If you assign a paragraph style and nothing happens, chances are that you or someone else assigned text attributes by using the Text menu or SmartIcons. These attributes are considered local styles, which means they affect the current text only. Local styles or text enhancements override paragraph styles, so they can't be

removed by simply reapplying the original style.

When you want to change text in one paragraph without affecting the text in other paragraphs, you use a local style. That is, if you apply text enhancements to a paragraph currently assigned the Body Text style, those enhancements will have no effect on other paragraphs that are assigned the Body Text style.

The quickest way to remove a text attribute

is to select the text and then select *Text•Normal*. This command removes *all* attributes from the selected text and converts it to the current paragraph style. For example, if the text has italics and double-spacing, the *Text•Normal*

command will remove them both.

To remove just one text attribute from a block of text, you can use the *Revert to Style* option. For example, to change the line spacing in a paragraph back to the setting defined by the style, position the cursor in the block of text, choose *Text•Spacing*, and select *Revert to Style*. Other attributes, such as a paragraph indent or boldfacing, remain unchanged. You can also find the *Revert to Style* command in the Font and Indentation dialog boxes.

The third option for changing text attributes makes use of toggling commands such as Bold and Italic (which are either on or off). To try it, select any block of text, and click the *Italic SmartIcon* to apply the italic format. Then, with the text still selected, pull down the Text menu. Notice the check mark next to the Italic choice (see **FIGURE 1**). This check mark means that the current menu item is in effect. To remove the attribute, choose *Italic* from the Text menu, and the check mark disappears. (There's no way to tell immediately if a block of text is using a toggling command, so if you're having trouble, you must rely on the Text menu.)

2 When you use the ruler to set indents and tabs for your document, it affects only the current paragraph. When you set indents and tabs on the ruler that appears in layout mode, those settings apply only to the current or selected paragraph(s). To change the indent and tab settings for the entire document, you must select *Page•Modify Page Layout* and use the ruler in the resulting dialog box.

Like the local settings described in the item above, the settings you define with the tab ruler override the settings established with the *Page•Modify Page Layout* command and any tabs you may have defined in a paragraph style.

Confusing, isn't it?

Here's what you do. First, specify the indent and tab settings you want for the entire document using the *Page•Modify Page Layout* command. Next, find

any paragraphs that require different settings, and specify these with the *Style•Create Style* command. Finally, if you're in a paragraph and decide that you need still another type of tab setting, choose *Page•Ruler•Insert* and use the inserted tab ruler.

If you use the *Page•Modify Page Layout* command to modify all your tab and indent settings but it doesn't work, there are probably local tab rulers in your document overriding the page layout settings. To find out, choose *View•View Preferences*, select the *Marks* option, and click *OK*. A small rectangular box with vertical lines will appear at the beginning of any paragraph that contains a tab ruler. To remove the ruler, highlight the paragraph and choose *Page•Ruler•Remove*. Ami Pro returns the paragraph to the settings defined by the style and page layout.

3 You can't find that important file. Your boss is breathing down your neck for the proposal you wrote over a month ago. You know it's on your hard disk, but you can't remember what you named it, and the heat is on. You remember that the WordPerfect and Microsoft Word File Managers both have file searching capabilities, so you jump over to Ami's File Manager for help.

But Ami Pro's File Manager is less than helpful. In fact, it's an unnecessary burden on your system resources. You can't search for a file or even open any of the files that are displayed.

Here's a little secret: Ami Pro comes with a macro that lets you search for files, either by file name or by a word within the file. The macro goes by the name of *FINDFILE.SMM* and is one of the more than 70 macros that ship with Ami Pro. It works a bit like the Search command in the Windows File Manager but has a lot more power.

To use the Findfile macro, choose *Tools•Macros•Playback*, select the file named *FINDFILE.SMM*, and click *OK*. In the Search For text box of the resulting dialog box (see **FIGURE 2**), enter

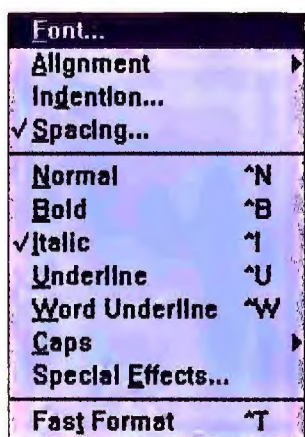


FIGURE 1: TO FIND OUT IF A LOCAL ATTRIBUTE IS ON, select a block of text, choose Text from the menu bar, and look for check marks.

the drive and directory you'd like to search. If you want to search for all Ami Pro documents within the specified path, select the *Include Subdirectories* option. Next, if you're searching for a

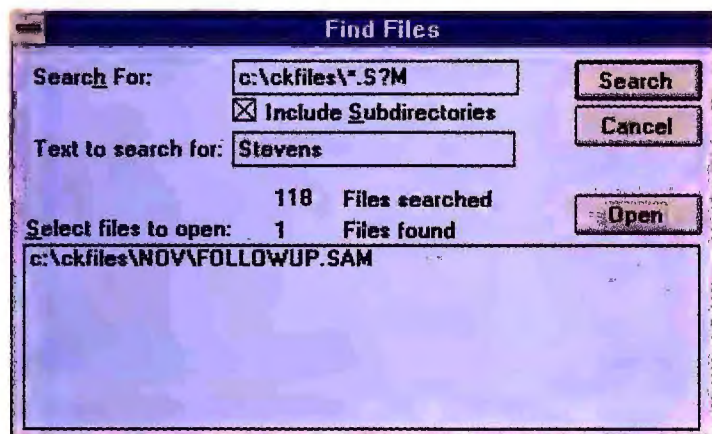


FIGURE 2: AMI PRO'S FINDFILE MACRO finds and opens a file quickly. You can specify the directory you'd like to search, as well as a string of text to search for.

document that contains a specific word, enter the word in the Text to Search For box. (Keep in mind that this will search every document for the specified word, so you might want to restrict the search to a few directories at a time.) Finally, choose *Search*. Ami Pro scans the disk for every file that matches the search criteria, and it displays the results in a list. To open a file, select it from the list and click *Open*.

4 The File Open dialog box isn't listening. The small task of opening a file can be a major annoyance. The current directory setting in the File Open dialog box invariably reverts to one that you don't want. If you specify that you want to open an Ami Pro document or macro, the directory setting automatically jumps to the directory you specified with the *Tools•User Setup* command. If you want to open any other type of file, such as an ASCII file, the directory setting jumps to the last place you saved a file of that type. In both instances, you must manually change the directory.

You can change the default directory settings for your Ami Pro files at any time in a session. To do this, choose *Tools•User Setup*, click *Paths*, and then enter the new directories in the appropriate text boxes.

But you can also instruct Ami Pro to remember the last directory you used,

whether you were opening an Ami Pro document, an Ami Pro macro, or an ASCII file. To do this, choose *Tools•User Setup*, click *Paths*, select the *Use working directory* option, and click *OK*.

The next time you select *File•Open*, Ami Pro will display the documents available in the last directory you used.

5 You're tired of specifying style sheets. Every time you create a new document in Ami Pro, you must specify the style sheet you want to use. Chances are that you use the same style sheet for a majority of

the documents you create and you'd like to let Ami Pro know this. So you select *Tools•User Setup*, click the *Load* button, select the style sheet you'd like to use each time you start the program, and click *OK*. That should do it, but it doesn't. When you select *File•New*, the *New* dialog box is waiting for you to pick a style sheet.

OK, it's not that big a deal. All you have to do is press <Enter> to select the default style sheet. But why can't Ami Pro just figure it out and do it?

There is a solution of sorts: a SmartIcon. It looks like an exclamation point on a piece of paper that's sprinting.



When you click it, it creates a new document and uses the default style sheet.

Right now, before you forget, add this icon to the Default icon palette: Choose *Tools•SmartIcons*, select the *Default* palette, and then scroll through the list of SmartIcons displayed on the left side of the dialog box. When you come to the icon that matches the above description, drag it over to the Default palette and click *OK*.

6 You can't get rid of somebody else's styles. When a co-worker sends you an Ami Pro document for review, what's the first thing you do? If you're like me, you use your own style sheet to view the document. For example, my default style

sheet contains only two styles: *Body Text* (12-point Times Roman with line-and-a-half-spacing) and *Subtitle* (Arial 12-point Bold with single-spacing). Before I can dig in and start reviewing the document, I need to switch style sheets.

But this is no easy task. The problem is that when a new style is created or any existing style is modified, the paragraph formatting is stored with the document in which it was created and not in the style sheet. So your co-worker's styles remain rigidly fixed in place.

The *Use Another Style Sheet* command allows you to assign a new style sheet to a document. But this command has no effect when the formatting is stored in the document instead of a style sheet.

To override the paragraph formatting in the document, you must transfer the styles from your style sheet to the document: Choose *Style•Style Management* to display the *Style Management* dialog box. The *Styles in Document* list box includes the styles stored in the current document. The *Styles in Style Sheet* list box includes the styles stored in the current style sheet.

To change the paragraph styles used in the current document to the settings specified in the current style sheet, select the style from the *Styles in Document* list and click *Remove*. Ami Pro removes the paragraph style from the document. Continue these steps for each additional style in the document. Once you've removed the styles from the document, you're free to use the styles specified in the style sheet.

So there you have it. This article listed only a few of the puzzling features of Ami Pro. If there's anything about Ami Pro that you'd like to change, or if you want to find out ways you can perform tasks more efficiently, drop me a line at 77 Franklin St. #300, Boston, MA 02110; on PC World Online on America Online, CATHYKENNY; or on CompuServe, 72723,2071. In the meantime, explore Ami Pro's menus and pay particular attention to the macros and SmartIcons. You never know when a solution is just a click away.

By Catherine Kenny



Manage Your Mail With cc:Mail Rules

Imagine being able to rig your mailbox so that it incinerates junk mail and then sorts what's left into neat little piles. Well, cc:Mail for Windows can do just that—by following rules that you define. For example, you can define a rule that instructs cc:Mail to sort your messages by subject matter or by author, then place them in separate folders. Before you go on vacation or on a business trip, you can instruct cc:Mail to automatically respond to anyone who sends you a message.

Rules can also alert you when important messages show up in your Inbox.

List window displays the nine rules, along with information describing when the rule should be activated, whether the rule is enabled, and the last time the rule was executed.

The first rule in the list is activated whenever you receive a new message from an author named Patty. To get a closer look at this rule, double-click the rule description to display the Rule Editor (see the figure). The Rule Editor is the first in a series of dialog boxes that you'll use to create and modify rules.

The first two text boxes in the dialog box tell you what the rule is and when it will be activated. The Enable check box, which is currently deselected, is used to turn a rule on or off. The three buttons that appear in the center of the dialog box are used to define the rule. When you want cc:Mail to search within a particular folder, click the Find Messages In button. The button is currently disabled because in the When to Run text box, we've told cc:Mail to look only in the Inbox. The With Conditions button is used to define the conditions a mail message must meet, and the Actions button determines the action that will be performed when those conditions are met. The lower portion of the Rule Editor displays the current definition of the rule.

particular topic. For example, if you and your co-worker are collaborating on a project, you may want to file only those items that are related to the project. You do this by adding another set of criteria to the rule. Select *AND* in the first text box, then click the Author drop-down list box arrow and select *Text*. Enter the string of text that must appear in the message, click *Add* to add the condition to the view window, and then click *OK* to return to the Rules Editor.

Define the Actions

The action for this rule is to move any messages on a specified subject from a specified person to the folder named Patty's Msgs. This is an efficient way to organize messages, but it does have one disadvantage: If you've turned off notification, you won't even know that you've received those messages. It might be better to have cc:Mail direct all incoming messages to the Inbox, copy those specific messages to a folder, and then beep to let you know when you've received a message.

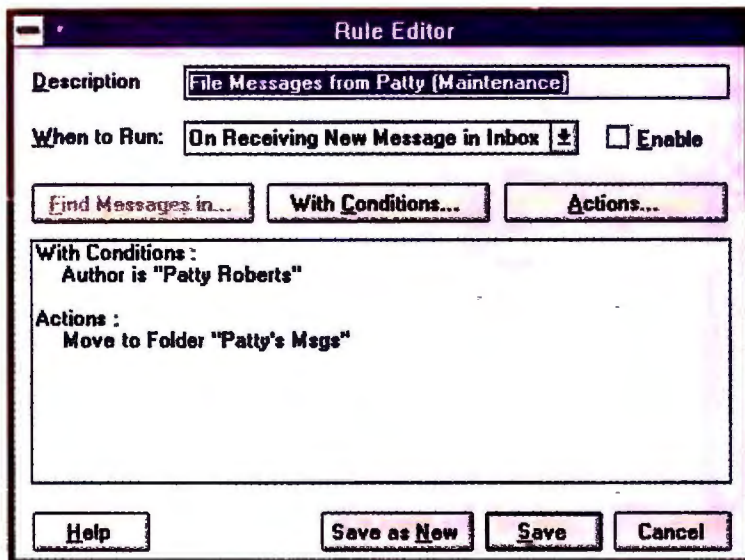
To modify this action, click the *Actions* button to display the Actions dialog box. Double-click the line that reads *Move to Folder "Patty's Msgs"* in the view window, and then click the *Action* drop-down list. Select *Copy to*, and click the drop-down list that contains the names of the folders in your cc:Mail desktop. Select the folder you want to use, and choose *Replace*. Next, choose *Beep* from the drop-down list of actions, click *Add* to add this to the Actions view box, and click *OK*.

To finish up, enter a description for the rule and select the *Enable* check box to enable the rule.

To save the changes we've made to the rule, click *Save As New*. This command saves the rule as new and leaves the original rule intact. If you want to modify your new rule in the future, select *Save* instead.

Finally, choose *Rules* and make sure *Run Rules as Scheduled* is selected.

By Catherine Kenny



YOU CAN DEFINE YOUR OWN RULES IN CC:MAIL to delete, sort, and manage your electronic mail.

For instance, you can set up a rule that notifies you every time you receive a message from your boss.

To help you get up to speed with rules, we'll customize one of the nine predefined rules that come with cc:Mail for Windows.

Bending the Rules

For every rule you create, you must define the conditions under which the rule is in effect, the action that should take place when those conditions are met, and the time it should take place.

Let's get started. Choose *Rules • Rules List* or click the *Rules List* icon. (If the Rules menu is missing from the menu bar, ask your system administrator to restore the Rules feature.) The Rules

Set the Conditions

Let's modify this rule so you can use it in your work group. Choose *With Conditions*, and double-click the line that reads *Author is "Patty Roberts"*. The current segments of the condition appear in the Conditions section of the dialog box. Click the drop-down box that currently contains *Is* and select *Contains*. Then enter the name of a co-worker in the text box that holds "Patty Roberts", and click the *Replace* button.

You may not want to file every piece of mail that you receive from this person, only certain ones that relate to a



Enhance Printouts With Headers and Footers

Like 1-2-3, Improv lets you create headers and footers that automatically put page numbers, the current date, and the file name on the top or bottom of each page that you print. But Improv also allows you to pack a good portion of your report or presentation into the headers and footers.

We will look at two examples of headers and footers from the sample models shipped with Improv.

Header and Footer Basics

To see the first example, open the file FINANCE.IMP in the directory IMPROV\MODELS\EXAMPLES. The Balance Sheet, Cash Flow, and Income Statement views in this model have slightly different headers. The header contains the form name, which is different for each printed report. To see a header, select *Window • Browser*, click on a report name, and select *File • Print Preview*. To see how the header was created, select *File • Page Setup* and click the *Header/Footer* button in the Page Setup dialog box. The resulting dialog box (shown in FIGURE 1) contains boxes in which you enter codes and text.

When creating your own header or footer, type any text you want to appear in the boxes; for example, type the word **Page** to precede the page number. To create multiline headers or footers, press **<Enter>** and continue typing on the next line. Create as many lines as you like.

Click the SmartIcons in the top-left corner of the Header/Footer dialog box to justify text or to assign attributes such as boldface and underlining. Select a font and size from the drop-down lists. Improv will include all available fonts in the drop-

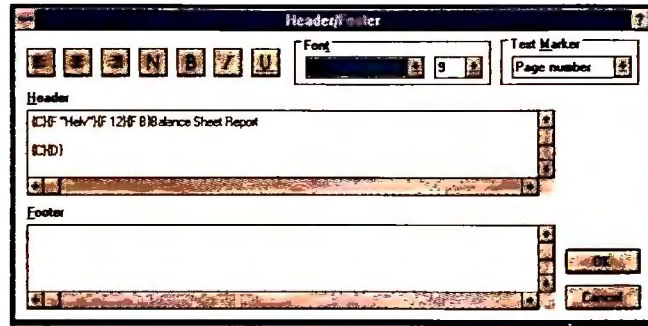


FIGURE 1: CREATE HEADERS AND FOOTERS by clicking on icons and entering text. Headers and footers can contain as many lines as you want.

down lists. The typeface name appears in double quotation marks within braces. If you don't specify a font or size, Improv will use the defaults.

Also use drop-down lists to select text markers that denote changeable information such as date, time, file name, view name, and page number. Improv updates text marker information each time you print the file.

All codes are in effect until you change them. So, for example, if you

click the Bold icon, anything you enter subsequently will be in bold until you click on another attribute.

Icons Keep It Simple

New views have a default header consisting of the codes to print the model name (without file extension or file path), centered on the page. The codes in the

default footer center the word *Page* and the current page number. In many cases, this header and footer are fine; you won't want to change them.

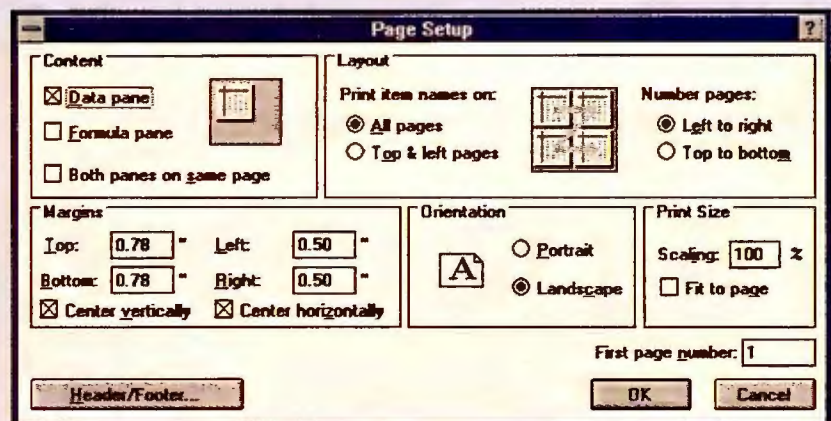
Other times, however, you will want to include different information. For example, the codes shown in the Header box in Figure 1—`{C}{F "Helv"}{F 12}{F B}Balance Sheet Report`—create a report with two header lines, the report name and current date, both centered and in 12-point bold Helvetica.

Page Setup Tips

The Page Setup dialog box sets ground rules for headers and footers. Here are some points to remember when creating them:

1 The page margins determine where the header and footer begin and end. If you create a 2-inch left margin, for example, your headers and footers will begin 2 inches from the edge of the paper.

2 You control the starting page number by typing that value in the First Page Number text box in the bottom-right corner of the dialog box. For example, if you are printing a worksheet that is being inserted as page 12 of a report, you would specify 12 in this text box.



SET MARGINS, PAGE NUMBERING, AND SEQUENCING in the Page Setup dialog box. Then design your headers and footers.

3 On multipage printouts of a single worksheet, you can determine whether pages are numbered left to right or top to bottom by making a selection in the Layout area of the dialog box. For example, if you choose *Left to right*, page 2 will be the righthand side of the top of the worksheet. If you choose *Top to bottom*, page 2 will be the lower, lefthand side of the worksheet.

4 The Center Vertically and Center Horizontally check boxes in the Margins area are not available for presentations and scripts. Use them to position worksheets between the margins and the header and footer.

5 The Scaling and Fit to Page options that are found in the Print Size dialog box do not affect headers and footers.

To duplicate the Balance Sheet header, select *File*•*New*, then select *File*•*Page Setup*, click the *Header/Footer* button, highlight the entire header, and press <Delete>. Click the *Center* icon shown in **FIGURE 2**. Select *Helvetica* from the first drop-down Font list, and select *12* from the second drop-down list. Click the *Bold* icon to add bold. Finally, type **Balance Sheet Report** to add that text to the first line. You can assign the attribute first and then the font if you wish.

To add the second line, press <Enter> twice to add a new line, and click the *Center* icon. Click the drop-down arrow to see the list of text markers, and select *Current date*. Improv adds the code for the date, {D}. Since you're copying the FINANCE model's Balance Sheet view and there's no footer, delete the default footer.

In the FINANCE model, the Income Statement Report and Cash Flow Report views have similar headers and footers. To use the same header or footer in another view or worksheet, copy it to the Windows Clipboard using <Ctrl>-key combinations, and paste it into the dialog box for the other view or worksheet. <Ctrl>-C copies to the Clipboard, <Ctrl>-X cuts to the Clipboard, and <Ctrl>-V pastes the Clipboard contents. (The menu and SmartIcons are not available in a dialog box.)

To see how your header or footer will look, click *OK* twice to accept the

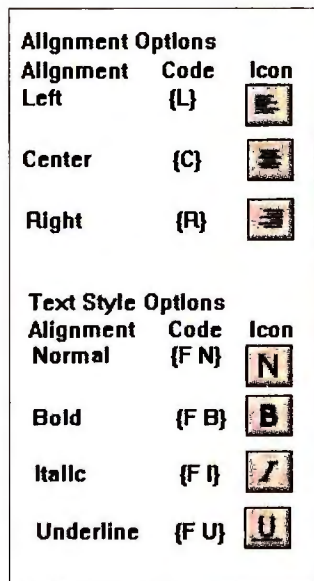


FIGURE 2: CLICK THE TEXT SMARTICONS to assign style and alignment, or enter the codes from the keyboard.

changes, and select *File*•*Print Preview*. If you want to see a detail of the preview, point to that area with the magnifying glass (mouse pointer), and click. If you want to change the Page Setup, including the header or footer, click the *Page Setup* button to move directly from Preview to the Page Setup dialog box and then click the *Header/Footer* button.

Fill in the Blanks With Complex Headers and Footers

In previous columns, you've seen how Improv's InfoBox lets you create a presentation and control a worksheet's page layout. Headers and footers can also

influence page layout. For example, the header and footer for the EXPENSES model, shown in **FIGURE 3**, illustrates how multiline, complex headers and footers can create a unique page. You can find this model in the MODELS\EXAMPLES directory.

The codes in the first line of the model's header center *EXPENSE REPORT* in 12-point bold. Because no typeface has been specified, Improv uses the default typeface, Arial 9.

The second header line uses all three alignments—left, center, and right. The code first changes the point size back to 9, which will remain the point size for the rest of the header. {L} indicates that the following text, *Name*, will be left-aligned, and {F N} returns the text attributes to normal for *James McGarry*. The {C} specifies that the text *Travel Authorization No.* will be centered, and {F B} makes it bold until {F N} changes it back to normal. Thus, *Travel Authorization No.* appears in bold, but the number 71712 appears in normal text. Finally, {R} specifies right-alignment,

and {F B} assigns the bold attribute to the text *Business Purpose of Trip*.

The third line begins by left-aligning the text *Employee Number*. Because no new attributes are specified, Improv continues to use the bold attribute assigned in the previous line. {F N} assigns normal text to the number itself. Finally, {R} {F B} right-aligns and assigns the bold attribute to the 30 underscore characters. The remaining lines, which can't be seen in the figure, follow the pattern of the third line.

The footer text will be left-aligned and will appear in the default typeface and point size. Notice that the footer also uses underscore characters to create a signature line.

When a complex header or footer line extends beyond the box, as in this model, don't press <Enter> to break the line. Instead, keep typing and use the scroll bars and arrows to view the parts

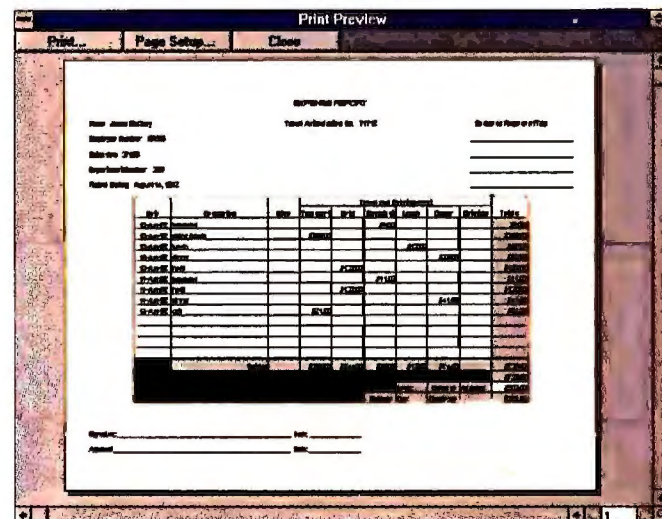


FIGURE 4: ONLY THE DATA AREA is contained in an Improv view. The other information shown here was entered in headers and footers.

that extend past the edges of the box. The end result is a forms-style page like the one shown in **FIGURE 4**.

Get creative with these flexible headers and footers. Create a fill-in-the-blank form, or include all manner of information like the page number, current date and time, view name, worksheet name, model name, file name, or total number of pages at the top and bottom of each printed page.

By Christie Williams

Christie Williams is a freelance writer in the Boston area.

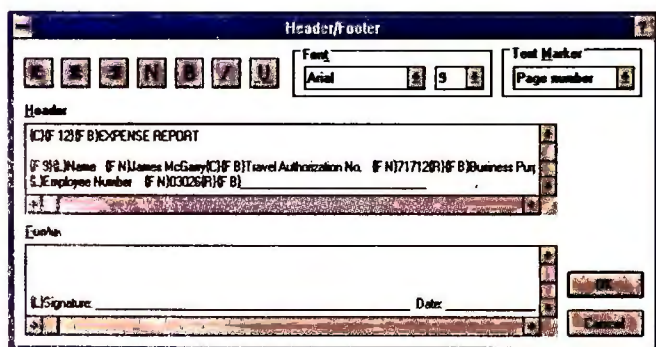


FIGURE 3: ENTER A COMBINATION OF TEXT AND TEXT ATTRIBUTES on multiple lines to create titles and signature lines on an expense report.

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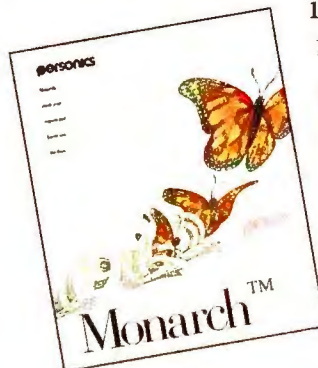
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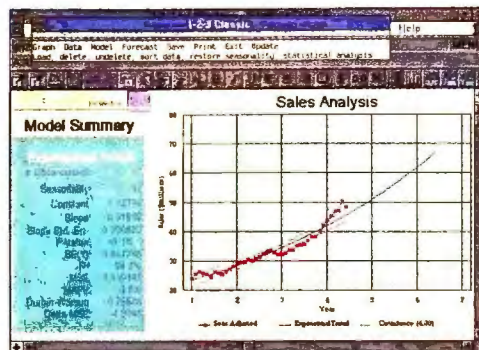
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41128	09/12/91	DALLAS	RAL	2564 GORDAUM & CO.	10,467.98	2,616.75
41215	11/13/91	CHICAGO	RCH	1277 ROBINSON PAPER	934.12	934.12
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41623	01/04/92	DALLAS	RBE	3593 ROCHE IND.	1,522.34	506.94
41789	01/04/92	LOS ANG	ARA	1059 H. H. WEBSTER	23,655.00	23,655.00
42031	02/13/92	CHICAGO	SJK	1056 XYZ INDUSTRIES	2,302.65	862.65
42256	03/13/92	MIAMI	RAL	2094 GOLD COAST IND.	18,909.50	9,494.65
42307	03/27/92	CHICAGO	PTR	3217 THE STRIKE CO.	532.35	532.35
42691	04/22/92	CHICAGO	RCH	3185 DUNAM & SONS	4,328.45	2,328.45
42793	04/23/92	CHICAGO	SJK	1056 XYZ INDUSTRIES	945.63	945.63
42811	04/26/92	DALLAS	RBE	3593 ROCHE IND.	11,432.89	6,432.89
43102	05/02/92	CHICAGO	RCH	1277 ROBINSON PAPER	520.31	261.15

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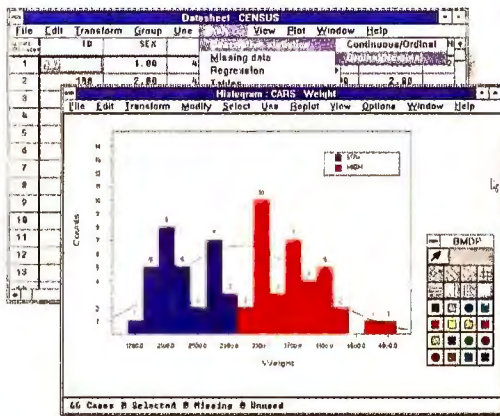


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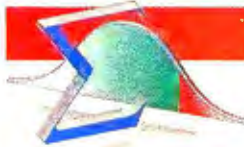
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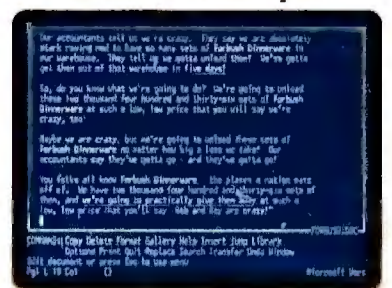
Normal Vision

Here's a typical VGA flat-screen. Note dead space at the top and bottom of the display area.



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	TI microLaser Pro 600	HP LaserJet® 4	HP LaserJet 4M
True 600 dpi	Yes	Yes	Yes
Memory	6MB	2MB	6MB
Emulations	PCL5/Adobe® PostScript® 2	PCL5E	PCL5E/Adobe PostScript 2
Compatibility	DOS/Mac	DOS	DOS/Mac
Toner Cart. Life	15K pages†	6K pages	6K pages
Paper Trays	250 sheet/250 sheet	250 sheet/100 sheet	250 sheet/100 sheet
Auto Language Switching	Yes	No	Yes
Auto Interface Switching	Yes	Yes	Yes
40MHz Processor Upgrade	Optional	Not Avail.	Not Avail.
List Price	\$1599*	\$1839	\$2479

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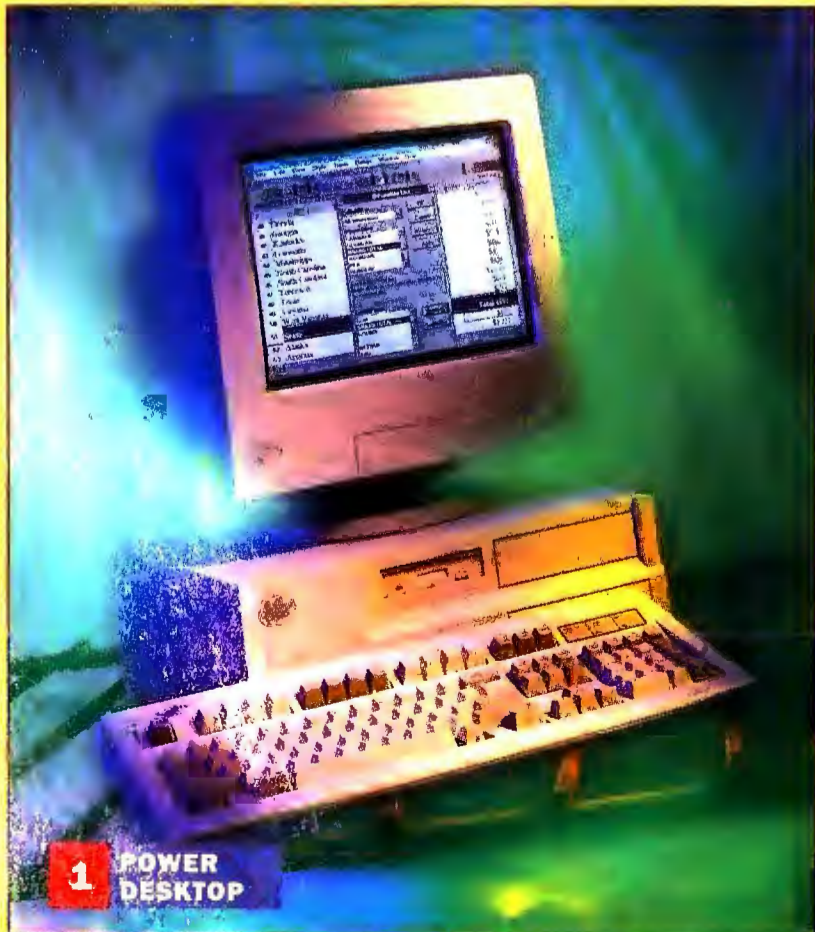


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**You want power? Low price? A desktop PC? A notebook?
This month we rate them all. On the top of the charts: AST's Bravo NB,
Axik's 486-66, and IBM's P/60D Pentium and ThinkPad 750C.**

TOP 20 PCs

In the Office,



1 POWER
DESKTOP

IBM VALUEPOINT P/60D: This Pentium desktop is loaded with features, reliable, and backed by solid service and support.



1 BUDGET
DESKTOP

AXIK 486DX2-66PCI: You can't find a better value than a fast DX2-66 desktop with high-end features like a PCI bus for under \$2300.



IBM THINKPAD 750C: This portable multimedia-ready powerhouse sports great design and expandability.



AST BRAVO NB: Good battery life, color, decent performance, and a PCMCIA slot combine for a great deal.

On the Road

This Month's Contenders pg. 125 • **Power Desktops** pg. 126 • **Budget Desktops** pg. 132 • **Mobile PCs** pg. 138

For once we stayed a step ahead of you: Immediately after we launched our new review format, we got requests from readers and vendors to include notebooks in our evaluations. Fortunately, we had already planned to do just that. Starting this month we present the Top 10 Power Mobile PCs and the Top 10 Budget Mobile PCs. We decided on Top 10s for mobile PCs—as opposed to 20s—because of their smaller selection and market share relative to desktop systems. We're covering notebooks and subnotes for now and eventually will add smaller devices. But don't look for any underpowered systems here: We'll cover only notebooks and subnotes with 486 or better CPUs. As with our Top 20 Desktop PCs, we'll give you comprehensive and informed buying recommendations, along with in-depth reviews of the newest notebooks on the market each month. The two highest-ranked systems on each Top 10 will earn Best Buy ratings. So in every issue you'll have all the up-to-date information you need to buy a new PC—mobile or desktop, budget or power.

Evaluating desktop PCs is a complex endeavor, and reviewing notebooks is even more complicated. Besides the factors we

consider when rating desktops, we add battery life, weight, size, keyboard and pointing device, and other criteria to the mix. And rating a notebook's LCD screen is less cut-and-dried than reviewing a conventional monitor: Monochrome screens are still common on notebooks in passive and active form. Plus, color LCD screens come in three flavors: passive at the low end, dual-scan in the middle, and active-matrix at the top. Plain passive screens vary considerably but run from poor to just adequate. Dual-scan screens provide color and brightness that are good enough for typical business use. And active-matrix screens approach CRT-level color and clarity.

To test notebook performance, we use the same business applications suite we employ for desktop benchmarks. We measure battery life using a blend of power-saving settings that is as consistent as possible, while simulating real work on the system's keyboard. In considering notebooks for the Budget Top

By Rex Farrance and Owen Linderholm

Testing by Ulrike Diehlmann and Susan Silvius; research and support by Gary Van Der Horn.

10, we weigh price more heavily and place a \$2750 ceiling on the cost. In rating power notebooks, performance and the quality of the display count more. We test only notebooks that are capable of running Windows, but many come with only 4MB of RAM; we suggest 8MB if you can afford it.

Notebook Notables

We received several subnotes for review, but it's clear that you sacrifice a lot of features, power, and usability to get low weight. Only one, the ZDS Z-Lite 486-25, made it as a Best Buy. And the Toshiba Portégé was the only subnote in the Power Top 10.

With desktop PC prices dropping rapidly, it's hard for notebooks to match the value of desktops, even with the obvious portability advantage. The major vendors are succeeding best by locking up the supply of high-quality components. As a result, all our notebook Best Buys are from major players. The IBM ThinkPad 750C and the Compaq Concerto 4/33 Model 250 are our two Power Mobile PC Best Buys: Each can reasonably handle desktop applications in a portable—albeit moderately heavy—package. The AST Bravo NB and the ZDS Z-Lite 486-25 won out in the Budget category because they're terrific values for the money. The Bravo is a solid dual-scan color notebook with the basic power you need for business applications, at a reasonable \$2350. With the advent of dual-scan color screens—a variation on the passive screen that essentially doubles the clarity and contrast—decent color is now affordable. The Z-Lite is a monochrome subnote with an excellent \$1999 price.

Reliability and Service

We're now principally using service-and-support data faxed back from readers. We still conduct independent anonymous testing for companies when we lack sufficient reader feedback. But we've found that your experience gives us a powerful tool to use in evaluating the reliability and service of vendors. We're receiving forms (see *Reliability and Service*, page 155) faxed back from you at the rate of 15,000 per month! We now know which vendors are most likely to send you a working system that never gives you any trouble, and we know which ones have a greater tendency to ship you a nonfunctioning PC.

Winning Desktops

Four new machines made it onto our Top 20 Desktops charts, although none achieved Best Buy status this month. The newcomers to the Top 20 lists are the National MicroComputers Pro-System PCI, the Cornell Pentium 60 VL, and the Micro Express MicroFlex-PCI/66 on the Power list, and the Shasta Prestige Desktop on the Budget list. There is a lot of movement on the Top 20 lists this month because of the price changes and our updated reliability and service methodology.

Buying Smart: Consumer Tips

Use a Credit Card

Buy your system with a credit card unless you already have an account or other credit arrangement with your vendor. If you have a dispute over the system you get, your credit card company can help mediate or even give you a refund if you fail to receive the product.

Make a Deal

Many direct vendors and dealers are now giving their sales representatives room to bargain. So you may be able to get a better price if you make it clear that you're comparison shopping and would like to cut a deal. We've even been told that a call toward the end of the week or month is more likely to catch a sales agent needing to make a quota.

Get It in Writing

Important details that contribute to the value of a PC, such as the amount of system RAM, hard drive, or secondary cache size, are often overlooked in the excitement of making a purchase. Make sure you get a written copy, by fax or letter, of all the details of your configuration before purchasing, and use it when comparison shopping with other vendors.

Balancing Notebooks and Desktops

To introduce the Mobile PCs Top 10s, we reviewed a total of 32 notebook systems—all those that met our basic criteria, passed our tests, and were received by our deadline—but we are including write-ups this month only of those that made it into our two Top 10s. To make room for the very large complement of notebooks, we had to cut back on the number of desktop systems we reviewed in this issue. Starting next month, however, we'll be dividing our coverage so that about two-thirds of the systems we evaluate will be desktops and one-third will be notebooks. That proportion is more representative of the actual market share of the two types of products. This month the *System Snapshots* section will provide brief reviews of the new desktop systems that didn't make it onto our Top 20 Desktops charts along with short looks at the bottom five notebooks from each Mobile PCs Top 10. The higher-ranked systems all receive in-depth reviews. So whether your needs run to desktop computing or PCs on the go—we'll rate the best of the best every issue.

Rex Farrance is an associate editor and Owen Linderholm a senior editor for PC World. They can be reached on PC World Online (see page 12 for contact information). PC World staff members Mike Desnoud, Ulrike Diehlmann, John Goddard, Anita Hamilton, Bryau Hastings, Caroline Jones, 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. For a list of all systems tested by the PC World Test Center for the Top 20 and the Top 10 (\$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. 906.

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.

AST Bravo NB

PC WORLD TOP 20
1 BUDGET MOBILE PC

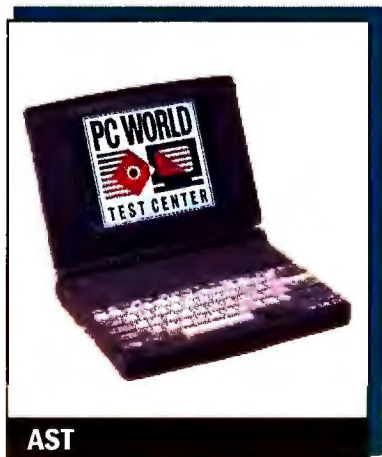
PROS: Low price, good battery life

CONS: Only 4MB of RAM

Want low-cost entrée to color computing on the road? The handsome AST Bravo is just that—and our top Budget Best Buy to boot. At a svelte 6.8 pounds, the attractive Bravo offers a strong package for an affordable price: just \$2350 direct. It features an Intel 486SX-25 CPU, 4MB of RAM, a 120MB hard disk, and a dual-scan color screen. The display delivers decent color images without the high price of an active-matrix screen. In addition, the Bravo provides good expandability, with a PCMCIA Type III slot that can accept a Type II card. Users looking to add memory and storage can move up to 20MB of RAM and a 170MB hard disk.

When it comes to performance, the Bravo's inexpensive 25-MHz CPU puts it at the lower end. The unit placed in the bottom third in virtually every test, though it was one of the faster 25-MHz systems we covered. In our test the NiMH battery did well, lasting a little under 4 hours before conking out. And the Bravo boasts a strong suite of power management controls that should help you squeeze more life out of a charge—albeit at the cost of performance.

The overall design is good, with excellent keyboard-based system controls and a convenient port to access RAM. On the downside, the trackball to the right of the <Space> bar is awkward—you may want to use the mouse port to install an external trackball. AST service is good, with a one-year warranty that includes replacement of defective units within two days. Twenty-four-hour toll-free tech support sweetens the package. The Bravo isn't fast, but the \$2350 price and solid design can't be ignored. As a budget notebook, it's among the best we've seen. *AST Research, 800/876-4278* **Reader service no. 836**



AST

Austin 466T

PC WORLD TOP 20
4 POWER MOBILE PC

PROS: Fast, large hard drive, vivid color screen

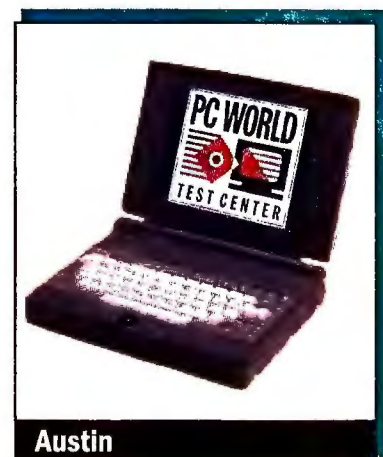
CONS: Pricy, no on-site service

This PC has all the earmarks of a classic power notebook: a 486DX2-66 processor, 8MB of RAM expandable to 32MB, and a 340MB hard drive. And when you're all packed to travel, the weight comes to just 7.8 pounds. Naturally, performance is a strong suit, and this notebook cruised through our tests up to twice as fast as the average DX-33 on Windows applications. But it ran the DOS application tests more slowly than expected, and a couple of systems with less powerful processors actually produced better overall results.

The keyboard has crisp response that makes for comfortable typing. And the trackball, which is mounted in the bottom center of the keyboard panel and has mouse keys on either side, is highly usable. The large 9½-inch color screen is a crisp, rich active-matrix display.

Power management, with two power-saving modes, is basic but effective. In our test, the NiMH battery lasted for a healthy 3½ hours. This unit has decent expandability for a notebook: It comes with a single PCMCIA slot that can take one Type III or two Type II cards. You can also install a proprietary internal modem instead of taking up the slot. Service and support is solid: You can call toll-free 18 hours a day, including weekends, and our test calls found hold times of less than 2 minutes. The system comes with a one-year warranty, a 30-day money-back guarantee, a three-day turnaround on repairs, and fax and BBS support.

The Austin 466T is a solid value. It's number 4 on our Power chart, and at \$4299, it's the least expensive DX2-66 notebook we looked at. *Austin Computer Systems, 800/433-7914, 512/399-3500* **Reader service no. 837**



Austin

CAF Aqualite-4SX2/120

PC WORLD TOP 20
4 BUDGET MOBILE PC

PROS: Low price, good pointing device

CONS: Poor-quality screen, heavy for a subnote

Want an entry-level subnotebook for a dynamite price? The CAF Aqualite-4SX2/120's \$1425 cost is the lowest of any unit we've reviewed, and it buys you a 486SX-25 CPU, 4MB of RAM expandable to 20MB, and a 125MB removable hard drive. No wonder the system earned a number 4 ranking on our Budget Mobile PCs Top 10. You'll also find one PCMCIA Type II slot and an external floppy drive. Performance is about average overall, although relatively quick for an SX-25. This 6.8-pound subnote's 2½-hour battery life falls a little below our 3-hour median. The unit comes with a suspend button above the keyboard and a good selection of power management settings in the CMOS setup.

The Aqualite-4SX2/120's 8½-inch monochrome screen is its worst feature: Contrast is poor, and we found it impossible to tune out the

streaky look completely. On the other hand, the keyboard is well laid out. We found the pea-size trackball at the bottom right corner of the keyboard moderately comfortable to use and easy to maneuver. As with almost every other subnote, an external floppy drive is included.



CAF

CAF offers a one-year warranty with a two-day turnaround on factory repairs. Unfortunately, the tech support line requires a toll call—unusual indeed these days. But the technicians provided prompt, accurate answers to our test questions. For a company that sells solely through dealers, its ven-

THE TOP 20

PC WORLD



POWER DESKTOPS

1 IBM ValuePoint P/60D
Four-time Best Buy Pentium.

- ▶ New this month
- ▲ Up from last month
- ◀ No change from last month
- ▼ 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	▲ IBM PC Company ValuePoint P/60D	3	3	79	80	83	\$4999	Pentium-60	16	424	ISA
2	▲ ALR Evolution V	4	3	77	81	73	\$4300	Pentium-60	16	544	ISA
3	▲ AST Premmia LX P/60	14	3	77	75	84	\$4930	Pentium-60	16	540	ISA
4	▲ DECpc XL 466d2	10	3	77	63	90	\$4762	486DX2-66	8	1024	ISA
5	▲ AcerPower Series 9000	7	3	76	71	78	\$4999	Pentium-60	16	520	EISA
6	▼ Micron 466 VL Powerstation CD	1	2	76	66	74	\$3699	486DX2-66	16	527	ISA
7	▶ NMC Pro-System PCI	—	1	76	64	66	\$2994	486DX2-66	16	540	ISA
8	▼ Austin Power System 60	2	2	76	64	73	\$3129	Pentium-60	8	420	ISA
9	▼ AcerPower Series 9000 DX2-66	11	3	75	63	78	\$4215	486DX2-66	16	520	EISA
10	▼ Dell Dimension 466V/XPS	6	3	75	60	75	\$3266	486DX2-66	16	340	ISA
11	▶ Cornell Pentium 60 VL	—	1	74	73	70	\$3099	Pentium-60	8	340	ISA
12	▼ Zeos 486DX2-66	5	3	74	60	75	\$2716	486DX2-66	8	528	ISA
13	▼ ALR Evolution V-Q	12	2	74	88	73	\$5900	Pentium-60	16	544	EISA
14	▲ AST Premmia 4/66d Model 343W	17	3	74	60	84	\$3967	486DX2-66	8	340	EISA
15	▲ Everex Step VL EISA DX2/66	—	1	73	58	68	\$2599	486DX2-66	8	240	EISA
16	◀ Gateway 2000 4DX2-66V	16	3	73	59	69	\$2795	486DX2-66	16	424	ISA
17	▼ NEC Image 466es	9	3	73	63	74	\$3510	486DX2-66	8	420	ISA
18	▼ VTech Platinum SMP	13	2	73	65	63	\$3799	486DX2-66 ²	16	544	ISA
19	▼ Axik 486DX2-66PCI	8	2	73	57	65	\$2298	486DX2-66	8	345	ISA
20	▶ Micro Express MicroFlex-PCI/66	—	1	72	60	69	\$2894	486DX2-66	8	256	ISA

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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); and a list of all systems tested by the PC



2 ALR Evolution V
Returns to top with price drop.

3 AST Premmia LX P/60
Great service, good speed.

4 DECpc XL 466d2
Lone DX2-66 Best Buy.

5 Acer Power Series 9000
EISA-based Pentium.

Monitor size/ dot pitch	Vendor contact number	Issue reviewed	Fax reprint number	Comments
15"/.28	800/772-2227	Jan 94	3041	Consistent Pentium is four-time Best Buy. PCI slots. Second time as best overall.
14"/.28	800/444-4257	Jan 94	3044	This expandable Pentium is a three-time Best Buy. Price dropped over \$600 since last month.
17"/.28	800/876-4278	Feb 94	3049	PCI Pentium with outstanding performance, service, monitor. Price down \$460 from last month.
15"/.26	800/722-9332	Feb 94	3046	Expandable PCI box. High reader service satisfaction. Price down \$600 from March.
17"/.28	800/733-2237	Jan 94	3042	Top components except for single-speed CD ROM drive. Price down \$400 from March.
17"/.26	800/438-3343	Mar 94	3061	Fast DX2-66 now configured as a tower. Has excellent reported rate of customer service satisfaction.
15"/.28	800/424-2983	current	3071	Fast, nicely designed and configured DX2-66 priced under \$3000.
15"/.28	800/752-1577	Mar 94	3062	Low-priced Pentium-60 starter PC is a solid value. A RAM upgrade would improve performance.
17"/.28	800/733-2237	Feb 94	3047	Fast DX2-66 with 17-inch monitor. CD ROM drive is just single-speed. Price down over \$500 from March.
15"/.28	800/289-3355	Jan 94	3045	Quick DX2-66. First-class service, design.
15"/.28	800/886-7200	current	3072	Extra-expandable and well-priced Pentium-60. But there's some shoddy construction.
14"/.28	800/554-5220	Feb 94	3043	Fast DX2-66. First-class service, design. Fine all-around value. Best Buy February and March.
14"/.28	800/444-4257	Mar 94	3066	Pentium-60 server is the fastest PC we've tested. Big price for a very big system.
17"/.28	800/876-4278	Jan 94	3051	Upgradable to full Pentium. Fast DX2-66 with big monitor. Three-year warranty.
15"/.28	800/821-0806	Dec 93	3073	DX2-66 EISA box has superb RAM expandability but needs a larger hard disk to live up to its server pedigree.
15"/.28	800/846-2000	Jan 94	3055	Fast Windows 3.1 box with good expandability, strong software bundle, double-speed CD ROM drive.
15"/.28	800/632-4636	Jan 94	3048	Great 15-inch flat monitor, integrated SCSI, three-year warranty. Nice design but pricey.
15"/.28	708/540-8086	Mar 94	3064	Very fast dual-processor 486DX2-66 for symmetrical multiprocessing OS's. \$1000 less for single processor.
14"/.28	800/234-2945 ³	Mar 94	3063	Expandable PCI DX2-66. Needs more RAM to use bundled NT. No. 1 Budget Best Buy.
14"/.28	800/989-9900	current	3074	PCI DX2-66. You'll want a bigger monitor and a larger hard disk for power apps. Presales service often poor.

World Test Center for the Top 20 and Top 10 (\$4.95). Touch-tone phone required. Charges will appear on your telephone bill.

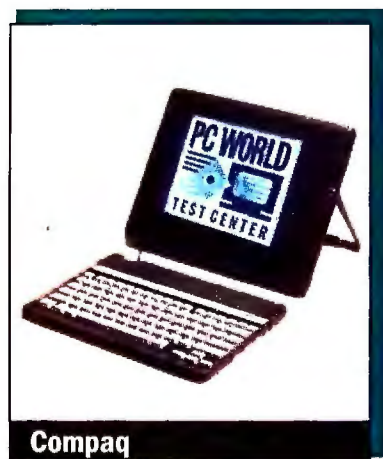
door-to-dealer support could use improvement. While the Aqualite-4SX2/120 sells for an amazingly low price, it cuts corners on support and screen quality to do so. Still, this unit provides a solid range of features. *CAF Technology, 818/369-3690 Reader service no. 838*

Compaq Concerto 4/33 Model 250

PC WORLD TOP 20
2 POWER MOBILE PC

PROS: Very long battery life, three-year warranty, versatile design **CONS:** Unacceptably long tech support hold times

The unusual pen-based Compaq Concerto gives you the versatility of using both keyboard and pen input. When using an application where the keyboard is mightier than the pen, however, you'll be glad to know you can either attach the keyboard to the screen/pen module or detach it and use it at a more convenient angle. The quiet keyboard is well laid out, with the stiffness and short travel typical of Compaq notebooks. The large 9½-inch



monochrome display is quite good, providing crisp contrast.

The 8.2-pound Concerto comes with a 486SL-33 processor, 4MB of RAM (20MB max), a 240MB hard drive, and a PCMCIA Type III slot that also holds two Type II devices. Local bus video contributes to strong performance. The battery's impressive 6½ hours of staying power are attributable to excellent and easily configurable

power-saving features plus a CPU designed for power management.

Compaq offers an impressive three-year warranty and three years of on-site service for \$115. Tech support lines are open 24 hours, seven days a week. Hold times for tech support were unacceptably long this time, ranging from 14 minutes to more than 45. Compaq assures us that it is aggressively ramping up staff to remedy this problem; we'll continue to monitor the situation and report on it.

The \$3025 Compaq Concerto plays as an enticing package, with great battery life and fine usability. It earns a Best Buy and second place on our Power Mobile PCs chart. But if you don't find the pen mightier than the mouse, you can save yourself some money by buying a more traditional unit. *Compaq Computer, 800/345-1518*

Reader service no. 839

Cornell Pentium 60 VL

PC WORLD TOP 20
11 POWER DESKTOP

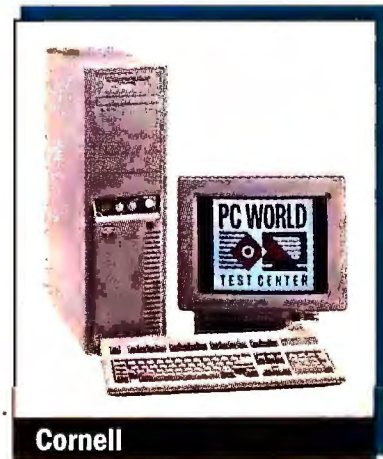
PROS: Fast, expandable, good video board, double-speed CD ROM **CONS:** Sloppily built

Cornell has put together more than a tower of power: This Pentium-60 is a veritable skyscraper. The PC, in its huge vertical case, comes laden with an entry-level 8MB of RAM and a healthy 512K secondary cache. But RAM and secondary cache can take the express elevator all the way to 128MB and 2MB, respectively. And this Pentium is fast, the sixth-quickest system we've ever tested.

Even with the 340MB Seagate IDE hard disk, 3½-inch floppy drive, and double-speed Sony CD ROM drive installed, you still have a fantastic eight free drive bays left over. And you get three 16-bit expansion slots and a VL bus slot free. A 2MB Hercules Dyna-

mite VL Pro video board drives a 15-inch ADI MicroScan monitor. The Sony CDU31A double-speed CD ROM drive—while quite capable—is hooked up to a nonstandard controller, so don't expect to be able to attach any SCSI peripherals to it.

The price for this big, fast, powerful system is an impressively low \$3099, but the construction does look a bit thin in one or two places. For example, we noticed that the supports for the ends of full-length cards were bowed, which makes it extremely difficult to insert such cards. In addition, some parts of the case were very poorly fastened.



Cornell backs this system with a three-year warranty, a 30-day money-back guarantee, 12 hours of daily toll-free support (not on Sundays), and a year of free on-site service. The company did well on our anonymous support checks. When we called (also anonymously) to check pricing a second time, we were quoted a marginally higher price on a slightly different system with a 256K secondary cache, a 450MB hard drive, and a Mitsumi CD ROM drive—because the precise configuration sent us was no longer available. This represents an equivalent value, but be careful to check the details when you order a system from Cornell (or any other vendor). Even with its rough edges, this system's low price, high power, and great expandability earn it the number 11 spot on our Top 20 Power Desktops list. *Cornell Computers, 800/886-7200 Reader service no. 793*

Dual SKD 486 Notebook

PC WORLD TOP 20
5 BUDGET MOBILE PC

PROS: Excellent expandability, good performance **CONS:** Loose display and keyboard

The \$1820 Dual SKD 486 Notebook is both nimble and unusually adaptable. This 7.4-pound modular unit is a good performer, and the generous 8MB of RAM helps significantly. Unlike with most notebooks, you can easily upgrade RAM yourself—to as much as 20MB—by pulling up the keyboard and plugging in modules. The 120MB hard drive is upgradable to 540MB, although it's much more cost-effective to buy the size of hard disk you need at the outset. Even the trackball can be replaced with an optional PCMCIA slot. And if you want a color screen—yes, you can replace the monochrome screen too. Road warriors will be glad to know that Dual Group threw in a fax-modem with our unit.

We would have preferred a more rugged design: The display and the keyboard both have a slightly loose feel that makes us a little uneasy when we think about the potholes of the open road. The Dual's overall support package is decent, and the promised two-day turnaround on repairs is good. Keep in mind that Dual Group doesn't sell direct, only via resellers and dealers.



Lowest Prices on the SX, DX & *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 money, including an outstanding integral trackball."

PC MAGAZINE, Guide to Portable Computing, 8/93



"If you're a Windows user on 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."

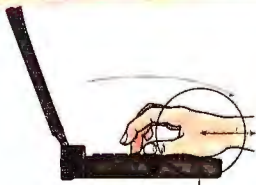
COMPUTER SHOPPER, This Powerbook Twin Acts Like a PC, 9/93



"The WinBook is a great example of what a Windows notebook should be....fast, easy-to-use and a miser on battery life....It's also inexpensive: nearly 50% less than some comparable notebooks."

WINDOWS MAGAZINE, Transcontinental Portable, 9/93

The WinBook Intel486 SX-25, DX-33 & DX2-50 SL Enhanced Features



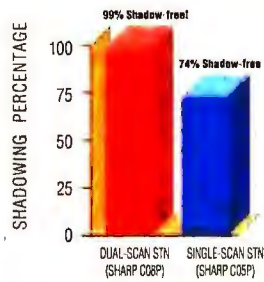
Ergonomically engineered & designed by award-winning Palo Alto Design

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 dual-scan 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

13:1 with previous passive matrix technology.



Longer battery life

The WinBook features NiMH 2200 MA batteries with gold-plated contacts, allowing it

to run much longer than units with traditional NiCAD batteries—and there's no memory effect!



The WinBook offers you more features for less!

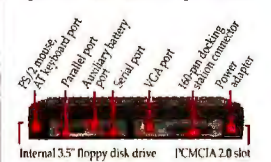
- 9600 baud send/4800 baud receive fax/2400 baud modem
- Industry-standard type II PCMCIA slot
- 512k video RAM
- Fast-acting LCD screen
- Built-in centered dual-button trackball

Docking station gives you desktop power!

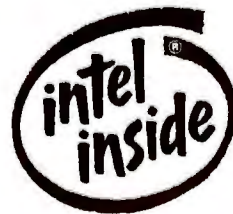
Two expansion slots and drive bays let you add peripherals such as monitors, hard drives, CD ROMs, I/O cards or an extended keyboard. Includes parallel, serial, PS/2 mouse, external keyboard and VGA ports. **And it's just \$399!**



Mouse/keyboard, parallel, serial and VGA ports plus PCMCIA expansion



WinBook®



Upgradable processor!

<p>Monochrome</p> <p>\$1599</p> <p>4MB RAM/200MB HDD</p> <ul style="list-style-type: none"> • SL Enhanced Intel 486SX 25MHz 	<p>Color Dual-Scan</p> <p>\$1999</p> <p>4MB RAM/200MB HDD</p> <ul style="list-style-type: none"> • Fax modem included! • DOS and Windows
--	--

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- 30-day unconditional money-back guarantee.
- 24-hour burn-in protection.
- One-year limited warranty on parts and labor.
- Toll-free technical support for the life of the computer.

30-day unconditional money-back guarantee

Your satisfaction is unconditionally guaranteed for 30 days from date of purchase. If for any reason you are not satisfied with your purchase from us, we want you to return it. We will be glad to give you your money back.



SX & DX Specifications

- Size/Weight**
- 11" x 8 3/4" x 1 3/4"
 - SX monochrome: 5.4 lbs. with battery
 - SX and DX dual-scan color: 5.9 lbs. with battery
- Pointing Device**
- 16mm Alps dual-action, Microsoft-compatible trackball

Battery

- SX-25: up to 3 hours with power management, over 5 hours with auxiliary power system (less 30 minutes for color)
- DX-33: over 2 hours with power management, up to 5 hours with auxiliary power system
- NiMH (no memory effect)
- Worldwide auto-sensing AC adapter

Processor and Memory

- SL enhanced Intel486 SX 25MHz, DX 33MHz, or DX2-50MHz CPU
 - 4MB RAM (upgradable to 32MB)
 - Pico Power Energygreen HV chipset
 - 8k internal cache
- Drives**
- 1 built-in 1.44MB 3.5" floppy drive
 - Internal 200MB (16ms) hard drive
- Software**
- Comes loaded with MS-DOS and Microsoft Windows

Display

- SX monochrome: super-twisted 64 gray-scale 10" LCD
 - SX and DX color: dual-scan STN color display 9.5" LCD
 - 640x480 resolution
 - 512k video RAM up to 1024x768 resolution for external monitor
 - Adjustable contrast and brightness
 - Visible LED indicator on coverdown
- Keyboard**
- Full-function keyboard with 85

- keys and 4 inverted-T cursor control keys, 3.0mm keyboard spacing
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- I/O Ports**
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 - PCMCIA type II slot
 - Serial: 9-pin connector

- Parallel port
 - Video: 15-pin connector for external monitor
 - 160-pin docking station
 - Auxiliary battery port
- Options**
- Docking station
 - Car adapter
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The Dual SKD 486 Notebook is a remarkably affordable and configurable mobile PC, and it provides good performance. While a monochrome setup like this won't attract most power users, the system ranks 5th on our Budget chart and is a very good value. *Dual Group*, 800/214-9467, 310/542-0788 **Reader service no. 840**

IBM ThinkPad 750C

PC WORLD TOP 20
1 POWER MOBILE PC

PROS: Fine color screen, built-in sound, good battery life
CONS: High price

The original IBM ThinkPad redefined what a power notebook should be, so we weren't surprised to see this improved unit emerge as our top overall Power Mobile PC Best Buy. Based on a 486SL-33, the ThinkPad 750C posted fine performance numbers, helped by the inclusion of 12MB of RAM (20MB is the maximum). Oddly, when we tested the system with the supplied IBM DOS 6.1, it was unable to complete our WordPerfect for DOS test. Retrying with MS-DOS 6.0 provided a trouble-free test, however. We provide the complete performance numbers based on MS-DOS 6.0, although aside from the incomplete WordPerfect test, the IBM DOS 6.1 numbers were equivalent.

The ThinkPad has a 10½-inch active-matrix color screen, which is still one of the best available. IBM also provides a 170MB hard drive, with a 340MB one optional.

One pleasant surprise is that high-quality, 16-bit stereo sound is included, along with a decent built-in mono speaker. Besides offering the usual slots, bays, and ports, an optional docking station includes stereo speakers and space for a CD ROM drive. The ThinkPad uses the TrackPoint II pointing device, an easy-to-use eraser-shaped red button in the center of the keyboard. The keyboard itself, like all IBM keyboards, is a pleasure—if not quite a desktop model.



IBM

Given all the power in this unit, it's a surprise that it lasted almost 4 hours on our test. Less surprising is its weight, a dense 8.2 pounds, packed into a regular notebook-size package. The unit includes a single PCMCIA Type III slot that also holds two Type II devices. A fax-modem PCMCIA card came as part of the package.

At \$4699, all these goodies don't come cheap. But for the money, you get one of the best-equipped notebooks on the market, backed up by terrific service and support, including a year of free on-site service and a three-year warranty. The ThinkPad 750C continues to define a Best Buy power notebook. *IBM*, 800/426-7735

Micro Express MicroFlex-PCI/66

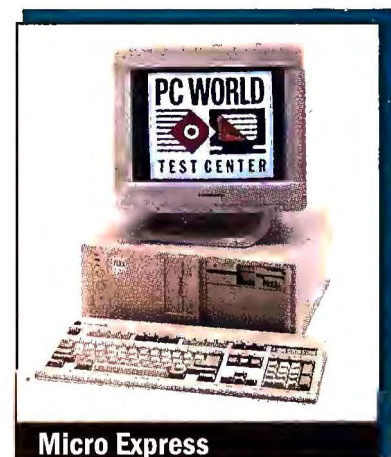
PC WORLD TOP 20
20 POWER DESKTOP

PROS: Fine price, good tech support, PCI graphics accelerator
CONS: Average monitor, spotty presales service

Micro Express's latest entry in the fiercely competitive budget desktop market is the MicroFlex-PCI/66. The fine design of this 486DX2-66 unit and the inclusion of a number of quality components at an average \$2894 direct price just edge it into the Power Top 20. As with most of the other Micro Express prod-

ucts we've reviewed, performance is good—9 percent faster overall than our median 486DX2-66 in this case.

The generic look of the surprisingly roomy compact case belies the quality of the internal components, which include a PCI bus motherboard, a 1MB DriveCache caching IDE disk controller, and a Diamond Viper PCI graphics accelerator with 2MB of VRAM. In addition, Micro Express throws in both standard floppy drives. The 256MB hard drive teeters on the border between basic 200MB budget storage and the 300MB-plus you usually get with a power unit. And to keep cost down, the display is just a 14-inch model that's adequate for non-graphics-intensive business apps but unable to support the Viper's highest resolution.



Micro Express

The 8MB RAM configuration is a snap to upgrade, thanks to the two free 72-pin SIMM sockets, and can go all the way to 80MB before you have to replace the two installed 4MB SIMMs (128MB is the RAM ceiling). The system will take five additional expansion cards, two of which can be PCI local bus boards. You also get two free externally accessible drive bays.

Micro Express offers decent service and support, including \$50 on-site service for the first year of the two-year warranty period. Our main complaint centers on *presales* service: Readers have reported difficulty getting through to place an order. Add up everything this PC brings to the party, and you get a decent PC at number 20 on the Power Desktops list—although you'll want more RAM, a larger hard disk, and a better monitor for most power applications. *Micro Express*, 800/989-9900, 714/852-1400 **Reader service no. 797**

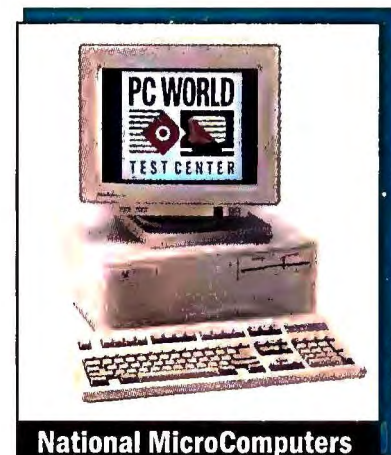
National MicroComputers Pro-System PCI

PC WORLD TOP 20
7 POWER DESKTOP

PROS: Excellent performance and design
CONS: None

National MicroComputers' \$2994 Pro-System PCI is a well-tuned, beautifully configured 486DX2-66. Overall performance benchmark results were excellent: 18 percent better than our median 486DX2-66's. Serious Windows buffs will appreciate the generous 16MB of RAM, which contributes to excellent task-switching performance. If you ever need more RAM, two free 72-pin SIMM sockets are available. Complementing the copious memory configuration is a 540MB IDE hard disk.

The compact case doesn't make you compromise on accessibility or expansion room. The vendor includes a nifty combo floppy drive, leaving four bays free (two externally accessible). There are two free PCI slots and four free 16-bit slots. One PCI slot is occupied by



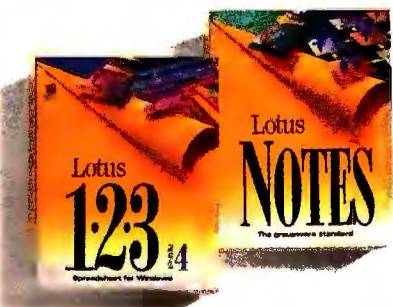
National MicroComputers

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THE TOP 20

PC WORLD



1 Axik 486DX2-66 PCI
Two-time number one.

BUDGET DESKTOPS

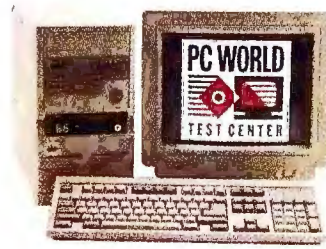
- ▶ New this month
- ▲ Up from last month
- ◀ No change from last month
- ▼ Down from last month

BEST BUYS

		Last month	Months on list	Overall rating	Performance rating	Service rating	Price	CPU	RAM (MB)	Hard drive (MB)	Bus	
1	◀	Axik 486DX2-66PCI	1	2	78	57	65	\$2298	486DX2-66	8	345	ISA
2	▲	Comtrade VL-Bus Best Buy 66	—	1	77	58	62	\$1975	486DX2-66	8	344	ISA
3	▲	Inmac Insignia 466P	7	3	77	53	72	\$2108	486DX2-66	8	170	ISA
4	◀	Blackship BLK 486/66LB	4	3	76	52	64	\$1895	486DX2-66	8	244	ISA
5	▼	Netis N433VL	2	3	76	38	63	\$1599	486DX-33	8	250	ISA
6	▲	Comtrade EISA VLB 486DX2/66	—	1	76	42	62	\$1795	486DX2-66	4	340	EISA
7	▼	IBM PS/1 Consultant DX2-66	6	3	75	42	83	\$2399	486DX2-66	8	420	ISA
8	▲	CompuAdd C433S Low Profile	12	3	75	39	76	\$1715	486SX-33	8	210	ISA
9	▼	Netis N 466 VL Power Station	3	3	75	51	63	\$1899	486DX2-66	4	250	ISA
10	▼	Blackship BLK 486DX2/50 LB	11	2	75	45	64	\$1750	486DX2-50	8	250	ISA
11	▼	Polywell Poly 4586VR	5	3	74	61	66	\$2370	486DX2-66	8	340	ISA
12	▶	Shasta Prestige Desktop	—	1	73	51	61	\$1799	486DX2-66	8	345	ISA
13	▲	AST Bravo LC 4/66d Model 213W	17	3	73	52	84	\$2479	486DX2-66	8	210	ISA
14	▼	NMC 486 VL-Bus Winstation	10	3	73	38	66	\$1861	486DX-33	8	212	ISA
15	▲	Insight 486DX2-66 VL	16	3	72	45	61	\$2245	486DX2-66	8	240	ISA
16	▲	Axik Ace Cache 486DX2-66V	13	3	72	56	65	\$2198	486DX2-66	8	240	ISA
17	▼	Insight 486DX2-66 SmartServer	—	1	71	56	61	\$2499	486DX2-66	8	340	ISA
18	▼	Micro Express MicroFlex-VL/S	17	3	71	37	69	\$1999	Cx486S40	16	220	ISA
19	▲	Tagram Concerto Hi-Note 486DX2/66	—	1	71	47	68	\$2342	486DX2-66	8	250	ISA
20	▲	Int'l Instrumentation Business Partner	—	1	71	56	65	\$2499	486DX2-66	8	340	ISA

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2 Comtrade VLB Best Buy 66
Low price, high speed.

3 Inmac Insignia 466P
Great IBM design.

4 Blackship BLK 486/66 LB
Cheap two-time Best Buy.

5 Netis N433VL
Lowest price in Top 20.

Monitor size/ dot pitch	Vendor contact number	Issue reviewed	Fax reprint number ¹	Comments
14"/.28	800/234-2945 ²	Mar 94	3069	PCI DX2-66 needs more RAM to use bundled NT. No. 19 Power system. Second-time top Best Buy.
15"/.28	800/969-2123	Feb 94	3075	Super price lets this DX2-66 live up to its name. Inconsistent service but big improvement takes it to Best Buy.
14"/.28	800/547-5444	Feb 94	3056	Expandable, IBM-made PC needs larger hard drive. \$300 price drop earns a Best Buy
14"/.28	800/531-7447	Jan 94	3023	Slots aplenty this on DX2-66. Dropped back to February \$1895 price.
14"/.28	800/577-7526	Dec 93	3021	Great price, good performance for an expandable DX-33. Third month as Best Buy.
14"/.28	800/969-2123	Dec 93	3076	Versatile VL/EISA DX2-66. Service has been inconsistent until recently.
14"/.28	800/772-2227	Feb 94	3025	Energy Star rating, new PS/1 user-friendly features, great service.
14"/.28	800/627-1961	Dec 93	3031	Relatively quick 486SX-33; responsive around-the-clock support rates very highly with readers.
14"/.28	800/577-7526	Feb 94	3022	Super price on basic DX2-66, but just 4MB of RAM.
14"/.28	800/531-7447	Mar 94	3070	Intel 486DX2-50 tower system is expandable, quick for its class. Good service and support.
15"/.28	800/999-1278	Dec 93	3050	Hot performer was a Best Buy last month. Higher price now but has 15-inch monitor.
15"/.28	800/546-9888	current	3077	Fantastic price for well-equipped DX2-66. Tech support could be more consistent.
15"/.28	800/876-4278	Dec 93	3034	Nicely designed compact DX2-66. Nearly flat 15-inch monitor, 24-hour-a-day support.
14"/.28	800/424-2983	Dec 93	3027	Nimble performance for DX-33, good service and support help keep this PC on the chart.
15"/.28	800/998-8011	Dec 93	3037	Price dropped \$200 on cleanly designed, expandable desktop PC. Still numerous service complaints.
14"/.28	800/234-2945 ²	Dec 93	3029	A particularly speedy DX2-66 for the money. Good service and support.
17"/.26	800/998-8011	Jan 94	3037	Expandable tower PC. Insight has high reported incidence of defective units.
14"/.28	800/989-9900	Dec 93	3033	Fast Cx486S40 with attractive price, caching drive controller. Some complaints on presales service.
14"/.28	800/824-7267	Jan 94	3078	Nice DX2-66 multimedia PC with good service, relatively slow performance.
15"/.28	800/543-3475	Mar 94	3079	Middle-of-the-road DX2-66 midsize tower. Price dropped \$250 since March.

¹ World Test Center for the Top 20 and Top 10 (\$4.95). Touch-tone phone required.
Charges will appear on your telephone bill.

a 2MB Diamond Viper PCI graphics accelerator. National MicroComputers even throws in a lovely 15-inch flat monitor.

Service and support stood up well to our tests, although we've gotten no reader *Reliability and Service* fax feedback, pro or con. The vendor provides a quick one-day turnaround for factory repairs and a two-year labor and one-year parts warranty. Calls to the toll-free tech support line yielded accurate answers, with a wait of just 2 minutes on average. The company doesn't have weekend support hours, however on-site service is just \$39 for the first year. This isn't the cheapest DX2-66 around, but performance and design are outstanding. As a result, this newcomer to our pages rates a number 7 on our Power Desktops Top 20. *National MicroComputers, 800/424-2983 Reader service no. 798*

Packard Bell Statesman 200M

PC WORLD TOP 20
3 BUDGET MOBILE PC

PROS: Low price, good battery life

CONS: Poor screen, performance

Price is what makes this chunky notebook stand out; this little system costs a mere \$1500 on the street. Performance, on the other hand, is much less engaging: Based on a Cyrix Cx486SLC-33 with 4MB of RAM, the 7.4-pound Packard Bell Statesman 200M turned in benchmarks noticeably below the



Packard Bell

average, so this machine is not a good choice for power users. To the good, battery life is almost 4 hours, and the 200MB hard drive is a plus. This notebook's worst feature is its passive monochrome screen; the display on our test unit was cloudy and a bit dim for our tastes.

Just as with its color sibling (see *System Snapshots*), you get a single PCMCIA Type II slot. Pack-

ard Bell includes an intelligent power-down sequence that refuses to turn off until you agree that you have no work to save. One of the system's most interesting features is the J key, which doubles as a tiny, joysticklike pointing device. Gently push it, and the screen cursor follows. Two other keys double as mouse buttons. We found this mouse alternative highly usable after we got some practice.

Number 3 on our Budget chart, this notebook is a good value if price is paramount, the relatively poor quality of the screen and the pedestrian performance notwithstanding. *Packard Bell, 800/733-5858 Reader service no. 841*

Shasta Prestige Desktop

PC WORLD TOP 20
12 BUDGET DESKTOP

PROS: Cheap, six free slots

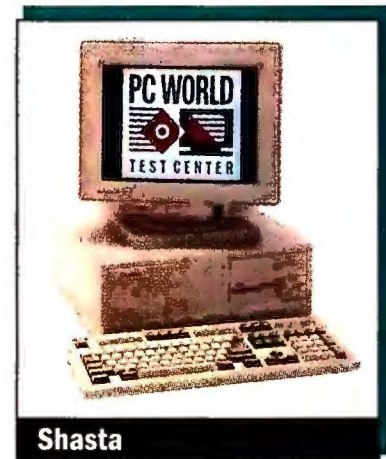
CONS: So-so performance

You would usually expect to pay more than \$2000 for a 486DX2-66 system with 8MB of RAM, a 256K secondary cache, and a 345MB hard drive. But the Shasta Prestige Desktop delivers the goods for an impressively low \$1799. And for that pittance, you even get a 15-inch monitor and a 3MB Cirrus Logic VL bus graphics accelerator. Performance is decent too, just slightly slower than that of our median 486DX2-66.

There's nothing unusual about the design and layout, although

unlike many cheaper systems, the Shasta prestige offers unimpeded access to all the essential components. Drive expandability is limited on this compact, with just two free bays (one externally accessible); however, you do get plenty of free expansion slots—one VL bus, three 16 bit, and two 8 bit. Both banks of 30-pin SIMM sockets are filled, so you'll need to discard SIMMs to upgrade to the 32MB maximum.

Support policies are okay. Shasta offers a one-year warranty, a year of on-site service for \$25, and toll-free technical support 9½ hours a day (but not on weekends). If you're scouting for a budget machine, this surprisingly well-equipped 486-DX2-66 is positively cheap. That factor, along with a generally clean design, translates into a number 12 on our Budget Desktops Top 20. *Shasta Computers, 800/546-9888 Reader service no. 799*



Shasta

Texas Instruments TravelMate 4000E

PC WORLD TOP 20
5 POWER MOBILE PC

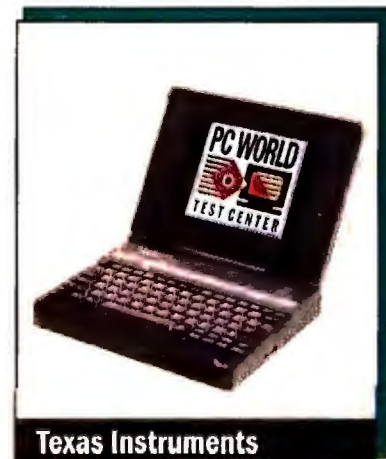
PROS: Bright active-matrix color screen, good performance

CONS: Port covers are somewhat flimsy

With the TravelMate 4000E, Texas Instruments shows it can wring top performance out of a 486DX2-50 notebook. This system is not only among the top 5 notebooks (out of 32 tested for this review), it even outpaced a DX2-66. The \$4499 machine weighs 8.2 pounds and comes with 4MB of RAM (20MB max) and a 209MB hard drive. A docking station, a modem, and an external numeric keypad are available as extra-cost options.

The battery ran for almost 3 hours; that's not bad for a notebook delivering this kind of performance. You can access the unit's wide range of power management settings either from a convenient Windows setup utility or in CMOS setup. A handy Windows icon lets you check remaining battery life, and a single keystroke puts the unit in standby mode.

The system's 8.6-inch active-matrix color screen gives you a bright, crisp display. The keyboard has excellent travel and nicely rounded keys, and a Microsoft BallPoint trackball clips onto the right edge. While the unit comes with a built-in floppy drive, the port covers are rather flimsy. TI's support package includes a year of on-site service for \$120 and two-day turnaround on factory repairs. Toll-free tech support lines are open 12 hours a day on weekdays only. The technicians we spoke to answered our questions correctly after an average hold time of 3 minutes. Aside from the lack of PCMCIA slots, this notebook has just about everything you could ask for: good performance, a great screen, solid support, and reasonable battery life. Accordingly, the TravelMate earns the number 5 position on our Power Mobile PCs chart. We give it a solid recommendation. *Texas Instruments, 800/527-3500, 512/794-5970 Reader service no. 842*



Texas Instruments

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Toshiba T4700CT 486 Notebook

PC WORLD TOP 20
3 POWER MOBILE PC

PROS: Great performance, keyboard, and screen; good battery life
CONS: High price

Want to fly first-class? You won't go wrong buying this first-class ticket from Toshiba. The vendor's latest notebook provides a rich mix of features: a brilliant 9½-inch active-matrix color screen, a great keyboard and mouse, sizzling performance, good PCMCIA expansion, and a battery pack that will take you from San Francisco to Chicago without a change. However, at \$4699 on the street, you pay a premium price for this 8.8-pound luxury cruiser.

Powered by a snappy Intel 486DX2-50 and equipped with 8MB of RAM (24MB max), the T4700CT is a good performer. It comes with a 203MB hard drive—better than average for a notebook. If you need more hard disk storage, you can insert a removable hard disk into the PCMCIA Type III slot, leaving the other slot (PCMCIA Type II) free for a modem, a LAN card, or a SCSI adapter.

The keyboard is comfortable, and the external Microsoft trackball is a delight. The notebook's large active-matrix color screen is outstanding, with brilliant colors and crisp, clear images. The unit even comes with built-in CD-quality sound capability, with microphone and speaker jacks.

The system is powered by a largish NiMH battery pack, and the 4 hours of computing time was more than we expected from an active-matrix powerhouse. Backing up this top-flight notebook is Toshiba's exemplary service and support. The three-year warranty is outstanding for a notebook, and the rest of the policy is competitive. All in all, the T4700CT offers just about as much as you can find in a notebook system. If you have a generous budget, be sure to check out this powerful mobile PC. *Toshiba America, 800/334-3445 Reader service no. 843*



Toshiba

ZDS Z-Lite 486-25

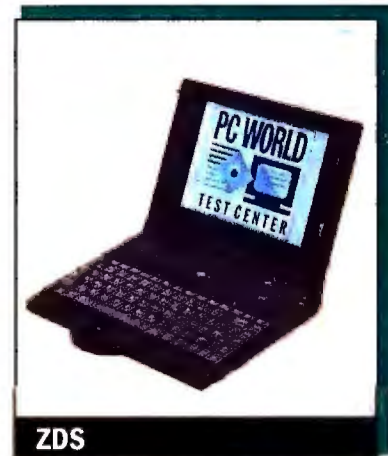
PC WORLD TOP 20
2 BUDGET MOBILE PC

PROS: Inexpensive, lightweight
CONS: Cramped keyboard

The Z-Lite 486-25 subnote is a great deal for buyers seeking the ultimate in effortless portability—and it earns our second Budget Best Buy. For just \$1999 you get a 486SL-25 processor, 4MB of RAM, a 170MB hard drive, and an 8½-inch monochrome screen. You can easily expand the memory to 28MB by installing a memory module on the unit's underside. Performance—while not the fastest here—was respectable. When it comes to portability, the Z-Lite lives up to its name; it has a traveling weight of just 6.2 pounds with the external floppy drive. You also get two PCMCIA Type II slots for adding a fax-modem, a network adapter, or a removable hard drive.

At 3¼ hours, battery life is good, and you can conveniently access the power management settings or put the unit into standby mode with a single keystroke. ZDS provides a one-year warranty with a two-day turnaround on factory repairs. Toll-free tech support lines are open for 16 hours a day, weekdays only. You get a 30-day money-back guarantee, but only if you buy direct from ZDS; so make sure of your return options if you buy from a dealer.

On the downside, the Z-Lite's screen could use sharper contrast, and the keyboard keys are too small for our taste (as is the case with the keys on most subnotes). The marble-size trackball is mounted in front of the keyboard and is easy to maneuver. A port on the back of the unit will accept either a keyboard or a mouse. Despite the less-than-perfect display and the cramped subnote keyboard, mobile PC users will find a great deal to like about this lightweight. The low price, decent performance, and good support package makes this unit a Best Buy shoo-in. *Zenith Data Systems, 800/553-0331, 708/808-5000 Reader service no. 844*



ZDS

System Snapshots

Brief reviews of notebooks in fifth to tenth place on the Top 20 Mobile PCs chart, as well as quick looks at new desktop PCs tested this month that didn't make the cut for the Top 20 Power and Top 20 Budget desktop PC charts.

Acma MPC-433 System

PROS: 45-day money-back guarantee, lots of free slots
CONS: Somewhat slow performance

Acma's \$2195 MPC-433 is a solid multimedia system at a down-to-earth price. It comes with a double-speed CD ROM drive, a sound card and built-in speakers. As you'd expect from its 486DX-33 processor, the system performed about 60 percent slower than

our 486DX266 median. Since 1MB SIMMs fill all eight of the unit's 30-pin sockets, upgrading requires discarding some installed SIMMs. And the 213MB hard drive is on the small side for business or multimedia use. You get two free drive bays (both internal), and one VESA local bus slot and four 16-bit slots free. The MPC-433's combination of a reasonable price, multimedia features, and strong support policies makes it a good value. However, if you need high performance in business applications, you'll be happier with a DX2-66. *Acma Computers, 800/786-6888, 510/623-1212 Reader service no. 791*

Blackship BLK P60 LB

PROS: Affordable, clean internal design
CONS: No weekend support

The \$2995 BLK P60 LB is Blackship's entry-level Pentium-60 model. Like most Blackship products, it looks solid. Performance is competitive: just 5 percent behind our median Pentium-60. The configuration is respectable for a Pentium starter model, with a robust 16MB of RAM, an impressive 512K secondary cache, both floppy drives, a 340MB IDE hard disk, a 512K VL caching disk controller, and a 15-inch monitor.

You get three free drive bays (two externally accessible), four free 16-bit slots, and one free 8-bit slot. The main fault we find with Blackship's **continued on page 142**

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THE TOP 20

PC WORLD



1 IBM ThinkPad 750C
Pure power.

MOBILE PCs

POWER SYSTEMS

	Last month	Months on list	Overall rating	Performance rating	Reliability and service rating	Price	CPU	RAM (MB)	Hard drive (MB)
1 IBM ThinkPad 750C	-	-	88	33	79	\$4699	486SL-33	12	170
2 Compaq Concerto 4/33 Model 250	-	-	87	24	78	\$3025	486SL-33	4	250
3 Toshiba T4700CT 486 Notebook	-	-	86	35	74	\$4699	486DX2-50	8	203
4 Austin 466T	-	-	85	30	67	\$4299	486DX2-66	8	340
5 TI TravelMate 4000E	-	-	79	33	69	\$4499	486DX2-50	4	209
6 Toshiba Portégé T3400CT	-	-	79	23	74	\$3549	486SX-33 ³	4	120
7 Sharp PC-8150	-	-	78	23	60	\$2699	486DX-33 ³	4	200
8 NEC Versa E Series	-	-	78	27	71	\$5000	486DX2-50 ³	4	340
9 Micro Express NB8266	-	-	78	42	64	\$4749	486DX2-66	8	203
10 Twinhead Slimnote 486E Model 4SX/33S	-	-	76	27	54	\$2710	486SX-33 ³	4	207

BUDGET SYSTEMS

1 AST Bravo NB	-	-	79	16	80	\$2350	486SX-25	4	120
2 ZDS Z-Lite 486-25	-	-	79	17	57	\$1999	486SL-25	4	170
3 Packard Bell Statesman 200M	-	-	79	14	64	\$1500	Cx486SLC-33	4	200
4 CAF Aquallte-4SX2/120	-	-	79	22	45	\$1425	486SX-25	4	125
5 Dual SKD 486 Notebook	-	-	78	31	47	\$1820	486DX-33	8	120
6 Sharp PC-8150	-	-	78	23	60	\$2699	486DX-33 ³	4	200
7 Ergo SubBrick 486	-	-	76	11	68	\$1695	Cx486SLCV-25	4	163
8 Epson ActionNote 4000	-	-	74	14	63	\$1499	Cx486SLC-33	4	85
9 Packard Bell Statesman 200c	-	-	74	15	64	\$2200	Cx486SLC-33	4	200
10 Toshiba Satellite T1950CS	-	-	73	17	74	\$2699	486DX2-40	4	130

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)



2 Compaq Concerto 4/33
Switches easily from keys to pen.



1 AST Bravo NB
All-rounder at a good price.



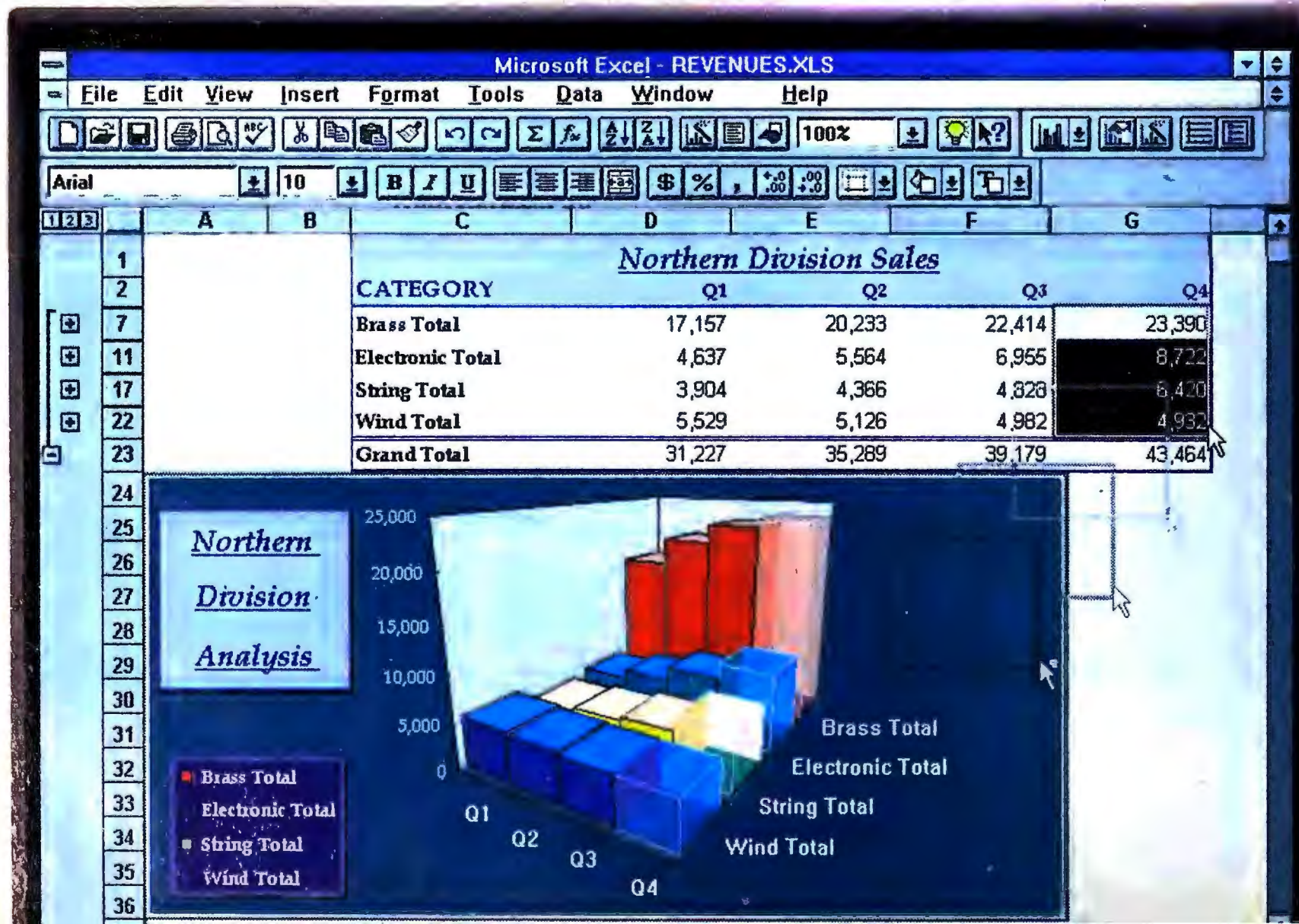
2 ZDS Z-Lite 486-25
Well-designed subnote.

Weight (pounds)	Battery life (hours)	Screen type/size ¹	Vendor contact number	Issue reviewed	Fax reprint number ²	Comments
8.2	3:52	CA/10.5"	800/426-7735	current	3601	Ultimate power notebook with great screen and built-in sound.
8.2	6:31	MP/9.5"	800/345-1518	current	3602	Flexible pen-based and regular notebook has great battery life.
8.8	4:02	CA/9.5"	800/334-3445	current	3603	Fast multimedia all-rounder with good battery life.
7.8	3:30	CA/9.5"	800/433-7914	current	3604	Powerful DX2-66 with big hard disk, active-matrix color, solid service.
8.2	2:55	CA/8.6"	800/527-3500	current	3605	All-around excellence with great Windows performance, will have larger screen soon.
6	5:30	CA/7.4"	800/334-3445	current	3606	Great screen and battery life and good performance for a subnote.
8.2	4:09	CD/9.5"	800/237-4277	current	3607	Surprisingly versatile for a budget-price box—also on Budget Top 10.
8.2	2:59	CA/9.5"	800/388-8888	current	3608	Flexible notebook can be upgraded in many ways, good for presentations.
8.8	2:07	CA/9.5"	800/989-9900	current	3609	Portable powerhouse, but needs better battery life.
8.2	2:54	CP/9.5"	800/995-8946	current	3610	Moderate price pulls this standard notebook into the Power Top 10.
6.8	3:48	CD/9.5"	800/876-4278	current	3611	Good price, good battery life, good design and color too.
6.2	3:15	MP/8.5"	800/553-0331	current	3612	One of the lightest subnotes, good battery life, generally good design.
7.4	3:50	MP/9.5"	800/733-5858	current	3613	A touch slower than its color sibling and has a poor mono screen but is very cheap.
6.8	2:18	MP/8.5"	818/369-3690	current	3614	Cheap, cheap, cheap subnote, but watch the low-power signal. Poor support policies.
7.4	2:30	MP/9.5"	800/214-9467	current	3615	Decent blend of features, good performance and power.
8.2	4:09	CD/9.5"	800/237-4277	current	3607	Also placed seventh on the Power Top 10—but ties for most expensive in this category.
6.6	4:27	MP/8.7"	800/633-1925	current	3616	Subnote—light and cheap but really slow.
6.6	2:41	MP/7"	800/374-7300	current	3617	One of the cheapest notebooks we reviewed—and one of the lightest.
8.2	3:15	CP/9.5"	800/733-5858	current	3618	Poor-quality screen but very cheap for color, uses the J mouse.
8.8	2:31	CP/9.5"	800/334-3445	current	3619	On the heavy side, but otherwise good quality.

each; December 3012, January 3001, February 3002, March 3003, April 3004); and a list of all systems tested by the PC World Test Center for the Top 20 and Top 10 (\$4.95). Touch-tone phone required. Charges will appear on your telephone bill.

³ SL Enhanced.

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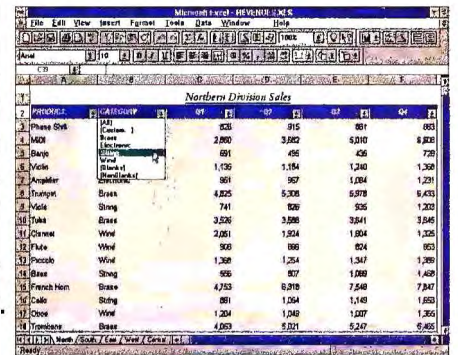
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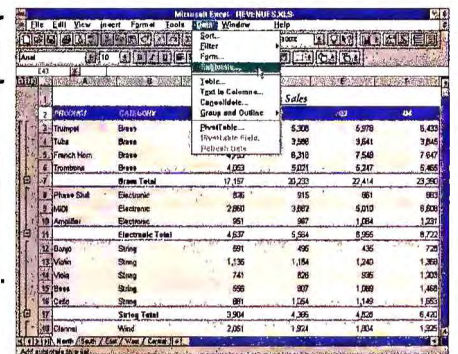
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Want to quickly browse through your information? AutoFilter lets you pick the information you need and filter out the rest.



		97	98	99	00
Phone Shk	Electronic	836	915	881	883
MDR	Electronic	2,880	3,082	5,010	8,201
Days	Electronic	891	495	435	728
Vinix	String	1,136	1,154	1,240	1,308
Amplifier	Electronic	981	987	1,084	1,231
Transept	Brass	4,825	5,308	5,878	6,433
Vale	String	741	826	926	1,203
Tuba	Brass	3,226	3,208	3,841	3,845
French Horn	Brass	2,281	1,924	1,954	1,328
Flute	Wood	926	108	824	853
Piccolo	Wood	1,388	1,254	1,347	1,389
Base	String	586	807	1,089	1,488
French Horn	Brass	4,733	8,318	7,548	7,247
Cello	String	881	1,284	1,149	1,893
Clarin	Wood	1,284	1,240	1,027	1,361
Trumpet	Brass	4,283	5,021	5,247	6,485

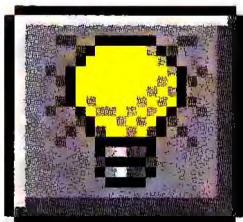
The Subtotal feature adds your number automatically, then Outlining lets you collapse and expand details of your worksheet.



		97	98	99	00
Subtotal					
Transept	Brass	4,825	5,308	5,878	6,433
Tuba	Brass	3,226	3,208	3,841	3,845
French Horn	Brass	2,281	1,924	1,954	1,328
Trumpet	Brass	4,283	5,021	5,247	6,485
Brass Total					
		17,187	20,233	22,414	23,290
Phone Shk	Electronic	836	915	881	883
MDR	Electronic	2,880	3,082	5,010	8,201
Amplifier	Electronic	981	987	1,084	1,231
Electronic Total					
		4,677	4,994	6,956	9,723
Days	String	891	495	435	728
Vinix	String	1,136	1,154	1,240	1,308
Vale	String	741	826	926	1,203
Base	String	586	807	1,089	1,488
Cello	String	881	1,284	1,149	1,893
String Total					
		3,924	4,269	4,829	6,410
Clarin	Wood	2,281	1,924	1,954	1,328

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service and support is the lack of weekend tech support. The BLK P60 LB is a respectable, affordable Pentium machine that almost made our Power Desktops Top 20. *Blackship*, 800/531-7447, 408/432-7500
Reader service no. 792

Dell OptiPlex 466/MXV

PROS: Superb performance, good service and support
CONS: Limited drive expandability, high price
 The \$3796 Dell OptiPlex 466/MXV is a powerhouse DX2-66 workstation backed by Dell's enviable track record for service and reliability. Performance is truly outstanding, matching the best we've seen from a 486DX2-66. Dell supplies a power-user's configuration: 16MB of RAM, a 2MB integrated local bus graphics accelerator, a 450MB hard drive, and a 15-inch monitor.

Drive expandability is limited to just one free 5¼-inch externally accessible drive bay. But there is one free VL slot along with four free 16-bit slots. A single 16MB SIMM leaves three sockets open for upgrades.

Everything on the motherboard is accessible, and the chassis is Dell's easy-open modular design. The price doesn't make for a DX2-66 bargain, but the OptiPlex's red-hot performance and first-class design make it worth considering. And it finished not far outside our Power Desktops Top 20. *Dell Computer*, 800/247-4739, 512/338-4400
Reader service no. 794

Duracom Multimedia DeskSaver 486/66DX2V

PROS: Multimedia bundle, 16MB caching disk controller
CONS: High price, poor WordPerfect for DOS performance
 This \$4149 DX2-66 comes with 16MB of RAM, a VL bus caching disk controller with a huge 16MB disk cache, a CD ROM drive, a 16-bit sound card, speakers, and a selection of CD ROM software. Even with its robust processor, performance dipped significantly below the median. And its relatively small 256MB hard drive seems out of place in this high-class package.

The video subsystem is good, with a 2MB VL bus graphics accelerator and a solid 15-inch monitor. Duracom's service and support rates well so far, although we have no reader *Reliability and Service* fax feedback. This PC's relatively high price

and small hard disk keep it from joining our Power Desktops Top 20. *Duracom Computer Systems*, 800/551-9000, 214/518-1200
Reader service no. 795

Epson ActionNote 4000

PROS: Small, low price
CONS: Sluggish performance, flimsy screen mount
 This subnote's light \$1499 price is a nice match for its 6.6-pound traveling weight. But its configuration is also light, with 4MB of RAM and an 85MB hard disk, a very marginal configuration for Windows use. And when it comes to performance, this Cyrix Cx486SLC-33 is a definite featherweight. Screen quality is good on the unit's 7-inch monochrome display, however. But there's a startling amount of flex in the screen assembly, which is attached with only a single hinge at one corner. The keyboard, while fairly usable, is cramped, and the internal trackball is a bit small and very awkwardly configured.

Using power management, we got 2½ hours of battery-powered computing. This isn't a bad subnote—as its number 8 position on our Budget Top 10 shows—but it will never replace a full-size notebook. *Epson Direct*, 800/374-7300, 310/782-0770

Ergo SubBrick 486

PROS: Inexpensive, light, long battery life
CONS: Poor performance, lacks upgradability
 If affordability and portability count more to you than power, you'll want to look at the Ergo SubBrick 486. This svelte \$1695 subnotebook weighs just 6.6 pounds, making it one of the lighter notebooks tested, and it boasts a long 4½-hour battery life. You get 4MB of RAM expandable to 20MB and a generous 163MB hard disk. But the 25-MHz Cyrix Cx486SLCV CPU—even with the included math coprocessor—contributes to bottom-end performance.

The case is solid and attractive, with a decent keyboard layout (except for the shrunken function and <Ctrl> keys). The Ergo even provides a PCMCIA Type III slot. The three-year warranty and year of free on-site service are great. This system is a reasonable compromise for those who value portability and a low price above all—and it's number 7 on our Budget Mobile PCs chart. *Ergo*, 800/633-1925, 508/535-7510 **Reader service no. 845**

Inmac 450SL Home Office Bundle

PROS: 24-hour tech support, lots of bundled software
CONS: Slow performance, no CPU upgradability
 Inmac specializes in fine service and support, so it comes as no surprise that you get responsive 24-hour **continued on page 146**

BATTERY LIFE TEST REPORT

Compaq and Toshiba Keep Going and Going...

Compaq Concerto 4/33 Model 250*	6:31
Toshiba Portégé T3400CT	5:30
Ergo SubBrick 486	4:27
Sharp PC-8150	4:09
Toshiba T4700CT 486 Notebook	4:02
IBM ThinkPad 750C*	3:52
Packard Bell Statesman 200M	3:50
AST Bravo NB*	3:48
Austin 466T	3:30
Packard Bell Statesman 200c	3:15
ZDS Z-Lite 486-25*	3:15
NEC Versa E Series	2:59
TI TravelMate 4000E	2:55
Twinhead Slimnote 486E Model 4SX/33S	2:54
Epson ActionNote 4000	2:41
Toshiba Satellite T1950CS	2:31
Dual SKD 486 Notebook	2:30
CAF Aqualite-4SX2/120	2:18
Microware Express NB8266	2:07

*Best Buy

Time in hours:minutes.

Methodology

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.

**We locked four
ordinary computer
users in a room for
30 minutes with
one extraordinary
program to see
what they could
come up with.**

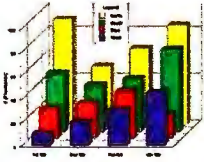
Thompson & Associates

December 30, 1993

Martin Sawyer
Transamerican Systems
1535 Washington Street
Atlantic City, NJ 08030

Dear Mr. Sawyer

It was a pleasure meeting you at our on-site visit of 11 December 1993. The following is a quick overview of the issues discussed and our preliminary findings.



As you can see by our initial evaluation, the overall financial performance of your organization continues to be strong! We believe you have positioned yourself well for continued growth in the marketplace. However, we will review the information you have provided and make some recommendations regarding the Eastern region. Overall, your product mix appears to be focused primarily on Framitz products, but the greatest amount of growth appears to be occurring in the Widget line.

You can expect to see our detailed report on 15 January 1994. We will work to provide you with key tactics to continue your success and target the future marketplace.



Have a very happy holiday season! I look forward to seeing you in the New Year!

Sincerely,

Mike Thompson
Principal

45 E. 32 St. - Edison, NJ 07705 - (908) 533-1467 Fax: (908) 555-1444

Mike, Eaton Town, NJ



Kusak Enterprises, Inc.

1799 Camliff Way, Seattle, WA 98033

Paul Carter
Principal
Carter & Christensen
204 Lincoln St.
Seattle, WA 98033

December 16, 1993

Dear Paul,

Thank you for attending our recent seminar in our area. I have enclosed the following information we discussed.

- A transcript of the seminars and procedures
- A brochure detailing our background and publications

It would be here this information and have any one who could not attend call Pulaski High School's Cougar InfoNet. In many cases the Tele-works Automated School Information System (ASIS) speaks best for itself.

Category	Date	Not
Teachers	✓	
Parents		✓
Students	✓	
Administration		✓
Volunteers		✓
Sponsors		✓

Building wide spread support for this type of system is essential before pursuing procurement or fundraising. It is important to expose teachers and parents to the ASIS in the early stages of your evaluations to ensure the application will be successful. I would be glad to present another brief demonstration at our school for you administration, teachers, PTA, parents and any local businesses interested in sponsoring an ASIS.

Thank you again for our interest and participation on our seminar. If you have any questions or comments please feel free to contact me at 801/375-7515. I look forward to working together to bring this truly worthwhile service to the community.

Sincerely,

Lisa

Lisa, New York, NY



Introducing the document WordPerfect

Memo

To: Sales Team
From: Sharon
Date: December 16, 1993
Regarding: I'm going on vacation!!

After working my fingers to the bone, I'm proud to announce that I'm taking a long weekend. I'll be spending five relaxing days at the Blue Bird Bed&Breakfast in Sandberg.

- December 24 - 28

I've arranged for the following people to cover my accounts:

Account	Covering for me
Scinfields Apparel	Bruce Bellomy
Adams Books	David Carlson
Keicler's Sporting Goods	Kim Githery
Darrell's Fly Shop	Chadwick Wilson
Dr. Shumonger	Alice Revell
Gibbler Photography	Marsha Maranvera

Thanks!

See you all soon
Sharon

Sharon, Poway, CA



ECONEWS

331

December 15, 1993

Organization Summary

Bruce Golden founded EcoService in 1961 upon returning to the private sector from serving under two US Presidents as the director of the



A global focus

Water and Air Commission. EcoService was a direct response to continued requests from naturalists looking for ways to rejuvenate wilderness and that had been abused through years of strip mining. Today, EcoService offices dot the US with specialty divisions ranging from man-made waterways to space ecology. EcoService is certified by the Nation Institute for Wildlife Preservation, Americans for Cleaner Solutions, European Environmental Awareness Group, and Planet Earth Group.

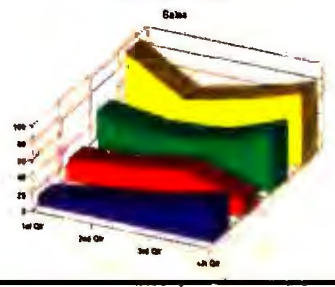
Management Summary

Management consists of individual who have at least 3 years of field experience as team leaders. Management levels include team leaders, field supervisors, and station managers. Individuals in these areas are responsible for conducting environmental management analyses and planning or redesigning construction projects to meet federal guidelines. These

individuals have a total of 540 years of experience with EcoService and 490 years of experience in related disciplines. Executive positions, or upper management, consist of individuals who oversee corporate operations, a necessary evil in any for-profit enterprise. Some of the goals are:

- Cleaner environment
- Economic Stability
- Safe Work Areas

EcoService



Year end report



Dan, Buffalo, NY



**WordPerfect® 6.0
for Windows.™**
Text, data and
graphics in one
easy-to-use program.



visual communication. It makes documents much more effective. But it doesn't have to make them harder to create.

WordPerfect 6.0 for Windows is the ideal environment for creating professional-looking documents. It starts with a foundation of great text-editing tools. Then it adds easy-to-use spreadsheet, charting and drawing functions. And it can import more types of files, even databases, than ordinary word processors. Making it the place you'll want to work.

Plus, it's only one program. So learning is easy. Coaches will teach you. ExpressDocs™ templates will design for



**world's first
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for Windows.**



you. Its customizable interface can easily change for the way you work best. And if you're moving from WordPerfect for DOS, the Transition Advisor makes it simple. What else would you expect from *PC/Computing's* MVP?

So visit your local reseller, or to order directly, call us at (800) 526-5198. And start processing more than words. Start processing documents.

**WordPerfect®
6.0 FOR WINDOWS™**

toll-free tech support and next-day on-site service. The company guarantees that it will ship custom-built systems—such as this \$1970 IBM SLC2-50 system with 8MB of RAM and a 256MB hard disk—within three days of receiving your order.

We got five free 16-bit slots and two free drive bays. The 450SL also comes with a wide array of software and a fax-modem. Performance fell between that of our median SX-25 and SX-33—about half as fast as our median DX2-66 desktop. The low price, great software bundle, and speedy support are outstanding, but the PC's slow performance and lack of CPU upgradability mean you'll never get top-notch performance. *Inmac*, 800/547-5444, 408/727-1970 **Reader service no. 796**

Micro Express NB8266

PROS: Great active-matrix color screen, performance

CONS: High price, short battery life

The NB8266 is the fastest notebook we've tested yet, and its 9½-inch active-matrix color screen is positively gorgeous. As a result, it ranks 9th on our Power Mobile PCs Top 10. This 8.8-pound DX2-66 comes with 8MB of RAM, a 128K secondary cache, and a 203MB hard drive. But battery life is just about 2 hours per charge.

You get a PCMCIA Type III slot with a fax-modem installed. Micro Express offers a 15-month warranty and 24-hour technical support. The NB8266's \$4749 price is steep, but this is still a reasonable deal for power users who are looking for a great screen and superior performance. *Micro Express*, 800/989-9900 **Reader service no. 846**

NEC Versa E Series

PROS: Speedy, good screen and expandability

CONS: High price, large

This SL Enhanced DX2-50 offers fine performance in a largish notebook that has a big active-matrix color screen and an uncramped keyboard. You get 4MB of RAM (20MB max) and a big 340MB hard disk. We got nearly 3 hours out of the NiMH pack—and you can remove the floppy drive and install a second battery to double battery life.

You can extend the one-year warranty to three years for just \$99, and the one-day service turnaround is outstanding. At \$5000, this system's not for bargain seekers, but if

you need an easily portable presentation system, the Versa E provides high performance and quality. It wins the number 8 spot on our Power Mobile PCs chart. *NEC Technologies*, 800/388-8888, 508/635-8000 **Reader service no. 847**

Packard Bell Statesman 200c

PROS: Decent battery life, hard drive

CONS: Poor performance

This color notebook differs in only a few ways from its monochrome twin: At \$2200, it's considerably higher priced, and it has a shorter, 3¼-hour battery life. The passive color display is marginal, although an improvement on the monochrome version.

The system is based on the Cx486SLC-33 with 4MB of RAM, and so consequently its performance is stuck

at the low end of our scale. Surprisingly enough, it's a tad faster than its monochrome sibling—perhaps due to better video drivers. Service and support is merely ordinary. This system is worth checking out if you're hunting for a bargain color notebook, as its number 9 ranking on our Budget Mobile PCs chart suggests. *Packard Bell*, 800/733-5858 **Reader service no. 848**

Sharp PC-8150

PROS: Long battery life

CONS: Port covers loose

This notebook presents an unusually balanced package of features, which explains its position at number 7 on the Power and 6 on the Budget Mobile PCs charts. Its dual-scan screen provides affordable color images, and its SL Enhanced 486DX-33 processor makes for decent performance and a respectably long 4-hour battery life. The configuration is solid, with 4MB of RAM (20MB max), a 200MB hard drive, and a single PCMCIA Type II slot.

The biggest problem is with the rear port covers, which are prone to breakage. Still, this notebook is a solid value. Although there are a number of 33-MHz mobile machines on the market for about the \$2699 price of the Sharp, few offer a comparable balance of performance, screen quality, and basic features. *Sharp Electronics*, 800/237-4277 **Reader service no. 849**

Tagram Top-Note 15

PROS: Monitor with built-in speakers, CD ROM drive

CONS: No free SIMM sockets, cluttered interior

The Tagram Top-Note 15 comes with a 425MB hard drive, a CD ROM drive, speakers, and a 15-inch monitor. This mini-tower unit is built around an Intel 486DX2-50. There's one free VL slot, four free 16-bit slots, and just one free externally accessible drive bay.

Tagram's service rates well (based only on our own research—no reader *Reliability and Service* fax feedback is yet available) and includes a two-year warranty and a year of free on-site service. The \$2499 price isn't bad for a multimedia system, but you could

The Micro Express NB8266 is the fastest notebook we've tested yet, but battery life is just 2 hours.

probably find a similarly configured 486-DX2-66 at comparable cost. *Tagram Systems*, 800/824-7267 **Reader service no. 800**

Toshiba Portégé T3400CT

PROS: Lightweight, great screen

CONS: High price, cramped keyboard

At number 6 on our Power Mobile PCs Top 10 is Toshiba's 6-pound subnote featherweight. Based on an SL Enhanced 486SX-33, it comes with 4MB of RAM (20MB maximum) and a 120MB hard disk. A PCMCIA Type II slot gives you some expandability. The system's real standout is the bright, clear, and sharp 7.4-inch active-matrix color screen. Toshiba uses an innovative lithium-ion battery for this unit and ekes out an outstanding 5½ hours of life.

The keyboard is cramped, but service is great, highlighted by a three-year warranty. At \$3549, the Portégé won't win any price wars, but if you value small size and light weight above price, Toshiba has made the perfect subnotebook for you. *Toshiba America*, 800/334-3445 **Reader service no. 850**

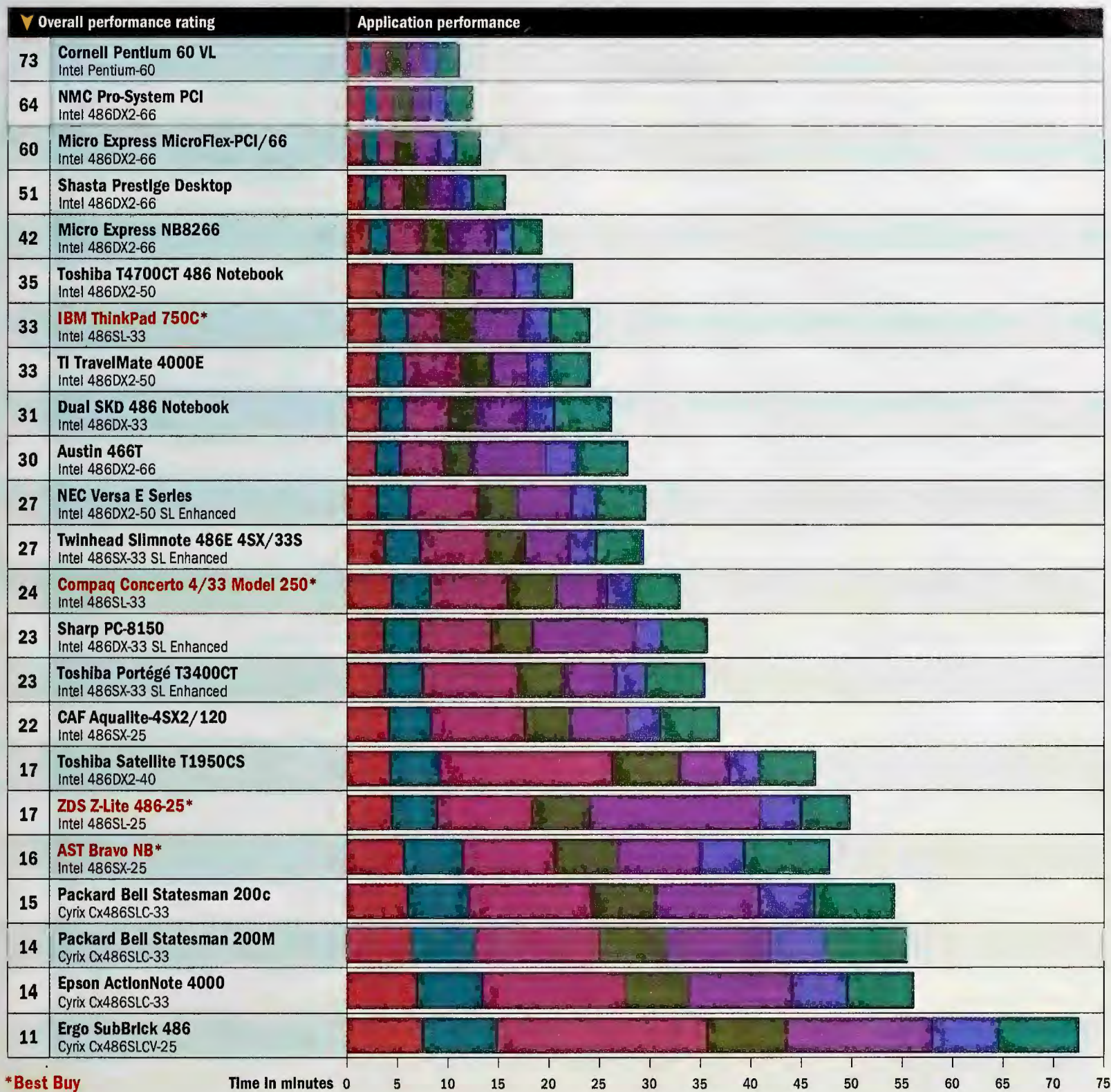
Toshiba Satellite T1950CS

PROS: Good keyboard and pointing device

CONS: Heavy

The Toshiba Satellite is a no-frills system, but it packs all the essentials into an 8.8-pound package. The **continued on page 150**

Four Best Desktops Outperform All the Notebooks



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.

FEATURES COMPARISON: THIS MONTH'S CONTENDERS—MOBILE PCs

Mobile PCs: From 486SX-25 to 486DX2-66

● Yes
○ No
n/a= not applicable

	BEST BUY AST Bravo NB	Austin 466T	BEST BUY CAF Aquilite-4SX2/120	BEST BUY Compaq Concerto 4/33 Model 250	Dual SKD 486 Notebook	Epson ActionNote 4000	Ergo SubBrick 486
Standard features							
Selling price as of 1/1/94 ¹	\$2350	\$4299	\$1425	\$3025	\$1820	\$1499	\$1695
CPU	486SX-25	486DX2-66	486SX-25	486SL-33	486DX-33	Cx486SLC-33	Cx486SLCV-25
Traveling weight (pounds)	6.8	7.8	6.8	8.2	7.4	6.6	6.6
Width x depth x height (inches)	11.5x8.8x1.8	11.1x8.6x2	11x7x1.5	12x9x2	11.7x8.8x1.8	10x7.6x1.5	9.9x7.5x1.4
Installed/maximum RAM (MB)	4/20	8/32	4/20	4/20	8/20	4/8	4/20
Secondary RAM cache installed/maximum (K)	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Installed/maximum hard disk (MB)	120/170	340/340	125/340	240/240	120/540	85/120	163/163
Removable hard disk	○	○	●	○	●	●	○
Display type	color dual-scan	color active	mono passive	mono passive	mono passive	mono passive	mono passive
Screen diagonal (inches)	9.5	9.5	8.5	9.5	9.5	7	8.7
Maximum colors or gray shades of LCD	256 colors	256 colors	64 gray	256 gray	64 gray	64 gray	64 gray
Simultaneous LCD and CRT	●	●	●	●	●	●	●
Highest resolution of external CRT	1024 x 768	1024 x 768	1024 x 768	800 x 600	1024 x 768	800 x 600	1024 x 768
Mouse/keyboard ports	1/1	1/0	1/0	1/0 ²	1/1	1/0 ²	1/0 ²
Cursor keys in inverted T	●	●	●	●	●	●	●
Dedicated page control keys	○	●	●	○	●	○	○
All 12 function keys dedicated	●	○	●	○	○	○	○
Standard <Ctrl> and <Alt> layout	●	●	●	○	●	○	○
Built-in pointing device	●	●	●	○	●	●	●
Modem fax/data speed (kilobits per second)	n/a	n/a	n/a	n/a	9.6/2.4	14.4/14.4	n/a
Docking station available	○	●	●	○	●	○	○
PCMCIA slot Type I/II/III	0/0/1 ⁴	0/0/1 ⁴	0/1/0	0/0/1 ⁴	0/0/0	0/1/0	0/0/1 ⁴
Power management							
Supports APM	●	●	○	●	●	○ ³	○
Type of battery	NiMH	NiMH	NiMH	NiMH	NiMH	NiCd	NiCd
Suspend button	● ⁵	●	●	●	●	● ⁵	●
Suspends when case closed	○	○	○	○	○	●	●
Service and support							
Warranty (years)	1	1	1	3	1	1	3
30-day money-back guarantee	●	●	●	●	○	● ⁶	○ ⁷
On-site/replacement service price for first year	free	○	○	free	○	free	free
Turnaround policy (days at service center)	2	3	2	2	2	2	2
Daily toll-free phone support (hours)	24	18	0 ⁹	24	8	12	11
Weekend support	●	●	○	●	○	○	○
BBS	●	●	○	●	○	●	●
Fax	●	●	●	●	●	●	●

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 Uses minikeys.

⁴ Accepts two Type II devices.

⁵ Suspends with key combination.

	BEST BUY											
IBM ThinkPad 750C	Micro Express NB8266	NEC Versa E Series	Packard Bell Statesman 200c	Packard Bell Statesman 200M	Sharp PC-8150	Texas Instruments TravelMate 4000E	Toshiba T3400CT	Toshiba Portégé T1950CS	Toshiba Satellite 486 Notebook	Toshiba T4700CT 4SX/33S	Twinhead Slimnote 486E Model	ZDS Z-Lite 486-25
\$4699	\$4749	\$5000	\$2200	\$1500	\$2699	\$4499	\$3549	\$2699	\$4699	\$2710	\$1999	
486SL-33	486DX2-66	486DX2-50 SL Enhanced	Cx486SLC-33	Cx486SLC-33	486DX-33 SL Enhanced	486DX2-50	486SX-33 SL Enhanced	486DX2-40	486DX2-50	486SX-33 SL Enhanced	486SL-25	
8.2	8.8	8.2	8.2	7.4	8.2	8.2	6	8.8	8.8	8.2	6.2	
11.7x8.3x2	11x8.7x2	11.7x9.3x2.1	11x8.5x1.9	11x8.5x1.9	11.4x8.9x1.8	11x8.5x2.2	9.9x7.9x1.8	11.7x8.4x2.1	11.5x8.3x2.3	11.3x8.8x1.9	10x7.5x1.5	
12/20	8/20	4/20	4/12	4/12	4/20	4/20	4/20	4/20	8/24	4/20	4/28	
0/0	128/128	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	
170/340	203/340	340/340	200/200	200/200	200/200	209/455	120/120	130/320	203/320	207/340	170/170	
●	○	○	○	○	○	○	○	○	○	○	○	
color active	color active	color active	color passive	mono passive	color dual-scan	color active	color active	color passive	color active	color passive	mono passive	
10.5	9.5	9.5	9.5	9.5	9.5	8.6	7.4	9.5	9.5	9.5	8.5	
256 colors	256 colors	256 colors	256 colors	64 gray	256 colors	256 colors	256 colors	16 colors	256 colors	256 colors	64 gray	
●	●	●	●	●	●	●	●	●	●	●	●	
1024 x 768	1024 x 768	1024 x 768	1024 x 768	1024 x 768	1024 x 768	1024 x 768	1024 x 768	640 x 480	1024 x 768	1024 x 768	1024 x 768	
1/0 ²	1/0 ²	1/1	0/1	1/0	1/0 ²	1/0 ²	1/0 ²	1/1	0/0	1/0 ²	1/0 ²	
●	●	●	●	●	●	●	●	●	●	●	●	
●	●	●	●	●	●	●	●	●	●	●	●	
●	●	○	●	●	○	●	○	○	○	●	● ³	
●	●	●	●	●	○	○	●	○	○	●	●	
14.4/9.6	9.6/2.4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
●	●	●	○	○	●	●	●	○	●	●	○	
0/0/1 ⁴	0/0/1 ⁴	0/0/1 ⁴	0/1/0	0/1/0	0/1/0	0/0/0	0/1/0	0/0/1 ⁴	0/1/1	0/1/0	0/2/0	
●	●	●	○	●	●	●	●	●	●	●	●	
NiMH	NiCd	NiMH	NiCd	NiCd	NiMH	NiCd	lithium-ion	NiMH	NiMH	NiMH	NiMH	
● ⁵	○	●	●	○	○	● ⁵	● ⁵	○	○	○	●	
●	○	○	○	●	●	●	●	○	●	●	●	
3	1.25	1	1	1	1	1	3	1	3	1	1	
●	●	●	○	○	○	● ⁶	○ ⁸	○ ⁸	○ ⁸	● ⁶	● ⁶	
free	○	free	free	free	○	\$120	\$49.95	\$49.95	\$49.95	○	\$35	
3	2	1	2	2	3	2	3	3	3	3	2	
24	24 ¹⁰	24	24	24	12	12	10	10	10	12	16	
●	●	●	●	●	○	○	○	○	○	○	○	
●	○	●	●	●	○	●	●	●	●	●	●	
●	●	●	●	●	●	●	○	○	○	●	●	

⁶ Money-back guarantee only if bought directly.
⁷ 15-day money-back guarantee.

⁸ Depends on dealer.
⁹ Toll call.

¹⁰ Toll call with call-back in the evening.

FEATURES COMPARISON: THIS MONTH'S CONTENDERS—DESKTOPS

Desktops: PCI Bus Becoming Common

● Yes
○ No
n/a = not applicable

	Cornell Pentium 60 VL	Micro Express MicroFlex-PC/66	National Pro-System PCI	Shasta Prestige Desktop
Standard features				
Selling price as of 1/1/94 ¹	\$3099	\$2894	\$2994	\$1799
CPU	Pentium-60	486DX2-66	486DX2-66	486DX2-66
CPU/upgrade socket	273-pin	238-pin ZIF	238-pin ZIF	238-pin ZIF
BIOS	AMI 11/11/92	AMI 11/11/92	Phoenix 4/19/90	AMI 4/4/93
Installed/maximum RAM (MB)	8/128	8/128	16/128	8/32
30-pin or 72-pin SIMMs	72-pin	72-pin	72-pin	30-pin
SIMM sockets/number free	4/2	4/2	4/2	8/0
Secondary RAM cache installed/maximum (K)	512/2048	128/128	256/256	256/256
Case style	tower	compact	compact	compact
Free externally accessible 3½-inch/5¼-inch drive bays	0/4	0/2	0/2	0/1
Free internal 3½-inch/5¼-inch drive bays	4/0	0/0	2/0	1/0
Free 32-bit EISA/16-bit ISA/8-bit ISA expansion slots ²	0/3/0	0/4/0	0/4/0	0/3/2
PCI or VL bus slots/number free ²	2 VLB/1	3 PCI/2 ³	3 PCI/2 ³	3 VLB/1
Hard disk	Seagate ST3390A	WD Caviar 2250	Maxtor MXT540S	Seagate ST3390A
Size (MB)	340	256	540	345
Adapter	integrated	1MB DriveCache DC-200	integrated	VL bus
Floppy drives (MB)	1.44	1.2, 1.44	combo	1.2, 1.44
Graphics adapter	VLB Hercules Dynamite	Diamond Viper PCI	Diamond Viper PCI	OEM VLB Cirrus Logic GD5428
Installed VRAM/DRAM (MB)	0/2	2/0	2/0	2/1
Monitor	ADI MicroScan 4G	Micro Express FM370	ADI MicroScan 4G	ADI MicroScan 4G
Screen diagonal (inches)/dot pitch (mm)	15/.28	14/.28	15/.28	15/.28
Modem fax/data speed (kilobits per second)	n/a	n/a	n/a	n/a
Sound board	○	○	○	○
CD ROM drive	Sony CDU31A	○	○	○
Sequential data transfer rate (kilobytes per second)	300	n/a	n/a	n/a
Parallel/serial/mouse/SCSI ports	1/2/0/0	1/2/0/0	1/2/0/0	1/2/0/0

Service and support

Warranty (years)	3	2	1/2 ⁴	1
30-day money-back guarantee	●	●	●	○
On-site service price for first year	free	\$50	\$39	\$25
Turnaround policy (days at service center)	1	2	1	7
Daily toll-free phone support (hours)	12	24	9	9.5
Weekend support	● ⁵	●	○	○
BBS	●	○	●	○
Fax	●	●	●	●

¹ All 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 either direct or based on vendor estimate.

² VL slots also accept 16-bit ISA peripherals.

³ Just one free if you use all four free 16-bit slots.

⁴ One year parts, two years labor.

⁵ Saturdays only.

Satellite, with its 486DX2-40 processor, 4MB of RAM (20MB maximum), and 130MB hard drive, posts slightly lower scores than most 486SL-33s and 486SX-33s. The sub-3-hour battery life is ordinary. The 9½-inch passive color screen is decent, and the keyboard and BallPoint II pointing device are both quite usable.

Toshiba provides a single PCMCIA slot that will take a Type I, II, or III card. A fair deal at \$2699, the Satellite slides into the Budget Mobile chart at number 10. *Toshiba America, 800/334-3445 Reader service no. 851*

Twinhead Slimnote 486E Model 4SX/33S

PROS: Good expandability, good online help

CONS: Can't charge battery while computing

The diminutive Slimnote packs enough power and features into a \$2710 package to earn the 10th spot on our Power Mobile PCs chart. This SL Enhanced 486SX-33 notebook provides midrange performance and about 3 hours of battery life. The passive color screen is just adequate. Curiously, this unit won't charge while you're computing. The Slimnote does include a single PCMCIA Type II slot.

The Slimnote doesn't stand out in any one area but is still a decent overall value. *Twinhead, 800/995-8946 Reader service no. 852*

Xinetron X/LAN Station 316 486DX2-50

PROS: Energy Star system, ethernet card

CONS: No weekend tech support

Xinetron specializes in inexpensive network-client workstations. Its \$2015 X/LAN Station 316 486DX2-50 minitower comes with 8MB of RAM, a 213MB hard drive, an ethernet card, and LAN software. The unit outpaced our median DX2-50 but still ran slower than our median DX2-66. The four free 16-bit slots and two free externally accessible drive bays are more than adequate for most network-client applications.

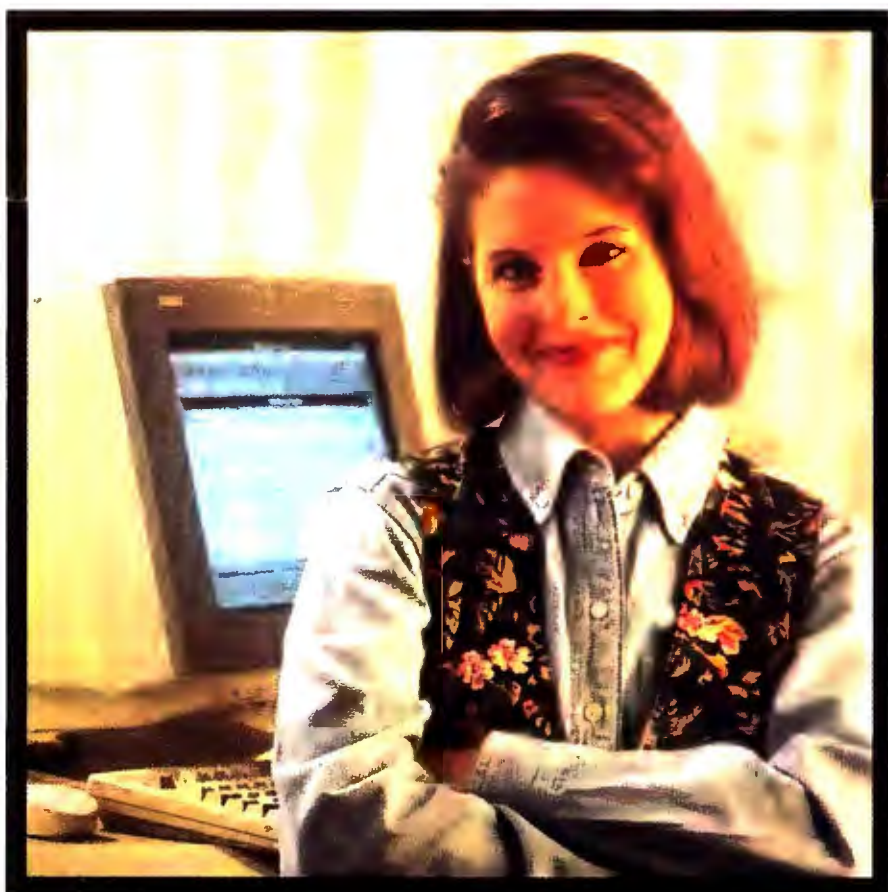
Xinetron adds a year of free on-site service to a three-year warranty—but we don't have enough reader feedback to add a *Reliability and Service* endorsement. This system looks like a decent LAN-client purchase. *Xinetron, 800/345-4415, 408/727-5509 Reader service no. 801*



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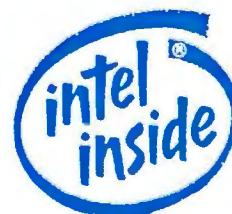
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- Windows TurboCharger Video w/1MB Video RAM
- Internal 2400 Data/9600 Fax Modem
- 14" SVGA VESA Flicker-Free .28mm Monitor



System 3230
Great For Home Or Office!

\$1,290 or \$47/month

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- Intel486SX/25 (upgradable to 50 MHz)
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- 3.5" Floppy Disk Drive
- VESA Local Bus Video
- Windows TurboCharger Video w/1MB Video RAM
- Internal 14,400 Data/14,400 Fax Modem
- 14" SVGA VESA Flicker-Free .28mm Monitor



System 3231
Green For Home Or Office!

\$1,975 or \$72/month

- Intel Pentium OverDrive Ready
- Intel486DX/33 (upgradable to 66MHz) with System Management Mode
- 3 ISA Expansion Slots/3 Drive Bays
- 270MB Hard Drive (expandable to 520MB)
- 8MB RAM at 70ns (expandable to 48MB)
- External Cache Upgradable to 128KB
- 3.5" Floppy Disk Drive
- VESA Local Bus Video
- Windows TurboCharger Video w/512KB Video RAM (upgradable to 2 MB)
- 14" ESVGGA Power Management .28mm Monitor



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Fantastic Powerhouse!

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- External Cache Upgradable to 256KB
- 3.5" Floppy Disk Drive
- VESA Local Bus Video
- Windows TurboCharger Video w/1MB Video RAM (upgradable to 2MB)
- 14" SVGA VESA Flicker-Free .28mm Monitor

\$3,405 or \$124/month

- Intel Pentium OverDrive Ready
- Intel486DX2/66
- 2 VESA Expansion Slots/4 ISA Expansion Slots
- 5 Drive Bays
- 520MB Hard Drive (expandable to 2GB)
- 16MB RAM at 70ns (expandable to 64MB)
- 256KB External Cache
- 3.5" Floppy Disk Drive
- Upgradable to VESA Local Bus Video
- SVGA Server Video w/512KB Video RAM (upgradable to 2MB)
- 14" SVGA VESA Flicker-Free .39mm Monitor

\$3,600 or \$132/month

- Intel Pentium OverDrive Ready
- Intel486DX2/66
- 2 VESA Expansion Slots/4 ISA Expansion Slots
- 5 Drive Bays
- 340MB Hard Drive (expandable to 2GB)
- 12MB RAM at 70ns (expandable to 64MB)
- 64KB External Cache (upgradable to 256KB)
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Big

Picture

So you've got a hot new 486 system, a pile of sophisticated Windows software, and even a fast graphics accelerator. Why aren't you more productive? The answer may be right in front of your eyes. If you use a 14- or 15-inch monitor to run powerful Windows spreadsheets, word processors, and graphics programs, you're working with blinders on. A 17-inch monitor provides 50 percent more viewing area than a 14-inch model and displays resolutions as high as 1280 by 1024 pixels, opening a wide stage for your work. The result: You spend less time searching through programs and more time working.

Better yet, these big screens give your eyes a welcome break from the strain of focusing on dim and distant shapes. Graphics and characters can be more sharply defined than on a 14- or 15-inch monitor, letting you work faster. And these monitors support high refresh rates (the number of times per second that a monitor repaints the screen) at all resolutions, reducing screen flicker that, according to some researchers, can cause eye fatigue. When you're working 8 or 10 hours straight to make a deadline, the display can make all the difference.

The best news is that some 17-inch monitors now sell for the price of a 15-inch monitor just a year ago—less than \$800. Higher-end products, such as the Trinitron-based offerings, deliver uncompromising quality and features for those willing to spend a little more.

But do the low-ball prices mean amateur performance? To find out, we evaluated 22 monitors worthy of consideration. All feature a built-

17-INCH MONITORS

PHOTOGRAPHY BY ROBERT PERRY, ILLUSTRATION BY RON CHAN



MONITORS 17-INCH DISPLAYS

Low Radiation

**STOP SCROLLING AROUND!
WITH 50 PERCENT MORE
DISPLAY AREA THAN 14-
INCH MODELS, THESE LARGE
SCREENS BROADEN YOUR
VIEW OF WINDOWS. WE
SELECT THE BEST AND THE
BARGAINS. BY TJ BYERS**

in microprocessor for handling settings and controls, and all boast sharp, noninterlaced operation at 1024 by 768 resolution. And while we set a \$1500 ceiling on street price, few monitors threatened our budget ceiling. In fact, about half of these monitors fell below \$1000—a very pleasant surprise.

The Screen Test

To see if these monitors deserve public acclaim, we tested them at three resolutions using the latest version of DisplayMate for Windows—a PC-based, expert monitor-testing program from Sonera Technologies. We rated screen quality for focus, brightness uniformity, geometric distortion, moiré, image streaking, stability, and contrast. We used a Genoa Phantom 32i VL bus graphics board to exercise the range of the monitors. To push the monitors to their limit, we placed each one on a T.E.A.M. Systems' VG-815 programmable video generator that pumps out resolutions up to 1600 by 1280. Of course, evaluations of control design, relative contrast levels, and the like are subject to personal preference. So test-drive a monitor before buying. Look at the screen, play with the controls, even lift the unit off the desk. It's your best bet to ensure a smart buy.

This season's playbill of monitors opened our eyes in more ways than one. While the bargain prices were compelling, we were impressed by the performance of even the lowest-priced monitors. This is in contrast to our last tour of these products ("Best Monitors for \$1000," December 1992), when display quality varied widely and several monitors suffered from poor screen focus and detail. No doubt about it, this crowd has come a long way in 16 months. While that makes our job tougher, it's terrific news for you.

These new monitors also let you get into the act with a variety of front-panel controls that adjust the size, shape, and other aspects of the on-screen image. Demanding users might even consider buying the DisplayMate software (\$79 list) used for this review. Its suite of detailed test patterns and simple instructions can help coax the best image from your monitor. And if a monitor arrives with a flawed display, *you* may be able to fix it using the new controls. For those few fixes you can't make yourself, seven monitors in this roundup have dedicated field-service ports that let a technician tweak the internal adjustments without removing the cover.

If these monitors share similar features and display quality, what makes one product a tour de force and another a pleasant diversion? As always, price is a big consideration. In this roundup, estimated street prices range from \$749 to \$1299, so the price differences are still dramatic. While pricier monitors generally offer more features and flexibility, products such as the \$749 CTX CPS-1760LR and the \$799 Mag InnoVision DX17F make great low-cost alternatives.

Another important factor is the horizontal scan rate of the monitor, which determines the maximum noninterlaced resolution and refresh rate. If you expect to work at 1024 by 768 resolution—optimal for word processing and most spreadsheet tasks—a monitor with a 64-kHz horizontal scan rate should be more than adequate. It can support a high 76-Hz screen refresh at 1024 by 768 resolution and help avoid eyestrain that can occur after spending long hours in front of the screen. But if you work at 1280 by 1024, or make heavy use of graphics, spreadsheets, and other demanding screen applications, look for an 82-kHz horizontal scan rate that can handle a 77-Hz refresh rate at that level. Nine of the reviewed monitors offer 82-kHz performance, and three of them—including a Best

Buy, the ViewSonic 17—do so for less than \$1000 on the street.

To find out if a monitor can support high refresh rates at the resolutions you use, you can resort to a little math. Take the number of horizontal lines in your resolution setting—let's say 1024 lines for a 1280 by 1024 screen—and multiply it by 1.04, which allows for the time it takes the monitor's electron gun to position itself for each scan of the screen. Then divide the result—1064.96—into the monitor's horizontal scan rate. If you're considering a monitor with a 64-kHz scan rate, for example, you'll divide 64,000 by 1064.96. The result is just over 60 Hz. Do the same with an 82-kHz monitor, and that number leaps to 77 Hz. And don't forget that your monitor is only as good as the graphics adapter driving it—your graphics board must be able to handle high resolutions and refresh rates to make a 17-inch monitor worth buying.

Behind the Curtain

The first thing you notice about any monitor is the screen, which can vary in viewable area depending on the product. Just as a poorly placed column can block an audience's view of the stage, the front panel of the monitor's case, called the bezel, can reduce viewable screen area. In effect, some 17-inch monitors in this review are larger than others, with the smallest measuring 114 square inches and the largest measuring 128 square inches—a difference of 11 percent. Compare these numbers with our buyers' guide of 15-inch monitors (see "15-Inch Monitors: The New Standard"), and you see that 17-inch screens offer nearly 33 percent more viewable area than 15-inch displays. That advantage grows to 50 percent compared with the 14-inch monitors found on most desktops.

Of course, the size of the display means little if the images aren't sharp and clear. A major factor determining sharpness is the relative dot pitch of the monitor, which is the distance, in millimeters, between phosphor dots of the same color. The smaller the dot pitch, the sharper your image should be. In this review the dot pitch of all the monitors is so close (.25mm to .28mm) that there is no visible difference between them. As a rule of thumb, buyers should not consider monitors with a dot pitch above .28mm.

BEST BUYS



The overall quality of these monitors has certainly improved since our last visit. But when it comes to putting together the complete package, the ViewSonic 17 stands apart from this talented crowd. While it features an excellent display, the ViewSonic distinguishes itself with its outstanding controls, ergonomic design, three-year warranty, and high refresh operation at 1280 by 1024 resolution—all at a reasonable \$995 street price. If you're looking for the most

potent combination of quality, features, and price, the ViewSonic 17 is your mix.

For those pinching pennies, consider the Acer AcerView 761 and the Optiquest 4000DC, which run about \$850 on the street. These twin monitors offer everything you need for business tasks, including outstanding displays and powerful controls for adjusting settings. Finally, the \$1199 IBM 17P hauls in a Best Buy with its razor-sharp Trinitron display and unparalleled suite of screen controls.

The exception is the Sony Trinitron tube (and its Mitsubishi inline counterpart), used in four of the monitors. The Trinitron uses color stripes instead of the color dots used in standard CRTs. This construction creates color rectangles with .25mm or .26mm separation—referred to as stripe pitch—yielding brighter, sharper images. But these tubes are heavier and more expensive than standard CRTs. No Trinitron-like monitor sells for less than \$1000, and the least expensive models cost \$1050.

If you do high-resolution desktop publishing and have a high-end video board that operates at 1280 by 1024 resolution, you'll also want to consider a monitor that accepts separate BNC connections for red, green, and blue video signals. These connectors hook to a three-pronged cable that reduces signal interference and increases video bandwidth, letting your monitor handle high resolutions and refresh rates. Eleven monitors here provide back-panel BNC connectors, and five of them can automatically sense BNC video signals when they are switched on.

Setting the Stage

Until recently, adjusting your display meant twirling thumb wheels—one for brightness, one for contrast. Well, screen adjustments have come a long way, and users will find a variety of powerful, digital controls within easy reach on the front panel. These controls do things like fix misaligned pixel colors (static convergence), straighten tilted displays (screen rotation), and eliminate uneven screen edges (pincushioning and barrel distortion). Adjustments like these used to require a trip to the shop, but now you can perform them from your desk. Fifteen monitors also offer color adjustments—a nice feature if you work with color output. Of course, punching all those buttons can strand you with a screen that looks nothing like what you intended. That's why several monitors use on-screen display utilities to take the trial and error out of adjustments. If your button-pushing antics land you in a video twilight zone, all but three of these monitors can be reset to factory specifications.

But the hottest issue facing vendors is no longer improving image

quality, it's reducing power consumption and electromagnetic emissions. Public concern over electromagnetic radiation has been growing for some time, prompting monitor makers to adopt the strict Swedish MPR-II emissions standard that defines exposure limits. While years of study have yet to prove a definitive health hazard from electromagnetic fields, all of these monitors achieve MPR-II compliance.

Power consumption, meanwhile, became a concern for monitor makers when the Environmental Protection Agency launched its Energy Star program. This program certifies displays that draw less than 30 watts of electricity during a period of inactivity. To give you a sense of the power savings involved, the 17-inch monitors we tested drew an average of 107 watts when displaying a standard Windows screen, while an all-black screen, such as at a DOS prompt, drew about 70 watts. Of the 22 monitors in this review, 12 offer power conservation that meets Energy Star requirements, with some drawing just 1 or 2 watts when we tested them in full power-down mode.

Finally, users should be aware of differences among monitors claiming Energy Star compliance. Some monitors offer more levels of power-down than others—so one may have a single, deep power-down setting that takes up to 30 seconds to recover from, while another may feature intermediate stages to allow a rapid return to activity. And as our testing showed, some monitors draw less energy than others when in power-down mode.

Denouement

As we said before, fewer monitors need to be sent for service due to display problems. But if your display goes bad, a comprehensive warranty and toll-free phone service are invaluable. If you're looking for a solid commitment to quality from a vendor, nothing says it more boldly than the length of warranty. While three-year warranties were nonexistent in our last roundup, ten manufacturers offer them now. And two-year warranties, which were the exception, have now become common. Considering the amount of money and time you invest in a monitor, the support package should be an extremely important consideration.

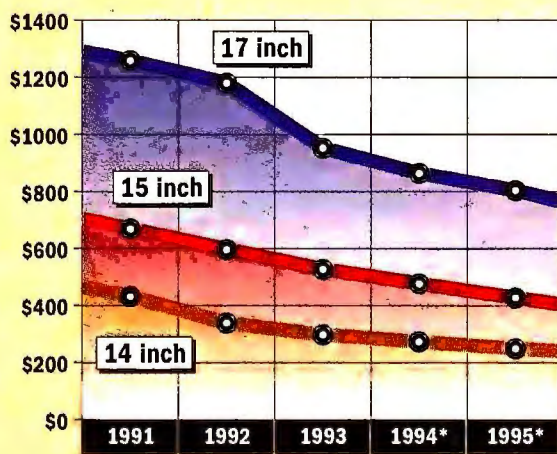
Remember that you spend more time staring at your monitor than at anything else. Choosing the right display is not just about knowing the specs and checking the warranty. If possible, test-drive one for a while and use it with some familiar applications. It can save you a lot of aggravation and disappointment down the road.

TJ Byers is a contributing editor for PC World. He can be reached on PC World Online (see page 12 for contact information). John Goddard is an assistant editor for PC World.

For more information about all products in this article, circle reader service no. 905.

PRICES LEVEL OFF

Average street prices of color monitors



*Projected Source: Stanford Resources Inc.

Surging production has allowed monitor makers to cut prices on 17-inch units.



THE VIEWSONIC 17 stands out as the best all-around value in the review.

Acer AcerView 76i

PROS: Large viewable screen area, on-screen controls

CONS: Low horizontal scan rate



So much for dramatic suspense. The \$849 AcerView 76i earns a Best Buy on the merits of its low price, large viewable screen area, and convenient on-screen controls. The Acer delivers the largest display in the review, at a spacious 128 square inches, while an on-screen utility takes the guesswork out

of making adjustments.

And despite its large screen, the AcerView is a real energy miser, drawing a mere 2 watts when in power-down mode. There is one caveat: Those working at 1280 by 1024 resolution might consider another model, since the Acer's 64-kHz maximum horizontal scan rate limits it to a flicker-prone 60-Hz vertical refresh rate. Still, the Acer is a terrific buy for anyone using word processors or spreadsheets in Windows. Buyers might also want to con-



MORE MONITOR FOR THE MONEY: Acer boasts the largest viewable area of all the models we tested.

sider Acer's twin—the Optiquest 4000DC—which offers a nearly identical package. *Estimated street price: \$849. Horizontal scan rate: 64 kHz. Contact: 408/432-6200, 800/368-2237. Reader service no. 690*

ADI MicroScan 5AP

PROS: Powerful controls

CONS: Small viewable display

A year ago the ADI MicroScan 5AP might have won a Best Buy with its crystal-clear display and \$899 street price. Today it's another pretty face in a very good-looking crowd. The ADI features a strong complement of controls that let users fine-tune the display. The 11 multifunction controls sit behind a flip-out door, with adjustments for pincushioning, barrel distortion, keystone, and other functions. The monitor also lets you save color settings so you can adjust screen colors for output on printers and slides, while a back-panel service port lets a technician handle major adjustments. On the downside, the ADI's viewable display is the second-smallest in the review, and its 64-kHz horizontal scan rate limits refresh at the highest resolutions. Still, the ADI offers standard compliance with the MPR-II low-radiation specification, as well as EPA Energy Star power conservation. For those who need to keep a close reign on their monitor settings, the ADI is an excellent choice. *Estimated street price: \$899. Horizontal scan rate: 64 kHz. Contact: 408/944-0100. Reader service no. 691*

CTX CPS-1760LR

PROS: Lowest price in roundup, large screen

CONS: Dearth of controls

If you're looking for a rock-bottom price in a 17-inch screen, you can't beat the CTX CPS-1760LR. Not only is its \$749 street price the lowest in this review, its viewable screen area ranks third after Optiquest and Acer. To keep the price down without sacrificing image quality, CTX eliminated a lot of the nifty user adjustments

like color controls and even a reset button. Users looking to adjust more than brightness, contrast, or screen sizing will surely be frustrated. Nonetheless, the screen looks as good as any in this review when running at 1024 by 768. Kick it up a notch to 1280 by 1024, however, and the limited 65-kHz horizontal scan rate lowers screen refresh to the point that it is prone to flicker. But for the bargain shopper who can't otherwise afford a 17-inch monitor, the CTX is a terrific buy. *Estimated street price: \$749. Horizontal scan rate: 65 kHz. Contact: 909/595-6146. Reader service no. 692*

ETC ViewMagic CA-1765

PROS: Low price, powerful controls

CONS: Poor display, problems at 800 by 600 resolution

At first glance, the ETC ViewMagic CA-1765 has a lot going for it—a low \$789 street price, an expansive viewable screen area, and a strong suite of controls. The ETC also offers on-screen adjustments, and its ergonomic controls—concealed behind a stylish trapdoor—make changing settings

a breeze. Unfortunately, things go downhill from there. The display on the ETC unit we tested looked washed out—a result of the limited brightness range available in the controls. We also encountered problems at 800 by 600 resolution, where the displayed image failed to fill the screen completely. Finally, the on-screen controls gave us fits—we had to race to input settings within a 3-second time frame before the controls vanished. Anytime you see a 17-inch monitor selling for less than \$800, it gets your attention. But the faded-looking ViewMagic won't hold it for long. *Estimated street price: \$789. Horizontal scan rate: 65 kHz. Contact: 510/226-6250. Reader service no. 693*

IBM 17P

PROS: Excellent display quality, three-year warranty

CONS: Expensive, smallest viewable display in review



IBM sure managed to make an impression with its recent entry into the monitor market. The \$1199 17P hauled down a Best Buy with a bright Trinitron screen, fast refresh rates at all resolutions, and powerful controls. Employing the same high-contrast Trinitron CRT used by Sony, the 17P is among the brightest displays we've seen, with images possessing a crispness and clarity that only a Trinitron can deliver. IBM didn't push the contrast as hard as Sony, however, so buyers should go with their preference. And the 17P appeals to the high end, with a fast 82-kHz



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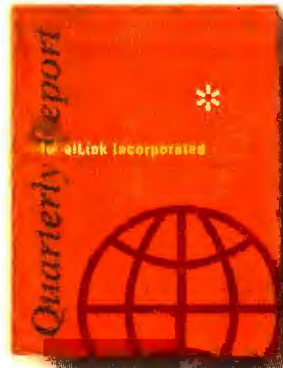


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horizontal scan rate that supports flicker-free 77-Hz refresh at 1280 by 1024. The monitor also includes an unmatched battery of screen controls, allowing users to tweak their displays to optimum performance. The only disappointments are the limited viewable screen area—smallest in the review—and the 28 difficult flat-panel push buttons. The \$1199 street price won't attract bargain shoppers, but the three-year warranty and 24-hour technical support can make you feel good about investing all that money. Add full MPR-II low-radiation compliance and Energy Star power conservation features, and the IBM 17P is a compelling Best Buy for those demanding the most of a 17-inch monitor. *Estimated street price: \$1199. Horizontal scan rate: 82 kHz. Contact: 800/772-2227.*

IBM 17V

PROS: Excellent display quality, lowest tested power-down energy consumption
CONS: Relatively high price

When IBM makes a comeback, it doesn't fool around: The computer giant has not one but two impressive monitors in this review. The 17V is IBM's value-priced 17-inch monitor, though the \$999 street price is only average for the units in this review. Still, the 17V's crisp, detailed display is one of the best-looking non-Trinitron products in the roundup. In addition, an impressive selection of controls helps keep your settings in trim, while the membrane control buttons on the monitor's face are easy to reach and use. The 17V also features MPR-II low-radiation compliance, as well as an energy-saving sleep mode that consumes barely a watt of electricity—the lowest of any monitor we tested. On the downside, the 17V's 64-kHz horizontal scan rate makes long hours of work at 1280 by 1024 a problem, and those looking to adjust color settings will have to go elsewhere. The IBM 17V offers display quality approaching a Trinitron, but the compromises make it difficult to justify the relatively high price. *Estimated street price: \$999. Horizontal scan rate: 64 kHz. Contact: 800/772-2227.*



CONTROL FREAKS will enjoy the IBM 17P's unmatched suite of adjustments.

Idek MF-8317

PROS: Three-year warranty, convenient controls

CONS: Average price

The \$949 Idek MF-8317 may fall in the middle of the pack in price and performance, but it has the distinction of being the least expensive display protected by a full three-year warranty. Better yet, the Idek monitor is easy to use, with 17 flat-panel controls spread along the width of a 12-inch apron beneath the screen. Adjustments are made using a convenient thumb wheel—you select a function by pressing the appropriate button and spinning the knob. While the 65-kHz horizontal scan rate falls short for long hours of work at 1280 by 1024 resolution, the Idek does well at 1024 by 768. And although the Idek lacks power conservation features, MPR-II emissions compliance helps limit exposure to electromagnetic fields. Finally, the Idek's 43-count 'em!—video modes may appeal to users who need to work in numerous graphical environments. *Estimated street price: \$949. Horizontal scan rate: 65 kHz. Contact: 800/394-4335, 215/957-6543. Reader service no. 694*

Mag InnoVision DX17F

PROS: Low price, large viewable screen area

CONS: Lacks screen brightness

The \$799 Mag InnoVision DX17F is a great deal, plain and simple—in fact, it narrowly missed winning a Best Buy. It boasts one of the largest viewable screens in the review, and its display quality at 1024 by 768 is very good. The Mag also has a strong suite of easy-to-use controls and offers MPR-II and Energy Star compliance. Unfortunately, the Mag's screen lacks brightness—a real problem in some work environments—and the display won't support high refresh rates at 1280 by 1024 resolution. Still, for rock-solid viewing at 1024 by 768 resolution, you can't go wrong with the Mag DX17F.

Its low price makes it one of the best deals around. *Estimated street price: \$799. Horizontal scan rate: 64 kHz. Contact: 800/827-3998, 714/751-2008. Reader service no. 695*

Mitsubishi Diamond Pro 17

PROS: Excellent display, three-year warranty

CONS: Lacks power-down capability, low horizontal scan rate

The \$1050 Mitsubishi Diamond Pro 17 is one of two low-cost Trinitron-like designs in this review. Unlike the Sony display, however, the Diamond Pro is based on Mitsubishi's own inline CRT—though users will be hard pressed to notice any difference. The Mitsubishi features a strong package, with MPR-II compliance, a strong three-year warranty, and superlative display quality. Unfortunately, the 64-kHz horizontal scan rate falls short at 1280 by 1024 resolution, and the monitor lacks power-down capability. If you want a terrific display, the Mitsubishi is worth considering, but don't ignore less expensive monitors that can offer more for the money. *Estimated street price: \$1050. Horizontal scan rate: 64 kHz. Contact: 714/220-2500. Reader service no. 696*

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Nanao FlexScan F550i-W, F560i-W

PROS: Easy-to-use controls, excellent power management

CONS: Pricey

Nanao's F550i-W and F560i-W monitors are an impressive pair. The F550i-W costs about \$1075 and offers a 65-kHz horizontal scan rate that's best for work at 1024 by 768. The F560i-W adds a high 82-kHz scan rate for rock-solid images at 1280 by 1024, and a higher \$1275 street price. Otherwise, they are cut from the same mold, with excellent display quality and convenient controls. Both monitors use a flat-panel switch to select controls, with adjustments made using a thumb wheel—a thankfully simple operation. In addition to standard MPR-II compliance, the Nanaos cue off a screen blanker to power down—a unique approach. As an added value, the F560i-W bundles a special edition of Berkeley Systems' After Dark that starts the energy-saving mode after a set interval. Both monitors feature a three-year warranty, though the CRT is only warranted for one year. This is a very strong pair, but the prices are a bit too high. *Estimated street price: F550i-W \$1075, F560i-W \$1275. Horizontal scan rate: F550i-W 65 kHz, F560i-W 82 kHz. Contact: 800/800-5202, 310/325-5202. Reader service no. 697*

NEC MultiSync 5FGe, 5FGp

PROS: Excellent display, three-year warranty

CONS: Pricey, 5FGp lacks Energy Star compliance

NEC has dominated the market with its trademark high-contrast displays. But low-priced, quality monitors in this review offer a potent mix that the pricey NEC 5FG line has yet to meet. Both the 5FGp and 5FGe are excellent monitors with impressive displays, though the logical controls are somewhat tough to reach. One big plus: NEC's three-year warranty illustrates plenty of confidence in

its products. The 5FGp runs \$1299 on the street—making it the most expensive monitor in the review—and boasts a 79-kHz horizontal scan rate that can manage an impressive 74-Hz refresh rate at 1280 by 1024. The \$1053 5FGe, on the other hand, has a slower 62-kHz scan rate that limits use at 1280 by 1024, though 1024 by 768 operation can go to 78 Hz. While the 5FGp features color controls that the FGe lacks, only the 5FGe carried Energy Star certification at the time of the review—despite the fact that the 5FGp we tested delivered a lower wattage reading in power-down mode. Go figure. Overall, both monitors boast terrific displays, excellent support, and solid construction. But the price is steep. *Estimated street price: 5FGe \$1053, 5FGp \$1299. Horizontal scan rate: 5FGe 62 kHz, 5FGp 79 kHz. Contact: 800/632-4636. Reader service no. 698*

Nissei Sangyo America/Hitachi SuperScan Elite 17

PROS: Excellent on-screen controls, high horizontal scan rate

CONS: Expensive

Don't pass by the SuperScan Elite 17 from Nissei Sangyo America/Hitachi. The \$1100 street price won't turn heads in this aggressive crowd, but the NSA boasts an impressive 82-kHz horizontal scan rate for 77-Hz refresh at 1280 by 1024, and some of the most sophisticated on-screen controls we've seen. Display adjustments are made on screen in Windows—no more poking at mysterious buttons—with settings saved to the monitor or onto a hard or floppy disk. The NSA also meets Energy Star compliance, though its 21.5-watt draw in sleep mode is among the highest we found in our testing. If you work at 1280 by 1024 resolution or require close control over your monitor's display, then the SuperScan Elite 17 is worth its premium price. *Estimated street price: \$1100. Horizontal scan rate: 82 kHz. Contact: 800/441-4832, 617/461-8300. Reader service no. 699*

Optiquet 4000DC

PROS: Large viewable screen area, on-screen controls

CONS: Low horizontal scan rate



The Optiquet 4000DC is a carbon copy of the Best Buy-winning AcerView 76i, so it's hardly a surprise that the Optiquet earned the same honor. Its display is clear and sharp, and it ties the AcerView for the largest viewable screen area in the review. Like the Acer, the Optiquet features convenient on-screen controls that are a real plus for adjusting the display. The only drawback: The Optiquet has the same low 64-kHz horizontal scan rate offered by the Acer, making it prone to flicker at resolutions beyond 1024 by 768. In fact, the only way to tell the Acer and the Optiquet apart is to check the logo—the Optiquet's \$850 estimated street price is nearly identical to the \$849 Acer's. If you don't do a lot of work at 1280 by 1024 resolution, the extra-large display and on-screen controls make the Optiquet 4000DC a Best Buy—just like its Acer twin. *Estimated street price: \$850. Horizontal scan rate: 64 kHz. Contact: 800/843-6784. Reader service no. 700*



LIKE ITS ACER TWIN, the Optiquet's low price, large screen, and convenient on-screen controls make it a Best Buy.

Philips Brilliance 1720

PROS: Excellent display, high horizontal scan rate, three-year warranty
CONS: Lacks power-down capability; has difficult controls

No doubt about it, the Philips Brilliance is well named. Its striking display is the best non-Trinitron monitor we saw, while its viewable screen is one of the largest in the roundup. The fast 82-kHz horizontal scan rate handles high refresh rates at 1280 by 1024—perfect for high-resolution design work. While the \$1095 street price is a bit high, a three-year warranty protects the investment. Unfortunately, the Philips's controls—one button selects the function and two others change the setting—are difficult despite the presence of a backlit LCD indicator. And while the Philips complies with the MPR-II low-emissions standard, it lacks energy saving features. Still, the Brilliance 1720 is an excellent monitor for those working at the highest resolutions. *Estimated street price: \$1095. Horizontal scan rate: 82 kHz. Contact: 800/822-1219. Reader service no. 701*

Sampo AlphaScan 17e

PROS: Easy-to-use controls, high horizontal scan rate
CONS: No energy conservation capability, lacks some adjustments

The Sampo AlphaScan 17e has some impressive features: high 82-kHz horizontal scan rate, convenient ergonomic controls, and MPR-II compliance. In addition, the Sampo's screen is among the best we've seen, with bright images, crystal-clear characters, and excellent contrast. But the Sampo falters with a \$950 street price and lack of energy conservation capability. And the Sampo fails to offer controls found on some of its competitors. Still, users will enjoy the oversized control buttons that feature identifying icons and are easy to reach—a welcome relief from the Lilliputian world of monitor controls. *Estimated street price: \$950. Horizontal scan rate: 82 kHz. Contact: 404/449-6220. Reader service no. 702*

Samsung SyncMaster 17GLs

PROS: High horizontal scan rate
CONS: High price, control buttons are difficult to use

The Samsung SyncMaster 17GLs boasts a high-quality display with clear, bright graphics and a high 82-kHz horizontal scan rate that virtually eliminates flicker at all resolutions. It also features MPR-II and Energy Star compliance, while its 87-watt operational power draw is the lowest in the review. The monitor sports a solid set of controls, including color adjustments for reconciling screen colors with printed output, as well as useful tools such as pincushion and trapezoid adjustments. While the function-select buttons are a bit small and hard to push, all



THE SONY MULTISCAN 17SE'S TRINITRON SCREEN gives it the best display quality.

the adjustments are easily made using a thumb wheel. Unfortunately, the Samsung's \$1150 street price may dispel bargain hunters. *Estimated street price: \$1150. Horizontal scan rate: 82 kHz. Contact: 800/726-7864. Reader service no. 703*

Shasta 1701

PROS: High horizontal scan rate
CONS: Limited brightness control

Shasta is a newcomer to the monitor biz, but its 1701 should help this company get a solid start on the market. The Shasta features the same outstanding display quality that has spoiled us throughout the review, while its high 82-kHz horizontal scan rate supports 77-Hz refresh at 1280 by 1024. In addition to MPR-II compliance, the Shasta has plenty of screen controls, with push buttons that are easily activated with the slightest pressure. But the Shasta stumbles with a limited brightness range and the lack of power saving features, though an RS-232 service port allows access to internal adjustments without opening the housing. As we said, Shasta is off to a good start with its 1701. If it whittles away at the \$999 street price and fixes the brightness control, it could be a nice trip. *Estimated street price: \$999. Horizontal scan rate: 82 kHz. Contact: 800/546-9888. Reader service no. 704*

Sony CPD-1730

PROS: Excellent Trinitron display
CONS: High price, lowest horizontal scan rate in review

Built around the company's award-winning Trinitron CRT, the CPD-1730 provides unsurpassed brightness and clarity for the most demanding tasks. But Trinitron tubes ain't cheap, and Sony had to skimp to cut the price of this value-oriented monitor. The result: The 1730's 58-kHz horizontal scan frequency is the lowest in the roundup, topping out at 72-Hz refresh at 1024 by 768. At 1280 by 1024, the monitor falls into flicker-prone interlaced operation. And while the 1730 meets MPR-II emissions standards, those looking for energy-saving features will have to go elsewhere. Still, the 1730 has easy-to-use digital push buttons, as well as a fair set of controls, including trapezoid balance for correcting lopsided images. Yes, the Sony CPD-1730 is the lowest-priced Trinitron-based monitor in the review. But you might consider the Mitsubishi Diamond Pro monitor—it offers comparable price and display quality with fewer sacrifices. *Estimated street price: \$1050. Horizontal scan rate: 58 kHz. Contact: 800/352-7669. Reader service no. 705*

Sony Multiscan 17se

PROS: Sharpest display in review, excellent controls
CONS: High price

The \$1229 Sony Multiscan 17se is not only Sony's top-of-the-line 17-inch monitor, its Trinitron display is the sharpest and brightest we've seen. In fact, colors on the screen appear "cold"—our pastel blend test revealed stripes along the transition of colors that other monitors didn't pick up.



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The 17se's high-bandwidth BNC connectors pump much more data than standard 15-pin cables, yielding sharper images and the potential to handle 1600 by 1200 resolutions. The 17se also offers color-adjusting tools and five convenient buttons for adjusting the screen, while Energy Star and MPR-II compliance complete the package. Yes, the 17se is expensive, but its superlative Trinitron display and excellent controls make it the monitor of choice for those who refuse to compromise. *Estimated street price: \$1229. Horizontal scan rate: 82 kHz. Contact: 800/352-7669. Reader service no. 706*

ViewSonic 17

PROS: Excellent controls, high horizontal scan rate, three-year warranty

CONS: No power-down capability



Some folks crave performance. Some look for price. And then there are those who want it all. If you belong to the third crowd, the \$995 ViewSonic 17 is the monitor for you.

Its screen is a joy to behold, with sharp, crystal-clear images and rich

FEATURES COMPARISON

Big Screens Offer More Features for Less Money

	BEST BUY Acer AcerView 76i	5AP ADI MicroScan	CTX CPS-1760LR	BEST BUY ETC ViewMagic CA-1765	17P IBM PC Company	17V IBM PC Company	Idek MF-8317	DX17F Mag Innovision	Diamond Pro 17 Mitsubishi
Standard features									
Estimated street price	\$849	\$899	\$749	\$789	\$1199	\$999	\$949	\$799	\$1050
Maximum horizontal scan rate (kHz)	64	64	65	65	82	64	65	64	64
Maximum refresh at 1024 x 768 (Hz)	80	80	81	81	103	80	80	80	80
Maximum refresh at 1280 x 1024 (Hz)	60	60	61	61	77	60	60	60	60
Viewable screen (diagonal inches)	16.36	15.48	16.20	16.12	15.44	15.72	16	16.14	15.86
Dot/stripe pitch (mm)	.27	.26	.28	.26	.26 ¹	.28	.26	.26	.25 ¹
Dimensions (width/height/depth)	16 x 16.7 x 17	15.6 x 15.9 x 18	16.2 x 17 x 17.3	16.5 x 16.1 x 17.2	16.1 x 17.2 x 18.1	15.7 x 16.7 x 17.6	16 x 16.5 x 16.7	16 x 16.6 x 17.5	16 x 16 x 19
Weight (pounds)	45	48	44	50	48	48	46.2	50.6	48
Monitor settings/controls									
On-screen controls	●	○	○	●	○	○	○	○	○
LCD video mode indicator	○	●	●	○	○	○	○	○	○
BNC video input connectors	○	○	○	○	●	○	●	○	○
Field service port	○	●	○	○	●	●	○	○	○
Standard controls									
Reset/recall	○	●	○	●	●	●	●	●	●
Pincushion/barrel	●	●	○	●	●	●	●	●	●
Trapezoid/keystone	●	●	○	●	●	○	●	○ ²	●
Screen rotation	○	○	○	●	●	○	●	●	○
Manual degauss	●	●	●	●	●	●	●	●	●
Static convergence	○	○	○	○	●	●	○	○	●
Auto-save	●	●	●	●	●	●	○	●	●
Number of preset/user video modes	16/16	10/18	14/15	13/17	14/16	10/6	10/33	16/8	6/4
Color temperature controls	●	●	○	●	●	○	●	○	●
Power/emissions profile									
MPR-II emissions compliance	●	●	●	●	●	●	●	●	●
EPA Energy Star compliance	●	●	○	○	●	●	○	●	○
Operational/suspend power draw (as tested)	119.9/2.4	97.5/8	131.4/n/a	93.4/n/a	110.5/8.5	108.8/1	105.9/n/a	112.3/5.1	115.7/n/a
Service and support									
Warranty (months)	12	24	24	24	36	12	36	12 ²	36
On-site service less than \$100	●	○	○	○	●	●	○	○	○
Toll-free support	●	●	●	○	●	●	●	●	●
Daily support (hours)	24 ⁴	8	8.5	10.5	24 ⁴	9 ⁴	8.5	9	8
BBS/fax	●/●	○/●	●/●	○/●	●/●	●/●	●/○	●/●	●/●
Turnaround policy (days)	3	3	5	10	2	2	5 to 7	15	none

¹ Sony Trinitron or Mitsubishi inline CRT.

² Two-year warranty on CRT.

³ One-year warranty on CRT.

⁴ Plus additional weekend support hours.

colors. The image quality continues at 1280 by 1024 resolution, thanks to the ViewSonic's fast 82-kHz horizontal scan rate that provides high refresh rates for rock-solid images. In fact, the ViewSonic is the second least-expensive monitor in the review with an 82-kHz scan rate. The ViewSonic also has some of the best controls in the review, including static convergence controls for eliminating color shadows on thin lines and dots, and pincushion/barrel distortion controls for keeping the edges of the displayed image straight. Strong color controls are useful for reconciling the display with out-

put to film. The controls are mounted on a panel that rotates into place when pushed—a neat effect. While the ViewSonic features MPR-II emissions compliance, it stumbles a bit with its lack of power-down capability—those requiring Energy Star certification will have to look elsewhere. Finally, a three-year warranty means you can rest easy knowing that your investment is secure. Even in this tough crowd, the ViewSonic scores a Best Buy as the top all-around monitor. *Estimated street price: \$995. Horizontal scan rate: 82 kHz. Contact: 800/888-8583. Reader service no. 707*

Model	Price	Resolution	Scan Rate	Refresh Rate	Weight	Depth	Width	Height	Aspect Ratio	Power	Warranty	Features
FlexScan F550i-W	\$1075	65	80	60	15.64	.28	16.1x16.5x17.5	48.6	16:10	100W	3y	MPR-II, Energy Star
FlexScan F560i-W	\$1275	82	103	77	15.64	.26	16.1x16.5x17.5	49.7	16:10	100W	3y	MPR-II, Energy Star
NEC MultiSync 5FGe	\$1053	62	78	n/a	15.56	.28	16.3x18x19.7	53.7	16:10	100W	3y	MPR-II, Energy Star
NEC MultiSync 5FGp	\$1299	79	99	74	15.56	.28	16.4x18x19.7	56.1	16:10	100W	3y	MPR-II, Energy Star
Nisael/Sanyo America/Hitachi SuperScan Elite 17	\$1100	82	103	77	16	.26	16x16.9x18.6	48.5	16:10	100W	3y	MPR-II, Energy Star
Optquest 4000DC	\$850	64	80	60	16.36	.27	16.2x16.7x17	41.7	16:10	100W	3y	MPR-II, Energy Star
Philips Brilliance 1720	\$1095	82	103	77	16.14	.27	16.3x16.5x18	46	16:10	100W	3y	MPR-II, Energy Star
Sampo AlphaScan 17e	\$950	82	103	77	15.80	.28	15.6x16.2x17.7	50.6	16:10	100W	3y	MPR-II, Energy Star
Samsung SyncMaster 17GLs	\$1150	82	103	77	15.64	.26	16.5x17.2x17	46.3	16:10	100W	3y	MPR-II, Energy Star
Shasta 1701	\$999	82	103	77	15.64	.26	16x16.3x17.8	45	16:10	100W	3y	MPR-II, Energy Star
Sony CPD-1730	\$1050	58	72	n/a	16.02	.25 ¹	16x17.1x17.2	44.05	16:10	100W	3y	MPR-II, Energy Star
Sony Multiscan 17se	\$1229	82	103	77	15.94	.25 ¹	15.9x16.5x18.3	49.6	16:10	100W	3y	MPR-II, Energy Star
ViewSonic 17	\$995	82	103	77	15.56	.27	16.1x16.5x17.6	42.6	16:10	100W	3y	MPR-II, Energy Star

○	○	○	○	●	●	○	○	●	○	○	○	○
○	○	○	○	○	○	●	○	○	○	○	○	○
●	●	○	●	●	○	●	○	●	○	○	●	●
○	○	○	○	●	○	○	○	○	●	○	●	●

●	●	●	●	●	○	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●	○	●
●	●	○	○	●	●	●	○	●	●	●	○	○
○	○	○	○	○	○	○	○	○	○	○	○	○
●	●	●	●	●	●	●	●	●	●	●	○	●
●	●	○	○	○	○	○	○	○	○	○	●	●
●	●	●	●	○	●	○	○	●	○	●	●	●
9/19	9/19	14/22	14/24	7/24	16/16	12/15	10/10	12/11	14/16	9/9	9/11	13/8
●	●	○	●	●	●	○	○	●	●	○	●	●

●	●	●	●	●	●	●	●	●	●	●	●	●
●	●	●	○	●	●	○	○	●	○	○	●	○
101.7/4	127.3/12.5	93.3/25.8	118.7/10.6	98.6/21.5	119.9/2.4	89.4/n/a	101/n/a	86.8/7.6	104.1/n/a	100.8/n/a	114.7/9.7	112.2/n/a

36 ³	36 ³	36	36	36	12	36	24	24	12	12 ²	12 ²	36
○	○	○	○	○	○	○	○	○	○	○	○	○
●	●	●	●	●	●	●	○	●	●	○	○	●
8.5	8.5	9.5	9.5	8	11 ⁴	13	11 ⁴	9.5	10	9	9	11
●/●	●/●	●/●	●/●	○/○	●/●	○/○	●/●	●/●	○/●	●/●	●/●	●/●
7	7	1	1	3	3 to 5	none	3 to 5	2	10	3	3	2

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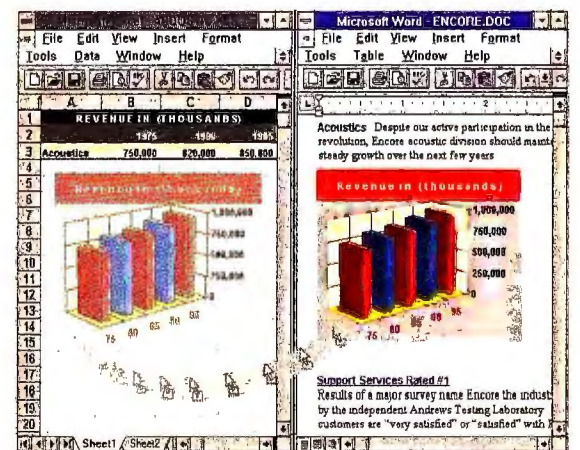
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15-Inch Monitors: The New Standard

Serious Windows users who are not working with graphics or monster spreadsheets may find that a good 15-inch monitor is the best bet. Not only does it save \$300 or more over the cost of a 17-inch model, but the low price includes advanced features such as powerful digital controls, high refresh rates, and automatic operation with various graphics modes. To help you choose, we've compiled a buyers' guide of forty-three 15-inch monitors. All these products boast variable-frequency operation to work with nearly any graphics card, while many feature advanced digital controls to adjust and tune the display. When it comes to viewing comfort, look for monitors with fast refresh rates at 1024 by 768 resolution, preferably 70 Hz and above. While 15-inch monitors are best for 800 by 600, the capability to step up to 1024 by 768 for handling graphics and large spreadsheets is a real plus. Our advice: Consider products with a horizontal scan rate of at least 60 kHz.

But image quality is only half the picture. Buyers concerned about the potential effects of electromagnetic emissions should look for monitors with MPR-II compliance, while those more concerned about the electric bill should seek products approved by the EPA's Energy Star program. When it comes to discerning quality, check out the vendors' warranty and support policies before buying. A two- or three-year warranty says a lot about the manufacturer's confidence in its product.

Finally, keep a close eye on cost. Street prices for these monitors will continue to drop as competition in this fast-growing market heats up. While the products here average \$550 on the street, you can find quality 15-inch displays for \$450 or less. Hard-core bargain hunters might even consider the two monitors that fall below \$400, though we suggest looking closely before making any purchase. With the extra \$300 or more you save by not jumping to a 17-inch screen, you can improve other parts of your system—perhaps by buying a graphics board to take advantage of the new display. Or you can just keep the change.

By John Goddard

● = Yes
○ = No

Company	Telephone	Model	KEY FEATURES			
			Estimated street price	Viewable area (diagonal inches)	Maximum horizontal scanning frequency (kHz)	Weight (pounds)
AAMAZING TECHNOLOGIES	714/255-1688	CM-1528X	\$645	13.75	66	30
ACER AMERICA	800/368-2237	AcerView 56 L	\$449	13.5	60	33
ADI SYSTEMS	408/944-0100	MicroScan 4GP SM5515GP/ROO	\$490	13.8	64	30
AMDEK	800/722-6335	AM/815E	\$379	14	64	31
COMPAQ	800/345-1518	Compaq 151 FS	\$449	13.13	58	32.9
CTX INT'L	909/595-6146	1565 ES	\$605	13.75	65	31.9
		1565 GM	\$625	13.75	65	31.9
		1562 ES	\$545	13.75	62	31.9
		1562 GM	\$595	13.75	62	31.9
DYNA MICRO	800/336-3962	Addonics 152/LR	\$445	13.38	60	27.5
ETC COMPUTERS	510/226-6250	ViewMagic CA-1565SPL	\$439	13.7	65	28
		ViewMagic CA-1565CP	\$409	13.7	65	28
GOLDSTAR	201/816-2000	1520	\$550	13.75	65	30.1
		1515	\$530	13.75	62	30.1
		1510	\$575	13.75	60	34.1
IBM PC COMPANY	800/772-2227	15P	\$695	13.77	64	33
		15V	\$575	13.77	64	33
KFC USA	800/253-2872	CA 1511	\$395	13.75	60	30
		CA 1507	\$450	13.75	64	35
LEADING EDGE	800/874-3340	CMON 1528V	\$400	12.88	58	35
MAG INNOVISION	714/751-2008	DX15F	\$439	13.8	64	34
		LX1564	\$549	13.8	64	34
		MX15F	\$749	13.8	68	38
MITSUBISHI	714/220-2500	Diamond Scan 15FS	\$500	14	62	28.6
NANA0	800/800-5202	FlexScan F340iW	\$690	13.8	61.5	35.3
NEC	800/632-4636	MultiSync 3V	\$550	13.8	50	38.1
		MultiSync 3FGe	\$635	13.8	50	38.1
		MultiSync 4FGe	\$755	13.8	62	39.2
NISSEI SANGYO AMERICA	800/441-4832	SuperScan 15S	\$499	14	64	31
NOKIA	800/296-6542	449E	\$630	13.7	62	33
OPTIQUEST	800/843-6784	2000DC	\$469	13.7	65	29.8
ORCHESTRA MULTISYSTEMS	714/708-3400	French Horn	\$475	14.2	66	39.7
PHILIPS	800/822-1219	Brilliance 1520	\$500	14	58	33
PORTRAIT DISPLAY LABS	800/858-7744	Portrait/ 15 Plus	\$899	13.9	60	47.9
RELISYS	408/945-9000	RE-1564	\$432	13.5	64	33.5
		TF-1560	\$438	12.5	66	38
SAMPO AMERICA	404/449-6220	KDM-1566 Bi/Alphascan 15e	\$495	14	64	30
SAMSUNG DISPLAYS	800/726-7864	SyncMaster 15GL	\$499	13.6	62	29.8
SAMTRON DISPLAYS	800/726-8766	SC-528UXL	\$549	13.5	64	35
SCEPTRE TECHNOLOGIES	800/788-2878	CC-615GL	\$555	14	64	35
SIGMA DESIGNS	510/770-0100	ErgoView 15	\$500	13.5	64	36.3
VIEWSONIC	800/888-8583	ViewSonic 15	\$450	13.8	64	33
ZENITH DATA SYSTEMS	800/553-0331	ZCM-1540-UT/XT	\$549	13.47	62	33

¹ Also optional TCO compliance.

² On-screen control utilities.

³ MPR-II compliance optional.

⁴ Two years parts and labor, three years CRT.

⁵ One year parts and labor, two years CRT.

⁶ Three years parts and labor, one year CRT.

⁷ Power-saving mode optional.

⁸ Limited two-year warranty, \$75 for labor in second year.

Case dimensions (height/width/ depth, in inches)	MPR-II emissions (watts)	Operational power draw	Energy Star compliant	Maximum refresh at 800 x 600/ 1024 x 768 (Hz)	CONTROLS					SERVICE AND SUPPORT				
					Digital controls	RGB-level controls	Pincushion/ barrel	Degauss	Image rotation support	Toll-free technical support per week	Technical support (hours per week)	Warranty (months)	Service number	Reader
14.29 x 14.29 x 15.03	●	90	○	72/72	○	○	●	●	○	○	40	12	750	
14 x 14.3 x 15.1	● ¹	110	●	72/72	●	●	●	●	○	●	168	12	751	
15.2 x 14.6 x 14.6	●	90	●	90/76	●	●	●	●	○	●	40	24	752	
14.8 x 14.7 x 15.4	●	140	●	80/76	●	○	●	●	○	●	60	12	753	
14.4 x 14.6 x 15.4	●	110	●	72/72	●	●	●	●	○	●	168	12	754	
15.35 x 14.56 x 15.43	○	90	●	75/75	●	○	●	○	○	●	50	24	755	
15.35 x 14.56 x 15.43	●	90	●	75/75	●	○	●	○	○	●	50	24	755	
15.35 x 14.56 x 15.43	○	90	●	75/75	○	○	●	○	○	●	50	24	755	
15.35 x 14.56 x 15.43	●	90	●	75/75	○	○	●	○	○	●	50	24	755	
14. x 14.3 x 15.1	●	110	○	72/70	●	○	●	○	○	○	40	24 ¹⁰	756	
14.7 x 15 x 15.7	● ¹	75	○	100/76	● ²	●	●	●	●	○	40	24	757	
14.7 x 15 x 15.7	○ ³	75	○	100/76	● ²	●	●	●	●	○	40	24	757	
15.3 x 14.6 x 15.5	●	80	●	76/76	● ²	○	●	●	○	●	45	24 ⁴	758	
15.3 x 14.6 x 15.5	●	80	●	76/76	●	○	●	●	○	●	45	24 ⁴	758	
15.8 x 14.9 x 16.5	○	80	○	72/72	●	○	●	●	○	●	45	24 ⁵	758	
15.8 x 14.4 x 16.2	●	82	●	100/76	●	●	●	●	○	●	168	36		
15.8 x 14.4 x 16.2	●	82	●	100/76	●	●	●	●	○	●	168	36		
15 x 14 x 14	○ ³	60	○	72/72	○	○	○	●	○	●	42.5	24	760	
14.8 x 14 x 14	●	60	●	72/72	●	○	●	●	●	●	42.5	24	760	
12.9 x 14.6 x 15.6	●	85	○	70/72	○	○	○	●	●	●	55	12	761	
14.3 x 14.3 x 15.3	● ¹	85	●	85/76	●	○	●	●	○	●	40	24 ⁵	762	
14.3 x 14.3 x 15.3	● ¹	85	●	85/76	○	○	○	●	○	●	40	24 ⁵	762	
14 x 14.1 x 17.4	●	110	○	85/76	●	○	●	●	○	●	40	24 ⁵	762	
15 x 14.3 x 15.1	●	100	○	90/76	●	○	●	●	○	●	40	36	763	
14.9 x 14.4 x 16.2	●	95	●	90/76	●	●	●	●	○	●	42.5	36 ⁶	764	
15.4 x 14.6 x 16.3	●	100	●	72/60	○	○	●	●	○	●	60	36	765	
15.4 x 14.6 x 16.3	●	100	○	76/60	○	○	●	●	○	●	60	36	765	
15.4 x 14.6 x 16.3	●	105	●	76/76	●	●	●	●	○	●	60	36	765	
14.09 x 14.17 x 15.9	●	110	●	100/74	●	○	●	●	○	●	40	36	766	
14.75 x 14 x 16	●	110	●	90/75	●	●	○	●	●	●	50	36	767	
14.8 x 14.5 x 15.8	●	110	●	100/76	●	●	●	●	●	●	40	24	768	
14.4 x 14.4 x 15.6	●	130	● ⁷	72/70	●	●	○	●	○	●	50	24 ⁸	769	
15 x 14 x 15.5	●	68	●	90/72	○	○	○	●	○	●	50	36	770	
16.5 x 15 x 17 ⁹	●	80	● ⁷	72/75	○	○	○	●	●	●	45	12	771	
15.4 x 14.8 x 16.7	○	110	● ⁷	72/76	●	○	●	●	○	●	40	12 ⁵	772	
15.4 x 14.8 x 16.7	○	100	○	72/74	○	○	○	○	○	●	40	12 ⁵	772	
15.75 x 14.75 x 15.5	●	120	○	72/76	●	●	●	○	○	○	40	12 ¹⁰	773	
15.2 x 14.6 x 15.6	●	90	●	76/76	●	○	●	○	○	●	40	24	774	
14.5 x 14.1 x 15.7	●	80	●	75/75	●	○	●	●	●	●	40	24 ¹¹	775	
12.3 x 14.1 x 14.8	●	85	●	72/76	●	●	●	●	●	○	45	12 ¹⁰	776	
13.8 x 14 x 17.4	●	110	○	100/80	●	○	○	●	○	○	50	12	777	
14.5 x 14.8 x 16.8	● ¹	120	●	76/76	●	○	●	●	○	●	55	36 ¹²	778	
14.6 x 14.7 x 15.4	●	110	●	85/75	●	○	●	●	○	●	80	12	779	

⁹ Portrait or landscape pivoting monitor.

¹² One year parts, three years labor.

For more information about all products in this table, circle reader service no. 906.

¹⁰ Two years parts, one year labor.

¹¹ Three years parts, two years labor.

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August, 1993

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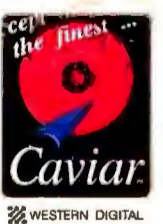
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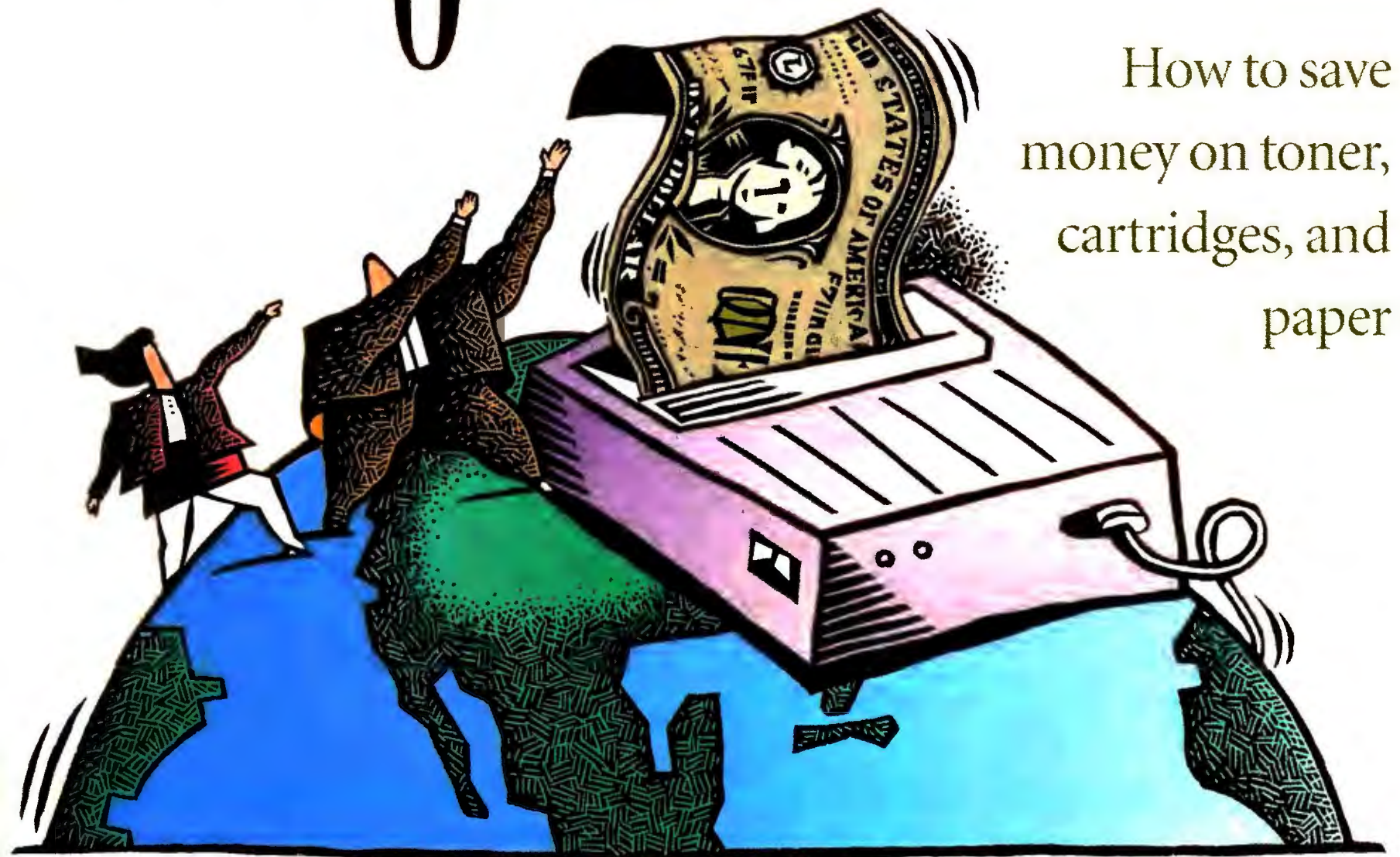
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Frugal Printer

How to save money on toner, cartridges, and paper



There's one small detail they probably forgot to mention when you bought that new printer: One year's print supplies—toner for lasers, ink for ink jets, paper for both—could easily cost more than the printer itself. If that sounds like bad business, we've got some good advice. With careful buying and use, you can slash the cost of printing—and help the environment to boot.

The first step to saving money is to buy smart. But where do you get the best deals? To find out, we priced consumables for three of today's most popular printers: Hewlett-Packard's

LaserJet III and DeskJet 500, and Canon's BJ-200.

For toner, especially in smaller quantities, we found the best sources are office warehouses (see "Channel Surfing: Buying Printer Supplies"). If you're buying it in bulk, mail-order vendors offer some great deals. Small local computer and stationery stores are the most expensive sources, but they offer the advantage of personal service. For relatively rare printers (those that use non-Canon engines, for example), mail order or the printer vendor itself may be the only available options.

By Bob Weibel

Used-Cartridge Dealers

To really save money on toner, consider used cartridges, of which there are several different species:

Recharged cartridges are simply refilled with fresh toner. If the vendor doesn't offer a guarantee, stay away.

Remanufactured cartridges are disassembled and cleaned and their worn parts replaced with new ones. As long as their print quality is up to snuff and you get a guarantee, they can be an excellent deal.

Reconditioned cartridges are remanufactured, but their imaging drums are simply recoated with fresh photoelectric polymer instead of being replaced. They're inexpensive, but, because the drums aren't new, be sure to check print samples before you buy.

Some used cartridges are actually designed to be better than the originals. Codo's Permajet Plus, for example, is packed with twice as much toner as the original HP cartridge; it will last twice as long for roughly the same price.

How do you know what you're getting in a used cartridge? First, ask vendors how they remanufacture. Do they replace the drum, or just recondition it? Do they test

each cartridge, and, if so, how many times? Second, demand a guarantee. Third, check out the print quality. (See "The Question of Quality" for some pointers on assessing laser printer output quality.)

Ink-Drained Wretches

When it comes to buying ink jet cartridges, look for selection first, then price. While it's easy to find cartridges for HP's DeskJet 500 (the most popular ink jet on the market), finding supplies for other printers can be quite a chore (see chart). Mail-order firms generally have the best selection. Electronics and office warehouses may carry supplies from a few top vendors, and your local stationery store will probably limit its stock to DeskJet cartridges.

You can save some money by refilling your ink jet cartridges when they run dry, but this process has its pros and cons. The biggest pro is saving dough. Refill kits sell for as little as \$12 (compared to the \$25 or so you'll pay for a new cartridge). The biggest con: You may be risking your printer's health. In addition to the ink reservoir, ink jet cartridges have delicate print heads and circuitry built in. While refill vendors say a

print head can survive eight or ten refills, they generally don't guarantee that they can. To make matters worse, refilling or modifying the cartridge may void the printer's warranty. Before you try a refill, be sure to check the fine print on your printer's warranty or call the vendor.

Playing the Stock Market

If laser printer vendors had their way, you'd spend *more* money on paper, not less. That's because they recommend high-quality, high-priced stocks to maximize output quality. One laser vendor we spoke to, for example, suggests \$13.50-a-ream 24-pound Hammermill Laser Plus; plain 20-pound bond costs only around \$2 a ream at office warehouses (see chart). Our advice: Unless your professional survival depends on printer output quality, don't waste your money on fancy paper.

If you're concerned about the environment *and* your wallet, consider recycled paper. While recycled stocks once had a reputation for grayness, recent changes in manufacturing have yielded some recycled stocks that are as white as their nonrecycled counterparts. To be

The Question of Quality

To re or not to re, that is the question—if you want to save money on print consumables. If you own a laser, you can buy remanufactured toner cartridges; if you use an ink jet, you can refill your printer's reservoir of ink. Either way, you can save up to 50 percent compared to buying new.

But what about reliability and output quality, you ask? The reliability question is easy to answer—just make sure the product comes with an adequate guarantee. To settle the quality question, you'll have to take a close look at some output samples.

Remanufactured Toner Cartridges

If you're considering a remanufactured toner cartridge, you want to check its output for three things:

- First, take a look at small characters. Are they sharply rendered or fuzzy? Do they fill in because of toner splatter?
- Next, look at a print job containing areas of solid black and graded shades of gray. Are the blacks even or splotchy? Are the transitions between different shades of gray smooth, or are they jerky?
- Finally, look closely at "blank" areas of white. Can you see any streaks or spots of toner? If so, the cartridge may be physically damaged. What about *ghosting*—faint impressions of other parts of the image?

Refilling Ink Cartridges

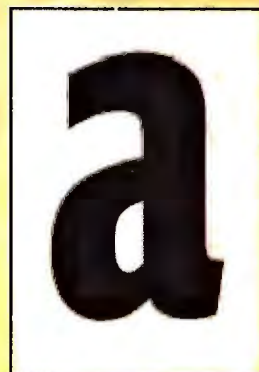
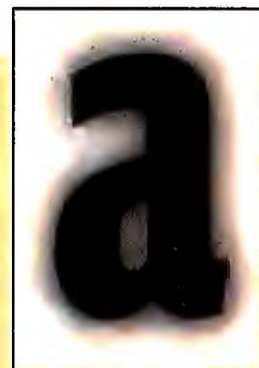
For ink jet owners, the big question is safety. Will refilling a tapped-out ink cartridge hurt the cartridge or—*shudder*—the printer itself?

To find out how dangerous refilling can be, we refilled a cartridge for Canon's BJ-200 twice, using a refill kit from Aussie Products. The first time around, we followed the kit's instructions to the letter. When we were done, the cartridge printed perfectly.

After printing a couple of dozen graphics-heavy pages, we refilled the cartridge again, but this time we got a little sloppy. When the instructions said hold the cartridge horizontally, we held it vertically. When they told us to stop filling when bubbles came out of the refill hole, we just kept pumping in more ink.

We were so sloppy, in fact, that we broke the cartridge. After our ham-handed refill, the poor thing managed to print just a couple of lines before conking out altogether. The lesson—refilling should be perfectly safe, as long as you *follow those directions*.

Before you buy a used toner cartridge, check its output for fuzzy letters (top), uneven blacks (center), and ghosting on "blank" areas of the page (bottom).



on the safe side, check the ratio of recycled to nonrecycled fiber. Generally speaking, the higher the proportion of recycled fiber, the grayer the stock.

Paper quality is crucial if you use an ink jet. Some stocks absorb ink too readily, a trait that can ruin print jobs. Ink jet vendors recommend papers with high cotton content. Our advice: Try some sample sheets on your printer before buying.

Print Less, Save More

No matter where you buy, you can also save money by using consumables wisely. Here are a few hints from Joel Makower, editor of *The Green Business Letter*, an environmental newsletter published in Washington, D.C.

- **Think before you print.** Edit documents thoroughly on screen before printing, then ask yourself: Do I really need to print this?

- **Print smaller.** Use smaller typefaces, single-spacing, and narrower margins.

- **Use both sides.** If your laser supports duplex printing, use it; if not, fake it. Create a macro to print odd-numbered pages first, then—after you flip the paper and reinsert it—print even pages on the other side (see *Word Processing*, March 1994). Save drafts, and use their unprinted sides for drafts and informal memos.

- **Reduce your circulation.** When distributing memos, don't print a copy for each recipient. Post general announcements in a central area or circulate one or two copies with routing slips attached.

- **Publish electronically.** Distribute memos via E-mail, or post them online. Look into software, such as Adobe's Acrobat, that lets you distribute documents electronically with formatting intact.

- **Squeeze that toner.** If your printer has a control for toner density, turn it down for drafts, then crank it up for final versions. If your toner cartridge starts to print faintly, don't chuck it. Remove it from your printer, hold it level, and shake it side to side to redistribute the remaining toner.

Channel Surfing: Buying Printer Supplies

Laser Toner

Cartridge type	Source	Typical price per cartridge	Cost per page	Comments
HP brand for LaserJet III, new	office warehouse	\$76	1.9¢	Rated for 4000 pages; fits majority of 8-ppm printers.
	mail order	\$87	2.2¢	Includes shipping. Ask about bulk discounts.
	electronics warehouse	\$89	2.2¢	Okay if no office warehouse nearby.
	computer/stationery store	\$99	2.5¢	May offer free delivery, personal attention.

Remanufactured

Future Graphics SX	mail order	\$39	1¢	Uses reconditioned drum.
Codo Permajet Plus	mail order	\$89	1.1¢	Rated for 8000 pages.
LaserTech	office warehouse	\$50	1.2¢	Worn parts replaced; six-month guarantee.
Hewlett Packard Optiva 95LR	retail	\$64	1.6¢	Worn parts replaced; 90-day guarantee.

Ink Jet Ink

Cartridge type	Source	Typical price per cartridge	Cost per page	Comments
Canon BJ-200	mail order	\$23	4.6¢	Rated for 500 pages at 1500 characters per page.
	office warehouse	\$24	4.8¢	Limited availability.
	electronics warehouse	n/a	n/a	Availability so limited we couldn't find them.
DeskJet 500	office warehouse	\$24	2.4¢	Rated for 1000 pages at 1000 characters per page.
	electronics warehouse	\$26	2.6¢	
	mail order	\$27	2.7¢	Includes shipping. Ask about bulk discounts.
Refill kits	various	\$12	1.2¢	Check printer's guarantee first; refilling may void it.

Paper

Brand	Source	Typical price per ream	Cost per page	Comments
House brands	office warehouses	\$1.89	.4¢	No-frills 20-pound bond.
House brands	local retailers	\$2.99	.6¢	No-frills 20 pound bond.
Weyerhaeuser First Choice	mail order	\$7.95	1.6¢	Recommended by laser vendors.
Crane's Crest fluorescent white	mail order	\$57.50	11.5¢	Recommended by ink jet vendors.

Recycled

Weyerhaeuser Recycled Laser Copy	local retailer	\$2.69	.5¢	50 percent recycled.
Peacetreer's Unity DP	local retailer	\$3.23	.6¢	100 percent recycled; made without chemical bleaches.
Peacetreer's Eureka 20-pound	local retailer	\$3.75	.8¢	50 percent recycled.

The Greater Good

How do you convince your fellow employees to print wisely? Cost saving alone isn't always a sufficient motivator. Recycling experts say moral or environmental appeals often work better on people than cost-cutting imperatives; after all, it's their planet, but not their money.

Whatever it takes to make it happen, cutting the cost of consumables is a win-win

situation for any business. You save money up front, and you throw away less in the end. It's further proof that the greener you get, the more green you save.

Bob Weibel is a freelance writer in Ashland, Oregon, and coauthor of Desktop Publishing Secrets (1992, Peachpit Press, Berkeley, California) and The QuarkXPress Book, Windows Edition (1994, Peachpit Press).

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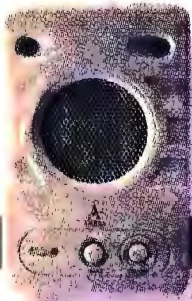
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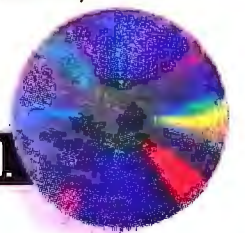
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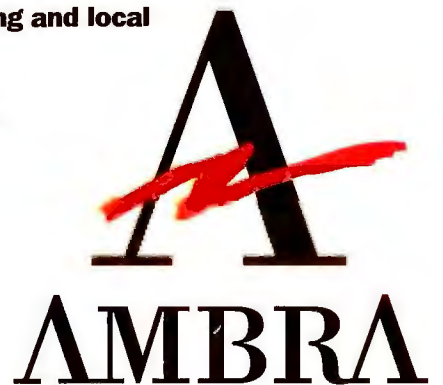
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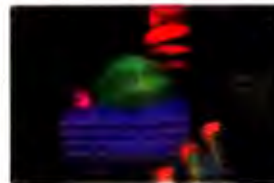
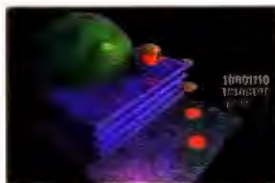
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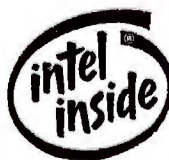
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Dynamic-STN color: Designed with greater contrast and improved color saturation, Toshiba's dual-scan display is noticeably pure and vibrant.

***Rugged Design:** Rounded corners and a tough lightweight casing are just a few of the details that make this notebook engineered to last.*

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Short on time?

No sense of design?

Just plain inexperienced?

**With sophisticated tutorials
and templates, today's Windows
presentation software can help.**

We compare five top packages.

Never underestimate the power of a compelling presentation. The Atlanta Olympic Committee didn't when it made its pitch to host the 1996 Olympic Games. While competing cities used films, the AOC designed a dazzling interactive video show where viewers could navigate the proposed Olympic

Village by using a menu on a touch-screen computer.

"Our booth received many more than its fair share of visitors, including voting members of the Olympics Committee," says the AOC's Bob Brennan. Clearly, Atlanta's presentation played a big role in the city's successful bid for the Games. **BY WILLIAM HARREL**

Presentations Without Pain

While the latest presentation graphics programs won't let you assemble a show as interactive as the AOC's, they've made major strides in helping you create striking presentations. Even more important, these programs have become much easier to learn and use than their forebears. Let's face it, most of you put together slide or screen shows only from time to time, not often enough to remain fluent in an application dedicated to the job. For a presentation program to lay claim to a corner of your hard drive—especially a corner as large as 25MB—it's got to let you get up and running fast. We've found some that do just that.

Real-World Testing

Just how feature filled are these presenters? How easy are they to use? To answer these questions, we reviewed the top five programs (based on market share) from the current group of Windows presentation packages and determined which is best at helping you

build a winning show quickly and easily. (Aldus and Micrografx kept their products out of this review because they are soon releasing upgrades of Persuasion and Charisma—be sure to read about them in "Coming Attractions.")

To examine the capabilities of each program, we prepared a presentation involving a wide range of common features, including outlining, imported spreadsheet data, charts, sound and motion video, speaker aids, and various types of output, such as printouts and 35mm slides. We also sent the software to some *PC World* readers who were familiar with Windows but had never used such a program and asked them to follow a script to create a simple presentation. Some of their comments are included here.

How much computer do you need to run these apps comfortably? We tested them on both a power system and an economy machine. The power PC—a 486DX-33 with 20MB of RAM—turned out to be more than adequate. The economy 386SX-33 system with 8MB

Coming Attractions

As we prepared this review, three of the top presentation software vendors were preparing their latest productions for market. By the time you read this, Charisma 4.0 and PowerPoint 4.0 should be shipping, and Persuasion 3.0 should be out later this year. Judging by the press kits and preproduction software we've seen, these developers are pushing for greater ease of use and more multimedia features.

Charisma 4.0 is the long-awaited upgrade to a once-popular package. It includes a few features to make it easier to use, such as Wizard-like prompts when you start a presentation, but the most significant improvements are in graphics editing and interactive multimedia. Charisma's Media Manager provides thumbnail previews and lets you assemble catalogs of media clips. A new Element Editing feature lets you clip, loop, and balance sound in any video, eliminating the need to create a new file to use only part of a media clip. This \$495 program (a \$149 upgrade for users of earlier versions) supports complete graphics editing and special effects, such as Bézier curve editing, warps, blends, shadows, text on a curve, and gradient fills.

3-D charts are common these days, but Charisma 4.0 takes the idea several steps further, allowing you to rotate charts at any angle and adjust simulated lighting, as with a draw program's light source option. You can

also save charts as templates for reuse.

No longer is it necessary to import these effects from a draw program. The program also supports TWAIN-compliant scanning and bit-map editing. (You have to buy a scanner separately.) Although it's still playing catch-up with the current generation of presentation programs, Charisma 4.0 is an immense improvement over version 2.1. Micrografx, 800/733-3729, 214/234-1769.

Reader service no. 730

Persuasion has long been a favorite on the Macintosh, but Persuasion 2.1 for Windows has needed an upgrade badly. Relief should be here this year. The next version of Persuasion will have many of the features we've come to expect in presentation packages, such as true color support, auto-formatting between printer and slide recorder, virtually unlimited slides in a slide show, and OLE so you can bring in multimedia clips. Aldus is also reworking the interface in this next version, giving it a PageMaker-like approach to laying out slides. The document window will use a pasteboard metaphor, with T-square rulers

and grid lines to help you lay out pages, and a tabletop where you'll be able to shunt objects to get them out of the way. Floating tool palettes, similar to PageMaker's, will let you further customize your work area.

The next Persuasion will include a comprehensive online tutorial. Chart, clip art, and multimedia clip previews will be available

from the appropriate dialog boxes.

This latest version of Persuasion will be equipped with an arsenal of drawing tools, including Bézier drawing and gradient fills. You'll be able to display a palette of all OLE servers on your system and click an icon to embed any OLE 1.0 object. The new release will also enable you to create interactive presentations, complete with

hot words and buttons that invoke multimedia events or open other programs.

It's clear that the next Persuasion will have all you need to produce dazzling presentations. Even if it isn't the easiest to learn, at least it should be a joy to use, especially for those familiar with desktop publishing programs. Early indications are that the new



of RAM ran all the programs passably except for WordPerfect Presentations 2.0. On the 386SX-33, this program made us wait several minutes between screen redraws, particularly in Master Gallery and slide sorter views.

Kinder, Gentler Programs

The program that took our Best Buy had the strongest combination of accessibility and power. Harvard Graphics 2.0 for Windows, produced by veteran presentation software developer Software Publishing, offers the ultimate in ease of learning and ease of use. It provides minitutorials in a feature called the Five Minute Coach, and the Advisor, an enhanced form of context-sensitive help, gives you step-by-step guidance. At the same time, Harvard Graphics is chock-full of talent, offering everything from extensive charting to a slew of screen show options.

Freelance Graphics 2.0, a close second, is nearly as easy to use as

Harvard but lacks some of the more sophisticated features. Its online tutorial is conveniently separated into several short categories you can run at any time to reacquaint yourself with key features.

Anatomy of a Presentation

The reviewed programs set up essentially the same approach to creating a presentation. First you plan it, using an outliner in most cases; then you choose a template for the slides and enter or paste in elements such as text, graphics, tables, charts, graphs, sound, and motion video clips.

To help you plan and create, all the programs except Compel offer an outliner, and all except Compel and Harvard Graphics let you print an outline. Most of these programs include a text tool bar in the outline view to help you format your outline for printing. PowerPoint 3.0 goes the extra mile by providing WYSIWYG outlining, so you can format the text in your slides from the outline rather

Persuasion, like the latest revision of Charisma, won't break new ground but will keep pace with the current crop of presenters. Pricing is not yet available. Aldus, 206/622-5500. Reader service no. 731

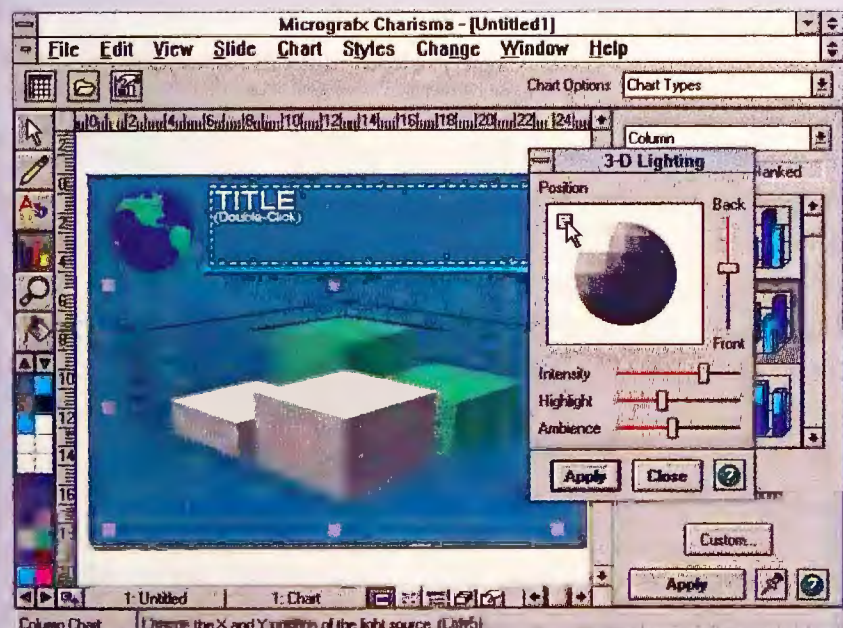
Had a shipping version of PowerPoint 4.0 been available for this review, it would probably have blown the rest of the packages out of the water. We will conduct a full review of this package as soon as a production version is available. PowerPoint 4.0 is more feature packed and easier than ever to use. Microsoft took a cue from Harvard Graphics' Advisor and added context-sensitive help screens (called CueCards) that prompt you as you work, with tips about what to do next. Other

innovations include the AutoContent Wizard, much like the Wizards found in Word 6.0 and Microsoft Publisher. Wizards are macros that ask questions about general message and style and then create templates based on your answers. PowerPoint identifies several categories of messages, including Financial, Good News, Bad News, and Sales Presentation. After the tone of your message is identified, the Wizard sets up your template. Just add text and graphics. Microsoft also includes a Quick Preview online tutorial, much like Harvard Graphics' Five Minute Coach, and ToolTips labels, which appear when you point to items on the tool bar.

Want more innovation? You can integrate

PowerPoint 4.0 with other OLE 2.0 applications, such as Word for Windows 6.0 and Excel 5.0. Over 100 tasks, such as text formatting and creating charts and drawings, are the same in PowerPoint as in Microsoft's word processor and spreadsheet programs. You can now drag and drop data such as text, charts, and images from Word or Excel as well as from other PowerPoint presentations. Word even has a Present It button on the tool bar that automatically moves selected portions of a document to PowerPoint. PowerPoint was due to be released in mid-February with a list price of \$495. Microsoft, 800/426-9400, 206/882-8080.

Reader service no. 732



SIMILAR TO DRAW PROGRAMS, Charisma 4.0 lets you adjust the 3-D intensity and the simulated light source to create interesting shadow effects for your charts.



IF YOU USE A DESKTOP PUBLISHER, YOU'LL BE DELIGHTED with Persuasion 3.0's interface, which comes with floating palettes, a toolbox, and a pasteboard.

than having to jump back and forth. For example, you can change the font and point size in the outliner to affect four or five slides at a time rather than having to page up or down to change the text in each slide.

Before creating the slides, you'll want to choose a template for your presentation. The latest wave of software comes with stunning slide templates, to which you can add your own text and graphics.

Once you add the elements you want, you can modify them in a number of ways. Most of these presenters allow you to recolor the clip art you bring in, so you can match the color of an imported image to its background. WordPerfect Presentations and Harvard Graphics up the ante with full graphics editors. WordPerfect even throws in a nifty ScanMan hand scanner and lets you trace bit maps and turn them into vector-type graphics that display and print faster.

Once you have created a presentation, you can output it in several formats. Most people prefer to use either 35mm slides or black-and-white printouts, which all these programs produce easily. You can save the files to disk and have them made into slides. You can also print slides of your presentation in color or black-and-white, on standard paper for handouts or on transparencies for overhead projection.

What about presentation aids? All these programs let you print audience handouts and speaker notes, and all except Freelance let you customize them. PowerPoint, for instance, lets you print two, four, or six slides per handout.

Charting

Data displayed in graphical form is often the most important element in a slide show, so a program's capability to graph data is critical. These programs build graphs from datasheets, which are similar to worksheets in a spreadsheet program. In fact, you can import Excel and 1-2-3 worksheet data directly into datasheets of all these five programs. You can even establish a Dynamic Data Exchange (DDE) link between the datasheet and the source worksheet so that changes in the latter are automatically reflected in the former and thus in the chart.

All these programs have the basic pie, bar, line, and area chart types. Many offer variations, such as stacked-bar and 3-D charts. You can also find table charts, which resemble worksheets, in every program except PowerPoint. Need to make a flowchart of your company's management structure? Freelance, Harvard Graphics, and WordPerfect offer organization charts so you can represent people in a diagram according to their positions.

Every program provides sample charts that take the guesswork out of completing datasheets. Instead of stumbling around in a blank sheet because you're not sure which cells affect which portion of the chart, simply replace the sample data with your own. Compel, Harvard Graphics, and WordPerfect have an additional feature—chart preview—that simplifies using the datasheet. Miniature

versions of the different chart types appear on screen with your datasheet and change instantly as you edit your data.

Making It to the Silver Screen

The increasingly popular on-screen presentation, displayed either on the PC or through a projection panel, provides more dynamic and professional results than 35mm slides or transparencies. You can insert special transition effects such as wipes, glitter, and rain to give the presentation a more cohesive feel. All these programs let you use automatic-build slides, which add bulleted points one at a time to the same slide so you don't have to create a separate slide for each point.

While all the programs except PowerPoint provide some form of interactivity, Harvard Graphics and Compel excel at it. These two programs let you create interactive buttons and hot words for finer control of your screen show as you advance through it. Simply click on an object, such as a word or a graphic image, to open another application, jump

to another slide, or change slide order to emphasize points on the fly. Harvard Graphics and Compel also let you hide slides and display them by clicking a hot button, displaying a thumbnail view, or clicking the bullet of a bulleted point.

All the programs let you create slide shows that you can run without the creating program being present, but Compel is the undisputed leader in this area. It not only compresses a screen show for transport, making it easier to fit a slide show on floppies, it is the most adept at packaging multimedia shows for export.

You'll need a machine that's powerful enough to handle your show. The PC you choose to run it should be a 386DX system or better with at least 4MB of RAM and a video subsystem that can display 256 colors simultaneously. Nothing ruins a good presentation like an application crash.

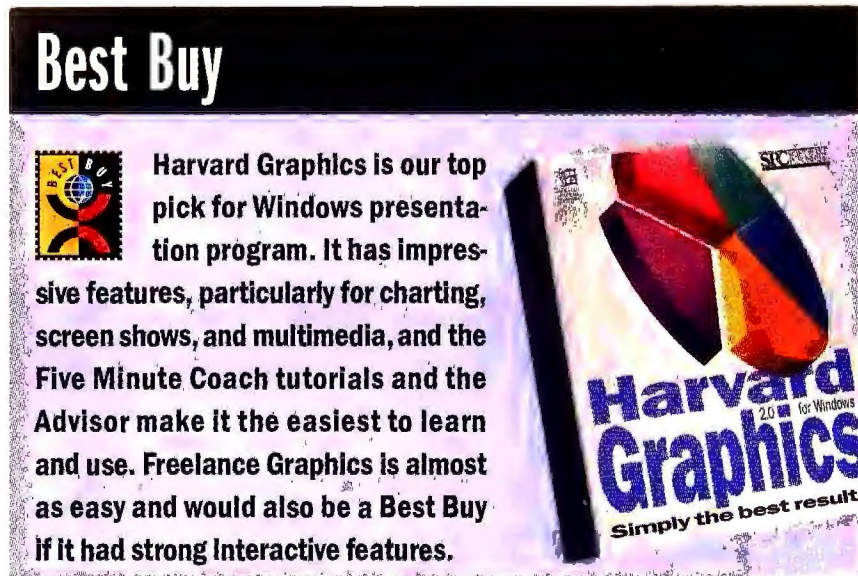
Just Like in the Movies

The latest and snazziest additions to your screen show are motion video and sound. All these programs support animated graphics created with programs such as Gold Disk's Animation Works Interactive and CorelMove, as well as several digital video and sound formats. All except PowerPoint let you add analog video clips (such as images imported from a TV or VCR). While PowerPoint lets you attach a clip to a slide and play it as is, the other four programs give you more control over how the clip will run.

Looking to Future Events

Expect programs to become more inviting to the casual user. As computers grow faster and more programs ship on CD ROM, you should see a proliferation of multimedia online tutorials.

Equally encouraging is the push to integrate presentation programs with other applications. Microsoft's soon-to-ship PowerPoint 4.0, for example, looks and operates much like Microsoft Word and



Best of the Rest

In the highly competitive Windows presentation market, a number of products are vying for center stage. We chose the market leaders for our full reviews, but you also may want to check out the following:

At \$299 list, Action 3.0 is a relatively inexpensive package that excels at interactive multimedia shows. A VCR-like control panel helps you create and run presentations. Macromedia, 800/945-4061, 415/252-2000. Reader service no. 733

Looking for an even lower price in a presentation package? Alpha's Bravo lists for \$119 and provides impressive features such as extensive charting, outlining, and speaker notes. Alpha Software, 800/852-5750. Reader service no. 734

Equally inexpensive is CA's Cricket Presents, although it has limited charting and presentation options and no multimedia

capability. Computer Associates, 516/342-5224. Reader service no. 735

CorelDraw 4.0 (\$595 list) is best for creating and editing graphical images but also has respectable charting and presentation features. If you need a powerful graphics tool and can live without a few presentation features such as outlining and audience handouts, you may want to look into this package. Corel, 613/728-8200. Reader service no. 736

The \$195 DeltaGraph Professional offers a huge set of chart types as well as an automatic chart-plotting option. DeltaPoint, 800/446-6955, 408/648-4000. Reader service no. 737

If you don't need to create data charts, consider HSC's \$295 InterActive, a pared-down version of AimTech's powerful IconAuthor multimedia authoring software. InterActive's Icon-based flowchart approach to creating presentations is easy to use. HSC Soft-

ware, 310/392-8441. Reader service no. 738

At \$595 list, SoftCraft's Presenter is pricey, but it offers a full range of charting features as well as outlining and speaker notes. You have to put up with a few awkward workarounds, but otherwise this is a solid presentation package with all the standard features. SoftCraft, 608/257-3300. Reader service no. 739

Q/Media is an easy-to-use, entertaining multimedia presentation program at the right price (\$99), though it's limited when it comes to presenting data. Q/Media Software, 800/444-9356, 604/879-1190. Reader service no. 740

When it comes to charting power, data analysis, and sheer brute strength, nothing even comes close to Stanford Graphics. This \$495 program is the presenter of choice if you need powerful charting for statistics and scientific data. 3-D Visions, 800/729-4723. Reader service no. 741

Excel, which makes learning the presentation package easier. Well-integrated programs also exchange data more efficiently. You can import a Word for Windows outline seamlessly into PowerPoint; each level-one point (Heading 1 style) automatically becomes a new slide, and secondary levels become bulleted points. You'll find similar integration in equivalent Lotus and WordPerfect products. In fact, Microsoft, Lotus, and Borland/WordPerfect all offer a suite that contains a presenter along with a word processor, spreadsheet, E-mail, and database. If you use a Microsoft, Lotus, or WordPerfect word processor or spreadsheet, consider using a presentation

package from the same vendor even if you don't buy a suite. Now that presentation programs are easier to use and better integrated, you can build a world class show without all the heavy training.

William Harrel is a desktop publisher and writer living in Ventura, California. He has written seven books about desktop publishing and graphics programs.

For more information about all products in this article, circle reader service no. 903.

Compel 1.0

PROS: Low price, fine multimedia interactivity and presentation file management
CONS: No outliner, sluggish

If you contended with Asymetrix's previous entry in the presentation arena—Multimedia Make Your Point—you'll be relieved to know the company has learned from its mistakes. Asymetrix's presenter has metamorphosed from an unstable toy into one of the hottest multimedia presentation packages available. Compel not only provides everything you need to create conventional presentations, it excels at creating shows with sound and motion video.

One key factor in Compel's superior interactive ability is *hyperlinking*. Buttons, graphics, and words on Compel slides can become hyperlinked "hot" objects, which you can click to call up a multimedia clip, jump to another slide, execute another application, or start another Compel presentation. The TwinClick panel lets you



COMPEL LETS YOU SELECT OBJECTS on the slide to be hot words or hot buttons. Here we've selected "Telecommunications for the '90s."

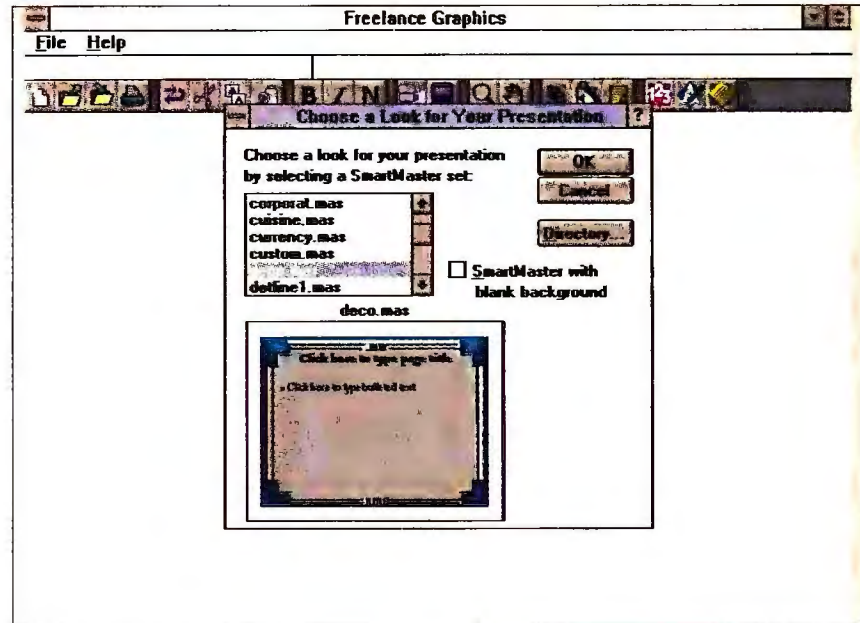
move easily around the presentation, jumping back to a topic or moving ahead in response to audience questions.

Especially impressive is Compel's Package Presentation option, which lets you save an entire presentation to floppy disk for non-Compel users to view. The Package copies all elements of a screen show, including linked clips and graphics, to one location. It recreates the links and then compresses the package. It also automatically includes (and compresses) Compel Show, the royalty-free viewer used to distribute Compel presentations to non-Compel users. Windows users can then decompress and run the show just by copying the compressed file to their hard disk and clicking an icon. It couldn't be easier to prepare a show to run on another PC.

Compel's extensive on-line tutorial covers all the basics of creating presentations. The supplied CD ROM disk also includes some striking sample presentations and over 100MB of animation, sounds, and video clips.

This program is not without drawbacks. Compel takes a long time to load and initiate presentations (including the tutorial, itself a presentation). Because the program has no outliner, you must create one slide at a time; planning a presentation is less streamlined. You can import text only onto the current slide rather than onto a series of slides, as you can with the other programs. Compel would also benefit from context-sensitive help.

Despite these limitations, Compel lets you create dazzling presentations without a lot of frustration. You'll find this low-cost package particularly helpful if you already have presentation know-how and want to advance your multimedia capabilities. If this product were easier to learn and use, it would likely have been a Best Buy. *Asymetrix; 800/448-6543, 206/462-0501. Reader service no. 744*



CREATING A PRESENTATION IN FREELANCE GRAPHICS is an easy three-step process. First you select a "look," or template, from a list.

Freelance Graphics 2.0

PROS: Easy to use and learn, excellent integration with other Lotus products

CONS: Lacks strong interactive features

Lotus touts its latest revision of Freelance as "easy to learn, easy to relearn," and the program lives up to this claim. Creating a Freelance presentation is an easy three-step process that even technophobes can warm up to. Just select a template to provide the design elements for all the slides in your show, pick 1 of 11 layouts for each kind of slide—such as for the title, bullets, and charts—and click text prompts to fill in the blanks. To insert a slide title, for exam-

DOS Presenters Still Have an Audience

DOS-based presentation packages long ago ceded the limelight to their Windows counterparts. They're still an attractive alternative, however, for people with lower-end systems, such as early 386s, which would strain under the hefty processor and memory demands of a Windows-based presenter. WordPerfect Presentations for DOS and Harvard Graphics for DOS prove that in less powerful systems you can enjoy the added zip DOS allows without giving up brilliant colors and powerful charting.

Harvard Graphics for DOS has long been the premier DOS presentation program and remains so with version 3.07. As with its Windows-based sibling, this \$595 program lets you create slide shows and print or display them on a variety of media. You can import files from a number of spreadsheet and word

processor formats, including the leading Windows applications. Version 3.07 also supports sound and graphics animation and lets you set up hyperlinks with any Windows application, so you can open an Excel spreadsheet, for instance, or a report in Microsoft Word for Windows. Harvard Graphics 3.07 for DOS has modest system needs—you can get by with a 286 PC that has only 438K of free RAM. Software Publishing Corp., 800/336-8360, 408/986-8000. Reader service no. 742

If you're a fan of WordPerfect's word processor, take a gander at WordPerfect Presentations 2.0 for DOS. This package offers many of the advantages of its Windows counterpart without demanding a high-powered 486 system. It has a Windows-like graphical interface, supports TrueType and Type 1 fonts, and, like WordPerfect the word processor, supports virtually any printer out there. The interface has a customizable but-

ton bar, a powerful macro feature, and even a Reveal Codes option that lets you see and edit formatting codes.

Like the Windows version, WordPerfect Presentations for DOS has a bit-map editor and performs bit-map tracing. Unfortunately, also like its Windows counterpart, the program has limited online help. Online tutorials are woefully incomplete and not very interactive. You will find more help in the excellent documentation.

Multimedia? Not really. WordPerfect Presentations for DOS supports some sound and animation files but not full-motion video. It also lacks many of Harvard Graphics' hyperlinking capabilities, so screen shows are not as interactive. WordPerfect Presentations 2.0 for DOS runs acceptably on a 286 with 490K of available RAM (560K with sound). The program retails for \$495. WordPerfect, 800/451-5151, 801/225-5000. Reader service no. 743

The New Generation Monitors

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Screen Size	15"	17"	20"	21"
Dot Pitch (mm)	0.27	0.27	0.28	0.25
Horizontal Frequency (KHz)	30-64	30-82	30-82	30-82
1600 x 1280 Non-Interlaced		■	■	■
Maximum Refresh Rate (Hz) at 1280 x 1024 Ni	60	76	76	76
Flat Square Screen	■	■		■
ViewMatch™ Color Control	■*	■	■	■
Low Radiation (MPRII)	■	■	■	■
Suggested List	\$549	\$1,199	\$1,899	\$2,199

*Color temperature select 9300°K or 6550°K only

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ViewSonic 21 screen image by SPATIAL TECHNOLOGY INC., Boulder, CO
Note: The maximum diagonal viewable screen areas are: Viewsonic 15, 13.8"; Viewsonic 17, 15.6"; Viewsonic 20, 18.5"; Viewsonic 21, 19.7"

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Circle 218 on reader service card





AFTER SELECTING A LOOK, you pick one of 11 slide templates. Here we are creating a slide with two charts.

ple, simply click where the screen says 'Click here to insert page title'. This approach is so effective that many programs, including Harvard Graphics, have incorporated it, and the new upgrades (see "Coming Attractions") use it.

The program is a snap to use. One of our testers, Michael Simpson, director of research for an asset management and appraisal company, was impressed with Freelance Graphics' QuickStart online tutorial: "The animated graphics were so interesting, it made learning the program painless." This 30-minute tutorial proved unstable, however, crashing on both our power and economy PCs. Users of other Lotus packages will find Freelance particularly easy to learn. It uses an identical SmartIcons button bar and other similar interface options.

Freelance accepts outlines from the three top word processors. This process worked perfectly with Ami Pro outlines, but outlines from WordPerfect and Word didn't come in as expected: All the imported text wound up squeezed onto a single slide.

Freelance multimedia options include utilities that control how media clips play on slides. You can control when a clip starts, how many times it plays, at what volume, and other options. Media



FINALLY, YOU ADD THE DESIGN ELEMENTS by clicking designated areas to fill in the blanks. For example, click the title to type a title. To add a chart, click the chart placeholder.

Manager provides rudimentary file management, such as the ability to view media clips and copy them to different locations. We found Freelance to be more adept at handling spreadsheet data than most of the other programs. When we selected a worksheet file (1-2-3 or Excel) from inside our presentation, Freelance displayed the spreadsheet and let us highlight the data we needed for our chart. All the other packages forced us to import the entire worksheet.

Freelance Graphics is powerful and easy to use; the only feature it lacks is an equivalent to Harvard Graphics' Advisor. In fact, except for its weak interactive capabilities, this program would have scored a Best Buy. You should consider Freelance Graphics, especially if you use Ami Pro and 1-2-3. *Lotus Development; 800/343-5414, 617/577-8500. Reader service no. 745*

Harvard Graphics 2.0 for Windows

PROS: Competitive price, easy to learn and use, excellent multimedia interactivity

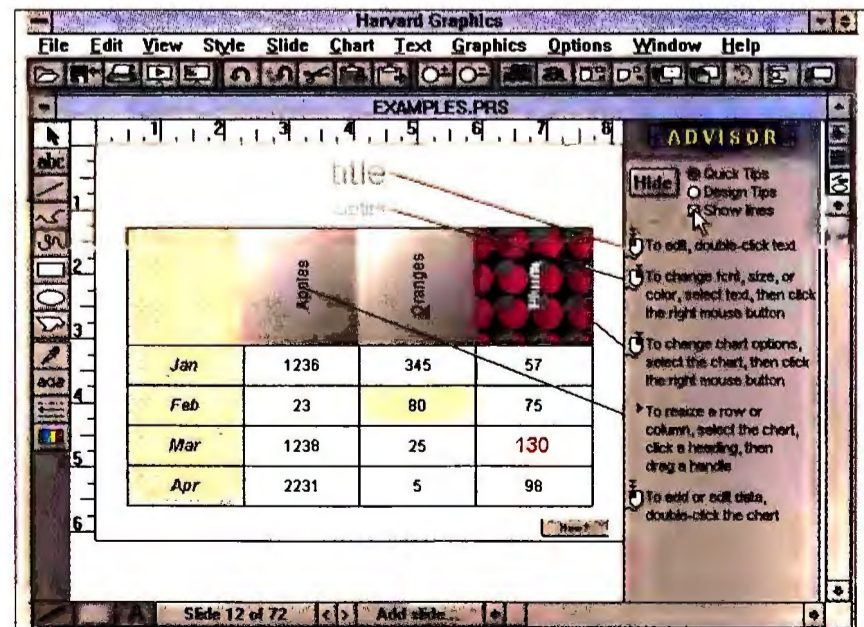
CONS: Outliner needs better word processor support



Harvard Graphics is designed with both the power user and the part-time user in mind. It not only has versatile interactive capabilities, it is easy to learn and use. In fact, it's so strong in all categories, it's our roundup's sole Best Buy.

What makes the program so fast to pick up is the entertaining Five-Minute Coach—several short lessons you can run at any time to get an overview of the features. But the program's crowning achievement is the Advisor, a context-sensitive help screen that not only tells you what to do next but also provides design tips, such as which chart type to use for your data. You can run Harvard Graphics with the Advisor displayed, or hide and show it whenever you want.

Testers who used Harvard Graphics completed their scripts faster than those who used other packages, and all attributed their speed to the Five Minute Coach and the Advisor. Deborah Kaufman, office manager for an architectural firm, said, "I didn't waste any time wondering what to do next, a refreshing change from the usual stumbling around that goes along with learning new software."



HARVARD GRAPHICS' ADVISOR PROVIDES STEP-BY-STEP ADVICE for creating presentations. Note the lines pointing to slide elements discussed in the steps.

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We combine the latest software and hardware technology with intelligent environmental awareness. Optiquet is committed to providing you with a Complete Green Solution.

*Opti-Green (\$29.95 list) is included free with any Optiquet green monitor purchase for a limited time.

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1500D	14"	.28	1280 x 1024	•	•			\$ 399
2000DC	15"	.27	1280 x 1024	•	•	•		\$ 469
4000DS	17"	.27	1280 x 1024	•	•	•		\$ 799
4000DC	17"	.27	1280 x 1024	•	•	•	•	\$ 899
5000D	20"	.31	1600 x 1280	•	•			\$1799

For the dealer nearest you, please call 1(800) THE-OPTI.

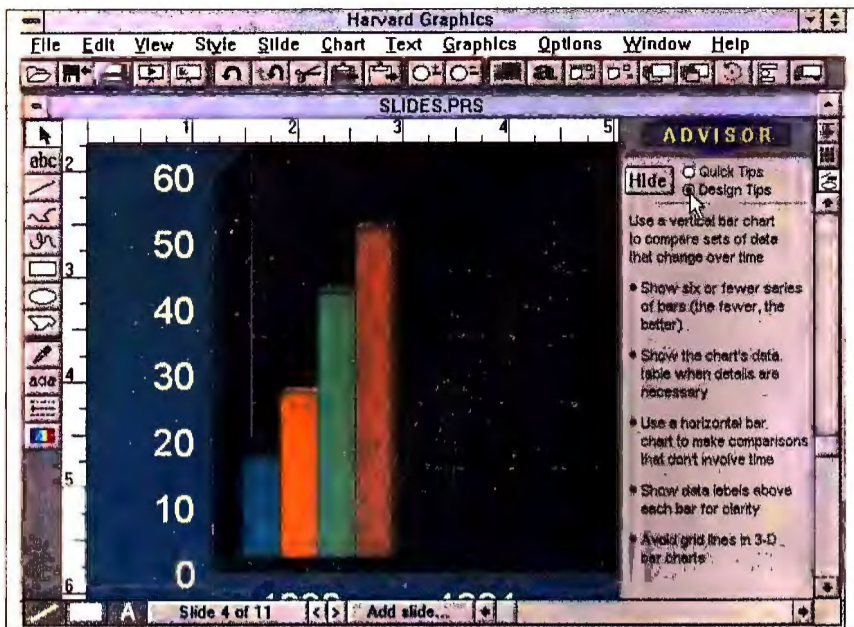


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Note: The maximum diagonal viewable screen area of the Optiquet 4000DC is 16.2".

Circle 199 on reader service card



CLICK THE ADVISOR DESIGN TIPS BUTTON, and you get suggestions for your slides, including the best type of chart for your set of data.

Harvard Graphics is also a strong interactive multimedia package. As in Compel, you can create hot buttons from any object, including text, and click them to jump to slides, run multimedia events, and open other applications or presentations. Hot buttons let you perform virtually any Windows function interactively.

Need to tailor your slide show for a particular audience? Harvard Graphics lets you hide slides for selective viewing. You can also easily import data from word processors and spreadsheets. About the only thing missing is strong text-outliner integration.

Harvard Graphics is aptly named—the program provides a great learning environment and comes replete with resources. But you don't have to pay top fees. Harvard Graphics is our top choice in presentation programs. *Software Publishing Corp.*; 800/336-8360, 408/986-8000. **Reader service no. 746**

PowerPoint 3.0

PROS: Powerful color and graphics features, well integrated with Word and Excel
CONS: A little difficult to learn and use

Two years ago the big name in presentation graphics was PowerPoint 3.0, and it still has a lot to offer. PowerPoint 3.0 provides brilliant effects, such as color washes, animated bullets, and powerful charting, and has beautifully designed templates. It is also one of the first to support sound and motion video. PowerPoint lets you recolor bit maps inside the presentation, so you can easily match the colors in your imported graphics to those in your presentation.

Integration with Word and Excel is another PowerPoint attraction. Outlines import flawlessly, and the program knows exactly what to do with Excel data. Even if you don't use other Microsoft products, you'll find PowerPoint attractive. It is widely used, and we've yet to find a service bureau that doesn't support it.

PowerPoint has a lot of talent, but it's showing its age. Some procedures could be smoother; for example, our testers had trouble figuring out how to work the color editing. Also, version 3.0's implementation of multimedia is limited to assigning a media clip to a slide. PowerPoint also lacks strong interactive capabilities—you can't create hot buttons or hot words. Finally, PowerPoint 3.0 doesn't include any advanced help features.



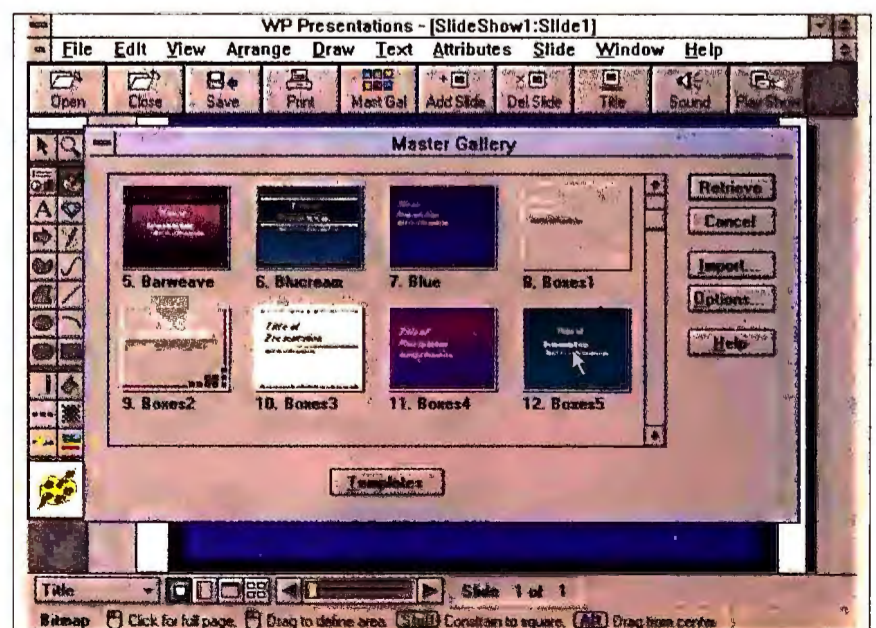
POWERPOINT 3.0'S RECOLOR PICTURE OPTION makes it easy to match the color of your clip art to that in your presentation.

While PowerPoint 3.0 may be past its heyday, its successor, version 4.0 (due on the market by the time you read this) comes with a greatly enhanced repertoire of help and presentation tools and will likely catapult PowerPoint back to the head of the ranks. *Microsoft*, 800/426-9400, 206/882-8080. **Reader service no. 747**

WordPerfect Presentations 2.0

PROS: Comes with scanner and media clips, works well with WordPerfect
CONS: Sluggish, difficult to learn and use, lacks extensive interactive hyperlinking

Many users put presentations together on their word processor, so you might expect the developer of the premier word processor to bring forth a premier presentation package. WordPerfect Presentations does offer a number of convenient features. It imports spreadsheet data intuitively, and the data needs little massaging. It also displays charts in a window so you can see the changes reflected in them as you edit the datasheet, just by clicking on a redraw button. You can create build slides and assign transitions from the same dialog box rather than from separate boxes as **continued on page 201**



WORDPERFECT PRESENTATIONS' MASTER GALLERY THUMBNAIls give you a quick overview of available slide backgrounds.



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The new Diamond Scan 17FS represents another pinnacle of achievement from the company that has been manufacturing flat square color monitors longer than anyone else – Mitsubishi Electronics.

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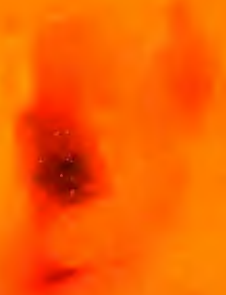


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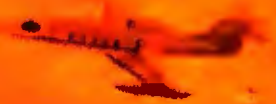
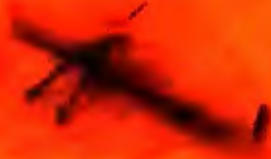
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5



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pages devoted
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to the things you
advanced communications
have to do:

capabilities, a continent
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screen could well inspire you
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FEATURES COMPARISON

Harvard Puts On the Best Show

- = Yes
- = No
- ▼ = Limited by available RAM

	Compel 1.0	BEST BUY Freelance Graphics 2.0	Harvard Graphics 2.0 for Windows	PowerPoint 3.0	WordPerfect Presentations 2.0
Standard features					
Price	\$295	\$495	\$395	\$495	\$495
Minimum/maximum disk space required (MB)	5/20	10/20	8/21	5/14	9/22

	Compel 1.0	BEST BUY Freelance Graphics 2.0	Harvard Graphics 2.0 for Windows	PowerPoint 3.0	WordPerfect Presentations 2.0
Presentation development					
Outliner	○	●	●	●	●
WYSIWYG outlining	n/a	○	○	●	○
Number of clip art pieces	400	500	536	573	1000+
CD ROM multimedia clips	●	○	○	○	○
Image recoloring	○	●	●	●	●
Graphics editor	○	○	●	○	●
Bit-map tracing	○	○	○	○	●
Handouts	●	● ²	●	●	●
Speaker notes	●	● ²	●	●	●
Printable outline	○	●	○	●	●
Text tool bar in outline view	n/a	●	●	●	●

	Compel 1.0	BEST BUY Freelance Graphics 2.0	Harvard Graphics 2.0 for Windows	PowerPoint 3.0	WordPerfect Presentations 2.0
Charting					
Datasheet rows/columns	200/20	4000/24	1024/16	▼	1022/8000
Number of chart types	6	108	88	84	38
Charting tips	○	○	●	○	○
Organization charts	○	●	●	○	●
Predefined charts	34	108	88	84	38
Table charts	●	●	●	○	●
Preview	●	○	●	○	●

	Compel 1.0	BEST BUY Freelance Graphics 2.0	Harvard Graphics 2.0 for Windows	PowerPoint 3.0	WordPerfect Presentations 2.0
Screen show					
Number of presentation colors	16.7 million	256	16.7 million	16.7 million	16.7 million
Number of transition effects	34	32	51	45	33
Transition speed control	●	●	○	●	○
Transition preview	●	●	●	●	●
Automatic build slides	●	●	●	●	●

	Compel 1.0	BEST BUY Freelance Graphics 2.0	Harvard Graphics 2.0 for Windows	PowerPoint 3.0	WordPerfect Presentations 2.0
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	Compel 1.0	BEST BUY Freelance Graphics 2.0	Harvard Graphics 2.0 for Windows	PowerPoint 3.0	WordPerfect Presentations 2.0
Screen show cont'd					
Interactive buttons and hot words	●	○	●	○	○
On-screen pointing	●	●	●	●	●
On-screen drawing	○	●	●	●	●
Rearrange show during presentation	●	●	●	○	●
Presentation packaging	●	○	○	○	○
Run screen show from DOS	○	●	●	○	○

	Compel 1.0	BEST BUY Freelance Graphics 2.0	Harvard Graphics 2.0 for Windows	PowerPoint 3.0	WordPerfect Presentations 2.0
Help					
Context-sensitive coaches	○	○	●	○	● ³
Contact-sensitive design tips	○	○	●	○	○
Online tutorial	●	●	●	○	● ³
Quick tips	○	●	●	○	●

	Compel 1.0	BEST BUY Freelance Graphics 2.0	Harvard Graphics 2.0 for Windows	PowerPoint 3.0	WordPerfect Presentations 2.0
Multimedia					
Animation files supported	FLI, FLC	FLI, FLC, MMM	FLI, FLC, MMM	FLI, FLC	FLI, FLC, MMM
Analog video supported	●	●	●	○	●
Digital video files supported	AVI, QuickTime	AVI, QuickTime	AVI, QuickTime	AVI, QuickTime	AVI, QuickTime
Sound files supported	WAV, MIDI, CD-Audio	WAV, MIDI	WAV, MIDI	WAV, MIDI	WAV, MIDI, CD-Audio
Clip media editor	●	●	● ⁴	○	● ³
Multimedia file management	● ³	● ³	○	○	○

	Compel 1.0	BEST BUY Freelance Graphics 2.0	Harvard Graphics 2.0 for Windows	PowerPoint 3.0	WordPerfect Presentations 2.0
Service and support					
Unlimited free support	●	○ ⁵	○ ⁶	●	●
Toll-free number	○	●	●	○	●
Daily support (hours)	12	11.5	9	12	11
Weekend support	○	○	○	○	● ⁷
BBS	●	●	●	●	●
Fax support	●	●	●	●	●

¹ Vector images only. ² Not customizable. ³ Limited. ⁴ Sound only. ⁵ Free for 30 days. ⁶ Free for 90 days. ⁷ Saturday only.

is normally the case. And, as expected, we imported WordPerfect 5.1 outlines without a hitch. Add a full-featured graphics editing module and a ScanMan hand scanner, and you have a package that sounds exciting.

Regrettably, this program is fraught with awkward work-arounds. For example, you can't edit slide titles and bulleted lists in their layout as you can in other presentation packages. Placing our logo on a master template was so complicated, we had to call tech support for help. Help features are relatively sparse. The package has a weaker version of Harvard Graphics' Advisor called QuickTutors; they're context sensitive but more like tips than full instructions.

WordPerfect Presentations' multimedia support, like that in PowerPoint 3.0, is rudimentary—it doesn't offer interactivity such as

hot buttons and hyperlinking. And it's sluggish. It displays galleries and screen shows with grueling slowness, unbearable on a 386. Judith Brown, secretary with the California Teachers Association, lamented, "The program is so slow, I began to dread making changes." The Quick Files option can speed up screen shows, but it makes editing them cumbersome, since it has to generate a new screen show each time you make changes.

You may want to give WordPerfect Presentations a look if you work with the WordPerfect word processor or if you want extras such as the great little hand scanner (bought separately, the scanner runs over \$200). However, due to its dated, Byzantine functions and slow performance, we cannot recommend this program. *WordPerfect*; 800/451-5151, 801/225-5000. Reader service no. 748

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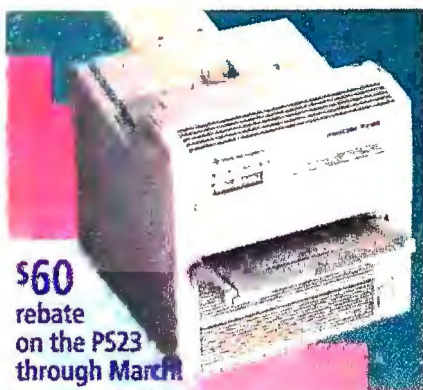
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The Boss From Hell You remember him: the one who always called you into lengthy impromptu meetings just as you were leaving for vacation? Who was quick to blame you for his errors, and even quicker to take credit for your accomplishments? Who never seemed to know the status of anything or anyone? You probably vowed that when you became manager, you'd be better—smarter, fairer, maybe even, well, human.

Now that the tables are turned and *you're* behind the desk, what's the verdict? Are you making the same mistakes? Or have you found that elusive "better way"? Maybe you've read a few articles or books, or even taken some classes—all with mixed results. Well, these are the nineties, and there's a new way for the rational manager to approach the task: with software.

Like you, we were skeptical that a piece of software could make anyone better equipped to juggle people, time, and finances. So we decided to test some programs that purport to do this. We assembled a team of *PC World* regulars—all managers in their own right—and had them run a

Management by Software?

Under fire, an intrepid team of managers answers the question: Can PC software—bona fide management packages, group schedulers, and project management programs—help you maximize staff, money, and time?

series of one-month trials with a few of these applications. We looked at a range of products, from traditional project managers to management "coaches" to group schedulers. Our conclusion: These tools *can* make managers more productive, but they're not for everyone, and they require that both managers and employees learn new work metaphors and styles. The memos that follow—each is a dialog between one of three managers and his "boss from hell"—detail our journey of discovery, and explore software-based solutions for common managerial challenges. —*Editor*

By Jeffrey Gordon Angus, Steve Fox, Dan Miller, and Richard Scoville

To: Jeff Angus, Richard Scoville, Dan Miller, Directors

From: Steve Fox, President

Priority: Urgent

Date: January 5, 1994

Re: Getting Back on Track

I trust you've all seen the recent numbers from Monday's board meeting; I am, shall we say, *displeased*. You've all assured me we've already reduced general staff as much as is prudently possible. Apparently, then, I have only three options: Replace myself, replace you, or seek further efficiencies. Option one is unpalatable to me; option two is likely unpalatable to you (though not out of the question). That leaves option three.

I've identified three areas in which we need immediate help: project management, managers' productivity, and group scheduling. We've spent \$125,000 on PCs in the last 12 months; let's see if we can get some return on investment. The three of you have one month to study computer-based alternatives that might best serve our needs.

Scoville, you're in charge of evaluating project management software. I will no longer tolerate late projects and cost overruns—especially when I hear about them too late to correct them or divert necessary resources. Given that in your year-end performance review you characterized yourself as “unafraid to take on new challenges,” I am hereby appointing you to evaluate the usability of the current generation of project management software. Choose the packages that look most promising and try them out. I want to know if they'll help us meet deadlines and budgets, and whether our current crop of employees will be able to learn how to use them.

Angus, I appreciated your clever cost-cutting suggestions and, as you are no doubt aware, instituted them last week when we let go of three of your employees. It's rare that you and I agree on something. (I know, for instance, that you objected to our distribution of copies of *Reengineering the Corporation* in lieu of Christmas bonuses last year.) Simply eliminating employees and bonuses, however, isn't enough. I need to see more efficient oversight from our managers. Since you always seem to have your nose stuck in the latest management treatise, I'd like to see you pass on some of your “expertise” to the rest of the managers in the company. I am not prepared to send all our managers back to school to learn basic

management skills, so I want you to look into software that will make our people better managers. There must be something out there; I want you to find it.

Miller, much has been made of your missing last month's managers' meeting. I won't dwell on that anymore. But I will nominate you to examine the feasibility of group scheduling in our firm. I'm tired of the time we waste scheduling meetings here. Worse, apparently some of our people—and I'm sure you know who you are—have missed

To: Steve Fox, President

From: Jeff Angus, Director of Marketing

Date: January 12, 1994

Re: Your Recent Decisions

One could say that I miscalculated your recent request for a plan to cut staffing costs in the marketing department by 25 percent. I thought you realized that I was kidding when I offered up all three of my direct reports, especially since they were all long-time employees, recognized both within and outside the company for their accomplishments and commitment.

Given their termination—and my sudden acquisition of all 15 of their direct reports—your directive that I find new technologies to replace *their* contributions takes on particular urgency. And your suggestion that you could outsource the entire department to a contract agency in Ciudad Juárez that charges \$8 per person per day is certainly a powerful incentive, too.

OUR PLAN: As you know, I've been a manager since Lyndon Johnson was president and, in general, don't believe that software can replace individual skills. I hope, though, that a program I've found—Avantos Performance Systems' ManagePro 2.0—might be the exception.

A management information manager (or “MIM”), ManagePro helps a manager set priorities, assign work, monitor progress, and remember key people-management details. It provides tools such as group action and to-do lists, structured files that turn the daily tracking of data into a basis for performance reviews, and the Advisor, a context-sensitive management “coach.”

This last feature, if it works, will be critical to our future. While our budget has

key engagements recently because of scheduling conflicts. Will a group calendar solve this problem? If your research indicates it will, I want you to get one of these programs installed for a test run.

I want each of you to report back to me one week from today with your preliminary findings. The right management tools are critical to our company's success—as well as everyone's future employment. Remember, gentlemen, Mexican labor is relatively cheap. Keep your résumés updated. ♦

been “downsized,” our need for skillful decisions *hasn't*. My plan is to delegate much of the decision making to the line staff and let each employee build ad hoc task forces and project SWAT teams that they manage. I'll act as coach and air-traffic controller. ManagePro might enable us to implement my plan.

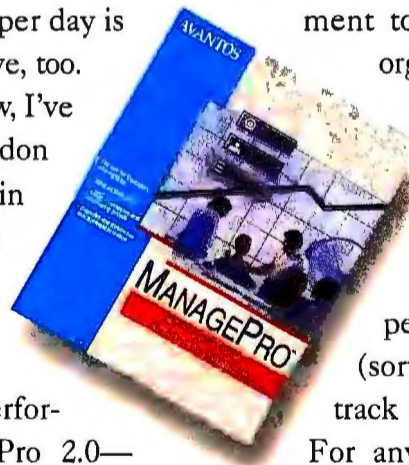
WHY IT MIGHT WORK: First of all, ManagePro seems to be truly networked—not only allowing people to share files over the net, but also allowing them to integrate files with the applications they already know, via DDE and E-mail.

Second, ManagePro is not just a passive project “accountant” that tells you what you *did*; the product aims to actually coach users, weaving together the best of Peter Drucker's management-by-objective philosophy with more modern people-development tools that view employees as organizational assets. Since each staffer will head task forces, each will need to obtain management skills in a hurry.

Third, ManagePro includes personal organization features (sort of a digital Day-Timer) to track appointments and to-do lists. For any staff member not already tracking daily tasks, this should yield immediate productivity gains.

While I don't buy the idea that even great software can replace the skills of good people (like the ones you recently let go), I'm willing to take a look at this package. In concept, it seems to address the right questions. Whether the answers are right...

MY RECOMMENDATION: 1) I go ahead with my push-down strategy, discussing it with the staff this afternoon. 2) I speak with HR about the two or three peo-



ple we are likely to lose who will not be able to work in the new system. 3) We try out a pilot project: Install ManagePro in Marketing as a networked application to enable this different management approach. If the project succeeds, 4) the company adopts it, and I have PR contact Tom Peters to do a feature on how you implemented this brilliant idea.

P.S. As to your kind offer to contribute one-third of the cost of a night class in Spanish, I think I'll take you up on it.

Vaya con carne, el jefe

To: Jeff Angus

From: Steve Fox

Date: January 12, 1994

Re: Your Proposal

I'll run with you on ManagePro, Angus, though it sounds like you want a staff full of chiefs with not many Indians. No complaints here, as long as none of 'em expect to be paid like chiefs. *Capisce?*

And leave Human Resources alone for now. They're still up to their necks in spin control over our recent downsizing.

Now, about ManagePro. I've never heard of it, so I'll want you to run a rigorous test. I'm not sure I trust this mumbo-jumbo management-guru stuff, and the last thing I need is a hall full of loose cannons spouting *Pursuit of Excellence*-isms. Having you to deal with is taxing enough. So I want you to run this trial without reorganizing your entire department.

Assuming it works (a big assumption), I want some hard figures. 1) What will it cost, both in terms of actual purchase price as well as support and training? 2) What are the best-case/worst-case scenarios for further personnel reduction? 3) Most important, can this staff learn it?

To: Steve Fox

From: Jeff Angus

Date: January 17, 1994

HARD FIGURES: Tough to be exact, O Generous One. But I'll try. A ten-pack of ManagePro is \$2995. As for training, Avantos offers a one-day seminar. I figure one day—\$4500 for 20 of us—should be enough to get our people comfortable. By the end of the first month, everyone should be up and running, not just walking fast. And Avantos tech support is free, though I can't guarantee how good it is. You know how many people we have in the company and

Your suggestion that you could outsource my entire department to a contract agency in Ciudad Juárez that charges \$8 per person per day is certainly a powerful incentive.

what they make. Why not have one of your spreadsheet jocks do the math for you?

PERSONNEL IMPLICATIONS: It's a big program with a lot of functions. Experienced managers who understand and accept management principles should find it easy to master. But for most of the bozos in the world who hold the title "manager," it may be tough sledding. The online context-sensitive management Advisor gives good advice, but most managers are more interested in being in charge than in managing. As you know from your fox-hunting exploits, you can lead a horse to water, stick his head in it and spray it up his nose, but you can't make him drink. I suspect we have two or three potential "nondrinkers" in my department who will be emotionally opposed to, or simply unable to function with, the new system. If I'm right, I strongly recommend that we replace them as soon as possible—we're already down three, as you may recall. You will find job reqs enclosed just in case. Please sign them before you leave for that handball tournament in Kauai.

MUMBO JUMBO? Even given your favored "Neutron Fox" management style—that is, wipe out the people but preserve the buildings—I'm surprised you'd call this mumbo jumbo. ManagePro's approach is rooted in four sound management principles: Make clear agreements with your reports as to what's expected; monitor progress; provide feedback; and

review, recognize, and correct performance.

ManagePro carries this off with five "usage levels." Level one, the People Planner, helps you communicate goals, evaluate and document individual results, and create performance reviews. (Even at this basic level, 85 percent of our managers could use help here.) Level two, the People Status Board, adds feedback and coaching between reviews, allowing more frequent course corrections and faster skill development. Level three, the Goal Planner/Manager, is for managers with project authority but no direct reports. It supports delegation, monitoring actual progress versus proposed schedule, and goal management through goal planning and action lists. Level four, the Goal and People Manager, combines the Goal Planner/Manager and the People Planner, integrating communication and project management. Level five is ManagePro's Holy Grail, the Management Advisor. It merges goal and people management with individual skill development as practiced in the People Status Board.

I'll be starting my staff at level four, the Goal and People Manager. It took me about 5 hours to set it up to manage 15 direct reports. BTW, check out the canned tutorial; it offers a good functional overview.

GETTING A HEAD START: Since the program runs as either a stand-alone application for a manager or on the network for my reports, I'm going to circulate the tutorial, which has special versions for manager



and managed. I'll require everyone in the department to go through the tutorial and discuss the implications of working with the product. Deadline: end of next week.

Then, I'll start them at the shallowest level—keeping to-do lists and coding them by goals I assign. Later, I'll introduce more of the program and put it online so I can help them set priorities and stay on schedule. Once ManagePro is networked, I'll get an alert when anyone has missed, or is in danger of missing, a deadline. Deadline for network installation: end of the month.

IN SUM: I like ManagePro's point of view. It's not going to work for everyone in the company, especially a certain testosterone-overloaded showboat down in Sales. But I do think, short of sending managers to night school, it's the best we can hope for.

Vaya con huaraches, el jefe

To: Jeff Angus

From: Steve Fox

Date: January 18, 1994

Nice to see you're still working on your Spanish, because your geography stinks. It's Maui, not Kauai, and it's for a sales conference. The handball tourney just happens to be going on that same week.

Your plan looks fine. Just promise me I won't end up with a staff of Anguses when this is over.

P.S. Signed job req forms are with my asst.

To: Steve Fox

From: Jeff Angus

Date: February 7, 1994

While you were in Maui, we continued the ManagePro experiment, though it required a lot of extra effort on the part of the staff, including working on weekends. I think you'll notice a touch of prison pallor on the workers, who haven't seen daylight for ten days. (By the way, *great tan*, Boss.)

MY CONCLUSION: ManagePro does what it was designed to do. Does it solve all our problems? No.

THE GOOD NEWS: The task force plan looks workable, with some modifications. I'd hoped every staffer would assume responsibility, but five of them have made it clear they don't want the responsibility.

At first, the staffers who will be managing task forces will use ManagePro to sharpen their skills. The program is a great help in most areas (the context-sensitive Advisor is great for high-level conceptualization). I

think it's already helping them understand the job of management.

The to-do list and task calendars are already making a difference. My staff has missed few details, and I'm able to do better "air-traffic control," deciding which things get done and which are put off. But I'm not sure we can maintain these efficiency gains in the presence of reduced staffing and increased workloads. As I've said before, this downsizing fad is like strip-mining employees, using them up for short-term gain. No computer can make a company's flawed strategy any less destructive.

THE BAD NEWS: Four people have strongly objected to our using this kind of program to invade their privacy. One believes it isn't my job to monitor her regularly as long as she meets deadlines and does quality work (she does; she's one of my star employees). The other three feel it violates their privacy to have me "surfing" their schedules over the net. I'll let my "star" out of the system for now, as long as she keeps me informed. Assuming we go with ManagePro (and I think we must), the other three will have to be replaced.

Our pilot project is a great success. We've hit our deadlines this month, despite the

To: Steve Fox, President

From: Dan Miller, Director of Research

Date: January 11, 1994

Re: Group Scheduling Project

First of all, I want to apologize once again for missing last Wednesday's meeting. As I explained previously, my absence was the result of a series of unforeseen (and, I might add, unforeseeable) events and was in no way intended as an insult to Mr. Nagatomi. As requested, I've written letters of apology to Mr. Nagatomi and the board of directors. If there is anything else I need to do in this regard, please let me know.

Your observation re our need for group scheduling is on the money. I just had Collins in my department prepare a short report of our current meeting-invitation process. She found that for a five-person meeting, we exchange a minimum of 10 E-mail messages and typically as many as 25—roughly equivalent to one hour of work. Arranging a meeting takes longer than the meeting itself. Group sched-

absence of my three top employees. For the success to continue, I need no more resource cuts for a while and a chance to smooth out the inevitable kinks.

MY RECOMMENDATIONS: 1) Install ManagePro in one new department every other month, starting with the best-managed groups and working down to Sales. 2) Managing is a way of life, so I suggest we start the socialization process for all departments now by providing each director with the book that accompanies the product. 3) Make use of Avantos's training seminars to get each group up to speed. 4) Develop an informal, companywide user group to meet once a month to exchange ideas and tips about the product's use.

The limitations, as always, are not in technology but in the way human beings manage. ManagePro is an excellent product with a strong, constructive point of view. But if our managers don't embrace the underlying management principles and act on them, the program won't work for us.

Vaya con pesos, el jefe

P.S. That macadamia brittle you brought back from Maui was a big hit at my Business Spanish class. Last night I learned the Spanish term for "unpaid overtime." ◇

uling software would (in theory) make this kind of wheel-spinning a thing of the past.

I've drawn up a series of questions that we should address before we begin any trials.

1) Will this be companywide or merely for a few departments?

2) Even though almost all of us have moved to Windows, there are still some holdouts in Accounting running DOS.

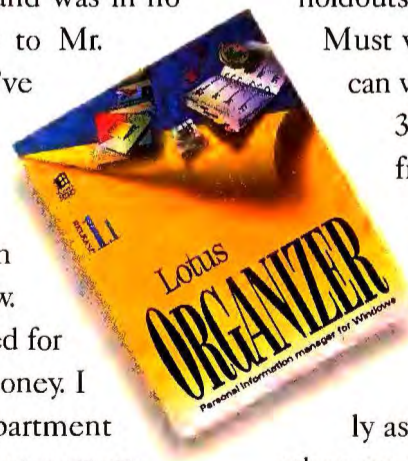
Must we commit to a DOS app, or can we go with Windows?

3) What support can we expect from Information Services? Some programs may require daily administrative support; other programs may require less backup.

4) These programs are only as good as the weakest link.

In other words, unless everyone in the group participates, a group scheduler is worthless. Will group scheduling be a top-down mandate, or will I have to cajole people into using it?

I know that you're busy and I hate to take up your time, but it will be tough for me to



proceed without your input. Perhaps we could meet at the end of this week to discuss some of your specific concerns. Are you free this Friday morning sometime before 10 a.m. to talk about this?

To: Dan Miller

From: Steve Fox

Date: January 12, 1994

I don't have time for a face-to-face. Frankly, I'd expected a bit more initiative from you on this. For that matter, we didn't need a time-wasting study to demonstrate the obvious—that we waste too much time setting up meetings. Instead, I need specific recommendations about a program or programs that can help us. As for answers to your questions:

- 1) Eventually I want group scheduling implemented throughout the organization. But let's crawl before we walk, shall we?
- 2) I want the best program for the job. Find it.
- 3) MIS will do whatever the hell I tell them to. But you know they have a lot on their plate. Low maintenance is better.
- 4) I've put you in charge of this. I want you to make it happen. If you must have backup, you'll get it, but I don't want to divert my energies here.

Now, let's see some details. On my desk. Tomorrow.

To: Steve Fox

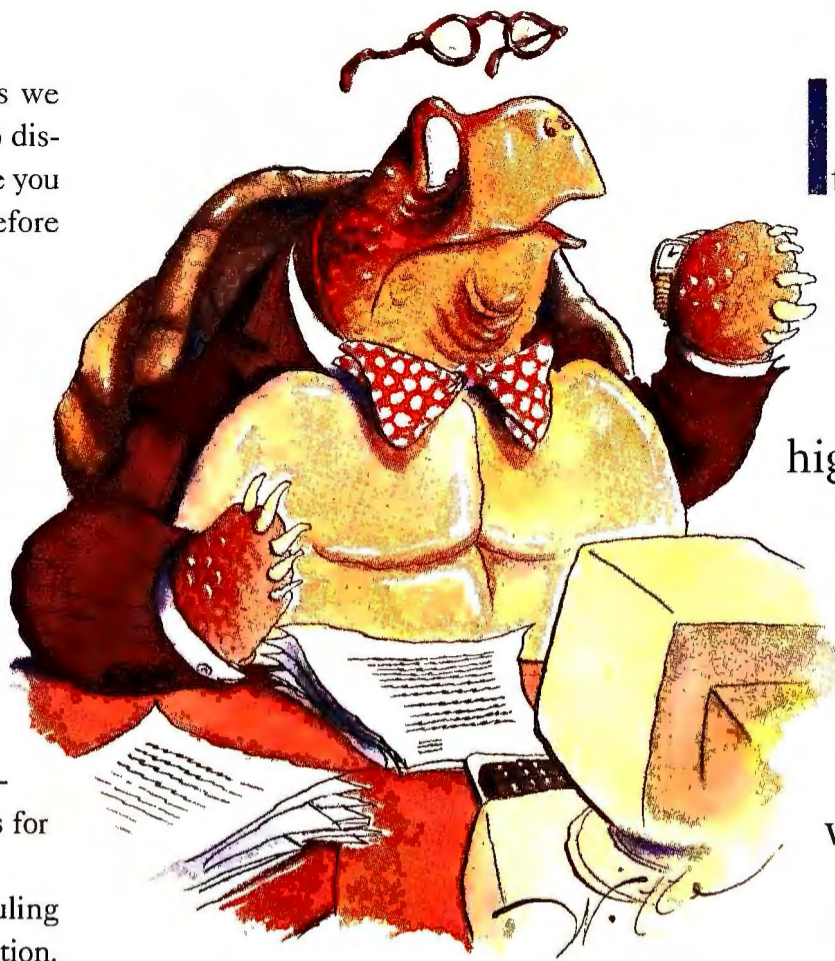
From: Dan Miller

Date: January 13, 1994

Re: Follow-up to Group Scheduling

As requested, herewith my recommendations. All group scheduling packages require some means of passing meeting information between users; some of them piggyback on existing E-mail systems. I recommend that we try to find a program that uses cc:Mail, since everyone in the organization already uses it. This might also translate into lower technical support requirements, since MIS is already supporting cc:Mail.

I also think we should commit to a Windows app. Our experiences with a DOS-based contact database on the server indicate that Windows users are reluctant to use a DOS program (see my memo of August 16, 1993). We've also found that Windows programs, because of their consistent user interface, are easier to learn, which means they're more likely to be used.



That said, I've narrowed the field to two candidates: Powercore's Network Scheduler 3 and Lotus Organizer. For our initial tests, I think we should try Organizer. It meets the criteria above (it's a Windows app that runs on cc:Mail). Part and parcel of that, people who don't use Organizer will receive meeting invitations as cc:Mail messages.

Second, it's easy to use. In review after review in the computer press, critics have raved about Organizer's ease of use. In fact, several members of my department use the stand-alone version and swear by it.

The program's interface mimics the familiar "Day-Timer"-style binder. To move between the calendar, address book, and other sections, users click the binder's tabs. You can reschedule appointments by dragging them from one day to another, and delete items by dragging them to an on-screen trash can (from which they disappear in a burst of animated flame).

Finally, Organizer should run us \$66 per user for 100 or more—competitive, if not the cheapest thing out there. But each copy of Organizer has the added advantage of including a stand-alone address book and other utilities, which integrate with the schedule module.

ALTERNATIVES: If Organizer proves to be a bust, I'd like to do a trial test with Network Scheduler. If that fails, we could fall back on Microsoft's Schedule Plus, which ships as part of Windows for Workgroups. The biggest problem with Schedule

It seems our employees are often resistant to mandates from on high. I need only remind you of the uproar that ensued when your predecessor insisted we use Microsoft Excel in all departments.

Plus: We'd have to get everybody in the company to install Windows for Workgroups (or, at the very least, to use Microsoft Mail), which may be overkill.

IN SUMMARY: I'd advocate the following action items: 1) We order Organizer in a ten-user pack. 2) I'll work with MIS to install it on the server. 3) I'll recruit nine users in my department to conduct a pilot program. 4) After a one-month trial, I'll deliver final recommendations.

By the way, it was Collins's idea to conduct the study. I hadn't authorized it. Of course, I'd have checked with you first.

To: Dan Miller

From: Steve Fox

Date: January 17, 1994

That's more like it. But I want your schedule accelerated. Three weeks, tops. If we decide to go ahead with a group scheduler, I'll want to cut the purchase orders before the end of Q1 since we have no other major software purchases slated for that quarter.

To: Steve Fox

From: Dan Miller

Date: February 14, 1994

Re: Group Scheduling Trial

Now that we've completed our shortened trial with Organizer, I can report that group scheduling *is* viable for our company. It will not, however, be easy. The trial has been a battle on two fronts: with MIS on the one hand and with end users on the other.

Charlie in MIS was slow to get with the program. It was two weeks from the time he received the Organizer network administrator's pack until he reported he was done. And even after he said he'd finished installing the network files, he hadn't. Apparently, he had failed to take one last, crucial step in the installation process. It took a walk downstairs and a five-minute visit to Charlie's cube to finish the job. Total work time required for server installation: an hour, tops. Time from beginning to end of project: four weeks.

Once Organizer was installed on the server, we still had to install it on ten individual workstations. Given Charlie's recalcitrance, I decided to do the installations myself. Each installation took about half an hour.

For those who'd already been using the stand-alone version of Organizer, the transition to the group version was painless. And setting up appointments went smoothly, saving time almost immediately. The transition was rockier for those who were using other calendars and PIMs. They had no trouble importing address records, but Organizer can't import calendar records—there's no standard format for calendar files.

Using the program was no problem. But I anticipate some problems taking this experiment companywide. For one thing, in group-scheduling mode, users found the method of receiving and acknowledging meeting invitations clunky. Invitations show up only in your cc:Mail box. Then you must double-click on an attached file to bring up a response dialog box, and click a Turn To button to view your Organizer schedule. The other major failing: The calendar doesn't support a monthly view.

The other modules have their weaknesses as well. You can't select more than one item at a time, which makes editing your address book a pain; you can't specify recurring to-do items; the record fields in the address section are inflexible; and there's no support for public databases, so users can't share a contacts directory over the network.

On a more general note, it seems our employees are often resistant to mandates from on high, particularly when it comes to software. I need only remind you of the uproar that ensued when your predecessor insisted we use Excel in all departments (the 1-2-3 users in Accounting were particularly vicious). I think, if possible, we should try a gentler approach in this case.

First, we need to sell users on the concept of group scheduling. Our central message must be that the advantages of group scheduling—to each user, not just to the company as a whole—are enormous. Let's stress that users can maintain their privacy by marking any appointments confidential. And let's not mandate use of the package beyond group scheduling. If we can ease resistance by allowing users to continue with their old address books and other familiar tools, let's do it.

Second, let's run a few more trials with different software packages and let the users have major input into our buying decisions. Then, in a companywide meeting, let's explain our eventual purchase decision.

To: Steve Fox, President

From: Richard Scoville, Director, Operations

Date: January 12, 1994

Re: Project Management and All That

Steve, I must say I applaud your memo. You are no doubt aware of the concern Helen and I have shared about your investment in PCs over the past few years. We had really expected a more demonstrable return. But then, you've known your mother longer than I, and you fully understand both her resolute nature and her position as majority stockholder in this firm. Of course, I disagree that our project management is in the state of disarray you describe. True, we were a few days tardy in completing the Hupp River project, but that was clearly the fault of unrealistic promises by that zealot Angus and his marketing people, and the \$300,000 cost overrun was barely a blip in our excellent product picture.

Now then, regarding project management software, it sounds intriguing. We've been using Gantt charts (time lines that show the relative duration of tasks) to help manage our operations projects for some time, and software that allows us to prepare these more quickly could be helpful. I've asked my colleague, young Perkins, to search out the latest and greatest, and she tells me the two market leaders are Project, from Microsoft, and TimeLine, by a company called Symantec. Coincidentally, new versions of both are under develop-

ACTION ITEMS: Organizer has indeed proved remarkably easy to use, but it may not have all the flexibility we'll ultimately need. I recommend we begin immediate trials using Network Scheduler, OnTime for Windows, and Schedule Plus, before committing to any one package. This is too big a commitment to base on a one-month trial. Say the word, and I'll set these pilot programs into motion.

To: Dan Miller

From: Steve Fox

Date: February 15, 1994

Quite the eager beaver, aren't we? Okay, consider the word said. But this time, you get just two weeks. Starting now. ◇

ment. We have contacted their marketing people and they are sending prototypes (I believe they are called *betas*) for our review.

When they arrive (and after Helen and I return from the Western Seniors Golf Tournament), I will perform an evaluation of these products myself, with Perkins's assistance. Let us hope they're more comprehensible than that dreadful 1-2-3 thing you tried to foist on me in '83.

To: Richard Scoville

From: Steve Fox

Date: January 13, 1994

Richard, I hope you didn't misconstrue my last message. That was a group memo, and you know how hard it can be to get Angus's and Miller's attention.

Now, I know that nothing can keep you and Mother from going to Pebble Beach, and I would love to get this evaluation under way as soon as possible. So I have a modest suggestion for you: While you're away, why not have Perkins install the Project and TimeLine programs, look over the manuals, and get started on a project or two? Then, toward the end of the month, you can review Perkins's work and make your recommendations. Until then, I wish both of you long drives and straight putts.

Tell Mother that Cynthia sends her love.—Steve





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Since our project managers are familiar with Windows spreadsheets, they should be able to put Project to work in short order. But I'm not sure about our senior managers—they rarely use PCs.

To: Steve Fox

From: Sally Perkins

cc: Richard Scoville

Date: January 20, 1994

Re: Project Management Software

Mr. Scoville asked me to report to you on the usability of two new project-management software programs. I've obtained pre-release copies of Microsoft Project 4.0 and TimeLine 6.0, installed them, and took the liberty of setting up a typical project.

Using Project, it took me about five hours to set up all the tasks for the upcoming Sea Islands Camellia Show that Mr. and Mrs. Scoville are sponsoring in April. Armed with what I had learned from Project, I then set up the same project using TimeLine, even though its help system seems much less thorough. Based on what I tried, I've come up with some preliminary observations.

As I'm sure you know, these programs allow managers to break a complex project into discrete tasks, arrange the tasks in order, and assign resources (staff, vendors, or equipment) to them. By estimating the length of time each task will take and the cost of the resources required, one can estimate how long it will take to complete the project and how much it will cost. As work proceeds, one can generate schedules and to-do lists, enter actual times and costs, and produce reports to show how the project is proceeding relative to the original estimates.

I admit I felt a little unsure about this assignment at first because, even though I

used plenty of PC software in college, I'm not that familiar with project management. But the online help systems built into Project have been a great help, especially the quick tour, which defines basic terminology and gives a program overview. And cue cards (pop-up explanations with menus) lead you through the process of setting up a project.

Given that most of our project managers are already familiar with Windows spreadsheet software, they should be able to put Project to work in short order. I'm not sure about operations' senior managers since they rarely use PCs. Also, it takes a long time to think through and enter all the details of a big project, and our managers are busy people. Mr. Scoville has asked me to teach him to use these programs when he returns next week so he can determine how they might fit into our management plans.

In closing, Mr. Fox, let me say how delighted I am to be working on this project. I look forward to helping Mr. Scoville learn all about it.

To: Sally Perkins

From: Steve Fox

Date: January 24, 1994

A camellia show, Perkins? I had expected we'd be using project management software on more critical business pursuits.

Make sure your boss is fully conversant with the chosen packages within a week after his return. I'm holding you personally responsible for getting him up to speed.

To: Steve Fox

From: Richard Scoville

Date: February 16, 1994

Tut tut, Steve, old man, what could be more critical than Helen's flowers, eh? (Actually, the software was a big help: The camellia show project involves 43 individuals and 380 distinct tasks!) You nearly scared poor Perkins to death with that last blast. But never fear: She has taken me in hand, and after three days, I am a new man. Forthwith, my assessment:

First of all, let's dispense with the silly notion that general management will use this type of software for planning. This software is not for casual to-do lists, nor is it for run-of-the-mill assignments or overseeing a few employees as they go about their tasks. It's for large projects, and the level of detail required to set up software to support a large project is extraordinary.

I also think upper management is unlikely to dig into these packages. Again, there's the problem with complexity and setup time. I do believe, however, that upper management could benefit from using the software to monitor active projects.

So that leaves our professional project managers. They will be the primary users, and I suspect they will benefit greatly from the discipline imposed by the program as they think through all the steps of a project. In general, any team project that takes more than a week to execute would probably justify the time required to set it up in the software. Anything less, forget it.

HOW WE CAN USE IT: 1) Planning. As I see it, this software's most valuable characteristic is that it forces a project manager to think through all the steps of a project, assigning resources to tasks and estimating costs down to the level of unique task responsibility. We should be able to use it very effectively for budgeting and preparing proposals. Because it's flexible, the software can truly mimic the structure and flow of projects. Some examples: Both programs allow us to specify a schedule for each individual resource, and both offer Gantt (time line) and PERT (flowchart) views, with task dependencies (in which one task must be completed before another) and critical paths (tasks whose length drives the overall length of the project) clearly marked. Either program allows us to designate dependencies not only as "finish to start" (you must complete the foundation of a building

before commencing the superstructure) but also as “start to start” (painting can begin as soon as you start putting up the drywall).

When a project is complex, it is not feasible for a single project manager to think through all the details alone. Fortunately, the programs are prepared for this: They allow each manager—plumbing, electrical, computer systems, and so on—to set up a subproject; the overall project manager maintains a master project file that reflects the current status of each subproject. Perkins assures me that we can install the software on our local area network to facilitate this kind of communication.

2) Anticipate resource conflicts. This is key to avoiding disaster once a project is under way. Once we’ve ascertained all the tasks and assigned resources, the software goes on automatic pilot, determining where resources are overcommitted or undercommitted and reporting the results in a bar graph. Then the manager can rearrange schedules to avoid bottlenecks before a project begins.

3) Generate work schedules. Although to-do lists alone are not enough to justify adopting this sort of software, once you’ve set up a project, the software provides to-do lists and reports in the form of calendars, along with E-mail messaging to notify everyone of changes.

Product Information

ManagePro 2.0 for Windows Combines savvy management philosophy and tracking tools to enable managers to actively oversee people and goals.

Avantos Performance Systems, Inc., 510/654-4600.

List price: \$395; ten-user pack \$2995.

Reader service no. 829

Lotus Organizer 1.1 A personal information manager and easy-to-use group scheduler.

Lotus Development Corp., 800/635-6887, 617/577-8500. List price: \$149.95; ten-user pack \$1160.

Reader service no. 830

Symantec’s TimeLine 6.0 and Microsoft Project 4.0 Professional project management tools for planning and tracking complex, multistep projects.

Symantec Corp., 800/441-7234, 408/253-9600. List price: \$699. Availability: Expected May 1994.

Reader service no. 831

Microsoft Corp., 800/426-9400. List price: \$695. Availability: Expected April 1994.

Reader service no. 832

T rue, we were a few days tardy on the Hupp River project, but that was the fault of unrealistic promises by that zealot Angus in Marketing, and the \$300,000 cost overrun was barely a blip.

4) Track a schedule against the baseline. Once a project is under way, we can establish the proposed schedule as a baseline. As tasks are accomplished, we enter their actual durations and resource utilization and print a report that shows which tasks were completed on schedule and which have fallen behind. The critical path calculation lets us know whether such slippage will affect the final completion date.

5) Provide roll-up reports for senior management. Here’s one you and I will appreciate, Steve: Summary reports can suppress levels of detail, so we’ll be able to get overviews as needed.

HOW WE WILL NOT USE IT: As I’ve said, this is a specialist’s package. Our project people can use it to manage contracts, but let’s not try to force it on our middle managers.

And forget using this software for tracking actual costs: We already have an excellent accounting system for personnel, equipment, and materials. In fact, this software could do us a real disservice here, since many of the people involved with these projects are competitively paid professionals. Were they to appear by name as “resources” in a project, it would be an easy

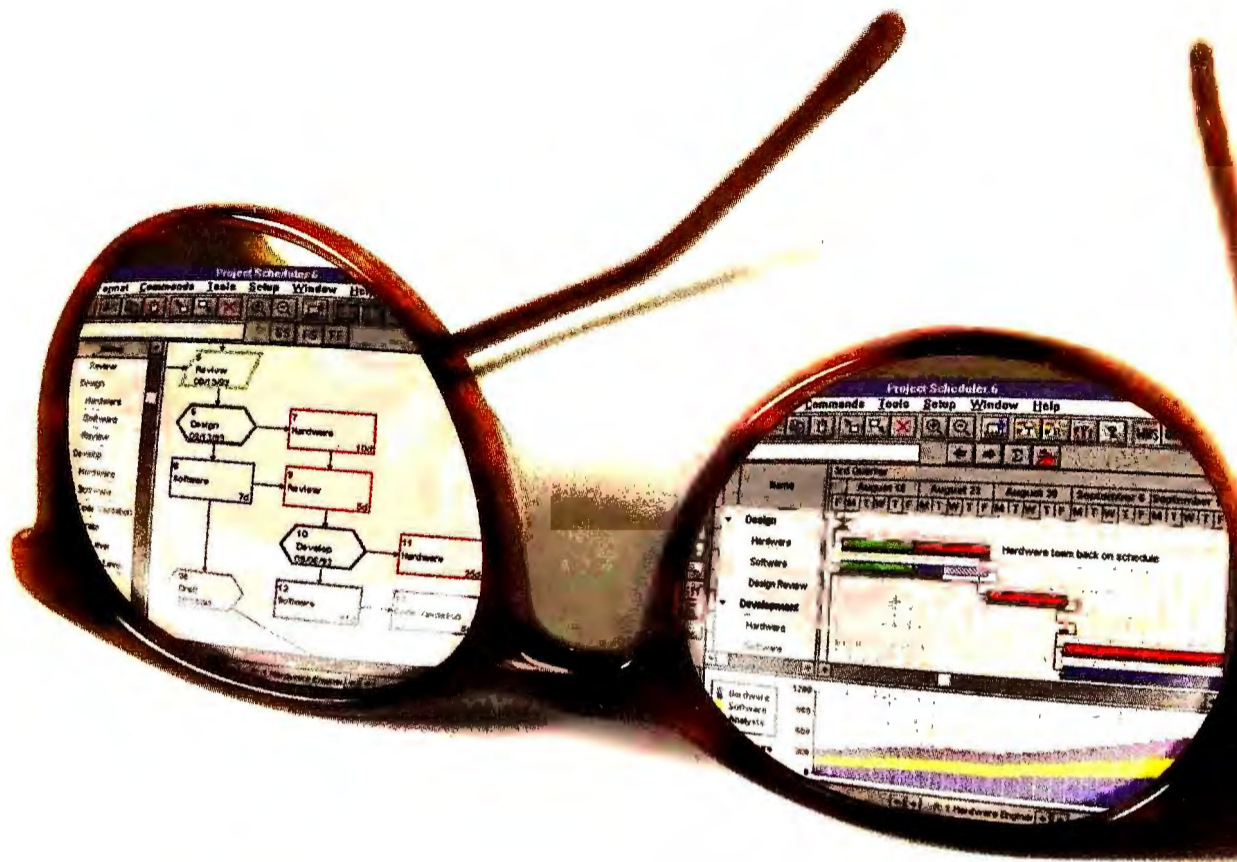
matter for any of them to deduce their co-workers’ salaries based on the costs assigned to their time. We do not want these fellows comparing notes, now, do we?

Incidentally, this Windows software is remarkably easy to use; it is a far cry from my experience ten years ago.

MY RECOMMENDATION: Let’s go ahead with this as a standard planning and scheduling tool for major projects. My software choice would be Project, with TimeLine a close second—its range of functionality is comparable to Project’s, but it seemed more difficult to fathom since it lacks Project’s tutorial devices. Should we adopt Project, let’s not neglect training (for once, I find myself agreeing with Angus!). I think we could introduce it to our project managers in an intensive two-day seminar. Then we could run a one-day class tailored to general management and anyone else who needs access to the information we’ll store in these programs. Who knows, maybe even you and I could learn something. ◇

Steve Fox is a senior editor and Dan Miller is an assistant editor for PC World. Richard Scoville is a contributing editor for PC World and a software training consultant in Chapel Hill, North Carolina. Jeffrey Gordon Angus is a Seattle-based management and computer consultant. Thanks to Emory Moore and Tom Colley of Greenville, South Carolina, for their insight into project management.



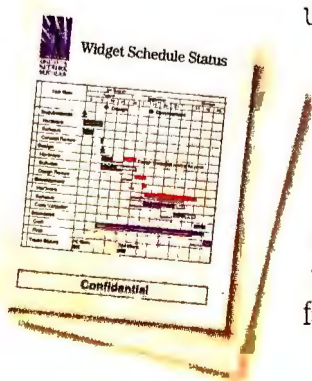


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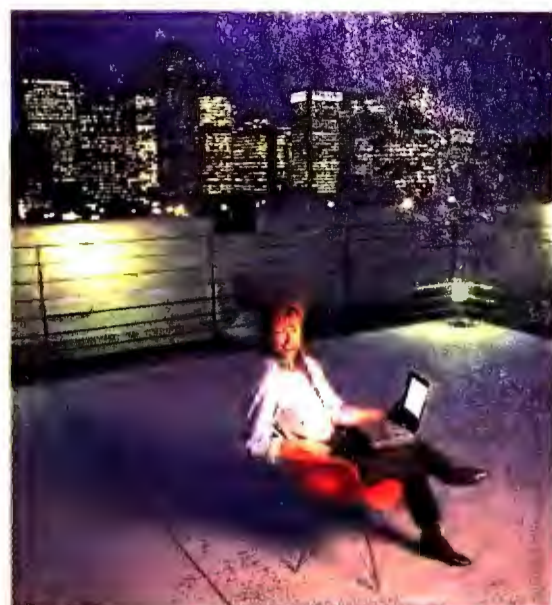
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SMALL OFFICE HOME OFFICE

FROM HIGH-RISE TO HOME:
HOW TO SET UP A SMALL OFFICE THAT WORKS.



SUSAN ROCKRISE,
CREATIVE DIRECTOR



SUSAN D'ELIA, MEDIA RELATIONS;
STEVEN WRIGHT, SALES



MARK DOWIE,
EDITOR-AT-LARGE

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EDITED BY STEVE FOX AND ROBERTA FURGER

COVER PHOTOGRAPHY BY ERIK BUTLER. COVER ILLUSTRATION BY JEFF KOEGEL.

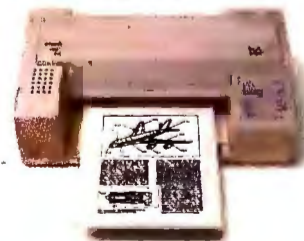
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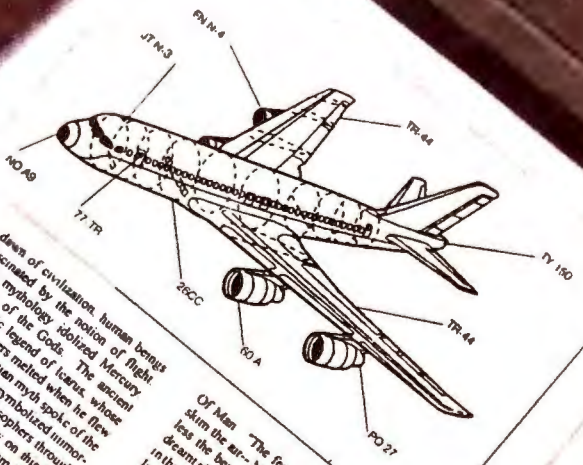


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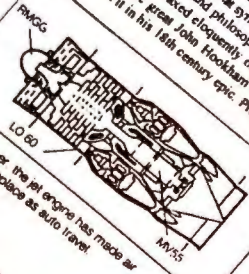


DATA
PAPER OUT
INK OUT
EJECT
LOAD/EJECT
PAUSE



Since the dawn of civilization, human beings have been fascinated by the notion of flight. Ancient Roman mythology idolized Mercury, winged messenger of the Gods. The ancient Greeks told the tragic legend of Icarus, whose wings of wax and feathers melted when he flew too close to the sun. Egyptian myth spoke of the phoenix, a beautiful bird that symbolized immortality. Writers, poets and philosophers throughout history have waxed eloquently on this lofty subject. As the great John Hookham Frazer so lyrically put it in his 19th century epic, Progress

Of Man: "The feathered race with pinions skim the air-- Not so the mackerel and all less the bear-- Yet while flying has been in the last century that it has become a reality. In 1901 near Kitty Hawk, North Carolina, the Wright Brothers helped set modern air travel off the ground with the first controlled and sustained, power-driven flight in history. Their distance of 120 feet at an altitude of 8 feet for about 12 seconds. But it took the invention of the jet engine in 1939 to truly make mass world-wide air travel feasible. More powerful and economical than the propeller engine, the jet engine has made air travel nearly as commonplace as the auto travel of the past. Today, a trip that once took days, weeks, or even months can now be achieved in a matter of hours. Natural boundaries have been eliminated. Indeed, the world has become a smaller, more intimate place.



With more power, the jet engine has made air travel as commonplace as auto travel.

ON PAPER.

EPSON®

ONE OFFICE, TWO BUDGETS

HOW TWO VETERAN WORK-AT-HOMERS NAIL THE BEST DEALS ON A COMPLETE OFFICE—INCLUDING PCs, FAXES, PRINTERS, AND SOFTWARE

IF SOMEONE HANDED YOU \$2500 to outfit an entire home office—a computer, printer, fax, software, and accessories—what would you buy? How about \$5000? We approached two experts—both computer mavens with thriving home offices of their own—waving two cashier's checks and posed the following challenge: Shop around, do some research, wheel and deal, and when you're done, pick out one dream home office for \$2500 and another for \$5000. Then tell us what you bought.

The ground rules were strict: Stick to the budget. Pull together enough software to give a small business some muscle. Find the kind of high-quality printing you'd be proud to show a client. Don't forget to throw in some kind of fax capability. And make sure it all runs on a powerful enough computer to get a home-based business off the ground.

We did make one aspect of this assignment easy. Sales tax and shipping charges, we realized, vary greatly according to location. So we instructed our two shoppers to spend fearlessly right up to their allowances, ignoring the harsh realities of tax and shipping. The happy contestants in our PC shopping spree were Peter Scisco and Anita Amirrezvani. Pete drew the \$2500 assignment, while Anita got the \$5000 check. Their accounts, and their recommendations, follow.

And remember, Anita and Pete went shopping sometime around New Year's. As they discovered, price is a moving target; you may not find all the same models or deals today. —*The editors*

Stalking the \$2500 Office

Fall came early to the back roads of the information highway. A wet, biting wind disappointed the trick-or-treaters and sent me digging for my wool-lined canvas jacket. I shoved my feet into a pair of cross-trainers, slung a satchel over my right shoulder, and headed into town. With my experience and *PC World's* \$2500, I was everything the savvy computer shopper ought to be.

I figured I would start with the hardware and worry about the software later. That was my first mistake. I was willing to trade brand name prestige for no-name power, and the sales rep at CompUSA read me like last week's news. The in-house CompuDyne line boasted a 486DX2-50 for \$1400, without a monitor. The 245MB Maxtor drive and 4MB of RAM were all right for DOS, but I'm a Windows kinda guy. So we cranked it up to 8MB. My eyes lit on a house-brand 15-inch super-VGA monitor, with a perfectly respectable .28mm dot pitch. I threw it into the mix. I kept both the 3½-inch and 5¼-inch floppy drives, then built an on-ramp to the digital highway with an internal 9600-bps modem from Practical Peripherals. The damage was done, but the bill was still due: \$2351.

The space between her quote and the bottom of my wallet wouldn't house a fly, much less a home-based freelance operative. But I plunged ahead, crossing the aisle quickly to the printers basking beneath the cool glow of fluorescent lamps. The rep stuck to me like ugly on an ape, suggesting a couple of ink jet printers that would satisfy most home-

office production without jarring teeth loose every time a print job moved through the queue. First up was the Canon BJ-200. It looked fine, with a built-in sheet feeder and 360 dot-per-inch (dpi) resolution for sharp, readable text. And it was small—a plus in my office. CompUSA listed the printer at \$279 and Canon was offering a \$30 rebate.

Stalling for time, I diverted the sales rep's attention to software. I needed the basics—a solid, easy-to-use word processor, a spreadsheet for modest number crunching, and some kind of database for tracking clients. Nothing elaborate, no CAD, no heavyweight financial analysis. I knew I could get all of this in a package deal, like Microsoft Office or Lotus SmartSuite, and so did she. What she didn't know was the right price, quoting me an absurdly low \$100. *Right, sister*, I thought to myself. *When toasters fly.*

I ditched her faster than a hot-wired Mercury and headed into the shelves solo. As I suspected, the rep was thinking Microsoft Office (\$500) but talking Microsoft Works—an integrated package that packs a lot less power.

I didn't leave with a system, but my time at CompUSA wasn't wasted. Now I knew that if I dropped the CPU a notch or two, I could come in at around \$1800 for the system. That would give me room for the printer and software.

THE PHONE BECKONS

Time to hit the phones. Ordering a computer by phone doesn't scare me, but trying to fix a broken computer does. So

BY ANITA AMIRREZVANI AND PETER SCISCO



before getting on the horn, I scanned *PC World's* service and support ratings to see which computer companies seemed to have the happiest customers. I decided to concentrate on those firms that customers said they'd most likely recommend to a friend.

The end of the alphabet seemed as good a place as any to start, so I called Zeos. When we started dickering, I made straight for a 25-MHz 486SX system. The 214MB hard disk advertised was a bit small for my tastes, but I let it slide. We talked a little about fax-modems, about adding memory, and about the warranty, service, and support. Then the Zeos rep spoke those magical words: "unadvertised special." Instead of putting together a 486SX-25 system that met

THE \$2500 OFFICE

PRODUCT	SOURCE	PRICE
Zeos 486SX-33 PC, 14-inch monitor, 8MB RAM, 340MB Conner hard drive, 1MB video accelerator, Windows for Workgroups 3.11, DOS 6.2, Ami Pro	Zeos Int'l	\$1745
One year of on-site service	Dow Jones	\$49
Canon BJ-200 bubble jet printer	CompUSA	\$249
Quattro Pro for Windows	CompUSA	\$38
Money Counts Business Edition	CompUSA	\$40
Supra fax-modem, WinFax Lite	PC Connection	\$150
APC power suppressor	PC Connection	\$60
PKZip	PKWare	\$47
America Online (one year)	America Online	\$120

TOTAL: \$2498

all my specs for \$1645, for an additional \$100 Zeos was willing to jack up the processor to a 486SX-33 and bump up the hard disk to a 340MB Conner drive. To sweeten the pot, Zeos would throw in my choice of Lotus software. That put me under \$1800 with a top-notch word processor, Ami Pro, in my kitty.

My next call was to the mail-order big shot Gateway. The information gets pretty crowded at the Gateway exit: The reps have no time for chitchat. But I was able to find a 33-MHz 486SX, with a 424MB hard drive, a 14.4-kbps fax-modem, speakers, and a copy of Microsoft Works, for just over \$1900. "I'll get back to you," I promised.

Now that I had a fix on the box, I started shopping software. For mail order, PC Connection took the top spot for its well-stocked inventory and cheap shipping—\$5 for overnight express no matter what you buy, what it weighs, or where you live. Just a notch below, I discovered Tiger Software, which has a good selection of closeout applications at rock-bottom prices. On the retail side, CompUSA beat everybody for selection and price. And I knew I wanted a copy of PKZip, the \$47 shareware package that most everyone uses to compress files.

After wearing out my shoe leather, I'd narrowed my choice to a few systems that met my ground rules. They all ran on an Intel 486SX-33 processor and would let me upgrade the CPU. They all came with 8MB of RAM and ran video through a local bus equipped with 1MB of video RAM, and each one shot pictures through a 14-inch super-VGA monitor with at least a .28mm dot pitch for clarity. Each was equipped with an APC power suppressor, which guards the system and the telephone line to the modem and backs up its promised surge protection with a \$25,000 insurance policy. And all of them included a year's subscription to America Online, for seeking assistance, advice, and shareware—useful when you run a home business. For faxing and telecommuting, I rigged each system with a 14.4-kbps internal fax-modem.

BALANCING HARDWARE AND SOFTWARE

My ultimate choice, the Zeos 486SX-33, provided the best balance of hardware and software applications—though if I'd had just a few bucks more, I'd have anted up

the additional \$100 for the 486DX-33. And once I had decided to spring for a year's worth of on-site service (\$49), I felt confident that any repairs would be taken care of. The Ami Pro word processor that Zeos threw in free of charge (it's roughly a \$400 value) lets me create high-quality documents. Quattro Pro for Windows, on a \$38 special, puts some serious number-crunching ability on the desktop. Money Counts Business Edition keeps the books and writes the checks. WinFax Lite turns the computer into a fax machine and is as simple to use as a printer. The Canon BJ-200 bubble jet printer produces sharp correspondence, promotions, fliers, and invoices, while keeping operating costs and decibels at a manageable level. The biggest trade-off was the fax-modem, which I would have to install myself. If pulling the top off a computer case makes you feel like an intern at a post-mortem, leave it to the experts.

AND IN SECOND PLACE

If the Zeos hadn't been available, I'd have gone for a CompuDyne from the shelves at CompUSA. For one thing, service and support are as close as the store's repair counter. For another, it was available as an in-store special (when I returned to the store three weeks later, the price had jumped by nearly \$800!). Plus, it's a multimedia machine, with a double-spin CD ROM drive and 16-bit audio card. Then I'd have filled out my software kit with an integrated package—the \$120 ClarisWorks, which comes bundled with Quicken 3.0 for Windows. To keep tabs on clients and print pages for my paper-based organizer, I'd have opted for Dynodex, a personal information manager. That would have left me just enough scratch for the Canon bubble jet printer.

No matter how many computers I buy, the next week always reveals another choice, another system, another combination. All the advice boils down to a couple of well-worn phrases. Don't mortgage today to buy tomorrow. Know your comfort level. Keep a bottle of good Scotch in your desk drawer to celebrate your first big deal. And make friends with an accountant.

Peter Scisco writes about technologies for business, education, and leisure from his home office in High Point, North Carolina.

\$5000 to Burn

I hate to admit it, but until recently I still owned a 386SX, though I've taken plenty of not-so-subtle ribbing from *PC World* editors, industry folks, and my so-called *friends* about the state of my creaky old PC. I can't help it: I like to squeeze every dollar of value out of technology. That's why, when it came time to purchase new equipment, I set my sights on a 66-MHz 486DX2 rather than a much pricier Pentium. Just one rung below the top-of-the-line models, the DX2 will give me plenty of power without breaking the bank. To cover my bets for the future, I insisted on a system with a Pentium upgrade socket, although there is no guarantee of compatibility until Intel's upgrade chip is released.

Ideally, I wanted a tower configuration, which would offer plenty of drive bays and, more important, could rest on the floor.

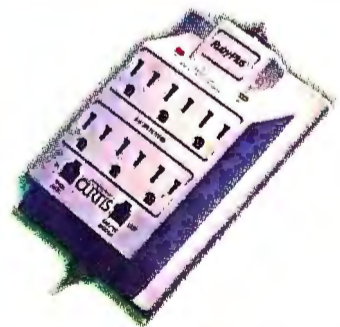
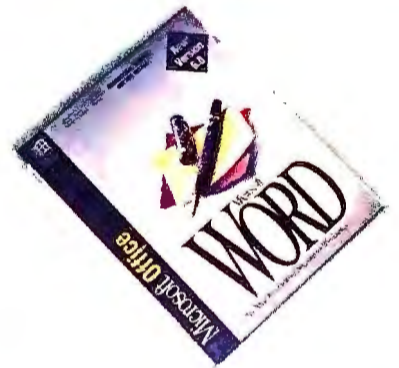
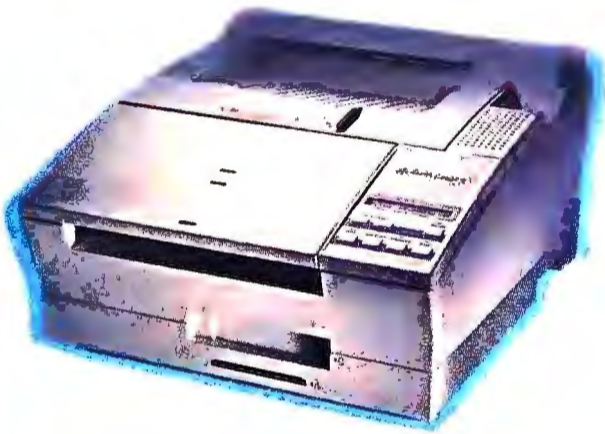
To accommodate Windows, my ideal system needs at least a 400MB hard drive so I can do full installations of every program; 16MB of RAM so I can keep lots of windows open at once; and local bus video with 1MB to 2MB of RAM for zippy screen display.

Because I'm notoriously lazy about backing up, a tape backup drive is absolutely essential—though not very exciting. To get myself more enthused about the system purchase, I decided to splurge on a double-speed CD ROM drive. Some of the most dynamic products I've ever seen—like Encarta, Microsoft's multimedia encyclopedia, or Broderbund's Living Books series for kids—are on CD ROM, and I knew that getting a drive later would seem like an expensive hassle. A sound board would be a nice addition, too, though not vital.

I'VE GROWN ACCUSTOMED TO ITS CLICK

I decided to hold on to my Northgate OmniKey/101 keyboard no matter what I purchased. Any other keyboard feels sluggish. As for a mouse, I wanted one of the new ergonomic devices from Microsoft or Logitech but decided that I could probably live with just about any model.

With my old system, I had fallen severely behind the times by not being able to receive faxes. But now I wanted the real McCoy. Since my budget was liberal, I



THE \$5000 OFFICE

PRODUCT	SOURCE	PRICE
Gateway 2000 4DX2-66 tower PC, 15-inch monitor, 16MB RAM, 424MB Western Digital hard drive, Mitsumi CD ROM drive, one year of on-site service, Windows 3.1, DOS 6.2, Word for Windows	Gateway 2000	\$3000
Colorado Memory Systems 250MB tape backup	Gateway 2000	\$175
TelePath II 14.4-kbps fax-modem	Gateway 2000	\$159
Epson ActionLaser 1500 printer	Gateway 2000	\$669
Sharp NX-1 Home Fax	CompUSA	\$300
Curtis surge suppressor	CompUSA	\$60
Qualtec Lok-kit II	CompUSA	\$25
Quattro Pro for Windows	PC Connection	\$45
Procomm Plus for Windows	PC Connection	\$95
Norton Utilities	PC Connection	\$116
Desktop Set	Okna Corporation	\$99
Ultralight headset	Hello Direct	\$119
CWR wrist rest	Back Designs	\$47
Footrest	Back Designs	\$33
PKZip	PKWare	\$47

TOTAL: \$4989

TIPS FOR BUYING SMART

YOU NEED THE SMARTS TO GET the parts. Follow these ground rules and you'll end up buying a computer system you can grow with.

1. CRANK IT UP. The practical minimum for the home office nowadays is a 25-MHz 486SX. If you're crunching some heavy numbers or performing graphics or CAD work, though, spring for a 486DX, preferably a DX2-66. At the high end, a Pentium chip may tempt you, but it's probably not yet worth the extra bucks.

2. YOU NEED DRIVE. You can never have too much disk space. Get as much as your wallet will support. You can jump from 220MB (the smallest hard disk you should consider) to 340MB for as little as \$30 or as much as \$120. This real estate is a good investment.

3. MEMORY NEVER FORGETS. Microsoft says you need at least 4MB of RAM to run Windows. Liars. Get 8MB. The extra \$200 is a small price to pay to get Windows to run instead of walk.

4. EYES HAVE IT. Don't scrimp on your monitor just to shave some bucks. If you have to stare at a muddy screen for any time at all, you'll pay for it in eye-strain. The size of the screen isn't as important as the clarity of the display. Make sure you get a noninterlaced monitor, with a minimum .28mm dot pitch (the smaller the better). Most entry-level computers ship with 14-inch monitors, but a 15-incher lets you work in higher resolutions, so you can get more information on the screen without squinting.

5. BEAT THE BUSHES FOR GOOD SERVICE. Worst-case scenario: You buy a lemon from a vendor that doesn't care. Hedge your bets by choosing a company with a superior reputation for service and support. Any system you buy should carry at least a one-year warranty; two years is better. Look for a deal that includes a year of on-site service (or an option to buy it) and generous technical support by telephone.

6. ROOM TO GROW. Those small models are cute, but towers and mini-

towers offer more room to add goodies later. CD ROM drives, tape backup units, and additional floppy drives require externally accessible drive bays; fax-modems, sound cards, and other expansion cards need open slots. Figure out what accessories you'll eventually want to add to your machine, and make sure the unit you buy has enough bays and slots to accommodate them.

7. SHOW ME WHAT YOU GOT. An entry-level 486 system is almost certain to come standard with VESA local bus (VLB). That's good, but if you want to get true VLB performance and a reasonable number of colors, don't neglect the video card itself. Insist on 1MB of video memory; that'll probably cost you only \$30 more than the 512K many systems ship with.

8. BE GOOD TO YOUR BODY. Don't become a medical statistic: Shop for a keyboard and a mouse that feel comfortable and conform to the shape of your body. Consider buying a footrest, wrist rest, headset, and/or document clip to help keep your body in alignment. Look for a monitor that offers a flicker-free, 70-hertz refresh rate at the resolutions you intend to use and that supports the Swedish MPR II standards for reduced radiation emissions. If you crave quiet, don't buy a PC with a loud fan or a noisy dot matrix printer.

9. THINK GREEN. The environmental movement is creeping up on Silicon Valley. Many vendors now offer Energy Star-compliant PCs, printers, and monitors that save power by entering an idle state when you're not using them. These devices save you money on your energy bill. Your conscience will feel good, too.

10. SHOP FOR SMART ACCESSORIES. Don't lose your PC to an electrical surge when you can buy a \$50 surge suppressor. Don't hand your PC to a thief when a \$25 security kit will lock it to your desk. Don't save money by skipping that \$150 tape backup unit; it'll save your grits if your system ever goes south.

—A. A. and P. S.

decided to look for a stand-alone fax machine instead of a fax board. Too many of my friends have complained about having their systems tied up for long stretches while their fax boards receive incoming faxes, and frankly, I didn't want to learn how to use fax software. Of course, I also needed a modem—preferably an internal device with a transmission rate of at least 9600 bps. And a printer was essential. With \$5000 to spend, I was pretty sure I could afford a laser printer over a bubble jet or dot matrix; I made a mental note to allot somewhere between \$600 and \$1000.

Since I also like to keep an eye on my electric bill, I wanted the PC, the monitor, and the printer to be Energy Star devices, designed to power down to 30 watts or less after a period of inactivity. Although I don't leave my system on at night and on the weekends, there are times when it stays on without being used. An Energy Star PC would save me some cash each month. More important, I wanted to support environmentally conscious vendors: those who produce green PCs; take back and dispose of dead hardware, as Hewlett-Packard does; recycle old toner cartridges to reduce the load on landfills; or use recycled paper, cardboard, and packing materials.

I also needed to buy a suite of Windows programs: Microsoft Word, Quattro Pro, and Procomm, plus Norton Utilities as insurance against disasters, and Desktop Set for keeping track of my contacts. Ideally, I wanted all these products installed on my system by the hardware vendor.

I HATE SALES TAX

Since I know how to set up a PC and diagnose any basic ills, I had a slight preference for shopping from home. I don't like the crowds you find at computer stores; the pushy, uninformed sales representatives; the long lines; or the driving. Most of all, even though my editor told me not to sweat the taxes, I don't like my county's 8.25 percent sales tax. I figured I could save *PC World* \$250 or so by buying through the mail. Many mail order companies also offer on-site service, which increased my confidence about buying by mail. The only disadvantage? I'd have to personally transfer all the document files from my old system to my new one—a service local vendors had

always provided for me in the past.

After reading a bunch of computer publications, doing research by phone, checking with friends, and making some shopping trips, I ruled out systems by brand name manufacturers such as Compaq and IBM, which would have consumed most of my budget. I got price quotes instead from solid second-tier vendors who have been in business for at least five years and offer generous service and support.

Because of its excellent price and internal components, I finally opted for a Gateway 4DX2-66V, despite the company's dumb ads about cows. For \$3334, I got a 66-MHz 486DX2 tower with 16MB of memory, 2MB of video memory, a 13ms 424MB Western Digital IDE hard drive, a double-speed Mitsumi CD ROM drive with a 300K/sec transfer rate and a 250ms average access time, a Colorado Memory Systems 250MB tape drive, two Epson floppy drives, and a TelePath 14.4-kbps fax-modem.

I settled on Gateway's 15-inch Crystal-Scan monitor, made by Mag Innovision. I was tempted by the 17-inch model, but to my disappointment that would have cost \$350 more. Still, the 15-incher offers a .28mm dot pitch for reasonably sharp characters. It also meets the Swedish MPR II guidelines for reduced radiation emissions (a potential health hazard, though there is controversy on this point. If you ask me, you're better safe than sorry).

The price didn't include a keyboard, since I opted to keep my own. It *did* include DOS, Windows, an ergonomic Microsoft mouse, and my choice of software. I picked Microsoft Word for Windows—the most expensive software item on my wish list.

Off the top of his head, my salesperson knew the make of every component in the PC, and he reeled off magazine awards and lowest failure rate statistics for every device.

Another big selling point was Gateway's

promise of a full year of on-site service and toll-free support. Reportedly the company has reduced the long waits on these lines.

I had \$1666 left. I settled on an Epson ActionLaser 1500 printer—just as reliable as, but cheaper and more capable than, the low-end Hewlett-Packard lasers. Last year I purchased an HP LaserJet IIIp for more than \$900; this time I didn't want to pay a 50 percent premium for the HP name. The Epson cost \$669 from Gateway plus \$25 for shipping.

After reading up on thermal fax machines, I selected a Sharp NX-1 Home Fax from CompUSA for \$300. It features a 20-number auto-dialer and it mounts on a wall or sits on a desktop. With a couple hundred bucks more, I'd have bought Panasonic's Panafax PX-150, which offers an automatic paper cutter and promises to distinguish between fax and voice calls if you have "distinctive ring" service.

With all this new hardware, a surge suppressor and a security lock seemed like necessary deterrents to damage and theft. At CompUSA I paid \$60 for the Curtis Ruby-Plus: a six-outlet surge suppressor that includes protection for a fax machine, a modem, and an answering machine, and \$25 for Qualtec's Lok-kit II security kit, which consists of adhesive plates that attach to your monitor, PC, and desk; a long cable; and a sturdy lock.

To get a tax break on the remaining major applications on my list (Quattro Pro for Windows, Norton Utilities, and Procomm Plus for Windows), I decided to purchase them from PC Connection, a mail-order house, for \$261 including overnight shipping. (A plus: The company offers a toll-free technical support line.) I decided to add a copy of PKZip for squeezing down large files before transmitting them (\$47

plus shipping and handling, directly from PKWare); and Desktop Set cost \$99 from Okna Corporation.

With my last few dollars, I sprang for three key ergonomic comforts: a \$119 telephone headset from Hello Direct, a super-padded wrist rest from Back Designs (\$47), and a footrest from Back Designs (\$33). And that maxxed me out! If I'd had a few more dollars, I'd have sprung for the 17-inch monitor and a subscription to an online service so that I could have some (virtual) interaction, expand my contacts, and stay

Given my liberal budget, I opted for a stand-alone fax machine instead of a fax board—I didn't want to mess with fax software.

informed about the latest technology and business trends.

It was difficult to find a runner-up that offered as good a deal, though I gave some thought to Acer America's AcerPower DX2-66 340CD. Another Energy Star system, the AcerPower is packed with 16MB of RAM, a 14ms 340MB hard disk drive, two floppies, a double-speed Panasonic CD ROM drive, a Colorado Memory Systems 250MB tape backup drive, a GVC 9600/2400-bps fax-modem (no other modems were available), a 15-inch monitor, and 1MB of video memory. The cost was \$3569, including a mouse, Windows, Quicken for Windows, some miscellaneous software packages, shipping, and tax—a few hundred dollars more than the Gateway system.

Acer's purchasing lines were jammed, and I had to call repeatedly before getting any help. "They're short-staffed in there," the receptionist told me. When I finally got through, however, I got good service.

Still, it was the Gateway that eventually won my wallet. And yes, life with a fast PC is definitely better. But now that I've given up my 386SX, what are my friends going to tease me about? Don't tell anybody, but I'm still driving a '79 Toyota.

Anita Amirrezvani is a contributing editor for PC World who specializes in environmentalism and computers.

WHERE TO BUY

ACER AMERICA 800/733-2237; AMERICA ONLINE 800/827-6364;
BACK DESIGNS 510/849-1923; COMPUSA 800/266-7872, 214/888-5770;
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HOME ALONE WITH A PC

BY LESLIE CRAWFORD

NOT EVERYONE HAS A SPARE BEDROOM OR DEN JUST WAITING TO BE TRANSFORMED INTO THE ULTIMATE HOME OFFICE. BUT LACK OF SPACE DOESN'T HAVE TO STOP YOU FROM CUTTING THOSE CORPORATE STRINGS. AS THE

PROFESSIONALS PROFILED HERE ILLUSTRATE, AN OFFICE CAN BE ANYWHERE YOU PLUG IN YOUR PC—FROM A NEW YORK LOFT TO A CONVERTED GARDEN SHED. ALL IT TAKES IS THE RIGHT EQUIPMENT—AND A LITTLE IMAGINATION.



CAROL KEYS AND PHILIP ANDREWS

PROFESSION: Marketing communication designers

COMPANY NAME: Andrews/Keys Associates

LOCATION: San Anselmo, California

EQUIPMENT: Two desktop computers with graphics applications, two high-resolution color monitors, two smaller color monitors, two laser printers, fax machine, modem, scanner, two answering machines, call waiting, five phone lines

OFFICE: Two separate offices in a three-bedroom house

Carol Keys worked for a corporate multimedia firm before joining freelance graphic artist Philip Andrews to set up shop in their own home, a 1950s dwelling tucked into the Northern California backwoods. They say it's popular with clients as a meeting place; their living room doubles as a conference room. "My friends ask, 'Don't you have trouble going to work when you're at home?'" says Keys. "Actually, I have trouble knowing when to 'go home' by shutting the office door."

MARK DOWIE

PROFESSION: Editor-at-large

COMPANY NAME: InterNation, an international features syndicate

LOCATION: Pt. Reyes Station, California

EQUIPMENT: Two notebooks, external fax-modem, ink jet printer, fax machine, AT&T digital remote answering system, two phone lines

OFFICE: Garden shed in back of home

New York-based InterNation, a consortium of publications in 42 countries, offered Dowie a position in Paris, but he

wasn't drawn to *la vie française*, so he proposed doing the job from his home, next to a sprawling national park. InterNation agreed, so the company's "world headquarters" moved to Dowie's garden shed. "My office leaks and the wind blows through it," says Dowie. "Critters are always running in and out; I've found a frog sitting on my phone. It's rustic, but all I really need to communicate is a good fax-modem, a good computer, and some technological know-how."



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SMALL OFFICE / HOME OFFICE

SUSAN ROCKRISE

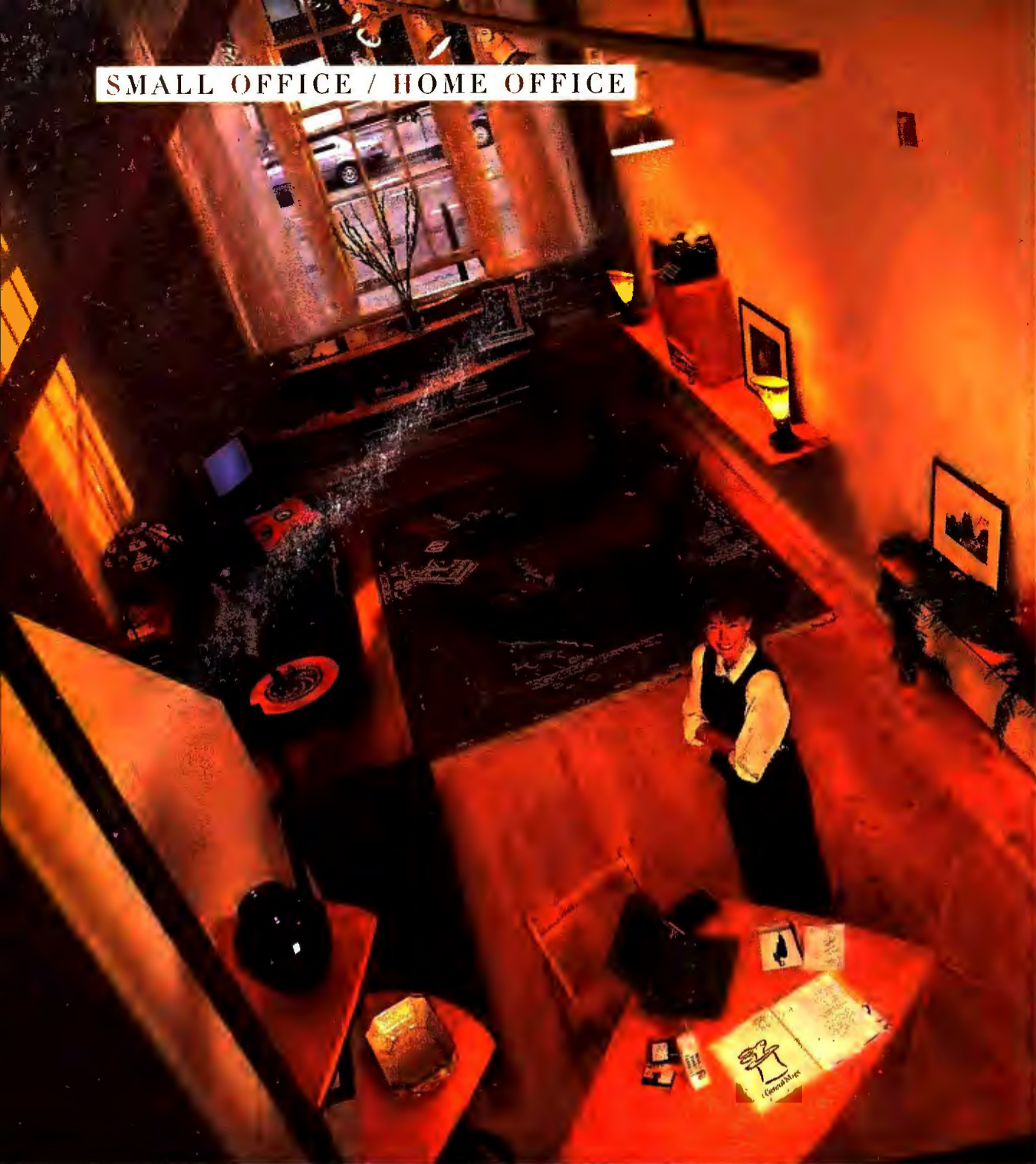
PROFESSION: Creative director
COMPANY NAME: Rockrise & Associates

LOCATION: San Francisco

EQUIPMENT: Notebook with internal fax-modem, laser printer, fax machine, AT&T Message Center, call waiting, three phone lines

OFFICE: 760-square-foot loft located in a historic building with a clock tower

Susan Rockrise, who has worked with NeXT and Esprit and whose current clients include General Magic and Frontier International Travel, says being situated in a San Francisco landmark has been a big plus for her business. "Clients love to come here," says Rockrise. "They feel at ease." Rockrise is equally at home with her arrangement. "I've gone from power suit to flannel suit—my pajamas," she says. She relegates the upstairs to living quarters; downstairs serves as a stylish setting for receiving clients, with 16-foot-high ceilings, blond-maple hardwood floors, exposed brick, and large windows offering a dramatic view of the city.



SUSAN D'ELIA AND STEVEN WRIGHT

PROFESSION: Media relations specialist (Susan); sales manager (Steven)

COMPANY NAME: Newtrend (Susan); Software Spectrum (Steven)

LOCATION: San Mateo, California

EQUIPMENT: Two notebook computers (each equipped with an internal fax-modem), laser printer, dot matrix printer, fax machine, AT&T Message Center, three phone lines

OFFICE: Garage adjoining their two-bedroom house

Susan D'Elia and Steven Wright say working from home

enables them to devote sufficient time to their three small children and two big jobs. D'Elia works for a Florida-based technology company servicing financial institutions, and Wright, for a Texas-based distributor of microcomputer software. Their no-frills converted garage doubles as a regional office for both their companies. Working East Coast hours, Susan often starts work at 5 a.m. "I'm five times more productive than if I were at a formal office," says D'Elia. Wright agrees: "The commute is absolutely marvelous, both coming and going."



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SMALL OFFICE / HOME OFFICE



MARCY HAMILTON

PROFESSION: Independent college admissions counselor

COMPANY NAME: Opportunities Through Education

LOCATION: Mill Valley, California

EQUIPMENT: Three desktop computers, external modem, laser printer, fax machine, photocopier, answering machine, call waiting, three phone lines

OFFICE: Remodeled den

"I have everything here for my clients: reading, writing, and rowing," says

Marcy Hamilton, whose office on scenic Strawberry Lagoon faces an Audubon Society wildlife sanctuary.

"If it's an especially nice day, we go out to the dock for the consulting session," says Hamilton, noting that clients can relax while they watch the birds, seals, and windsurfers. On inclement days, she conducts business from her downstairs den, which is well equipped with computer, printer, and fireplace. A cozy fire, says Hamilton, "makes clients feel more at home."



JOHN DANZER

PROFESSION: Designer and manufacturer of garden furniture

COMPANY NAME: Munder-Skiles, Inc.

LOCATION: New York City

EQUIPMENT: Notebook PC, laser printer, photocopier, fax/phone/answering machine, three phone lines

OFFICE: Studio apartment

"You can design your way out of any problem," says John Danzer, whose 700-square-foot Manhattan studio apartment is proof that small quarters can form an efficient work space. The wall used for slide shows hides a foldaway Murphy bed, and his equipment fits neatly into a "portable office," a rolling metal kitchen rack that Danzer stashes in a closet at the end of the day.

Leslie Crawford is a freelance writer in San Francisco.





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HOT PICKS FOR THE HOME OFFICE

THESE ARE A FEW OF OUR FAVORITE THINGS. BY STEVE BASS

Who's got the time to scour office supply stores, membership clubs, and superstores for the latest hardware and software? If you own a small business, chances are you're already putting in 14-hour days just keeping the business running. Not to worry—we've done the searching for you.

Interested in a way to keep your back and wrists from aching for under \$40? How about a product to inexpensively cool your system and extend its life? Or what about a way to save energy and reduce wear and tear on your printer for about \$60?

Sound intriguing? Read on: There are more hot products where those came from.

ERGONOMIC SMARTS

At the end of the day, your spreadsheet looks good and all your documents are crisp and sharp. But your neck and shoulders are tight, your back's sore, and your wrists are aching. Relax, there's relief in sight with Ergodyne's Stretch Software, a Windows program that uses a combination of text and 3-D graphics to lead you through stretching exercises. At regular intervals throughout the day, the program appears automatically and prompts you with an exercise designed to relax one of the major muscle groups. If you're in the middle of a project and don't want to be interrupted, you can tell the program to appear 20, 30, or 40 minutes later. Don't you feel better already? Stretch Software \$39.95; Ergodyne; 800/323-0052, 612/642-9889, 612/642-1882 (fax).

Reader service no. 719

SNAPPING IT TOGETHER

Are you stuck for space and need a small, cheap computer desk? Instead of spending a lot of money and time shopping for a desk

at the local Danish furniture store, take a look at the SnapEase Workstation. It's small—about 4 feet square—and takes about 10 minutes to assemble. As the name implies, no tools are needed; the components just snap into place. The unit has a keyboard drawer with a built-in wrist support and storage compartment, a mouse tray, and a separate printer cart. SnapEase Workstation \$169; MicroComputer Accessories; 310/645-9400, 310/645-9403 (fax).

Reader service no. 720

FIRE UP THE CANONS

What do people in a home office need most? High-quality equipment that's small, cheap, and easy to use. Canon's new BJ-200e ink jet printer fills that bill. Selling at the major chains for about \$269, it produces documents at 360 dots per inch.

If you've been experimenting with fancy graphics, Canon's BJC-600 does an exemplary job of reproducing both low-end Windows Paintbrush documents and the beautiful designs created in Fractal Design and CorelDraw. The printer is also energy efficient and prints at 360 dpi. It discounts to about \$600, and the cost to print a color page is about 15 cents. BJ-200e \$399, BJC-600 Color Printer \$719; Canon Computer Systems; 800/848-4123, 714/438-3317 (fax).

Reader service no. 721

KEEPING YOUR COOL

Do you know what's going on under the hood of your computer? Well, if you've got a 486 or Pentium processor and you don't work in an icehouse, it's heat—and lots of it. To avoid frying your components, get yourself a FanCard IImj. It's a low-cost—and low-energy—device consisting of an add-in card with two fans and enough clout to cool

your computer's insides by 50 percent. Installation takes no time or skill—just turn off the computer, take off the cover, and stick the FanCard into an unused slot near the middle of the case. The FanCard also adds a cool twist: an output plug with 6 volts of power, letting you power your multimedia speakers off the fan instead of using an AC adapter. Hot stuff. There's also a Macintosh version. FanCard IImj \$47.95; KLS Technologies; 800/455-7832, 518/274-9022, 518/273-8268 (fax).

Reader service no. 722

SCANNING FOR THE MASSES

Do you like surprises? How about a full-page, 400-dpi, gray-scale scanner that's reasonably priced and small enough to be truly portable? Two new scanners—the Niscan Page and Logitech's ScanMan PowerPage—fill the bill. They both sell for a discounted price of roughly \$580 and are small enough to fit on any desk.

The size of a fat ruler, they measure only 12 inches long, 2½ inches high, and 2¼ inches wide. Each has a built-in sheet feeder for 8½ by 11 sheets, or you can use either like a hand scanner, guiding it over larger documents. Both scanners come with an AC adapter. A rechargeable battery, for when your work takes you on the road, is optional with the PowerPage and standard with the Niscan. The battery is good for 30 to 40 full-page scans. Installation's a snap because there's no interface board—just a quick connection to your PC's parallel or printer port.

And there's more: image-editing software, and optical character recognition (OCR) for translating your scanned documents into text. If you have a fax-modem, you can scan and send your images using the bundled



TAKE YOUR PICKSM

(CLOCKWISE FROM TOP LEFT): LOGITECH'S SCANMAN POWERPAGE; MICROCOMPUTER ACCESSORIES' SNAPEASE WORKSTATION; COMMAND COMMUNICATIONS' COMSHARE550; ERGODYNE'S STRETCH SOFTWARE; AND PACIFIC CREST'S CARDGRABBER



software. Niscan Page \$799; Nisca; 800/466-9096, 214/242-9696.

Reader service no. 723

ScanMan PowerPage \$799; Logitech; 800/231-7717, 510/795-8500, 510/792-8901 (fax).

Reader service no. 724

IS THAT CALL FOR ME?

Do you like guessing games? Well, your phone's ringing, so start guessing: Is it a fax or a new customer calling to place an order? With Command Communications' ComShare550 telephone-line-sharing device, you won't need a crystal ball. That's because the ComShare550 takes your single phone line, detects the source of the incoming call, and redirects it to the correct destination. If it's a voice call and you're not able to answer the phone, the device is smart enough to send the call to the answering machine. But what about a fax? No problem—the ComShare550 is designed to handle your computer's fax-modem card, determining if it's a fax or data call. The device sells at a discount at many major chains for about \$89. ComShare550 \$129.95; Command Communications; 800/288-3491, 303/751-7000, 303/752-1903 (fax).

Reader service no. 725

SAVING ENERGY AT HOME

It's a waste of energy—and money—if you leave your computer's peripherals turned on and idling when not in use. PC Ener-G Saver, a slick combination of hardware and software, senses when your system is no longer in use and automatically switches the printer and monitor off; your printer is ready for use the moment you press a key or move the mouse. It's a no-hassle installation: Plug the keyboard, monitor, and printer into a specially designed power strip. The software—you can use either a DOS or a Windows version—allows you to independently configure the monitor and printer to turn off at a specified time or after a specified period of idleness. You can also configure the printer to remain off and restart when you print something to a designated port. PC Ener-G Saver \$89.95; PC Green Technologies; 800/984-7336, 714/228-2230, 714/228-2239 (fax).

Reader service no. 726

THE BUSINESS CARDGRABBER

So you're back from the weekly networking meeting, clutching a big handful of business cards. You need to get the information into

your database, but you can never find the time. Why not just give the job to your computer? You can, with CardGrabber, a nifty scanning device the size of a small Walkman that sits on your desk and connects to your parallel port. Just feed a business card into the device—in seconds CardGrabber intelligently searches the business card for name, title, company address, phone and fax numbers, and E-mail address, inserting data into the correct field of a Windows address book. You can easily export the data to almost any Windows or DOS database or personal information manager (PIM), including Paradox, Access, dBASE, PackRat, Act, or Ascend. CardGrabber's scanning technology includes an auto-contrast adjustment that factors in the various ink colors and shades used on business cards. CardGrabber \$399; Pacific Crest Technologies; 800/870-3391, 714/261-6444.

Reader service no. 727

Contributing Editor Steve Bass is president of the Pasadena IBM Users Group. He can be reached on PC World Online via CompuServe and America Online.

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FROM PC TO PAPER

BY GEORGE CAMPBELL



CRAFTING BETTER BUSINESS DOCUMENTS

Let's face it: The days of the typewritten letter—humdrum Courier type on plain white paper—are gone, and good riddance. Businesses have taken a more sophisticated approach to existing and prospective customers. Today, the way you present yourself, from the simplest business card to the most complex sales presentation, has to look great. Think of how you, as a consumer, wade through a day's mail—a river of brochures, advertisements, and offers. How do you decide which ones to pitch and which to save? You probably unconsciously choose to look at the most handsome, professional-looking ones.

As a small-business owner, you can use this strategy to your advantage, creating professional documents in-house using the PC and printer you already have.

HARDWARE AND SOFTWARE ESSENTIALS

If you have one of today's powerful Windows or Macintosh word processors, you probably have most of the tools needed to create almost any document you can imagine. And if you need more layout power, you can use a low-cost desktop publishing program like Microsoft Publisher or TimeWorks' Publish It to create complex items such as newsletters. If you want to add further pop to your pages, pick up an inexpensive collection of fonts and clip art; check the ads in *PC World* and other computer magazines to find a selection you like.

Naturally, you'll need to print your creations. A laser printer is ideal, and the new 600-dot-per-inch (dpi) printers, such as Hewlett-Packard's LaserJet Series 4, can print documents that look like they were produced at a professional print shop. Even the more common (and less expensive) 300-dpi laser printers are adequate when used with the proper fonts. And if you're trying to economize, today's high-quality ink jet printers from HP and Canon, among others, do a perfectly good job, although laser-printed documents have a crisper look and print much faster. If you just need to print in color in small quantities, color ink jet and thermal transfer printers, which sell for less than \$1000, are good bets.

PAPER, PAPER, WHO'S GOT THE PAPER?

Exceptional documents call for exceptional paper: Printing on cheap copier paper just won't cut it anymore. Fortunately, several companies offer specialty paper that makes your documents look great.

Consider a typical advertising brochure—an 8½-by-11-inch sheet folded into thirds. It fits into a standard number 10 business envelope and is the stock-in-trade for almost every business. You could create a brochure like this on standard white paper or send the job out to a professional printer for added color and design. But a third option combines the best of both worlds: Buy preprinted paper, complete with professionally designed color borders and accents, then print your flyer on it. As far as your prospective customer knows, you spent hundreds of dollars at the printer.

And that's just the beginning. The same companies offer sets of matching business stationery—from business cards, letter-size sheets, and envelopes to brochures, postcards, and note cards. You'll even find specialty paper that includes the letter and envelope on a single page, ready for production. Preprinted designs come in every variety of color and design, from stately stationery for conservative firms to colorful layouts for more boisterous businesses. Best of all, these paper products are designed to feed effortlessly through your laser printer.

But there's more. Say you want to take a few dozen business cards to a trade show that display both your permanent address and a local address and phone number while you're at the show. Or say you need to send a brochure to just ten people. You couldn't afford to do such a small job at your local print shop. But using prescored card stock or preprinted brochure stock, you can print as few items as you need, when you need them. Other popular products include bordered paper for presentations, preprinted blank certificates, greeting cards, and brochure holders.

All of this comes at a price, however. Expect to pay \$10 to \$20 per hundred sheets of paper and equivalent prices for other products. But compared with printing

similar items in small quantities at your local print shop, the cost is low.

Currently about half a dozen companies supply this type of paper product. Paper Direct (800/272-7377) offers the widest variety, including a full range of presentation products. Deluxe Business Forms (800/328-0304) has a good selection of preprinted papers, along with business forms and checks compatible with most accounting and check-printing software. Beaver Prints (800/923-2837) specializes in preprinted brochure stock featuring color photographs. Premier Papers (800/843-0414) has a good assortment of letter and brochure designs, plus a collection of high-impact and humorous specialty papers, including tractor-feed preprinted paper. Queblo (800/523-9080) and Viking Office Products (800/421-1222) also offer preprinted stock. Call any of these toll-free numbers for a full-color catalog.

DESIGNING DOCUMENTS

When you work with preprinted paper stock, you'll need to lay out your text to work with the existing design. In most cases, all you need is your current word processor, especially if it's one of the high-powered Windows programs such as Microsoft Word 6.0, WordPerfect 6.0, or Ami Pro 3.01. Here are some tips.

Let's start with a business card. Prescored business card paper comes in standard-size sheets, with ten cards per sheet, arranged much like a sheet of labels. By creating a custom label template in your word processor, you can lay out and design a card. In Word for Windows 6.0, select *Tools* • *Envelopes and Labels*, then select *Options* • *Details* in the Labels dialog box to design a label page. Create your card just like any other document, and print using the *Full Page of the Same Label* option. In Ami Pro 3.01, create and position frames to match the layout of your card stock, then design one card and copy and paste the design into the other frames. In WordPerfect 6.0 select *Layout* • *Labels*, then design a label format to match the stock. Another option is to use a program like the \$39 CardsNow from Topitzes and Associates (800/233-9767) to create cards complete with clip art and fonts.

Brochures and fliers are popular specialty paper buys, but getting the text for such documents in the right format to work with the preprinted page can be tricky. The key is to think of your page as a three-column layout in landscape mode (with the long side of the sheet at the bottom). Then, by using your word processor's frame or text box tool, you can position text to fit accurately on the page. Naturally, you'll have to experiment with margin and column settings for the best results. If you want to mail the brochures without enclosing them in envelopes, put the address on the center panel. If you need to switch paper orientation to print the address information, make two print runs—one for the address and one for the rest of the text—passing the page through your printer twice.

Envelopes present their own challenges. Be sure your envelopes are designed to feed correctly through your printer. Choose the wrong envelope, and it may jam or exit from the printer with the flap already glued. Check with your supplier. Today's word processors handle envelopes quite well, but some printers have difficulty printing return addresses without smearing. It's best to use envelopes with preprinted return addresses. One caution: Never feed window envelopes through a laser printer.

If even this minor formatting seems like

GETTING RESULTS WITH PLAIN PAPER

While preprinted stock is attractive, not every document needs to go on this high-priced paper. You can create high-impact documents on plain and not-so-plain paper.

First, start with good paper. That \$5-a-ream copier paper just can't provide the kind of quality you need. Spend a little more and get paper that reflects the quality of your business. For special needs, select color paper ranging from subdued tones to neon. You can even purchase parchmentlike paper for an elegant look. And transparency film for overhead presentations is available for laser, dot matrix, and ink jet printers. You'll find a wide variety of papers at any major office supply outlet or from the paper suppliers listed earlier.

One warning: If you want to avoid paper jams, make sure the paper you buy is compatible with your printer. Look for paper specifically designed for laser or ink jet printing. Watch paper weights, too. Most printers can't handle anything heavier than 67-pound card stock, and even then you may have to feed that stock manually.

Enhancing documents on plain paper is simple. Add a page border or line to create a separator for your letterhead. Create a logo using either your program's drawing and text graphics tools or a graphics program. In

magazine; and by studying the before-and-after document redesigns in *PC World's Publishing & Presentations* column.

MAILINGS EN MASSE

At one time or another, most businesses need to create mass mailings. Fortunately, the current crop of word processors makes this job easy. All offer a three-step procedure for mail merges, plus easy mail merges onto standard envelopes and labels.

Still, there are some mass-mailing tricks that can help personalize your documents and avoid that junk-mail look. First, start with as detailed a set of data as possible. Create separate data fields for first and last names, along with fields for nicknames, dates of recent contacts, and products or services purchased. By using this detailed data with your word processor's conditional mail merge tools, you can insert specific text for certain groups of recipients and avoid the "Dear John P. Jones:" salutations that send most mailings into the garbage.

Also, whenever possible, don't use mailing labels. These brand your document as junk mail. Instead, print envelopes as part of your merge or as a separate print run. If your printer accepts a special envelope tray, it can save many hours of manual feeding.

If you must use mailing labels, use fonts that match your document and make the label as attractive as possible. Alternatively, transparent labels, available from Avery Dennison and other suppliers, almost disappear on your envelope. You can print labels from within your word processor or with label-creation software like Avery LabelPro. Or use a shareware label-printing program, such as PrintEnvelope 2.32, which you can download as ENVELO.ZIP from the Featured This Month folder on PC World Online via CompuServe and America Online.

WHEN TO PRINT ELSEWHERE

Sometimes it's better to send certain print jobs out. Figure it this way: For print runs over about 250 copies, it makes little sense to tie up your printer—never mind the wear and tear on your hardware. In most cases, with print jobs of 250 copies or larger, outside printing saves you money as well.

Even when you turn to an outside print shop, there are times when you'll still want to do part of the job. This is particularly true




Figure it this way: For print runs over about 250 copies, sending a print job to an outside shop makes more sense than tying up your own printer—and it will probably save you a chunk of money, too.

more work than it's worth, don't give up. Paper Direct offers templates for its preprinted papers for WordPerfect for DOS and Windows, Microsoft Word for Windows, Ami Pro, CorelDraw, Aldus PageMaker, and Microsoft Publisher. The group of templates sells for \$39.95 and eliminates all the hassles. The templates generally also work with papers from other suppliers.

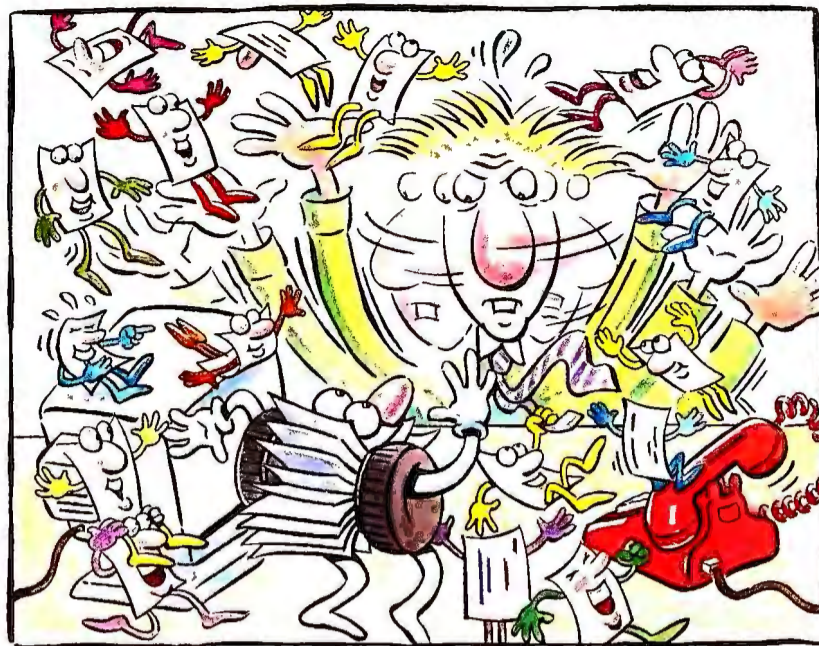
the latest versions of the Windows word processors, you can even print a watermark—a faded-out image, in the background—behind your text.

Document design is no simple matter, but you can learn the basics from books like *The Desktop Publishing Secrets*, by Robert C. Eckhardt, Bob Wiebel, and Ted Nace; by reading specialty publications like *Publish*

SCAN-IN-DEX TO THE RESCUE



"#@!*#@!, WHAT IS THIS? 'Attack Of The Killer Business Cards'? They're everywhere ... and they're breeding. They multiply faster than my accountant!"



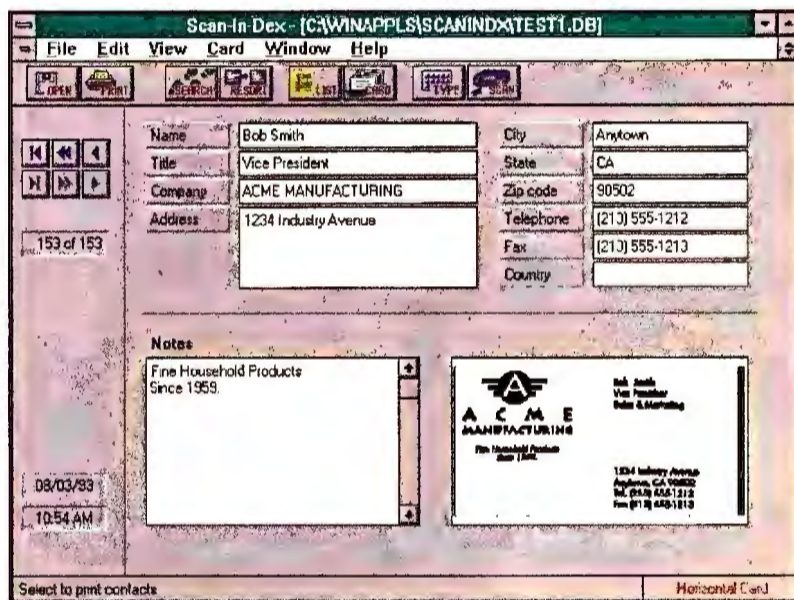
"They're attacking from all sides ... business cards, card files ... t-t-taking over!! ARGH, I'm losing it! Paper shredder ... yeah, that's the ticket, shred 'em, go for the kill. What a nightmare! HELLLLLLLLLL!"



"Yo! Hey genius. Reee-lax. We know what's driving you looney, because it was driving us crazy too. That's why Microtek came up with the *Scan-in-Dex* ... Check it out."



Thanks to *Scan-in-Dex*, no more business card clutter. Just an automatic, low cost way to organize business card information into your computer. Now Bill has it all together. Cool, calm and in touch, (well, sort of cool??).



"*Scan-in-Dex*, scans, reads and records business card information in an electronic address book in seconds! Then you can print, search, or export the information. So what do you think Bub? Is this a solution to a problem or what?!"

Scan-in-Dex solves the business card dilemma by eliminating the need for cumbersome card files. For the first time, accessing business contacts from a computer is a realistic option for busy people, because it requires minimal typing. Scan-in-Dex comes to you from Microtek, the leader in affordable desktop scanning for over a decade. For more information on Scan-in-Dex or the name of your nearest Microtek retailer call, **1-800-654-4160**.

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COLOR PRINTING: FAKING IT

If you use a laser printer based on Canon or Lexmark engines (which include Hewlett-Packard LaserJet II and III printers), you aren't limited to printing in black and white. Color toner cartridges let you create entire documents in color or print just part of a document in one color, then make another print run to add text in black toner. These color cartridges can be tough to find in your local office supply center; however, you can order them directly from Advantage Laser Products (800/239-4027).

FONTs, FONTs, FONTs

While there are no hard-and-fast rules, there are a couple of basic concepts for avoiding big errors.

First, select a font with serifs, such as Times New Roman, for the body text. (A *serif* is the ornamental crossbar at the end of a character). Serif fonts are generally easier to read in extended blocks of text (this text is set in a serif face). Then choose a sans serif typeface (one without serifs) such as Arial for headings. You can

when printing a mail merge. By having the bulk of the document, like a brochure or flier, printed at a print shop and then printing just the address information in-house, you can save money while preserving the personalized look of the mailing.

Finally, once you have designed letterhead, envelopes, business cards, and other items you need in quantity, have the printing done by someone else. Save your hardware for specialized jobs and short runs.

PROFESSIONAL SECRETS

use more than one size and weight of these fonts, but keep all your headings in the same face.

Next, if you use a decorative headline font or other text that serves as a graphical element, use it only there. Avoid sprinkling your document with fancy characters, which can clutter the page.

Select fonts that look good coming from your particular printer. Arial and Times New Roman, supplied with Windows, are specifically designed for optimal appearance on 300-dpi printers, as are the internal fonts available in most printers. While you needn't stick with these fonts for all documents, you'll find that they produce excellent results.

Finally, choose font sizes for body text that are easy to read. Typically, a font size between 9 and 12 points is best. Go any smaller and your fine print won't get read. Also, use italics for emphasis only; avoid large blocks of italicized text.

DESIGN ADVICE

A page that's gray with type is unattractive. Allow white space around blocks of text to help guide the reader's eye to the message. A good tip is to focus your eyes at a distance, then look at your page. The blurry image you see will let you judge the overall layout.

A few special rules apply when setting type in columns. Select larger fonts for wide columns and smaller fonts for narrow columns. Also, allow plenty of white space between columns for easier reading, especially when you *justify* text—set the

type so that it fills the entire column width, like the text on this page.

DESIGNING FOR FAX

We're all communicating more and more by fax, and these documents have special design needs. First, keep type sizes fairly large; 10 points is a reasonable minimum, and 12-point is even better. Also, avoid fonts with fine design details such as fancy serifs. Graphics, too, often degrade in quality when sent over phone lines. Stick with simple graphics for faxed documents. Finally, if the recipient is likely to use optical character recognition (OCR) software to convert the fax to text, use 12-point Courier, since OCR software is optimized for that face.

SIGNATURES AND SCANNERS

Your signature is your personal stamp on a document. While it's easy to sign a few business letters, a large mail merge can cause terminal writer's cramp. Here are two ways to get your signature on any page. First, you can scan a copy of your signature, crop the scanned image to size, then insert it in documents as a graphic. (You can accelerate this process by recording a macro to insert the signature image.)

Or you can have a service bureau turn your signature into a TrueType font for about \$40; to insert it you just change fonts and type one letter. Again, a recorded macro can simplify the job. One company that offers this service is AutoFont USA (800/588-7548). The company can also turn logos into font characters.

And remember, when ordering printed material that you plan to feed through your printer, make certain the printing techniques and inks used are compatible with your printer. For example, raised thermographic inks, like those used on inexpensive business cards and letterhead stock, will smear if you run them through a laser printer. So make sure your print shop understands that you'll be running the paper through a laser or ink jet printer.

After all, in business, neatness counts—and so does sharp design. By thinking carefully about the kinds of documents you create and then printing them on high-quality paper, you'll be more competitive with other businesses, and you'll keep your correspondence from ending up in the trash.

George Campbell is a contributing editor for PC World. Joe Hutsko, a writer based in San Francisco, contributed to this article.

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Circle 1 on reader service card

THE PLAYERS

CD ROM Drives and Sound Cards

Ready to upgrade to multimedia? It's never been cheaper, with double-speed drives priced from \$188 and sound cards for \$89 and up. By Anita Hamilton

THE CD ROM REVOLUTION HAS ARRIVED! Everywhere you turn, CD ROM-based applications and titles are inundating the market—including reference information and text sources, educational and training applications, entertainment titles, and business applications and operating systems such as Microsoft Office, CorelDraw, and Windows NT. Mecklermedia's *CD-ROMs In Print 1994* lists over 5800 CD ROM products on the market today. Since many titles are available *only* on CD ROM, you'll need a drive to run them.

Sound cards go hand in hand with CD ROM drives. While a sound card is not essential for playing a CD ROM, it is necessary if you want to play many sound clips found on entertainment and educational CD titles. It also gives you the ability to embed sounds in business documents or add music and narration to presentations. Some presentation graphics packages, such as WordPerfect Presentations and Asymetrix's Compel, even include CD ROM sound clips.

With prices as low as \$188 for double-speed CD ROM drives and \$89 for 16-bit sound cards, these peripherals are no longer luxuries. The question isn't whether or not to buy, but which items to select. With 32 CD ROM drives and 32 sound cards listed here, your options are plentiful.

IS THE PRICE RIGHT?

Although the drives in this guide start at \$188, you can spend as much as \$840. We collected these vendor-estimated street prices in February 1994, so by the time you read this, your actual cost may be lower. Prices are for internal models only; external models generally cost \$80 to \$200 more. We recommend that you purchase an external drive only if you lack the 5¼-inch bay needed to hold an internal drive. If you have no free slots or don't want to bother with installing a card, look for external models that connect to the parallel port.

All CD ROM drives use either a SCSI adapter designed to work with any SCSI device or a proprietary adapter that works solely with the drive you purchase. Since you need an adapter to run the drive, we priced all units with the adapter provided by the vendor, except for the AppleCD 300i (Apple doesn't sell an adapter for its internal drive).

Later this year CD ROM makers such as Chinon, Mitsumi, NEC, and Procom plan to sell drives with standard IDE interfaces that either plug directly into system motherboards with an extra connector or plug into extensions on a hard drive's IDE cables. While the first of these drives may be available by the time you read this article, others won't ship until the fall of 1994. These new drives should be easier to install and less expensive than current drives, since most will require no adapter card. Once the new IDE drives become available, the number of SCSI drives sold will probably decline, because the cost savings with the IDE drives will outweigh SCSI drives' technological advantages, according to industry analyst Robert Freeman of Freeman Associates. Sales of the more competitively priced proprietary drives, however, should remain quite strong.

MAKING SENSE OF PERFORMANCE NUMBERS

This buyers' guide focuses on CD ROM drives that meet or exceed the Multimedia Marketing Council's MPC Level 2 requirement for sustained data transfer rates of 300 kilobytes per second (K/sec) and average access times of 400 milliseconds (ms) or less. Drives that meet these standards should run today's CD ROM-based software at a satisfactory speed. *Data transfer rate* refers to the speed at which the drive moves data from the CD ROM disk to your system's memory. Single-speed drives, which have data transfer rates of 150 K/sec, are insufficient for running video or animation clips found on many CD titles.



16-bit Sound Cards

● = Yes
○ = No

Company	Product	Street price ¹	KEY FEATURES				COMPATIBILITY			
			Maximum sampling rate (kHz)	Digital signal processor on board	FM synthesis	Wave-table synthesis	Ad Lib System	Microsoft Windows Sound	CD ROM Interface ²	Speech recognition software
ADVANCED GRAVIS 604/431-5020	UltraSound Max	\$199	48	○	●	standard	●	●	SCSI, M, P, S	○
AZTECH LABS 800/886-8859	Sound Galaxy Basic 16	\$149	44.1	●	●	\$169 ³	●	●	M, P, S	○
	Sound Galaxy Pro 16 Extra	\$169	44.1	●	●	\$169 ³	●	●	M, P, S ⁴	●
CARDINAL TECHNOLOGIES 717/293-3049	Digital Sound Pro 16	\$139	48	●	●	\$59 ³	●	●	M, S	○
	Digital Sound Pro 16 Plus	\$199	48	●	●	\$59 ³	●	●	M, S	○
CREATIVE LABS 800/998-5227	Sound Blaster 16 SCSI-2 w/ Advanced Signal Processing	\$229	44.1	●	●	\$249 ³	●	○	SCSI ⁵	●
	Sound Blaster 16 Basic	\$129	44.1	\$69 ³	●	\$249 ³	●	○	CL	●
CRITERION COMPUTER 800/933-6055	Sound Genie Pro	\$209	44.1	●	●	standard	●	●	M, P, S	●
	Sound Genie	\$180	44.1	●	●	standard	●	●	M, P, S	●
DIAMOND COMPUTER SYSTEMS 408/736-2000	SonicSound LX	\$119	44.1	○	●	○	●	●	M, P, S	○
	SonicSound	\$199	44.1	●	●	standard	●	○	SCSI	○
GENOA SYSTEMS 408/432-9090	AudioBlitz Stereo 16 Plus	\$147	44.1	○	●	\$99 ³	●	●	M, P, S	○
IMAGIMEDIA 408/453-9911	Audio Image 16	\$199	44.1	○	●	standard	●	●	SCSI, M, P, S	○
KYE INTERNATIONAL 800/456-7593	Genius SoundMaker 16	\$155	44.1	○	●	○	●	○	S	○
LOGITECH 800/231-7717	SoundMan Wave	\$249	44.1	○ ⁶	●	standard	●	○	SCSI	○
	SoundMan 16	\$119	44.1	○	●	○	●	○	○	○
MEDIAMAGIC 800/624-8654	ISP-16 Audio Board	\$89	48	○	●	○	●	●	P, S	○
	DSP-16 Audio Board	\$149	48	●	●	○	●	●	S ⁴	○
MEDIA RESOURCES 714/256-5048	Studio Jr. Spectrum 16	\$145	44.1	○	●	standard	●	○	M, S	○
MEDIATRIX PERIPHERALS 819/563-6722	Audiotrix Pro	\$250	44.1	\$50 ³	●	standard	●	●	○ ⁷	○
MEDIA VISION 800/845-5870	Pro Audio 16 Basic	\$119	44.1	○	●	○	●	○	○	○
	Pro AudioSpectrum 16	\$159	44.1	○	●	○	●	○	SCSI	○
	Pro AudioStudio 16	\$199	44.1	○	●	○	●	○	SCSI	●
MICROSOFT 800/426-9400	Microsoft Windows Sound System 2.0	\$219	48	○	●	○	●	●	○	●
MIDI LAND 909/595-0708	Midi Win	\$179	48	●	●	\$199 ³	●	●	M, P, S	○
ORCHID TECHNOLOGY 800/767-2443	SoundWave 32	\$180	48	●	●	standard	●	●	M, S	○
PROCOM TECHNOLOGY 800/800-8600	Symphony 16	\$200	44.1	●	●	standard	●	●	SCSI, S	●
RED HOT MEDIA 510/249-9834	Red Hot SC1000	\$239	44.1	○	●	standard	○	●	M, P, S	○
	Red Hot SC500	\$110	48	○	●	3, 8	●	●	M, P, S	○
SIGMA DESIGNS 800/845-8086	WinSound 16	\$169	44.1	○	●	○	●	○	SCSI, S	○
TOPEK TECHNOLOGY 800/416-8889	Golden Sound Pro 16	\$199	48	●	●	\$119 ³	●	●	M, P, S ⁴	●
WEARNES TECHNOLOGY 800/822-8884	Beethoven ADSP-16	\$159	48	●	●	3, 8	●	●	S	○

¹ Prices are vendor-estimated street prices as of 2/10/94.

² M = Mitsumi, P = Panasonic, S = Sony, CL = Creative Labs.

³ Option.

⁴ SCSI interface is an extra-cost option.

⁵ Other models available with different interfaces.

⁶ DSP is an extra-cost option; price not available at press time.

⁷ SCSI, M, P, and S interfaces are extra-cost options.

⁸ Price not available at press time.

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

REPORT

Warranty (months)	Toll-free telephone service	Reader Service number
36	○	665
12	●	666
12	●	666
36	○	667
36	○	667
12	○	668
12	○	668
lifetime	●	669
lifetime	●	669
24	○	670
24	○	670
24	○	671
36	○	672
12	○	673
36	○	674
36	○	674
12	●	675
12	●	675
12	○	676
12	○	677
36	●	678
36	●	678
36	●	678
12	○	679
12	○	680
48	●	681
12	●	682
12	●	683
12	○	683
60	○	684
12	●	685
24	○	686

At press time, just one company, NEC, offered triple-speed drives, which have data transfer rates of 450 K/sec. You will probably only notice the performance improvement in video and animation sequences. NEC's single-disk quadruple-speed drive should also be available by the time you read this.

Average access time refers to the amount of time the drive takes to locate a piece of requested information on the disk. Quick average access times—300ms or less on today's drives—are especially important for reference titles, such as encyclopedias or telephone directories, which involve frequent random information searches. If you plan to use these types of applications, look for a drive with a fast access time, such as Optical Access International's CD/Allegro II.

Buffer size can also boost performance. When the system CPU requests information from the drive, the drive's buffer can have the data ready to go, which means faster access. Buffers are generally 32K to 256K, with the latter able to hold more data. Some disk-caching software, such as DOS 6.2's SmartDrive, Norton Speed Drive, or Super PC-Kwik, can supplement a small hardware buffer by caching your CD ROM drive as well as your other local drives.

DETAILS THAT MATTER

CD ROM disks come in a variety of formats, so it's important to make sure your drive will run them. All drives in this guide adhere to the industry-standard ISO 9660 format (which means they will read CD ROMs written to the earlier High Sierra format as well). They also support CD-ROM XA and Photo CD multisession standards. CD-ROM XA, the most common format for business and games, efficiently weaves voice and data on CD ROM disks in order to optimize synchronized playback. Photo CD multisession capability ensures that the drive can read Photo CD digitized image files, even if they were recorded on the disk at different times.

Protective features such as automatic lens cleaning, a dust protection door, and an emergency eject button protect your investment by reducing the chance of damage to your drive. All but Creative Labs' Creative OmniCD and Sony's CDU-33A have a dust protection door. While using a disk caddy takes a little longer than simply sliding a disk into your drive, caddies protect your disk against dust and scratches. If you own a

Micro Channel system such as IBM's PS/2, look for a CD ROM drive that offers a Micro Channel interface.

If you see a drive listed here that looks particularly expensive compared to others with nearly identical specs, call the vendor to find out why you are paying the extra money. If you're not satisfied with the vendor's answers or you don't think you'll need the extra features, buy the less expensive unit.

Installing a CD ROM drive can be tricky. If you need to speak to a technician for help, a toll-free support line will save you money. You should also look for a drive that offers at least a 12-month warranty.

FINDING THE BEST SOUND CARD

Silence may be golden, but sound gets people's attention. Whether you want to add voice annotations to documents, hear music and sound effects when playing games, or create full-blown multimedia presentations, you'll need a sound card. And with CD-quality, 16-bit sound boards priced as low as \$89 on the street, adding sound is an affordable upgrade.

We've gathered 32 sound boards with street prices of \$250 or less. All these boards support 16-bit recording and playback, which gives you professional-quality voice and music reproduction. While 8-bit sound suffices for voice annotation, it doesn't work well for music playback.

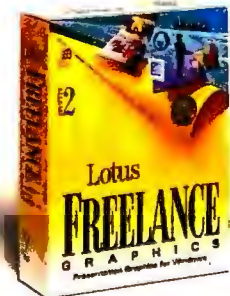
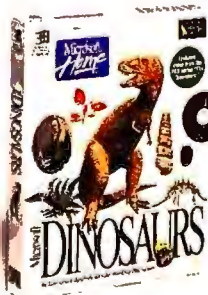
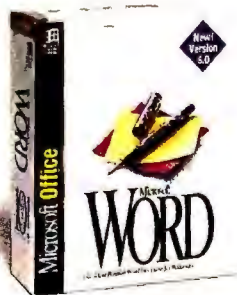
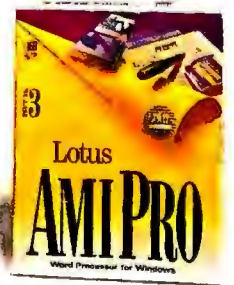
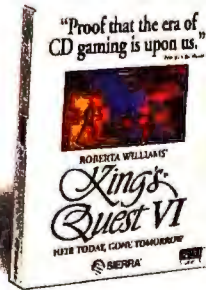
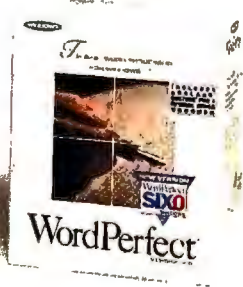
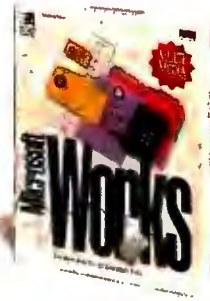
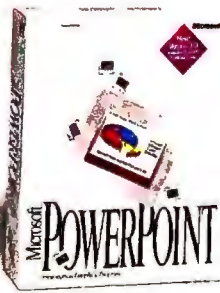
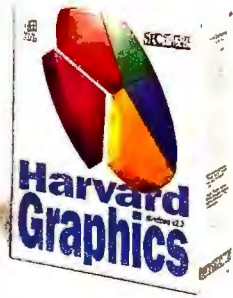
QUALITY COUNTS

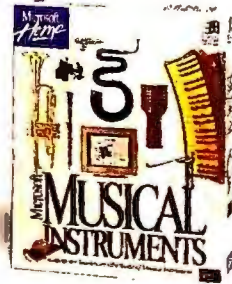
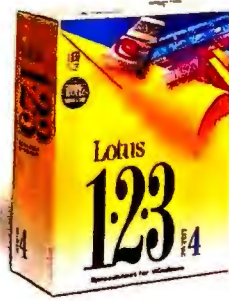
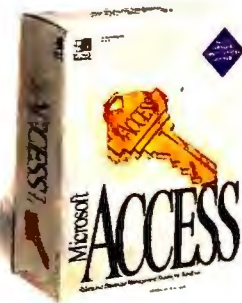
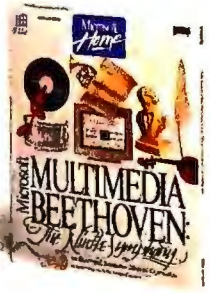
All these cards boast a maximum sampling rate of either 44.1 or 48 kHz. *Sampling rate* refers to the number of times per second the sound card checks the frequency of incoming sound waves while converting them to digital form. A card with 44.1-kHz sampling actually checks incoming sound waves 44,100 times per second. A higher rate will result in better-quality sound reproduction, but the difference between 44.1 and 48 kHz is so slight that you're unlikely to notice.

All cards also support MIDI, the universal standard for creating, exchanging, and manipulating musical scores. MIDI support ensures that your card will be able to play back MIDI sound files often found in presentation packages, games, and CD ROM titles. MIDI files consist of instructions for playing back predefined sounds.








Sound boards use two different methods to reproduce MIDI sounds: FM synthesis

Using any of these?





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CD ROM Drives

● = Yes
○ = No

Company	Product	Street price ¹	External model available ²	Adapter type	KEY FEATURES			DESIGN ELEMENTS				
					Sustained data transfer rate (K/sec)	Average random access time (ms)	Built-in buffer (K)	Micro Channel bus interface	Automatic lens cleaning mechanism	Automatic door protection	Dust protection	Emergency eject
APPLE COMPUTER 800/538-9696	AppleCD 300i	\$329 ³	●	SCSI	300	295	256	○	●	●	●	●
AZTECH LABS 800/886-8859	CDA 268-01A	\$188	○	proprietary	300	380	64	○	●	●	●	●
CD ROM 303/526-7600	CRI 1100	\$249	●	proprietary	300	320	64	○	●	●	●	●
CD TECHNOLOGY 408/752-8500	CD PortaDrive-Model T3401	\$600	●	SCSI	330	200	256	●	●	●	●	●
CHINON AMERICA 800/441-0222	CDS-535	\$329	●	SCSI	300	220	256	○	●	●	●	●
CMS ENHANCEMENTS 714/222-6000	H-CD ROM	\$529	●	SCSI	300	280	256	●	●	●	●	●
CONSAN 800/229-3475	CDU-561	\$395	●	SCSI	300	295	256	●	●	●	●	●
CREATIVE LABS 800/998-5227	Creative OmniCD	\$299	○	proprietary	300	320	64	●	●	○	○	○
HITACHI HOME ELECTRONICS 800/241-6558	CDR-6700	\$775	●	proprietary	300	260	128	●	●	●	●	●
	CDR-6750	\$795	●	SCSI	300	235	256	●	●	●	●	●
INSIGHT DIRECT 800/998-8011	Talon DS-200 CD-ROM	\$399 ⁵	○	SCSI	330	245	64	●	●	●	●	●
	Talon DS-100 CD-ROM	\$199	○	proprietary	300	320	32	○	○	●	●	●
MICRO DESIGN INT'L 800/228-0891	SCSI Express 600 CDI	\$840 ⁶	●	SCSI	330	200	256	●	●	●	●	●
MITSUMI ELECTRONICS Contact your local computer store	CRMC-FX001D	\$199	○	proprietary	300	250	32	○	●	●	●	●
NEC TECHNOLOGIES 800/388-8888	MultiSpin 3Xi	\$625	●	SCSI	450	195	256	●	●	●	●	●
ORCHID TECHNOLOGY 800/767-2443	CDS-3110	\$190	●	proprietary	300	350	64	○	●	●	○	○
OPTICAL ACCESS INT'L 800/433-5133	CD/Performer II	\$379	●	SCSI	335	230	64	●	●	●	●	●
	CD/Allegro II	\$439	●	SCSI	330	180	256	●	●	●	●	●
PERIFITECH 216/278-2070	Aerial-CD	\$699	●	SCSI	330	200	256	●	○	●	●	●
PHILIPS LMS 800/777-5674	CM206	\$499 ⁶	●	proprietary	352	350	64	○	○	●	●	●
PLEXTOR (formerly Texel) 800/886-3935	DM-3028 DoubleSpeed Plus	\$349 ⁶	●	SCSI	335	240	64	●	●	●	●	●
PLI 510/657-2211	PLI CD ROM MS	\$637	●	SCSI	330	200	256	●	●	●	●	●
PROCUM TECHNOLOGY 800/800-8600	PICDS-DS	\$249	●	proprietary	300	350	64	●	●	●	●	●
	SICD-DS	\$550	●	SCSI	330	200	256	●	●	●	●	●
SONY ELECTRONICS 800/352-7669	CDU-561	\$470 ⁶	●	SCSI	300	295	256	●	●	●	●	●
	CDU-33A	\$270 ⁶	○	proprietary	300	320	64	○	●	○	○	○
TODD ENTERPRISES 800/445-8633	CDR6700	\$625	●	proprietary	307	260	128	●	●	●	●	●
	CDR6750	\$650	●	SCSI	307	235	256	●	●	●	●	●
TOPTEK TECHNOLOGY 800/416-8889	Panasonic CR-562B	\$249 ⁶	○	proprietary	300	290	64	○	●	●	●	●
TOSHIBA AMERICA 714/457-0777	XM-3401B	\$320	●	SCSI	330	200	256	●	●	●	●	●
	XM-4101B	\$250	●	SCSI	300	320	64	●	●	●	●	●
WEARNES TECHNOLOGY 800/822-8884	CDD-110	\$229	●	proprietary	307	380	64	○	●	●	●	●

¹ Prices are vendor-estimated street prices as of 2/10/94 for internal models with adapters.

² Check with vendor for price.

³ Adapter not available for internal model.

⁴ 24 months parts, 12 months labor.

⁵ Price includes three CD titles.

⁶ List price.

For more information about all products in this table, circle reader service no. 902.

and wave-table synthesis. FM synthesis uses wave forms to simulate the sound of actual instruments. Wave-table synthesis achieves superior quality to FM synthesis by using digital recordings of real instruments. Cards using wave-table synthesis usually cost more than their FM counterparts, but the difference can be worth it—especially for those wanting quality playback of musical sources. FM synthesis tends to have an unrealistic, tinny sound, whereas wave-table sounds are much richer.

If you want wave-table quality for games or professional presentations without paying through the roof, check out the inexpensive wave-table boards, such as Criterion's Sound Genie or Media Resources' Studio Jr. Spectrum 16.

SPECIAL FEATURES

Many cards have recently added digital signal processors (DSPs) to handle sound synthesis (both FM and wave-table), special effects, compression and decompression of audio files, and a host of other functions. In many cases, DSPs take on work that the CPU would otherwise handle, making complex audio functions feasible. If the CPU had to handle all these audio processing functions, system performance would plummet.

DSPs also let you upgrade boards through software, which extends the life of your card and saves you money. Unfortunately, DSPs provide a limited upgrade path. Technology moves forward at such a rapid pace that a software upgrade may only keep your board up-to-date for a short while before an entirely new card is required to handle new functions effectively.

Remember that sound quality depends not only on the board you use, but also on the speakers you select. If you want to take full advantage of a board's capability, plan to purchase a pair of magnetically shielded computer speakers (costing \$200 or more) to go with it.

Most of the boards in this guide let you mix sounds from a variety of sources—CD audio, MIDI, microphone (for voice), and stereo line-in being the most common. If you plan to do complex sound mixing, look for boards that mix multiple stereo sources simultaneously.

Buying a card with a CD ROM interface that is compatible with a drive you own or plan to buy can save you money and free up the slot your adapter would otherwise occu-

py. Many cards offer either the industry standard SCSI interface or one or more popular proprietary CD ROM interfaces, such as those for Mitsumi, Panasonic, or Sony drives. Contact the manufacturer to make sure the drive and card you plan to install are compatible.

COMPATIBILITY, SOFTWARE, AND COMPRESSION

As with CD ROM drives, compatibility with various standards greatly increases the number of applications you can run. Sound Blaster and Ad Lib are important standards for games. While all cards in this guide are Sound Blaster compatible, not all support Ad Lib. Microsoft Windows Sound System compatibility enables you to run the Sound System's software programs, including easy-to-use tools for adding voice annotations to documents and using voice commands to control any Windows program. The software-only version of the Microsoft Windows Sound System is street-priced at about \$60.

All cards listed in this guide include at least one sound recording and editing package, and some even throw in limited voice recognition software. Don't expect to be able to use voice recognition software effectively for dictation or business correspondence, however. It's best for replacing key-stroke-driven macros and menu commands.

A word to the wise: The WAV files that PCs use to store recorded sound can be very big. Unlike MIDI files, which contain only the instructions for playing back sounds, WAV files hold the sound's actual wave forms. A minute of 16-bit sound sampled at 44.1 kHz occupies over 10MB on your hard disk. A card that can do compression reduces file size, but you usually can't decompress the files with a different card.

If possible, shop at a store that lets you listen to different sound cards before making your purchase. You can compare FM to wave-table synthesis and even try to differentiate between various wave-table boards. Even cards with nearly identical feature sets can vary in sound quality, depending on how the manufacturer designed the board. Remember that whatever sounds best to you will be the most satisfying purchase you can make.

Anita Hamilton is an assistant editor for PC World. She can be reached on PC World Online (see page 12 for more information).

SUPPORT			
Warranty (months)	Toll-free service telephone	Reader service number	Issues
●	12	●	636
○	12	●	637
○	12	●	638
●	24/ 12 ⁴	○	639
●	12	●	640
●	12	○	641
●	12	●	642
○	12	○	643
●	24	●	644
●	24	●	644
●	12	●	645
○	12	●	645
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○	12	○	647
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●	12	○	651
○	24	●	652
●	12	●	653
●	12	●	654
○	12	●	655
●	12	●	655
●	12	○	656
○	12	○	656
●	36	●	657
●	36	●	657
○	12	●	658
●	12	○	659
○	12	○	659
○	12	○	660



Media Vision. You're stranded in the semi-destroyed control room of an island complex. Using the room's weapons and communications gadgetry, you must guide Kat, a tough-as-nails helicopter pilot, past a series of underground traps, mazes, and psychotic henchmen before she can rescue you. Sophisticated action sequences mixing live actors with background animation make the game visually unique. The graphics, animation, video, and sound effects are surprisingly good, but you pay for these high production values: Critical Path lists for \$79.95. Media Vision, 800/684-6699. —J. B.
Reader service no. 855

EDITOR'S CHOICE

You've heard it before: With multimedia, you can use video to create attention-grabbing business presentations. But how many of us have the time to produce our own video clips? With Editor's Choice, a series of eight CD ROM titles, you don't have to. Each disk contains 120 video clips

THE TITLES

From Shareware to Leisureware

A selection of CD ROM software for getting serious work done—oh yes, and having fun, too. By Jeff Bertolucci

THERE'S CERTAINLY NO shortage of CD ROM titles, and developers continue to jump on the multimedia bandwagon. The trick is finding worthwhile titles that bring text to life by adding sound, music, and animation; that let you explore topics and ideas in creative ways; and that add new dimensions to games and learning.

Unfortunately, many of the titles we tested (and rejected) were shabbily produced, with low-quality audio and video clips that added little to the program's educational or entertainment value. So it pays to shop carefully. Here are some of the best new titles on the market for education, business, and pleasure.

CAPITOL HILL

You're a newly elected member of Congress. The mudslinging and vicious innuendos of the campaign were hard enough, but now comes the true test of your political

mettle: Capitol Hill. With this CD ROM, you don't just learn about life in the House and Senate, you live it. Using narration, music, nearly 500 photos, and 45 minutes of video clips, Capitol Hill gives you a sneak peak at how Congress works. Besides teaching you the essentials—such as how a bill becomes law—the program instructs you in the really important issues, like how to land a truly awesome power office. At each step, short video clips offer advice from real-life members of Congress. Unfortunately, the video clips suffer from low resolution, blotchy colors, and an out-of-sync audio track. Capitol Hill lists for \$49.95. The Software Toolworks, 800/234-3088. —J. B.

Reader service no. 854

CRITICAL PATH

"Earth has been devastated by a third world war." So begins Critical Path, a sophisticated action-adventure CD ROM game from

that you can use royalty free and with no copyright restrictions. One such collection, "What's a Kid to Do? Children of the U.S.," shows children playing, sleeping, crying, burping, and so on. Each clip includes sound and runs from 5 to 90 seconds. Other titles include "Sites for Sore Eyes, Our Natural Environment" and "In Our Own Crazy Way, Recreation in America." All clips are in Video for Windows AVI format and can be viewed in either 160-by-120- or 320-by-240-pixel resolution. Each disk lists for \$74.95. Firstlight Productions, 800/368-1488, 206/869-6600, 206/869-6605 (fax). —J. B.

Reader service no. 856

EXPLORING ANCIENT ARCHITECTURE

Medio Multimedia's Exploring Ancient Architecture lets you "walk" through three-dimensional renderings of ancient temples and tombs as they appeared centuries ago, including the Parthenon, Stonehenge, and the Temple of Khon on the River Nile. During your tour, a narrator explains the architecture and historical significance of each structure. The program's attention to detail is impressive, but the graphics are



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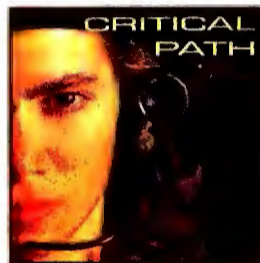
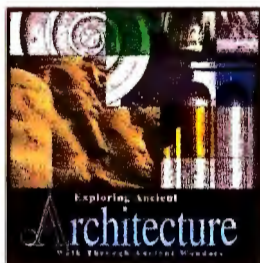
Circle 54 on reader service card

grainy, the animation jerky, and the colors blotchy—common problems with today's 3-D animation, especially on slower PCs. The title lists for \$59.95. Medio Multimedia, 800/788-3866. —*J. B.*

Reader service no. 857

MAPEXPERT 2.0 FOR WINDOWS

Computer mapping programs can't match the detail of the fold-up maps in your glove compartment, but they do have interactive advantages. MapExpert 2.0 for Windows, for example, offers street-level maps of the entire United States, plus a collection of editing tools for highlighting specific streets or sections of a city, adding text or markers,



Hone your competitive edge, have an adventure, or explore the world from your desktop. CD ROM titles are the '90s way to learn and have fun.

and performing other tasks to personalize your maps. You can then print and save your cartographic creations. A word of warning: Don't try to use this program in a moving vehicle! MapExpert 2.0 for Windows lists for \$495. DeLorme Mapping, 800/452-5931, 207/865-1234. —*J. B.*

Reader service no. 858

MEGA MOVIE GUIDE

Similar in scope to Microsoft's Cinemania, InfoBusiness's Mega Movie Guide is fun for both casual and serious movie buffs. The guide contains film reviews, video clips, celebrity biographies, and enough movie trivia to make you the star of your next cocktail party. While the program's no-nonsense menu and icon-bar Windows interface aren't as aesthetically pleasing as Cinemania's sculpted, art deco look, Mega Movie Guide is fairly easy to navigate. The disk contains nearly 2 hours of film clips, but the viewing window is about 1/6 the size of the screen. The program claims to have more than 58,000 movie reviews, but most of these are just one-sentence plot sum-

maries. On the plus side, Mega Movie Guide contains up-to-the-minute information on recent hits, and the company plans to offer an updated Movie Guide every 9 to 12 months. List price: \$59.95. InfoBusiness, 801/221-1100, 801/225-0817 (fax). —*J. B.*

Reader service no. 859

MICROSOFT ENCARTA, 1994 EDITION

The interactive encyclopedia is perhaps the ideal multimedia application, and no program illustrates this better than the 1994 edition of Encarta. The program now offers some 6500 sound clips; more than 100 animations on topics such as physics and human anatomy; 800 color maps; and 8400

graphs, illustrations, and photographs. The program's hypertext links make browsing easy: Jumping from *radio* to *ionosphere* to *atmosphere* to *acid rain* is as simple as clicking on the words. All this makes Encarta an excellent research tool for schoolchildren and fun for adults. The program's main drawback: its \$395 list price.

Students, teachers, and administrators pay only \$139. Microsoft Corp., 800/426-9400, 206/882-8080. —*J. B.*

Reader service no. 860

MULTIMEDIA BUSINESS 500

Want the lowdown on your competitors? Need fast access to a company's financial and stock information? Multimedia Business 500 is one of the cheapest ways on CD ROM to get detailed information on more than 500 major companies. By culling company reports from *Hoover's Handbook of American Business* and financial information from Standard & Poor's Compustat Services, Multimedia Business 500 provides brief company descriptions and histories, up to ten years of financial and stock data for each company, product lists, and information on competitors; company addresses, telephone numbers, and fax numbers are also included. You even get executives' names, ages, titles, and salaries for fiscal year 1992. List price: \$49.95. Allegro New Media, 800/424-1992, 201/808-1992. —*J. B.*

Reader service no. 861

SOFTWAREVAULT, THE COLLECTION FOR WINDOWS

This CD is a collection of about 2000 zipped Windows and games shareware files. It offers something for everyone and includes file viewers, compression programs, contact managers, memory utilities, fonts, games, and much more. With menu-driven interfaces for DOS and Windows, SoftwareVault lets you read a one-line description of each file to decide whether you want it. And the program can simultaneously unzip and transfer files to your hard disk, unlike some shareware CD ROMs that make you decompress the files yourself. But remember, *shareware* doesn't mean *freeware*: If you decide to use a program, you're expected to pay the author for your copy. The collection lists for \$59. American Databankers Corp., 918/497-1201. —*J. B.*

Reader service no. 862

Kids' Corner

DINO-MANIA

3-D Dinosaur may be made by Knowledge Adventures, but it's no adventure. On the box it says "Works with DOS or Windows." Not! It's a DOS program and we couldn't get it to run right in Windows. It's hard to figure out how to move around in the program, and it's hard to move once you've figured it out. You often have no choice of where to go. The dinosaur video clips were the best part, and the 3-D was neat (the program comes with two pairs of 3-D glasses). List price: \$79.95. Knowledge Adventure, 800/542-4240. —*Elijah Kinch Spector*

Reader service no. 863

Microsoft Dinosaurs is really good. It has so many facts and ways of telling them that it would take a long time to explain. My favorite part was "Dino Don" Lessem's spoken guided tours, which are really funny while they tell you lots of stuff. You can also look things up by subject. Microsoft Dinosaurs also has cool video clips. It lists for \$79.95. Microsoft, 800/426-9400. —*E. K. S.*

Reader service no. 864

Jeff Bertolucci is an associate editor for PC World. Elijah Kinch Spector is a fourth grader at Canyon Elementary School in Berkeley, California.

For more information about all products in this article, circle reader service no. 907.

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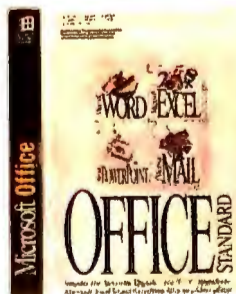
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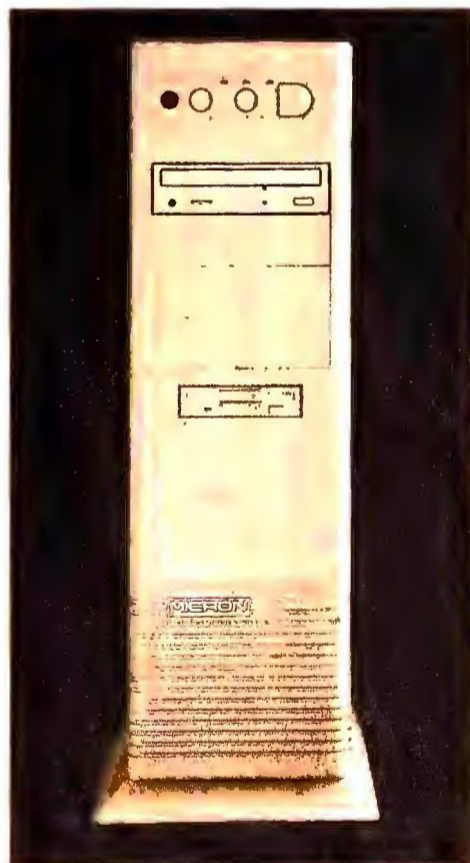
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HELP LINE Q & A



Tip of the Month

BE DIRECT WHEN MODEMS WON'T CONNECT: It pays to know how to talk directly to your modem—someday your communications program's fancy scripts and menus or your modem's exotic features, such as data compression, will turn on you.

It may start when you hear the modems forge a connection, but your communications program doesn't report the connection or reports a disconnection shortly afterward. No matter what speed, modem, or brand of communications software you use, you can't connect. Most likely, one of the many modem settings buried in your communications program's interface is to blame, but you may not have the time to determine what's wrong.

To get around the problem and try for a quick connection, use your communications program's terminal screen, which allows you to talk directly to the modem. Type **ATDTxxx-xxxx** and press **<Enter>** (In place of the x's, type the phone number). You'll have to do without the fancy settings, but you'll gain the chance to make a connection. Even if you don't connect, you'll remove your modem as the culprit and isolate the problem to the modem you're trying to connect to.

Judy Helm, Contributing Editor

Load DOS High

Q When I boot my 386SX-based laptop with DOS 5.0, it gives me some basic information about my system and then an error message stating that HIMEM.SYS is unable to control the A20 line, that the HMA is not available, and that DOS is loading low. My system contains a megabyte of RAM, and I'd like to load DOS high and make this error message go away.

Judith A. Nedrow,
Clifton Springs, New York

A MS-DOS 5.0 and later versions let users exploit a memory-addressing quirk of the 286 (which, for compatibility, also exists in the 386 and later x86 processors). This idiosyncrasy uses the processor's A20 address line to let DOS access almost 64K of the beginning of extended memory. Because DOS uses HIMEM.SYS to manage the use of that region of memory, that area is now called the HMA (High Memory Area). DOS is supposed to load much of itself there (to reduce the amount of conventional memory it needs to use) if your CONFIG.SYS file includes the com-

mand **DOS=HIGH** after the command **DEVICE=C:\DOS\HIMEM.SYS**.

Unfortunately, not all computers or BIOS firmware behaves uniformly when HIMEM.SYS tries to take control of the A20 line. To address this glitch, Microsoft added the **/MACHINE:x** parameter, where *x* is a predefined code number, to HIMEM.SYS to handle anomalous systems. For example, using **/MACHINE:1** will take care of your Chaplet 386SX; other readers having A20 problems can check the DOS manual or type **HELP HIMEM.SYS** at the DOS prompt for a list of code numbers for defined machine types.

Using a text editor, such as the EDIT program included with DOS 5.0 and later versions, append **/MACHINE:1** (using the code number appropriate for your system in place of the 1) to the **DEVICE=C:\DOS\HIMEM.SYS** command in CONFIG.SYS, save the file, and reboot. (You can abbreviate MACHINE to M, as in **/M:1**.) After you reboot, the A20 error message should disappear, and DOS should load into the HMA. If the problem persists or you can't find your system or BIOS list-

ed in the HIMEM.SYS documentation, feel free to experiment with different code numbers.

Don't Curse the Cursor

Q Here at NASA we've been gradually replacing our old dumb terminals with PCs. One of the few complaints I've received from users after the switchover is about the cursor. On our old terminals, it was easy to set the cursor to a nonblinking one, which most users came to prefer. Is there a way to change a PC's cursor from blinking to steady? The company that manufactures our PCs told us it would take a major DOS programming job, which we can't afford.

Margaret Barnes, Washington, D.C.

A Your system vendor is right. You can control almost any aspect of your computer's text display, including the size and color of the cursor, using a simple assembly language program or ANSI.SYS Escape sequences. However, the display routines built into your system's ROM BIOS do not provide an easy way to make the cursor stop blink-

ing, although they do let you make it disappear altogether. A no-cursor display can be the crowning touch to a custom ANSI-graphics menu interface that insulates users from the command line, but it isn't practical for most DOS users.

Fortunately, there are several public-domain and shareware utilities that give you a solid cursor at the command line and also banish the blink in programs. My favorite is Biologic's Unblink 1.3. You can download it as UNBLINK.COM from PC World Online (see page 12 for more information).

- **Unblink 1.3** \$20; Biologic, P.O. Box 1267, Manassas, VA 22110
Reader service no. 688

Can Viruses Harm NT or OS/2 Systems?

Q Here is a brain teaser for the experts at *PC World*: I use Windows NT almost exclusively, but yesterday I booted up MS-DOS to send a fax and discovered that someone's dirty disk had infected both hard disks with the Michelangelo virus. What I'm wondering is, would a virus have any effect on the computer while it's running an operating system other than MS-DOS—in this case, Windows NT? Any ideas on what the outcome would have been on Michelangelo's birthday had the virus gone undetected?

Scott Boyd, Olympia, Washington

A If anything, it's even more crucial for users of Windows NT and OS/2 to practice safe computing. There is very little data currently available on how well DOS viruses perform their dirty work under those operating systems. The better those OS's duplicate the native DOS hardware-software environment, the more effective your average virus will be at replicating itself and damaging your system.

Viruses that fail to execute properly under NT or OS/2 may not spread as quickly as under DOS, since the internal geography of executable files and file allocation tables in the new OS's is different. For the same reason, however, the new files and file allocation

tables may be irreparably damaged when DOS viruses jump in and start rearranging bytes. One class of virus, those that infect the master boot sector (also known as the master boot record), is unaffected by changes in the operating system. The master boot record, which is your hard disk's first physical sector, contains the partition table (which describes the location of the logical drives that compose your hard disk), as well as a small program that locates the boot sector (which contains some system information and a routine to load the OS). Michelangelo and other master-boot-record infectors insinuate themselves into this master boot program and thus commit their crimes before an operating system is even loaded. So you can be almost certain that booting your Michelangelo-infected system under Windows NT on March 6 would have been disastrous. The only way to know for sure is to try it, although I would recommend what you did—simply disinfect your computer and knock on wood.

There's one more thing to consider: Your antivirus software may have triggered a false alarm when it encountered part of Windows NT's multiple boot program in your old boot sector (according to Microsoft, Norton Anti-Virus has been known to make this error). To sort out false alarms, try using a second or third virus scanner and apply some logic—did you add any new executable programs or copy them from a floppy or network since the last time your anti-virus program gave your system a clean bill of health? Has anyone else used your computer? If you answer no to these questions, the likelihood of infection is less, and chances are greater that the alarm was false.

CMOS Virus?

Q I have a virus-infected 486 system that refuses to be disinfectied. I've even low-level-formatted the hard drive, but the pesky devil always resurfaces. Is it possible for a virus to infect the CMOS? It's the only nonvolatile

USER GROUP OF THE MONTH

CCS

April's user group tips come from the Chicago Computer Society. The CCS has six regionally based chapter meetings per month, each with a different topic and an open forum session in which novices can ask questions of the experts. The group also offers special interest groups covering such topics as Windows, WordPerfect, ACT, Paradox, spreadsheets, accounting, programming, communications, law, and multimedia and animation. Membership includes CCS's 60-page journal, *Hard-Copy*, featuring product reviews, chapter and SIG reports, a beginner's column, and a listing of members you can call for support. A six-line BBS offers special conferences and shareware and public-domain software. Family membership costs \$40; senior membership costs \$30.

For more information, call 312/794-7737; dial CCS's BBS at 312/879-9021; or write to Carol Diamond, executive director, at P.O. Box 27, Deerfield, IL 60015-0027.

Reader service no. 689

SPEED UP PKZIP: Speed up PKZip by pointing it to a RAM drive to store the temporary files it creates during compression. (To make a RAM drive, check your DOS manual or, if your DOS directory is in your PATH, type **HELP RAMDRIVE.SYS**.) In your AUTOEXEC.BAT, add the line **SET PKTMP=d:**, where *d* is the RAM drive's letter. Each file being zipped is first compressed into a temporary file, then added to the ZIP file itself. Remember, your RAM disk requires free disk space equal to the size of the largest compressed file.

Ken Johnson
Chicago Computer Society



memory on the machine besides the fixed disk. Will replacing the CMOS chip and reconfiguring the EISA setup with a noninfected setup floppy solve the problem? Will the virus jump from the fixed disk back to the new CMOS?
Terry Briggs, Cincinnati

A Good guess, but no, your CMOS is not infected with a virus. Any program, including a computer virus, must first get into memory in order to do anything, such as infect files and boot records. Viruses get into memory by inserting themselves into executable files (those ending with the COM or EXE extensions) or by replacing the bootstrap program in your hard disk's first physical sector.

It's true that your computer's CMOS chip is nonvolatile (meaning that it stores data even when the system is powered off) and, like a hard disk, is writable. However, there is no executable code in the CMOS chip—the system configuration utility you use to change the values in CMOS runs from ROM. Even if a virus could write itself into CMOS, it couldn't execute. It's worth noting, however, that a few viruses can corrupt CMOS data, so it's a good idea to write down the values stored there from time to time and keep them in a safe place. There are also shareware utilities available that back up CMOS data to a file, which you should keep on a write-protected floppy. The combination of a CMOS backup floppy and a recent, uninfected full backup of your hard disk will let you recover quickly from the destructive effects of even the most difficult-to-detect virus.

Assuming your infection isn't a false alarm (see the previous item), you're clearly reinfected your system. First, boot from a noninfected write-protected floppy, and then partition and format your hard disk. Before running the EISA setup or reinstalling programs from floppies, scan each of them with one or more antivirus utilities to be doubly safe; run the utilities from write-protected floppies as well. Scan the DOS install disks, program disks, and especially the EISA setup disks. If you

restore executable files from a tape drive or a network server, scan them right away before running anything.

Am I on the Right Bus?

Q The article on PCI in the *New Products* section of *PC World's* October 1993 issue ["PCI: A New Local Bus Offers Plug-and-Play Card Installation"] states that the VL bus does not support system speeds above 40 MHz. However, my system builder says he sells several 50-MHz 486DX systems equipped with VL bus video. Am I misunderstanding the article when it says the VL bus does not have high-speed system compatibility?

Randy D. Meek, Lincoln, Nebraska

A The article gives the impression that the VL bus doesn't work in systems equipped with processors running faster than 40 MHz. While in fact there is no such arbitrary cutoff point, there are drawbacks to combining the VL bus with higher-clock-rate CPUs. According to a spokesperson for VESA, the industry consortium that continues to develop the VL bus specification, the fairly direct connections between your computer's processor and its VL bus slots physically limit the number of available connections—the faster the CPU, the fewer the slots supported. Most 33-MHz 486s (including those powered by clock doubled and clock tripled 66- and 99-MHz CPUs) offer a maximum of three, while 50-MHz machines generally can offer only one. According to VESA, manufacturers could theoretically squeeze four VL bus connectors into a 33-MHz system and two into a 50-MHz machine. As far as I'm aware, none has accomplished this.

Also, VL bus cards designed to run at up to 33 MHz may not run properly at faster speeds. Higher-speed VL buses would probably require special high-speed, more expensive cards. One way around the problem of using standard 33-MHz VL bus cards in systems running faster than 33 MHz is to buffer and retime the local bus. ALR already offers the 66-MHz Pentium-based Evolution, which accepts standard 33-MHz VL bus cards.

So your system builder may be offering 50-MHz local bus systems, but I'd say they either can accept only one special 50-MHz VL bus card, or their local bus isn't running at 50 MHz.

Fast Floppy Flubs

Peter Lubczynski of Fountain Valley, California, was dismayed to read my FASTFORM.BAT solution ("Streamlined Floppy Format," December 1993), which he found to be anything but streamlined. Rather than redirecting keyboard input to the FORMAT command from a text file as I suggested, Lubczynski points out that invoking FORMAT with the undocumented /AUTOTEST parameter will format disks without any prompts, eliminating the need for a text file. Using FORMAT /AUTOTEST also solves a problem with the accompanying multi-floppy-format batch file, MLTIFORM.BAT. That problem, notes reader Jim Riggs, is that pressing <Ctrl>-<Break> to exit MLTIFORM.BAT bypasses the command DEL C:\KEYS.TXT—hardly a critical error, but one I should have noticed. Thanks to Peter and Jim for their corrections.

By Scott Spanbauer

Scott Spanbauer is a contributing editor for PC World. Help Line welcomes your questions (see page 12 for contact information).



POWERTIP no. 299

Quick Lines in WordPerfect

In WordPerfect 5.1, you can set up the <Esc> key to make a line of asterisks or other characters across your page: Press <Shift>-<F1>IR, type 65 (or whatever number of characters fit on one line with your standard font and margins), and press <Enter>-<F7>. Then go to a blank line and press <Esc> followed by the character you want repeated (*, \$, #, or whatever). A line of that character will extend from one margin to the other.

Alice Caton

Vancouver, British Columbia, Canada



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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
800dpi/4 x 5"	2:20 Minutes	3:38 Minutes	6:36 Minutes
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Quick and Dirty Printing in 1-2-3 for Windows

Q I just upgraded from 1-2-3 release 2.2 to release 4.0, the Windows version. I love the interface and all the new features, but I have one major complaint: Printing takes forever on my dot matrix printer, and I need to print a report every morning before a staff meeting. Is there any way to make my routine reports print as fast as they did with the older version?

*Fiona O'Hara,
Charlotte, North Carolina*

A Funny, isn't it, how all this glitzy new Windows technology sometimes makes us long for simpler times? Well, guess what? 1-2-3's old /Print•Printer system, with its lack of fonts, mystifying printer setup strings, and speed, lives on in release 4.0's Classic Menu. You can use this system if you want to drive your dot matrix printer in character mode, as opposed to Windows' pretty, but slow, graphics mode.

To do this, make sure your printer is plugged into LPT1, since Lotus has disabled the old commands that let you change the printer interface, and check to see that the paper feed is at the top of a new sheet. Then press / to activate the Classic menu. Use the keyboard to


select *Print•Printer•Range*, choose the range you want to print, then select *Align•Go•Quit* and get to that meeting!

Automatic Spreadsheet Backup in 1-2-3—Not!

Q I'm a longtime WordPerfect user. Its automatic timed backup feature has saved my bippy more times than I care to remember. Isn't there a similar feature in 1-2-3 release 4.0 for Windows?

Shakeela Rashid, Brooklyn

A The good news? Yes, there is such a feature. The bad news? It can ruin your life. Recall how WordPerfect's auto-backup works: Every so often it saves your current document with a standard file name; it erases that file when you save your document and exit the program. If WordPerfect crashes before you exit, the special file still exists with your document safe inside.

The problem with 1-2-3's auto-backup is there's no special backup file: It simply overwrites your original document. This is okay, except when it saves your spreadsheet moments after you've made the Big Mistake and were just about to retrieve your work from the previously saved version. I recommend that you eschew 1-2-3's auto-save; instead, cultivate the nervous habit of clicking the save button  on the tool bar every once in a while. However, if you insist on playing Russian roulette, this is how to load the pistol: Select *Tools•User Setup*, then *Save files every*, and specify the interval for the saves.

Or you can switch to Excel. Its auto-save add-in also replaces the current file, but you can instruct it to prompt you each time, so you can forego the auto-save if you've just toasted

your prize spreadsheet. To activate Excel 4.0's auto-save, you must first attach the add-in. Select *Options•Add-ins* and wait for the Add-In Manager dialog box to appear. Click *Add*, select *autosave.xla* from the file list, and click *OK* and *Close*. Then select *Options•Autosave*. In the dialog box, be sure *Prompt Before Saving* is checked, then set the interval. I'm told that the High setting means every 3 minutes; Medium saves every 9 minutes; and Low, every 27 minutes.

Importing ASCII Dates Into Excel

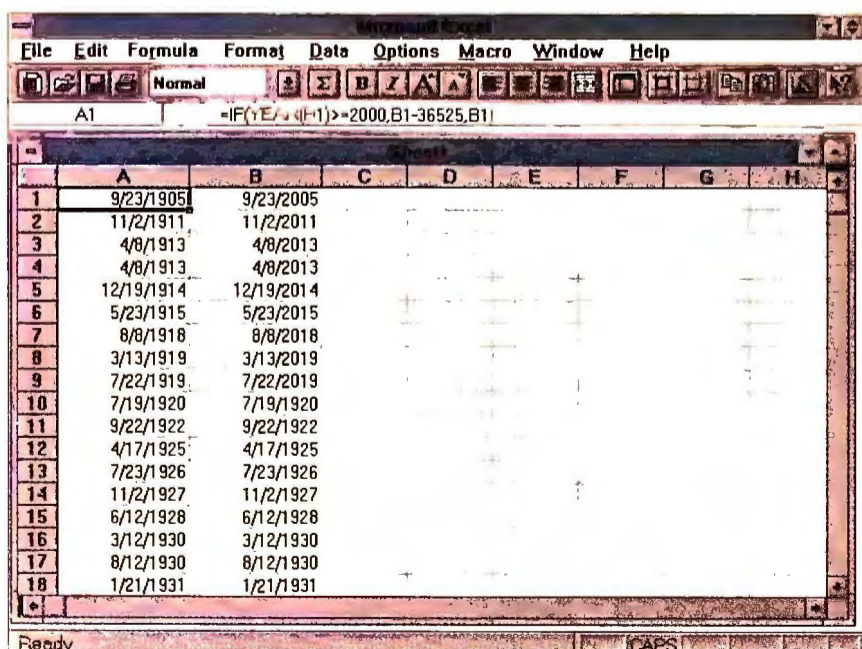
Q I've been importing text data into Excel, and one of the columns represents the birth date of patients at our hospital. I've discovered there's a cutoff at January 1, 1920: If a patient was born on 12/31/19 or before, Excel assumes the date is in the twenty-first century: 12/31/2019. Any dates after 1/1/1920 are okay. How can I fix this?

*Elizabeth Smith-Zawkiewicz,
San Francisco*

A Excel behaves this way whether you import the data or enter it using the keyboard. To check out this problem for yourself, find a blank cell and enter **1/1/20**. Then look in the formula bar to verify that Excel interpreted the year as 1920. Now enter **12/31/19**, and the formula bar reveals a year of 2019 instead of 1919. If you're entering dates, the solution is to type all four digits: Enter **12/31/1919**, and you'll find that Excel does the right thing.

If you're importing the data, you may not be able to change the format of the dates; you need to change them after the fact. First, insert a column to the left of the one that contains dates (let's say the first date was in cell A1; inserting the column would put it in B1).

Then, as shown in **FIGURE 1**, enter the formula **=IF(YEAR(B1)>=2000,B1-36525,B1)** into column A, and copy it down through the column for every date in column B. Here's how the formula works: It subtracts 36525—the number



	A	B	C	D	E	F	G	H
1		9/23/1905	9/23/2005					
2		11/2/1911	11/2/2011					
3		4/8/1913	4/8/2013					
4		4/8/1913	4/8/2013					
5		12/19/1914	12/19/2014					
6		5/23/1915	5/23/2015					
7		8/8/1918	8/8/2018					
8		3/13/1919	3/13/2019					
9		7/22/1919	7/22/2019					
10		7/19/1920	7/19/1920					
11		9/22/1922	9/22/1922					
12		4/17/1925	4/17/1925					
13		7/23/1926	7/23/1926					
14		11/2/1927	11/2/1927					
15		6/12/1928	6/12/1928					
16		3/12/1930	3/12/1930					
17		8/12/1930	8/12/1930					
18		1/21/1931	1/21/1931					

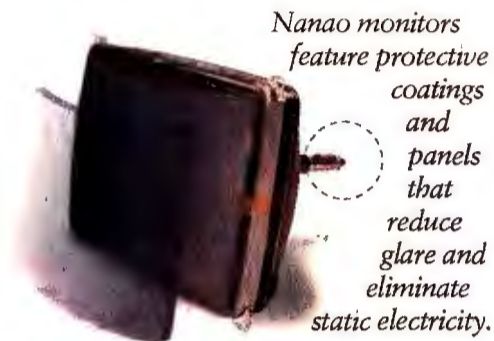
FIGURE 1: NEED TO IMPORT DATES that are earlier than 1920? Since Excel automatically places them in the twenty-first century, use this formula to convert them back.

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F760i-W	21"	0.28mm	H:30-78kHz V:55-90Hz	1280x1024
F560i-W	17"	0.26mm	H:30-82kHz V:55-90Hz	1280x1024
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Master Class: All You Ever Needed to Know About Printing Worksheets

In my training classes, it's like a mantra: "I built the worksheet in half an hour, then spent the rest of the day trying to print it." Understanding a few basic principles can help prevent printing nightmares. So in this month's Master Class, I introduce the essential concepts of printing simple spreadsheets. Next month I'll discuss the intricacies of printing multipage reports.

Printing a small worksheet—smaller than the piece of paper you want to print it on—is simple. A Windows spreadsheet such as Excel automatically senses the active area of your worksheet when you choose *File • Print* or *File • Print Preview*. If you use a DOS spreadsheet or want to print just a subsection of a Windows worksheet, you must set a print range before you issue the print command: In 1-2-3 for DOS versions 2.4 and 3.4, use *:Print • Range • Set*; in Quattro Pro for DOS, */Print • Block*; in Excel 4.0, highlight the print range, then select *Options • Set Print Area*. What you get is a straightforward paper facsimile of your worksheet or range.

The Bread Slicer

When your worksheet (or the range you've selected) is larger than a single sheet, the software slices it into pages. First it determines how many columns will fit in the page width, and then it slices the worksheet vertically into pagewide strips. If necessary, it divides each strip horizontally into multiple pages. This "bread slicer" effect can produce baffling results. For instance, most of a report may appear as expected on page one, but the last column or two gets pushed onto another page; or you may get a fine-looking report, followed by several blank sheets of paper. To solve the latter problem, be sure to include in the print range only the cells you actually want to print; don't carelessly select empty adjacent rows and columns. In Windows programs, you might try selecting a range to print instead of letting the program choose the entire worksheet.

Squeeze It Onto One Page

If your worksheet is only slightly larger than the page, you can force it to fit by decreasing the page margins, using landscape orientation, making the worksheet image smaller, or some combination of all these methods. To change the margins, look under *File • Page Setup* in a Windows spreadsheet; in 1-2-3 for DOS use *:Print • Layout • Margins*; in Quattro Pro for DOS, */Print • Layout*.

of days in the twentieth century—from each date with a year greater than or equal to 2000. Finally, you use *Format • Number* to format column A to a suitable date format.

Now replace the formulas with date values: Select all formulas in column A, choose *Edit • Copy*, select cell B1, choose *Edit • Paste Special*, click the *Values* button in the Paste box, and click

OK. Although Excel gives you the option of continuing to paste, ignore the prompt in the status bar and press **<Esc>**. Delete column A, and now all your dates will be accurate.

Excel's Print Area Revealed

Q In 1-2-3, I named ranges throughout my spreadsheet for easy navigation and printing. When I wanted to print a

If changing the margins doesn't work and your worksheet is a bit wider than it is tall, try landscape orientation to fit the page sideways: In Windows spreadsheets, choose *File • Page Setup* and click the *Landscape* button in the Orientation box. In 1-2-3 for DOS, choose *:Print • Config • Orientation • Landscape*; in Quattro Pro for DOS, */Print • Layout • Orientation*.

Another approach to this problem is to shrink your worksheet to fit the page (see FIGURE 1). Here's how you can do this in all the major spreadsheet programs:

1-2-3 for DOS: *:Print • Layout • Compression • Automatic*

Quattro Pro for DOS: */Print • Print to Fit*

Excel: *File • Page Setup • Fit to*

1-2-3 for Windows: *File • Page Setup • Size*

Quattro Pro for Windows: *File • Page Setup • Print to Fit*

Note that both Excel and 1-2-3 for Windows let you fit the page in just one dimension: For example, you could force a long, skinny worksheet to print one page wide, but use as many pages as necessary to accommodate all the rows.

So much for the small stuff. Next month I'll explain what to do when your report won't fit onto a single page. Stay tuned for page headers and titles, page numbers, and how to print a report that comprises more than one range.

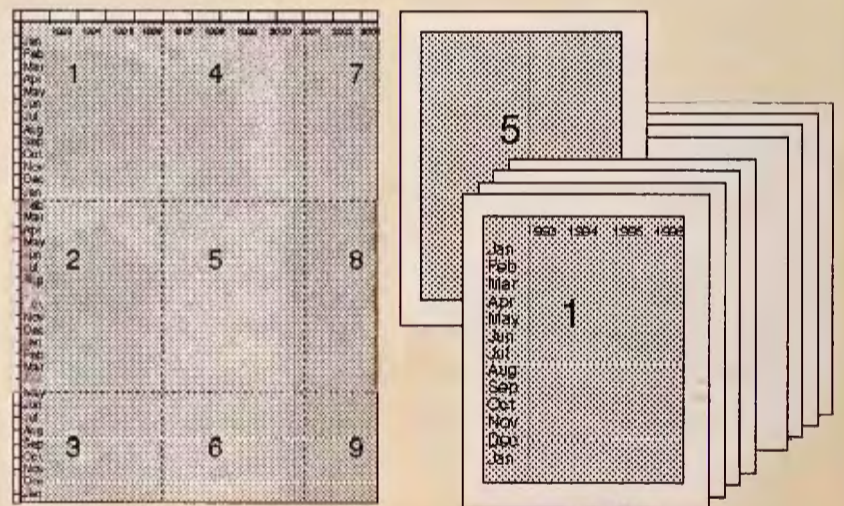


FIGURE 1: TO FIT A LARGE PRINT AREA on paper, a spreadsheet slices it into pages (as shown on the right). If the worksheet's not too large, you can use compression to shrink it onto a single page (left).

range, I simply entered one of the existing range names in the */Print • Printer • Range* command. Now that I'm using Excel instead, I find that each time I want to print a portion of the worksheet, I must first select it, then use *Options • Set Print Area*. How can I "set print area" on a range that I have already named?

Carl Anderson, Erie, Pennsylvania

A Easy. Have you noticed that if you execute Excel's Options•Set Print Area command, then select Formula•Define Name, the range name Print_Area appears in the Define Name dialog box? Instead of a Lotus-type "print range," Excel uses this special range name to identify the print area. If the name exists, Excel prints what's inside; if not, it prints the entire worksheet.

The trick to printing a named range is to skip the Options•Set Print Area step altogether and set the print area yourself. To print a named range, select *Formula•Define Name*; in the resulting dialog box's Name text box, enter **Print_Area**. In the Refers to text box, enter an equal sign (=) followed by the name of the range you want to print, and then press <Enter>. Once you've done this, selecting *File•Print* will print your named range.

Planning Cash Payments in Any Spreadsheet

Q I work for a small company in Bolivia that pays its workers weekly in cash, in bank notes denominated 500, 100, and 10

bolivars, plus change. I need some formulas to calculate the number of bills we would need in each denomination for each salary. Can you help?

George Butler, Caracas, Venezuela

A With *wage* representing the cell address or range name of an employee's earnings, try these formulas in 1-2-3 or Quattro Pro. To calculate how many 500-bolivar bills an employee needs, use `@INT(A1/500)`. For 100s, use `@INT(@MOD(A1,500)/100)`. For 10s, use `@INT(@MOD(A1,100)/10)`. Finally, for additional change, use `@MOD(A1,10)`.

In Excel, you can use essentially the same formulas, with two simple changes: Remove all the at symbols (@), and then add an equal sign (=) at the beginning of each formula.

Here's how these formulas work: The first one yields the number of times the wage can be divided by 500; the INT() function trims the decimals. In the second formula, MOD(A1,500) yields the remainder when A1 is divided by 500; the formula divides this by 100 and shows the integer

value. The remaining formulas for 10s and for additional change repeat the pattern.

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). ■

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WORD PROCESSING Q & A

Glacially Slow Printing in WordPerfect 6.0 for DOS

Q I recently upgraded to WordPerfect 6.0 for DOS, and I have one problem. It takes far too long to print documents if I use any of the scalable fonts that come with the program. On my 386SX system with 5MB of RAM and a Canon BJ-200 printer, it takes over 30 minutes to print the PRINTER.TST file shipped with the program. This is unacceptable, and I will have to abandon this program unless I can improve its performance. Do you have any suggestions for me?

Ron Levesque, San Francisco

A I have one suggestion that will help considerably. Run, don't walk, to your telephone and call WordPerfect's order department at 800/321-4566 (or 800/451-5151) to order a copy of the 6.0a interim upgrade. This update improves printing speed quite a bit, although not as much as you may wish. There's a small fee for the upgrade: \$17.50 for 3½-inch disks and \$13.50 for 5¼-inch ones.

For even more improvement, consider upgrading your system as well. Today's more complex programs make severe demands on hardware, as your situation demonstrates. As an example of the improvements you might see, the

same file that took 30 minutes to print on your setup took just 30 seconds on a 66-MHz 486DX2 machine with 16MB of RAM and a Hewlett-Packard LaserJet series IID. Performance improvements on that scale can pay off quickly, especially considering the current hardware price wars.

Manual Character Kerning in WinWord 6.0

Q I understand the new 6.0 version of Word for Windows lets you do manual kerning, and I want to use this to decrease the space between letters in a headline for a newsletter. Can you help me figure out this process?

Marcus Wilson, St. Louis

A Sure thing! WinWord 6.0's new ability to control letterspacing, or kerning, is one of its handiest features. When you work with large type, such as the type you use in headlines, manipulating the space between characters can really improve the look of your text. Here's how to proceed:

Start by typing in your text and setting the font and size for the characters. Then, to decrease the spacing between two characters, select the first character of the pair. Select *Format*•*Font*, then click the *Character Spacing* tab in the Font dialog box. Drop down the Spacing list and choose *Condensed*. Use the

scroll bar's down arrow to set the amount of condensing in points. When you condense, the down arrow increases the number in the box and brings the characters closer together. Click *OK* to return to your document, and use the Font dialog as needed for further changes.

Using these manual kerning tools, you can even force characters to overlap (for monograms and other special effects). To alter spacing

USER GROUP TIP

Trick to Switch Keyboard Layout in WordPerfect

In WordPerfect for DOS 5.1 or 6.0, you can switch from a special keyboard layout to WP's original layout without going through the Setup menu: Just press <Ctrl>-6. To get back to the special layout, press <Ctrl>-6 twice. A message in the lower left corner of the screen will indicate the active keyboard.

Collette McManus
Chicago Computer Society

for larger blocks of text, simply select the text you want to contract. You can also expand the space between letters or adjust the vertical position of characters relative to the baseline.

One warning for you, though: Due to differences in resolution between your monitor and printer, what you see may not be exactly what you get when you use these kerning tools. Be sure to check your printout and make any adjustments that are necessary.

Recording Commands While Editing Ami Pro Macros

Q I use Ami Pro's macro language to automate many word processing chores. I would love it if I could record additional keystrokes rather than use the macro language when I'm editing a macro. Is there a way to record commands and insert them automatically into a macro I'm writing or editing?

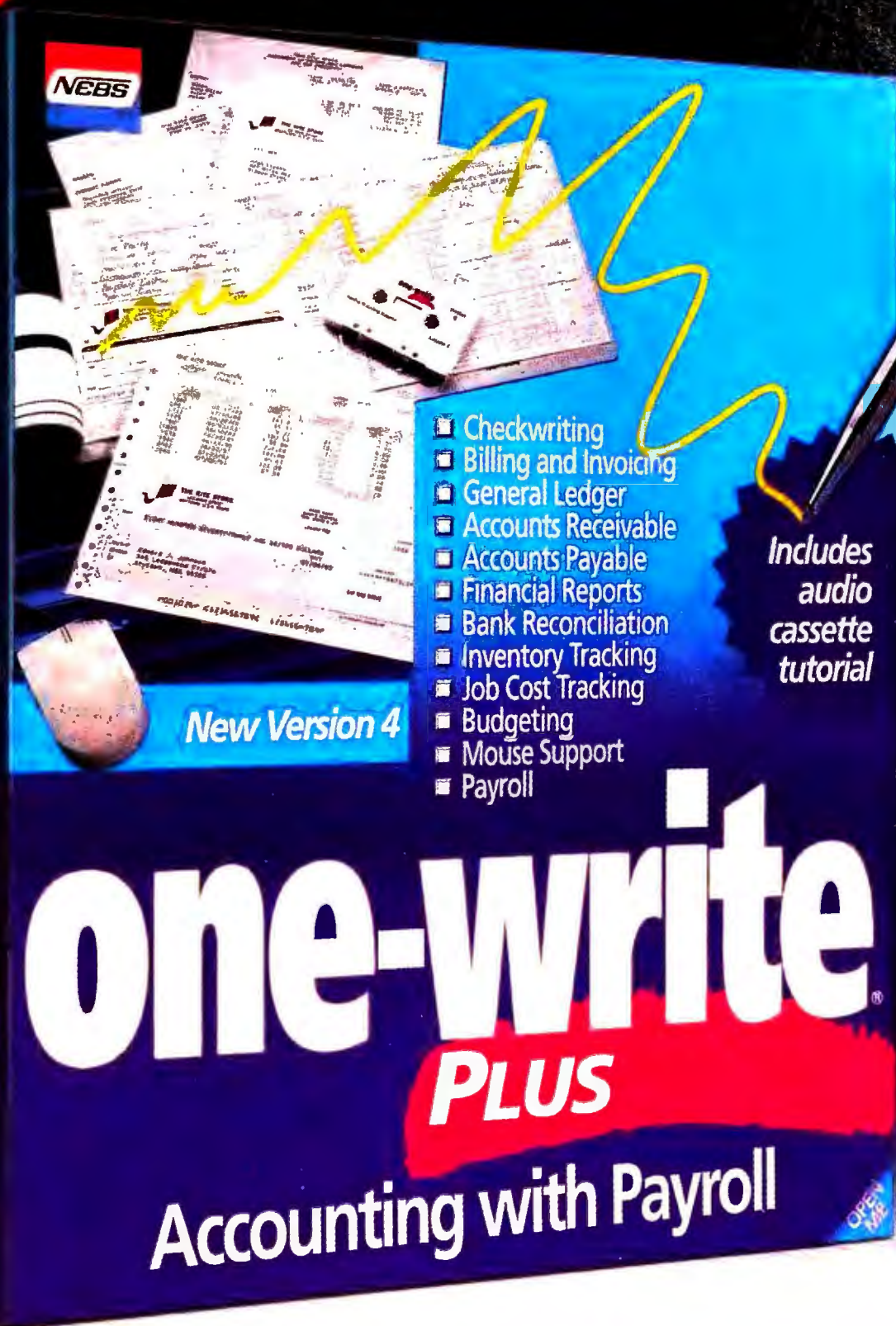
Alan Jameson, Chicago

A Like you, I've looked for a way to record commands while editing Ami Pro macros. I had just about given up when you asked the question and sent me back into the program for another look. While there's no direct way to do



FIGURE 1: ADJUST KERNING IN WINWORD to improve the appearance of headlines by repositioning badly spaced text.

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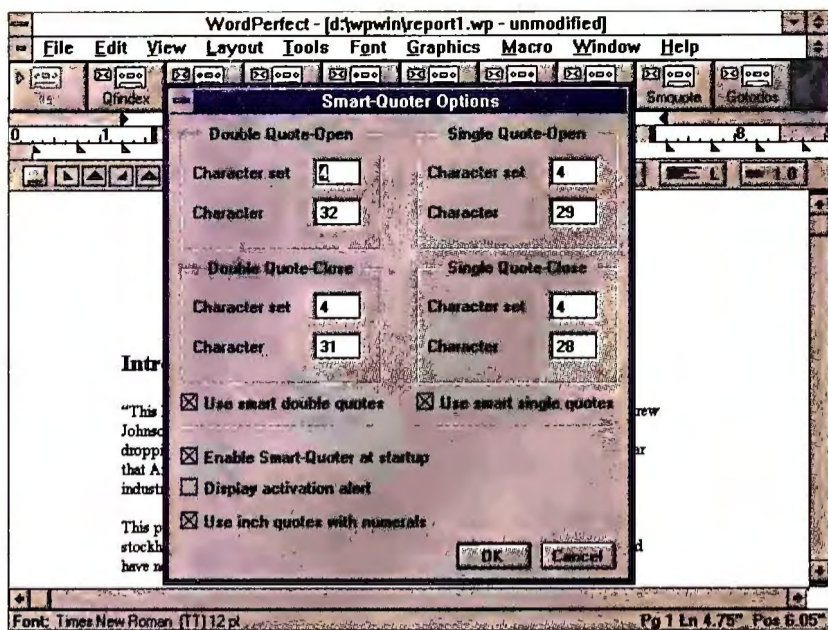


FIGURE 2: USE TYPESET-QUALITY QUOTATION MARKS, courtesy of WordPerfect's built-in SMQUOTE macro.

what you want, I found a simple workaround method. Here's what to do:

With a macro loaded into Ami Pro's editing window, select *Tools • Macros • Quick Record*. Record the commands you want to insert. When you finish, select *Tools • Macros • End Quick Record*. Ami Pro automatically stores your Quick Record macro commands in the file UNTITLED.SMM.

To insert the commands into the macro you're editing, position the cursor where you want the commands to appear, then select *File • Open*. Ami Pro automatically displays all SMM files. Find and choose UNTITLED.SMM, then select *Insert*. The commands you recorded will appear in Ami Pro's macro language at the cursor position.

This Quick Record routine creates a new copy of UNTITLED.SMM every time you use this technique, so you can repeat the process whenever you need to record commands and insert them into a macro.

Word Counting in Ami Pro

Q I like Ami Pro 3.01 a lot, but I can't find a word count feature in it anywhere. Can you help?

Diane Shifrin, San Francisco

A You bet. With the document in question loaded, select *File • Doc Info*. In the resulting dialog box, click the *Update* button at the bottom center, then read your word count, shown in the Statistics frame.

MultiMate Printer Problem

Q My word processor is MultiMate IV. Unfortunately, since Ashton-Tate merged with Borland, MultiMate is no longer supported. I recently purchased an Epson LQ-570 printer but am unable to take advantage of many of its features since there is no MultiMate driver for that particular printer. Do you have any suggestions?

*Jack Roemer,
Princeton, New Jersey*

A Situations like this often occur when a product slips into orphanhood. While you can still use your printer for simple printing, you're stuck when it comes to anything fancy.

After a long search of online services, I failed to find a MultiMate printer driver for your printer. A call to the third-party firm that now handles MultiMate customer service was equally fruitless. A call to Epson turned up one suggestion: Try a driver for a similar printer. Check to see if you have drivers for any of the following Epson printers (listed from most to least preferable): LQ-510, LQ-550, LQ-500, LQ-860, LQ-850, LQ-2550, LQ-2500, LQ-800, LQ-1500. If you find one of these drivers, use it.

If you can't find any of these, you may be out of luck. The only other suggestion I can offer is to switch word processors. If you're not interested in a Windows program and don't have a high-powered computer, WordPerfect 5.1 for DOS or Microsoft Word 6.0 for DOS both offer full support for your printer. If your hardware can handle a Windows word processor, any major program will work. All can import your MultiMate files with little or no loss of formatting. You'll also benefit from the features in an up-to-date program.

Typographical Quotation Marks in WordPerfect 5.2

Q I like to take advantage of all the fonts available in WordPerfect 5.2 for Windows. But there's one thing miss-

ing: I'd like to use real, typeset-quality curved quotation marks, rather than the ugly, straight-up-and-down default characters. Is there an easy way to do this seemingly simple task?

Victor Kaminsky, Buffalo

A You bet! When you installed WordPerfect 5.2, you installed a set of macros at the same time. (If you performed a custom installation and refrained from installing the macro files, go back and reinstall them from the original disks.) Among the macros is one named SMQUOTE.WCM, which lets you use the typographical quotation marks you're looking for. While you could run the macro from the Macro menu each time you want to use these quotation marks, it's much easier just to make them the WordPerfect default. Here's how:

If the WordPerfect 5.2 button bar isn't already in view, start by selecting *View • Button Bar*. Now, use the right button on your mouse to click on the button bar, then choose *macros.wcm* in the list that pops up. Next, click the *Smquote* button on the new button bar. In the dialog box that appears, select *3 Configure Smart Quotes*. You'll see the Smart-Quoter Options dialog box shown in **FIGURE 2**. Leave all the settings as they are but turn on the *Enable Smart-Quoter at Startup* check box, then click *OK*. To use Smart Quotes in the current work session, click the *Smquote* button again and select *1 Turn Smart Quotes ON*. To finish, right-click the button bar again and reselect the button bar you prefer.

Once you enable Smart Quotes, WordPerfect will insert the proper typographical character automatically when you type the keyboard character, for both the single and the double quotation marks. The feature even knows enough to use the foot and inch marks, instead of typeset-quality quotation marks, after numbers.

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

Size Up Directories With File Manager—and DOS

Q I like the way File Manager lets me copy subdirectories by dragging and dropping them to a new destination. The only problem is, sometimes the target floppy or partition isn't big enough to hold the directories I'm copying. Yet there's no way File Manager can tell me how much total disk space a directory *and* the files in its subdirectories take up. Can I add this function to File Manager?

Mel Carter, Chicago

A The easiest way to do this is through the Microsoft Windows Resource Kit. Besides providing detailed documentation on Windows' inner workings,

the kit includes a floppy packed with utilities, including FILESIZE.DLL, which adds this function transparently to File Manager. The kit (\$19.95 plus \$5 shipping) is available from Microsoft at 800/426-9400.

If you don't want to buy the kit, you can achieve more or less the same effect by running a DOS 5 or DOS 6 command. To obtain a quick readout, simply step out to the DOS prompt by double-clicking the MS-DOS icon, and type **DIR/S**. This lists complete file information by subdirectory and calculates total disk space used.

Want to pare that listing down to just the subdirectory names, number of files, and disk space used? Type **DIR/S | FIND "f"**. (The *f* must be lowercase.)

Using this command forces DOS to display only file information that contains the lowercase letter *f*. Since files are shown only in capital letters, what you end up with are just the disk statistics, such as '28 file(s) 70331 bytes'.

You can use this technique to further refine the listing. Need only the totals, minus directory names? Replace *f* with a left parenthesis (or a right parenthesis). Want the list to include the current drive too? Replace *f* with *e*. Unfortunately, there's no way to display only the grand total at the end.

To run this command from File Manager's File•Run box, you must put it into a batch file, which should look something like this:

```
@DIR /S | FIND "f" | MORE
@PAUSE
```

The |MORE command scrolls long lists

one screen at a time—a feature you may or may not want. If you're interested only in the grand total on the last line, omit this command. You'll need to use the PAUSE command to keep the last screen up until you press a key and close the window. Create the batch file with a text editor such as Notepad and save it as DIRSIZE.BAT. (The @ in front of the commands keeps them from appearing on the screen.)

To use this batch file, you'll want to create a PIF for it. Run Windows' PIF Editor, and in the Program Filename text box, type the name and path of the batch file (such as **C:\DOS\DIRSIZE.BAT**). Enter **DOS DIRSize** in the Window Title text box, and select *Windowed* for Display Usage. Save the PIF in your WINDOWS directory as **DIRSIZE.PIF**, and exit the PIF Editor.

To get the total size of a directory and its subdirectories, just select that directory in File Manager, select *File•Run*, type **DIRSIZE**, and press <Enter>. The size of your directory, its subdirectories, and the grand total will scroll up in a separate window. If '—More—' appears at the bottom of the listing, press a key to view the next screen; 'Press any key to continue' means you've reached the end of a listing. Press a key, and the window will disappear.

If you'd like a more automatic approach, you can create a Recorder macro that produces this information in one keystroke. Here's how:

Launch File Manager, but don't run it maximized, since you'll need to select the Recorder icon on the desktop. Select *File•Run*, type **RECORDER**, and press <Enter>. Choose *Macro•Record*, type in a macro name, and specify a shortcut key. As usual with Recorder, take care to choose a keystroke combination that you don't use with any other application, because when the macro is loaded, it will always grab the keystroke combination before the application does, and execute. Set playback to *Same Application* and *Fast*. For Record Mouse, select *Ignore Mouse*, then click *Start*.

Windows Toolbox



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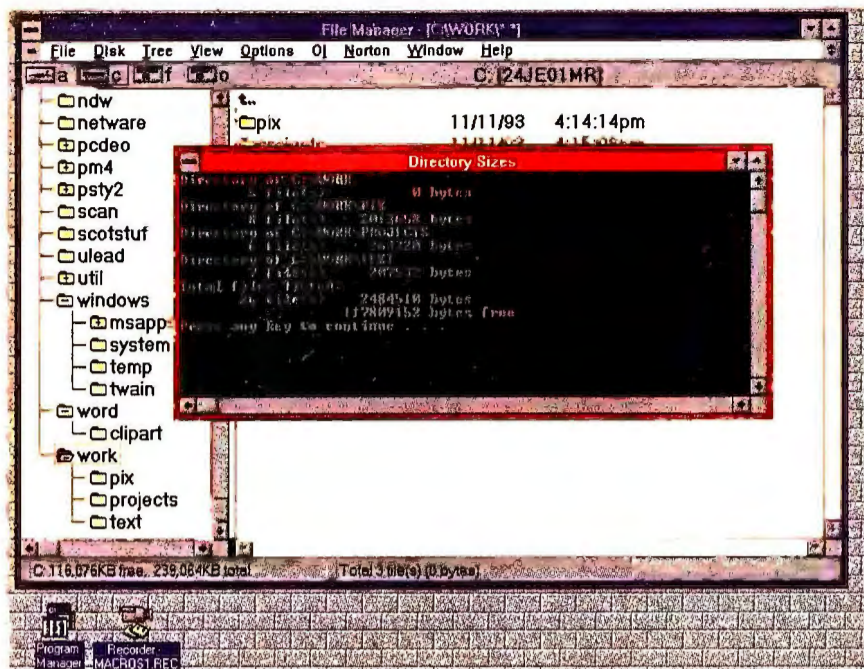


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NEED DISK USAGE STATS on subdirectories and their files? Get instant information with a batch file and PIF tied to File Manager.

A macro is now being recorded, with File Manager as the active window. Press **<Alt>-F**, then **R** to open the Run dialog box. Type **DIRSIZE** and press **<Enter>**. The PIF will start to execute. To end the macro recording, click the flashing Recorder icon at the bottom of your screen. Select *Save Macro* and click *OK*. Then switch to Recorder and save the macro in a REC file. The next time you want to use this macro, remember to load Recorder and open the appropriate REC file. If you plan to use this tool frequently, you can automatically load both by adding the REC file to Windows' Startup group.

That's it. Now you can simply run File Manager, select the directory in question, press your macro shortcut key, and *voilà*—you'll learn how much disk space a directory and its subdirectories are soaking up.

Spiffing Up Title Bars

Q I've changed group and icon fonts by editing WIN.INI, as described in your April 1993 column ["Easy on the Icons"]. But I'm getting tired of the same old fonts in Windows' title bars. Can I change these fonts, too?

Jim Kezman, Cincinnati

A A simple tweak to WIN.INI can change the font used by title bars, menu bars, and menu options, and even the default text font that some programs use. However, unlike with icon

labels, you are limited to bit-mapped fonts with the FON extension, and you cannot specify a size.

First, make a backup of WIN.INI, in case anything goes wrong. In either File Manager or Program Manager, choose *File • Run*, type **WIN.INI**, and then press **<Enter>**. When WIN.INI opens, locate the [windows] section and add the line **SystemFont=**, followed by the font name, such as **SystemFont=EGA80W0A.FON**. Save

WIN.INI, then exit and restart Windows to see the new font take effect. Experiment with different FON files found in the \WINDOWS\SYSTEM directory until you find one you like.

For a more exciting way to dress up your title bars, see this month's "Windows Toolbox."

Relocating Help

Q I recently moved all my application help files onto a compressed drive to conserve space. But when I access help in a program, I'm told, 'Cannot open Help file'. Instead, I must run WINHELP.EXE and use *File • Open* to read the proper file. There has got to be an easier way.

Frank Masters, Lansdale, Pennsylvania

A There is, but the success of any strategy depends on the particular application. Some programs just give up when their help files are removed from their home directories. Others look a little harder, but they may need a nudge or two.

Your first line of attack is the WINHELP.INI file in the \WINDOWS subdirectory, which many newer Microsoft programs check when locating their help files. If it's not present, simply create it using Notepad or another text editor. Enter [Files] on the first line; underneath, type in separate lines for each help file, starting with the name of the file, followed by an equal sign and the

file's new path. For example, an entry for Word for Windows' help file might be **WINWORD.HLP=D:\HELP**. Save WINHELP.INI in your Windows directory, and your problems *could* be over. For example, WinWord 2.0 uses WINHELP.INI, but Excel 4.0a doesn't.

Another solution is to add the new help directory to the DOS path statement in AUTOEXEC.BAT. Still another: Select the application's icon in Program Manager, press **<Alt>-<Enter>** to display its Program Item Properties dialog box, and type in the help directory as the Working Directory. Although these two methods work with some programs (including Solitaire, of all things), many applications won't consult the DOS path or the working directory.

If all else fails, create a Program Manager group that holds the help files you want. To create a new group, select *File • New • Program Group*, type **Help Files** in the Description box, and click *OK*. Then load File Manager, place it in a window, locate the desired HLP files, and simply drag them into the Help Files window. Now you can double-click any help icon, and WINHELP.EXE runs and opens the help file, ready to do your bidding.

Adding a Tools Menu

Q In your November column you talked about a Tools menu that DOS 6.0 installs in File Manager for running backup, defrag, and antivirus programs. I use DOS 6.0 and Windows 3.1, but there's no Tools menu in sight. How can I add this to File Manager?

Ken Wolf, New York

A Not to worry. Exit Windows, pop your DOS 6.0 Setup floppy into a drive, and type **SETUP /E**. Follow the prompts to add the Backup, Anti-Virus, and Undelete programs—and the Tools menu—to Windows.

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).

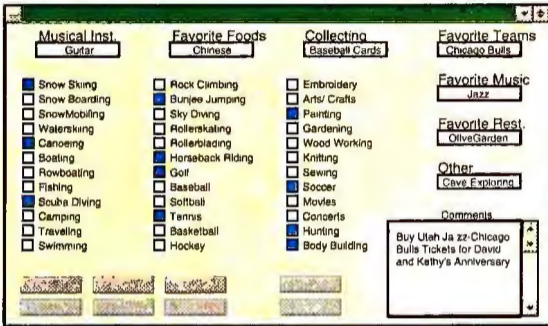
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Create Your Own Templates

Q Whenever I install a new program, I drag a Program template from the Templates folder into another folder and fill out the requisite information. But most of my DOS programs need one collection of settings, while my Windows programs need another. Is there an easier way than setting all the parameters manually each time?

Vicki Cole, Atlanta

A Templates are default objects that automatically copy themselves when you drag them into folders or onto the desktop. By dragging a template to a new location and filling in the additional information (such as the name of your program file), you can add new programs to the Workplace Shell quickly and easily.

One of the best things about templates is that you can create your own, with whatever default values you want. In your case, you might want to build a template with the settings you usually use for your Windows applications.

Here's how to set up a new template.

Select a preexisting program object with settings that match your default. For instance, you might pick one of your Windows programs. Copy this object to the Templates folder (or the desktop, or wherever you want this template to be) by holding down **<Ctrl>** and right-dragging the icon.

Right-click the icon, click the arrow to the right of 'Open', then select *Settings*. In the Settings notebook, delete the file name in the Path and File Name text box. Click the *General* tab. Delete the current title and add one of your own, such as **Vicki's Windows Program**.

Here's the key: Check the *Template* option at the bottom of the page. This turns the object into a template. Close the Settings notebook by double-clicking the window icon in the upper left corner.

The icon should turn into a generic program icon that looks like it's on a Post-it note, indicating that it's a template. To create a new program object with it, just right-drag the icon to a new

folder or a new place on the desktop. It automatically pops up the Settings notebook, where you can fill in the program's file name, a new title, and any other information.

But Is It Right for Me?

Q I'm a Windows user running 1-2-3 4.0, WordPerfect 6.0, Quicken 3.0, and CominWorks for Windows on a 25-MHz 486SX with 8MB of RAM. I find it annoying that I can't work while I'm printing a long document (Windows has no real multitasking). I just saw IBM advertising OS/2 for Windows. What's the difference between that program and regular OS/2?

Holger Laufenberg, CompuServe

A You sound like just the kind of person IBM is targeting with this product. OS/2 for Windows has several advantages for Windows users over the full copy of OS/2:

Cost OS/2 for Windows retails for \$149 (\$139 if you buy it on a CD ROM), \$100 less than the standard OS/2 2.1.

Space Since it uses the version of Windows already on your system, OS/2 for Windows takes about 8MB less disk space than the full OS/2 2.1. And it can save more space by doing the job of Program Manager replacements like Norton Desktop.

Convenience One annoyance of keeping both OS/2 and Microsoft Windows on your system is you effectively have two versions of Windows installed. Every time you install a Windows application, the installation program changes the INI files, DLLs, and Program Manager groups only in the Windows version you're currently using. OS/2 for Windows completely eliminates this problem, since you need only one copy of Windows on your system.

By Lou Miranda

Lou Miranda is a senior systems analyst at Poliac Research in Burnsville, Minnesota. OS/2 welcomes your questions. See page 12 for contact information.

From Windows to OS/2

Replacing Windows' Task List With OS/2's

Pressing **<Ctrl>-<Esc>** in Windows brings up the Task List; in OS/2 this action brings up something similar called the Window List (you can also bring up the Window List by clicking both mouse buttons). While both programs share some basic functionality, there are some significant differences.

Windows' Task List, for instance, features a button bar, something OS/2's Window List lacks. But as with everything else in OS/2, you can select an entry and press the right mouse button for a menu of options.

Windows' Task List has several limitations: You can't resize it, you can't perform actions on more than one entry at a time, and you can't get application help from within the list. This is not the case with OS/2.

First, you can dynamically resize OS/2's Window List; it retains the size and position you select. Second, you can choose more than one window by holding down **<Ctrl>** and selecting with the left mouse button. Multiple selection is handy if you need to concentrate on a few programs and keep the others out of your way (for instance, when you copy data from one program to another). Just select the desired programs, press the right mouse button, and select *Tile*. OS/2 tiles only the applications you selected.

Finally, if you want more information, right-click the application in your Window List and choose *Help* (this works only for native OS/2 programs). Quite literally, the Window List gives you more help than its Windows equivalent.

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DATA MANAGEMENT Q & A

Showing a Running Total in a Paradox 4.0 for DOS Report

Q At my office we use Paradox 4.0 to enter expense information for various projects, with a master table called PROJECTS and a detail table called EXPENSES. I've linked these tables in a form, but I can't figure out how to show a running total of expenses as they're entered.

I've experimented with using a calculated field, but I can't seem to devise an expression that will work. Have you got any ideas?

Sarah Chambers, Toledo

```

PROC WaitProc(Trig,EvRec,CycNum)
SWITCH
CASE EvRec["KEYCODE"] = ASC("F2"): RETURN 2
CASE Trig = "DEPARTFIELD":
  IF TABLE() = "Expenses" AND (FIELD() = "Amount"
  OR EvRec["keycode"] = ASC("Del"))
  THEN IF EvRec["keycode"] = ASC("Del")
    THEN DEL MOVETO [Amount]
    ELSE POSTRECORD
  ENDIF
  totqty = IMAGECSUM()
  MOVETO "Projects"
  [Total Expenses] = totqty
  MOVETO "Expenses"
ENDIF
IF EvRec["keycode"] = ASC("Del")
  AND TABLE() = "Expenses"
  THEN RETURN 1
  ELSE RETURN 0
ENDIF
ENDSWITCH
ENDPROC

COEDIT "Projects"
PICKFORM "1"
SHOWPULLDOWN ENDMENU
PROMPT "[F2] Quit"
ECHO NORMAL
WAIT WORKSPACE
  PROC "WaitProc" KEY "F2" TRIGGER "DEPARTFIELD"
ENDWAIT
DO_IT!

```

FIGURE 1: SHOW RUNNING TOTALS in your report easily by preparing them with this Paradox 4.0 script.

A I'm assuming you're trying to use a calculated field in the master part of your multitable form. This won't work because Paradox can't handle fields from a linked table in a calculated field's expression. A better solution would be to add a real field called **Total Expenses** to your PROJECTS table and use a script like the one shown in **FIGURE 1** to enter data or edit within your form. The script keeps the Total Expenses field up to date.

First, use *Modify•Restructure* to add the Total Expenses field to PROJECTS, giving it the \$ (currency) data type. Once you've saved the altered table, add the new field to your master form: Select *Forms•Change* and the name of your form to bring up the form design screen, then insert the Total Expenses field with the *Field•Place•Regular* command. It doesn't matter where you put the field, although you'll probably want it underneath the subform's Amount column.

When you have saved the form and are back at the main menu, select *Scripts•Editor•New*, enter **EDITEXP** for a name, and press **<Enter>**. In the resulting editing window, enter the script in Figure 1.

You did not mention your field names, so I'm guessing that the expenses go into a field called Amount. If this is not the case, be sure to change the references to '[Amount]' appropriately. I am also assuming that you are using PROJECTS.F1 as the master form. Change the '1' that follows the PICKFORM command if you are using a different form number. If you use the default standard form, replace the '1' with **F**. When all the commands are entered, press **<F2>** to save the script.

To edit your data, select *Scripts•Play•EDITEXP*. With the script controlling data entry and editing, you can still use **<F3>** and **<F4>**, or you can move between the PROJECTS and EXPENSES tables with mouse clicks. Every time you leave the Amount field in an EXPENSES record, EDITEXP updates the Total Amount field. The script will work if you insert or delete records in the detail part of the form, but there's no checking for key violations. If you try to leave a record with a duplicate key, you'll get an error message. Simply cancel the script play, delete the offending record, and start over.

Selecting Printable Records in Paradox for Windows

Q I use Paradox 4.5 for Windows to manage a database of sales leads, and I often need to print mailing labels based on various criteria. One day I might want to send a mailing to all the leads on the East Coast, another day to potential customers who called after seeing a magazine ad. I've got a good mailing label report already set up. What's the quickest way to print labels for the smaller groups?

Mark Fong, Vancouver, Washington

A There are two simple ways to print labels—or any other kind of report—on only a subset of your data. You can change your report's data table before you print it, or you can tie a query into your report design. I'll tell you how to do both.

The first technique is the best solution if you only occasionally need to print labels on a subset of your table. Start by doing a query to bring up only the leads you need. The query puts these records into a table called ANSWER. Once you have the ANSWER table, open your labels report with *File•Open•Report*, change the Open Mode to *Print*, and click the *Change Table* button to change the report table to ANSWER. When you click *OK*, Paradox will print your selected labels.



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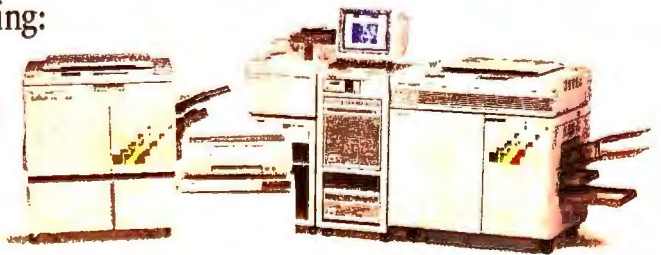
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If you often print labels from a subset of your table, you may want to attach your report permanently to a query. Your data table must be keyed for this to work. Create a query to select the records you currently want to see (you can always change it), and save it with a name like **GETLABEL**. Then open your labels report in Design mode, and use *Report • Data Model* or click *Data Model SpeedBar*. Change the Type setting to *<Queries>* and click *GETLABEL.QBE* (or whatever you called your query) to move it to the box on the right side of the dialog. Then use your mouse to drag a line from the query to the LEADS table. When the Define Link dialog opens, use the key field(s) to join the tables.

With the query added to the report design this way, you can open the GETLABEL query before you run your report, edit it to select different records, and then close the query window, saving your changes. You don't actually have to run the query; the next time you print labels, the report will automatically run the query and print the appropriate labels.

Converting a Character Field to a Memo Field in dBASE

Q I have a dBASE IV file with a character field that really should be a memo field. I tried modifying the file's structure, changing the field type to Memo. However, the new memo field came out empty. How can I make this change without losing my original data?

Randy Fullerton, Oklahoma City

A The answer involves making a copy of your file and putting your data into a memo field in the new data file.

First copy your old data file to one called TEMP.DBF. You can use either DOS's or dBASE's COPY command. To use the dBASE command, first make sure the file is open, then enter **COPY TO TEMP.DBF**. Change the field in question in your original file to a memo field.

This will, as you pointed out in your letter, wipe out the text in that field. But don't worry, you're about to get it back. At the dot prompt, enter the following commands, replacing *file* with the name of your original

file and *field* with the name of the field you're changing:

```
SELECT 1
USE Temp
SELECT 2
USE file
SET RELATION TO RECNO() INTO Temp
REPLACE ALL field WITH Temp->field
```

These commands tell dBASE to match the records in the two data files by record numbers (so make sure you don't add or delete records as you go through this process) and update the original file against the temporary one. Browse the new data file and press **<F9>** with the cursor in the memo field; you should see the data from your old file. Once you're sure the text is there, go ahead and erase TEMP.DBF.

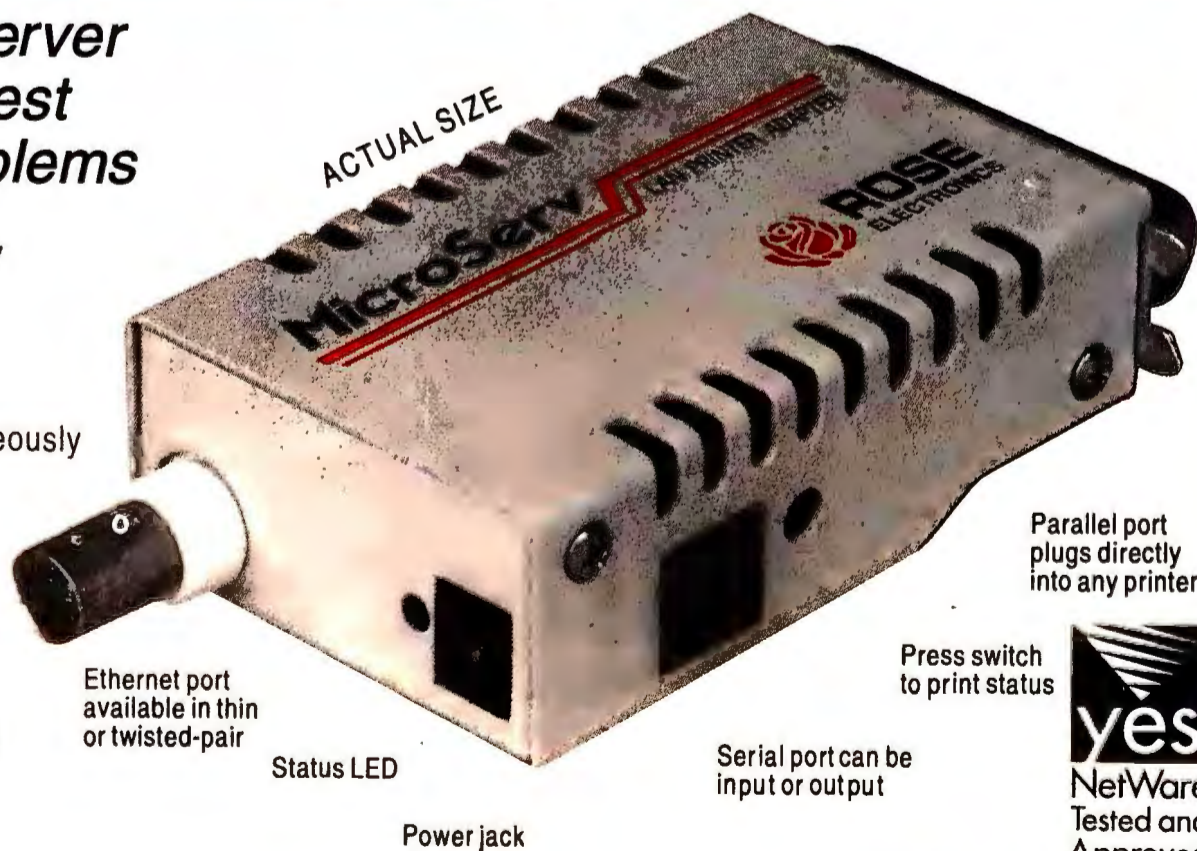
By Celeste Robinson

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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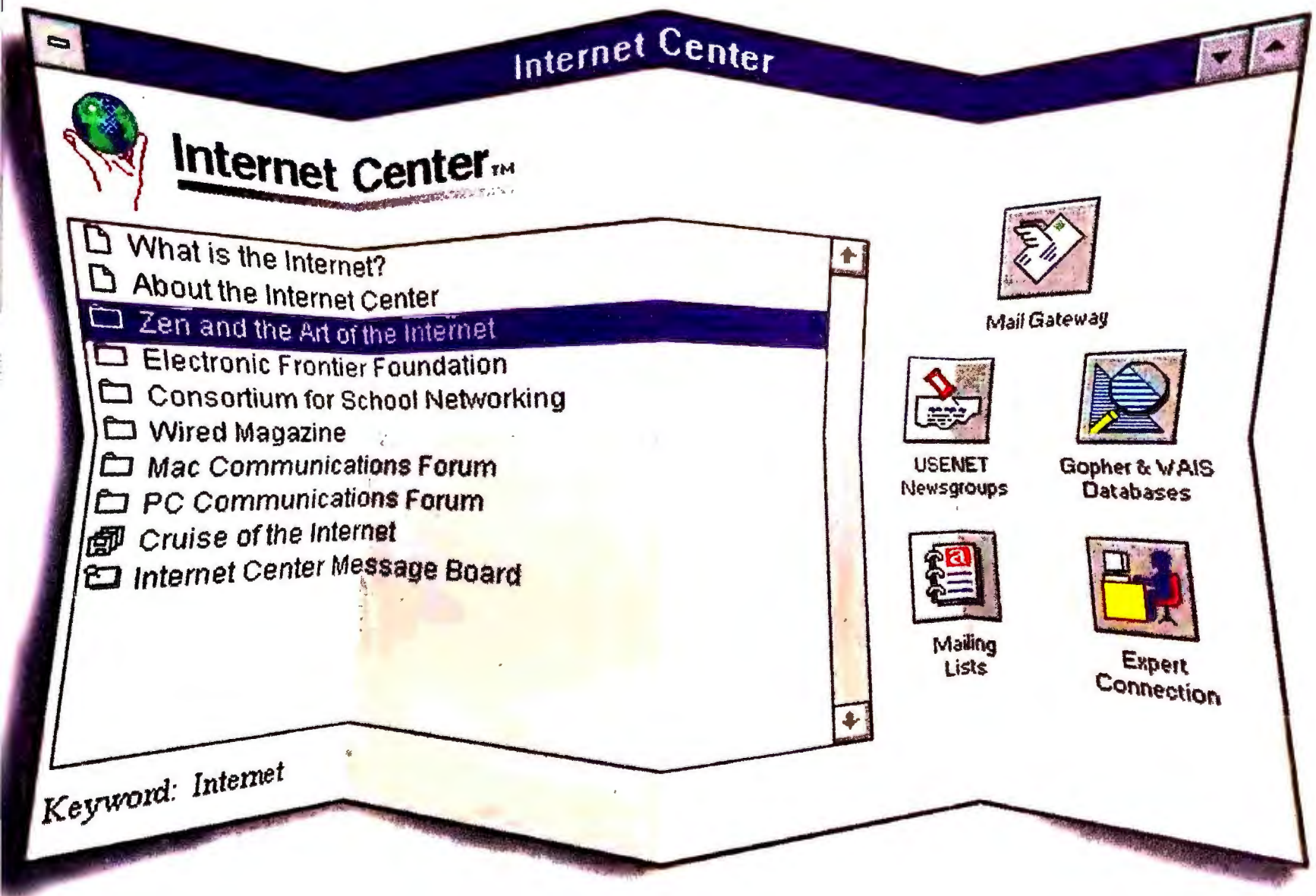
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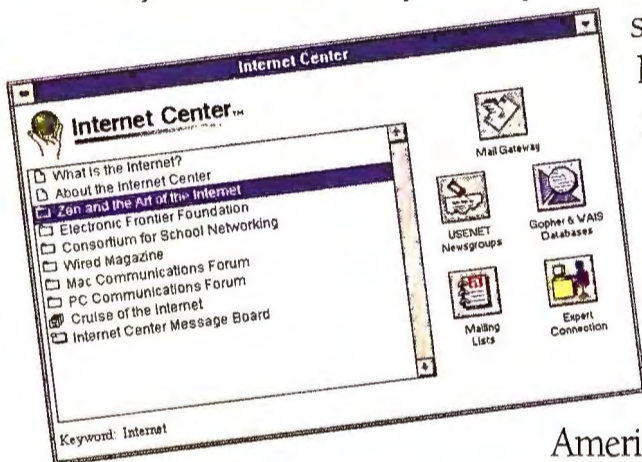
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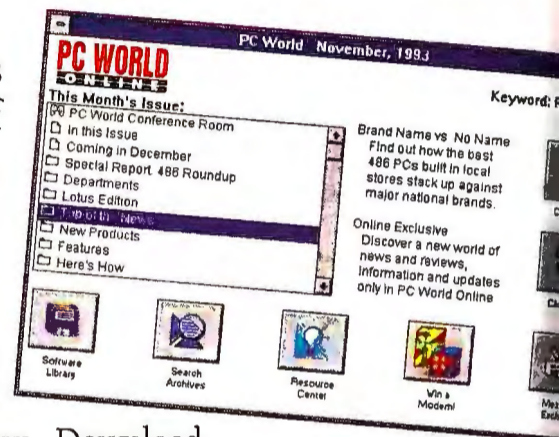
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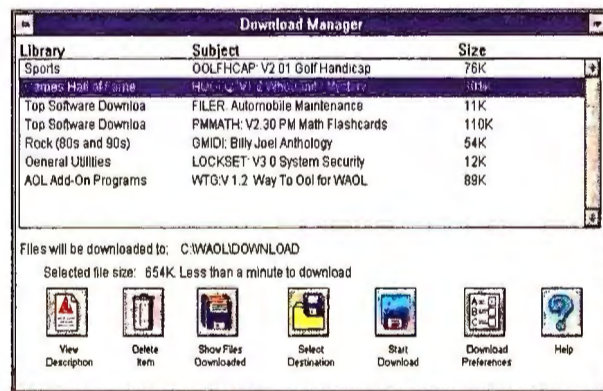
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PUBLISHING & PRESENTATIONS Q & A

Lightning-Fast Style Changes With PageMaker

Q Instead of reformatting a PageMaker 5.0 document one paragraph at a time, I want to reformat all the paragraphs at once by redefining the current paragraph style. I planned to do this by changing the old style in the Type • Define Styles dialog box, but then I thought there might be a speedier way to do it using the Control palette. Any suggestions?

*Krzysztof Szewczak,
East Lansing, Michigan*

A You're on the right track with PageMaker's Control palette: It's so full of shortcuts for formatting text that once you start using it, those old drop-down menus soon grow cobwebs. Using the Control palette to replace one style's specifications with another's is a perfect example of how powerful this tool can be. Let's say you want to apply Style A to all paragraphs that currently use Style B. Here's how to do it:

1. Open your document in layout view. If the Control palette isn't already displayed, select *Window • Control palette*. Select the Text tool and use the cursor to highlight a paragraph that's in Style A.

2. Activate the Control palette by clicking it. The palette should be in

paragraph view, with the selected paragraph's style (Style A) displayed in the style name box (the leftmost box in the palette).

3. Use the cursor to highlight *Style A* in the style name box, and change the name, typing in **Style B**. Now hold down **<Ctrl><Shift>** and click the name you just typed. PageMaker responds with an alert box asking you if you want to update the style with current settings. Click *OK* (or press **<Enter>**), and PageMaker applies Style A's specifications to all paragraphs that previously followed Style B.

A similar technique creates new styles. Just format a paragraph with the attributes you want to include in the new style, and select the paragraph with the Text tool. Then select the Control palette, type a new name over the old one displayed in the paragraph style name box, and press **<Enter>**. PageMaker immediately adds the new name to the Styles palette and tags the selected paragraph with that style name.

Copy-and-Paste Express With Publisher

Q I want to recycle text and graphic objects from one Microsoft Publisher 2.0 document to another. Unfortunately, Publisher can open only one document at a time, so I have to open the source document, copy the object,

close the source document, open the destination document, paste the object, close the destination document, and so on—a major hassle. Do you know of any shortcuts?

*Dennis Hagerty,
Novato, California*

A Absolutely! Although Publisher 2.0 lets you open just one document at a time, there is a way to open two Publisher documents simultaneously. Simply start a sec-

ond Publisher session, and then copy and paste between the two sessions.

1. Open the document containing the items you want to copy. Using the Selection tool, select the first object you want to copy—such as a text frame, table frame, or picture frame—and press **<Ctrl><C>** to copy it to the Clipboard.

2. Next, start a second Publisher session, open the document you want to paste *to*, and press **<Ctrl><V>** to paste the item from the Clipboard.

That's it. You can use the same two-step procedure to copy multiple objects from one Publisher document to another. To select a combination of objects, just hold down **<Ctrl>** or **<Shift>** as you click on each additional object, and then use the copy-and-paste commands in the same manner described.

Fancy Logos in CorelDraw

Q I'm a new CorelDraw user, and I'd like to create a logo that looks like a neon sign. Any suggestions?

Frank Tiffenbach, Trenton, New Jersey

A The trick to creating neon type is to blend two versions, with different outlines and colors, of each character in the logo. The only catch is that you can apply the effect to just one character at a time. Here's the basic technique, which you can use with both CorelDraw 3.0 and 4.0.

1. Open CorelDraw and make sure *Display • Show Status Line* is switched on and *Display • Edit Wire Frame* (for color viewing) is switched off.

2. Click the Text tool, click an appropriate location on the page, and type the first letter of your logo. Select *Edit • Edit Text* and change the text to 36-point Arial Bold Italic (which works well for neon type). Click *OK*. If necessary, you can use the Zoom tool to see the letter clearly.

3. With the letter selected, begin the first version of the character by choosing *Arrange • Convert To Curves*. Click the Outline tool (the fountain pen) to open its fly-out menu, and select the third

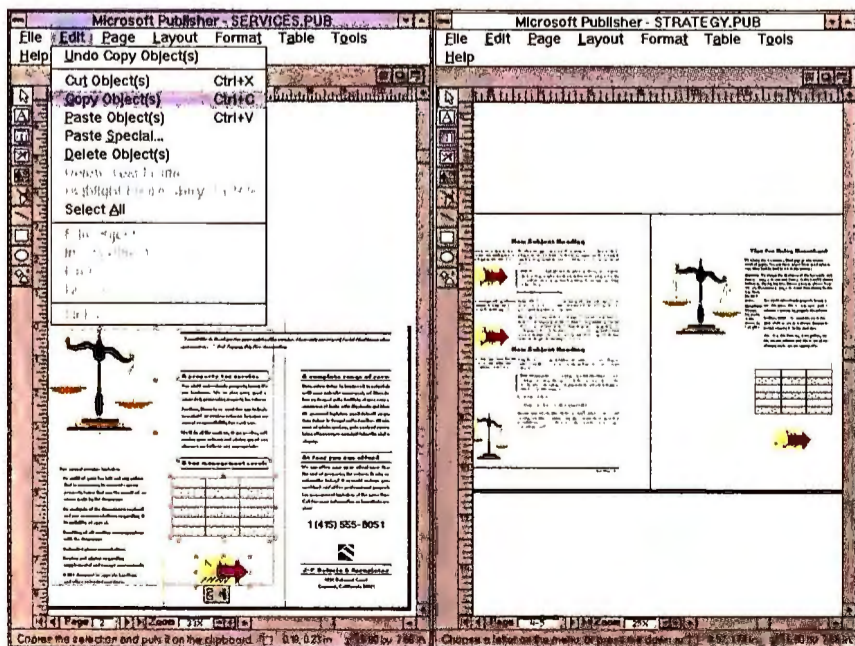


FIGURE 1: COPY OBJECTS BETWEEN PUBLISHER DOCUMENTS by opening two Publisher sessions.

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icon in the bottom row to give the letter a solid outline. Click the Outline tool again and select the fifth icon, top row, to make the outline heavier. Click the Fill tool (the tipping paint can) and select the third icon, top row, for no fill.

Note: You must add a few steps to this procedure if you're working on a letter that contains an enclosed shape: A, B, D, O, P, Q, or R. After you choose *Arrange • Convert To Curves*, you must also select *Arrange • Break Apart*. After you use the Outline and Fill tools to format the letter's exterior outline, repeat the procedure for the interior shape: Select the enclosed part by clicking its outline, and then use the Outline tool to apply a heavy, solid outline and the Fill tool to specify no fill. When you finish, select the whole letter by holding down <Shift>, clicking the outer outline, and selecting *Arrange • Combine*. You can now proceed with step 4.

4. Now you're ready to create the second version of your letter. Select *Special • Preferences*, type 0 in the Horizontal and Vertical options boxes under *Place Duplicate*, and

click *OK*. Choose *Edit • Duplicate* to place the second version of the letter directly on top of the first.

5. Next, click the Outline tool and select the fourth icon on the top row of the fly-out menu to give the duplicate letter a thin outline. (You won't notice any difference on screen.) Click the Outline tool again and select the fourth icon, bottom row, to give the letter a light shading.

6. To blend the two versions of your letter, deselect the duplicate, and then click and drag the mouse to draw a marquee (a blinking dotted line) around the versions. Select *Effects • Blend Roll-Up* to open the Blend dialog box, set Steps to 20 and Rotation to 0 degrees, and then click *Apply*. CorelDraw will now blend the outlines of both letters together and create the neon type effect.

To create a word, repeat the same steps for each letter, one at a time. And don't hesitate to experiment: Try the same effect with different typefaces, type styles, colors, and outline thicknesses.

By Richard Jantz

Contributing Editor Richard Jantz is an electronic publishing and presentations consultant in Berkeley, California. Publishing & Presentations welcomes your questions and makeover candidates. See page 12 for contact information. ■



POWER TIP no. 301

Trimming Windows' Weight

To remove unwanted Windows components such as accessories, wallpaper files, or games, launch Windows Setup (in the Main group if you haven't moved it) and select **Options • Add/Remove Windows Components**. To remove an entire component, clear its check box and select **OK**, then **Yes to All**. To remove parts of one, click its **Files** button, select the files you want to remove, and select **Remove • OK • OK • Yes to All**.

Shane Rau
Assistant Technical Editor

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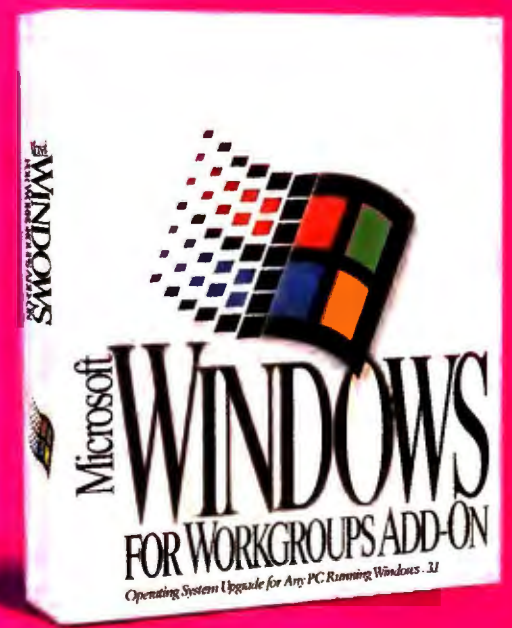
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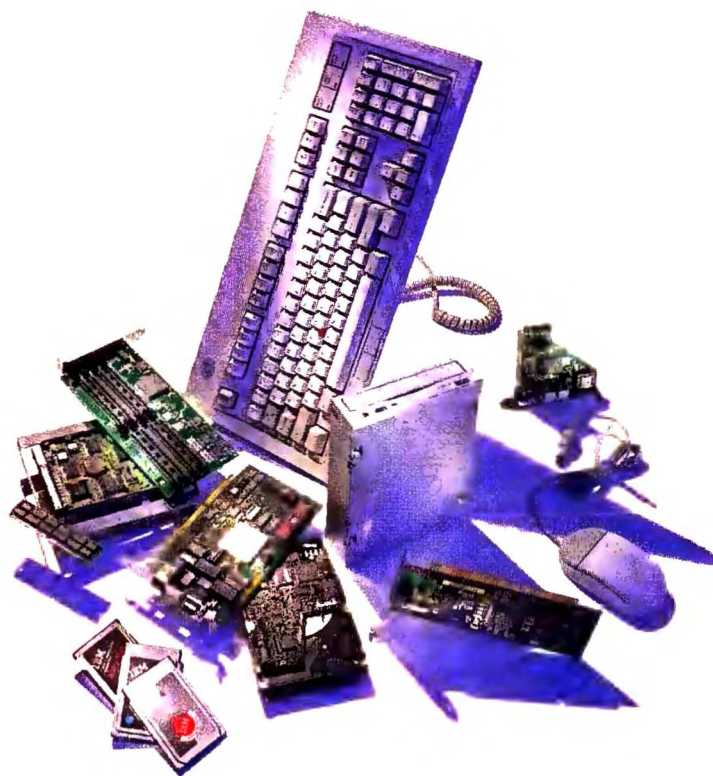
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COMMUNICATIONS Q & A

Learn Your XYZs

Q What's the difference between the various file transfer protocols? For example, when should I use the XMODEM protocol, and when should I use YMODEM-G?

*Richard M. Bazinet,
Orléans, Ontario, Canada*

A Your choice depends on several factors, particularly the quality of the phone lines. If the line is good, try ZMODEM, YMODEM-G, or IMODEM. ZMODEM can restart aborted transfers where it left off and is superfast (unless there's static on the wires). YMODEM-G and IMODEM are as fast as ZMODEM, but only because they don't perform error checking. Use them only with an error-correcting modem connected to clean phone lines.

You can use Internet to send E-mail between online services, including CompuServe, America Online, and MCI Mail.

If the phone line is only good to fair, try a member of the vast XMODEM family, which includes all of the XMODEMs plus YMODEM and YMODEM Batch but does not include YMODEM-G. Of these, I would start with YMODEM or YMODEM Batch.

If the lines are bad, consider the XMODEM-CRC protocol, which is poky but provides strong error checking. You might also use Kermit, which can be quite fast, but only if you *and* the system on the other end are using top-flight implementations of it. The only time I'd recommend an unidentified Kermit is when your phone lines are superdirty, in which case Kermit is practically indestructible. Don't use plain old XMODEM unless nothing else works: Its error checking is not as good as that found in other protocols; it won't work on networks; and it fails when it encounters time delays.

Finally, always use CompuServe B+

to download files from CompuServe; it's much faster on that service than any other protocol. And if you're lucky enough to have communications software blessed with HS-Link, the new bidirectional protocol, you can use it under just about any phone or network condition without worry.

Mailing Between Services

Q How can I send E-mail between the major online services?

Milko Lima, Camaguey, Cuba

A You can send messages between different online services, but what method to use depends on which services you're sending to and from.

You can use Internet to send E-mail between most major online services, including CompuServe, America Online, MCI Mail, GENie, and even many BBS's. Each of these services has its own slightly different way of addressing messages to and from Internet. To help you with the addressing process,

I put together the following two lists. First find your own online service in the list below, and see how you address mail *from* it to Internet.

CompuServe: At the Send prompt, type **INTERNET:recipient's Internet address**.

America Online: In the DOS and Windows versions of AOL, select *Mail • Mail Gateway*, then click the *Compose Message* icon to create your message. When you finish composing your message, enter *recipient's Internet address* in the To: box.

MCI Mail: At the To: prompt, type *recipient's name(EMS)* and press <Enter>. At the EMS prompt, type **Internet**, then press <Enter> again. Finally, at the MBX prompt, type *recipient's Internet address*.

GENie: At the TO: prompt, type *recipient's Internet address@inet#*.

Now find the Internet address for the service you want to send mail *to* in the following list. Add your recipient's user name or ID number as appropriate.

CompuServe: Type *CompuServe ID number@compuserve.com*. Change the comma in the CompuServe ID to a period.

America Online: Type *AOL user name@aol.com*.

MCI Mail: Type *MCI Mail ID number@mcimail.com*. Delete the comma from the MCI Mail ID.

GENie: Type *GENie user name@genie.geis.com*.

Combine the appropriate syntax for the services you're sending to and from, and you're in business. Let's say, for example, you want to send a message from your CompuServe account to a friend on America Online. At CompuServe's Send prompt, type **INTERNET:AOL user name@aol.com**.

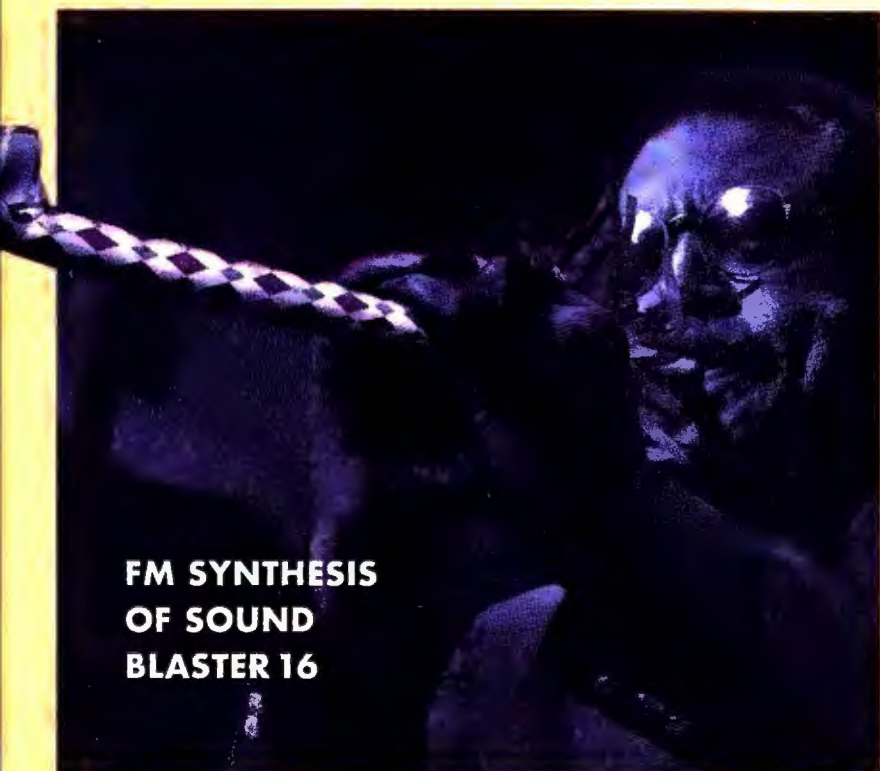
There are a couple of connections you can't make with Internet. You can't send E-mail to anyone on Prodigy from another service, nor can you send mail to the outside world from Prodigy. And you can't use Internet to send messages to or from AT&T Mail, or between CompuServe and MCI Mail.

Sending mail *from* CompuServe to MCI Mail is extremely simple: Just type **MCIMAIL:MCI Mail ID** at the To: line of your CompuServe message. Going *from* MCI Mail to CompuServe or sending mail to and from AT&T Mail is more complex because it requires X.400 addressing. This international E-mail standard offers sophisticated addressing and messaging capabilities, plus the ability to attach binary files to messages. On the downside, X.400 addressing is complex, and the syntax varies from service to service. For more information on X.400 and E-mail on Internet, download ADDRESS.ZIP from PC World Online (see page 12 for more information).

By Judy Heim

Judy Heim is a contributing editor for PC World and the editor of Online Investor, a newsletter about using online services to manage investments. Communications welcomes your questions (see page 12 for contact information).

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The Lost Clusters of Errorland

Q When I run CHKDSK to see how much hard disk space I have, I get a message saying I have 'lost allocation units'. Does this mean that my hard disk is going bad?

Ted Shackley, Miami, Florida

A Probably not. Lost allocation units, also known as lost clusters, seldom indicate that there's any problem with your hardware. Lost clusters are simply bits of data DOS has lost track of and are no longer part of any file.

The most common causes of lost allocation units are software-related system crashes (Windows is a frequent

If I were you, I would refuse to accept any disks from the chumps who format floppies beyond their safe capacity.

offender) and turning off your system or rebooting it without exiting an application first.

Lost clusters waste disk space that DOS could otherwise use to store useful data. To eliminate them, first make sure you're not in Windows. Then, at the DOS prompt, type **CHKDSK /F**; or if you're running MS-DOS 6.2, type **SCANDISK**. You'll be asked whether you want to turn those lost clusters into files. This is a good idea, since one of these files could contain data you thought you'd lost in a crash. Files containing the recovered data will appear in your root directory with the extension **CHK**. Load them into DOS's editor or any other text editor, and see if you find anything of value.

If you never experience system crashes (lucky you) and you absolutely never turn your computer off without exiting applications properly, lost clusters may in fact be a warning of hardware trouble. In that situation, run a full set of hard disk diagnostics using the sorts of tools that are offered by The Norton Utilities and PC Tools.

The Mysteries of Local Bus

Q I have a 33-MHz VESA local bus (VLB) system. It has three VLB slots—two "bus master" slots and one "bus slave" slot. What's the difference between the two? The manual tells me the slave slot can be used only for video, but in fact my VLB video card works only in a master slot.

Mark Murphy, Warren, Michigan

A The only practical difference between VLB master and slave boards is that bus masters can deliver better performance. As you probably know, the "local" in local bus means that local bus boards are on the CPU's home turf—they run at CPU speed (in your case 33 MHz), so the CPU processes data and passes it directly to the board without having to slog through a slower ISA or EISA bus. Master boards

have their own CPUs, and they can assume control of the system; slave boards don't and can't.

The manual tells you to put your video board in the slave slot because no one's built a VLB master video board yet. Whoever wrote the manual didn't want you to *waste* a master slot, which you could use for a different bus mastering VLB card (an interface board for a SCSI hard disk, to take a common example). But that doesn't mean a slave board won't work in a bus master slot.

There could be several reasons your slave video board doesn't work in the slave slot, but it all boils down to this: Compatibility between VLB systems and VLB boards is inherently shaky. Due to leeway in the VLB specification, VLB boards and systems (especially early models) don't always work together. In your case, the slave board likes the master slot better, but at least you got it to work.

If you bought brand-new VLB hardware today, this kind of funny business would be highly unlikely—manufacturers have learned from early mistakes. If

you're in shopping mode, however, you might consider a system that employs the Intel PCI (Peripheral Component Interconnect) local bus specification. (See "VL vs. PCI: Betting on a Bus" in our December 1993 issue.) PCI, a much tighter spec, vastly reduces the chances of hardware incompatibility. True, PCI hardware costs a little more, and at this point most PCI systems are Pentiums. But PCI is the bus of the future, and you can find nearly as many PCI peripherals as VLB ones. Better yet, you'll find several PCI video boards with bus mastering capability, which should come in handy for full-motion video.

How Much Cache Is Enough?

Q I read with interest your answer on secondary cache memory in the October 1993 *Hardware* column. I have a 486 with a 64K secondary cache and have been considering upgrading to 256K. According to your benchmarks, this upgrade would not give me a noticeable speed boost. Is this true in my case, even though I have 16MB of main memory?

Martin Klein, Fairbanks, Alaska

A With that much memory, it's certainly possible that you could see a small speed increase, but how much of an increase depends on what you use that 16MB for. Whatever the quantity of main memory, all PCs with memory caches "guess" which data your CPU is likely to need next and shovel it into cache memory. If your system works on one or two tasks at a time, 64K is generally enough guessing room. This is probably true even if you keep several Windows applications loaded at once, since the applications in the background seldom take processing power.

Still, I'd recommend you go ahead and upgrade to 128K. Since I wrote last October's column, the price of static RAM chips used by memory caches has dropped considerably. A 128K cache will give you better performance by a few percentage points for some applica-

tions, so why not upgrade? Get the specs on your cache's static RAM from the manufacturer, and shop around among discount electronics supply houses for the best price.

If two or more applications on your system often do CPU-intensive work simultaneously (which probably means you're a programmer who test-drives applications in the foreground while compiling others in the background), or if the system runs a database application for a group of users (as opposed to simply serving up files, as most network servers do), go for the 256K.

Performance improvement depends on your specific system design and the number of tasks or users. But maxing out the cache is definitely worthwhile.

Floppies Fast and Loose

On a distressingly regular basis, people who use IBM PS/2s give me data on 720K disks that have been formatted as 1.44MB disks. It seems that true-Blue machines don't sense the little hole that identifies 720K disks, and they let you format those disks beyond their rated capacity.

The trouble is, my floppy drive *does* sense the hole—it assumes 720K formatting and cannot read the 1.44MB-formatted disks. I can tape up the holes, but I would prefer to find a utility that temporarily disables my floppy's sensor. Where can I find one that will solve this problem?

Ed Bartkus, Portland, Oregon

Don't bother. In a pinch you can use write-protect tabs from 5¼-inch disks (or ordinary electrical tape). But if I were you, I'd refuse to accept disks from chumps who format floppies beyond their safe capacity. They're the same people who never do backups, and the data they give you on those dicey disks is probably the only copy they own. Put a stop to this dangerous practice—for their own good.

Battle of the Notebook Batteries

Should I care whether the notebook I buy uses a nickel-cadmium (NiCd) or a nickel-metal hydride (NiMH) battery?

Kekoa Lee, San Francisco

NiMH batteries last longer and cost a little more. And they don't have the NiCd batteries' "memory" problem. That is, if you recharge a NiCd battery before it has

completely run down, it may "remember" the point at which it was discharged and tell the notebook it has run out of juice, when in fact it hasn't.

Newer notebooks that use NiCd batteries have special circuitry that eliminates the memory problem. In addition, many such notebooks give you a choice of using either NiCd or NiMH batteries.

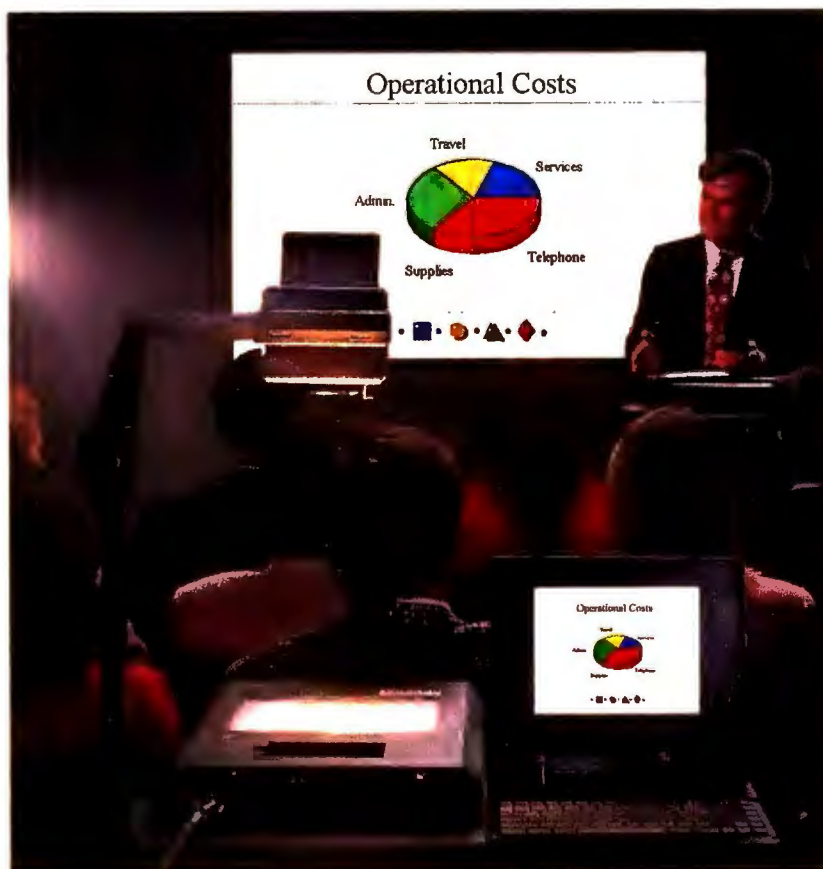
There's another reason to buy NiMH batteries besides longer life, however: The

cadmium in the NiCd batteries is extremely toxic. Of course, when your notebook battery stops recharging properly, you should send it back to the manufacturer for recycling. But the less cadmium floating around, the better.

By Eric Knorr

Eric Knorr is a contributing editor for PC World. Hardware welcomes your questions (see page 12 for contact information). ■

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Circle 19 on reader service card

STAR-DOT-STAR TIPS

Quick Batch Counter

Need a batch file to repeat an action? This example [FIGURE 1] illustrates a simple technique that lets you execute one or more commands a predetermined number of times. It does this by appending the same character (in this case, a 1) to an environment variable each time through the loop, until that

```
SET COUNTER=1

:LOOP
REM Place commands to execute repeatedly here
ECHO This command will be executed eight times

REM Increment and test the counter
SET COUNTER=%COUNTER%1
IF NOT "%COUNTER%"=="11111111" GOTO LOOP

:ENDLOOP
SET COUNTER=
```

FIGURE 1: REPEAT DOS BATCH COMMANDS a specified number of times with this quick batch language counter.

```
@ECHO OFF
:LOOP
REM Increment and test the counter
SET COUNTER=%COUNTER%1
IF "%COUNTER%"=="1111" GOTO ENDLOOP
GOTO %COUNTER%

:1
ECHO This command executes on the first pass
GOTO LOOP

:11
ECHO This command executes on the second pass
GOTO LOOP

:111
ECHO This command executes on the third pass
GOTO LOOP

:ENDLOOP
SET COUNTER=
```

FIGURE 2: EXECUTE DIFFERENT COMMANDS on each pass through a logic loop with this variation on Figure 1.

variable has grown to match a target string (here, a series of eight 1s).

S. Haldar, New Delhi, India

Editor's note: When you're working with DOS's batch language, the simplest tricks often save you the most time and effort. This tip demonstrates a good way to get around the absence of counted loops in DOS's batch language.

The technique also suggests two other tricks.

First, if you want to execute a specific command on a particular pass, say, only on the third time through the loop, add **IF "%COUNTER%"=="111"** followed by the command you want to execute on the third pass. Second, if you want to execute different sets of commands each time through the loop, you can create labels named 1, 11, 111, and so on. You can then use the command **GOTO %COUNTER%** to select a series of commands for each pass. For an example of this technique, see **FIGURE 2**.

Finally, note that these sample batch files clean up after themselves by removing the **COUNTER** environment variable once the loop is finished. This is good practice and prevents the problems that can result when you overflow the memory allocated for the DOS environment.

Parlez-Vous WordPerfect, Part II

In October 1993, you featured a tip from Nathan Cummings ("Parlez-Vous WordPerfect?") that used a macro to create accented characters. Here's an easier way to display foreign language characters using a simple DOS command. To reconfigure the keyboard to conform to an international layout, in **AUTOEXEC.BAT** include the command **KEYBxx,C:\DOS\KEYBOARD.SYS**, where **xx**

stands for the two-letter country code. For a list of available country codes, enter the command **HELP KEYB** at the DOS prompt. (For DOS versions earlier than 5.0, consult the documentation.) Finally, the file name at the end of the command gives the location of the DOS file that contains the keyboard layouts.

Once **KEYB** is running, you can press **<Ctrl>-<Alt>-<F1>** to switch back to the U.S. keyboard or press **<Ctrl>-<Alt>-<F2>** to return to the international layout.

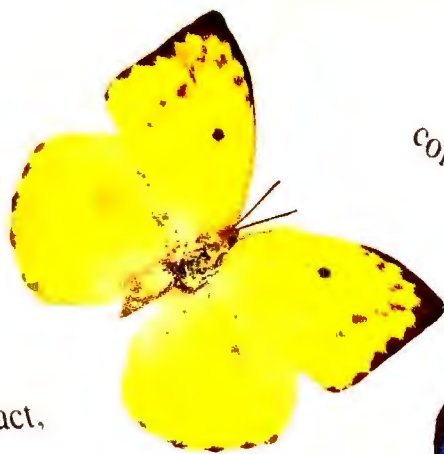
Jean Bouchard, Ville d'Anjou, Quebec

Editor's note: The **KEYB** command works well if you're used to typing on the standard keyboard layout used in a foreign country. But if you haven't committed that country's key locations to memory, you might find it slow going. Therefore, if you use this method, copy the keyboard layout, which can be found in the back of most DOS manuals, and post it in a convenient spot.

The **KEYB** command's main advantage is that it isn't specific to WordPerfect; it remaps the keyboard in nearly all DOS applications. Windows is another story, however; DOS programs running under Windows will reflect the **KEYB** command's changes, but you'll have to select a different keyboard layout in Windows' Control Panel in order to use a different language in Windows applications. If you need to type foreign characters mainly in WordPerfect 5.1, you can avoid confusion by using either Cummings' tip or the one below.

Parlez-Vous WordPerfect, Part III

As Nathan Cummings points out, macros are handy when you need to type special characters in WordPerfect 5.1. But when it comes to typing the most basic accented characters, WordPerfect's Compose feature is just as intuitive and quick. To use it, press **<Ctrl>-V**, then type the vowel you wish to accent (or a consonant that takes a diacritical mark). Next, indicate the accent you want by typing an apostrophe (acute accent), an open single quote (grave accent), a dou-



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USER GROUP TIP

Disabling DOS's Clean-Boot Feature

If you press **<F5>** when booting DOS 6.0 or 6.2, DOS will bypass your **CONFIG.SYS** and **AUTOEXEC.BAT** files; press **<F8>** and it will display each line of your **CONFIG.SYS** and ask if you want to run the line. If other people use your machine, though, they might choose to disable devices that you will need. To disable **<F5>** and **<F8>** when DOS boots, just include **SWITCHES=/N** as the first line of **CONFIG.SYS**.

Paul Bernstein
Chicago Computer Society

ble quote (umlaut), or a caret (circumflex). (You can also type a tilde above an *N*, or a comma for a cedilla below a *C*.) Want to know all the possible combinations? Print the file **CHARACTR.DOC**, which should be in your **WP51** subdirectory.

Debra J. Gips, Baltimore

Editor's note: WordPerfect's Compose command lets you print almost any character your printer can create. Besides taking letters and accents, it can also accept a character set number followed by a character number for unusual characters such as bullets, dingbats, and even Japanese Hiragana and Katakana characters.

Which of the three approaches should you choose? Gips's approach—using Compose—has two big advantages: It's available on any machine running WordPerfect, and it doesn't require you to make any configuration changes or carry macros from machine to machine. On the other hand, **KEYB** works better if you're used to a foreign keyboard and are running many applications. A macro like Cummings' gives you the most flexibility because it can be 100 percent customized. So, as with most matters, it's a matter of *chacun à son goût*.

File Manager Format Foible

Windows 3.1 users who have upgraded to DOS 6.0 or 6.2 and are using a compression product, such as DoubleSpace or Stacker 3.1, should know that File Manager is not

capable of making a complete, bootable DOS system disk. When you use File Manager's Disk•Format Disk command to make a system disk, it does not copy **DBLSPACE.BIN**, the hidden system file used to access compressed data. Fortunately, using the DOS command **FORMAT A: /S** (or **SYS A:** on a disk that's formatted but not bootable) does the trick.

The moral: Don't rely on File Manager to make your emergency system disks, and be sure always to test those disks before putting them away.

Richard DeJarnette, Lacey, Washington

Editor's note: This problem won't affect you if you don't use DoubleSpace on your hard disk. But if you rely on DoubleSpace, **DBLSPACE.BIN** must be on whatever disk you boot from. If you use DoubleSpace and want an automated way to format floppies, choose the *File•New* command in Windows' Program Manager to create a program item that issues the command **FORMAT A: /S**. Just enter a description, such as **Format A:**, in the Description box, then type **FORMAT A: /S** into the Command Line box. If you want to get fancy, you can also create an icon to format a disk in drive B:, or add other **FORMAT** command line options (you can format a double-density disk, for instance, by using the **/F** option). From then on, you can just click on an icon to format disks.

Screen Saver Savior

If you've ever forgotten the password for your Windows screen saver, you may have given up on using passwords. You can avoid being locked out of your system by restarting Windows, then unchecking the Password Protected box in the screen saver's setup dialog (invoked by pressing *Setup* in the Control Panel's Desktop applet). You won't be able to set a new password, however, because the screen saver makes you enter the old password first. It seems the only way to use the password-protection feature again is to reinstall Windows.

Luckily, there's a way around this problem. Use the *File•Run* command in Windows' Program Manager, then enter **CONTROL.INI** in the Command Line box to open the file in Windows' Notepad text editor. Scroll down until you find a line that reads '[SCREEN SAVER]'. Look below that line until you find one that reads 'Password=,'

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
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MICROSOFT EXCEL 5.0 ADVANCED FEATURES


Note: Keys to press are shown here in **boldface**. Keys to press simultaneously are joined by a hyphen. A bullet (•) links menu, option, button, check box, and dialog box tab names in a series. This Instant Reference Card is the second of two on Excel 5.0; IRC #45 details Excel's basic features.

MANAGING DATA WITH DATA FORMS

A series of rows of similar data (a list) can act as a database: A row is a record, a column is a field, and a column label is a field name. Select **Data • Form** to open a data form to view, change, add, delete, or search for a record in the current list (indicated by the active cell) or range (with column labels) of 32 columns or less.

Move to previous/next record	 /  or <Up>/<Down> or Find Next/Prev
Move to same field ten records back/forward	<Page Up>/<Page Down> or click above/below scroll box in scroll bar
Select editable field's text box	Double-click field box or <Shift>-<Tab> or <Tab> or <Alt> -field's underlined letter
Edit field	Make changes in field's text box
Undo changes to current record	Restore
Add new record	<Ctrl>-<Page Down> or New , enter data
Delete current record	Delete • OK
Search for records	Criteria , type character or expression criteria in field(s), Find Next/Prev to view records





PROTECTING AND AUDITING DATA (continued)

Remove password required to open/save workbook	<F12> or File • Save As, Options • Protection Password/Write Reservation Password, <Delete>, OK
Set/remove recommendation to open workbook as read-only	<F12> or File • Save As, Options • Read-Only Recommended • OK
Protect worksheet/workbook contents	Tools • Protection • Protect Sheet/Protect Workbook , type password, OK, retype password, OK
Unprotect current worksheet/workbook contents	Tools • Protection • Unprotect Sheet/Unprotect Workbook , type password, OK
Protect/unprotect selected range	<Ctrl>-1 or Format • Cells, Protection • Locked
Hide/show current workbook	Window • Hide/Unhide (File • Unhide if no other worksheet open)
Hide/show current worksheet	Format • Sheet • Hide/Unhide
Hide/show selected range	<Ctrl>-1 or Format • Cells, Protection • Hidden
Show/hide Auditing tool bar	Tools • Auditing • Show Auditing Toolbar
Annotate selected cell	 or <Shift>-<F2> or Insert • Note , type note, Add • OK

Remove search criteria	Clear
Cancel search, return to form	Form

ORGANIZING DATA WITH OUTLINES








An outline allows you to group rows and/or columns and then show or hide them, creating detail or summary reports. An outline (one per worksheet) can have eight horizontal and vertical levels.

Outline selected range (or worksheet if no range selected)	Data • Group and Outline • Auto Outline
Outline sorted list and insert subtotals	Data • Subtotals , select sorted column's label in 'At Each Change in' list, check/clear label boxes in 'Add Subtotal to' list, OK
Remove outline from selected range (or worksheet if no range is selected)	Data • Group and Outline • Clear Outline
Group/ungroup selected row(s) or column(s)	<Alt>-<Shift>-<Right>/<Alt>-<Shift>-<Left> or Data • Group and Outline • Group/ Ungroup • Rows/Columns • OK
Show detail up to level <i>n</i>	 ... 
Show/hide group's detail	 /  or Data • Group and Outline • Show Detail/Hide Detail
Show/hide outline symbols	<Ctrl>-8 (not on numeric keypad) or Tools • Options • View • Outline Symbols
Apply style to selected outline	Data • Group and Outline • Settings • Apply Styles
Unselect selected range's hidden cells	<Alt>-<Semicolon> ; or <F5> or Edit • Go To, Special • Visible Cells Only • OK


PROTECTING AND AUDITING DATA









Precedents are cells referred to by a formula; *dependents* are cells containing formulas that refer to other cells. *Tracers* display a graphic representation of the flow of computations on a worksheet.

Set password required to open/save workbook	<F12> or File • Save As, Options • Protection Password/Write Reservation Password, type password, OK, retype password, OK
---	---

Show selected cell's info	 or <Ctrl>-<F2> or Tools • Options • View • Info Window
Return from info window	<Ctrl>-<F2> or Window • Show Document
Close cell info window	Go to window, <Ctrl>-<F4> or File • Close
Trace selected cell's precedent(s)/dependent(s)	 /  or Tools • Auditing • Trace Precedents/Trace Dependents
Trace error	 or Tools • Auditing • Trace Error
Remove precedent/dependent/all auditing arrows	 /  /  or Tools • Auditing • Remove All Arrows

SUMMARIZING DATA WITH PIVOT TABLES

Select **Data • PivotTable** or press the Query and Pivot tool bar's  to launch the PivotTable Wizard and create a *pivot table* (cross-tab table) from a list, a non-Excel data file, multiple Excel consolidation ranges, or another pivot table. A pivot table organizes data according to headings (field names) you choose. You can add various subtotal functions (such as SUM, AVERAGE, and so on) and add, remove, and drag and drop headings to rearrange the data.

Show/hide Query and Pivot tool bar	View • Toolbars • Query and Pivot
Select field	Click field
Insert/move/delete field	 or Data • PivotTable , drag field label into table/to new location/out of table, Finish
Change field name	Double-click field label, type new name
Delete subtotals or block totals	Double-click field, None
Change selected field's summary function	 , select new function, OK
Group/ungroup/show/hide selected detail data	 /  /  / 
Copy each page of page field to new worksheet in current workbook	 or right-click, Show Pages
Update pivot table (after change in source data)	 or Data • Refresh Data
Delete selected pivot table	Edit • Clear • All


MICROSOFT EXCEL 5.0 ADVANCED FEATURES





LINKING AND EMBEDDING

- Link active cell to cell or range in another worksheet **<Equal>**, select source range in source worksheet, **<Enter>**; or select source range in source worksheet, **<Ctrl>-C**, select target cell, **Edit • Paste Special • Paste Link • OK**
- Link selected text box's text to cell's label or value **<F2>** or click formula bar, **<Equal>**, select source cell in source worksheet, **<Enter>**
- Embed existing object from another application **Insert • Object • Create from File**, select drive and/or directory if necessary, select file, **Link to File (optional)**, **Display as Icon (optional)**, **OK**
- Create and embed object from another application **Insert • Object**, select type, **OK**, create object, exit application, **Yes** to update object

CHARTING


To select and manage a chart (see next section), click it. To activate a chart, double-click it (if embedded) or select its Chart sheet. To edit, format, or delete a chart element, first select it in an active chart. The main menu, its options, and the right-click shortcut menus change when a chart is active and when an element is selected.









- Create chart from selected range and embed chart in worksheet  or **Insert • Chart • On This Sheet**, select worksheet if not current, drag mouse over target area, do ChartWizard steps or **Finish**

- Create chart from selected range and on new chart sheet **<F11>** or **<Alt>-<F1>** or **Insert • Chart • As New Sheet**, do ChartWizard steps or **Finish**
- Show/hide Chart tool bar when chart is selected or active **View • Toolbars • Chart • OK**
- Set selected or active chart's type  on Chart tool bar's Chart Type button, select type; or (in active chart) **Format • Chart Type • 2-D/3-D**, select type, **Options • Subtype**, select subtype, **OK**
- Set default chart type to selected or active chart's type **Tools • Options • Chart • Use the Current Chart**, enter name, **OK • OK**
- Set selected or active chart to default type  on Chart tool bar
- Select element in active chart* Cursor to or click element
- Delete selected chart element **<Delete>**
- Format selected chart element* **<Ctrl>-1** or double-click element, complete relevant part(s) of Format dialog box
- Show/hide selected or active chart's horizontal gridlines  on Chart tool bar; or (in active chart) **Insert • Gridlines • Major Gridlines (2-D) or Major Gridlines (3-D) • OK**
- Show/hide selected or active chart's legend  on Chart tool bar; or (in active chart) **Insert • Legend/delete legend element**
- Add title(s) to active chart **Insert • Titles**, select type(s), **OK**, select title, type title, **<Enter>** (repeat for others)
- Set active chart's data label(s) **Insert • Data Labels**, select type, **OK**
- Add/delete active chart's units **Insert • Axes**, select/deselect type, **OK**
- Add trendline/error bars for selected data markers **Insert • Trendline/Error Bars**, select type, **OK**
- Incorporate additional data into active chart **Insert • New Data**, type or select range, **OK**, **New Series/New Point(s) • Rows/Columns** and other options if prompted, **OK**

* To select a subelement, such as a single data marker or a legend entry, click the main element, then the subelement; to format it, select and double-click it.


MANAGING GRAPHIC OBJECTS

Clicking  displays the drawing tool bar which you use to create and manage graphic objects on worksheets and charts.

- Select graphic object Click object; or  on Draw tool bar, drag around object
- Cancel selection  or **<Esc>** or click outside object
- Move/copy selected graphic Drag/**<Ctrl>**-drag
- Resize selected graphic Drag handle
- Crop selected object **<Shift>**-drag handle
- Delete selected graphic **<Delete>** or **Edit • Clear • All**
- Set selected graphic's pattern  on Draw tool bar, select pattern
- Bring selected graphic to front/send to back  /  on Draw tool bar
- Group/ungroup selected graphic objects  /  on Draw tool bar
- Show graphics/show placeholders/hide graphics **<Ctrl>-6** until choice reached or **Tools • Options • View • Show All/Show Placeholders/Hide All**
- Add/remove drop shadow (dark border to right side and bottom) on selected graphic object 

SOLVING PROBLEMS

Excel can create data tables to aid what-if analysis; seek a cell value to set a formula dependent on that cell to a goal value; adjust cells' values within limits you set, to maximize, minimize, or set a dependent formula's value; and help you create scenarios that compare the results of different values on a worksheet.

- Create one-input data table, which lists the result of substituting values in input cell referenced by formula(s) In second cell (and, optionally, subsequent cells) of first row of table's range, enter formula(s) referring to input cell outside range. In second and subsequent cells of first column, enter values. Select range, **Data • Table • Column Input Cell**, select input cell or type its name or cell address, **OK**
- Create two-input data table, which lists the result of substituting values in two input cells referenced by formula In upper left cell of table's range, enter formula referring to two input cells outside range. In subsequent cells of first row and column, enter values for each input cell respectively. Select range, **Data • Table**, select one input cell or type its name or cell address, **Column Input Cell**, select other input cell or type its name or cell address, **OK**
- Adjust a cell's value to set selected formula dependent on that cell to desired value **Tools • Goal Seek • To value**, enter desired value, **By changing cell**, select cell to change or type its name or cell address, **OK**
- Adjust up to 200 cell values to set selected formula dependent on those cells to its maximum, minimum, or desired value **Tools • Solver • Set Target Cell**, specify cell, **Max/Min/Value • By Changing Cells**, specify cells, **Add**, specify constraints for changing cells, **OK • Solve • Save Scenario**, type name, **OK • Restore Original Values • OK**
- Create scenario **Tools • Scenarios • Add**, type name, **Changing Cells**, select changing cells, enter changing cells' values, **OK**
- Display scenario  on Scenario list box, select name; or **Tools • Scenarios**, select scenario, **Show**
- Unprotect/protect scenario **Tools • Scenarios**, select scenario, **Edit • Prevent Changes**
- Create scenario summary **Tools • Scenarios**, select scenario, **Summary**, select result cells, **OK**

followed by some odd characters (an encrypted version of your old password). Delete those characters to remove the old password, then save the file and restart Windows. Because you now have no password, the screen saver will allow you to enter a new one.

Jesse Courchaine, Sun Prairie, Wisconsin

Editor's note: The password-protection feature in Windows screen savers isn't fool-proof (even an amateur spy can circumvent it by rebooting the machine), but it does protect you from casual snoops who might glance at your screen or mess with your work when you walk away from the PC. It's a shame to lose the ability to set a password forever, just because you forgot it once.

Paste Without Waste

If you use Windows Paintbrush, you may be frustrated to discover that when you paste an image from the Clipboard, or use the Edit•Paste From command to import an image that's bigger than the visible portion of the picture, you lose everything that falls outside the window frame. Fortunately, there's an easy way to import the whole image. Before you paste, choose *View•Zoom Out* to make the entire picture visible. When you paste, the entire image will be inserted into your picture.

Ted Guo, Pocatello, Idaho

Editor's note: All paint programs written by ZSoft (now part of WordStar International), including Windows Paintbrush, Photo-Finish, and Corel Photo-Paint, share this frustrating quirk: Anything you paste, draw, or type will not become part of your picture unless it's visible. Likewise, you can select and copy only what you can see on screen. To avoid unintentional cropping in any of these programs, make sure the entire area you want to affect is visible before you start working on that area. But beware: In some of these programs, you may find that the tool or command you wish to use is not available while the picture is zoomed out. If this is the case, you may have to paste or draw your image a piece at a time or switch to a more flexible painting program.

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).

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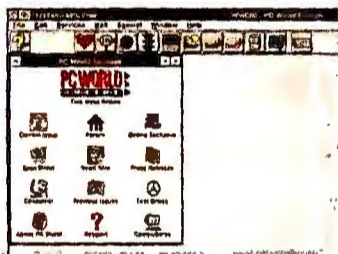
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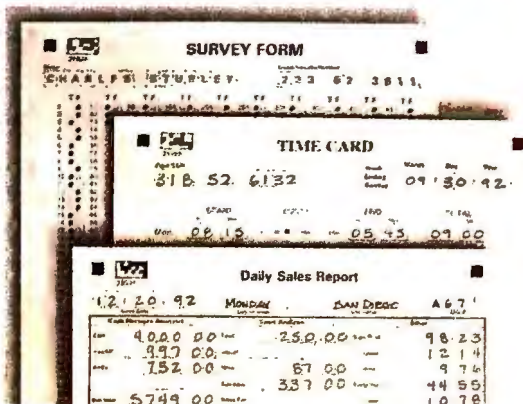
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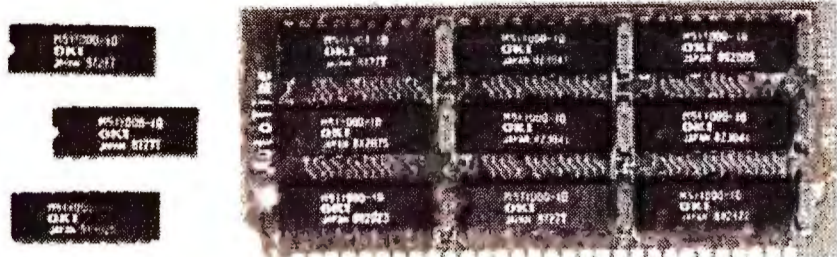
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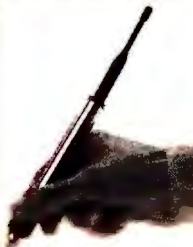
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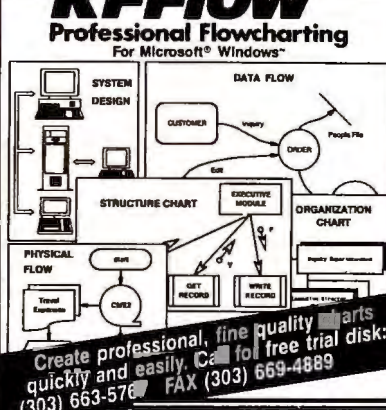
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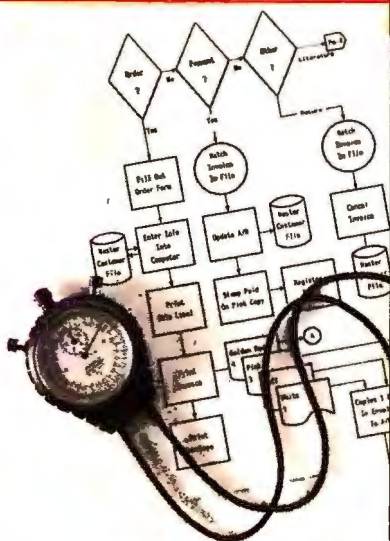
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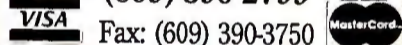
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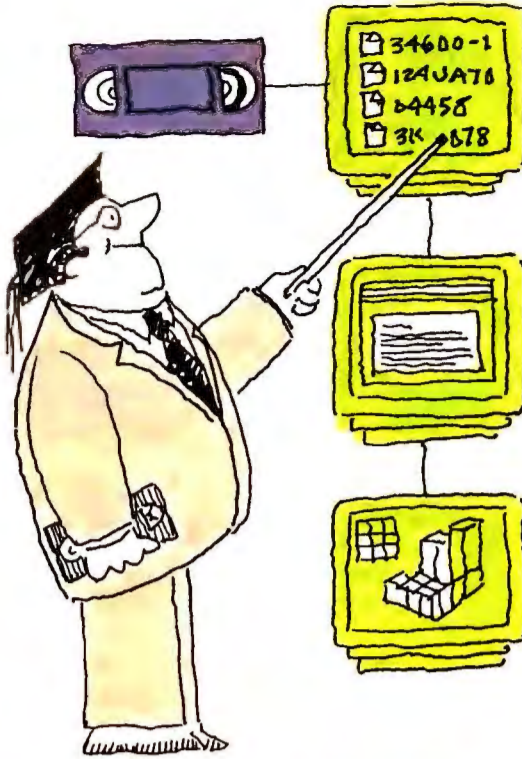
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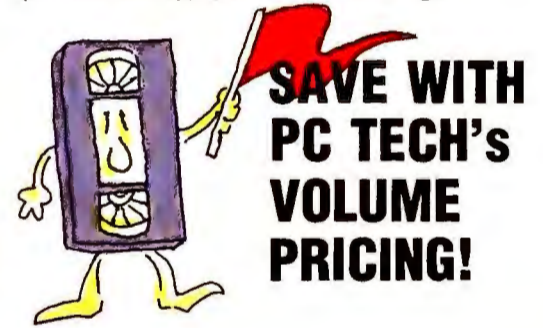
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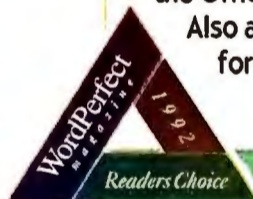


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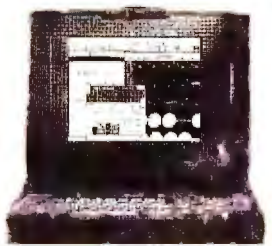
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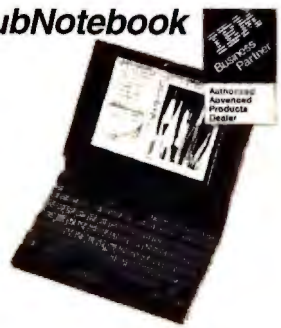
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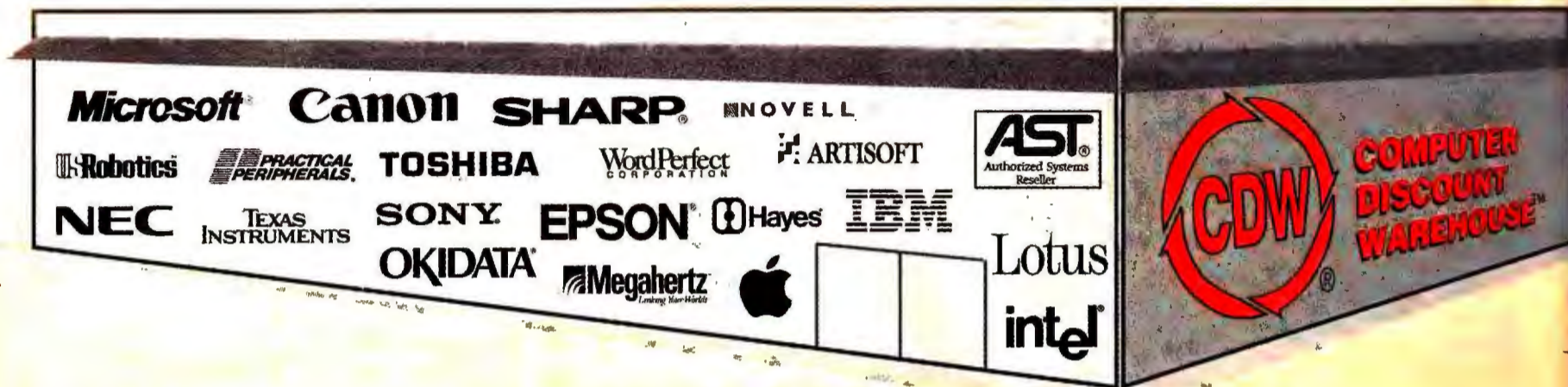
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- ✓ Lifetime Warranty

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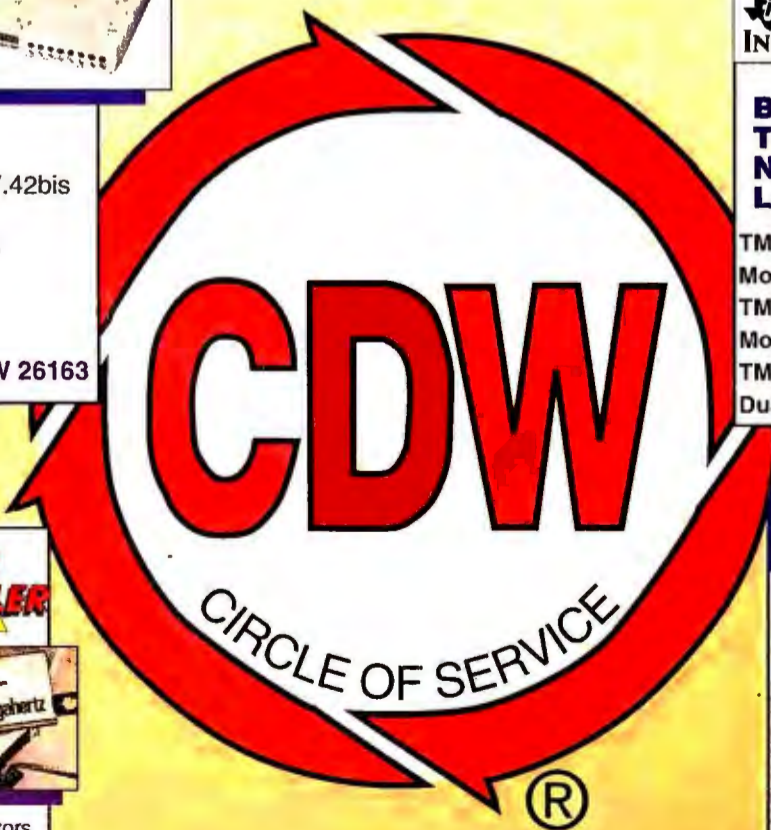
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- i486DX2/40 Power!
- Battery-saving 3.3 Volt Technology
- Integrated Math Coprocessor
- 3 Display Options



T4600/T4600C

- SL-enhanced i486SL/33
- Integrated Math Coprocessor
- LCD QuickRead Status Icons
- Optional Docking Stations



T4700CS/T4700CT

- Blazing i486DX2/50 Speed
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- Local Bus Video
- Optional Docking Station



**T6600/T6600C/CD
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- Lightning Fast i486DX2/66 CPU
- 2 Full-length 16 bit ISA Slots
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Computers**



T3400/T3400CT

- Subnotebook Portability
- Desktop Performance
- Battery-saving SL-enhanced i486SX/33 CPU
- Local Bus Video for Optimal Windows Performance
- Serial, Parallel Ports, Optional Port Replicator

Toshiba Portable Computers

1-Year Warranty

3-Year Warranty

Model	CPU	RAM (MB) STD/MAX	Display	Expansion PCMCIA	Weight Lbs.	Hard Drive	CDW Price	CDW	Lease Per Mo
T1950	i486DX2/40	4/20	9.5" 64 Gray Scale LCD	Type III	6.6	120MB	\$1899.00	31928	\$65.90
						200MB	\$2099.00	31929	\$72.84
T1950CS	i486DX2/40	4/20	9.5" Dynamic STN Color	Type III	6.9	120MB	\$2479.00	31930	\$86.02
						200MB	\$2699.00	31932	\$93.66
T1950CT	i486DX2/40	4/20	8.4" Active matrix Color	Type III	6.9	120MB	\$2799.00	32042	\$97.13
						200MB	\$2999.00	32043	\$104.03
						320MB	\$3399.00	32044	\$118.95
T3400	i486SX/33	4/20	8.4" 64 Gray Scale LCD	IV Type II	4.1	120MB	\$2197.00	33634	\$76.24
T3400CT	i486SX/33	4/20	7.8" Active Matrix Color	IV Type II	4.4	120MB	\$3428.00	33635	\$118.95
T4600	i486SL/33	4/20	9.5" 64 Gray Scale LCD	IV or II	6.5	120MB	\$2089.00	29539	\$72.49
						200MB	\$2299.00	29540	\$79.78
T4600C	i486SL/33	4/20	9.5" Active Matrix Color	IV or II	6.9	120MB	\$3869.00	29541	\$134.25
						200MB	\$3999.00	29542	\$138.77
						320MB	\$4369.00	29543	\$147.67
T4700CS	i486DX2/50	8/24	9.5" Dynamic STN Color	II, III	6.9	200MB	\$3897.00	33645	\$135.23
						320MB	\$4238.00	33646	\$143.24
T4700CT	i486DX2/50	8/24	9.5" Active Matrix Color	II, III	6.9	200MB	\$4499.00	33642	\$152.07
						320MB	\$4849.00	33644	\$163.90
						320MB	\$4849.00	33644	\$163.90
T6600	i486DX2/66	8/20	10.4" Active Matrix Color	IV Type II	17.1	510MB	\$6099.00	30400	\$206.15
T6600C/CD	i486DX2/66	8/20	10.4" Active Matrix Color	IV Type II	18.7	510MB	\$6599.00	30401	\$223.05
T6600C/CDV	i486DX2/66	8/20	10.4" Active Matrix Color	IV Type II	19.3	510MB	\$7599.00	30402	\$256.85

All Toshiba Computers Are Bundled with MS-DOS, Windows 3.1, BallPoint Mouse with QuickPort and Toshiba Utilities Software

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50 Mhz

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Without Removing a Screw or Disconnecting a Wire, You Can Change the UltraLite Versa from a Crisp Monochrome Display to Brilliant Active Matrix Color. Increase Hard Disk Storage. Or Expand Memory from 4MB up to 20MB. Just Slide the Components In and Out.

- ◆ NEC Upgradable i486SL DX2 Processor
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- ◆ Versa Track™ Front Mounted Trackball
- ◆ Memory Card Slot, Docking Station Port
- ◆ MS-DOS and Windows 3.1 Factory Installed
- ◆ Removable Floppy Drive for Extra Battery; Removable Hard Drive and Display.



MONOCHROME

LEASE OPTION

120 MB, 486SL/40	\$2613.09	CDW 34104
250 MB, 486SL/40	\$3037.22	CDW 34105
209 MB, 486SL/50	\$3299.22	CDW 34108
340 MB, 486SL/50	\$3719.28	CDW 34109

Active Matrix **COLOR**

LEASE OPTION

120 MB, 486SL/40	\$3878.84	CDW 34106
250 MB, 486SL/40	\$4279.22	CDW 34107
209 MB, 486SL/50	\$4549.56	CDW 34110
340 MB, 486SL/50	\$4974.69	CDW 34111

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Texas Instruments Notebooks



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Active Matrix
Performance at
a Passive
Matrix Price



**TM4000E
WinDX/25/50
Color**

Brilliant Dual Scan
Color,
i486DX2 Power



All TravelMate Notebooks Include Pre-Installed MS-DOS V6.X, Windows V3.1, and TI Utilities

Texas Instruments TravelMate Notebook Computers

Model	CPU	Hard Drive	RAM Std/Max	Keyboard 4mm Travel	Display	Pointing Device	Weight (lbs.)	Price	CDW
Monochrome Notebooks									
TM4000	i486DX/25	200MB	4/20MB		10" Mono LCD, 64 Gray Scales	TravelPoint	5.6	\$2249.55	24583
TM4000	i486DX2/50	120MB	4/20MB		10" Mono LCD, 64 Gray Scales	BallPoint	5.6	\$2527.55	28973
TM4000E	i486DX/25	120MB	4/20MB	✓	10" Mono LCD, 64 Gray Scales	BallPoint	5.6	\$1859.55	32070
TM4000E	i486DX2/50	200MB	4/20MB	✓	10" Mono LCD, 64 Gray Scales	BallPoint	5.6	\$2699.55	32678
Color Notebooks									
TM4000E	i486DX2/40	200MB	4/20MB	✓	8.2" Advanced Passive Matrix Color	BallPoint	6.0	\$2888.55	34876
TM4000E	i486SX/25	120MB	4/20MB	✓	8.2" Advanced Passive Matrix Color	BallPoint	6.2	\$2099.55	31495
TM4000E	i486DX2/50	200MB	4/20MB	✓	9.4" Dual Scan Color	BallPoint	6.3	\$3219.55	32679
TM4000E	i486DX2/50	200MB	4/20MB	✓	8.4" Active Matrix Color	BallPoint	6.2	\$3779.55	29697



PowerExec Notebook



Bravo Notebook

AST Notebooks

PowerExec Notebooks...The New Balance of Power

Processor	Display	RAM	Max RAM	HD	PCMCIA	Battery Life	Lbs	Price	CDW#
i486SL/25 3.3 Volt	Monochrome	4MB	32MB	200MB	2(II) or 1(III)	6.5 Hrs Max.	5.9	\$2372.00	25687
i486SL/25 3.3 Volt	Active Matrix Color	4MB	32MB	200MB	2(II) or 1(III)	6.5 Hrs Max.	6.8	\$3917.00	25691
i486SL/33 3.3 Volt	Monochrome	4MB	32MB	200MB	2(II) or 1(III)	6.5 Hrs Max.	5.9	\$2634.00	32505
i486SL/33 3.3 Volt	Monochrome	8MB	32MB	340MB	2(II) or 1(III)	6.5 Hrs Max.	5.9	\$2997.00	32997
i486SL/33 3.3 Volt	Active Matrix Color	4MB	32MB	200MB	2(II) or 1(III)	6.5 Hrs Max.	6.8	\$4193.00	32995
i486SL/33 3.3 Volt	Active Matrix Color	8MB	32MB	340MB	2(II) or 1(III)	6.5 Hrs Max.	6.8	\$4574.00	32996

All Models include: External Monitor Support Up To 1024 @ 16 Colors, 640 @ 256 Colors ✓ Monochrome Display: 640 X 480 ✓ Color Display: 640 X 480 X 256 Colr rs ✓ SmartPoint Trackball ✓ DOS 6.X, Windows 3.1 ✓ 1S/1P/1 Video/1KYbd/1 Expansion Ports ✓ Nickel Metal Hydride Battery ✓ Battery Hot Swap

Bravo Notebooks . . . Power Without The Price

NEW LOWER PRICES

Processor	Display	RAM	Max RAM	HD	PCMCIA	Battery Life	Lbs	Other	Price	CDW#
i486SX/25	Monochrome	4MB	20MB	80MB	1(II or III)	3.5 Hrs	5.5	A,B,C,E	\$1608.97	30855
i486SX/25	Monochrome	4MB	20MB	120MB	1(II or III)	3.5 Hrs	5.5	A,B,C,E	\$1719.97	30856
i486SX/25	Monochrome	4MB	20MB	170MB	1(II or III)	3.5 Hrs	5.5	A,B,C,E	\$1799.97	30857
i486SX/25	Dual Scan Color	4MB	20MB	120MB	1(II or III)	3.0 Hrs	6.2	A,B,D,E	\$2227.97	30858
i486SX/25	Dual Scan Color	4MB	20MB	170MB	1(II or III)	3.0 Hrs	6.2	A,B,D,E	\$2437.97	30859
i486SX/25	TFT Active Color	4MB	20MB	170MB	1(II or III)	3.0 Hrs	6.2	A,B,C,E	\$3157.97	30860

A= Integrated Trackball B= 1P/1S/1VGA/1KYBD Ports C= Simultaneous Int & Ext Video D= Int or Ext Video E=MS DOS 6.X, MS Win 3.1, Star Bus. Tools

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NEC READY 486es PCs Have Everything You Need to Get Right Down to Business:

◆ 4MB RAM Expandable to 36MB ◆ 3 16Bit Expansion Slots ◆ Local Bus Graphics with 1MB of Memory ◆ 16.7 Million Colors at 640 x 480, Maximum Resolution: 1024 x 768 ◆ Optional 256KB Secondary Cache ◆ 1.44MB 3.5" Floppy Drive ◆ CD-ROM Ready 5.25" Drive Bay ◆ 238 Pin ZIF OverDrive Socket ◆ Preloaded with MS-DOS V6.X, Windows V3.1, and PFS: WindowWorks ◆ 486SX/33 and 486DX2/66 Models Include 2400 bps Modem with Fax and Delrina WinFax LITE ◆ One Year On-Site Warranty ◆ Monitor Sold Separately

		LEASE PER MO.
Ready 425es (i486SX/25, 170MB HD).....	\$997.11	CDW 31494 34.70
Ready 433es (i486SX/33, 210MB).....	\$1199.63	CDW 31244 41.64
Ready 466es (i486DX2/66, 250MB HD).....	\$1694.07	CDW 31245 58.78



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◆ 4MB RAM Expandable to 36MB ◆ 3 16Bit Expansion Slots ◆ Local Bus Graphics with 1MB of Memory ◆ 16.7 Million Colors at 640 x 480, Maximum Resolution: 1024 x 768 ◆ Optional 256KB Secondary Cache ◆ 1.44MB 3.5" Floppy Drive ◆ CD-ROM Ready 5.25" Drive Bay ◆ 238 Pin ZIF OverDrive Socket ◆ Preloaded with MS-DOS V6.X, Windows V3.1, and PFS: WindowWorks ◆ 486SX/33 and 486DX2/66 Models Include 2400 bps Modem with Fax and Delrina WinFax LITE ◆ One Year On-Site Warranty ◆ Internal NEC Double Spin (25Mhz Model) or Triple Spin (33 Mhz Model) CD-ROM ◆ 16 Bit stereo Sound Card Featuring Media Vision JAZZ 16 Technology ◆ Labtec CS-800 Amplified Speakers ◆ Microphone, Headphones ◆ MPC Level 2 Compatible ◆ Multimedia Tutorial for PFS WindowWorks

◆ Kodak Multisession Photo CD Compatible ◆ Compton's Interactive Encyclopedia ◆ Knowledge Adventure's Dinosaur Adventure and Space Adventure ◆ Monitor Sold Separately

		LEASE PER MO.
Ready 425 CD2™ (i486SX/25, 170MB HD).....	\$1447.97	CDW 32781 150.25
Ready 433 CD3™ (i486SX/33, 210MB HD).....	\$1899.89	CDW 32784 65.93



NEC POWERMATE



486es Series

PowerMate Desktop Computers from NEC Combine Expandability with Performance in an Economical Package. The PowerMate Series is EPA Energy Star Certified, Incorporating a "Sleep" Feature That Cuts the Computer's Power Use Down to 30 Watts or Less, When Not in Use.

◆ 4MB RAM, 170MB HD ◆ 1.44MB 3.5" Floppy Drive, 1 Open 5.25" External Device Bay ◆ (3)16 Bit Expansion Slots ◆ Pre-Installed MS DOS V6.X, Windows V3.1 ◆ Integrated High-Performance Local Bus ◆ 1MB Video Memory: Supports 24-Bit True Color ◆ Maximum Display Resolution: 1024 x 768 at 72Hz, 256 Colors ◆ 3 Year Warranty, (1st Year On-Site) ◆ Monitor Sold Separately

		LEASE PER MO.
PowerMate 433es (i486DX/33, 170MB HD).....	\$1399.97	CDW 34575 39.56
PowerMate 450es (i486DX2/50, 210MB HD).....	\$1499.97	CDW 34577 52.05



NEC IMAGE III Series



NEC Image Series Computers Combine Modularity, Performance, Upgradability and Expandability in a Sleek, Low Profile Chassis.

◆ 4MB RAM Expandable to 128MB ◆ Supports 4,8,16 and 32MB Simms ◆ 4 Drive Bays (2 5.25" External, 1 3.5" External, 1 3.5" Internal) ◆ 32bit Local Bus Video ◆ 1MB 45ns Video Memory Upgradable to 2MB ◆ Image Sync™ Provides Highest Optimum Refresh Rate Automatically When Used With NEC Multisync™ Monitors ◆ Max Res 1280 X 1024 Interlaced, 1024 X 768 Non Interlaced ◆ 237 Pin ZIF OverDrive™ Socket ◆ 3.5" 1.44MB Floppy ◆ Optibus™ Local Bus IDE ◆ 4 Expansion Slots (2 32bit VESA Local Bus/ISA Slots, 2 16/8 Bit ISA Slots) ◆ Fast SCSI-2 Internal and External Interfaces ◆ 2 Serial, 1 Parallel, 1 PS/2 Style Keyboard and 1 PS/2 Style Mouse Ports ◆ 101 Key Keyboard ◆ MS DOS 6.X, Windows and Ez-SCSI Software Pre Installed On Hard Drive ◆ Energy Star Compliant ◆ Monitor Sold Separately

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Image III 433 (i486DX2/50, 210MB HD).....	\$1796.14	CDW 34580 62.32
Image III 433 (i486DX2/50, 420MB HD).....	\$2049.47	CDW 34581 71.10
Image III 466 (i486DX2/66, 250MB HD).....	\$1988.50	CDW 32648 69.02
Image III 466 (i486DX2/66, 540MB HD).....	\$2228.15	CDW 32649 77.35



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AST BRAVO & PREMMIA Desktop Computers

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	Energy Star	Local Bus Graphics	Max Video Resolution	Expansion Slots	Bays Ext (Int)	Power Supply	Case
Bravo LP Series	YES	YES	1024 @ 72Hz	2 (16bit)	2 (1)	60W	Low Profile
Bravo LC Series	NO	YES	1024 @ 72Hz	4 (16bit)	3 (2)	145W	Midsize
Bravo MT Series	YES	YES	1024 @ 72Hz	6 (16bit)	4 (2)	200W	Mini Tower
Premmia Series	NO	YES	1280 @ 72Hz	5 (32bit)	3 (2)	200W	Midsize
Premmia MTE	NO	YES	1280 @72Hz	6 (32 Bit)	4 (2)	200W	Mini Tower
Premmia LX	NO	YES	1280 @72Hz	5 (2 PCI, 3 ISA)	3 (1)	145W	Midsize



AST Bravo LP Series



AST Premmia



AST Premmia MTE

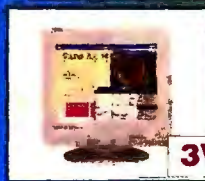
"W" Models with Hard Drives Include MS-DOS V6.X, Windows 3.1 and Mouse

TYPE	MODEL	HD	RAM	CPU	PRICE	CDW
BRAVO LP	173W	170	4	i486SX/25	\$1168.86	30398
BRAVO LP	343W	340	8	i486SX/25	\$1599.00	30399
BRAVO LP	173W	170	4	i486DX/33	\$1445.00	30395
BRAVO LP	343W	340	8	i486DX/33	\$1889.00	30396
BRAVO LP	343W	340	8	i486DX2/66	\$2394.00	30393
BRAVO LC	123W	120	4	i486SX/25	\$997.00	30837
BRAVO LC	3	NONE	2	i486DX/33	\$1079.91	30840
BRAVO LC	123W	120	4	i486SX/33	\$1088.00	30839
BRAVO LC	123W	120	4	i486DX/33	\$1257.00	30841
BRAVO LC	173W	170	4	i486DX/33	\$1329.14	33115
BRAVO LC	213W	210	8	i486DX/33	\$1497.00	30842
BRAVO LC	3	NONE	2	i486DX2/50	\$1329.14	30843
BRAVO LC	123W	120	4	i486DX2/50	\$1515.95	30844
BRAVO LC	173W	170	2	i486DX2/50	\$1589.61	33117
BRAVO LC	213W	210	8	i486DX2/50	\$1767.59	30845
BRAVO LC	3	NONE	2	i486DX2/66	\$1589.61	30846
BRAVO LC	123W	120	4	i486DX2/66	\$1787.00	30847
BRAVO LC	173W	170	4	i486DX2/66	\$1849.44	33119
BRAVO LC	213W	210	8	i486DX2/66	\$2019.00	30848
BRAVO MT	173W	170	4	i486DX/33	\$1497.00	30850
BRAVO MT	343W	340	8	i486DX/33	\$1936.00	30851
BRAVO MT	173W	170	4	i486DX2/66	\$2018.00	30853
BRAVO MT	343W	340	8	i486DX2/66	\$2467.00	30854
PREMMIA	213W	210	8	i486DX/33	\$2108.00	33112
PREMMIA	343W	340	8	i486DX/33	\$2309.00	27551
PREMMIA	213W	210	8	i486DX2/50	\$2174.00	33110
PREMMIA	343W	340	8	i486DX2/50	\$2388.00	27548
PREMMIA	213W	210	8	i486DX2/66	\$2480.00	33108
PREMMIA	343W	340	8	i486DX2/66	\$2697.00	27545
PREMMIA MTE	423	420	8	i486DX/33	\$2258.00	32301
PREMMIA MTE	3	NONE	8	i486DX/33	\$1841.00	32300
PREMMIA MTE	3	NONE	8	i486DX2/66	\$2258.00	32303
PREMMIA MTE	423	420	8	i486DX2/66	\$2687.00	32304
PREMMIA LX	543W	540	16	Pentium 60Mhz	\$4172.00	33107
PREMMIA LX	3	NONE	8	Pentium 60Mhz	\$3107.00	33106

Monitor Sold Separately

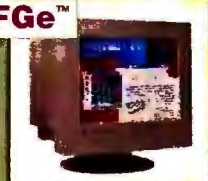
NEC

NEC MultiSync Monitors



3V™

4FGe™



5FGe™

6FGp™



Display	3V	3FGe	4FGe	5FGe	5FGp	6FGp
Display	15" Flat Sq	15" Flat Sq	15" Flat Sq	17" Flat Sq	17" Flat Sq	21" Flat Sq
Max Resolution	1024	1024	1024	1024	1280	1280
Dot Pitch	.28mm	.28mm	.28mm	.28mm	.28mm	.28mm
MPR II (Low Radiation)	✓	✓	✓	✓	✓	✓
Energy Star	✓	✓	✓	✓	✓	✓
AccuColor						
Digital Controls				✓	✓	✓
OptiClear				✓	✓	✓
Manual Degauss		✓	✓	✓	✓	✓
Anti-Static Screen		✓	✓	✓	✓	✓
Up Front Controls	✓	✓	✓	✓	✓	✓
Dual Dynamic Beam Focus				✓	✓	✓
XGA-2 Compatibility		✓	✓	✓	✓	✓
Invar Shadow Mask		✓	✓	✓	✓	✓
CDW	32663	28593	33298	33297	32664	32665
Price	\$499.82	\$577.17	\$722.72	\$1099.90	\$1357.21	\$2368.94

3 YEAR WARRANTY

SONY

SONY MULTISCAN MONITORS

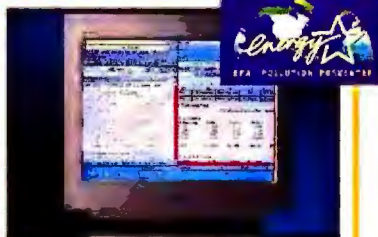


SONY CPD-1430

14" Multiscan Trinitron Digital Color Monitor Low Emissions

- Complies with Swedish MPRII VLF and ELF (Low Radiation Emissions)
- .25mm Aperture Grille Pitch
- Horizontal Scan Rate of 25-28 kHz and Vertical Scan Rate of 55-110 Hz
- Non-Interlaced Maximum Resolution 1024 x 768 @ 72 Hz
- Sony Display Memory System Auto Optimizes for 9 Most Popular Video Signals
- Vertically Flat Black Screen Produces Crisp, Clear Images

CDW® Price..\$599.50 CDW 26660



SONY GDM-17se

- Breakthrough Design
- 33% Flatter than CPD Displays
- 50% Fewer Parts
- 60,000 Hours MTBF
- On-Board Diagnostics
- .25mm Aperture Grille Pitch
- ASIC Continuous Scan Technology
- Full Digital Control
- Refresh up to 100MHz @1024x768 Max res 1600 X 1200 @ 60Hz
- Energy Star
- Meets Swedish MPRII Guidelines
- 31.5 to 82 kHz Horizontal
- 50 to 150 Hz Vertical

CDW® Price. \$1199.48 CDW 33216

CPD1730.....**\$1049.15** CDW 28890



SONY GDM-2038

20" Multiscan Trinitron Graphic Display

- .30mm Aperture Grille Pitch
- 1600 x 1200 at 60 Hz Maximum Resolutions
- 80 Hz Refresh
- Vertically Flat Black Screen
- 28 to 85 Hz Horizontal Scan Range
- 50 to 160 Hz Vertical Scan Range
- Front Panel Controls
- Tilt/Swivel stand

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GDM2036.....**\$1979.18** CDW 27040

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TM

MAGNAVOX



CM2079



CM2089



CM9217



20CM64

	7BM749	CM2079	CM2089	CM2099	CM9217	CM4017	20CM64
Display	14" Mono	14"	14"	14"	17"	17"	20"
Max Resolution	720	1024(I)	1024(I)	1024(NI)	1280(I)	1280(I)	1280(NI)
Dot Pitch	N/A	.39mm	.28mm	.28mm	.31mm	.31mm	.31mm
Anti-Glare Display	✓	✓	✓	✓	✓	✓	
Tilt & Swivel Base	✓	✓	✓	✓	✓	✓	✓
Up Front Controls	✓	✓	✓	✓	✓	✓	✓
Refresh @ 640	N/A	72Hz	72Hz	72Hz	72Hz	72Hz	72Hz
Built-In Amp & Speakers					✓		
Price	\$109.50	\$215.20	\$268.90	\$299.88	\$599.50	\$688.34	\$1169.88
CDW	17756	29644	30422	33755	23261	31768	20751

NANAO

FLEXSCAN® F550iw

17" HI-Res Color

- ◆ High Resolution 17" Color Monitor Features Low Radiation
- ◆ Flicker-Free Display: High Refresh Rate of 75Hz
- ◆ 0.28mm Dot Pitch
- ◆ Scan Frequency – H: 30-65 kHz, V: 55-90 Hz
- ◆ 1024 x 768 Resolution, 75 Hz Refresh Rate; Maximum: 1280 x 1024 (Non-Interlaced)
- ◆ Power Save

NANAO



CDW Price..... **\$1199.00** CDW 28956

F550i
17" HI-Res Color **\$1047.77** CDW 22262

F760iw
21" Color..... **\$2119.34** CDW 30243



MAG InnoVision

MX15F & MX17F Features:

- ◆ Maximum Resolution 1280 X 1024 Non-Interlaced
- ◆ Dark Tinted, Non-Glare Etched, Invar Shadow Mask, Flat Square Tube
- ◆ PINcushion Control
- ◆ Removable 4-Way Tilt & Swivel Base
- ◆ Meets Swedish MPRII Guidelines
- ◆ Auto-Synchronizing * 50-120Hz Vertical
- ◆ 30-68Khz Horizontal
- ◆ 2 Year Warranty on CRT, 1 Year Labor
- ◆ MX15F: .28mm Dot Pitch
- ◆ MX17F: .26mm Dot Pitch, LCD Display Panel, Manual Degaussing Switch



MX15F 15" Multi-Frequency **\$517.15** CDW 24096

MS17F 17" Multi-Frequency **\$899.50** CDW 24273

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 10 User.....**\$2054.00** CDW 31560 100 User.....**\$5526.00** CDW 31563
 25 User.....**\$3035.00** CDW 31561 250 User.....**\$10199.00** CDW 31564

NetWare V3.12

♦ Updated LAN Drivers, Disk Drivers, Management Utilities and NLM Services
 ♦ MHS Basic Services ♦ New VLM Client Architecture ♦ First Mail E-mail Application for DOS and Macintosh ♦ New Client Tools to Better Support Microsoft Windows ♦ Support for CD-ROM Installation and CD-ROM Read Only Volumes ♦ Distributed on CD-ROM or 3.5" Floppy Disks

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 10 User 3.5".....**\$1619.42** CDW 32149 100 User 3.5".....**\$4545.99** CDW 32191
 25 User 3.5".....**\$2399.00** CDW 32187 250 User 3.5".....**\$7826.52** CDW 32193

NOVELL Upgrade Program

	v3.12 5 User	v3.12 10 User	v3.12 25 User	v3.12 50 User	v3.12 100 User	v3.12 250 User
v3.11 5 User	32448/32449 \$259.50	32450/32451 \$1299.23	32452/32453 \$2179.40			
v3.11 10 User		32454/32455 \$399.33	32456/32457 \$1539.17	32458/32459 \$2479.99		
v3.11 20 User			32460/32461 \$458.30	32427/32462 \$1879.36	32463/32464 \$3269.19	
v3.11 50 User				33401/34611 \$659.12	32426/34612 \$2739.95	33692/34613 \$6719.26
v3.11 100 User or Netware 386 v3.0/3.1						32578/34615 \$5693.04
v3.11 250 User					33694/34614 \$909.16	33695/34616 \$1619.44

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WYSE Terminals

Models	Columns	Keyboard	Emulation Modes	Features	Display Color	CDW	Price
WY30+	80	83 Key	ADDS A2, TVI 910+ and 925	Flat Non-flare Screen	Amber Green	11553 14246	272.87
WY60	80/132	Sold Separately	WY30/50/50+ ADDS +1 TVI 910-955, IBM 3101	7 Pages of Scroll Memory	Amber Green White	10739 13455 11589	279.60
WY150	80/132	Sold Separately	ASCII, ANSI	1 Serial, 1 Parallel Port	Amber Green White	12330 15001 13179	265.45
WY160	80/132	Sold Separately	WY50/50+/80, ADDS A2 DEC VT52/100/220	Tilt-Swivel Base	Amber Green White	18209 18492 18870	329.88
WY185	80/132	105 Key ANSI	ANSI, VT52/100/220/320	Tilt-Swivel Base	Amber Green White	15888 17704 18982	379.98
WY325	80/132	Sold Separately	ASCI, VT100/220, WY50/60/120/150,	16 Color	Standard	21798	519.40
WY325ES			TVI 910/925, ADDS21799	Display	Low-Emission	21799	549.40

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Model	Data (bps) Protocol	Fax (bps)	V.42 V.42bis MNP 2-5	Type	CDW Price	CDW
V.32terbo	19.2K, V.32terbo, 14.4K, V.32bis		✓	INT	\$333.90	32490
				EXT	\$378.20	32489
V.32terbo w/Fax	19.2K, V.32terbo, 14.4K, V.32bis	14.4K	✓	INT	\$355.50	32492
				EXT	\$399.50	32491
Dual Standard	19.2K, HST	14.4K	✓	INT	\$679.90	32779
V.32terbo w/Fax	V.32terbo, V.32bis		✓	EXT	\$732.90	32778

WORLDPORT PCMCIA MODEMS

Model	CDW Price	CDW
14.4 Fax/Data	\$298.15	33778
2400 Data/9600 Fax	\$284.60	30224

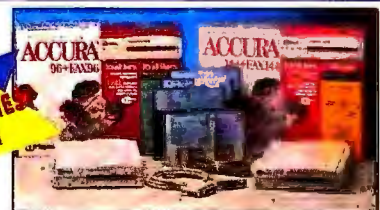


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- ♦ 5 Year Warranty

144+FA96..... **\$219.46** CDW 27349

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INTEL FAX MODEMS

INTEL SatisfAXtion MODEMS



Model	Intel Faxmodems							Intel SatisfAXtion Modems					
	14.4/14.4i	14.4/14.4e	96/96i	96/96e	24v/96i	24v/96e	24/96i	400	400E	350	300	200	100
Type	Internal	External	Internal	External	Internal	External	Internal	Internal	External	Internal	Internal	Internal	Internal
Data bps	14.4K	14.4K	9600	9600	2400	2400	2400	14.4K	14.4K	9600	14.4K	2400	2400
Data Protocol	V.32bis	V.32bis	V.32	V.32	V.22bis	V.22bis	V.22bis	V.32bis	V.32bis	V.32	V.32bis	V.22bis	V.22bis
Send Fax bps	14.4K	14.4K	9600	14.4K	9600	9600	9600	14.4K	9600	14.4K	9600	9600	9600
Receive Fax bps	14.4K	14.4K	9600	9600	9600	9600	4800	14.4K	9600	14.4K	9600	9600	4800
Error Correction (V.42, MNP 1-4)	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	
Data Compression (V.42bis, MNP 5)	✓	✓	✓	✓	✓	✓		✓		✓	✓	✓	
i80186 Fax Coprocessor								✓				✓	
UART Buffering	✓		✓					✓		✓			
Scanner Interface								✓				✓	
Smart Line Sharing								✓		✓		✓	
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Model	Type	Data Speed bps	Fax Speed Send/Receive	V.42/ V.42bis	CDW Price	CDW
PM2400FX MINI	External	2400	9600/4800	—	79.05	24888
PM2400FX96	Internal	2400	9600	—	89.95	19932
PM2400EFX	Internal	2400	9600	✓	89.85	24891
PM2400EFX/SA	External	2400	9600	✓	109.55	24890
PM2400SA	External	2400	N/A	—	69.95	13112
PM9600FX	Internal	9600	9600	✓	139.77	26162
PM9600FXMT	External	9600	9600	✓	156.68	26160
PM14400FX	Internal	14.4K	14.4K	✓	159.50	21941
PM14400FXMT	External	14.4K	14.4K	✓	179.55	26163
PM14400FXP	Pocket	14.4K	14.4K	✓	287.50	26165
PM14400FXSA	External	14.4K	14.4K	✓	374.45	21940
Practicard	PCMCIA	14.4K	14.4K	✓	279.10	31316

14.4 FXMT MiniTower w/Fax **\$179.55** CDW 26163

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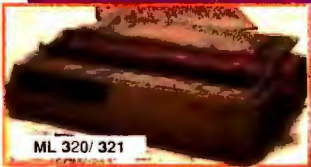
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◆ 4 PPM ◆ 300 DPI ◆ 32 Bit RISC Chip ◆ 512 KB RAM Standard Expandable to 4.5 MB ◆ HP PCL4 Emulation ◆ Serial and Parallel Interfaces with Auto-Switching ◆ 100 Sheet Paper Tray ◆ 44 Bitmap Fonts ◆ Industry's Best Warranty: 5 Years on Printhead, 1 Year Parts/Labor on Printer ◆ Energy Star Certified

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LED Page Printers	PPM	DPI	RAM	Max RAM	OKI Smoothing Technology	FONTS	Postscript	Interface	Emulation	Price	CDW
OL810	8	300	1MB	5MB	Yes	13 Scale, 42 Bit	No	Parallel	PCL 5	\$905.50	23104
OL830	8	300	2MB	4MB	Yes	17 PS, 26 Bit	Yes	Parallel	PCL 4	\$1,079.95	27207
OL850	8	300	2MB	4MB	Yes	65 PS, 26 Bit	Yes	S/P/APPLE	PCL 4	\$1,195.20	27208



ML 320/ 321



ML 590/ 591



ML 395/ 395C



ML 520/ 521

Dot Matrix Printers	Pins	CPS HS Draft	CPS Draft/Utility	CPS NLQ	CPS LQ	Color	Buffer	Interface	Emulation	Width	Price	CDW
ML320	9		300	63		No	28/16K	Parallel	A,B	Narrow	\$304.45	15676
ML321	9		300	63		No	28/16K	Parallel	A,B	Wide	\$432.43	10515
MLS20	9	430	320	80		No	64K	Parallel	A,B,C	Narrow	\$369.14	27668
ML521	9	430	320	80		No	64K	Parallel	A,B,C	Wide	\$499.18	27670
ML590	24	450	360		120	Opt	32/64K	Parallel	D,E	Narrow	\$429.51	24899
ML591	24	450	360		120	Opt	32/64K	Parallel	D,E	Wide	\$585.87	24900
ML380	24		240		63	No	8K	Parallel	D	Narrow	\$214.95	15526
ML395	24	607	486	242	162	No	64K	Par/Ser	E,F	Wide	\$989.20	29571
ML395C	24	607	486	242	162	Std	64K	Par/Ser	E,F	Wide	\$1,039.74	29572
Pacemark 3410	9	550	417	104		No	64K	Par/Ser*	G,H	Wide	\$1,222.92	21815

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BJ-200E **\$289.12** CDW 34907

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CDW® Price **\$588.33** CDW 32552

EPSON Dot Matrix Printers



LQ570+



LQ1070+



FX870



AP3250



FX1170

EPSON®

Dot Matrix Printers	Pins	CPS HS Draft	CPS Draft/Utility	CPS NLQ	CPS LQ	Color	Buffer	Interface	Emulation	Width	Price	CDW
AP2250	9		240	48			4K	Parallel	A	Narrow	\$155.63	24064
AP3250	24		200		72		11K	Parallel	A	Narrow	\$172.95	22301
AP3260	24		270		100	Opt.	11K	Parallel	B	Narrow	\$199.15	30964
LX-810	9		240	48			4K	Parallel	A	Narrow	\$167.90	12540
FX-870	9		380	68			24K	Parallel	A, D	Narrow	\$267.59	24686
FX-1170	9		380	68			24K	Parallel	A, D	Wide	\$355.95	25046
LQ-570+	24		337		112		8K	Parallel	A, B	Narrow	\$237.97	28765
LQ-1070+	24		337		112		8K	Parallel	A, B	Wide	\$365.35	30961
LQ-870	24	413	300		138		8K	Parallel	A, B	Narrow	\$444.91	19683
LQ-1170	24	413	300		138		8K	Parallel	A, B	Wide	\$671.93	19684
LQ-2550	24		500		167	Yes	8K	Par/Ser	F	Wide	\$898.08	13693
DFX-5000	9	533	480	80			3K	Serial	A	Wide	\$1327.84	12654
DFX-8000	9	1066	960	192			3K	Serial	C, E	Wide	\$2271.97	13084

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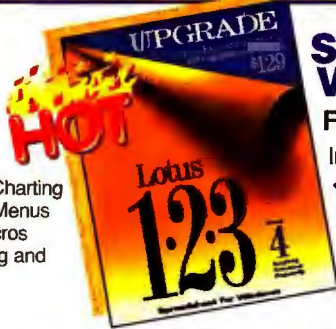
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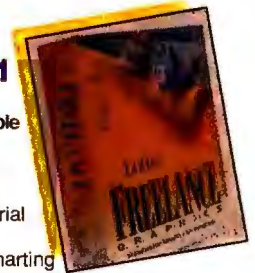
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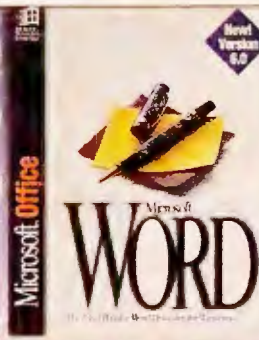


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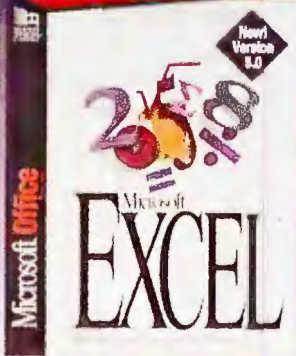
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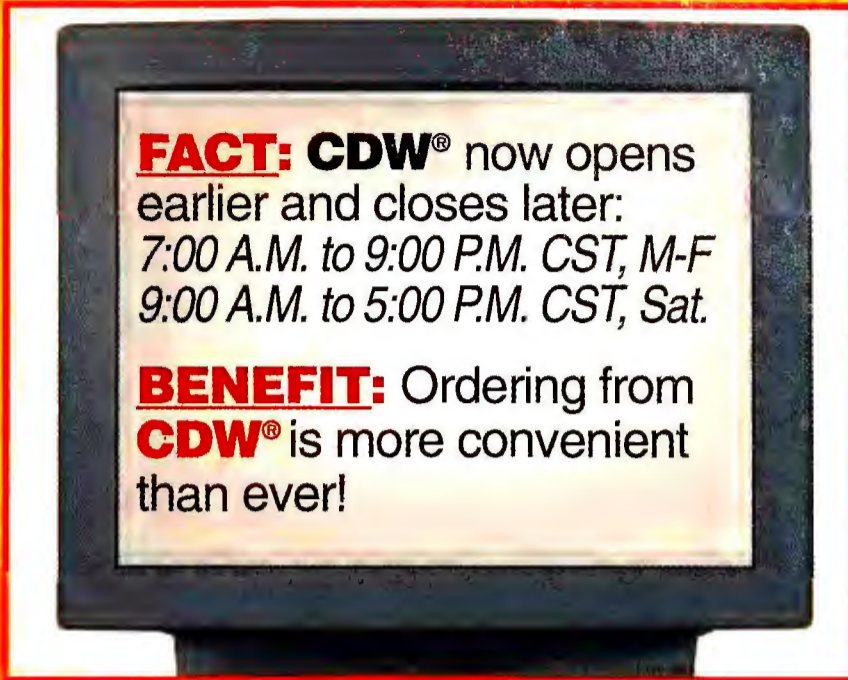
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BATTERY BACKUP AND UPS

BC250.....	99.11	BC600 LAN.....	249.00
BC400.....	152.59	BC750 LAN.....	313.90
BC500.....	191.42	BC900 LAN.....	359.67
BC500 LAN.....	199.40	BC1250 LAN.....	449.59

SMART UPS SERIES NEW

SMART 250 LAN.....	232.46
SMART 400 LAN.....	279.87
SMART 500 LAN.....	309.09
SMART 600 LAN.....	334.91
SMART 750 LAN.....	428.53
SMART 900 LAN.....	525.64
SMART 1250 LAN.....	659.66
POWERMISER 4 OUTLET.....	49.50
ISOBAR 4 OUTLET.....	38.95
ISOBAR 6 OUTLET.....	46.38

AMERICAN POWER

BACK UPS 250.....	99.34	BACK UPS 900.....	374.15
BACK UPS 400.....	159.83	BACK UPS 1250.....	498.77
BACK UPS 450.....	189.88	SMART UPS 400.....	299.95
BACK UPS 600.....	263.67	SMART UPS 600.....	363.38

MICE

LOGITECH TRACKMAN PORTABLE.....	72.50
LOGITECH MOUSEMAN CORDLESS.....	89.93
LOGITECH MOUSEMAN COMBO.....	66.85
LOGITECH DEXXA SERIAL MOUSE.....	24.98
LOGITECH 2 BUTTON.....	28.67
LOG FOTOMAN PLUS V2.0 SERIAL.....	549.76
MICROSOFT MOUSE V2.0 SERIAL.....	59.00
MICROSOFT MOUSE V2.0 PS/2.....	59.00
*WHILE SUPPLIES LAST	

PCMCIA

BOCA 14.4K DATA/FAX.....	259.70
DATARACE 14.4K W/FAX.....	238.24
DATARACE 2400 W/FAX.....	168.70
EAGLE NE200T ETHERNET.....	209.35
HAYES OPTIMA 14.4 W/FAX.....	315.00
IBM TOKEN RING 16/4.....	452.64
INTEL 14.4 W/FAX.....	299.00
INTEL 2400 W/FAX.....	189.00
INTEL 9600 W/FAX.....	249.00
LINKSYS ETHERNET 10BT.....	197.91
LINKSYS ETHERNET COAX.....	197.91
MAXTOR MOBILEMAX 105MB HD.....	498.27
MEGAHERTZ 14.4 W/FAX.....	295.49
MEGAHERTZ 14.4 XJACK W/FAX.....	309.31
MEGAHERTZ 2400 XJACK W/FAX.....	197.82
MEGAHERTZ 9600 XJACK W/FAX.....	399.61
MINISTOR 42MB HARD DRV.....	399.61
NAT SEMI NE4100T ETHERNET.....	68.95
NOVELL/EAGLE ETHERNET COAX.....	242.80
PRACTICAL 14.4K DATA/FAX.....	279.16
T. CONRAD ETHERNET COAX.....	228.44
TRANTOR SLIM SCSI-2.....	285.49
USR WORLDPORT 14.4 W/FAX.....	285.22
XIRCOM TOKEN RING ADAPTER.....	439.77
XIRCOM ETHERNET 10BT.....	229.41
XIRCOM ETHERNET COAX.....	228.79
XIRCOM ETHERNET COMBO.....	265.55

MEMORY UPGRADES

CDW® Features Delkin, Kingston, Pacific Data and Simple Technology Memory.

AST BRAVO 486LC 2MB.....	CALLI
AST POWEREXEC 486 4MB.....	CALLI
AST PREMIUM II 1MB CUPID SIMM.....	CALLI
AST PREMIA 8MB UPG.....	CALLI
COMPAG DESKPRO 8MB.....	CALLI
COMPAG CONTURA 486 8MB.....	CALLI
COMPAG CONTURA 4MB.....	CALLI
COMPAG DP 386/16 4MB.....	CALLI
COMPAG LITE 4/25C 4MB.....	CALLI
COMPAG PROLINEA 486/33 4MB.....	CALLI
COMPAG PROSIGNIA 16MB.....	CALLI
EPSON ACTION LASER 2-8MB.....	CALLI
HP DESKJET 500 & 500C 256KB.....	CALLI
HP LASER 4L 1MB MEM UPG.....	CALLI
HP LASERJET 2P/III 2MB.....	CALLI
HP LASERJET 3SI 4MB.....	CALLI
HP LASERJET 4 4MB.....	CALLI
HP PAINTJET XL300 4MB.....	CALLI
IBM DESKTOPS-ALL MODELS.....	CALLI
IBM THINKPAD 700 4MB.....	CALLI
NEC SILENTWRITER 95 2MB.....	CALLI
NEC VERSA 4MB.....	CALLI
OKILASER 400 2MB.....	CALLI
OKILASER 800 2MB.....	CALLI
PANASONIC 4410, 4430 2-4MB.....	CALLI
PANASONIC P4450I 2MB.....	CALLI
TI MICROL	

MEMORY SUPER SOURCE

LIFETIME* WARRANTY 100% GUARANTEED

WE WILL BEAT ANY LEGITIMATE PRICE QUOTED BY A COMPETITOR IN THIS ISSUE.



Seagate

FACTORY NEW - FULL WARRANTY

IDE		
130MB ST3144A	15MS 3.5X1"	\$ 189
128MB ST9145AG	16MS 2.5"	299
260MB ST3290A	16MS 3.5X1"	246
343MB ST3390A	12MS 3.5"	309
209MB ST9235AG	16MS 2.5"	399
452MB ST3550A	12MS 3.5X1"	416
540MB ST3655A	12MS 3.5"	535
SCSI		
457MB ST3550N SCSI-2	12MS 3.5X1"	520
525MB ST3600N SCSI-2	11MS 3.5X1"	625
343MB ST3390N SCSI-2	12MS 3.5X1"	399
1420MB ST41650N	15MS 3.5X1"	1121
1350MB ST41600N	12MS FH	1625
1.2GB ST11200N SCSI-2	10MS 3.5"	953
1.2GB ST41200N	14MS FH	995
1.6GB ST41651	15MS FH	1167
2.1GB ST42100N SCSI-2	14MS FH	1429
2.1GB ST42400 SCSI-2	11MS FH	1769
3.55GB ST43400N SCSI-2	10MS FH	2250
1.7GB BARRACUDA-I ST11950N SCSI-2	3.5"	1655
2.1GB BARRACUDA-II ST12550N SCSI-2	3.5"	2025
2.2GB ST12400N SCSI-2	12MS 3.5"	1745

Maxtor

FACTORY NEW - FULL WARRANTY

IDE		
130MB 7131A	14MS 3.5X1"	189
213MB 7213A	15MS 3.5X1"	232
245MB 7245A	15MS 3.5"	245
345MB 7345A	15MS 3.5"	299
SCSI		
345MB 7345S SCSI-2	12MS 3.5"	385
540MB 540S	8MS 3.5X1"	608
1.2GB 1240S SCSI-2	8MS 3.5"	1325

CONNER

FACTORY NEW - 1 YEAR WARRANTY

IDE		
170MB CP30174E	17MS 3.5X1"	\$ 207
212MB CP30204	12MS 3.5X1"	225
250MB CP30254H	14MS 3.5"	249
340MB CP30344	14MS 3.5X1"	299
540MB CP30544	10MS 3.5X1"	645
SCSI		
212MB CP30200	12MS 3.5X1"	253
540MB CP3540 SCSI-2	10MS 3.5"	615
1GB CP1060S SCSI-2	10MS 3.5"	955

WESTERN DIGITAL

FACTORY NEW - 2 YEAR WARRANTY

IDE		
212MB WD2200	12MS 3.5X1"	\$ 225
250MB WD2250	14MS 3.5X1"	242
340MB WD2340	12MS 3.5X1"	295
420MB AC2420	13MS 3.5X1"	370
540MB WD2540	11MS 3.5X1"	495

TOSHIBA

5 YEAR WARRANTY ON 3.5" 1 YEAR WARRANTY ON 2.5"

SUPERFAST SCSI-2

130MB N/A	17MS 2.5"	\$329
200MB IDE MK2224	17MS 2.5"	418
200MB SCSI MK2224	17MS 2.5"	439
340MB IDE MK2326	2.5"	588

1 x 9 \$48 4 x 9 \$154 SIMMS

70 NS SIMMS

4MB X 9-80NS SIMM-PC	147	256K X 9-100NS SIMM	13	1MB X 9-70NS SIPP	53
4MB X 9-70NS SIMM	154	256K X 9-80NS SIMM	14	1MB X 9-60NS SIPP	55
4MB X 9-60NS SIMM	160	256K X 9-70NS SIMM	15	256K X 9-100NS SIPP	18
1MB X 9-100NS CHIP SIMM	44	256K X 9-80NS SIMM	16	256K X 9-80NS SIPP	19
1MB X 9-80NS CHIP SIMM	42	256K X 9-70NS SIMM	17	256K X 9-70NS SIPP	20
1MB X 9-60NS CHIP SIMM	47	1MB X 8-80NS SIMM	42	256K X 9-60NS SIPP	23
1MB X 9-70NS CHIP SIMM	42	1MB X 8-70NS SIMM	43	256 X 36 - 1MB	55
1MB X 9-70NS CHIP SIMM	48	4MB X 8-80NS SIMM	140	512 X 36 - 2MB	89
1MB X 9-60NS CHIP SIMM	44	4MB X 8-70NS SIMM	147	1 X 36 - 4MB	185
1MB X 9-53NS CHIP SIMM	50	1MB X 9-100NS SIPP	49	2 X 36 - 8MB	375
1MB X 9-53NS CHIP SIMM	53	1MB X 9-80NS SIPP	52	4 X 36 - 16MB	695
16MB X 9-70NS SIMM	720				

MOTHER BOARDS

OPTI

386DX-33-64K CACHE W/CPU	199
386DX-33-256K CACHE W/CPU	249
386DX-40-64K CACHE W/CPU	210
386DX-40-256K CACHE W/CPU	260
486SX-25-64K CACHE W/CPU	349
486DX-33-64K CACHE W/CPU	490
486DX-33-256K CACHE W/CPU	540
486DX-50-256K CACHE W/CPU	749
FREE	
486DX-33 128K CACHE	537
486DX-50 256K CACHE	740
486DX-33 8-ISA, 2-VESA 256K CACHE	612
486DX-66 8-ISA, 2-VESA 256K CACHE	894
OCEAN	
JAGUAR 386DX-40 128K	139
HIPPO 486DX-33 ISA 256K*Dynamic Cache*	448
HIPPO 486DX-50 ISA 256K*Dynamic Cache*	609
JAGUAR IV 486DX-40 128K Math Co	319
JAGUAR VESA486DX-33 256K 2-VL8*Dynamic Cache*	569
AMERICAN DIGICOM	
486SX-25 ISA 128K	249
486DX-66 ISA 128K	899
486DX-33 VESA 256K	469
486DX-66 VESA 256K	729
SILICON STAR	
386DX-40 128K Cache	159
486DX-33 ISA 128K Cache	429
486DX-33 VESA 256K Cache	479
486DX-33 EISA 256K Cache	534
NICE Made In U.S.A.	
486DX-33 8-ISA, 2-VESA L8 256K	489
MINI 486DX-33 5-ISA, 3-EISA, 2-VESA L8 256K	576
MINI 486DX-66 5-ISA, 3-EISA, 2-VESA L8 256K	839
486DX-66 6-EISA 2-ISA 1 Meg Cache	1179
SUPER EISA 486DX-66 8-EISA 1-VESA L8 512K	1059
A.I.R. Made In U.S.A.	
486DX-33 8-ISA, 3-VESA 256K P24T Socket	549
486DX-66 8-ISA, 3-VESA 256K P24T Socket	809
486DX-33 8-ISA, 3-VESA 256K	789
486DX-66 8-ISA, 3-VESA 256K	1049
VEGA Made In U.S.A.	
3/486DX-33 VESA 2-VL 256K,ZIF MULTI I/O IDE	519
3/486DX-33 VESA 3-VL 256K,ZIF	499
486DX-550 ISA 256K	699
486DX-66 3-VESA 256K	769
MICRONICS (U.S.A.)	
MX-30 486DX-33 VESA 256K	699
MX-30 486DX-50 VESA 256K	889
GEMINI 486DX-33 VESA 256K	795
GEMINI 486DX-66 VESA 256K	1249
MYLEX (U.S.A.)	
486DX-66 256K MULTI I/O	1019
486DX-50 EISA 256K MULTI I/O	1239
486DX-66 VESA 64K MULTI I/O	1049
486DX-66 EISA/VESA 256K MULTI I/O	1299
AMI Made In U.S.A.	
SUPER VOYAGER LC 486DX-33 256K	978
SUPER VOYAGER 486DX-33 VESA 2-VL8 256K	888
SUPER VOYAGER 486DX-66 VESA 2-VL8 256K	1258
ENTERPRISE III VL8 486DX-66 256K	1378

Quantum

FACTORY NEW - 2 YEAR WARRANTY ELS & LPS 5 YEAR WARRANTY ON P. DRIVES 1 YEAR WARRANTY ON 2.5" DRIVES

CAPACITY	M/N	SPEED	SIZE	PRICE
IDE				
127MB	ELS127A	17MS	3.5X1"	\$181
170MB	ELS170A	17MS	3.5X1"	188
240MB	ELS270A	16MS	3.5X1"	249
525MB	LPS540A	10MS	3.5X1"	495
SCSI				
127MB	ELS127S	17MS	3.5X1"	184
170MB	ELS170S	17MS	3.5X1"	195
270MB	LPS270S	16MS	3.5X1"	252
540MB	LPS540S SCSI-2	10MS	3.5X1"	495
1GB	P1080S SCSI-2	10MS	3.5X1"	908
1.2GB	P1225S SCSI-2	10MS	3.5"	985
1.8GB	P1800S SCSI-2	10MS	3.5"	1085

FUJITSU

FACTORY NEW - 5 YEAR WARRANTY

SCSI		
1.2GB	M2694SA	10MS 3.5" \$885
2.4GB	M2654SA	12MS FH 1415

MICROPOLIS

FACTORY NEW - 5 YEAR WARRANTY

IDE		
976MB	MC2210A	10MS 3.5" \$860
1.6GB	MC2217A	10MS 3.5" 1185
SCSI-2		
976MB	MC2210 SCSI-2	10MS 3.5" 860
1.2GB	MC1598 SCSI-2	15MS FH 811
1.6GB	MC1908 SCSI-2	10MS FH 1259
1.75GB	MC2217 SCSI-2	10MS 3.5" 1185
2.0GB	MC1548 SCSI-2	14MS FH 1173
2.1GB	MC1926 SCSI-2	11MS 3.5" 1489
2.4GB	MC192 SCSI-2	11MS FH 1489
3.6GB	MC1936 SCSI-2	11MS FH 2145

SAMSUNG

FACTORY NEW - FULL WARRANTY

IDE		
120MB	3062	17MS 3.5X1" 189
250MB	3125	15MS 3.5X1" 235

digital

FACTORY NEW - FULL WARRANTY DISK DRIVES FOR POWER USERS

SCSI II			
1.0GB	3107S	9.5MS	3.5" \$909
1.6GB	3160S	9.5MS	3.5" 1231
2.0GB	5200S	12.5MS	FH 1187
3.5GB	5350S	11.5MS	FH 2517

HEWLETT PACKARD

FACTORY NEW - 5 YEAR WARRANTY

CAPACITY	M/N	SPEED	SIZE	PRICE
SCSI				
1.0GB	C2247	10MS	3.5"	\$1145
1.0GB	C97558	13MS	FH	1395
1.8GB	C3009	11.5MS	FH	1995
2.0GB	C3010	11.5MS	FH	2295
2.1GB	C2490	8.9MS	3.5"	2295

DYNAMIC RAMS

1MB X 1-100NS	CALLI
1MB X 1-80NS	CALLI
1MB X 1-60NS	CALLI
256K X 1-150NS	CALLI
256K X 1-120NS	CALLI
256K X 1-100NS	CALLI
1 X 4-80NS DRIP	CALLI
256 X 1-80NS	CALLI
256K X 1-70NS	CALLI
256K X 1-60 NS	CALLI
256K X 4-100NS	CALLI
256K X 4-80NS	CALLI
256K X 4-70NS	CALLI
256K X 4-60NS	CALLI
64K X 4-120NS	CALLI
64K X 4-100NS	CALLI
64K X 4-80NS	CALLI
64K X 1-150NS	CALLI
64K X 1-120NS	CALLI
64K X 1-100NS	CALLI

CACHE

8 X 8-15	5.00
32 X 8-15	16.00
8 X 8-25	4.00
32 X 8-25	7.00
64 X 8-25	12.00
16 X 4-25	5.00
8 X 8-20	4.50
32 X 8-20	8.00
64 X 4-20	10.00
16 X 4-20	5.50
16 X 4-15	9.00
64 X 1-20	18.00
64 X 1-15	20.00

MATH CO-PROCESSORS

INTEL		
8087 5MHz INTEL		49.00
8087 2 8MHz INTEL		139.00
8087 1 10MHz INTEL		99.00
8087 4 8MHz INTEL		49.00
80287 10 10MHz INTEL		59.00
80287 1 12MHz INTEL		75.00
80287 1 15MHz INTEL		75.00
80387SX 16 15MHz INTEL		75.00
80387SX 20 20Hz INTEL		75.00
80387SX 25 25Hz INTEL		75.00
80387DX 16 16MHz INTEL		75.00
80387DX 20 20MHz INTEL		75.00
80387DX 25 25MHz INTEL		75.00
80387DX 33 33MHz INTEL		75.00
80487SX 25 INTEL		375.00
OVERDRIVE SXDX33		CALL
OVERDRIVE SXDX25		CALL
OVERDRIVE SXDX20		CALL
RAPID CAD		CALL
CYRIX		
83087DX 16 16MHz CYRIX		75.00
83087DX 20 20MHz CYRIX		75.00
83087DX 33 33MHz CYRIX		75.00
83087DX 40 40MHz CYRIX		65.00
83587SX16 16MHz CYRIX		69.00
83587SX20 20MHz CYRIX		88.00
83587SX25 25MHz CYRIX		69.00
83587SX33 33MHz CYRIX		69.00
WEITEK		
3167 20MHz WEITEK		295.00
3167 25MHz WEITEK		305.00
3167 33MHz WEITEK		485.00
4167 25MHz WEITEK		445.00
4167 33MHz WEITEK		695.00
ITT		
2C87-8 8MHz IIT		54.00
2C87-10 10MHz IIT		54.00
2C87-12 12MHz IIT		60.00
2C87-20 20MHz IIT		64.00
3C7-16 16MHz IIT		69.00
3C87-20 20MHz IIT		69.00
3C87-25 25MHz IIT		69.00
3C7-33 33MHz IIT		89.00
3C7-40 40MHz IIT		

LYCO SHOPPING CENTER

DOT MATRIX PRINTERS

PANASONIC

NX-2480 Rainbow 24-pin 330/100 cps 2-yr warranty color \$245.95
 XB-2425 24-pin 375/125 cps 2-yr warranty \$589.95

CITIZEN

GSX-190 9-pin 270/88 cps 2-yr warranty \$159.95
 Color version \$199.95
 GSX-220 24-pin 240/80 cps 2-yr warranty \$174.95
 Color version \$209.95
 GSX-240 24-pin 300/80 cps 2-yr warranty \$229.95
 Color version \$319.95

OKIDATA

184 9-pin 300/50 cps 1-yr warranty \$210.95
 320 9-pin 300/63 cps 1-yr warranty \$289.95
 Wide carriage version 321 \$415.95
 520 9-pin 430/80 cps 1-yr warranty \$348.95
 Wide carriage version 521 \$455.95
 380 24-pin 240/83 cps 2-yr warranty \$204.95
 590 24-pin 450/120 cps 2-yr warranty \$415.95
 Wide carriage version 591 \$565.95

EPSON®

FX-870 9-pin 380/88 cps 2-yr warranty \$267.95
 Wide carriage version FX-1170 \$349.95
 LQ-570+ 24-pin 337/112 cps 2-yr warranty \$239.95
 Wide carriage LQ-1070+ \$359.95
 LQ-870 24-pin 360/138 2-yr warranty \$439.95
 Wide carriage version LQ-1170 \$599.95
 LQ-2550 24-pin 400/133 cps 1-yr warranty Color \$899.95

MANNESMANN TALLY

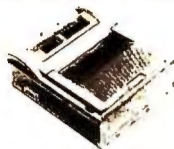
MT150 24-pin 360/120 cps 1-yr warranty \$589.95
 MT350 24-pin 540/120 cps 1-yr warranty wide carriage \$649.95
 MT645 Line printer 450/210 LPM 1-yr warranty \$449.95
 MT661 Line printer 800 LPM 1-yr warranty \$649.95*

STAR

NX-1001 9-pin 180/75 cps 2-yr warranty \$129.95
 NX-2450 Rainbow 24-pin 240/80 cps 2-yr warranty color \$219.95

OKIDATA

OL400e LED
Best buy at 4PPM

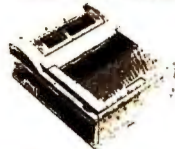


Key Features
 ▶ 4PPM W/32-bit RISC processor
 ▶ 512K with EMM
 ▶ 44 resident fonts
 ▶ 5-yr printhead warranty

\$479⁹⁵*

*Quantities Limited

OL410e LED
600 DPI Class



Key Features
 ▶ 4PPM W/32-bit RISC processor
 ▶ 2MB with EMM
 ▶ 12 scalable fonts
 ▶ 5-yr printhead warranty

\$619⁹⁵*

EPSON®
Stylus 800
Best Buy InkJet



Key Features
 ▶ Monochrome printing
 ▶ 225 cps LQ
 ▶ 360 X 360 dpi
 ▶ 100 sheet paper tray
 ▶ 48-nozzle printhead
 ▶ 2 yr warranty

\$249⁹⁵*

*After \$25 Rebate

Canon
BJC-600



Key Features
 ▶ Up to 360 dpi
 ▶ 240 cps in draft mode
 ▶ 64 nozzles X 4 printheads
 ▶ 100 sheet auto sheet feed
 ▶ 2 year limited warranty

\$569⁹⁵

INKJET PRINTERS

EPSON®
Stylus 300 360 X 360 dpi 165 cps LQ 100 sheet paper tray \$224.95
 Stylus 800 360 X 360 dpi 225 cps LQ 100 sheet paper tray \$249.95

CANON
BJ-10SX Portable 360 X 360 dpi 110 cps draft \$239.95
 BJ-200E 360 X 360 dpi 248 cps draft 100 sheet feeder \$265.95
 BJC-600 Color 360 X 360 dpi 240 cps draft 100 sheet auto feeder \$589.95

CITIZEN
ProJet 2 300 X 300 dpi 3PPM draft 70 page auto sheet feeder \$265.95

THERMAL PRINTERS

MANNESMANN TALLY
Mobile Writer mono 300 X 300 dpi portable 6PPM \$749.95
 Mobile Writer PS mono 300 X 300 dpi Post Script portable 6PPM \$825.95

FARGO
Primera Color \$879.95

STAR
SJ-144 Color 360 X 360 dpi \$455.95

CITIZEN
Notebook Printer 2 mono 360 X 360 dpi portable \$299.95

LASER PRINTERS

CANON
LBP-430 4PPM 300 X 300 dpi 1MB memory HP/II emulation 1-yr warranty \$579.95
 LBP-860 8PPM 600 dpi 2MB memory 2-yr warranty \$1359.95

LASER PRINTERS

OKIDATA
OL400e LED 4PPM 300 X 300 dpi 512K memory HP/II emulation 5-yr printhead warranty \$479.95*

OL410e LED 4PPM 600 X 600 dpi 2MB memory HP/II emulation 5-yr printhead warranty \$619.95*

OL810 LED 8PPM 300 X 300 dpi 1MB memory HP/II emulation 5-yr printhead warranty \$789.95

OL830+ LED 8PPM 300 X 300 dpi 2MB memory HP/II emulation 5-yr printhead warranty \$1045.95

OL850 LED 8PPM 300 X 300 dpi 2MB memory HP/II emulation Post Script 5-yr warranty \$1049.95

CITIZEN
ProLaser 6000 6PPM 300 X 300 dpi microfine toner 1MB memory HP/II emulation 2-yr warranty \$599.95*

EPSON®
ActionLaser 1500 6PPM 300 X 300 dpi 1MB memory HP/II emulation 2-yr warranty \$619.95

PANASONIC
KX-P4410 5PPM 300 X 300 dpi 512K memory HP LJ-II (PCL4) emulation 1-yr warranty \$519.95
 KX-P4430 5PPM 300 X 300 dpi 1MB memory HP/II emulation 1-yr warranty \$639.95
 KX-P4400 4PPM 300 X 300 dpi 512K memory HP/II emulation 1-yr warranty \$539.95
 KX-P5400 4PPM 300 X 300 dpi 2MB memory Post Script 1-yr warranty \$779.95
 KX-P4440 10PPM 300 X 300 dpi 1MB memory HP/II emulation 1-yr warranty \$989.95

*Quantities Limited

HARD DRIVES

SEAGATE

3 1/2" 1 Inch High IDE/AT:
 ST-3145A 130MB 16MS \$179.95
 ST-3243A 214MB 16MS \$199.95
 ST-3290A 283MB 16MS \$217.95
 ST-3390A 341MB 12MS \$265.95
 ST-3550A 452MB 12MS \$375.95
 ST-3600A 528MB 10.5MS \$449.95
 ST-3655A 528MB 12MS \$475.95

MAXTOR

3 1/2" 1 Inch High IDE/AT:
 7245A 245MB 15MS \$215.95
 7273A 273MB 12MS NEW
 7345A 345MB 14MS \$259.95
 7545A 546MB 12MS \$525.95

WESTERN DIGITAL

3 1/2" Half Heights Fast SCSI-2:
 ST-11200N 1050MB 10.5MS \$869.95
 ST-12550N 2139MB 8MS \$1699.95
 ST-12400N 2148MB 8MS \$1399.95

Caviar IDE/AT Series:
 WD 1210 212MB 13MS \$198.95
 WD 2250 256MB 13MS \$217.95
 WD 2340 341MB 13MS \$265.95
 WD 2420 425MB 13MS \$325.95
 WD 2540 540MB 13MS \$445.95

Seagate



Key Features
 ▶ Model ST-3390A
 ▶ 3 1/2" 1 inch high
 ▶ 341MB
 ▶ IDE/AT
 ▶ 12 msec seek time
 ▶ Priced at 78¢ a meg

\$265⁹⁵

WESTERN DIGITAL



Key Features
 ▶ Model WD 2420
 ▶ Caviar series
 ▶ 425MB
 ▶ IDE/AT
 ▶ 13 msec seek time
 ▶ Priced at 76¢ a meg

\$325⁹⁵

HARD DRIVES

CONNER

3 1/2" Half Heights IDE/AT:
 CFS 210A 213MB 14MS \$209.95
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1Megx4	35.00	29.00	27.00	-	-	-	-	-	-	-	-	-	-
1Megx4 (Zip Pack)	27.00	25.00	23.00	-	-	-	-	-	-	-	-	-	-
256 x 4	-	-	11.95	10.95	-	-	-	-	-	-	-	-	-
256x4 (Video Zip)	7.95	6.95	-	-	-	-	-	-	-	-	-	-	-
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256 x 16VDRAM	-	39.00	39.00	-	-	-	-	-	-	-	-	-	-
64x4	-	-	3.25	-	-	-	-	-	-	-	-	-	-
64x1	-	-	2.00	-	-	-	-	-	-	-	-	-	-

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60NS	70NS	80NS	100NS
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256 x 16VDRAM	-	39.00	39.00
64x4	-	-	3.25
64x1	-	-	2.00

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Model	RAM	Price
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Ambra S4540SL	4/16 Meg Kit	CALL
Ambra Spinola 386, Hurdia 386SX, Enterprise 386 Slim	2/8 Meg Kit	CALL
Ambra Sprinta, Hurdia & Enterprise 486	4/16 Meg Kit	CALL
Ambra NC 425SL	2/4/8 Meg	109.00/209.00/449.00
Ambra N Series	4/8/12/16 Meg	189.00/379.00/569.00/829.00
Ambra SN Series	4/16 Meg	189.00/829.00

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Model	Price
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CX486 DRx2-33/66	CALL
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Model	40NS	50NS	60NS	70NS	80NS	100NS
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1Meg x 9 (9 chip)	60.00	59.00	49.00	48.00	46.00	38.00
4Meg x 9	-	-	165.00	159.00	149.00	-
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Model	Price
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	4Meg	500987-002	179.00
	8Meg	500987-003	419.00
	16Meg	500987-004	819.00
	32Meg	500987-005	1399.00
Premium 486/25, 25S, 33, 33E	8Meg	500780-001	398.00
Premium 386/33E, 486/25E, 33TE			
Prem. Serv. Prem II 386SX/20, 25			
Prem. II 386/25, 386/33, 486/33, 486SX/20			
Premium 386/33E, Prem. 386SX/16			
Prem. II 386SX/20, 25			
Premium 386/25, 33, 386/33T, 386SX/16			
Prem. II 386SX/20, 25			
Premia	8Meg	501159-002	379.00
Premia	16Meg	501159-003	789.00
Premia	32Meg	501159-004	1489.00
Premia	64Meg	501159-005	3111.00

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MODEL	AMT. UPGRADED	AST PART #	PRICE
Z386/33, 25, 20, 33E	1Meg	ZA3800ME	59.00
Z386/33, 25, 20, 33E, 486/25E	4Meg	ZA3800M1	180.00
Z386SX	2Meg	Z-605-1 modules	119.00

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2Meg	4Meg	\$238.00
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IBM PART NO.	WORKS WITH MODEL NO.	PRICE
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30F5360 (2Meg)	30-286, 25-286, 50 MTHR 8D	104.00
6450375 (1Meg)	80-041	79.00
6450379 (2Meg)	80-111, 311-121, 321, 081, 161	84.00
6451060 (4Meg)	70-421, A-61, 80-A31, 80-111, 80-311	189.00
6450604 (2Meg)	70-061, E61, 121, 50Z, 55SX, 65SX, P-70	89.00
6450608 (2Meg)	59LS, 65LS, X-Station 120 & 130, 35SX, 35LS, 40SX	95.00
78X8955 (128K)	70-A21, A-61, B-21, B-61, 35SX, 35LS, 40SX, Val Pt, 325T	30.00
34F2933 (4Meg)	35SX, 40SX, 55SX, 65SX, 55LS, 65LS	180.00
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1057035 (512K)	P/S1 286	89.00
92F9694 (2Meg)	P/S1 & P/S1/386SX-2121	189.00
92F9694 (4Meg)	P/S1 & P/S1/386SX-Model-2121	189.00
6450902 (2Meg)	56, 57, 57SX, 90, 95, P-75, 57SLC	90.00
6450128 (4Meg)	Value Point 77 486DX2, 486SX, SVR 85	175.00
6450129 (8Meg)	57SX, 90, 95, P-75, 57SLC, 56, 56SLC, P/S1, 386SX, Mod-2123, 2133, 2155, Val Pt 77, 486GS2, 486SX, SVR85	379.00
6450130 (8Meg)	35SX, 40SX	379.00
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79F1001 (8Meg)	349.00
07G1416 (2Meg)	103.00
07G1827 (4Meg)	199.00
07G1828 (8Meg)	419.00
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53G6959 (4Meg)	CALL
53G6960 (8Meg)	CALL
07G1414 (2Meg)	119.00
07G1415 (4Meg)	149.00
07G1416 (8Meg)	399.00
66G0094 (16Meg)	879.00
07G1420 (4Meg)	199.00
07G1421 (8Meg)	399.00
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MODEL	AMT. UPGRADED	COMP PART #	PRICE
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486/25, 486/33L	8Meg Module	116561-001	429.00
486/50L, System Pro	32Meg Module	116568-001	1459.00
DeskPro 386/33L, 486/33L	(Exp 8d)	116589-001	279.00
DeskPro 386/25, 386/20	1Meg Module	113131-001	79.00
DeskPro 386S-16MHz	4Meg Module	113132-001	219.00
	1Meg Exp Bd	113833-001	149.00
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	1Meg Module	113646-001	79.00
DeskPro 386/20E	4Meg Module	112534-001	219.00
DeskPro 386/25E	1Meg Exp Bd	113644-001	149.00
	4Meg Exp Bd	113645-001	329.00
	1Meg Module	113131-001	79.00
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DeskPro 286N, 386N, 386SX/20, 386/25M, 486/33M, 486S/25M, 486S/16M	1Meg Module	118688-001	59.00
Port. I Series 486C	2Meg Module	118689-001	89.00
M Series Exp 8d	4Meg Module	118690-001	180.00
DeskPro 386/16	8Meg Module	128877-001	389.00
	0-64Meg Kit	129160-001	279.00
	1Meg Kit	108071-001	99.00
	4Meg Kit	108072-001	299.00
	1-2Meg Exp Bd	108069-001	239.00
	4-8Meg Exp Bd	108070-001	437.00
DeskPro 286	512K Kit	113012-001	49.00
DeskPro 5/60, 5/66M, 5/66M	8Meg Kit	149911-001	389.00
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Proliant 100 5/60	32Meg Kit	149912-001	1599.00
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Proliant 4000 4/50, 5/66	128Meg Kit	149914-001	5900.00
Prolinea 386 3/25S, 3/25ZS	2Meg	141738-001	109.00
	8Meg	141742-001	320.00
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Hardware: Pentium 486, 1.5MB RAM, 10MB HD. Software: Lotus 1-2-3, WordPerfect 5.1, dBase III, Visual Basic, Windows 3.11, DOS 6.02. QEMM 7, QEMM 6.02, MS-DOS 6.02, MemMaker. In addition to the driver for devices required by each memory manager, the following drivers, DOS resources and programs were loaded for all comparisons: the COMMAND.COM, IO.SYS, MSDOS.SYS, USER.COM, AUTOEXEC.BAT, VSAFE, MSCDEX, UNDELETE, LSL.COM, NERD.COM, IPMOD.COM, NETX OR ENHNETX, MATHS.COM, SMARTDRV.COM, PRTM.CAP.COM. ©1993 Quarterdeck Office Systems. Trademarks are property of their respective owners.

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VACANCY

Dracula and the Berlin Wall on Your Desk

I loved Indiana Jones and the Fate of Atlantis, by LucasArts, when it appeared a year ago—and the new talkie version on CD ROM is even better. The story and screenplay—both written by ace screenwriter and filmmaker Hal Barwood—are loaded with snappy dialogue. But instead of reading it on screen, you now hear it performed by a cast of professional actors. Talk about a movie on your PC! When I first reviewed this game I called it “the most cinematic computer game I’ve ever played,” thanks to a series of exciting, tightly scripted set pieces. These short animated films turn your PC screen into a private theater, providing essential information and advancing the plot. (Between scenes, you run the show.) Imagine how much better the sequences work in the new multimedia format. Too bad they couldn’t get Harrison Ford to do Indy’s dialogue.

Garlic Not Included

Dracula Unleashed is the latest interactive CD ROM adventure from Viacom New Media (see *New Products*, March 1994). The action advances via a series of filmed live-action scenes. But for the most part, *your* only role is to move from place to place, hoping that another little film will unreel. Despite the good performances by a large cast, it was frustrating to be in such a passive role; playing Dracula Unleashed is more like watching a movie than running an interactive game.

On the plus side, the live-action sequences look terrific. Viacom has managed 15 frames per second—*much* smoother than the flickery 4-fps movement so common in most multimedia. And I applaud one marvelous touch: The help functions are spoken, not written, in a charming middle-European accent by the ever-popular Dr. Van Helsing!

By Michael Goodwin

Digital Dog in Transylvania

The Vampire’s Coffin, by Sanctuary Woods, is also on CD ROM, but any similarity to Dracula Unleashed ends there. Vampire’s Coffin is an interactive comic book with a tone borrowed from *Saturday Night Live*. Victor Vector and his digital dog Yondo—who seems to be the brains of the outfit—move through a series of animated episodes that run in a small center-screen window. You can influence events by choosing different characters for the digital duo to chat with and places for them to explore. Actors provide live voice-over dialogue, but the script is pretty lame: “That castle looks way cool.” The game seems aimed at a younger audience, but if you’re feeling silly it could be good for a giggle.

Murky Underwater Videos

Some companies seem to be jumping on the multimedia bandwagon before their bags are packed, dumping any video footage they have onto a CD ROM. Ocean Life: Western Pacific isn’t quite that bad: The intentions behind this field guide to coral reef fishes of the Southwest Pacific are good, but the product itself disappoints. The CD covers only 16 species, and in each case you get one screen of printed information and a murky underwater video that runs in a window the size of a postage stamp. Even at this size, the videos stutter and hesitate on my 486SX-25.

Testing, Testing...

Yes, CD ROM technology is capable of presenting full-motion image and sound, but just barely and with many compromises. Sumeria’s QuickTime:

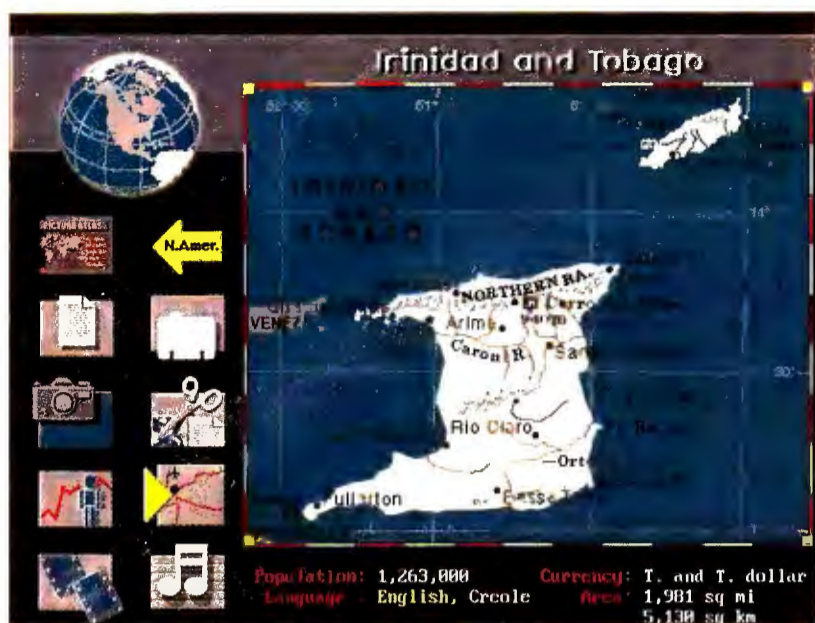


The CD 92/93 boasts “Winners of the 1992 and 1993 Film Festival,” but what it really offers is a collection of very short, uneven, experimental videos. Many of the films run in a tiny window; you can enlarge it, but then the images look lousy and the sound stutters. The videos are mostly 10 to 30 seconds long, with lots of puppet animation and animated slide shows to accommodate the slow frame rate. The best are on a par with second-rate MTV videos. If these are the winners, I hate to think what the losers were like. What’s more, it costs \$65! Aiee!

On the Brink of a Nuclear Confrontation

Time Warner’s Seven Days in August is a far more successful production. This exciting CD ROM is an interactive documentary about the week in 1961 when the Berlin Wall went up, bringing the world to the brink of nuclear confrontation. The material is presented in a day-by-day format: For each day, you view footage and reportage on Berlin, profiles of world leaders, progress of the Wall’s construction, and more. There’s even a

Click the wrong personage in Vampire's Coffin and you could end up in the clink—or suffer through some really dumb dialogue.



CLICK THE ICONS TO THE LEFT of National Geographic's map of Trinidad to hear a steel band or see a live-action Carnival film.

roundtable discussion that interprets the events from a 1994 perspective.

The 4-fps rate isn't a problem because the producers resourcefully use a slide-show graphics approach with professional voice-overs; the result is much like a TV magazine sequence. Time-Warner seems to be jumping into multimedia with both feet: It

multimedia stuff is fun, the maps are cruder than what you're used to in a printed atlas. And for the price of this CD, you can buy a pretty fancy ink-and-paper edition. Still, any atlas that shows a map of Trinidad accompanied by film of steel-pan master Boogie Sharpe playing "Pan Rising" gets my vote!

• **Indiana Jones and the Fate of Atlantis**

already has 19 titles, ranging from The New Family Bible to Clinton: Portrait of Victory.

Maps With Steel Band Accompaniment

National Geographic's CD ROM Picture Atlas of the World includes plenty of maps and the usual geopolitical stuff. But it also includes music, full-color snapshots, and film clips that bring countries alive. There's a trade-off, though: While the

\$69.95; LucasArts Entertainment Co.; 415/782-7927

Reader service no. 819

• **Dracula Unleashed** \$59.95; Viacom New Media; 800/877-4266, 708/520-4440

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• **Victor Vector & Yondo: The Vampire's Coffin** \$39.95; Sanctuary Woods Multimedia Corp.; 800/872-3518, 415/578-6340

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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 information). ■

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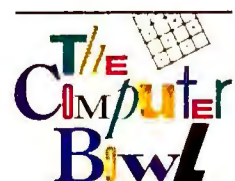
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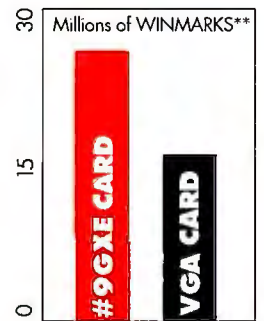
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- VS15 Color Monitor (15" CRT, 1024 x 768, .28mm, NI)
- 3.5" 1.44MB Diskette Drive
- MS-DOS 6.2/Microsoft Windows 3.1/Mouse

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Business Lease: \$81/Mo.

- 8MB RAM • 64MB Max RAM
- 450MB Hard Drive
- Upgradeable to Pentium Overdrive
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- VL #9GXE Video Accelerator Card with Video Control Panel Software
- VS15 Color Monitor (15" CRT, 1024 x 768, .28mm, NI)
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Business Lease: \$96/Mo.

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- MS-DOS 6.2/Microsoft Windows 3.1/Mouse

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- Accelerated Local Bus Video
- VS14 Color Monitor (14" CRT, 1024 x 768, .28mm, NI)
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- MS-DOS 6.2/Microsoft Windows 3.1/Mouse

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- 8MB RAM • 128MB Max RAM
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- 450MB Hard Drive
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- PCI Video Card
- 1MB Video RAM
- VS14 Color Monitor (14" CRT, 1024 x 768, .28mm, NI)
- 3.5" 1.44MB Diskette Drive
- MS-DOS 6.2/Microsoft Windows 3.1/Mouse

Order Code #5000673

DELL DIMENSION 466V i486 DX2 66MHz SYSTEM
\$1,999

Business Lease: \$74/Mo.

- 4MB RAM • 64MB Max RAM
- 450MB Hard Drive
- Upgradeable to Pentium Overdrive
- 5 Expansion Slots Total (3 ISA, 2 VL/ISA Available)
- Accelerated Local Bus Video
- VS14 Color Monitor (14" CRT, 1024 x 768, .28mm, NI)
- 3.5" 1.44MB Diskette Drive
- MS-DOS 6.2/Microsoft Windows 3.1/Mouse

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- 256KB External Cache
- 450MB Hard Drive
- Multi-session, Double-spin CD ROM Drive
- 7 Expansion Slots Total (3 ISA, 1 PCI, 1 PCI/ISA Available)
- PCI Video Card
- 1MB Video RAM
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- 3.5" 1.44MB Diskette Drive
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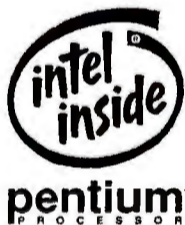
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