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<table>
<thead>
<tr>
<th>Model Name</th>
<th>Millennia C400</th>
<th>Millennia C400</th>
<th>NEW! Millennia C466</th>
</tr>
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<td>Direct Price with monitor</td>
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For additional product information and important sales terms, please see first page of the advertisement. 12-month free with purchase of new Micron desktop or notebook system. Free subscription does not include books or software. 1/2/3/95 is based on the unlimited EarthLink Sprint Internet service for one year. *CD-ROM speeds, 48K max. **72K max. ***32K max. ****17.5K max. 64K max. 128K max. ** You will receive a complimentary 1-hour upgrade to Microsoft Office 2000 when you purchase a Micron Millennia or TransPort T224C equipped with Microsoft Office 97. This offer must be redeemed by Aug. 30, 1999. Micron will send you a copy of Microsoft Office 2000 upon receipt of a warranty update. 1/2/3/95 is not a BizTalk compatible system. Please call for availability.

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  - Microsoft Project 98 (3 levels)
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- Netscape Communicator 4.0
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- Windows 95: level 2 levels
- Windows 98: level 3 levels
- Windows NT: level 4 levels
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Set up Windows to open a file type in multiple applications, make Web-page text more legible.

**Windows NT**
Dual-boot NTFS and FAT32 without a third-party boot manager, download Service Pack 5.

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**Got a Problem?**
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**Home Office**
Universal Serial Bus connections are fast and easy, after all, Steve Bass finds.

**Bugs and Fixes**
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<thead>
<tr>
<th>64 MB Desktop Upgrade Comparison:</th>
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<tr>
<td>Compaq Presario 4808</td>
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(All prices taken from the Web sites of Crucial and Kingston on 5/4/99)

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Technically, Superior.
Your Worst Nightmare, or What?

IN MID-MAY, AT&T announced a $58 billion deal designed to kickstart high-speed Internet access. With its impending acquisition of Media One, AT&T will become the nation’s largest cable company, with access to more than 60 percent of households. The communications giant will be able to deliver cable Internet access and digital TV to more than 25 million homes, and local phone service over cable to more than 56 million homes.

AT&T’s goals are aggressive: It says it will offer cable modem service to at least 80 percent of its customers by the end of next year. For bandwidth-starved PC users, what’s not to like?

For starters, take AT&T WorldNet’s recent track record. Complaints from PC World readers poured in earlier this spring after we rated WorldNet the number one Internet service provider. Not so, countered readers, who cited constant busy signals, dropped connections, and torpid transfer speeds that resulted from the ISP’s influx of customers, which occurred after we tested the service. If AT&T couldn’t handle a couple of million customers, how on earth will it deal with 25 million?

To the rescue...Microsoft! The software giant plans to make a $5 billion investment in AT&T. The communications company will use the funds to upgrade its newly acquired cable networks. In exchange for the cash, AT&T will use Microsoft’s Windows CE operating system on 7 1/2 to 10 million TV set-top boxes.

THE WORST OF BOTH WORLDS

THE TWO MEGACOMpanies intend to deliver digital services to homes in three cities next year. In two cities, AT&T will use Windows 2000 as its server operating system, along with parts of Microsoft’s WebTV service. According to Microsoft, its cable software system will download updates automatically, diagnose problems, and permit personalized services. In the third city, AT&T will pair Windows CE with server software from a third party.

Imagine the possibilities: The year 2000 comes and goes with no sign of cable access because Windows 2000 still isn’t shipping. On the other hand, if Win 2000 does ship, rebooting your TV suddenly becomes the least of your worries. Now the cable company has to reboot its Win 2000 servers a couple of times a day. Meanwhile, you upgrade Win CE with the latest service pack, though CE still doesn’t sync properly with 2000. Or you need to upgrade your set-top box to handle the new software, but the box you want comes with a Java operating system that refuses to work quite right with Microsoft’s software. Then hackers infiltrate the system and broadcast your bedroom activities over the Web, but you can’t make your way through voice-mail hell to reach Microsoft and AT&T customer support. And to top it off, you can’t decipher your exorbitant Internet-TV-phone bill, but you think you’re getting double-charged. You get the idea.

THERE’S NOTHING ON TV

COMPLICATING THE picture is the question of who controls the content that flows over the cable wires and through the Microsoft system software. As part of its Media One deal, AT&T gets partial control of Time Warner’s Road Runner cable Internet access provider and 25 percent of Time Warner Entertainment. AT&T and Time Warner could make it harder and more expensive for rivals’ programs to be distributed over their cable system. AT&T also controls the At Home cable ISP. With its stake in both Road Runner and At Home, AT&T could control the content and services delivered when Internet customers log on. It could, for example, feature Excite’s portal, which At Home recently bought, or it could award prime positions to Microsoft sites like Expedia and Car Point.

The most disturbing vision conjured up by the AT&T-Microsoft megamarriage is one in which Microsoft’s stranglehold over the desktop extends, with the help of a former communications monopolist, to digital cable boxes across the country. Granted, AT&T did not give Microsoft an exclusive contract to supply software for all its set-top boxes. But let’s hope Microsoft doesn’t extract exclusivity by bundling software and services in a deal that’s too sweet for AT&T to pass up. And let’s urge the FTC and FCC to keep consumer choice at the forefront as they consider the merits—and demerits—of the deal.

Cathryn Baskin is editor in chief of PC World.

Meet the Digital Duo

STARTING IN MAY, PC World columnist Stephen Manes began cohosting Digital Duo, a weekly series broadcast on public television stations. Along with U.S. News & World Report editor Susan Gregory Thomas, Manes helps consumers make sense of the latest, the greatest, and the flash-in-the-pan digital technologies. Who needs interactive TV?
**Toshiba’s Small Door a Big Help**

Opening on side makes servicing Equium easy

BY MICHAEL CATON, PC WEEK LABS

The side door on the Toshiba Equium 7000S allows easy inside access. The Equium 7000S is one of those small features that works so well that it’s a wonder no vendor thought to include one like it before.

The side door on Toshiba America Information Systems Inc.’s $1,714 Equium computer is designed to make plans for the 7000 series call for continuing enhancements to the mini-desktop computer.

**Toshiba Equium 7100D**

The Equium 7100D is an excellent system designed from the ground up for mainstream enterprise desktop deployment. It’s a snap to maintain and it has a software bundle that’s nearly ideal. But the icing here is its price tag.

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### Manageability, Flexibility, Serviceability & Environmental Adaptability

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**EQUIUM 7100S**

- Intel LANDesk Client Manager, Expert Intelligence
- Help, Toshiba Configuration Builder, SMS Connect

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**Fewer Inventory Parts Saves $$$**

**Manageability**

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YOU'RE BEING TRACKED—SO WHAT?

IT'S IRRITATING that while we are in a furor over privacy and embedded serial numbers ([Top of the News, April]), it was these very tracking capabilities that apparently helped lead to the arrest of the alleged creator of the Melissa virus. Do we really need to lose sleep over Intel knowing where its chips end up or what sites those PCs visit? Does it matter if Microsoft keeps a record of the registration numbers and names of legitimate buyers? I don't care who knows where I've been, and I don't think most other users do, either. True, the information does allow a certain degree of "big brotherism" and creates a potential for abuse. But let's hear about the actual abuses. Let's hear what really was done with all those serial numbers and Web site addresses some nefarious chip or software maker collected. Then let's see if it all amounts to a hill of beans. My prediction is that it won't.

T. L. Rousseau
Army Post Office AE 09716

AWOL DEVELOPERS?

IN THE GOOD old days, software bundled with a new system was a welcome bonus, considering how complex program installations used to be, especially under DOS. One could contact the software developer for support and receive expert help. Now, practically every new PC comes with OEM (aka licensed) versions of software installed at the factory, including Windows and application suites, and with limited documentation. OEM versions of software usually require the end user to contact the system vendor, not the software maker, for support. But PC vendors often seem to lack the expertise needed to address software-related system failures; and for their part, developers don't cooperate when contacted. My questions are:

1) Why do software developers refuse to offer support directly?

CATHRYN BASKIN

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1) Why do software developers refuse to offer support directly?

CATHRYN BASKIN'S May editorial ["Do You Have a Right to Privacy?" Up Front] reminded me of a statement I heard at a seminar that among all Western countries, the United States had the weakest laws on the safekeeping and exchange of data. I am horrified at current trends. When IE 5 crashes inexplicably after extended use, Microsoft's registration wizard claims it is "for security reasons" that the company must capture cookies and encrypt information on my hardware and my identity. Hotmail says it needs my digital address in a cookie so it can "know more about me." Our grocery store practically demands we use a smart card so it can track our purchases and give us great deals on diapers. What about a random purchase of Stoli or condoms? Who will buy and analyze that data?

Companies are developing data marts that will capture and provide to law enforcement (and marketing groups) information on any individual with an address: who lives with them, the names of their neighbors, what cars they own, how much equity they have in their house, you name it. All ostensibly public data, but now aggressively sought and sold.

I refuse to play. And I won't buy products (I don't care who else uses them) that undermine my fundamental right to privacy.

Terri Walker, via the Internet

SHOULD INTERNET users expect to have privacy? The answer is a resounding NO! The user of a public resource does not have a right to anonymity.

Gerrit A. Holdrum, via the Internet

I'M SURE I'M NOT the first or only person to point out the irony (hypocrisy?) of the sidebar "Your Chance to Win $25,000" in the May Up Front. Wouldn't you know it? I have to submit my name, address, and phone number to complete your survey!

Paul MacDonald
Newport News, Virginia

EVEN MORE AMUSING than the information required by the survey is [PC World Online's] Privacy Policy. To access it, I had to wade through three cookies. The policy assures readers that the cookies PC World Online places on our computers are "for tracking purposes." In addition, the statement says "PC World Online is not responsible for the actions or policies" of third parties.

Do we have a right to privacy? If the activity hidden behind (Baskin's) editorial is any indicator, PC World has answered that question in the resounding negative.

Dave Cook, Mt. Shasta, California

YOUR OWN SURVEY illustrates that ultimately, the issue of privacy on the Internet will be moot: Privacy isn't as profitable as a large, traceable, and quite exposed user base. Economics will decide how much privacy we get on the Net.

Keith Howe, Moscow, Idaho

Editor's response: My apologies to all who objected to our survey. We requested contact information so editors can reach respondents if needed and to meet the legal requirements of the sweepstakes. The survey is strictly for editorial research—we do not sell personal information to third parties. If you don't want to participate, we understand. We hope, though, that you'll choose to respond—we need your input, even the negative! We'll also look for less invasive ways of surveying readers.

~Cathryn Baskin
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COMING UP IN AUGUST

HARDWARE TROUBLES SOLVED
Our hardware troubleshooting guide delivers advice and fixes for real-world questions. We dug up solutions to the problems we found—including glitches with new technologies like USB and FireWire. Also: Quick Tip advice and a Prevention Checklist.

EXPERTS PICK TOP UTILITIES
Is free software enough, or should you pay for a separate program or suite? Take our quiz to find the right type of utility for the chores you do. Then check our ratings of the top stand-alones and suites to pinpoint your choice.

HOW TO WIN AT WEB AUCTIONS
Looking for a steal on a digital camera or a high-end Pentium? How about Mark McGwire's rookie card? Our primer teaches you to bid like a native and avoid the bunco. Our roundup of 5-inch LCDs evaluates with new technologies like USB and FireWire. Also: Quick Tip advice and a Prevention Checklist.

THE TRUTH ABOUT LCDs
They don't cost ten grand anymore, but LCD monitors are still more than twice as expensive as comparable CRTs. Do the sexy flat panels warrant the price? Our round-up of 13-inch LCDs evaluates 19 models, from $949 to $1599.

ALSO NEXT MONTH
► The PC World Top 10: The best Power and Budget Desktops, Notebooks, Home PCs, Printers, Monitors, Graphics Boards, and Modems.
► Here's How: Internet Tips on getting your e-mail box ready for vacation, Windows Tips on banishing desktop clutter, Upgrade Guide on installing removable-media drives.

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On the Web
You Have No Secrets

Everything you buy, say, or do online can be tracked.
Do we need a law ensuring Internet privacy?

I'M CONSTANTLY TRYING to salvage a few minutes here and there from my jam-packed day. I'm a sucker for time-saving techniques and convenience foods. I'll willingly (though not gladly) pay a little more for an item if it will save me a half-hour of driving. The less time I spend working or running errands, the more time I have to sleep, spend with my family, or do absolutely nothing.

Folks like me are a dream come true for Web businesses. On the Web, I can order my latest book-group selection, stay on top of the day's high-tech news, and research my next column in half the time it would take me to do these things offline.

Lately, though, I've been balking at the asking price. You see, the cost for all this convenience is my privacy—my right to buy what I want, when I want, or visit whichever Web sites I want without someone collecting data about me or tracking my mouse clicks. And as much as I value my time, I value my privacy even more.

I'm not alone, either. Anyone who's spent time online has experienced some assault on his or her privacy: junk mail solicitations following a Web site visit, cookies dumped into the hard drive, or demands for detailed personal information in return for browsing a site.

In several recent surveys, consumers have said privacy concerns keep them from embracing the Web. And 71 percent of respondents to the 10th Annual Georgia Tech World Wide Web User Survey (www.gvu.gatech.edu/user_surveys) cast their votes in favor of new laws governing privacy in the Internet age.

Even the folks who gather our personal info are getting the message. In a survey of top executives of high-tech firms conducted by the Information Technology Association of America and Ernst & Young (www.itaa.org/software/research/indpulse/barriers.htm), 60 percent of respondents said they thought lack of privacy protections was the number one factor inhibiting the growth of e-commerce.

WHAT A DIFFERENCE A YEAR MAKES

Fortunately, Web sites are beginning to address these concerns. In its survey of 1400 Web sites in June 1998, the Federal Trade Commission discovered that only 14 percent of all Web businesses informed visitors of their data gathering practices. A follow-up study of 364 commercial sites conducted in March 1999 by a Georgetown University professor found that nearly 66 percent of the sites had posted privacy policies. However, less than 10 percent of these policies could be considered comprehensive.

The increase in posted policies is due largely to the attention e-commerce leaders have given the issue over the past 12 months. Besides Truste (www.truste.org), an initiative formed in 1996 to develop a privacy seal for Web sites, we counted two business-sponsored efforts in 1998: The Online Privacy Alliance, a group of more than 80 businesses, launched last July to promote self-regulation as a solution to privacy concerns. More recently, the Better Business Bureau Online (www.bbbonline.org) went live with its own privacy program.
IBM has been a founding member of all three groups. In April of this year, Big Blue announced it would pull ads from any Web site that did not post a privacy policy. The move, says Harriet Pearson, director of public affairs for IBM, was the "natural next step" in IBM's ongoing efforts to encourage Web businesses to adopt and declare such policies.

As the second-biggest advertiser on the Internet, IBM has done more to promote consumer privacy than most PC vendors. Early indications are that many of the nearly 400 U.S.-based Web sites IBM advertised on in 1998 would post a policy before the company's June 1 deadline. But critics argue that IBM's bold threat to pull advertising isn't really so bold—or so great for consumers.

"It's a nice gesture, but I don't think it's going to change things very much," says privacy advocate Jason Catlett, president of junkbusters, a Greenbrook, New Jersey, developer of Web surfing privacy tools. "IBM isn't requiring specific minimum standards for privacy policies," says Catlett. "Companies could comply with its requirement by putting up a page saying, 'You have zero privacy anyway. Get over it.'"

EDUCATION OR LEGISLATION?

Catlett's comments illustrate how businesses on the one hand and legislators and privacy groups on the other differ on the need for regulation. IBM advocates self-regulation, while many others favor government intervention. Even a bald statement of no privacy, though clearly inadequate, would at least let you know what you were dealing with.

Congressman Bruce Vento (D-Minn.) lauds IBM's efforts but says industry efforts alone won't provide enough protection. Vento and Congressman Ed Markey (D-Mass.) plan to introduce bills requiring Web sites to divulge their privacy policies and to obtain users' permission before sharing their personal data with other businesses. In the Senate, Conrad Burns (R-Mont.) has introduced a bill that might become the Online Privacy Protection Act of 1999. The law would force sites to post policies, offer consumers a chance to opt out, and give users access to data about them that is shared with other entities.

"I'm glad [the industry] recognizes that this is a serious problem," says Vento. "But even if you get 90 percent of Web sites to post a policy, what happens with the other 10 percent? If one-tenth of the sites do nothing, then for all practical purposes, the king has no clothes." The burden would still fall on users to check each site.

Russell Bodoff, chief operating officer of BBBOnline, disagrees. "We need education, not legislation," argues Bodoff. "BBBOnline has tried to educate businesses about the value of good privacy policies. Besides, asks Bodoff, who would enforce an Internet-specific privacy law? "We have laws governing fraud and credit card theft already, but the FTC and others haven't filed many [Internet] cases. They're overworked and understaffed as it is."

WORDS AREN'T ENOUGH

While industry players and privacy groups argue over the need for legislation, representatives from both sides agree on one point: A few words under the heading "Privacy Policy" are not enough.

To get a clearer sense of how Web sites are implementing privacy policies, I studied a cross-section of sites. Though most of the three dozen sites I visited posted some type of privacy policy, these statements rarely told me everything I wanted to know. Often omitted were how the site used cookies, how I could update and verify data collected about me, and how the security and confidentiality of personal information were protected. In every case, it was up to consumers to say they didn't want to receive future mailings from the site or have personal data shared with others (the so-called "opt-out" provision).

It would have taken me hours (if not days) to correspond with every site and get clarification on their policies.
Empower yourself with an Intel Pentium III processor based PC system from UMAX! Blazing new Intel Pentium III processor with 512k integrated cache & 100MHz bus give you the power you need to maneuver today's system-demanding multimedia and business applications with ease.

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Moreover—as an FTC case last summer against the GeoCities site illustrates—there's no guarantee that Web sites are following their posted privacy policies. In the first case to involve Internet privacy, the FTC charged GeoCities with misrepresenting how it used personal information about visitors to the popular Web site. Specifically, the FTC accused GeoCities of disclosing information to third parties, despite an explicit policy to the contrary.

TECHNOLOGY TO THE RESCUE?

Given all of the attention focused on privacy these days, it should come as no surprise that developers are busily releasing software to fill the privacy vacuum.

Microsoft and Novell have announced software tools to enable your PC to digest those privacy policies automatically as you browse. Web sites could use the tools to post policies that a browser or a search engine could analyze, making it easier for consumers to match their priorities with the policies of specific sites. At the same time, companies are developing privacy tools for consumers: Privaseek and Lumenia have designed software that gives consumers control over what information is shared with sites. Other companies offer software to filter spam, collect cookies, and let you surf the Web anonymously.

Such tools represent good, constructive efforts to protect your privacy on the Web. But they aren't enough. Consumers should not have to install software and configure browsers to prevent Web sites from collecting personal information about them.

The FTC is understaffed, but we can't simply forgo privacy laws. We need to re-think law enforcement strategies at all levels to respond to the rise of e-commerce—and the inevitable abuses that follow.

We need to establish baseline privacy protections that all Web sites—not just those that feel like it—must adhere to.

We need a law that puts privacy on an equal footing with commerce.

Introducing the new 8X CD-ReWriter. Best in class record speed. Best of Plextor.

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If you haven’t looked at us lately, now’s the time. We’ve created a dynamic array of state-of-the-art monitors with built-in features the others don’t offer. And our technical support is unmatched. There’s never been a better time to take a good hard look at MAG InnoVision monitors.

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Fast and Loose: Online Merchants

LATELY, I’VE BEEN FEELING like the complaint office for the world’s biggest department store: the Internet. One gripe I get a lot comes from people who’ve placed an order online—often with a well-known merchant—had their credit card charged, and discovered later that the product wasn’t available. Shoppers think that they should be told right away if a product can’t be sent.

There are laws about how merchants must handle situations in which they are unable to fill an order. The Mail or Telephone Merchandise Order Rule (see www.ftc.gov) says merchants must have a reasonable basis for implying—in ads, on the Web, or on the telephone—that an order can be shipped within a reasonable amount of time (30 days at most). The rule does not stipulate when a credit card should be charged, but some state laws do. Before you order, check the merchant’s site for its policy on payments and charges.

The federal rule does require that merchants tell you before the product’s due date if it can’t ship your order when promised—and to then let you agree on a new date or cancel your order. But judging from my mail, online retailers do not always adhere to this rule.

“Should online merchants clean up their act? Absolutely,” says Edgar Dworsky, the founder of Consumer World (www.consumerworld.org), a public service site that gathers tips, advice, and other help. “I anticipate that as the Net becomes a bigger marketplace it will become a bigger target for law enforcement.”

Dworsky thinks that more stringent rules may emerge. After all, 30 days is a long time in the right-now world of the Web, and it’s all too easy for an automated Web site to charge your card without first checking to see if you’re likely to get the item you’re paying for.

What can you do if you get stiffed? Contact the FTC and your state attorney general’s office. If they see a pattern of misconduct, they’ll investigate.

**LETTER OF THE MONTH**

I ORDERED A sound card from Computer Parts USA (www.computerpartsusa.com). I received a prompt confirmation via e-mail, and my Visa card was charged. Time went by. I sent e-mails. Nothing. Then I noticed that the company had no phone number listed on its site. When I called the Better Business Bureau, a representative told me the BBB had received other complaints about the company. Is my money gone?—Scott Logan, Stratford, Connecticut

PC World responds: I e-mailed Computer Parts USA on behalf of Logan. Jeff Wilson, an e-mail support rep, told me he was surprised to learn Logan had not received a refund, and assured me that the company would issue one right away. (Logan has since gotten his refund.)

As for the complaints to the BBB, Wilson says, “We have thousands of satisfied customers who never report good things to the BBB. Whenever we have an issue that arises, we do our best to make the customer happy.”

**Heads Up...**

YOU’VE DISCOVERED by now that Hayes has gone belly-up. But if you need repairs on a Hayes modem, try www.modemexpress.com. Modem Express bought Hayes’ domain name and repair gear and is offering fixes for a fee... Readers who responded to a Microworkz ad for $499 systems in PC World let me know they were unhappy with long shipping delays. “We are ramping up production as fast as possible,” says Mark Palmer, chief purchasing officer. “There is no issue here, but sometimes we, like everybody, get in back-order situations.” Of course, irate customers think excessive delays are an issue. Palmer suggests that those still waiting for PCs call BBB/306-2044 for help... I’m told changes are afoot at Egghead (www.egghead.com). The company has consolidated operations and hired more phone representatives. As a result, says Norm Hullinger, vice president of sales and operations, calls to customer service now get picked up within 5 seconds, and e-mails get answered in 3 to 10 hours. “The past wasn’t perfect,” says Hullinger, admitting that customers encountered poor service, “and the present can still be improved upon. But there’s now nothing higher on the management priority list than providing a positive customer service experience.”

GOTTEN A RAW DEAL? Or a great one? E-mail the details to onyourside@pcworld.com. We’ll investigate complaints and publish items of the broadest interest. Christina Wood is a contributing editor for PC World.
The digital economy holds virtually unlimited possibilities for your business. Want to capitalize on everything your company knows, every minute of the day? Want to integrate your supply chain? Want to be closer to your best employees? Your best vendors? Your best customers?

It’s all possible. But to do it, you’ll need an environment in which all the people who are part of your organization are working within a system that allows a rich, rapid, and accurate flow of business information. An environment where your team acts together as quickly as a single person could act, but yet they possess the insights of the entire team. And when your business reaches this level, where your employees, partners, and customers are all connected, you’ve got a digital nervous system.

So how far is your company from this ideal? Well, if you’re like thousands of other businesses already using familiar Microsoft tools to help run your company (for example, millions of people use Microsoft Windows in business every day), the possibilities of the digital economy are closer than you think. Only as far away as your PC, in fact.

Here’s an example: Take the widely popular product Microsoft Office. With just a few clicks, you can post documents to the company intranet so that members of your team can review and comment on the document anytime, anywhere. Add to that another

Microsoft offers the best integrated solution from desktop to data center:

- **Windows**: The operating system used by millions around the world on PCs, handheld devices, and servers to bring PCs and the Internet together.
- **Office**: The world’s most popular business productivity software, enabling people to develop ideas and share knowledge in powerful new ways.
- **BackOffice**: The flexible server platform for building mission-critical e-commerce, knowledge management, and line-of-business solutions.
best-selling product, Microsoft BackOffice, and you're a click away from accessing and manipulating all the data in your company, no matter where it resides.

All of which gives you a computing environment that provides unprecedented decision support and quicker response time, and turns workers into knowledge workers.

We'd like to show you how Microsoft Office, the BackOffice family, and the Windows platform can combine with our many hardware, software, and service partners to more quickly and easily evolve your company into an organization poised for success in the new digital economy. An organization that, from desktop to data center, has undergone a quantum shift in business efficiency and productivity, without having to rip and replace your entire information infrastructure. In short, a company with a powerful digital nervous system.

Best of all, you can start your company's evolution to a digital nervous system right now with the help of our many industry partners. Once you get started, you'll be joining many premier companies who are already building or using a digital nervous system, including Barnes & Noble, Eddie Bauer, MasterCard, Dell, Office Depot, British Petroleum, and Nabisco. For complete details and helpful case studies, visit www.microsoft.com/dns

Where do you want to go today?
If you’ve seen any of these children, please call the NCMEC hotline at 1-800-THE-LOST.

Every day, more than 2,200 children disappear. A staggering statistic. But there is good cause for hope. Working closely with law enforcement agencies across the country, the National Center for Missing and Exploited Children (NCMEC) has achieved substantial success in finding children. Canon is proud to join the effort by donating state-of-the-art equipment to help disseminate photos and information about missing children faster. We urge you to look at these children and see if you recognize any of them. Then take current photos of your own children just in case of an emergency. Because photos are the best way to help find missing children. For more information about this program, visit our Web site at www.picturethemhome.com.
Back to School, Web Style

**Problem** You want to take a course or get a degree but can’t find time in your schedule.

**Solution** Take classes over the Internet.

CAROL HOPKINS DREAMED OF earning her MBA, so like many people the Ledyard, Connecticut, salesperson struggled to squeeze night classes into an already packed schedule. In 1982, she had to drop out of graduate school. Three years ago she decided to try again. But by then, new obstacles intervened: She had a young child and lived an hour away from the nearest college. “I had more time to study, but I had to be home for my daughter,” she recalls.

Unable to attend classes the traditional way, Hopkins enrolled in an online-studies program offered by the University of Phoenix. Last November, after two and a half years of study over the Internet, she received her MBA degree and joined Prudential Securities as a financial advisor in training. “Getting a degree online was a wonderful experience,” she says. “It was a rigorous, high-quality program, with very, very sharp instructors.”

Even if you study online from the comfort of your home, attaining a degree requires major commitments of time, intellectual energy, and money. Still, whether you want to take a class for your career or for fun, the new world of online learning is worth checking out.

**Education Boom**

THOUSANDS OF ONLINE courses are available to anyone with a PC and Internet access, including classes from such respected institutions as the University of Wisconsin, Stanford University, Penn State, and the University of California at Berkeley. According to International Data Corporation, the number of people taking at least one college course over the Internet will triple by the year 2002 to about 2.2 million. That figure doesn’t include students enrolled in online courses offered by computer training companies like Scholars.com, which offers Microsoft and Novell certification courses. Nor does it count people taking online hobbyist classes.

To see what’s available, consult a clearinghouse such as TeleCampus (telecampus.edu). This Web site lists over 12,000 classes offered by 700 colleges and other teaching organizations located throughout the world. Also worth a visit is Yahoo’s online learning section (www.yahoo.com/education/distance_learning), which provides more than 400 links.

With most online courses, students go to the school’s Web site to pick up lessons, assignments, and tests; and they communicate with teachers via e-mail. Group discussions rely on chat rooms and message boards. Some courses even let online learners view streaming video of classroom lectures. Schedules are often accelerated. For example, the New School in New York offers 9-week online courses that would take 15 weeks to complete if taken on campus.

You may not care about frat parties or hanging out at the Student Union anymore, but will you miss the face-to-face interaction with classmates if you attend an online school? You might, but proponents say the benefits outweigh the drawbacks. Because students communicate primarily through e-mail, they can participate at any time and from any place that gives them access to a computer.
Terri Hedegaard-Bishop, vice president of the University of Phoenix's distance learning program, adds that with online studies, "people aren't responding to physical features, gender, charisma, or whatever—they're responding to ideas, and that can be very freeing."

**NOT FOR SLACKERS**

Still, online learning is not for everyone. Though you might expect online classes to be cheaper to conduct than traditional ones, they can cost more, because teachers must put in longer hours. For example, University of Phoenix online graduate courses, most of which cost $1410 each, are 3 to 15 percent more expensive than their campus counterparts.

And Internet courses can be just as demanding as traditional classes, if not more so. That means online students, working in relative isolation, must be especially motivated to hit the books. "Don't think that just because you can study on your laptop that you can travel and earn a degree in your spare time," warns Hopkins. "To finish my 18 back-to-back six-week courses, I had to study several hours a day, including weekends."

Rigorous online classes offered by high-profile schools promise to bring new respectability to correspondence learning. "In general," says Hedegaard-Bishop, "today's employers are accepting of online study, both because they know the constraints employees face when attempting to go back to school and because companies are usually quick to embrace technology for their own training needs."

But that doesn't mean diploma mills aren't as commonplace on the Web as they are in the analog world. These shady organizations, often graced with names that deceptively mimic those of real universities, may require little academic work or volunteer to sell you a degree outright. Warning signs include absence of a physical address or phone number on the Web site. Don't sign up for a college-level program unless it's approved by a regional accreditation agency. However, if you're taking a course not intended for completing a degree—say, a class on data warehousing from Scholars.com, or one on insects from The School of Flyfishing (www.schoolofflyfishing.com)—a nonaccredited Web school could serve you fine.

Although Carol Hopkins says she was "tethered to the computer" during her online studies, it wasn't all work. "One of my classmates invited several of us for a weekend on Nantucket so we could finally meet and celebrate the completion of our degrees." Which proves that even when you opt for a virtual campus, the friendships you form can be very real.

Carla Thornton is a contributing editor for PC World. If you're having trouble resolving a PC-related hardware or software problem, we'd like to hear from you. See page 12 for contact information.
When you buy a Dell OptiPlex Desktop, you're buying power and quality. So why settle for anything less when it comes to your monitor? Your decision to buy Dell will be brighter and better when you include a ViewSonic monitor. By specifying ViewSonic, you'll ensure that your Visual Computing experience is excellent.

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USB’s Fast and Easy—
No Bones About It

“I CAN’T DO IT,” I said to my editor. “See, an earthquake just hit Pasadena and an 18-wheeler plowed into my office, smashing my computer!” He was badgering me into playing with some Universal Serial Bus devices, something editors do when they’re afraid to try newfangled gadgets themselves. Hose your own computer, I thought, mine works just fine. But I relented, motivated by a mild curiosity about USB (not to mention a monthly paycheck).

Here’s the end of the story: USB is an utterly amazing way to connect peripherals to a PC. It works so well, in fact, that if I have the choice, I’ll never buy another product that uses a parallel or serial port.

USB UNLEASHED

The USB is a tiny port, about a half-inch wide, found on newer PCs. It’s small enough that you may never have noticed it. I have two USB ports on my PC, both in the back; my wife’s Gateway Destination has one in the front, a much better spot for making quick connections. It’s no contest: Compared to USB, parallel and serial ports look absolutely decrepit.

See, while the computer is running, I can plug a USB device into the port, and the machine recognizes it instantly. I think my PC looks forward to USB devices, like a Labrador with a tennis ball—oh boy, oh boy, a new toy.

I think my PC looks forward to USB devices, like a Labrador with a tennis ball—oh boy, oh boy, a new toy.

For example, I plugged in a Kodak DC265 digital camera and snapped a few pictures of my dog. Then I detached the camera from the USB port and connected an HP DeskJet 850C to my system so I could print the pictures. Folks, this is Plug and Play at its finest.

Next, I borrowed a dozen USB products and connected them all. (No bytes were harmed in this experiment.) I used Entrega’s 7-Port USB Hub to attach the HP DeskJet, a Visioneer scanner, a Logitech MouseMan, a Microsoft SideWinder joystick, an Iomega Zip drive, and a 3Com 56K modem. Everything worked! The clincher: No matter how many devices I used, USB needed just one interrupt.

Wait, it gets better. Some USB peripherals let me attach other USB devices to them. Mitsubishi’s 19-inch Diamond Pro 900U monitor has a built-in USB hub. Once I connect it to my PC’s USB port, I can connect three USB devices to the display.

RATHER SWITCH THAN FIGHT?

If your PC is more than 18 months old, you probably don’t have a USB port. And even if you do, your PC’s BIOS may not have the smarts to handle it. That’s because many manufacturers sold USB motherboards before USB specs were finalized—which is why so many people think USB is a scam.

But I think the USB technology is terrific, and I don’t want you to miss out on it. So if you have an older PC, I have some solutions. First, grab a copy of USBReady, a free program that will check your system and tell you what you have to get in order to use USB. This great tool is available on PC World Online’s FileWorld.

Then visit www.usb.org for details about USB and for useful links to available peripherals. For more technical information—like which version of Windows 9x you’ll need—read “Get on the Bus” in May’s Hardware Tips (www.pcworld.com/may99/hardware).

More good news: You can upgrade your older system to USB. Belkin sells an add-in card for about $40. If your PC’s BIOS is old and crotchety, you may need to upgrade it first. Check your BIOS manufacturer’s Web site for the skinny.

If you decide the USB upgrade isn’t worth the hassle—but you’re running out of ports—use a cheap data switching box. Belkin sells one that lets you switch between four serial devices with the flick of a dial. I’ve used one for years.

Uh-oh, I have to go. My editor’s calling. He has a Microsoft USB vacuum cleaner he wants me to play with.
EVEN THE MOST ADVANCED

DIGITAL COPIER CAN’T COPY THIS.

Inside every Toshiba copier and facsimile you’ll find Toshiba quality, reliability, and ingenuity—advantages no other company can duplicate.

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Iron out IE 5 wrinkles • VirusScan glitch control • IE 4.0 gets better

MICROSOFT'S LATEST BROWSER has been out for a few months now—long enough for the irritating interface glitches, security flaws, bugs, and incompatibilities with other applications to manifest themselves fully. The good news: IE 5 is more stable than IE 4.0 was at the same stage in its development. The bad news (sorry, Microsoft): IE 5 is buggy. Fortunately, you can fix or work around most of the problems.

An IE 5.0 service pack is undoubtedly in the works, though at the time of this writing, Microsoft had not announced one officially. Meantime, Microsoft has released a confusing dribble of minor updates. Office 2000 shipped with IE 5.0a, a minor upgrade that includes Office 2000 compatibility tweaks, but no bug fixes, according to Microsoft. Concurrently, the company updated the downloadable version, from the original IE 5.0 (shown as version 5.00.2014.0216 in Help·About Internet Explorer) to the new IE 5.0a (shown as 5.00.2314.1003). As news of the update leaked out, users anxious for a fix downloaded the update from Microsoft's Web site, but all for naught: Version 5.0a doesn't fix a thing.

Besides releasing its Office 2000-related versions, Microsoft has posted two corrective IE 5 patches to close the security holes mentioned in last month's column (www.pcworld.com/jun99/bugfix). The 1.1MB IE 5 MSHTML patch fixes three security flaws, and the 170KB DHTML "Edit Control" update fixes one. Find both of these patches—and more details—at www.microsoft.com/windows/ie/security/default.asp. Versions of each fix are also available for Internet Explorer 4.0, including version 4.01 with Service Pack 2 (see "In Brief").

Unlike the rather obscure security holes these patches try to plug, some other IE 5.0 bugs may interfere with your productivity, or at least drive you crazy. Here are three of the most commonly encountered bugs, and what you can do about them:

**Bugged While browsing in IE 5 and clicking links to visit new Web sites, you decide you want to return to a previous page—but the Back button is grayed out. Microsoft promises to include a fix for this snag in a yet-to-be-announced update.**

**Found a hardware or software bug? Tell us about it via e-mail at bugs@pcworld.com.**

**In Brief**

**VirusScan 4.0.2 SP2**
Taking a page from Microsoft, Network Associates now posts VirusScan service packs. Its 87KB Service Pack 2 corrects several bugs discovered since VirusScan version 4.0.2 appeared (see March's Bugs and Fixes, www.pcworld.com/mar99/bugfix) and incorporates fixes that appeared in SP1. Get the pack and a description of its contents at ftp.nai.com/pub/antivirus/service_paks/win9x.

**Internet Explorer 4.0 SP2**
Unwilling to take a chance on IE 5? These days IE 4.0 looks pretty stable. The most recent fix, which focuses on solving interface glitches, also includes all previously issued security patches. To upgrade, choose Help·Product updates. Find SP2 details at www.microsoft.com/windows/ie/ie40/ie40sp2.asp.

**Work-Around**
For the present, Microsoft suggests, you can get back to the page where you want to be by selecting the appropriate URL from the Address window's drop-down list. Or you can try closing and relaunching IE 5. Unfortunately, however, the drop-down list in question can take a long time to display.

Some users have reported that the Back button problem may go away if you perform the following steps: Choose Tools·Internet Options, select the General tab, click the Settings button that's located in the Temporary Internet files area, and set 'Check for newer versions of stored pages' to Every time you start Internet Explorer.

**Bug**
The Outlook Express 5.0 mail and news reader lacks a spelling checker, but it can use one that comes with another Microsoft product (like Office). When you spell-check an e-mail note you've written, though, OE may display one of those helpful error messages saying that the program encountered 'an error'.

**Fix**
Open the Registry Editor (Start·Run·Regedit). Press <F3> to start a search, enter SharedFilesDir in the 'Find what' field, check the Values option under 'Look at', and then click Find Next. When Regedit finally locates the value, double-click it and make sure that the string ends with a backslash. On most systems, the correct string will be C:\Program Files\Common Files\Microsoft Shared. Click OK, and exit the Registry.

**Bug**
Web pages appear blank or only partially rendered, even though IE 5 displays the 'Done' message in the status bar.

**Fix**
Download a 332KB patch from support.microsoft.com/download/support/msfiles/3725.exe. For more information go to support.microsoft.com/support/kb/articles/q226/5/50.asp.

You can find files mentioned in this article at PC World Online (www.fileworld.com/magazine). Scott Spanbauer is a contributing editor for PC World.
Y2K?

When you can have a lot more for less!

(Of course all Microworkz Computers are Y2K compliant.)
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*All prices listed are w/o Monitors.*
YOU HAVE probably seen the big blue door. That's Intel's marketing gimmick, designed to convince PC buyers that its new Pentium III chip powers the most irresistible systems ever built. The door is about to open again. Intel has pushed the PIII to 550 MHz, up from the initial 450- and 500-MHz clock speeds. But don't venture in just yet. The extra speed won't buy much more performance, and it'll cost you hundreds of dollars extra.

Moreover, Intel exaggerates when it claims that the new instructions that distinguish the Pentium III from earlier chips will propel you to a dramatically improved world of browsing. To date, about 16 Web browser plug-ins and a scant 30 sites have been enhanced for the PIII. Some of these sites do sparkle on a lot like their next-door neighbors, the PIII-500 family. And that should come as no surprise. PIII-450 and PIII-500 PCs already run blazingly fast, and few apps today cry out for more speed. But PIII-550s will cost $200 to $300 more than a similarly equipped PIII-500 PC and up to $400 more than a comparable PIII-450.

Of course, there's more to a PC than its processor, and all three PIII-550 machines deliver some compelling new features. For example, the Compaq has a 250MB Zip drive, and the Compaq and Dell systems both use an impressive 32MB graphics card based on the high-performance NVidia RIVA TNT2 chip.

OVERKILL?
DO YOU NEED a PC that runs faster than 500 MHz? Some people do. Database designers and multimedia content creators, for instance, push their PCs to the limit. But those of us who use ordinary productivity applications can hardly be blamed for getting a little blasé about speed. Even relatively inexpensive desktops are fine for routine office work.

A close look at the numbers confirms that the three PIII-550 machines we tested, each equipped with a hefty 128MB of RAM, ripped through our business application tests.

COMPAG'S Prosignia 330 (top), HP's Vectra VI18 (middle), and Dell's Dimension XPS T550.

Intel's knocking at your door with faster PIIIs. You may not want to answer.

By Laurianne McLaughlin
Tough Times for Cheap Chip Makers

CYRIX, WHOSE CHIPS power many of today's sub-$500 PCs, has been put up for sale by parent company National Semiconductor. For now, Cyrix continues to ship its M II processors; you'll see the CPUs in systems from Compaq, Emachines, Microworkz, and Packard Bell. Meanwhile, the only other companies competing in the sub-$500 PC market—IDT and Rise Technology—are making little progress. IDT, maker of the WinChip line of processors, is seeking new financial backing. Rise, which makes the MP6 chip, has yet to announce agreements with U.S. computer vendors.

New High in Hard Drives

A NEW TECHNOLOGY developed by IBM could allow desktop hard drives to hold 100GB of data, and notebook drives to store 36GB, says Jim Porter, president of the market research company Disk/Trend. According to Porter, the drives, which are expected to be available in 2001, will probably cost about what high-end drives do today. The highest-capacity desktop drives currently available hold 25GB and cost about $425 in an upgrade kit, Porter says. The largest notebook drives today store 12GB and sell for about $500 when purchased with the system.

GET UP-TO-THE-MINUTE NEWS about PC products and Internet happenings from PC World Online's News area. Just point your browser to www.pcworld.com/pctoday.
The Compaq Prosignia earned a PC WorldBench 98 score of 246, the best performance for a Windows 98 machine to date. The HP Vectra scored 244, and the Dell Dimension posted 241—a virtual tie. But these machines run business applications only about 5 to 7 percent faster (10 percent is noticeable) than the average PIII-500 with 128MB of RAM.

**PIII APPS CHECK IN**

**POWER IS IMPORTANT, but if you're considering a PIII PC, you should also ask some questions about PIII-enhanced software: How much is available, and what's in it for you?**

The PIII's 70 Streaming SIMD extensions (like the 57 MMX instructions) speed up applications or browser plug-ins designed specifically to take advantage of them. Programs that have been optimized for Microsoft's DirectX 6.1 API can also benefit. Intel estimates that about 100 Pentium III—enhanced applications will ship by June.

The improved plug-ins do speed up some tasks, such as streaming animation. One site that Intel touts as being optimized for Pentium III users (www.exciteextreme.com) features a PIII-enhanced plug-in that helps you search the Web. Instead of clicking through a list of search categories, you can click on and rotate a series of 3D objects that represent topics. The PIII instructions improve the smoothness and frame rate of the 3D graphics. But on the whole, Pentium III—enhanced content isn't radically improved your everyday browsing.

For business users, PIII-enhanced voice recognition and image editing apps show the greatest promise. Dragon's NaturallySpeaking is shipping already. Lotus's forthcoming SmartSuite Millennium edition, due in June, will also use PIII instructions to speed up voice recognition processing. Philips plans to ship a PIII-enhanced version of its FreeSpeech this summer, and both IBM and Lernout & Hauspie have made fall product plans. Microsoft Office 2000, due

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**The PC Challenge:**

**Can You Pick the PIII-550?**

**IN A TASTE TEST, most of you could tell Coke from Pepsi. But in a PC taste test, could you tell a PIII-550 from a slower, less expensive system? And what do PIII machines add when you're viewing PIII—enhanced Web sites? To find out, we asked two PC users to perform a suite of tasks using four unlabeled desktops: a PIII-550, a PIII-450, a PIII-400, and a Celeron-400.**

Our testers: Steve Hansen, owner of a moving company in San Lorenzo, California, and Jon Pevna, a vice president of service procurement for Bank of America in San Francisco. Their verdict: A PIII-550 with a top-flight graphics card galvanized 3D games. But in other apps, differences were harder to detect.

**SITE-SEEING**

**FIRST, WE WANTED to see whether Hansen and Pevna would notice the impact of the PIII's streaming SIMD extensions on Web sites that had been optimized for them. Each tester used two machines: a PIII-450 system and a PIII-450. Both men visited two PIII-enhanced pages**—www.sharperimage.com and www.styleclick.com—**He was able to spot the PIII-550 but found all four machines acceptably peppy.**

---

**HE WAS ABLE TO SPOT THE PIII-550 BUT FOUND ALL FOUR MACHINES ACCEPTABLY PEPPELY.**

**BREAD AND BUTTER**

**NEXT, OUR TESTERS used Microsoft's Picture-It on all four machines to edit an image for use on a Web page. After using each machine to rotate and flip an image, apply a background, and touch up the image, Hansen quickly pronounced the PIII-550 the fastest. He was an apt judge, since he edits images frequently for personal Web pages. Hansen pegged the PIII-450 as the second fastest and the Celeron-400 as the slowest, though he said the Celeron's perfor-**
to ship in June, has two PIII-enhancements, Microsoft says. PIII instructions should speed encoding of presentations for Web broadcasts and accelerate performance with PhotoDraw, the business graphics application included in Office 2000 Premium Edition.

**GOOD CONFIGS**

BEYOND THE PIII processor, you'll find the PIII-550 machines' configurations generous. The corporate PIII-550 system we tested, HP's Vectra VL16 MT, costs the least, at $2564, and comes with a 17-inch monitor. Our model included a 16X-32X CD-ROM drive, a 13.5GB hard drive, and a 3Com 10/100 network interface card. The design of the Vectra's case is also top-notch: Pull a small lever, and the left side of the case comes off. Another lever removes the motherboard, and drives slide out without tools.

For graphics performance, the Vectra uses a Matrox G200 chip with 8MB of memory integrated on the motherboard. This subsystem works fine for business graphics, though you can't upgrade it. HP's PIII-550 machine held its own during tasks such as playing a presentation in PowerPoint 97 or running a clip using Macro media Director. We excluded the HP from the 3D game tests because we didn't want to dismiss this corporate PC on the basis of game frame rates.

For home PC enthusiasts, Dell's Dimension XPS T550 packs the goods you'd expect in a $2600 PC, along with a 19-inch monitor. Our model had a 20GB hard drive, a 6X DVD-ROM drive, and a standard 100MB Zip drive. But if you're a 3D-game fan, the machine's Diamond Viper V7770 graphics card will probably be the major attraction: It turned in extremely fast, smooth performance in our game tests.

Compaq's $2799 Prosignia 330, the most expensive of the three machines that we evaluated, had the biggest hard drives. (www.eletter.com) offers a moderately priced, laborsaving, Web-based alternative. Working from mailing lists and files that you upload to the service with a browser, Eletter produces and mails postcards, letters, and brochures in black-and-white or color. Producing and sending first-class mail costs as little as 53 cents per letter for quantities under 200; per-letter rates decrease for larger runs sent by Class A bulk mail. A minimum $10 charge applies.

**CHILD-FRIENDLY SURFING:** A coalition of 15 tech companies plans to offer Net safety tips, a guide to browser filters, information on how to report troublesome online activity, and pointers to child-friendly content. In July the information will appear on many popular Web sites. For more info, see www.neted.org.

**NOVELL'S SMALL-BUSINESS BUNDLE:** This summer, Novell plans to ship Small Business Suite 5, which includes the new NetWare 5; Groupwise version 5.5 (e-mail/groupware tool); and Netscape Enterprise Server (Web server). The suite includes wizards for easier setup. A five-user license is expected to sell for about $1300.
drive—22GB—and a 250MB Zip drive, one of the first we've seen bundled in a system. Our model also carried a 52X CD-ROM drive, a 19-inch monitor, and the same Diamond graphics card as in the Dell machine. In our graphics tests we did detect a few differences. For example, the Compaq machine took 15 seconds longer than the Dell PC to complete the PowerPoint test. But don't read too much into that. The graphics cards and the graphics card drivers were in beta form. We expect to see more-uniform graphics quality in the shipping versions.

**PEEK IN THE KEYHOLE**

One final consideration: If you're inclined to buy the fastest PC on the market in hopes of postponing obsolescence, hold your horses. The next wave of PIII machines, expected in early fall, will add more than just clock speed. They will integrate a new system chip set code-named Camino, which supports a 133-MHz system bus (up from today's 100-MHz bus on PII computers and 66-MHz bus on Celeron systems). The chip set enables AGP 4X graphics and support for direct RDRAM, a fast new type of main memory.

Meanwhile, Intel's archival AMD has big plans of its own. The first systems based on AMD's new K7 processor are expected to make their appearance later this summer. The K7, which will launch in 500-, 550-, and 600-MHz versions, supports a 200-MHz system bus and looks to be a robust Pentium III competitor.

**BEHIND THE BLUE DOOR**

Make no mistake, the PIII-550 systems we tested are fast, solid, well-designed machines. But the PIII-500 and PIII-450 models offer a sweeter combination of price and performance for many people. For example, you could buy the Dell Dimension XPS with a PIII-500 processor for $2340. Workhorse PIII-450 desktops now go for less than $1800. And if all the hoopla over PIII-enhanced applications and browser plug-ins just doesn't intrigue you, by all means consider buying a Celeron-466 PC for $1499. Systems based on that processor race through apps like Word and e-mail much as a PIII-450 PC does.

Finally, if you've been saving for a dream game machine, consider waiting for PCs with the Camino chip set and AGP 4X graphics, due out this fall. Opening the big blue door may be more exciting then.
Office 2000: What Microsoft's Hiding Inside the Box

THE MOTHER of all office suites has landed. Microsoft's long-awaited Office 2000 delivers a boatload of small improvements. But many users will want to steer clear of one of its most highly touted features.

As part of the company's effort to make all of its products Web-centric, every application in the suite can save documents as Web pages, with formatting, formulas, and macros intact. Therewith, anybody who has a Web browser should be able to view Office 2000 documents in all their glory. But there's a significant problem. If you save particularly long or complex Office files as Web pages, many non-Microsoft applications-including Netscape Navigator and Composer-will not be able to read them.

THE GOOD NEWS

Users will find many intriguing new features in Office's latest version. Among the highlights:

- File Open and File Save dialog boxes have added a browser-style history list of recently used files and folders.
- The suite now has its own clipboard, which can hold as many as 12 items at a time.
- Office 2000 can repair itself, automatically replacing crucial program files that are missing or damaged.
- The Single Document Interface places an individual button for each open file on the Windows taskbar.
- Menus can adapt to your work patterns, putting items you use frequently on the top level, and those you rarely open on submenus below.

2000 native-format files even if they haven't upgraded to the new suite. And if your hard disk labors under a load of large PowerPoint presentations or Access databases, upgrading to Office 2000 and opening and saving those files in the native format could free up megabytes of disk space.

Note to users of Word-Perfect and Word Pro: Though you might be able to work with Word 97 files, our tests indicate you will have difficulties opening documents that were created in Word 2000. And some spreadsheets are out of luck as well: Quattro Pro is able to handle the new Excel 2000 format with some success, but 1-2-3 is not.

Finally, despite all its new bells and whistles, Office 2000 runs no slower than Office 97. Most tasks—including launching applications, opening and saving files, inserting graphics, and moving columns—take approximately the same amount of time in the new suite as they did in the old one.

POLYGLOT NOT

This rosy picture turns dark and gloomy when you attempt to save Office documents as Web pages.

To test Office 2000 file compatibility, we created HTML documents in three applications—Word 2000, Excel 2000, and PowerPoint 2000. Then we tried to open those files in Office 97, competing office suites, and in various browsers and HTML editors. If you save large or complex Office 2000 documents (in other words, files with macros, graphics, or any kind of complex formatting) as .htm files and then open them in a...
Microsoft has created a hybrid file format that only Office 2000 users can share fully.

Office 2000 Files Don't Always Work With Other Apps

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<th>FILE TYPE</th>
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<th>Can open file, but display varies noticeably from original</th>
<th>Can't open file, or displays garbled data or source code</th>
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<td>HotMetal Pro 5, Netscape Composer 4.51, Quattro Pro 9, PowerPoint 97</td>
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**NOT JUST HTML**

Why did this happen? The current Hypertext Markup Language 4.0 spec, to which most current browsers and HTML editors adhere, isn't equipped to preserve complex Office documents with perfect fidelity. Consequently, when it saves documents as Web pages, Office supplements standard HTML with some nonstandard technologies: XML (Extended Markup Language) handles macros and other interactive elements, while VML (Vector Markup Language) preserves some graphics. Because many editors and browsers don't yet support either XML or VML, they aren't fully compatible with Office's .htm files.

Office 2000's nonstandard implementation of HTML could also make collaboration more difficult. Microsoft has created a hybrid form of HTML that only Office 2000 users can share fully—and even then, they could run into trouble.

Here's why: Suppose you create an .htm document in Microsoft Word. Office 2000 embeds a special tag in the file's source code, identifying the file to Office and to Windows Explorer as a Word document. But should one of your collaborators subsequently open and save that same file in FrontPage, it becomes a plain Web page—losing all of its Wordiness in the process, including the special tag that identifies the document's original application. After that point, if a third user comes along and wants to open the file, he or she will have no clue about which application to use, potentially leading to all sorts of confusion.

**FAT AND SLOW**

This hybrid form of HTML can also be sluggish. Excel 2000 slows down substantially when working with HTML. Saving a 5MB spreadsheet in the program's native .xls format took a little under 4 seconds. But saving that very same spreadsheet as HTML caused the file to balloon to a whopping 20MB, and the process took almost 40 seconds. Other Office 2000 applications are better behaved: Word 2000 files we saved as Web pages turned out smaller than the native .doc files, and PowerPoint presentations enlarged only slightly when saved in .htm format.

The bottom line: Although Office 2000 has a number of nifty new features to recommend it, the implementation of .htm as a common file format is not one of them. Of course, the new suite's nonstandard HTML will not be a problem if you avoid it, sticking instead with each application's native document formats (if your collaborators have the new suite) or a standard document format like .rtf (if they don't). Nor will it be a problem if you are posting files to an intranet and you're sure that absolutely everyone in the office is using Internet Explorer 5.

But if you want to create Web pages for all the world to read, or if you want to collaborate with a variety of users using .htm as a common file format, Office 2000 is not the right tool for the job.

—Scott Spanbauer and Dan Miller
the new thinkpad 570. (dramatization)

Estimated resale price for model 570/2AU. Price excludes UltraBase and options. Retail price may vary. Actual weight/thinness may vary due to vendors, components, manufacturing process and options. Weight includes battery; excludes FOO and other e-business tools.

ThinkPad 570

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<td>1&quot; thin / 4.0 lbs / 12.1&quot; or 13.3&quot; active matrix display / 40gb or 64gb hard drive / 64-192mb sdram</td>
<td>Holds floppy drive or extra battery and options like CD, DVD, Zip, extra hard drive or SuperDisk LS-120</td>
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This is how it works. Slip the ultralight, superthin ThinkPad 570 into an UltraBase and it transforms into an all-in-one desktop ready for the office or the road. ibm.com/thinkpad 800 426 7255, ext. 4203
Dell and Gateway Enter Online Store Wars

Dell and Gateway want you, and not just when you’re buying a computer. The two direct-sales giants recently launched online superstores—Dell’s Gigabuys site (www.gigabuys.com) and Gateway’s SpotShop.com (www.spotshop.com)—each selling thousands of PC peripherals, accessories, and software titles. Like other online computer shops, Gigabuys and SpotShop.com beat brick-and-mortar stores on price and selection. They also offer existing Dell and Gateway customers nifty personalized buying advice. But you can find better bargains and a greater range of merchandise at other Web superstores.

OPENING SHOP

Dell’s Gigabuys launched last March. SpotShop.com opened in April, just two months after Gateway bought a 19.9 percent interest in NECX, one of the top-rated sites in our October survey of superstores (see “Where the Buys Are,” www.pcworld.com/oct98/mailorder). In fact, SpotShop is NECX in a new Gateway guise. Once you get past the first page, the two sites are almost identical except for the different logos at the top and

items, with 40,000 expected by midsummer. SpotShop.com boasts more than 30,000 products. In contrast, a typical CompUSA store has 5,000 to 6,000 items. But you can find larger selections elsewhere on the Web: CDW claims to stock 45,000 items.

We shopped for seven popular products—two monitors and two printers from recent PC World Top 100 roundups; a Palm IIIx personal digital assistant; Symantec’s Norton SystemWorks 2.0; and Adobe Photoshop 5.0—at seven different stores: Gigabuys, SpotShop.com, Shopping.com, Buy.com, CDW, CompUSA-Net.com, and a CompUSA store in San Bruno, California. We found all seven products at each of the Web sites. The CompUSA store in San Bruno, however, did not carry either of the two monitors or the HP DeskJet 880C.

Gigabuys and SpotShop.com both go beyond raw inventory numbers by offering personalized shopping services. Gigabuys’ home page invites Dell owners to identify their systems and then proposes compatible upgrades; it can, for example, automatically determine the right kind of RAM for your PC. SpotShop.com doesn’t offer the same degree of personalization, but Gateway customers can check the compatibility of upgrade items using NECX’s existing software.

BETTER PRICES ELSEWHERE

Overall, Gigabuys and SpotShop.com offered better deals than CDW, CompUSA-Net.com, and the brick-and-

<table>
<thead>
<tr>
<th>ONLINE STORES</th>
<th>PRICE COMPARISON</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buy.com</td>
<td>$294 †</td>
</tr>
<tr>
<td>CDW</td>
<td>$348</td>
</tr>
<tr>
<td>CompUSA-Net.com</td>
<td>$350 †</td>
</tr>
<tr>
<td>Gigabuys (Dell)</td>
<td>$320 †</td>
</tr>
<tr>
<td>Shopping.com</td>
<td>$320 †</td>
</tr>
<tr>
<td>SpotShop (Gateway)</td>
<td>$320 †</td>
</tr>
<tr>
<td>CompUSA ‡</td>
<td>$370</td>
</tr>
</tbody>
</table>

Lowest price for each product shown in red. † Out of stock on date checked (4/16/99). ‡ San Bruno, California, retail store included for comparison.
thinkpad.power suit

ThinkPad 600

- Price: $2,299 to $4,299
- Power: Mobile Pentium II processor
  266 to 366 mhz
- Bytes: 32 or 64gb hard drive
  32 or 64mb memory
- Media: 12.1" or 13.3" TFT display
  CD or DVD, SRS 3-D sound
  Option: Port replicator
- Design: ThinkPad 600. Light weight and high performance, in a 4.9 lb design statement
  a mere 14" thin! www.ibm.com/thinkpad
  or call 800-426-7255, ext. 5038
mortar CompUSA store, but both were consistently undersold by Shopping.com and Buy.com (see “Where to Find Deals and Steals Online,” page 56). For example, the Lexmark 5700 Color Jetprinter cost $226 at the Gigabuys site, $4 less at SpotShop.com, $11 less at Shopping.com, and $27 less at Buy.com. On the other hand, CDW wanted $229 for the same printer, while CompUSA Net.com and the CompUSA store both charged $230. Those prices didn’t include tax or shipping, which for ground delivery ranged from $8 (at CompUSA.Net.com) to $15 at Shopping.com. Currently, Gigabuys informs you by e-mail of the shipping costs after you make the purchase; it promises that it will fix this arrangement by July.

Dell and Gateway are not the only PC vendors expanding their “e-tail” activities. But Compaq, which owns Shopping.com through its AltaVista subsidiary, seems content to keep its store and its PC business separate. Don’t expect other computer giants to open their own online superstores anytime soon. “Compaq has been dipping its toe in this, and Acer tried something like it,” says Eric Brown, an analyst for Forrester Research. “But I don’t think anybody else is going to get into this.”

For the two mail-order stalwarts, their new online stores mean new revenue streams at a time when PC margins are shrinking. And both companies have a large following of consumers who are willing to buy online and are probably in the market for PC-related products.

Nonetheless, both Dell and Gateway have their work cut out for them. Dell’s store does simplify the upgrade process for owners of its systems, and both stores offer a respectable selection of products at competitive (if not rock-bottom) pricing. Like the song says, you better shop around.

—Yardena Arar

Snoopware: For Bosses Who Like to Watch

IT'S BAD ENOUGH that your bosses can read your e-mail. (You knew they could, right?) Now a new generation of software lets them keep a running record of virtually everything you do on your PC.

WinWhatWhere Investigator (www.winwhatwhere.com) and BlueWolf Network’s Prudence (www.bluewolfnet.com) are just the latest incarnations of snoopware, a rapidly growing genre of software that ostensibly was designed to combat corporate espionage and employee malfeasance. But while these programs may in fact serve a legitimate business purpose, they may also be illegal.

**ELECTRONIC STAKEOUTS**

**THE LATEST programs do more than keep track of your typing (so-called keystroke loggers have been around since the early eighties). Once installed on your system, Investigator and Prudence keep a running record of the files and applications you open, the menu items you click, and your browser’s history and bookmarks, as well as logging your keystrokes; then they send all this info to your network administrator. Why would companies impose this kind of surveillance on employees? According to security expert Winn Schwartau, insiders commit 60 percent of corporate computer crime. Snoopware can sniff out such miscreants. Or let’s say an outsider forges an e-mail threat to the company president in your name (it’s easy to do). If your company is using snoopware, it'll know you’re innocent.

But these utilities could run afoul of a section of the U.S. Code that prohibits the “interception of wire, oral, or electronic communications.” If employers use snoopware without notifying employees, they may be violating this law. While both Investigator and Prudence can be configured to warn PC users, neither does so by default. One way to find out if you’re being watched: Hit <Ctrl>-<Alt>-<Del> to call up the list of currently active applications. If snoopware has been installed on your PC, you'll catch it red-handed.

—Andrew Brandt
PC 300PL

**Price**
- Pentium III processor (up to 550mhz)
- 3D AGP graphics (up to 8mb)
- up to 768mb memory / 204gb hdd
- integrated ethernet & audio
- Zip drive / CD rom
- 19" G96 monitor
- (17.3" viewable)

**Options**
- Imagine PCs you control from virtually anywhere – over the network or the Web. PCs that integrate easily into your enterprise management software. PCs that offer time-saving features like LANClient Control Manager. It's the IBM 300PL. It's the ultimate in remote control. www.ibm.com/ibmpc
- 1 800 426 7255, ext. 4130

**Estimated reseller price for model 6862-29U (CPU) and 654102N (monitor). Actual prices may vary.**

MB denotes microprocessor internal clock speed; other factors may affect application performance.

*GB = 1 billion bytes for hard drive capacity. All PCs in this ad ship with an operating system. IBM product names are registered trademarks of International Business Machines Corporation. Intel, the Intel Inside logo, and Pentium are registered trademarks of Intel Corporation. © 1999 IBM Corp. All rights reserved.*
Warning: Free PCs Not as Cheap as You Think

A free lunch? Well, maybe. What about a free PC? That offer has surfaced in recent months. In fact, at least five companies plan to offer what appear to be sub-$30 PCs. PC World took a hard look at some of these offers, and guess what? There's still no such thing as a free PC—but there are some deals to consider.

Almost every company "giving away" a PC requires you to buy Internet access from it for three or four years—often at a slightly inflated price. In most cases, you shell out about $300 to $1000 over three years or so and get both the computer and Internet service. One company—Free-PC—plans to offer free PCs with no service- contract strings attached, but your screen will be cluttered with annoying advertising.

FREE FOR A FEE
You have to do some math to figure what you'd ultimately pay for an Internet-supported PC. Take the monthly fee, subtract what you'd expect to pay for an ISP—say, $20 a month—and multiply the remainder by the number of months you must subscribe. Then add any fees and shipping costs.

You may incur another cost by committing to an ISP for several years. If an ISP grows too fast or loses key personnel, its service can suffer. Moreover, you could be locked into 56-kbps modem service while your neighbors enjoy much faster cable access.

Gobi charges $75 for start-up and shipping fees, plus $26 a month for Internet access, and requires a three-year commitment. That adds up to $1011. But if you figure you'd probably spend $20 a month for access in any case, the real hardware cost is more like $291 over three years.

And the Gobi handled itself surprisingly well. Its PC WorldBench 98 score of 154, though nothing to e-mail home about, is more than acceptable for a Celeron-300 system. In fact, the Gobi came in just ahead of E machines' Etower 366i, a $738 Celeron-366 system (for details, see "How Low Can They Go? The Best PCs for Under $1000," page 114).

The InterSquid Basic Model costs $30 a month for 30 months of access. Add shipping and handling charges, and you wind up paying $400 just for hardware. And judging from the review unit we tested, the system isn't worth it. We found the machine to be badly designed, flimsy, and rather slow. This Celeron-333 system scored 144 on PC WorldBench 98, not keeping pace with the Gobi despite its faster processor. Inter-

Though adequate for some homes, these systems make no sense for offices.
<table>
<thead>
<tr>
<th>Netfinity 5500 for Windows NT</th>
<th>price</th>
<th>power</th>
<th>reliability</th>
<th>notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>from $8,525*</td>
<td>up to 4-way Intel® Pentium® III Xeon™ processors 500 mhz.</td>
<td>hot-plug, hot-add PCI component redundancy lightpath diagnostics</td>
<td>The Netfinity 5500 M20. Affordable, high-reliability servers for Windows NT. Heavy-duty hardware built on enterprise-class availability technologies you won't find in any other server for Windows NT. Visit <a href="http://www.ibm.com/netfinity">www.ibm.com/netfinity</a> or call 800 426 7255, ext. 4176.</td>
<td></td>
</tr>
<tr>
<td>up to 4gb ecc memory</td>
<td>optional fibre channel</td>
<td></td>
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</table>

*Estimated reseller price to end users for Netfinity 5500 M20 model 866231Y includes IBM 4 Sgb Hard Disk Drive. Certain features described are available for an additional charge. Actual reseller prices may vary. mhz denotes microprocessor internal clock speed; other factors may also affect application performance. IBM product names are trademarks of International Business Machines Corporation. Microsoft, Windows and Windows NT are registered trademarks of Microsoft Corporation. Intel, the Intel Inside logo and Pentium are registered trademarks and Pentium III Xeon is a trademark of Intel Corporation © 1999 IBM Corp. All rights reserved.
As business buyers and consumers know, the landscape is littered with technology companies that came and went all too quickly, leaving customers in a lurch. Value-conscious technology buyers know that quality and leading-edge product design begin and end with companies committed to research and development as well as to manufacturing and sales. This is not an area where the little guys play.

That total commitment to product quality is what buyers have come to expect from LG Electronics and its 35,000 dedicated workers around the globe. In business now for 41 years, this $11 billion-plus technology giant is a leader in several product areas and is out front and pulling ahead in many others. As a matter of fact, LG may be the most important technology leader you’ve never heard of. But you will.

A key to the success of LG Electronics is the company’s ability to leverage its huge research and development capabilities in one area to produce quality products in another. This research is carried out daily at 25 R&D facilities around the world, where engineers and scientists crank out a string of advances in liquid crystal displays, audio and video systems, multimedia products, and a host of other areas.

Consider that many of the world’s most respected computer makers turn to LG for their monitors. These companies trust LG Electronics to deliver increasingly higher levels of performance, and to meet the standards that their respective brands have come to represent. All this has propelled LG Electronics into one of the top three computer monitor makers worldwide. See that monitor on your desk? Whatever it may say on the outside, under the hood, it may be all LG, right down to the picture tube.

LG Electronics’ strength in CRT monitors has helped the company stake out a leading position in TFT-LCD manufacturing. Seen as the company to beat in this category, LG Electronics’ flat-panel displays are measurably clearer, with viewing angles of up to 160 degrees. The company is putting considerable resources into making TFT-LCD panels that are even bigger, brighter, and more affordable than ever before.

A similar story can be told about LG when it comes to storage technology. LG is already the world’s largest manufacturer of CD-ROM drives, but now, the industry is looking to LG Electronics to help develop and manufacture the next generation of optical disc storage technology, such as CD-RW and DVD-ROM. LG Electronics is committed to maintaining its No. 1 position by pushing the limits of performance in data storage and providing its customers more speed, space, and reliability.

In these technologies and others, LG Electronics has dedicated massive R&D investment and brought together thousands of the world’s most capable engineers, designers, and technological innovators in order to keep pushing the limits of performance. A global workforce, in an unending quest for product perfection—this is what stands behind the LG brand.

**FAST FACTS ABOUT LG ELECTRONICS**

- LG Electronics is the world’s largest manufacturer of high-performance CD-ROM drives.
- It is part of LG, an international conglomerate that operates in a wide range of industries, including chemicals and energy, electric and electronics, metals and machinery, and trade and services. Currently with more than $80 billion in revenues, LG is considerably larger than many of its technology partners.
- LG Electronics is the No. 1 maker of high-resolution TFT-LCDs for larger monitors. It commands more than half the market for 18-inch TFT-LCDs, a market that doubles in size annually. Additionally, LG has become the first company to develop and market a 15.7-inch TFT-LCD, the world’s largest for the burgeoning notebook PC market.
- LG Electronics ranks among the top three computer monitor makers in the world. Last month, its StudioWorks 790SC 17-inch display was rewarded with the prestigious PC World Top 10 award.

Circle 96 on card or go to www.pcworld.com/productinfo
What exactly can 35,000 people in over 120 countries do? Just about anything they set their minds to. Such as create the next generation of TFT-LCD flat panel displays.

Or develop tomorrow's DVD and CD ReWritable drives. Today's LG is all of this and more. As one of the world's largest electronics companies, we are using our knowledge and resources to push the limits of what's possible. Making the things that make every new day a little better than the day before.

LG is innovation. LG is performance. LG is technology.

SEE US AT PC EXPO – BOOTH #4554

(800) 243-0000
Squid is contracting out to more than one manufacturer, so you might receive a better system than we did.

Microworkz Computer has plans to offer a low-priced Webzter Jr. system (which was not available for testing). When fully configured it will run you about $300, after you deduct the cost of a year of included Internet access. (For more about Microworkz, see On Your Side, page 35.)

GOOD DEALS AND BAD OTHER COMPANIES with free offerings didn’t have systems ready for us to sample. Both Simple Solutions and Direct-Web keep their monthly price at $20 (at least for their low-end systems) and hope to make a substantial portion of their income from electronic commerce and advertising.

If you want the whole Simple Solutions Enchilada, you have to pay for the company’s Internet service for four years. DirectWeb doesn’t ask you to subscribe for a set period of time, but if you hold on to the system for 36 months, you get to keep it. You can cancel your subscription whenever you want by returning the computer. And at the end of three years, you can buy the computer by forfeiting the otherwise-refundable $150 deposit.

ADVERTISING OVERLOAD WHILE SOME free PCs subject you to advertising, only the Free-PC beats you over the head with it. Granted, you don’t have to pay a dime for your Free-PC—it even comes with 30 months of free Internet access. The company hopes to make a profit by selling ads. In addition, you must provide personal information to the vendor in order to qualify for its largesse.

The PCs are given away through a lottery, so you may or may not get one. If you do win a Free-PC, you’ll find nearly a third of the screen occupied by thick bands filled with blinking, ever-changing ads. Even when you’re offline, working in your word processor, the busy screen looks like a garishly overdone Web site. Like the Gobi, the Free-PC defaults to 1024 by 768 resolution. As a result, it renders text and images too small for you to view comfortably on the provided 15-inch monitor. But unlike the Gobi, the Free-PC doesn’t let you change this setting. In fact, you’re not permitted to do a lot of things on the Free-PC. You can violate the customer agreement by reinstalling your operating system, by partitioning your hard drive, or by using your computer for less than 10 hours a month.

Free-PC received over 1 million applications for the first 10,000 systems, which are slated to ship in early June to winners of its lottery. The company expects to offer more PCs later this year, increasing your odds of getting one. Free-PC is one of the few companies with free offerings that provides a name-brand machine. At press time, the company planned to give away Compaq systems based on Cyrix’s 333-MHz M II chip.

GIFT HORSE?

IF YOU NEED a second PC in the house, primarily for Internet access and word processing, a solid ISP-supported system such as the Gobi is worth considering. These PCs generally have basic support policies and full warranties similar to those of systems acquired in more traditional ways. The vendors also act as your ISP and handle support issues.

These systems make no sense for an office, where you probably already have Internet access—maybe with something faster than a modem—and don’t need to pay a separate monthly fee to connect one system over the phone lines. And with a few higher-priced exceptions, such systems are too slow to make good gaming machines.

Offers of “free” PCs are alluring, and in some cases, the temptation is worth acting on. But be sure to check the fine print, and do the math.

—Lincoln Spector
38% of you think choosing the right computer system is too complicated.

Okay, we’ll start with a simple multiple choice...
The Gateway™ Essential Line: powerful PCs at practical prices.

Okay, maybe you don’t need an astrophysics supercomputer. But you still want a fast chip and ample memory and drive space. Look no further than Gateway Essential PCs. With video, sound support and Intel® processors — but with affordable prices—they’re compromise-free PCs. And with any model, we’ll throw in a year on the Internet!

GATEWAY ESSENTIAL 400c
• Intel® Celeron™ Processor 400MHz with 128K Cache
• 32MB SDRAM
• EV500 15" Monitor (13.9" viewable)
• 8MB AGP Graphics
• 4.3GB Ultra ATA Hard Drive
• SoundBlaster® AudioPCI® 64D
• GC5-200 Speakers by Cambridge® SoundWorks
• 56K Internet/Fax Modem
• Microsoft® Windows® 98
• Corel® WordPerfect® Suite 8 Software
• 1-Year gateway.net™ Internet Access

$999 or as low as $28/mo. for 48 mos. through our Your:)Ware™ program
• Add a Gravis Game Pad — $19
• Upgrade to a EV700 17" Monitor (15.9" viewable)—$115

GATEWAY ESSENTIAL 433c
• Intel Celeron Processor 433MHz with 128K Cache
• 64MB SDRAM
• EV700 17" Monitor (15.9" viewable)
• 8MB AGP Graphics
• 8.4GB Ultra ATA Hard Drive
• SoundBlaster AudioPCI 64D
• GC5-200 Speakers by Cambridge SoundWorks
• 56K Internet/Fax Modem
• Microsoft Windows 98
• Corel WordPerfect Suite 8 Software
• 1-Year gateway.net Internet Access

$1299 or as low as $37/mo. for 48 mos. through our Your:)Ware™ program
• Upgrade to a 13GB Hard Drive—$45
• Upgrade to a DVD-ROM Drive—$80

GATEWAY ESSENTIAL 466c
• Intel Celeron Processor 466MHz with 128K Cache
• 64MB SDRAM
• EV700 17" Monitor (15.9" viewable)
• 8MB AGP Graphics
• 13GB Ultra ATA Hard Drive
• SoundBlaster AudioPCI 64D
• GC5-200 Speakers by Cambridge SoundWorks
• 56K Internet/Fax Modem
• Canon® Color Printer
• Microsoft Windows 98
• Corel WordPerfect Suite 8 Software
• 1-Year gateway.net Internet Access

$1499 or as low as $42/mo. for 48 mos. through our Your:)Ware™ program
• Upgrade to a EV910 19" Monitor (18" viewable)—$130
• Upgrade to a Boston Acoustics® 3 Piece Speaker System—$40

All Gateway Essential PCs include: 32X Max Variable CD-ROM; 3.5" Diskette Drive, Micro-Tower Case, Multi-Function Keyboard, Mouse, Year 2000 Compliance; 1-Year Parts & Labor Limited Warranty / 1-Year On-Site Warranty Service.
Choose any Gateway Essential or Gateway Performance PC, and you can customize it with the following solution packages:

<table>
<thead>
<tr>
<th>Solution Package</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>KidBuilder '99 Preschool-Kindergarten Software</td>
<td>$99</td>
</tr>
<tr>
<td>KidBuilder '99 Grades 1-4</td>
<td>$99</td>
</tr>
<tr>
<td>Gateway Total Travel Package</td>
<td>$129</td>
</tr>
<tr>
<td>Family Entertainment Package</td>
<td>$149</td>
</tr>
<tr>
<td>Available add-ons and upgrades:</td>
<td></td>
</tr>
<tr>
<td>- Visioneer™ OneTouch™ 7600 USB Scanner</td>
<td>$149</td>
</tr>
<tr>
<td>- IOMEGa ZIP Built-INTM Internal Drive</td>
<td>$99</td>
</tr>
<tr>
<td>- Epson® Stylus 640 Color Ink Jet Printer</td>
<td>$179</td>
</tr>
<tr>
<td>What is the Your:)Ware™ Program and Why Is It for You?</td>
<td></td>
</tr>
<tr>
<td>Your:)Ware is our way of helping you personalize your order in every way.</td>
<td></td>
</tr>
<tr>
<td>First, choose a model from any of our lines of PCs. Then add on any peripherals, accessories, or solution packages (like the ones above) to get exactly the right computer. Then we'll help you decide which service option and financing plan are best for you. And finally, you can trade in your Gateway PC toward the purchase of a new one in two years. The Your:)Ware Program is how we get your computer to fit you perfectly.</td>
<td></td>
</tr>
</tbody>
</table>

Check out SpotShop.com and choose from over 30,000 hardware accessories and software titles.
Gateway Performance Line:
serious computers with serious components.

Looking for a PC that's not fooling around? One with blazing processor speeds that's tricked out with the highest-end components? Bring on the Performance PCs—Gateway's line of top-tier machines. With the latest chip technology, lots of room to expand, and intense multimedia prowess, they’re dialed up to power-user levels.

**GATEWAY PERFORMANCE 450**
- Intel® Pentium III Processor 450MHz with 512K Cache
- 64MB SDRAM
- EV700 .28 Screen Pitch 17” Monitor (15.9” viewable)
- 16MB NVIDIA™ RIVA TNT™ AGP Graphics
- 9GB Ultra ATA 66 7200 RPM Hard Drive
- 6X DVD-ROM Drive & MPEG2 Decoder
- 3.5” Diskette Drive
- SoundBlaster® AudioPCI™ 64D
- Boston Acoustics® BA735™ Digital Speakers w/ Subwoofer
- 3Com® U.S. Robotics 56K Voice WinModem®
- 8-Bay Mid-Tower Case
- MultiFunction Keyboard & Mouse
- Microsoft® Windows® 98
- MS Works Suite 99 Software
- 3-Year Parts & Labor, 1-Year On-Site Limited Warranty
- Year 2000 Compliant

$1599 or as low as $45/mo. for 48 mos. through our YourWare™ program

**GATEWAY PERFORMANCE 500**
- Intel Pentium III Processor 500MHz with 512K Cache
- 128MB SDRAM
- EV700 .28 Screen Pitch 17” Monitor (15.9” viewable)
- 16MB NVIDIA RIVA TNT AGP Graphics
- 13.5GB Ultra ATA 66 7200 RPM Hard Drive
- 6X DVD-ROM Drive & MPEG2 Decoder
- 3.5” Diskette Drive
- SoundBlaster AudioPCI 64D
- Boston Acoustics BA735 Digital Speakers w/ Subwoofer
- 3Com U.S. Robotics 56K Voice WinModem
- 8-Bay Mid-Tower Case
- MultiFunction Keyboard & Mouse
- Microsoft Windows 98
- MS Works Suite 99 Software
- 3-Year Parts & Labor, 1-Year On-Site Limited Warranty
- Year 2000 Compliant

$1999 or as low as $56/mo. for 48 mos. through our YourWare™ program

**GATEWAY PERFORMANCE 550**
- Intel Pentium III Processor 550MHz with 512K Cache
- 128MB SDRAM
- VX900 .26 Screen Pitch 19” Monitor (18” viewable)
- 32MB NVIDIA RIVA TNT2™ AGP Graphics
- 13.5GB Ultra ATA 66 7200 RPM Hard Drive
- 6X DVD-ROM Drive & MPEG2 Decoder
- 3.5” Diskette Drive
- SoundBlaster AudioPCI 64D
- Boston Acoustics BA735 Digital Speakers w/ Subwoofer
- 3Com U.S. Robotics 56K Voice WinModem
- 8-Bay Mid-Tower Case
- MultiFunction Keyboard & Mouse
- Microsoft Windows 98
- MS Works Suite 99 Software
- 3-Year Parts & Labor, 1-Year On-Site Limited Warranty
- Year 2000 Compliant

$2499 or as low as $70/mo. for 48 mos. through our YourWare™ program

- Upgrade to 10-Bay Tower Case — $50
- Upgrade to 18GB Hard Drive — $110

Gateway Performance 550XL

Gateway Performance 450

Gateway Performance 500

Gateway Performance 550

Gateway Performance

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www.gateway.com
GATEWAY COUNTRY®
Choose any Gateway Essential or Gateway Performance PC, and you can customize it with the following solution packages:

**Additional Upgrades**
- Thrustmaster 'Top Gun™ USB Joystick – $39
- 1-Year gateway.net™ Internet Access – for $129
- Philips® CD-RW Recordable/ReWritable Drive – $229
- Hewlett-Packard DeskJet® 895Cse Color Printer – $399
- Olympus D340R Digital Camera – $399

**Intel AnyPoint™ Home Networking Packages**
- $79 for 1 PCI card (1PC)
- $149 for 2 PCI cards (2PCs)

**Extreme Gaming Software**
- Extreme Gaming Software (Hexen II™, Heavy Gear™, Quake II™, Battlezone™)
- Extreme Gaming II Software (Unreal™, Forsaken™, The House of The Dead™, Turk® Dinosaur Hunter)
- $99 Each

**Electronic Photo Album Package**
- Visiовой™ One-Touch™ 7600 USB Scanner
- Philips® CD-RW (CD-ReWritable) Drive
- 2 One-Time Recordable CDs, 1 Rewritable CD
- $369

**Web Page Creator Software**
- Adobe® PageMill® 3.0
- Micrografx® Webtricity™ II
- $129

**Digital Photo Workshop Package**
- Epson® PhotoPC™ 700 Color Digital Camera
- Epson® Stylus® Color 640 Color Ink Jet Printer
- Epson® Photo-Quality Paper
- CorelDRAW™ 8 Illustration/Layout Software
- $778

**What Is the Your:)Ware™ Program and Why Is It for You?**

Your:)Ware is our way of helping you personalize your order in every way. First, choose a model from any of our lines of PCs. Then add on any peripherals, accessories, or solution packages (like the ones above) to get exactly the right computer. Then we’ll help you decide which service option and financing plan® are best for you. And finally, you can trade in your Gateway PC toward the purchase of a new one in two years. The Your:)Ware Program is how we get your computer to fit you perfectly.

Check out [SpotShop.com](http://SpotShop.com) and choose from over 30,000 hardware accessories and software titles.
Gateway GP-Series Small Business Desktops: network-ready and ready to work.

Gateway GP-Series desktops are perfect for small businesses or small network environments. They have the power and network capability to get the work done, at a cost that’ll keep you on good terms with your accountant.

**Gateway GP6-400C**
- Intel Pentium III Processor 400MHz with 512K Cache
- 64MB SDRAM (expandable to 384MB)
- 4.3GB Ultra ATA Hard Drive
- 8MB AGP Graphics
- 17X min/40X max CD-ROM Drive
- 10/100 Twisted Pair Ethernet
- Iomega Internal ZIP™ Drive
- EV500 17” Color Monitor (15.9” viewable)
- Business Audio with Speakers
- Microsoft Office 2000 Small Business Software
- Microsoft Windows 95 or Windows 98

$1098 or as low as $38/mo. for 36 mos. business lease

**Gateway GP6-400**
- Intel Pentium II Processor 400MHz with 512K Cache
- 96MB SDRAM (expandable to 364MB)
- 8.4GB Ultra ATA Hard Drive
- 16MB AGP Graphics
- 17X min/40X max CD-ROM Drive
- 10/100 Twisted Pair Ethernet
- Iomega Internal ZIP™ Drive
- EV700 17” Color Monitor (15.9” viewable)
- Business Audio with Speakers
- MS Office 2000 Small Business Software
- Microsoft Windows 95 or Windows 98

$1499 or as low as $51/mo. for 36 mos. business lease

**Gateway GP7-550**
- Intel Pentium III Processor 550MHz with 512K Cache
- 128MB SDRAM (expandable to 384MB)
- 13.5GB Ultra ATA Hard Drive
- 32MB AGP Graphics
- 17X min/40X max CD-ROM Drive
- 10/100 Twisted Pair Ethernet
- Iomega Internal ZIP™ Drive
- EV910 19” Color Monitor (17.9” viewable)
- Business Audio with Speakers
- MS Office 2000 Small Business Software
- Microsoft Windows NT 4.0

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Until recently, "networking" was a word heard more often in high-rise data centers than ground-floor family rooms. It implied the necessity to master a complex, often confusing mix of hardware and software. But that's changing. Small-business owners are discovering, to their great satisfaction, that networking can help them transform their home office into a high-efficiency enterprise.

Today, of the 42 million homes that have PCs, nearly 18 million own two or more, twice as many as only two years ago. By the year 2003, analysts predict that number will rise to 28 million.

"Home networks make sense," says Jim Balderstom, an industry analyst at Zona Research in Redwood City, Calif. "As more homes start to add second and third PCs, and prices decline to $100 or so per networked PC, the technology's success is guaranteed."

CONSUMERS AND AT-HOME WORKERS ARE QUICKLY DISCOVERING THE BENEFITS OF NETWORKS THAT TRANSFORM THE HOME INTO THE ELECTRONIC COTTAGE OF THE FUTURE
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Today's techno-savvy home has plenty of computer equipment to network. Printers, files, back-up storage, drives, scanners, and Internet Service Providers can all be shared using one of the latest networking technologies geared toward the home user.

For example, Intel Corp.'s $189 AnyPoint Home Network starter kit provides two parallel-port adapters that do not require you to open the PC's case. Another version connects multiple machines using internal PCI cards. Both AnyPoint versions use your home's existing phone lines, eliminating the need to drill holes and run cables.

"We have a vision of a billion connected computers in the next decade," says Mark Christensen, vice president and general manager of Intel's Network Communication Group.

While Intel's system builds on your existing equipment, Compaq Computer Corp. literally delivers a total solution. Its home network in a box consists of two ready-to-network Presario desktops ready to plug into your existing phone lines. Compaq uses Tut Systems Inc.'s phone-based technology, which, like Intel's technology, adheres to a "no new wires" standard.

Intel's research reveals that 86% of U.S. households with multiple PCs also have Internet access. What's more, someone in the household is online an average of 14 hours each week, most often between the hours of 6 p.m. and 10 p.m. Those kinds of peak-use periods drive the rising interest in innovative and practical home networks.

"Consumer are hungry for home network product information," says Mike Komar, vice president of operations at IPX Motherboards and Upgrades of Mesa, Ariz., and former product tester for InfoWorld. "The more information that becomes available about home networking, the more they want."

And for good reason. When you own more than one PC, a network gives you the same benefits, convenience, and efficiency that you have at the office. "People have really bought into home computing," Komar states. "The next logical step is making all the home's devices talk to each other. Networks really are the next Big Thing. It's all about connectivity."

**HOME ALONE**

Like a commercial network, a home network connects computers and peripherals so all devices can communicate with each other. Unlike commercial networks, however, home networks can also link your PC to your security system, climate control, and entertainment systems. As with all innovations, the technology must deliver sustainable and clear benefits.

**Mining on MindSpring**

When researching any new technology, you need quality information to make an informed purchasing decision. With three classes of home network systems to choose from—phone line, power line, and wireless—how can you select the one that's right for you?

Some of the best information on home networks is available on the Web. We began our product search on MindSpring (www.mindspring.com), a leading Internet service provider (ISP) and portal. MindSpring's search engine led us to HotBot (www.hotbot.com) and the Mining Company (miningco.com) and ultimately provided links to informative articles in several computer magazines.

If you decide that you want a telephone wire-based system, visit the site maintained by the Home Phoneline Networking Alliance (www.homepna.org), an association of companies working to develop a standard phone line networking standard.

One of the more innovative uses for home networks comes from an alliance of British computer maker ICL and Electrolux. Their technical alliance has resulted in a smart refrigerator that will know when you have run out of ice cream, skim milk, tofu, or any other refrigerated food.

An ICL company spokesman says the refrigerator will call, via a dial-up ISP, a local supermarket who will offer to restock the refrigerator.
Some of those benefits include:

Your work notebook or laptop can double as a second workstation, synchronizing files with your primary desktop machine. A home network is the fastest way to transfer files from your desktop PC to the notebook before you leave or when you return from a trip.

Your Mac and Windows PC can finally make peace. One of the great things about networks is that they can transmit just the data and eliminate the need to worry about disk formats.

You can resurrect that dinosaur of a PC you've been using as a doostop. With a network, an older 486 or even (gasp) a 386 can share the resources of a newer computer. Once networked, you are no longer limited by the old PC's small, antiquated hard disk. You can save your files directly to the new machine. You can also use the CD-ROM drive on the new PC to install software on the old PC.

Children of any age can play popular head-to-head multiplayer games like Quake and Rainbow6. "I didn't network to play games," admits C.G. Willis, vice president of Walker Mortgage. "But now that we can, it's plenty of fun." Willis' primary use for his home network is to link his desktop and laptop computers. "I can work at home without having to carry a bunch of floppies around in my pocket. It's a huge timesaver," he says.

It's easy. There's no need to run category 5 cables throughout the building as required for commercial networks. New technologies simplify the process of wiring a network by either using the home's existing phone wiring or radio frequency-based wireless products. Working within the familiar Windows interface, the best home network options are simple and straightforward to set up, automatically configuring printers and drives after asking you a few simple questions.

You never again need to worry about someone else in your home logging in before you do. Home networks can share Internet access through a single dedicated phone or ISDN line. Higher-speed in-home networks can support applications such as multiple broadband Internet connections, software and computer peripheral sharing, IP telephony, and high-quality digital audio/video streaming throughout the home.

**HOME CONNECTIONS**

With the next generation of home networks, every digital/electric device in your house can be connected. Komar's own home network currently links his home-office PC, laptop, telephone, and cable TV. Through a service offered by his local cable company, Komar's home phone and Internet connection are piggybacked onto his existing cable line. Soon, he hopes to add his security system, stereo, lighting, and appliances.

Balderstom sees a time when home networks will use the Internet to exchange a variety of data from medical-monitoring devices, appliances, air conditioners, smart appliances, and many more. "Before that happens, we need to reach a critical mass in persistent, high-speed access into the home, as cable modems and ADSL provide."

Komar agrees. "One major benefit of home networks is how just one wire allows multiple users to share multiple devices," he says. "It delivers speed and convenience at a low cost. It is a new essential for the home office. Period."

Howard Millman (hmillman@ibm.net) maintains, networks, and designs computer systems that help clients achieve the maximum return on their automation investment.
Can the whole family surf the Net without crashing into one another?

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50 free hours of Internet Access is chosen from Compaq Internet Setup. The 50 free hours must be used over a 30-day period from initial setup. A valid credit card is required to initiate service, although no charges will be incurred until the 50-hour trial has expired. *System tested using NTLM. Year 2000 hardware test. Non-compliant third-party software/hardware products may affect roll-over results. For more details, see www.compaq.com/y2k. For hard drives, 5400RPM. The Y2K models are designed only to allow faster downloads from K56flex or V.90-compliant digital suppliers. Maximum achievable download transmission speeds are currently unknown, may not reach 56 Kbps per second (Kbps), and will vary with line conditions. Works with most third-party devices. The K56flex Drive transfer rate is up to 84 Kbps compared to 135Kbps for 4X DVD-ROM Drives. The 60MB Max Digital Modem uses the ADSL (S.901) protocol. ADSL (S.901) 1000 updates can be downloaded from the Compaq site when available. The ADSL (S.901) 1000 method is designed to allow faster downloads from ADSL (S.901) 1000-compliant digital suppliers. Availability of ADSL (S.901) 1000 services will vary by region and Internet Service Provider (ISP) and may differ from V.90/G.90 services. Maximum achievable download transmission speeds with ADSL (S.901) 1000 are currently unknown and may not reach 1.544Mbps and 64Kbps, and will vary with line conditions and distance. Simultaneous use of a single phone line for Internet access (and regular voice calls) may require a line splitter or filter under certain conditions. Installation of a line splitter is available at an additional cost and must be performed by your local telephone company. Each additional PC must have a network adapter. Sold separately. Cable modem service availability and offering may vary by cable provider. CD-RW drive recording transfer rates may vary from 150 to 400Kbps, reading transfer rate may vary from 1500 to 2600Kbps. One year parts and labor labor for desktop systems is a no-charge service during the first 90 days of ownership. Compaq is not liable for editorial, pictorial, or typographical errors in this advertisement. Compaq, the Compaq logo, and Presario are registered in the U.S. Patent and Trademark Office. Microsoft, MS, and Windows are registered trademarks of Microsoft Corporation. Intel, the inside logo, and Pentium are registered trademarks of Intel Corporation. Product and company names mentioned herein may be trademarks and/or registered trademarks of other companies. Call Compaq Monday-Friday 7:00 am-11:00 pm (CST), Saturday and Sunday 7:00 am-7:00 pm (CST). ©1999 Compaq Computer Corporation. All rights reserved.
The Compaq Presario 5700T Internet PC with Home Phoneline Networking.

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And make the living room a safer place to surf.

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Sony's VAIO Digital Studio

DESKTOP PC
YOU'RE POOLSIDE at the Beverly Hills Hotel, thumbing through Variety for news about your impending three-picture deal. Your cell phone rings. It's Spielberg. "Babe," he says, "heard you might sign with Miramax. Let's talk."

Okay, so you've never been to Beverly Hills, and Spielberg doesn't know you from Adam Sandler. But that's the kind of Tinseltown fantasy Sony's new VAIO Digital Studio PCV-R526DS ($2199, excluding monitor) is likely to inspire.

Like two other new (but less fancily appointed) Digital Studio midsize towers, the PCV-R526DS brings full-motion digital video editing capabilities to consumers in a stylish, intelligently designed system. We looked at a preproduction unit of the PCV-R526DS.

Processor speed is vital to a multimedia system, and this Digital Studio runs on a powerful Pentium III-500 chip. The CPU, along with 128MB of PC100 SDRAM and a 512KB level 2 cache, helped the system rack up a solid PC WorldBench 98 score of 219 (a bit below the PIII-500 average, but still quite fast).

The system's audio and video—bolstered by ATI Rage 128 GL 3D video acceleration, 16MB of video SDRAM, Aureal Dynamic 3D surround sound, and a 4X Hitachi DVD-ROM drive—serve up all the crisp, rich, fluid video, movie buff or game fanatic could possibly want.

One quibble: The included Sony SRS-ZX50V speakers were too wimpy to provide the kind of rock-your-world-sound you'd expect to obtain from an entertainment mogul's desktop system.

The PCV-R526DS is among the few PCs we've examined that packs both a DVD-ROM drive and a CD-Rewritable drive. Using the preinstalled Adaptec DirectCD software, you can copy up to 60 minutes of MPEG compressed video—or back up data from the 13GB hard drive—to a CD-RW. It's also possible to duplicate personal copies of audio CDs, but to do so you'll need a utility (not bundled with the unit) such as Adaptec's $99 Easy CD Creator.

The Digital Studio's biggest attraction is that it enables mere mortals to shape raw video footage into their own cinema verité. Sony has done a good job of making digital video editing accessible. For instance, the front bezel of the handsome gray-lavender Digital Studio case conveniently features a four-pin IEEE 1394 port that Sony calls an I.Link. The I.Link supports superfast transfer speeds of up to 400 megabits per second, which means you can quickly copy video direct from any digital camcorder that supports IEEE 1394 to the Digital Studio with virtually no perceptible image degradation.

Once you've transferred the scenes you want from your camcorder to the PC, you can use the straightforward, pre-
The new VAIO monitors Sony plans to offer for the Digital Studio line weren't available for our review. Instead, the company sent us a Sony Multiscan 200 ES 17-inch display (with 0.25 dot pitch). According to a company spokesperson, this model is identical in quality to the new $349 VAIO CPD-200ES/L monitor (shown in the photograph at left). The Multiscan renders bright, sharp text and graphics and delivers excellent contrast.

Sony earned high reliability scores in our May survey—but its service was rated only fair. Another drawback: While the Digital Studio comes fully loaded, it’s not terribly expandable—only two PCI card slots are available. Then again, what does that matter? Once your movie debuts at Sundance, sweetheart, you can buy all the computers you want.

—James A. Martin

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Loaded Multimedia PC at a Budget Price

**DESKTOP PC**

**WHAT'S IN A number? In the case of the CyberMax Enthusiast K2-475, which is built around AMD's K6-2-475 processor, not a heck of a lot.**

The preproduction unit we tested—equipped with 128MB of RAM and a 512KB level 2 cache—earned a PC WorldBench score of 176. That's not bad for a budget multimedia system like this—but neither is it any faster than the three systems we’ve tested that use AMD's K6-2-400 and have similar memory and cache.

But even if the PC’s performance doesn’t live up to the CPU’s clock-speed number (this machine is slower than the average Celeron-400 PC), CyberMax makes up for it by packing lots of powerhouse multimedia hardware into the Enthusiast K2-475. Your $1349 gets you theater-quality video playback and cage-rattling surround-sound audio: The K2-475 has a 4.8X Toshiba DVD-ROM drive, a set of awesome Altec Lansing ADA-305 speakers and subwoofer, Voodoo2 Graphics 3D video acceleration, and Aureal Vortex 2 PCI audio.

If that's not enough hardware for you, you’ll find it easy to expand the K2-475, thanks to the roomy, clutter-free interior, and removing the casing is just a matter of unwinding thumbscrews. The Enthusiast also comes with top-notch documentation and a compelling package of CD-ROM reference works and games.

We do have a couple of peeves: The keyboard and mouse are as basic as you can get, and the CyberMax CX750N 17-inch monitor rendered dark, lackluster colors. Overall, if you’re looking for a reasonably priced multimedia system and don’t have too demanding a standard of performance, the Enthusiast K2-475 might be just right for you.

—James A. Martin

---

**CyberMax Enthusiast K2-475**

**PRO:** Inexpensive, well-equipped multimedia system.

**CON:** K6-2-475 PC is no faster than a K6-2-400; subpar monitor.

**VALUE:** A good deal, even after you invest a little more to get a more serviceable monitor.

List price: $1349

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**SPEECH RECOGNITION**

I wish I had my own personal Jeeves to organize my working life—someone who could schedule meetings, write e-mails, and create to-do lists whenever I say so. Along comes Dragon’s NaturallyOrganized, a pocket voice recorder and voice recognition software bundle that goes way beyond plain-old dictation and actually helps perform those utterly mundane daily tasks.

Here’s how it works: Whenever you are, you dictate actions—“send e-mail to Dan regarding department meeting,” “schedule meeting with Susan next Friday at 4 p.m.,” “here’s a new contact”—as well as regular text documents into the recorder. Back at your desk, you connect the recorder to your PC via Dragon’s serial link cable. The bundled Voice It Link software then transcribes your recordings of action items, it can actually execute each item in the appropriate application.

**PRO:** Turns dictation into executable tasks, good accuracy.

**CON:** Works only with Act 4.0 PIM, accuracy is slow to develop.

**VALUE:** Voice-activated assistant helps you with daily tasks when you’re working remotely.

**Street price:** $299

**Dragon Systems**

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www.dragonsys.com

PRODUCT INFO NO. 781

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**ViaVoice Takes the Typing out of Online Chat**

**SPEECH RECOGNITION**

If you’re a chat room fanatic who’s tired of typing furiously to keep up with the flow, IBM’s ViaVoice Online Companion might be worth a try. For $20, you can give your weary hands a break from the keyboard and literally talk with other chatters.

As the name suggests, the Online Companion works with Big Blue’s ViaVoice family of voice recognition products—the ViaVoice 98 Home ($89), Office ($149), and Executive ($149) editions. If you already have one of these packages installed and trained properly, you don’t need to do any additional preparation.

After some initial installation problems, I got my headset and the mike connected. Then Online Companion let me yammer away in Yahoo Chat and on America Online with ease. Once I was in the chat area’s message field, I simply said “dictate directly” and then started “talking” to my newfound online pals.

Voice-to-text accuracy was pretty good, especially with brief messages. As with the regular edition of ViaVoice 98, I could correct misrecognized words on the fly by saying “Show correction window” and then dictating or typing the correct spelling. After finishing my dictation, I clicked Send—or in the case of AOL, I simply said “send”—and my message appeared immediately in the chat room. To other chat room participants, my messages looked as if I’d entered them on a keyboard.

Online Companion is optimized to let you dictate e-mail using Netscape Navigator, Microsoft Internet Explorer Outlook Express 98, and AOL—another plus. At $20, it’s a good deal for online chatters.

—Aoife McEvoy

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**ViaVoice Online Companion**

**PRO:** Cheap add-on program can speak-enable your chat room conversations and enhance your e-mail dictation capabilities.

**CON:** Works only with ViaVoice.

**VALUE:** Speech-recognition and chat-room enthusiasts will love the voice bonus.

**Street price:** $20

**IBM**

800/825-5263

www.software.ibm.com/speech
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The addition of the TrueFlat series to the award-winning family of monitors from iiyama is really something to see. Experience for yourself the benefits of these new, flat screen monitors. This advanced technology brings to you a brighter, sharper image that reduces the stress, and strain, on your eyes.

With amazing refresh rates, the resolution will provide you with unparalleled viewing performance. Add to this the TCO '99 certification and you’ll know why the TrueFlat series of monitors from iiyama can make the difference.

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AG pitch 0.25mm center
Horizontal frequency 27–56kHz

**VisionMaster Pro 450 – $699 ESP**
Resolution 1800 x 1440 @ 60Hz
AG pitch 0.25mm center
Horizontal frequency 30–115kHz

| CRT Monitor Model/ 
| Swiveling Area | TCO | Dot Pitch/ 
| CRT Type | Max. Horizontal 
| Scan Rate | Max. Resolution | Est. Street 
| Price |
| --- | --- | --- | --- | --- | --- |
| 22" VisionMaster Pro 510 (20.9" VIS) | TCO '99 | 0.255mm/AG | 130kHz | 2048 x 1600 | $1229 |
| 21" VisionMaster Pro 502 (19.5" VIS) | TCO '99 | 0.28mm/AG | 110kHz | 1800 x 1440/250Hz | $999 |
| VisionMaster Pro 510 (20.9" VIS) | TCO '99 | 0.22mm/H | 15kHz | 1800 x 1440/250Hz | $999 |
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| VisionMaster Pro 410 (17.3" VIS) | TCO '99 | 0.22mm/H | 15kHz | 1800 x 1440/250Hz | $899 |
| VisionMaster Pro 408 (16.9" VIS) | TCO '99 | 0.26mm/AG | 110kHz | 1800 x 1440/250Hz | $899 |
| VisionMaster Pro 408 (16.9" VIS) | TCO '99 | 0.26mm/AG | 110kHz | 1800 x 1440/250Hz | $899 |
| VisionMaster Pro 400 (16.0" VIS) | TCO '99 | 0.28mm/AG | 60kHz | 1280 x 1024 | $699 |
| VisionMaster Pro 400 (16.0" VIS) | TCO '99 | 0.28mm/AG | 60kHz | 1280 x 1024 | $699 |
| VisionMaster Pro 350 (13.7" VIS) | MPR-II | 0.28mm/AG | 60kHz | 1280 x 1024 | $219 |

**VisionMaster Pro 510 – $1229 ESP**
Resolution 2048 x 1536 @ 80Hz
AG pitch 0.25mm center
Horizontal frequency 30–130kHz

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Kingston and PowerLeap Boost PC Power

CPU UPGRADES
Replacing the processor has long been one of the best ways to give tired, two- to three-year-old PCs a power boost. New Plug and Play CPU upgrades from Kingston Technology and PowerLeap may make the process more viable than ever for some users.

I tested a shipping version of Kingston’s $249 TurboChip 366 and a prototype of the $349 PowerLeap K6-II. Both use AMD processors—the Kingston a 366-MHz K6-2, the PowerLeap a 400-MHz K6-II. The price gap is due not to the small clock-speed difference but to the fact that the K6-II has a 256KB internal cache that runs at the same 400 MHz as the CPU.

Each of the two modules is slightly thicker than the original processor. Each adds circuitry to the CPU that eliminates the need to change motherboard jumpers for voltage and clock multipliers. Both also have built-in fans to cool the chips.

The upgrades are designed for PCs running Pentium, AMD, or Cyrix processors with clock speeds of at least 166 MHz. They work only with processors that fit into standard Socket 6 or Socket 7 motherboards, which means you can’t upgrade a Pentium II-based system.

I started out with a two-year-old, home-built PC based on a Pentium-166. I’ve upgraded it occasionally, boosting the RAM to 64MB, adding a new SCSI hard drive, and upgrading the graphics card. Before trying the CPU upgrades, I ran PC WorldBench, which yielded a modest score of 79.

The Kingston TurboChip 366 was a breeze to install. I removed the existing Pentium-166, plugged in the TurboChip, and hooked up power to the fan. When I booted the PC, everything worked normally. I ran PC WorldBench again, and the score rose to 122—a 38 percent improvement, but still a lot lower than the average of 168 recorded by AMD K6-2-350 systems we’ve tested. (PCs based on the AMD K6-2-366 weren’t available for testing.)

I then removed the TurboChip and plugged in the PowerLeap. When I turned on the PC, I was greeted by the unmistakable stench of overheated electronics. The PowerLeap had burned out. The company said the prototype I tested did not have finished power-regulation circuitry, and sent me a second one. It worked, but I had to upgrade my BIOS first. I also had to install a utility to switch on the K6-II’s performance-boosting write-enable feature (a step the Kingston doesn’t require).

After rebooting, I ran PC WorldBench and got a score of 159—nearly double that of the original Pentium-166, and a percent better than the TurboChip 366. By comparison, seven off-the-shelf K6-II-based PCs averaged 187.

Should you consider upgrading with one of these chip modules? It depends on your PC. Although each module should work with most systems, it’s wise to check Kingston’s and PowerLeap’s Web sites to see if your PC and motherboard are compatible with the upgrades. In most cases, the vendor will recommend that you upgrade your BIOS (which could also help with Y2K compatibility)—usually a simple matter of downloading and running an installation file from your PC maker’s Web site.

If you’ve never upgraded your old PC’s RAM, graphics card, or hard drive, the upgrade chips could be hobbled by your old, slow components. But if you’ve kept your PC up-to-date with new parts and pieces, the upgrades can be worthwhile—especially the K6-II-based PowerLeap. If your budget’s tight, the TurboChip 366 can also give your old system a boost.

—Michael S. Lasky

PRO: Provides an impressive performance boost.
CON: More finicky about BIOS compatibility than the TurboChip.
VALUE: Good performance makes high price fair.
Street price: $349
PowerLeap
877/278-5327
www.powerleap.com

PRO: Works on practically any Pentium-166 or later PC.
CON: K6-2-based upgrade is slower than K6-II-based PowerLeap.
VALUE: Lower price choice for boosting an old PC’s power.
Street price: $249
Kingston Technology
800/435-2620
www.kingston.com

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DIGITAL PHONE lines are quickly replacing the analog lines we’ve used for years. But while digital lines provide a wide array of convenient new features, they can fry devices that depend on analog service—such as modems and numerous teleconference phones. Hello Direct’s LineStein Digital Adapter solves this problem by transforming any digital line into an analog-friendly one. This portable $120 lifesaver prevents potential modem damage wherever you travel. Installation takes seconds, and the device’s Learn button takes the guesswork out of making the right connections. One caveata: LineStein requires an AC adapter (included), which can be a drag if the outlet and phone jack aren’t near each other. And, yes, it is pricey—but so is replacing a modem or conference phone. Hello Direct; 800/444-3556; www.hello-direct.com.

—Michael S. Lasky

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—Michael S. Lasky

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*All prices shown are Compaq prices and are subject to change. Prices do not include applicable state and local sales tax or shipping to recipient's destination. Reseller prices may vary. Advertised configurations may vary from award-winning configurations. For hard drives, GB is billion bytes. 2.5 inch CD-ROM data transfer rates may vary from 150 Kbps to 600 Kbps. Designed only to allow faster downloads from 8.4Kb/s-compliant sources. Maximum achievable download transmission rates currently do not reach 36 Kilobits per second (Kbps), and will vary with certain line conditions. Compaq Online Services Free 30-day trial requires Internet access capability. Some restrictions and exclusions apply. Call (910) 799-COMPAQ for warranty details. 12U V.90 modems are designed only to allow faster downloads from 56Kb/s-compliant digital sources. Maximum achievable download transmission rates are currently unknown, may not reach 56 Kbps, and will vary with line conditions. For storage, GB is billion bytes. Compaq Server Pre-Failure Warranty. Pre-Failure Warranty is available on all Compaq Prosignia servers using Compaq Insight Manager 2.1 or higher, also covers EEC memory, and server hard drives (except the 335 MB Fast-SCSI-2 hard drives using Compaq I/OA, IDAZ, Compaq SMART-SCSI Array Controllers, or Compaq SMART-2 SMART Array Controllers). Leave Available through Compaq Capital Corporation to qualified businesses for a term of 36 months with a First Market Value purchase options, and is subject to approved credit and certain terms and conditions. Does not include taxes, fees, or shipping charges. 01999 Compaq Computer Corporation. All rights reserved. Compaq, the Compaq logo, and Prosignia are registered trademarks. PremierSound and Multibeat are trademarks, and Better answers is a service mark of Compaq Computer Corporation. Intel, the Intel Inside logo, and Pentium are registered trademarks, and Celeron is a trademark of Intel Corporation. Microsoft and Windows are registered trademarks of Microsoft Corporation. Other products mentioned herein may be registered trademarks or trademarks of their respective companies. Operating system pre-installed on all portable products. Compaq is not liable for editorial, pictorial, or typographical errors in this advertisement. 07/20/99
Micron's TransPort NX: A 'Desktop' Notebook

**Notebook**

Thin and light notebooks may be catching on with the jet set, but if you plan to use a notebook as your primary PC, you probably want more than the sleekest models offer. Fortunately, many 8- to 10-pound behemoths pack fast processors, giant screens and hard drives, wider keyboards, and many different internal devices as competing notebooks do. In place of the floppy drive, you can insert a second 14GB hard drive ($999 extra), for a total capacity of 28GB. Instead of the LS-120 drive, you can pop in a second lithium-ion battery ($99) or a Zip drive ($199).

Ports to connect multiple devices, including a TV or camcorder, let you record and play audio and video. Surprisingly, audio output is weak, and no modem is included.

The TransPort NX offers more for the money than almost identical notebooks by Empower and AMS Tech, including better-quality DVD and superior tech support. This is a workhorse PC that can go the distance—as long as you don’t have to carry it.

—Carla Thornton

Fix-It Has All the Utilities—But Do They Fix It?

**Utility Software**

Seemingly taking the evolution of utility programs to its logical conclusion, Fix-It Utilities 99 from Mijenix integrates all the utilities you're likely to need into a single scan-and-fix wizard, so you can find and repair the full range of PC problems with just a few clicks.

We tested a shipping version of the $35 program, which includes the following types of utilities: system diagnostics, antivirus, backup of Windows and disk configuration data, enhanced disk tools (for scanning, defragging, and undeleting), system crash protection, Windows customization (for user-controlled interface and system settings), and a Y2K system check. You also get a ready-to-use emergency boot disk and a copy of Desktop Utilities 98, the Best Buy file manager from PC World's June 1998 utility roundup. The only major omission is an enhanced uninstaller.

Fix-It integrates all these utilities seamlessly, but some don't work as well as they should. I got a chance to test Fix-It's CrashProof feature almost immediately in Windows 98, when the master FixWizard program crashed while running the registry scanner. CrashProof ultimately worked around the problem. And after installing Fix-It in my normally rock-solid NT system, I started getting regular blue-screen crashes, which went away after I uninstalled Fix-It. Mijenix has already fixed many of the bugs we encountered (the fixes are available as free downloads from its Web site), so the program may eventually live up to all its promises. A 60-day money-back guarantee means you can check the software out with no risk to your pocketbook. But if you do, back up first.

—Robert Lauriston
Now the award-winning WinBook XL is the first notebook to bring you 400 MHz performance. And don’t let the low price fool you, this model has what it takes to put that speed to work — 128 MB SDRAM, SVGA TFT screen, 3 GB of ultra DMA storage and a v.90, 56k capable modem.

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Acer's Slide Scanner: Power and Convenience

Scanner
With so many budget scanners available, a new model needs to have added features in order to stand out. Acer's $149 Prisa 620PT separates itself from the pack with its advanced slide, film, and transparency capabilities.

Not only can this 36-bit flatbed scan six slides simultaneously (thanks to its built-in, exceptionally capacious transparency adapter), it can also handle each of those slides as a separate job, with different color and resolution settings. This feature eliminates the need to shuffle individual slides in and out of the scanner. If you don't need to change settings for each slide, you can scan several slides at once, and then cut and paste each image into its own file.

In other respects, the Prisa 620PT is comparable to many other 36-bit parallel port flatbeds on the market. Image quality is acceptable, if not outstanding. The software bundle includes Ulead Photo Express 2.0 (a solid but not particularly user-friendly image editor) and Kai's Photo Soap for graphics; a utility that enables you to use the scanner as a copier; and TextBridge Classic 2.0, a limited version of ScanSoft's optical character recognition program (for a review of the full-fledged TextBridge Pro 9.0, see page 90). The Prisa does not, however, come with any document management software.

Helpful, clearly illustrated installation instructions on a large poster should get novices up and running easily. Note that the Prisa 620PT requires an extra power outlet, since the transparency adapter has its own AC adapter.

My shipping unit came with a parallel port hookup. If you're planning on a lot of high-resolution slide scanning, however, you might want to spend an additional $20 for the Prisa 620ST, whose SCSI interface is speedier—but note that you'll have to open your computer's case to install the 620ST's included SCSI board, unless you already have one installed. There are plenty of affordable scanners to choose from today, but if your scanning routine involves lots of slides, either version of the Acer Prisa is worth considering.

—Yarden Arar

May the ErgoForce Be With You

Keyboard
Over the years, PC keyboard manufacturers have tried to perk up sales of keyboards by adding speakers, scanners, and Internet navigation buttons to the boards. With the release of Windows 95, the basic 101-key device expanded to 104 keys. But despite all these changes, the only features that matter much to users are typing comfort and price. And beyond a few nods to ergonomics (such as the introduction of raised and angled keys), keyboard comfort levels haven't really changed for years. Until now.

Key Tronic's $25 ErgoForce revolutionizes typing comfort by varying the force required to press each key. On most keyboards, it takes about 55 grams of force to activate any key. But common sense tells us that the thumb can exert more pressure on the spacebar than the weaker pinky can when it reaches for the P or Q keys. Accordingly, the 104-key ErgoForce requires just 35 grams for outlying letter keys, 45 grams for inside keys, 55 grams for the function keys, 65 grams for <Enter>, and a full 80 grams for the bottom row with <Ctrl>, <Alt>, and the spacebar.

In my test of a shipping unit, I experienced a palpable improvement in typing comfort, especially after spending a couple of hours at the keyboard. Because I tend to inadvertently press the spacebar on conventional keyboards, I particularly appreciated that the ErgoForce's bottom row required more pressure.

For hunt-and-peck typists, the varied key pressures won't make much of a difference—the ErgoForce keyboard was clearly designed with touch typists in mind. And its reasonable $25 price tag should make it easier for them to handle the “pressure.”

—Michael S. Lasky

Key Tronic's ErgoForce keyboard varies the amount of pressure required for different keys, making typing more comfortable.
Starting at $99, it’s the least expensive disaster prevention you’ll ever buy

Why 8 million PC users can’t be wrong about APC power protection.

Power problems are the largest cause of data loss and occur 15 times more frequently than computer viruses. Besides an outright power outage, keyboard lock-ups, system crashes, corrupted data and lost Internet connections are also symptoms of power irregularities. These events cause interruptions and interfere with your ability to get the job done.

An APC UPS gives you:
- Enough outlets to protect your computer plus displays, printers, scanners and more
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- Site Wiring Fault Indicator
- Audible and Visible Alarms alert you to power events as they occur
- $25,000 equipment protection guarantee (U.S. and Canada only, see policy)
- “Best in Class” longest runtime guarantee (5-40 minutes)

An APC Uninterruptible Power Supply (UPS) gives you two layers of protection in one unit. Memory cards and hard disks are shielded from damaging surges while back up battery power enables you to shut down during an emergency without losing any data. APC units are the only UPSs on the market backed by a $25,000 equipment protection guarantee. Try one today!

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See ScanSoft Spell: TextBridge Pro 9

OCR SOFTWARE
IF YOU'RE SERIOUS about turning paper documents into editable text, you'll want more than you get from the limited optical character recognition software that comes with most scanners. ScanSoft's TextBridge Pro 9 reaches out to beginning and intermediate OCR users with its simplest interface ever, improved accuracy, support for color documents, and the ability to output formatted Web pages. The new version places TextBridge Pro closer than ever to its archival rival, Caere's OmniPage Pro.

In fact, I found a preproduction copy of TextBridge Pro 9 easier to use than OmniPage Pro 9.0, mainly because OmniPage's zoning tools—which divide complex documents into different areas for formatting purposes—are more difficult to master. ScanSoft also offers more prescanning options for different document types (newspaper clipping, magazine page, fax, letter, and so on). And like OmniPage, ScanSoft offers easy proofing and correction.

I tested TextBridge Pro 9 with a dozen or so letters, faxes, and spreadsheets, and a few pages from PC World magazine. On clearly printed letters, the program achieved impressive accuracy in both character recognition—99 percent or better—and format retention. But with more complex content, results varied wildly. For example, TextBridge Pro did a fine job recognizing the text from a Wall Street Journal clipping, but inexplicably changed typefaces in midstream and put a caption for a line drawing in the middle of text. The program was more adept at maintaining the format of a black-and-white warranty card, and recreating simple formats in HTML.

TextBridge Pro couldn't render a complex PC World page that had different font sizes and styles: It performed two scans of the color pages (one for the color elements, another for black and white) but then had difficulty recombining them properly.

TextBridge Pro's new user interface and simple zoning tools make it especially well-suited for OCR beginners, who need all the hand-holding they can get. For everybody else, it should make text conversion a breeze.

—Yardena Arar

HP's Palmtop: The Handheld PC Done Right

PDA
'HANDHE LD' PCs? Most of the latest Windows CE devices so marketed are more like a handful-and-a-half. Sharp's Mobiion Pro and its rivals approach the size and weight of subnotebooks. One palmtop that lives up to the name is Hewlett-Packard's Jornada 680. Though a tight squeeze for most pockets at 7.4 by 3.7 by 1.3 inches, the 1.1-pound Jornada is compact enough to carry almost anywhere in a briefcase or shoulder bag. With a usable if not quite ergonomic keyboard, the Jornada is a legitimate alternative to pen-only devices like IBM's Palm organizers.

The $899 price is a bit steep, but it gets you a zippy 133-MHz processor, a generous 16MB of RAM, a reasonably crisp 256-color screen, and a built-in 56-kbps modem. HP supplements Windows CE's standard applications (slimmed-down versions of Word, Excel, Outlook, Internet Explorer, and other programs) with useful extras such as Pocket Quicken, a backup utility, and a file viewer.

Most importantly, the Jornada 680 makes real strides toward overcoming two of palmtop computing's most annoying weak spots: keyboard quality and battery life. Its notebook-like keys are a bit too small for touch typing, but they're a vast improvement on most PDAs' calculator-type buttons. I was able to take care of basic data entry without too many typos. In my informal tests of a shipping model, the rechargeable battery provided more than 6 hours of power.

Judging from the success of 3Com's Palm devices, most palmtop buyers are perfectly happy without a keyboard, color screen, built-in modem, or Windows-style user interface. But if you crave those features, and you still want to go small and light, you won't do better than the Jornada 680.

—Harry McCracken

THE JORNADA 680 offers a crisp color display and an improved keyboard.

TextBridge Pro 9

PRO: Improved user interface and accuracy, good Web formatting.
CON: Has trouble re-creating complex documents with color.
VALUE: Solid product easily accessible to beginners.

Street price: $99 ($49 to upgrade from TextBridge 98 or Classic).
ScanSoft
888/663-0658
www.scansoft.com

Jornada 680

PRO: Improved keyboard and color screen, long battery life.
CON: Not really pocketable, keyboard too tiny for touch typing.
VALUE: Best color Windows CE palmtop we've seen.

Street price: $899
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PRODUCT INFO NO. 710

PRODUCT INFO NO. 712
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Hold Your Group Meetings on the Web

Given all its success with Notes, you might expect Lotus to make a compelling Web-based workgroup application. Not exactly. Judging from our experience with a prerelease version, the company’s new QuickPlace workgroup program—though miles ahead of its predecessor, Lotus Instant Teamroom—still lags several steps behind the competition.

Web-based workgroup applications are meant to be simple. Once you’ve loaded the program on a company server—or rented it from an ISP—you participate in group discussions and collaborations using nothing more than their Web browsers. QuickPlace, which will be available as a $995 stand-alone server application, bundled with Domino R5, and rentable through America Online and others, is certainly easier to use than Instant Teamroom. You can post messages with multiple fonts, colors, and formats, and include files, animations, or HTML pages. There’s also a shared calendar for planning meetings and deadlines.

But intuitive it isn’t. Instead of simply posting messages, you must create “pages.” Granted, these can be far more sophisticated than your typical discussion thread, but with all the typefaces and graphics froufrou, they also slow the program down.

The original Instant Teamroom lacked a way of notifying team members when you posted something new. Lotus added this crucial feature to QuickPlace, but buried it: When you create a page, you need to hit the Publish As... button to notify group members. A simple Notify button would have sufficed. QuickPlace also lacks a Log Out button, which should concern security-conscious workgroups.

Compare QuickPlace with ERoom from Instinctive Technology, and you’ll see what Lotus missed. ERoom has a chat feature for instant meetings and a search function for messages and documents, notifies you when other team members are logged on, and tracks document revisions. ERoom 4.0 also integrates with Microsoft Office 2000 and new workgroup administration features.

If QuickPlace had any of these features, it would be more alluring. As it is, however, a better name for it might be QuickSand.

—Brad Grimes

Kenwood 52X CD-ROM Drive: A Numbers Game

I nearly destroyed the shipping carton in my eagerness to open Kenwood’s $130 52X TrueX CD-ROM drive. I couldn’t wait to check out its new TrueX multibeam technology. 2MB onboard buffer (to further rev data output), and 52X speed.

Several passes with Testa Labs’ CD Tach benchmark software, using Windows “Quad speed or higher” buffer settings, did nothing to dampen my enthusiasm: The Kenwood’s 47X test rating was, in a word, smokin’.

The TrueX multibeam technology Kenwood has licensed from Zen Research is supposedly to speed throughput by reading seven tracks at a time. But what works in benchmark testing often doesn’t translate to improvements in real-world CD-ROM drive performance.

That was borne out when I compared the Kenwood with a 32X Toshiba CD-ROM drive. I used each drive to fully install Microsoft Office 97 and found no appreciable difference in their performance reading and loading data on the Microsoft installation disc. The shipping Kenwood drive also appeared no faster than the Toshiba when reading any of the ten other discs I tried.

On the positive side, the Kenwood 52X TrueX is ruggedly built and will probably hold up far beyond its one-year warranty.

There may be practical business uses where TrueX technology produces better results. Until I find them, I remain unconvinced that it can sustain its claims in the real world.

—Jon L. Jacobi

Kenwood 52X TrueX

PRO: Solidly constructed.
CON: Doesn’t live up to its speed rating for real-world uses.
VALUE: Okay but not a standout.
List price: $130
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Desktop Options

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<tr>
<th>Option</th>
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<th>Code</th>
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<tr>
<td>G790 19&quot; color monitor, 18&quot; viewable</td>
<td>$499.97</td>
<td>CDW 98512</td>
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<td>HP ScanJet 6250Cse Color scanner and document feeder</td>
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<td>OmniPage Pro V9.0 For Windows 95, 98 and NT Upgrade</td>
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<td>HomeSite V4.0 Build great Web sites</td>
<td>$88.92</td>
<td>CDW 139993</td>
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<td>Fast EtherLink XL 10/100 PCI Ethernet adapter</td>
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<tr>
<td>64MB memory upgrade</td>
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<td>CDW 115054</td>
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<td>Compaq 5226A dual-speed switch</td>
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<td>VERITAS Backup Exec™ V.7.2 For Windows NT</td>
<td>$447.30</td>
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<td>Cisco Systems 1601 Router</td>
<td>$1138.39</td>
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</table>

### Sony

Sony VAIO C1 PictureBook

**Notebook computer**

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CDW 146488

Sony VAIO C1 PictureBook includes built-in camera.

Sony VAIO C1 PictureBook is $100 mail-in manufacturer rebate with purchase of a Sony VAIO C1 PictureBook and a Sony PCGA-CDS or CDSI CD-ROM drive. (offer ends 9/30/99)

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CDW 146488

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Kodak's Digicam: Lots to Like, a Few Gotchas

Kodak DC240

**PRO:** Easy to use, speedy USB port, bountiful software bundle.

**CON:** Disappointing image quality with some outdoor shots, missing some features of the DC220.

**VALUE:** Worth considering, but not a runaway winner.

List price: $699

Kodak

800/235-6325

www.kodak.com

PRODUCT INFO NO. 717

The trimmer, easier-to-hold Kodak DC240 improves on its predecessor, the DC220.

**PRO:** Easy to use, speedy USB port, bountiful software bundle.

**CON:** Disappointing image quality with some outdoor shots, missing some features of the DC220.

**VALUE:** Worth considering, but not a runaway winner.

List price: $699

Kodak

800/235-6325

www.kodak.com

PRODUCT INFO NO. 717

USB CD-RW Drive: Instant Plug-In Convenience

**STORAGE**

For many users, the appeal of creating CD-ROMs and audio CDs with a CD-Recordable drive has been offset by assumed installation hassles. But installing LaCie's CDRW 226 drive—one of the first USB CD-RW drives—is as easy as plugging the drive into a standard USB port. The $379 drive works with any Windows 98 PC that has a USB port—and with Apple's iMac and G3 computers. Installing a shipping version of the drive (on a Pentium MMX-200 system with 32MB of SDRAM) was like plugging in a toaster. It was ready to go without a single reboot.

Alas, its performance was unremarkable. Testa Lab's CD Tach benchmark rated the LaCie's data-reading capabilities at just slightly faster than 3X—considerably slower than the drive's 6X rating. To its credit, the drive read a variety of CD-R and CD-RW disks and played audio CDs without hiccuping once.

Of course, the main reason to install a CD-RW drive is to write discs, and the LaCie does that with aplomb. I wrote two CD-Recordables at the drive's 2X speed with nary a glitch. CD-RW writing was also trouble-free (but slow—writing 100MB of files to disc took about 8 minutes). The exceptionally quiet drive is mounted inside a wide-profile case that appears sturdy enough to withstand the knocks and dings of moving it from PC to PC. Bundled software includes Easy CD Creator 3.5 plus DirectCD 2.5 for the PC, and Toast 3.5.6 with DirectCD for the Mac.

If you need a cost-effective, hassle-free way to share your CD-RW resources—especially in a mixed PC/Mac environment—the LaCie is well worth the cost.

—Jon L. Jacobi

LaCie CDRW 226

**PRO:** Portable, easy to install, compatible across platforms, solid CD writer.

**CON:** Slow reading performance.

**VALUE:** A bargain for anyone who needs to share a CD-RW drive among different computers.

List price: $379

LaCie

503/844-4500 www.lacie.com

PRODUCT INFO NO. 715

THE TRIMMER, EASIER-to-hold Kodak DC240 improves on its predecessor, the DC220.
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**BUDGET DESKTOPS #1 BEST BUY, QP6/400 M-1C—PC WORLD JUNE 1999**

“PC hunters looking for a budget small-office/home-office system will be hard pressed to do better than Quantex’s new Celeron-400 [Intel Celeron processor 400MHz based] PC."

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<table>
<thead>
<tr>
<th>Model</th>
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<tr>
<td>QP6/500 SM-3x</td>
<td>$2149</td>
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<td>QP6/400 M-1c</td>
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**DESKTOPS FOR HOME AND OFFICE**

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  - 933MHz AMD K6-2 Processor
  - 128MB SDRAM Memory
  - 512KB Secondary Cache
  - 20GB Ultra ATA Hard Drive
  - Intel Pro/1000 SDRAM Memory
  - New 19" Voodoo3 3000 2x AGP Video, 16MB, TV-out
  - CD-Rewritable Drive
  - 6x Max Variable speed CD-ROM Drive
  - 2x 3.5" 1.44MB Floppy Drive
  - Intel 810 Graphics Accelerator
  - 3.5" 1.44MB Floppy Drive
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  - 128MB PC100 SDRAM Memory
  - 19" Monitor w/Diamondtron Natural Flat CRT
  - 933MHz AMD K6-2 Processor
  - 128MB SDRAM Memory
  - 512KB Secondary Cache
  - 20GB Ultra ATA Hard Drive
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  - 2x 3.5" 1.44MB Floppy Drive
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<th><strong>Quantex QX6400</strong></th>
<th><strong>$7699</strong></th>
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<td>Business Line: $255/Mo, 36 Mos.</td>
<td>10 Money Down</td>
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<tr>
<td>- New Intel® Pentium® III Xeon® Processor 550MHz (Quad Processor Upgradable)</td>
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<td>- 256MB PC100 ECC SDRAM 4MB Max.</td>
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<tr>
<td>- 512MB Full-Speed ECC Secondary Cache</td>
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<tr>
<td>- Three 3.5&quot; Ultra160 QSC Hot Swap Hard Drives</td>
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<tr>
<td>- All MegaRAID 439 Dual Channel SCSI Controller</td>
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<tr>
<td>- Dual Eee! PCI Buses</td>
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<tr>
<td>- 104-Key Keyboard; MS Mouse</td>
<td></td>
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<tr>
<td>- 3-Year Limited Warranty</td>
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<tr>
<td>- 24 x Tel-Free Dedicated Server Hardware Support</td>
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<th><strong>Quantex QX6200</strong></th>
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<tr>
<td>- 9GB Ultra2/400 SCSI Hot Swap Hard Drive</td>
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<tr>
<td>- Intel EtherExpress Pro 100 Fast Ethernet w/RJ-45</td>
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<tr>
<td>- Dual Channel SCSI Controller, Ultra2/900 SQD, Ultra3 Wide SCSI</td>
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<tr>
<td>- Dual PC Card Bays, 1 ISA Slot, 1 64MB ECC RAM</td>
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<tr>
<td>- 40x Max Variable Speed CD-ROM Drive</td>
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<tr>
<td>- Quadex QX6200 Server Case; 2-1 400w Redundant Power Supplies, 6 Hot-Swap Drive Bays</td>
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<td>- up to 11 fans</td>
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<tr>
<td>- Emergency Management Port, ISC Management Console</td>
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<td>- Chassis-IntelliSwitch, Drive bay lock</td>
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<td>- 104-Key Keyboard, MS Mouse</td>
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<tr>
<td>- Add All MegaRAID 439 Dual Channel SCSI Controller with 16MB 8 Battery Backup Unit for $1299</td>
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<td>- 9GB Ultra2/400 SCSI Hot Swap Hard Drive</td>
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<td>- Dual Channel 800 Wide SCSI Controller</td>
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<td>- Quadex QX5000 Server Case</td>
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<td>- 104-Key Keyboard, MS Mouse</td>
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<td>- Add WinNT 4 Server 4.0 w/10 CAL for $799</td>
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<td>- Add Adaptec SCSI RAID Controller for $399</td>
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<td>- 4GB Ultra Wide Wide SCSI Hard Drive</td>
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<tr>
<td>- Single Channel Ultra-Wide SCSI Controller</td>
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<td>- 3 PC Card Bays, 1 ISA Slot, 1 Shared PCI/ISA Slot</td>
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<td>- 4x Max Variable Speed CD-ROM Drive</td>
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<tr>
<td>- Quadex QX3000 Mid Tower Server Case</td>
<td></td>
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<tr>
<td>- 4 Internal 3.5&quot; Bays, 4 External 5.25&quot; Bays</td>
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<td>- Emergency Management Port, ISC Management Console</td>
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<td>- 104-Key Keyboard, MS Mouse</td>
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<td>- 3-Year Limited Warranty</td>
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<tr>
<td>- 24 x Tel-Free Dedicated Server Hardware Support</td>
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<tr>
<td>- Add 410 Smart UPS 220VA for $199</td>
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Proactive Server Management — maximum uptime. Intel Controller Management software (ISC), Emergency Management Port (EMP) and System Health Monitoring.

R.A.I.D. — high-performance data management, configuration flexibility, easy expansion and robust fault tolerance.

Up to 4GB ECC RAM — extreme flexibility and scalability to support the most demanding server applications.

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Hot Swap Components — on the fly replacement of hard drives, fans and power supplies; avoid system failure and data loss with Redundancy option.

**Actual component placement may vary.**

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All Together Now: One Device to Print, Copy, Scan, and Fax

**MULTIFUNCTION**

If you’re like most small-office users, you have a space problem: You’ve collected a zillion complicated, desktop-hogging pieces of equipment. But if you’re starting from scratch, you can free up space and save money by choosing a multifunction device. MFDs combine a printer, a copier, and a scanner—and often a fax—inside a single case.

We tested four MFDs, each designed to handle color inkjet printing and color scanning. We looked at Brother’s $499 MFC-7150C, Compaq’s $399 A900, Hewlett-Packard’s $399 OfficeJet R40 (which has no fax capability), and Xerox’s $499 WorkCentre 480cc.

In exchange for the space savings, each of these MFDs forces you to accept trade-offs. None, for example, makes faxing as straightforward as a stand-alone fax machine does. All four MFDs are confusing to use in some way, usually because of complex software. The HP Officejet R40 comes closest to being a good overall package, but it can’t fax. The Brother MFC-7150C, meanwhile, has a simple control panel, but its print quality is only middling. Making copies is no fun with the Compaq, and takes too long with the Xerox. So when you consider buying an MFD, try to anticipate what you’ll use it for most and make sure your choice is strong in that area.

**SOFTWARE: THE MULTIFUNCTION GLUE**

For most users, the most compelling benefits of MFDs are that they free up desktop space and simplify connections. These models aren’t much bigger than inkjet printers, and they require only one power outlet and one parallel port connection to your PC. And unless you’d choose the cheapest stand-alone products on the market, an MFD costs you less than three or four separate devices.

But a bunch of hardware in one box does not an integrated system make. To tie it all together, you need software, and these MFDs make you switch between third-party programs to perform ordinary tasks. For example, the Xerox includes the Pagis Pro document manager and scanning software as well as LaserFax Lite.

**THE HUMAN FACTOR**

Another advantage of MFDs over stand-alone devices: You can operate an MFD from its hardware control panel without booting your PC. Of the fax-capable devices we tested, Brother’s MFC-7150C gets the nod in this area; its control panel groups clearly labeled buttons for each function. In addition, the Brother’s software can import phone numbers from databases such as Syman­tec’s Act and add them to memory. By contrast, the Xerox 480cc’s confusing control panel and menus require you to enter phone numbers by hand to store them in memory.

You can run Compaq’s A900 from its control panel, but for color copying or complicated jobs, it’s easier to use the control form. Once you’ve printed this form, marked your function choice (fax, copy, or scan), specified the number of pages involved, and fed the form in ahead of your document, the machine performs the desired function. You can also download names from an address book onto the form.

**A PRINTER BY ANY OTHER NAME**

There are no mysteries to printing with any of the MFDs we tested. They operate like stand-alone printers. They also vary in terms of print quality.

All four of these models print fairly well on plain paper. The Compaq and Xerox units print clean black text. The HP produces strong, solid black type, but letters look a bit jagged. The Brother MFC-7150C’s text is probably the weakest—somewhat gray and streaky—and its graphics seem washed out and gritty, but it should nevertheless be good enough for most uses. The Compaq and Xerox print attractive graphics. If you use inkjet paper, the HP’s graphics also shine, and the Brother’s improve substantially.

Our informal testing indicates that these MFDs run at about the speed of most ink jet printers. The Compaq and Xerox seem slow, while the HP runs about as fast as the company’s zippy DeskJet 882 ink jet printer. One quirk: The Brother MFC-7150C wiggles so much as it prints that it might need its own stand.

---

**MULTIFUNCTION** devices combine three or four products in one. We looked at four models and found the following:

- Prices under $600
- Many functions, small size
- Unintegrated software
- Broad usability range, from simple to baffling
- Good printers, mixed fax machines, slow copiers

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*Photograph: Bill Endland*
One Box, Many Functions: An MFD Can Save You Space, Money, and Time

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>STREET PRICE (2/3/99)</th>
<th>COPYING/SCANNING FEATURES</th>
<th>FAX FEATURES</th>
<th>PRINT QUALITY</th>
<th>COMMENTS</th>
<th>PRODUCT INFO NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brother MFC-7150C</td>
<td>$499</td>
<td>Copies color or black without PC, enlarges, reduces, prints copies in any color.</td>
<td>Polling, remote retrieval, forwarding, phone number downloading, built-in cover pages.</td>
<td>Pale text and color.</td>
<td>Includes telephone handset and video-in port, easiest control panel and fax, print quality merely adequate.</td>
<td>774</td>
</tr>
<tr>
<td>Compaq A900</td>
<td>$399</td>
<td>Copies black without PC, copies color with aid of PC scanning software.</td>
<td>Easy wizard-style function, calling-card support, fax backup and restoration.</td>
<td>Solid letters and gritty color.</td>
<td>Least expensive MFD here, can initiate scans, copies, and faxes with a control form, many features disabled in bundled &quot;Basic&quot; version of fax software.</td>
<td>775</td>
</tr>
<tr>
<td>HP OfficeJet R40</td>
<td>$599</td>
<td>Copies color or black without PC, enlarges, reduces.</td>
<td>None</td>
<td>Rich text with jagged edges. Colors are slightly off, but subtle.</td>
<td>Most expensive MFD here, no fax capability, very easy to use, fast printing and copying, removable scanner lid.</td>
<td>776</td>
</tr>
<tr>
<td>Xerox WorkCentre 480cx</td>
<td>$499</td>
<td>Copies black without PC, copies color with aid of PC scanning software.</td>
<td>Polling, cover-page design software.</td>
<td>Sharp black letters, very good detail and hue on color graphics.</td>
<td>Confusing control panel and menus, good print quality.</td>
<td>777</td>
</tr>
</tbody>
</table>

* Recommended

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**NEW PRODUCTS**

**PAPER CLONES**

Some MFDs make copying easy; others make it tough. The speed at which a model copies in color is the true test. Ideally, you just drop a document in the feeder and then push the "black copy" or "color copy" button. That's how HP's OfficeJet R40 and Brother's MFC-7150C work—and both can make a color copy in less than a minute. The HP, which scans on a glass flatbed like a photocopier, so you can duplicate pages from thick originals such as books.

The Compaq A900 makes black-and-white copies at the push of a button, but color copies are harder to obtain: Your PC must be running, and you have to navigate the A900's control panel menus (or use the control form). The scan goes to your PC and then back to the printer automatically; I waited 8 minutes for one page to print (yikes!). But copying with the Xerox WorkCentre 480cx was trickiest of all: You have to run Pagis Pro on your computer, initiate and save a scan, and then print. Time: about 11 minutes (double yikes!). By contrast, a typical stand-alone color copier can spit out a page in under 40 seconds.

**HARD FACTS ABOUT FAXES**

**RUNNING FAX software on a PC opens up intriguing possibilities.** For example, by using LaserFax with the Xerox, you can embed commands in documents to automatically fill out cover sheets for broadcast faxes or send different documents to each recipient. But some MFDs we tested—especially the Brother MFC-7150C—perform plenty of fax tricks without a PC. For example, the Brother can poll (that is, call another fax machine and request faxes from it) and be polled. The Brother also enables you to call in from a remote fax machine and retrieve documents from memory, and it supplies built-in cover pages for outgoing faxes. In comparison, the Compaq's fax functions are particularly limited. The Compaq has no polling or remote capabilities, and provides no way to talk with the recipient before faxing. The Xerox's fax capabilities are modest but adequate. The HP OfficeJet R40 has no fax (a fax-capable version, the R60, costs $799).

**THE MFD DECISION**

Ultimately, deciding which MFD is right for you comes down to what you want to do with it. If you plan on running a business with your multifunction device, you'll need one that can fax. But if all you're looking for is a printer with some extra features, your best bet is the HP OfficeJet R40, which combines high-quality printing, easy-to-use design, and fast performance. But its $599 price tag may give you pause.

Among the fax-capable devices, Brother's MFC-7150C costs the most—$499—and offers the most complete set of functions for the money. If you can live with its less-than-stellar print quality, you'll find its simple, easy-to-use design and strong fax features well worth the price.

—Dan Littman
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Circle 94 on card or go to www.pcworld.com/productinfo
show just how wild the end of the millennium is.

Our picks for 67 of this year's best performers show just how wild the end of the millennium is.

By PC World Editors

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PCs over 500 MHz, PCs under $500. Astonishing growth in e-commerce, astonishing erosion of online privacy.
LAST YEAR WE bestowed the title of Most Promising Hardware Newcomer on the sub-$1000 PC. Nowadays, even a $999 PC seems a tad pricey. Thanks in large part to the AMD K6 processors and their ongoing battle with Intel's low-cost Celeron chips, competition in the budget PC market is intense. How about an Emachines AMD K6-2-300 PC for $399? Or a Microworx Webvester Jr. with a Cyrix MII-300 chip for a paltry $300? Even business machines are cheaper. Witness a powerful Celeron-466 PC for $1499. We say (with apologies to Herbert Hoover): a PC in every pot.

NOT TO BE alarmist, but we recommend you savor these 17th annual World Class Awards—because they could be our last. According to a rumor flying around PC World's offices, our brains are not Y2K-compliant. Therefore, when the calendar changes at year's end, we may be reviewing products like it was 1900. Can you imagine what your great-grandparents would have made of the Palm IIIx?

Seriously now, that's the last you'll hear of millennial madness for the next eight pages. Despite the media furor over the Y2K bug, the past year saw a lot of other developments worth getting excited about:

An eight-year-old operating system called Linux was born; PC prices fell to the point where it wasn’t so crazy to pay in cash; and Big Brother carved out some space on which ones were the best. In the end, we crowned some previous unknowns (Amorphium and the Castlewood Orb drive come to mind), as well as some old favorites (Dell’s Dimension PCs and Adobe Photoshop). And caught up in the spirit of giving, we couldn't resist handing out brickbats for some of the past year's more dubious achievements (see “The No-Class Awards,” page 103).

But enough with the idle pleasantries. It's time to recognize the final World Class honorees of the '90s—that's the 1990s, not the 1890s.

At the office, we like Dell's OptiPlex GX1p series for larger installations. The PCs in this line have integrated remote management features and an interior design that makes multiple-system upgrades a snap. For smaller-scale business needs, check out the Micron Millennia Max series. These desktop systems consistently excel in our PC WorldBench 98 tests and come loaded with extras like DVD-ROM and Zip drives and toplight graphics cards.

Among home systems, the top two contenders fought to a draw. But depending on how much you’re willing to spend, your decision will be easy. The Dell Dimension XPS T series systems offer the latest technology in home PCs—a fast CPU, oodles of RAM, a DVD-ROM drive, and 3D graphics. But they aren’t cheap. For the fiscally conservative, we recommend the Quantex OP6 M-1c series of Celeron-based systems. With baseline chip speeds ranging from 333 MHz to 466 MHz, these PCs give you outstanding performance for the price. And with Quantex's reliability and service reputation on the rise, you can buy with confidence.

Don't hold your breath waiting for supercheap notebooks. Though prices are coming down, they're not in free fall. The hard-working Dell Latitude CPI corporate
notebooks top out above $3000, but they’re the series of portables you want for your business. They’ve dominated our Top 10 Notebook PCs power chart this year, with a classy look and superior keyboard. The latest model, the Latitude CPI A366 XT, is relatively thin and lightweight, too, though we wouldn’t call it a subnotebook. The best ultraportables come from Toshiba’s Portégé line. Its Portégé 3015CT may not be the best superslim (less than an inch thick) notebook, but group it with the high-class Portégé 7000CT (just over 1 inch thick) and you’ve got the best brace of thin, lightweight notebooks around.

### Components

- **Best Modem** Diamond Multimedia Supra-Express 56e Fast and incredibly easy to use.
- **Best Graphics Card** Matrox Millennium G200 Makes AGP look like a good idea.
- **Best Monitor** Mitsubishi Diamond Pro 900u The Mercedes-Benz of big monitors.
- **Best Input Device** Logitech MouseMan Wheel Sorry, lefties, but this mouse rules.
- **Best Sound Card** Creative Labs Sound Blaster Live Can you hear gamers drool?
- **Best PC Speakers** Cambridge SoundWorks SoundWorks Love ’em, love ’em.

If the explosion of cheap, no-frills computers has taught us one thing, it’s that you can’t do without some components. Not only must you have a reasonably roomy place to store your data (see our Storage awards, at right), you need reliable ways to see it, manipulate it, and send it over the Internet. We’d also argue that hearing what your PC has to say (or play) is a basic part of computing.

That said, you don’t have to be satisfied with the generic parts that come with most cheap PCs. Our favorite components start with the $100 Diamond Multimedia SupraExpress 56e external modem. It’s fast, affordable, and a breeze to set up. We also like the $129 Matrox Millennium G200 graphics card. It functions best as an AGP card, handling mixed-media graphics with aplomb, but it’s no slouch at supporting the occasional 3D game, either.

Hook up the Millennium to a big, bright Mitsubishi Diamond Pro 900u monitor and revel at the sight of everything from desktop publishing layouts to Web pages. This $799 19-inch display some of the sharpest, most vibrant colors we’ve seen on a computer screen. And when you’re clicking around in cyberspace, use the $50 Logitech MouseMan Wheel. Granted, southpaws are out of luck, but this is still the most comfortable mouse around—even our left-handed editors agree.

For listening to basic audio files, you need a good sound card. Throw in MIDI instruments or 3D games, and you’ll want a great sound card: the $200 Creative Labs Sound Blaster Live. It’s pricey—but worth every penny. If you paid for PC speakers by the pound, our World Class winner would also be expensive. The $150 Cambridge SoundWorks SoundWorks speakers are the size of your fist. But add the bundled subwoofer and you get audio that rivals the output of much larger systems.

### Storage

- **Best Hard Drive** IBM Deskstar 22GXP
Who says big can’t mean fast?
- **Best DVD-ROM Drive** Sony DDU-220E/ H5X Finally, a DVD-ROM drive that can deliver the goods.
- **Best CD-ROM Drive** Plextor UltraPlex 40max Really fast—’nuff said.
- **Best CD-Rewritable Drive** MicroSolutions Backpack 4X CD-Rewriter Create your own CDs on the run.
- **Best Removable Storage Drive** Castlewood Orb 2.2GB Upstart drive challenges the lomoga dynasty.

When you get serious about upgrading your PC, you’ll probably consider bolstering your storage system. After all, your storage system is all you’ve got. Even the various drives that hold your data. Just look at hard drives: A year ago, 14GB was considered huge; this year’s World Class winner—IBM’s Deskstar 22GXP—packs 22GB. Despite its vast capacity, the Deskstar is noticeably faster than previous generations of hard drives; and at $459, it costs only about 2 cents a megabyte.

Hard drives aren’t the only rapidly evolving storage device. CD-ROM, DVD-ROM, CD-Rewritable, and removable-media drives also made big strides in the past year. Early DVD-ROM drives could barely play DVD movies, and they ran...
CD-ROM programs sluggishly. The current generation plays DVD discs at about 5X speed and does justice to legacy CD-ROMs. Our favorite, the Sony DDU-220E/HSX drive, costs around $250 and is relatively easy to install.

But don’t count out CD-ROM drives just yet. Plextor’s UltraPlex 40max ($189 for an internal drive, $269 for an external drive) is breathtakingly quick; and if you need to create your own CDs, go for the portable $399 MicroSolutions Backpack 4X CD-Rewriter. Although the Backpack attaches to your computer’s parallel port, it doesn’t sacrifice much speed—a combination no other CD-RW drive can claim.

Rounding out our top storage products is the $200 Castlewood Orb 2.2GB removable-media drive. It uses 2.2GB removable cartridges that, like the drive itself, are considerably less expensive than Omega’s offerings. And if that isn’t incentive enough, it’s also significantly faster.

Are you ready to upgrade?

**Peripheral**

- **Best Personal Color Printer** Canon BJC-5000 Laserlike text output.
- **Best Personal Monochrome Printer** Brother HL-1040 Won’t break your SOHO’s budget.
- **Best Scanner** Epson Perfection 636 Nice colors, easy to set up.
- **Best Digital Camera** Nikon Coolpix 950 For pros and hobbyists alike.
- **Best Flat-Panel Display** Silicon Graphics 1600SW Stunning digital images for the well-to-do.
- **Best Projection System** Proxima UltraLight L51 Fully loaded—and priced to match.
- **Best Personal Digital Assistant** 3Com Palm IIIx Last year’s winner just gets better.

No PC is an island. The best peripherals make a computing experience complete. The past year has seen developments in peripherals that simply make stuff look better. The $199 Canon BJC-5000 color inkjet printer (recently joined in the line by the BJC-5100) may not be the fastest model on the block, but it turns out laser-quality text. And because it holds two ink cartridges, you can vary the output speed as needed. If you never need color, we recommend the $300 Brother HL-1040. This small-office/home office printer has lots to offer: it’s inexpensive and fast, and it prints great-looking documents.

But enough about getting things out of your computer. There are also a couple of great ways to get documents and images into your PC. The speedy $299 Epson Perfection 636 flatbed scanner produces good scans and is easy to set up—despite its SCSI interface. If you want to skip the scanner intermediary, Nikon’s Coolpix 950 ($999) is the digital camera to buy. A thousand bucks is a lot of money.

Clockwise from top: The Epson Perfection 636 scanner, Proxima’s UltraLight L51 projection system, and the Palm IIIx PDA from 3Com.

but the Coolpix can capture images at 1600 by 1200 resolution, which makes for beautiful 8-by-10-inch printouts.

Speaking of big images, you should see what they look like on the Silicon Graphics 1600SW 17.3-inch flat-panel monitor. The 1600SW comes as part of the $2795 Digital Flat Panel Solution Pack, which includes a Number Nine Revolution IV FP graphics board. Because the Solution Pack is a 100 percent digital system (no analog conversions to muddy the waters), the images it produces rank among the sharpest, most stunning we’ve seen on a computer display. Another source of striking images is the $5999 Proxima UltraLight L51 projection system. At this price you’ll want to make sure it doesn’t walk out of your conference room, but it’s ideal for making presentations.

Even our favorite personal digital assistant made notable advances in image quality. The new four-gray-scale LCD of the $369 3 Com Palm IIIx is a big improvement over the Palm III’s version. In addition, the Palm IIIx has twice as much RAM as its predecessor, and it can accept cool little expansion cards for such upgrades as flash memory and pagers.
newspaper retraction. Let’s get things right the first time, people.

Of course, bugs are a fact of life. Our World Class application suite, Microsoft Office 97, certainly had its share, but it reigns as the best collection of bread-and-butter programs on the market. (Its successor, Office 2000, doesn’t offer enough of an upgrade to cause a mass exodus from 97.) The only thing missing from Microsoft’s suite is the best personal information manager—Lotus Organizer 5. For the time being, this $79 program provides the easiest way to manage schedules and contacts, though Outlook 2000 appears to be gaining on it.

Suites aren’t always about word processing and spreadsheets. The Norton SystemWorks 2 utility suite from Symantec does everything but wipe the crud off your keyboard. Among the latest additions to the $59 package are CleanSweep, the wonderful uninstall utility, and CrashGuard, for system protection and recovery. SystemWorks also includes the year’s best antivirus program—Norton AntiVirus.

YOU’VE SEEN THE BEST, now here’s the rest. Join us in razzing some of the year’s most notably underwhelming performers.

BARON MÜNCHHAUSEN LIFETIME ACHIEVEMENT AWARD to Vice President Al Gore, who in an interview with CNN said that he “took the initiative in creating the Internet.” Amazingly, Al also invented the steam engine, the incandescent light bulb, and those little clips that prevent eyeglasses from sliding off your nose.

OLIVER STONE “IN VIDEO VERITAS” AWARD to Microsoft’s crack demo team, which was forced to admit that three videotapes shown at Microsoft’s antitrust trial were “bolloxed up.” English translation: faked.

POWER SPRINGS FROM THE BARREL OF A KEYBOARD AWARD to the Chinese government, which sentenced Shanghai businessman Lin Hai to two years in jail for supplying 30,000 Chinese e-mail addresses to a U.S. online publication. The magistrates showed mercy; Lin’s original sentence was two years in an AOL chat room.

THERE’S ONE BORN EVERY NANOSECOND AWARD to Intel, for slapping three (count ’em, three!!!) exclamation points after the name Pentium and expecting gullible computer users to believe the new chip was something more than a dolled-up version of the Pentium II, er, II.

THE MARRIAGE MADE IN HADES AWARD to AOL, which after being dogged for years by complaints about poor service, gobbled up Netscape—a company notorious for shipping software late or not at all. Finally, some real competition for Microsoft.

Left to right: First-rate business apps Lotus Organizer 5, Microsoft Office 97, and Norton AntiVirus 5.

5. The $50 stand-alone antivirus package has an efficient Scan and Deliver feature that roots out new viruses, quarantines them, encrypts them, and e-mails them to Symantec’s researchers for analysis. Looking for the best way to track the financial health of your business? Try Peachtree Office Accounting. For $149, you get a complete set of tools that integrate seamlessly with Microsoft Office.

The NO-CLASS Awards

“THAT DEPENDS ON WHAT YOUR DEFINITION OF ‘IS’ IS” AWARD to Bill Gates. When questioned by a government attorney during the Microsoft antitrust trial about what he “would ask of Apple,” Gates replied, “I have no idea what you’re talking about when you say ‘ask.’” Other words and idiomatic expressions not in Bill’s vocabulary: “competition,” “bugs,” “backward-compatible,” and “the product will be released on time.”

CLAUDE RAINS “I AM SHOCKED, SHOCKED” AWARD to Iomega. Just as the Zip drive’s Click of Death was fading from memory, Iomega had to recall 60,000 Jaz power supplies that potentially expose users to electrical shock. Hey, maybe the company should call ’em Zap drives.

SHOW ME THE MONEY AWARD to Amazon.com, for posting book recommendations that publishers paid for. Rumor has it that, for $20 million more, company CEO Jeff Bezos is willing to advise readers to buy the books at barnesandnoble.com.

THE MARRIAGE MADE IN HADES AWARD to AOL, which after being dogged for years by complaints about poor service, gobbled up Netscape—a company notorious for shipping software late or not at all.
SURE, IT'S BEEN a cult fave of the geek elite for years. But this was the year Linux emerged as a legitimate competitor to Microsoft Windows. And no wonder: Thanks to a worldwide team of talented, unpaid programmers, Linus Torvalds's brainchild is stable, powerful, and (depending on where you get it) either cheap or free.

Admittedly, Linux still has some distance to go before it qualifies as an operating system for the masses (easier installation, broader hardware support, and a wider array of applications would help). But with big guns like Compaq, Dell, Intel, and IBM in its corner, this underdog could end up being Bill Gates's worst nightmare.

Best Personal Financial Software
Microsoft Money 99 Financial Suite Smart alternative to Quicken's bugs.

Best Tax Software
Kiplinger TaxCut Deluxe 98 Free state forms!

Best Freeware
NetSonic 1.02 A Web accelerator that actually works.

Best Voice Recognition Software
Dragon NaturallySpeaking Preferred 3 Highest level of accuracy, easiest error correction.

Best Reference Software
Microsoft Encarta Reference Suite 99 DVD-ROM bursting with information and useful clips.

Best Game
Links LS 1999 Tired of Web links? Then hit these greens instead.

EXPERIENCED PC USER seeks personal software. Should be comprehensive but not a hard drive hog, reasonably priced but not buggy, innovative but not gimmicky. Dancing paper clips and singing icons need not apply.

Hey, you have a right to be picky: Personal software involves your time and your money. Consider our financial software winner, Microsoft's Money 99 Financial Suite. Microsoft Money and its chief rival, Intuit's Quicken, have been serving people well for years. But this time around, Microsoft's $65 package gets the nod, for two reasons: First, Money's latest makeover adds plenty of wizards, forward-looking planning tools, and links to useful online content. Second, the application seems even better in light of Quicken 99's bug problems (see Bugs and Fixes, www.pcworld.com/apr99/bugfix).

Intuit's TurboTax is a seasoned veteran of the personal income tax wars, but the company fell behind in this category, too. Block Financial's $40 Kiplinger TaxCut Deluxe 98 is every bit as easy to use as TurboTax, and this year it offered free state forms. If Intuit follows suit next year, consumers will win big.

On the Net, some of the best utilities are free, like Web 3000's NetSonic 1.02 browser accelerator (www.web3000.com). It won't make you feel like you've upgraded to a Ti line, but it will make your 56-kbps modem run at closer to 56 kbps. NetSonic installs easily and significantly reduces the loading time of your favorite Web pages.

As an ongoing locus of innovation, voice recognition continues to intrigue even jaded PC users. Though it remains imperfect, the technology made progress in the past year. Dragon NaturallySpeaking Preferred 3 ($160) beats its competitors on accuracy and ease of correction.

It's hard not to be charmed by Microsoft's Encarta Reference Suite 99. The $139 version packs Encarta Encyclopedia Deluxe, Virtual Globe 99 Atlas, and Bookshelf 99 onto one DVD-ROM disc. You'll find sharper audio and bigger and better video clips than ever before.

When you need a break, try Links LS 1999, recently bought by Microsoft. Four golf courses, admiring fans, nifty sound effects, and advice from Arnold Palmer make it a tiger of a $40 golf game.
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Internet

- **Best Internet Utility**  ICQ 99 Your mother's online. Wanna chat?
- **Best Web Authoring Tool**  Microsoft FrontPage 2000 Programming a VCR should be this easy.
- **Best Web Browser**  Microsoft Internet Explorer 5 Death to the Channel Bar!
- **Best E-Mail Software**  Microsoft Outlook Express Only a P.O. box is easier to use.
- **Best Internet Service Provider**  IBM Internet Connection Keeps you online.

THE PAST YEAR SAW ever more people piling online—so many, in fact, that some observers predict the load will break the Net's backbone. And what are all these new Web wanderers doing while the lines of communication creak beneath their weight? They're chatting up a storm, and millions are using our favorite Internet utility, ICQ 99 (that's "I seek you"). ICQ is the immensely popular, free buddy list program that lets you know when your friends are on the Web so you can send them instant messages. Of course, your buddies have to use ICQ, too; but with 15 million registered users to date, you can always make new buddies.

When they're not chatting, Webheads may be creating their own sites. To make your site look marvelous, try the $199 Adobe ImageStyler 1. It comes chock-full of shapes, images, and textures (and 14 levels of undo, in case you mess up) for creating eye-catching Web graphics. And it works with our favorite authoring tool, Microsoft's FrontPage 2000 ($149). The latest FrontPage has the same capabilities as its predecessor (last year's World Class winner), but it makes the job of building Web pages easier. You also get more flexibility in selecting text styles, colors, and layouts. Some cool features, however—like cascading style sheets—must be viewed in version 4.0 (or higher) browsers.

Cue Internet Explorer 5, the latest, World Classiest browser from Microsoft. In its perennial struggle with Netscape for World Wide Web domination, IE now has the upper hand. It's faster and considerably thinner than its predecessor, and (hurray!) it won't load that infernal Channel Bar unless you really want it to.

**Most Promising WEB NEWCOMER**

HIP, IMMENSELY popular, and controversial, MP3 caused a stir in the music scene rivaled only by the buzz generated by R&B singer Lauryn Hill. The technology creates highly compressed, near-CD-quality sound files you can download off the Web in a jiffy. It has endeared itself to millions of PC users. And it's struck fear into the hearts of recording industry execs because it lends itself to audio piracy. Still, MP3 is rapidly going legit. Sites such as www.mp3.com offer thousands of authorized files, and Diamond's Walkman-like Rio PMP300 player is a hit. Next up: Empeg's in-dashboard MP3 player for cars, with a carrying capacity of 7000 digitized tunes.
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For a small or home office, Boca's HAN Kit offers cheap, fast, and easy home area networking for $109.

Charles Schwab is the online broker to beat.

For running a network, we like Compaq's ProLiant 1600 server. It moves files around at lightning speeds, without breaking the bank. And if things are about to go wrong, Compaq's Insight Manager promises to warn you in advance. If you like, you can hook the ProLiant up to the $1995 Tektronix Phaser 740/N, a superior network printer that pumps out monochrome and color pages at a reasonable price.

But maybe productivity on this scale is more than you need. For a small or home office, Boca's HAN Kit offers cheap, fast, and easy home area networking for $109.

THE BIGGEST NETWORKING NOISE CAME FROM Novell NetWare 5. Some recent NetWare versions lost market share to Windows NT, but NetWare 5 has a legitimate chance to reverse that trend. It runs natively over TCP/IP and has improved network directory services—a feature that NT won't support until Windows 2000.

If you want users to collaborate on projects—in your office or across the country—you need ERoom 3 ($4995 for the server, $199 per user) from Instinctive Technology. The latest version of this repeat winner is easier than ever to customize (version 4 should be out soon).

Speaking of irate customers, recent service outages at several major online brokers have had investors up in arms. Even though Charles Schwab (www.schwab.com) has experienced some glitches, it's still a World Class winner. The site is easy to navigate and offers the best research, and the company's service can't be touched.

IF YOU DOUBT THAT the Web has ingrained itself in the American consciousness, consider this: 1999's Super Bowl was sandwiched between commercials for job-hunting sites and Victoria's Secret's first online lingerie show. Our World Class picks, however, are old-timers. Not that they're resting on their laurels. Yahoo (www.yahoo.com), for instance, has morphed into the best Web portal. And unlike some of its competitors, it didn't sacrifice quality for quantity in doing it. The Web's best, most popular bookstore, Amazon.com (www.amazon.com), has branched out, too—into CDs and videos. Heck, it's even started running online auctions. Of course, its growth has not been bump-free: Amazon.com raised shoppers' hackles last winter at the disclosure of its policy (thereafter quickly rescinded) allowing publishers to purchase editors' recommendations.

YOU'LL DEFINITELY WANT IE 5's Outlook Express e-mail client, of course. It remains the easiest e-mail software to use.

Finally, none of this excitement is possible if you can't connect to the Net. For our money, IBM Internet Connection does the best job of getting people online. It's easy to install; provides fast, reliable connections; and earns praise from users. Not so long ago, AT&T WorldNet was the ISP to beat (see March's "Good Providers: The Best National and Regional ISPs," www.pcworld.com/3mar99/isps), but recent growing pains have dramatically worsened that provider's service.

For running a network, we like Compaq's ProLiant 1600 server. It moves files around at lightning speeds, without breaking the bank. And if things are about to go wrong, Compaq's Insight Manager promises to warn you in advance. If you like, you can hook the ProLiant up to the $1995 Tektronix Phaser 740/N, a superior network printer that pumps out monochrome and color pages at a reasonable price.

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Of course, you need support for software, too. In a separate survey, readers told us Microsoft remains the best among software makers. Considering all the legal distractions it faces, we applaud Microsoft for finding time to answer the phone!
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ViewSonic® applauds Starlight's humanitarian mission. And we're joining them. Throughout the coming year, the ViewSonic hot air balloon will travel across the United States and Canada as part of a program we're calling the Journey of Hope. We'll be joined by a generous group of corporate partners, all working toward the goal of raising awareness, visibility, support—and most importantly—funding that will assist Starlight Children's Foundation in helping North America's children in need.

It's the kind of thing good neighbors and good corporate citizens must do. We hope it helps and we hope you'll come out and take part when the Journey of Hope tour visits a city near you.

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How Low Can They Go?

The Best PCs for Under $1000

Sub-$1000 PCs are flying off shelves and into millions of homes and offices. We review 21 budget friendly systems in search of the best combination of value and performance.

By Jon L. Jacobi and Andrew Brandt

POLL EXPERIENCED COMPUTER USERS about sub-$1000 PCs, and you’ll hear words like slow, compromised, limited, and obsolete used to describe them. Not long ago, those terms would have been accurate. PCs in this class typically offered the slowest processors, the smallest hard drives, aging graphics subsystems, and terrible sound. They were often small, difficult-to-upgrade boxes with cheap keyboards and tiny monitors—attractive only to unlucky first-time buyers who didn’t know any better.

PHOTOGRAPHS BY PIERRE-YVES GOAVEC
BEST OF THE BARGAIN PCs:

Quantex's M400c (top) and
MidWest Micro's Office
MWO-400C took top honors in the
review. Both systems—one
targeted at home users, the other
at office workers—offer
outstanding features and speedy
performance at a very low price.
Nonetheless, even experienced users considered sub-$1000 systems, for one reason: They were incredibly cheap. If a $999 PC became obsolete in a year or two, so what? For that price, you might not feel cheated if you had to buy a whole new system a year later.

**LANDFILL NO LONGER**

HAS THE SUB-$1000 PC finally come of age, or is it still just a way for vendors to part fools from their money? To find out, we ordered 21 of the most recent offerings. From our past experiences with low-cost machines, we had low expectations.

After all, given that the average computer on our Top 20 charts costs between $1500 and $2000 these days, how much can you expect for $999?

It turns out that you can expect quite a lot. The systems we looked at offer surprisingly peppy performance, reasonably strong feature sets, and thoughtful design. For general business computing and Internet browsing, these machines will suit most people's needs.

**$999 GETS YOU THE WHOLE ENCHILADA**

IF ONE OF THOSE big, bright $999 price tags catches your eye, read the fine print before you take the bait. PC vendors, in their zeal to advertise something for under a grand, have been known to omit certain niceties—like a monitor—from the price. When we ordered systems for this review, we asked vendors to send us a complete system priced below $1000 (excluding rebates and special offers). To ensure that these PCs were truly usable, we set minimum requirements: a 4GB hard drive, a

### SMALL-OFFICE WORKHORSES

like Emachines' Etower 366i (left), Kingdom's Pinnacle 4005 (middle), and Dell's Dimension V400c performed well in our PC WorldBench 98 tests. Most of these PCs include thorough, well-illustrated manuals that make the initial setup process easy.
'In fact, 11 of the PCs in our class offer users a generous number of open drive bays, memory sockets, and expansion card slots. Historically, vendors have crammed their cheapest PCs into small cases and built them around bargain motherboards, sacrificing upgradability in the process. But most of the sub-$1000 systems we reviewed are as expandable as PCs that cost two to three times as much. The mid-size tower and minitower cases typical of this class offer users a generous number of open drive bays, memory sockets, and expansion card slots.

**CELERON BOUNCES BACK**

Not surprisingly, low-cost processors—such as Intel’s Celeron and AMD’s K6-2 and K6-III—lie at the core of this new generation of PCs. But something has changed since the unveiling of last year’s $999 PCs: The budget processors in today’s sub-$1000 PCs are among the newest on the market. Most systems in this roundup use 366-MHz or faster versions of Intel’s Celeron—a once-maligned class of CPU that has made remarkable performance strides. In fact, 11 of the PCs in our **Top 20 Budget Desktops** list this month use Celerons.

Intel is churning out new Celeron processors so fast that some vendors will no longer offer the Celeron-366 by the time you read this. But take heart: The vendors tell us you should be able to buy a Celeron-400-based system with the same configuration, for under a grand.

Overall, these cheap PCs perform surprisingly well. Even the slowest of the systems managed a **PC WorldBench** g8 score of 153—close to the average for all Pentium systems. **For a Few Dollars More...**

**THOUGH WE** imposed a $1000 price ceiling for admission into this roundup, your cutoff may be higher. After all, the cheapest PCs inevitably have limited expandability and upgradability. And because so many low-priced PCs use integrated components that are hard to upgrade, examining the advantages of paying a few extra bucks up front is worthwhile.

We looked at three sub-$1000 systems from companies that let you upgrade individual components when you buy the PC: Dell’s Dimension V400c, Gateway’s Essential 366C, and Quantex’s QP6/333 M1c. We weighed the cost of upgrading the hard drive, RAM, CD-ROM drive (to DVD), and monitor against the attendant performance benefits and found that most of the upgrade options merit consideration—especially if you plan to keep the PC for more than a couple of years. And upgrading these parts at the outset will not only save you money but also make subsequent upgrades faster and easier. Most PC makers also offer speedier processors, 3D graphics cards, removable-storage drives, better keyboards and mice, and higher-quality speakers.

**Better Memory** If you upgrade memory when you buy the system, get a single, larger DIMM and keep the other slot(s) free for later upgrades. Dell’s standard 32MB of RAM can be upgraded to 64MB for $49. Both the Gateway and Quantex systems start with 64MB, which can be upgraded to 96MB or 128MB for around $60 or $125, respectively. Beyond 128MB, RAM costs increase prohibitively; and unless you’re a graphics designer or a serious multitasker, the performance benefits of more RAM are negligible.

**More Space** While the size of hard drives increases exponentially, storage prices continue to shrink. With minimal investment, you can sometimes double your hard drive capacity. Both the Dell and the Quantex come with a 6.4GB drive. You can upgrade the Dell’s to 8.4GB for just $20 more, and the Quantex’s to 8.4GB for $40 or to 10.2GB for $60. Gateway’s Essential 366C starts with a 4.3GB drive, which you can increase to 8.4GB for $65, to 13GB for $110, or to 15GB for $185. If you’re a glutton for space, you can buy a 22GB drive for the Gateway, but it’ll cost you $440 extra—the law of diminishing returns kicks in on drives larger than 10.2GB.

**I Want My DVD** Most sub-$1000 PCs come with a high-speed CD-ROM drive. A few include a DVD-ROM drive instead. A third-generation DVD-ROM drive is surprisingly affordable, but ask whether you get a software or hardware decoder with it. (A hardware decoder is preferable, but unusual at this price point.) Gateway and Quantex offer a 4.8X DVD-ROM drive for $80 or $120, respectively. They also offer CD-Rewritable drives; Gateway’s is $155, while Quantex’s runs $189.

**Dell** sells a DVD-ROM drive with software decoder for $49 (hardware-based options cost $109), or a CD-RW drive for $104.

**Sights for Sore Eyes** A larger monitor—or one with a tighter dot pitch (smaller dot pitch numbers mean a sharper picture)—can help you savor images without incurring eyestrain. All three systems start with scarcely adequate 15-inch monitors. Dell offers a 17-inch, 0.26-dot-pitch replacement display for $89 more or an extremely sharp Trinitron for an extra $188.

Gateway’s 17-inch options include an okay 0.28-dot-pitch model ($115) and a better 0.26-dot-pitch unit ($165). Quantex’s 17-inch upgrades bump the system price up $100 for the standard 0.28-dot-pitch monitor and $180 for the 0.25 variety (rated sharper than Gateway’s 0.26-dot-pitch display). For 19-inch and larger monitors, upgrade costs start at $300.

Of course, the total expense of adding the extras you want can quickly push your low-end PC into the price range of our **Top 20 budget desktops**. If you find you need a lot of these upgrades, you may be wiser to buy into the next price level of PCs from the get-go and obtain all the features you want as standard parts of the configuration. —Joel Strauch
tium II-333 systems, and more than adequate for typical business applications. Our two Best Buys earned a PC WorldBench score of 192, which makes them front-runners among PCs with the same CPU and amount of memory.

LOWER COST, FEWER CHOICES

On a machine tagged in the low three figures, expect fewer options. In fact, the further a PC's price sinks beneath the magic $999 mark, the less flexibility you get. Emachines' Etower 366i, for example, is a take-it-or-leave-it proposition. At $738, it's the least-expensive system in this roundup. But like all Emachines PCs, it ships in a fixed configuration. Similarly, PC maker Microworkz can sell its ultra-cheap Webzter Jr. for just $399 because the company doesn't use state-of-the-art components or customize its PCs. Microworkz couldn't even send us a system in time for inclusion in this review, but we tested a pair of the vendor's PCs for this month's Top 10 Home PCs (see page 216). Neither system made the Top 10 chart. We also cover Microworkz in this month's On Your Side, page 35, in which we detail some readers' complaints that Microworkz failed to ship systems within the promised three- to four-week time frame.

HEAVY-DUTY HOME SYSTEMS break the beige box syndrome. Among the home-oriented PCs in this roundup that blend attractive design features with good multimedia performance are Acma's A333 (left), Compaq's Presario 5070 (middle), and IBM's Aptiva E Series 240.

1 MIDWEST MICRO OFFICE MWO-400C

BEST USE: Superb as a corporate workstation, the MidWest Micro Office MWO-400C becomes a terrific home-office system if you specify a modem in place of the network card our test system included.

WHAT'S NOT: Redundant front and rear power switches may confuse new users. The scope of the user guide is somewhat limited in areas beyond initial setup, and no online manuals are available.

VALUE: The Office MWO-400C offers excellent performance, good components, easy networkability, and a five-year warranty on the CPU and system RAM.
### QUANTEX M400C

**Best Use:** This PC handles everyday home-office or schoolwork apps with ease, but not 3D games.

**What's Hot:** The M400C tied for second place on our PC WorldBench 98 test suite, scoring a 192. With six free drive bays and four free slots, the system offers more room for expansion than any other PC in the roundup, and its easy-open case makes upgrading a breeze. The excellent user guide augments a basic online help system.

**What's Not:** The included 17-inch Shamrock XP170S monitor displays both text and graphics just passably well. Though the system ships with Windows 98, its documentation refers to Windows 95. Inadequate 3D performance restricts the M400C's use as a game machine.

**Value:** Powerful business performance at a reasonable cost, though you may want to invest in a better monitor.

### KINGDOM PINNACLE 400S

**Best Use:** Excellent components and good all-around performance make this a reliable choice for SOHO users.

**What's Hot:** The PC comes equipped with a generous 10GB Seagate hard drive and an excellent 17-inch monitor. Free slots and bays abound, and a roomy case allows easy access. A bundled Microsoft Natural keyboard, the only "ergonomic" unit in this roundup, offers crisp action.

**What's Not:** The Pinnacle's PC WorldBench 98 score puts it on a par with the fifth-place Dell Dimension V400C for the lowest score among Celeron-400 systems. Novices may have to hunt for help: Daily tech support is limited to 12.5 hours, with no service on Sundays; and the second-rate user guide doesn't provide much help.

**Value:** Excellent PC for the price, provided that your computer needs don't extend to top-level performance. Best suited for users who are unlikely to need help on Sundays or during nonbusiness hours.

### ACMA A333

**Best Use:** Its low price makes the A333 a good choice for first-time buyers; with better speakers, multimedia would be great.

**What's Hot:** Its PC WorldBench 98 score of 172 matches those of comparably...
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equipped PCs, and the Acma is the second-cheapest PC on the chart. Good 3D and one of the better 15-inch monitors we saw (an Impression 5XVM) round out the deal.

**WHAT'S NOT:** Cheap speakers and keyboard reduce the A333's appeal, and the system's 4.3GB hard drive is smallish.

**VALUE:** Good performance, a long parts warranty, and a low price make this a great all-around SOHO machine.

### DELL DIMENSION V400C

**BEST USE:** Dell's terrific customer support record makes this PC perfect for home-office users who might need extra help.

**VALUE:** If reliability and support are primary considerations, by all means buy Dell. If not, go for a system that offers a heftier configuration for the same price.

### AXIS SYSTEMS ORION LXN

**BEST USE:** High-quality components and great performance make the Orion suitable for corporate use.

**WHAT'S HOT:** With a PC WorldBench 98 score of 193, the Orion roared past all other chartmakers (and the average Celeron-400 PC with 64MB of memory, regardless of price). The high-quality 17-inch monitor and 4.8X DVD-ROM drive help this PC adapt to work and play. Clear documentation is accompanied by a large setup sheet.

**WHAT'S NOT:** The generic case is hard to open and has duplicate power switches on the front and back. Color-coding or better labeling of the rear ports would help.

**VALUE:** Stellar features and celestial performance distinguish the Orion LXN as a fine office machine.

### IBM APPTIVA E SERIES 240

**BEST USE:** A solid home-office-oriented PC with name-brand security.

**WHAT'S HOT:** The famous logo and handsome case and monitor stand out. The setup sheet, user guide, and online help via Windows Active Desktop rate above average. The system ran 3D games fairly swiftly, though some images were poorly rendered in our tests.

**WHAT'S NOT:** A Quantum Bigfoot hard drive (the industry's slowest) hogs a 5.25-inch drive bay. IBM recklessly includes a password-protected screen saver (intended for retail-store use) on all systems; if you install the screen saver, assign a password, and then forget that password, you'll be locked out of your machine. The only way to reenter your system is to completely rebuild it from a CD-ROM—bye-bye, data. Finally, the Aptiva E Series 240's PC WorldBench 98 score of 163 is below average for systems of comparable configuration, though still respectable.

**VALUE:** With good bundled software, respectable 3D, and handsome looks, the Aptiva is a decent deal despite major flaws.

### NEXTREND NEXSTAR C366

**BEST USE:** The NexStar is a fairly strong Celeron-366 office system suitable for relatively experienced users.
To all the girls from Monday Night Bingo who didn’t like my lemon tarts...HEAR THIS.

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**WHAT'S NOT**: The NexStar's cheap speakers have no more bass response than a clock radio. A second internal port needlessly occupies an expansion card bay. Nextrend's user guide is primarily a setup document.

**VALUE**: Meager documentation supplies little guidance, but the hardware is fine.

**9 COMPAQ PRESARIO 5070**

**BEST USE**: Home users should appreciate the software Compaq bundles with the PC and the company's solid support policies.

**WHAT'S NOT**: The Presario's attractive styling, great-sounding f8L speakers, a sharp 17-inch monitor, and 50 free hours of Internet access combine to make it a great buy for the home. The keyboard has convenient audio, CD-ROM, and Internet quick-launch buttons. Compaq throws in helpful touches like a setup sheet and color-coded ports.

**WHAT'S NOT**: The Presario 5070 runs a substantial 8 percent slower than comparably configured systems. The graphics chip turned in poor 3D performance, probably because it uses main (UMA) memory for graphics (see "Cheap PC Pitfalls"). There's no room for expansion, so upgrades can be difficult. The lack of technical documentation may hamper users' ability to tweak the system.

**VALUE**: Though targeted at home users, this Presario works better than it plays. Game-happy home users should opt for a PC with dedicated graphics memory.

**10 EMACHINES ETOWER 3661**

**BEST USE**: Low price and easy setup make this a great home or small-office system.

**WHAT'S NOT**: At $738, the Etower easily ranks as the most affordable system we tested. For such a low price, you might not expect to get design touches like front-mounted USB or game ports, but...
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Building Blocks

Assembling Your Own PC From Scratch or From Parts

If you're technically savvy, you can build a powerful new system for far less than a thousand bucks. And you may be able to save even more money by upgrading your current computer into the system of your dreams.

BUILDING FROM SCRATCH

Building a PC isn't a task to undertake lightly. You're your own tech support, your computer's parts come with shorter warranties, and you can't blame anyone else if something goes wrong. That said, assembling your own system can be extremely satisfying: You decide which peripherals go in, you become very knowledgeable about your PC, and (best of all) you can save lots of cash.

If you opt to build a PC, you must first pick a processor. You can find versions of Intel's Celeron and AMD's K6-2 chips for around $100. Web sites such as PriceWatch (www.pricewatch.com) let you compare the costs of all your components from various sources.

Beware the lowest-priced chips, though: OEM chips ship to PC makers first, who then build them into complete PCs. By the time you buy one, these chips are shop-worn and are more likely to fail than a brand-new unit in a shrink-wrapped box. Worse, many OEM chips carry a meager 15-day warranty.

You'll also need a motherboard, and it's a good idea to purchase the motherboard from the same company where you buy the processor. If you're building a Celeron system, using jumperless boards (such as those made by Abit) will allow you to configure all the settings through software. Otherwise, look for name brands like ASUS, Intel, or SuperMicro. And make sure you get a warranty of no less than one year.

When shopping for a motherboard, make sure the one you buy has enough expansion card slots—a pair of 16-bit ISA slots, at least three 32-bit PCI slots, and at least two RAM sockets. If you plan to install a new AGP graphics card, make sure the board has an Accelerated Graphics Port.

You'll also need to buy the right type of RAM. If your motherboard runs at 100 MHz, it requires PC-100 memory to function properly. A 64MB PC-100 memory DIMM costs about $60; a 128MB DIMM costs about twice that.

(Pricing can fluctuate daily, so if the price seems a bit high when you go shopping, wait a few days for prices to settle.)

With your PC's remaining components, you have a lot of leeway. Get the largest-capacity hard drive you can afford. CD-ROM and floppy drives (priced at around $40 and $15, respectively) are so inexpensive and reliable you needn't worry much about the brand you choose. The same goes for input devices such as keyboards and mice: Simple ones are cheap, but you can opt for ergonomic and wheeled species for a few bucks extra.

Sound and video card prices vary widely, depending on their abilities. If you get a kick out of multimedia or games, you'll want to splurge on more expensive units. But for general business, schoolwork, or Internet use, the low-cost stuff will get the job done.

STRIPPING OUT AN OLD PC

If you've got a Pentium II system you're looking to overhaul, adding a speedier CPU, more RAM, or a faster video card can be cheap. On the other hand, if you're starting with a Pentium 60 or slower system, just salvage your hard drive, CD-ROM and floppy drives, your monitor, and your input devices—and build around those pieces. Check out PC World Online's Upgrade Guide (www.pcmag.com/upgradeguide) for detailed information on how to soup up your existing system.

Building or upgrading a PC is no trivial matter, but it's not brain surgery, either. And if you do it right, you can acquire maximum power for your PC at a minimal price. —Joel Strauch
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Watch out: Swindlers are alive and flourishing on the Web.

The Online

BY JEFFREY ROTHFEDER

ILLUSTRATIONS BY JANET WOOLLEY
Early one morning in April, a scam operation took just a couple of hours to swindle dozens of investors out of tens of thousands of dollars. It all began with a message on a Yahoo stock alerting investors that PairGain Technologies, a Tustin, California, maker of high-speed Internet products, was about to be bought by an Israeli company for $1.35 billion, nearly twice its market value. To reinforce its authenticity, the message contained a link to a Bloomberg news story giving details of the deal. That was enough proof for many investors, who dived into PairGain's stock, immediately bidding it up more than 30 percent, from $8.50 a share to over $11.

It was a hoax: PairGain wasn't being bought by anybody. The "news story" was a phony article, written to mimic a Bloomberg report and posted anonymously on Angelfire, a Web page service. If eager investors had only stopped to do a little digging, they would easily have uncovered the fraud. All someone had to do was to look for a legitimate press release on www.pairgain.com, for instance, or search for the announcement on any portal.

But the hoax went unchallenged for almost 2 hours before anyone discovered the lie and warnings started appearing on the Web. Thereupon, PairGain stock quickly tumbled to prehoax levels, leaving bandwagon investors with stock of a much lesser value.

One week later, federal authorities arrested Gary Dale Hoke, a PairGain employee, on charges of stock manipulation. An FBI task force had tracked Hoke down by following electronic footprints from Angelfire and Hotmail.

"This is the first case in which an individual has abused the power of new technology to spread false news to millions of investors at lightning speed," says Alejandro Mayorkas, United States district attorney in Los Angeles, who is handling the case.

FRAUD ON THE RISE

Illegal stock-touting is just one of the countless scams executed on the Internet these days. Thousands of new surfers plunge into the Web each week, but the same technology that they find so attractive also makes it simpler for scammers to rook them. The Internet permits anyone selling good or bad investments, business ideas, or products to reach hundreds of thousands of people at once with virtual anonymity. For the unscrupulous, nothing is more mouth-watering than an expanding pool of potential victims.

The Securities and Exchange Commission currently gets more than 100 complaints a day about illegal Internet activity—mostly involving online stock scams and dubious investment touting, known as pump-and-dump scams. In 1998, the National Consumers League received 7752 Internet fraud complaints—up from less than 2000 the year before. "These scam artists are waging war," says John Reed Stark, the SEC's chief of the office of Internet enforcement. "They're committing frauds that can ruin lives."

Scammers Find Weakness The maliciousness of these acts is especially clear when the criminals target the desperate and weak, according to Federal Trade Commission officials. The proliferation of phony weight-loss plans and cheap fake Viagra pills that are nothing more than placebos, official say, are the best evidence of scammers' deviousness. "Deceptive health claims and pseudo-cures are an epidemic on the Internet," says Betsy Broder, the FTC's assistant director of the Bureau of Consumer Protection. To combat the alarming surge in Internet fraud, the FTC, the SEC, and many state law enforcement agencies have set up SWAT teams.
to police the Internet daily. At press time, the National White Collar Crime Center and the National Fraud Center announced the formation of the Internet Fraud Council. Later this summer, the IFC promises to launch its Internet Fraud Complaint Center for consumers, and the Federal Bureau of Investigation will take on an advisory role. Despite the ongoing efforts of federal authorities and law enforcement to curb crime, scammers continue to represent moving targets, in an environment that's perfect for hit-and-run tactics.

WEB SCAMS MADE EASY
“EVERYTHING ABOUT the Internet makes it perfect for criminals bent on perpetrating a scam,” says Susan Grant, director of the National Consumers League’s Internet Fraud Watch program. Of course for scams to work, the perpetrators must find gullible people. In the past, contacting potential suckers required expensive mass mailings of come-on literature or labor-intensive hours calling from boiler-room telephone banks. Now, armed with mass-marketing software and a CD-ROM of e-mail addresses, a criminal can contact thousands of online targets with one keystroke, relatively cheaply. Or by attaching press releases to a few well-traveled portal sites, announcing a fantastic ground-floor investment opportunity with a hot company, the crook can lure potential victims to the scam’s home page for practically nothing.

As e-commerce thrives, more and more people use their credit card numbers to order products over the Internet. Consumers like the protection of being able to cancel a charge on their card if an item they buy doesn’t match its specifications. But hackers steal, collect, and sell credit card numbers to “crammers,” who in turn use the data to hit the card owners with fraudulent billing charges. And on the Internet, criminals can operate in relative anonymity: Phony merchants tend to work without a fixed address, relying instead on various mail drops. Their modus operandi involves maintaining multiple e-mail addresses and using a raft of...

other problems with Hawk’s story surfaced as well. For one thing, Harvard doesn’t offer a course in network marketing. And for another, tax laws forbid taking a charitable deduction for a venture set up as a profit-making organization.

I contacted Mr. Hawk’s attorney, Thayer Lindauer, who has represented network marketers for 30 years. Lindauer defended the practice of network marketing but refused to comment specifically about the business operations of Prosper America.

Multilevel is Illegal, Right?
THE FEDERAL TRADE COMMISSION and the Ohio attorney general’s office say pyramid schemes or multilevel marketing schemes are against the law no matter how you soft-soap their activities or marketing practices with charitable overtones. “It’s illegal for a business to promise wealth that’s generated through the signing up of other people,” says the FTC’s Betsy Broder.

I decided to keep my $45 a month. I reported Prosper America to the FTC, the National Consumers League’s Internet Fraud Watch, and the attorney general’s office in Ohio.

As of this writing, I haven’t received any response from those officials as to what action they might take. —Jeffrey Rothfeder
pseudonyms. Shysters can set up virtual shop, make some money, shut down, and relocate to another URL—all without leaving a paper trail or risking detection.

What's more, as evidenced by the Bloomberg hoax, shoddy products and false information can be digitally airbrushed onto a glossy Web site that looks as legitimate as Warren Buffet's or IBM's.

Clearly, con artists are milking the Internet for all it's worth, making stacks of quick bucks. Sometimes their profits depend on volume business—duping many people into losing small sums of money, rather than bilking relatively few out of large amounts. The more you open yourself up to e-commerce, the more likely you are to run into these kinds of scams. Here's a look at the top four scams on the Net according to the National Consumers League's Internet Fraud Watch.

**ONLINE-AUCTION FRAUD**

When buying goes bad

**Telltale signs:** Unbelievably low prices for desirable items, seller's general evasiveness about providing a contact phone number, lack of response to e-mail queries, promises to get you an item that's not currently in stock.

**The danger:** You post the winning bid, send in your check or money order, and get nothing in return—or you get an item that's nothing like the one advertised.

**TOPPING THE** National Consumers League's list of Net complaints is fraud related to online auctions. Though most transactions conducted through auction sites come off without a hitch, the medium gives scammers an easy way to rip people off. Says the Internet Fraud Watch's Grant, "The typical complaint is 'I won the auction, paid for [the item], and got something that wasn't remotely like what it was supposed to be.'" For instance," she says, "one person was expecting a portable collapsible wheel chair and received a lawn chair on casters."

William P., a Maryland biologist, reports being burned at an EBay auction. Last July he was a high bidder at $615 for a new Pentium PC. He wrote a check in that amount and sent it to a California address. The check was cashed quickly, but William P. never received the PC. The seller ignored the buyer's repeated...
e-mails and couldn't be reached by phone. "I still buy things from Internet auction sites," William P. says, "but I won't make such an expensive purchase again."

With the growing number of Internet auction sites, it's almost impossible for the authorities to monitor all the goings-on. And scam artists, like the the one who took William P. for a ride, can easily skirt capture. Then using a different name, they can repeat the same flimflam on a new victim.

In an effort to stem illegal activity, some auction sites have instituted feedback systems where customers warn other buyers about problem sellers; some sites even bar particular sellers from participating if their rating falls too low. These auction houses also demand that anyone with a Web-based e-mail address (like Hotmail or Yahoo) register with a credit card.

**Security Threat** Unfortunately, federal authorities say, these measures offer scant protection to consumers. Scammers can evade the rules and appear legitimate by using multiple e-mail accounts and stolen credit card numbers when they sign up.

And if that's not disconcerting enough, hackers can wreak havoc at sites that have inadequate security. In March, for instance, a hacker claimed to have changed auction prices on EBay's site, posted fake ads, and directed visitors to other sites. EBay, however, says it has no indication that this actually happened. EBay does state that subsequent to the claim, the hacker briefly posted this message on EBay: "Proof...that you can't always trust people...not even huge companies." The company says that the hacker didn't steal any credit card information.

A key difficulty in combating auction fraud, federal authorities say, is the tendency of some online auction houses to cultivate a hands-off attitude about activities on their sites. To minimize their exposure to liability, proprietors of these auction sites assert that all they do is offer a place for people to trade goods for money, and they disclaim any responsibility for ensuring the legitimacy of those transactions.

**Quest for Safety** This attitude was evident in May 1998, when the FTC asked executives from several top auction sites—including Auction Addict, Auction Universe, EBay, Haggle Online, and Up4sale—to do more to prevent fraud on their sites. Nothing substantial came of that meeting, FTC officials say. The short answer is that auction site policies protecting consumers are not consistent across the board. "It's a big field," says the FTC's Broder.

"Different auction houses are taking different approaches. Some sites take great pains to provide safety measures, and they see it as a competitive edge to have their site safe for consumers."

With the disparity that exists among auction sites' policies on fraud, it's up to consumers to protect themselves. Some simple tips: Pay attention to an auction site's evaluation system—where buyers rate sellers based on their own personal experience—and don't buy anything from anyone who has a spotty record. Pay by credit card whenever possible, or better yet, try using an escrow agent such as www.escrow.com. For a fee of about 5 percent of the product's cost, an escrow agent will hold your money and send it to the seller only after you confirm that you've received the goods in satisfactory condition.
Telltale signs: Company stocks hyped (and artificially inflated) out of the blue, without supporting or background information.

The danger: No real value driving up the price of the stock, loss of the entire amount of the investment with little or no chance of recouping it.

"THE INTERNET IS DELIVERING a new, rapidly growing universe of victims to scam artists," says Kevin Lichtman, publisher of StockDetective.com, a two-year-old independent online resource that focuses on Internet security fraud. Supported by advertising dollars, mostly from small electronic trading brokerages, StockDetective.com includes sections like "Stinky Stocks" and "Red Light District" that highlight stocks to avoid.

One victim of a classic pump-and-dump scam was Art M., an aircraft mechanic in the Midwest. He considered himself a conservative investor, but in November 1996 Art M. did something completely out of character. Surfing the Web for investment opportunities, he came across a site called Future Superstock that offered investment tips. He wasn't planning to buy any stock that night but was struck by Future Superstock's claims about its track record, displayed prominently on the site: Its stock picks consistently paid off in a big way.

One recommendation stood out. Level Best Golf had risen solidly recently but was still cheap enough for small-stock traders at not quite $5 a share. According to Future Superstock, Tiger Woods' manager had endorsed Level Best's golf instruction equipment, and the firm had just signed new agreements with companies like Best Buy. Impulsively Art M. paid $5625 for 1200 shares.

As the stock tip-toed over $5 during the next few days, Art M. congratulated himself. Then the share price of Level Best stock suddenly plunged by more than 25 percent, followed by a more gradual but steady descent. That didn't seem to matter to Future Superstock. Throughout 1997 and early 1998, the site told investors to ignore price fluctuations.

THE ART OF THE CON hasn't changed much in 50 years, but scammers' tools have grown more sophisticated. The newest spam scam: dotless IP addresses, which hide the true location of the spammer's Web site, thwart antispam software, and could even leave your machine open to attack.

Here's the pitch: A scammer e-mails an invitation to visit a Web site, say, to buy Viagra or view pornography. But instead of supplying a standard Web URL, the e-mail contains a dotless IP address—so named because it lacks the dots found in standard Web URLs (such as www.pcworld.com) and IP addresses (like 209.123.30). Instead, dotless URLs employ a series of numbers and/or percent signs (for example, http://3506509598 or http://%33%35%30%36%35%30%39%36).

Dotless addresses make hunting down the location or registered owner of a scam site much harder. That obstacle makes it more difficult for users to report an offending site to its hosting service or to authorities. And when you click on such a link, you open up a Pandora's box of security and privacy hazards.

When Microsoft's IE 4.x or higher encounters a dotless address, it treats the URL as if it resided on your company intranet. Depending on your browser security settings, this could make your PC vulnerable to hostile applets. A patch posted last October solves that problem in IE 4.x. But any browser, even a patched one, will "resolve" dotless IP addresses and open their associated Web pages.

In our research, we discovered one fishy site called Vsource (not affiliated with either of two other companies that registered the Vsource.com or Vsource.net domain names), a slick-looking Web page from a pseudo-Viagra pitchman. Vsource's thorough "online consultation" asked for all kinds of information, including financial and personal data like our social security number. The site had no e-mail address, postal mail address, or telephone number. It disappeared 24 hours after we first saw it.

Protect yourself by using a little common sense. Make sure the company publishes its address and telephone number on the site. Call the Better Business Bureau in the company's city, and browse the FTC's Web site (www.ftc.gov) for news about the latest scams. And of course, if you see a dotless IP address link, don't click on it. —Andrew Brandt
Level Best’s stock currently is trading near zero. The celebrity endorsements and retail store deals turned out to be fabricated. As for Art M., he is still holding on to the stock. “It would cost me more in commission to sell it now,” he says with a mixture of bitterness and resignation. “I can’t figure out what happened, but I was taken. Five thousand dollars may seem like chump change to the guys who conned me, but that was a lot of money to me.”

According to SEC allegations, companies like Level Best paid Future Superstock and its owner Jeffrey R. Bruss a total of more than $1.6 million to hype their stocks, and Future Superstock illegally failed to disclose this arrangement. By enticing investors with lies about its client companies, the site artificially inflated the value of Level Best stock. Then, the SEC charges, insiders (including Bruss) sold their stock shares at a large profit, at which point the bubble burst, prices tumbled, and individual investors took the losses. The agency brought charges against Future Superstock and Bruss last October, but the case has yet to go to trial. Bruss declined to comment.

The SEC has made a number of high-profile busts recently, but pump-and-dump scams still abound. It’s unclear exactly how many people lost money in the FairGain scheme, but the stock’s sales volume that day approached its record high, so a large number of investors got stung. And although authorities have charged Gary Dale Hoke with fraud, the victims won’t ever get their money back.

**MULTILEVEL MARKETING**

**More recruitment, more money?**

Tell tale signs: Profit comes exclusively from recruitment effort, no real product or service is sold.

The danger: Only about 2 percent of investors ever make any money; the rest of the participants lose everything. 

Victims of recruitment-based get-rich-quick programs—also known as pyramid schemes—are slower to complain than people who lose money in online auctions. They may not know for months that they’ve been victimized, and some people keep hoping that they weren’t taken and that they’re just a step away from reaping a windfall. “When we try to shut down multilevel schemes, at first people treat us like we’re ripping up their winning lottery ticket,” says Paul Luehr, FTC assistant director of marketing practices.

The classic multilevel marketing or pyramid scheme requires participants to pay a monthly fee and to sign up additional people in order to make money. In fact, according to federal and state authorities, even if the program involves your selling products (like cosmetics or key chains) that you get in exchange for your monthly fee, the program cannot legally require you to recruit people before you can make money. “The first people to sign up for those programs actually make some money off the people who come in after them,” reports the FTC’s Broder. “But our economists tell us that even in the best case, 98 percent of the people that get involved in a pyramid scheme get nothing back.”

In March 1999 the FTC and state officials filed suit or recommended disciplinary action against 67 promoters of Internet pyramid schemes. A typical instance: Five Star Auto Club of Poughquag, New York, promised earnings of $180 to $80,000 and an opportunity to lease a “dream car” for free, in exchange for an annual fee, monthly payments of $100, and recruitment of new participants. The FTC received a temporary injunction from the U.S. District Court to shut down the operation. So far, no criminal charges have been filed against Five Star.

“[Filing charges against pyramid scheme promoters] is a good step,” says Jim Lanford, coeditor of Internet ScamBusters, a Web newsletter that educates people about Internet fraud. “But if you type in ‘multilevel network’ or ‘get-rich-quick’ on a search engine, you’ll find dozens more who brag openly about offering the same things those guys were busted for.”

The lesson here? If an e-mail offer sounds too good to be true, delete the message and forget all about it.

**CREDIT CARD CRAMMING**

**Little charges, big problems**

Tell tale signs: Mysterious charges on your credit card statement and telephone bill for Internet products or services you never ordered.

The danger: Initial charges may be insignificant and go unnoticed; victims may have a hard time getting previous charges removed.

Perhaps the most insidious type of Internet fraud is a scam known as cramming, which involves charging Internet products or services to other people’s credit cards.

Cramming is a tremendously popular criminal activity built on stolen credit card information, some of it collected by hackers who prowl the Net for nonsecure and unencrypted sites where consumers have used their credit cards to buy things. The crammers then use these credit card numbers to order goods for them—
selves. Though the FTC has not had much success stopping crammers, it did finally hook a huge operation in May 1999 that had allegedly defrauded consumers out of as much as $45 million.

In that scheme, according to the FTC, numerous individuals and companies using a long list of aliases—Kenneth H. Taves, Kenneth Till, Netfill, N-Bill, Webtel, and Online Billing, among others—charged thousands of consumers $20 apiece for subscriptions to pornographic sites they had never requested.

Upon discovering those charges on their credit card bills, many victims attempted to contact the scam artists, according to the FTC. But the crammers were inaccessible, hidden behind a long string of mail-drop boxes, postal boxes, and voice mail.

“I called the credit card company and had the charge removed,” says one victim who asked not to be named. “But it kept reappearing. I finally canceled the credit card.”

At press time, federal agents had arrested Taves for the alleged credit card swindle. A trial date has been set for October 26.

Regulators believe this scam has probably claimed some 900,000 victims who remain unaware that they’ve been cheated because they don’t look at their bills closely before paying them. The FTC advises consumers to check all charges and to report any they don’t recognize to the FTC and their credit card company.

CONSUMERS FIGHT BACK

LAW ENFORCEMENT AGENCIES can’t catch all the scammers who set up shop on the Web, but a growing grassroots movement is working to unearth online scams, issue warnings, and offer tips on how to avoid getting cheated in the first place. This information can be found on a number of sites, including www.scambusters.com, www.scamwatch.com, www.stockdetective.com, and www.bbb.com. Some sites offering products or services that tend to attract swindlers have a section for consumer complaints, where buyers can expose scams. Two such helpful sites are www.bestfares.com and www.creditinfocenter.com.

One tireless Internet-scam vigilante goes by the screen name Steve Pluvia. He is often found on one of the Web’s most popular stock chat sites, Silicon Investor. Pluvia has correctly identified several companies as engaged in deceptive activities and has watched day traders scurry out of stocks as their prices plunged.

Scam Exposé One of Pluvia’s favorite stories involves the unmasking of Teletek, a now-defunct Las Vegas telecommunications company, which in 1996 boasted about its planned expansion. On a hunch, Pluvia checked into Teletek’s claims, calling creditors and researching SEC documents. “To keep up the lie about its growth, Teletek would offer long distance through MCI, not pay the bills, get shut off, and then move on to another carrier,” says Pluvia. “Of course, none of this was disclosed to the public.”

One person taken in by Teletek’s illegal touting was Cliff Plas, owner of a Chicago printing firm, who bumped into the company’s phony claims on an AOL chat board. He invested $10,000 in the stock, buying 5000 shares at $2 each. The stock’s value peaked near $10 per share in March, at which point Pluvia spread the word on the Net about Teletek’s deception.

“Pluvia put out some vicious stuff, so I called the company and they told me nothing negative was going on at the company and that Steve Pluvia had it all wrong,” Plas recalls.

Plas held the stock as its price per share plummeted to below $6 almost instantly and kept dropping. Shortly thereafter, one of Teletek’s controlling shareholders was indicted for fraud, the firm’s top management resigned, and the company went bankrupt. “I ended up being right about 99 percent of what I said,” says Pluvia. Plas never got out.

With so many scams and schemes on the Web waiting to ambush victims, consumers’ most effective shield may be skepticism. A century ago, P. T. Barnum said a sucker is born every minute. On the Internet, that birthrate is a lot higher.

Jeffrey Rothfeder is a freelance journalist and the author of Privacy for Sale (Simon & Schuster, 1992). Andrew Brandt is an associate editor for PC World.
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  - HP OpenView NNM Special Edition
  - Intel Pro/100+ PCI Ethernet Adapter
  - Integrated Ultra-2/LVD and Ultra/Narrow SCSI Controllers
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  - 3-Year NBD On-site Service
  - 1-Year DirectLine NOS Support
- **Business Lease**: $1749

**Price**: $1,749

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### Dell Server Award Info
- **Network World” World Class Award” – Dell PowerEdge 2300, 6/98.
- **Computer Shopper “Top 100” – Dell PowerEdge 2300, 11/98.
- **PC Computing’s “A List” – Dell PowerEdge 6300, 11/98.
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THE WORLD may exist in color, but for most businesses, printing remains a black-and-white proposition. Why, when you can get a serviceable color ink jet for $150, would you pay $250 and up for a monochrome laser? Lots of reasons—among them speed, lower long-term costs, and paper handling. And when it comes to reports, proposals, and other documents that require crisp and authoritative text, laser printers have the edge.

We considered 30 monochrome printers designed for small or home businesses or

Faster than a speeding ink jet, laser printers are still the business standard. For sharp text, flexible paper handling, and low long-term costs, you can’t beat these peppy monochromes.
for corporations, including 9 new models ranging in price from $399 to $1,500. We evaluated all the printers' performance, print quality, ease of use, reliability and service, and overall value. In the final analysis, the most balanced printers—not necessarily those that stood out in any given category—were our top choices.

**Black and White Basics**

In a big office, print speed is as fundamental as output quality—the faster the printer runs, the less time you’ll spend waiting for documents to print. Even the fastest color lasers deliver plain text documents at less than 10 pages per minute; monochrome printers can run significantly faster. This month, for example, we saw some impressively swift performances, including better than 14 ppm from Kyocera’s new FS-3700+ and 16 ppm from Minolta’s new PageWorks 25.

If you’ve got a small staff, print speed probably doesn’t matter quite as much. Regardless, you get a lot more speed for your money with a monochrome model. For example, our top-ranked small-business/home laser, Brother’s HL-1640, costs just $299 and cranks out text at 8.4 ppm. By contrast, Hewlett-Packard’s snazzy new color DeskJet 882C (see June’s Top 10 Color Printers, www.pcgworld.com/jun99/printers), costs the same but delivers text at only half the Brother’s speed—and it’s just about the fastest home ink jet in recent memory.

Once you’ve paid for your printer and set it up, how much will it cost to operate? Here, too, monochrome offers a big advantage over color. In fact, a page of color can cost five or even ten times as much as a page of plain old black on white. That’s partly because color documents use more ink or toner per page and because consumables for color printers cost more than those for monochromes. Plus, periodically replaced components (like a laser printer’s fuser) cost more on color units—and don’t last as long.

Still another factor that makes monochrome lasers a better fit in the button-down world are their extensive paper handling options. Though you can find an extra paper tray for most color lasers these days, monochromes offer many more extras to keep a busy office humming—duplexers, envelope feeders, 2000-sheet paper bins, job stackers, and more.

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**Best Buy Lasers**

Among low-end lasers, the Brother HL-1040 (right) shines with its $299 price tag, quick printing, and very good text quality. A fine choice for small offices, it’s easy to install and run. One caveat: The cost of consumables adds up if you print tons of pages.

For corporate types, the Lexmark Optra S 1855 (left) can’t be beat. This quick laser costs $1,299 and whips text pages out at almost 14 pages per minute. Its numerous paper-handling options, including extra paper trays, can shorten those long lines waiting for output.

Prints look good, too.

**The Contenders**

We tested three new mono printers geared for the small-office and home markets: Lexmark’s Optra E310, Okidata’s OkiPage 12i, and Kyocera’s FS-1700+. None of them made our Top 10, though...
such as the easy-to-use Minolta PageWorks 8L.) Okidata's OkiPage 12i is more affordable at $599, but it offers less than the identically priced Xerox DocuPrint P12, our number two choice for small-business and home users.

We also tested six new corporate-oriented monochromes. Brother's inexpensive ($899) and impressive HL-1660c lands in second place, and the $1099 Laserjet 4050 from HP debuts at number five. Falling just short of the chart are Kyocera's FS-3700+, which is identical to the small-business 1700+ except for dramatically faster performance and a slightly higher $1899 price tag; and Minolta's PageWorks 25, an excellent printer that, at $1899, is simply too expensive (unless you need its ability to print 13-by-19-inch documents). Trailing the pack are Compaq's $1005 LN16 and Genicom's $970 MicroLaser 170—essentially two versions of the same unremarkable printer.

The $399 Lexmark missed by only a smidgen. Kyocera priced the FS-1700+ out of the small-office market at $1095 (that's as much as some 18- and 20-ppm corporate models cost). However, Kyocera's low per-page cost—which is due to inexpensive toner and long-lasting components—could make it a sensible choice for those who need high-volume printing. (Those with lesser volume needs and tighter budgets could go with any SOHO unit on the chart, such as the Brother HL-1660c.)

**Small-Office Lifestyles**

**YOU'RE STRUGGLING to grow a new business. How can your printer help?**

First, it must be dependable, since you probably don't have a backup printer down the hall. And if it does start acting up, it must have good support and a warranty that commits the vendor to replacing a bad unit promptly (preferably overnight). Epson shines on reliability, while Lexmark comes out on top in terms of service, according to our reader survey (see "Reliability and Service," page 148). Only Xerox and NEC offer a warranty longer than a year (Xerox's runs three years, NEC's lasts for two). HP, GCC, and Genicom also got dings for lacking toll-free tech support.

But even the best-trained technicians won't come to your office to change a toner cartridge or clear a paper jam. With no in-house technical staff, you need a printer that's easy to set up, simple to maintain, and supported by thorough, clear documentation. Though it didn't make our chart, Lexmark's Optra E310 is exceptionally easy to use.

You also need a printer that will be affordable to own in the long run. Some vendors hook you with a low purchase price, then charge steep rates for toner and other replaceables. Other printers cost more up front but use less expensive supplies. Don't neglect the cost of consumables if your operating budget is tight; over the years it'll far exceed the purchase price. For example, Brother's HL-1040 costs just $299, but its toner prices out at a fairly high 1.2 cents a page, and its short-lived (20,000 pages) drum adds 0.8 cents a page. Print 40 pages a day for a year, and you've spent another $300.

Finally, you'll want a printer that's fast. But don't believe everything you read. Printer makers rate their models' speeds according to the engine's theoretical maximum, which never holds true in the real world: Among the 17-ppm-rated printers we've tested, for instance, the average text speed is just 11 ppm.

**Print Quality: Xerox Rocks**

The newcomers from Lexmark, Okidata, and Kyocera faced some tough competition from established small-office printers. The Xerox DocuPrint P12,
Reliability and Service

WILL YOUR LASER GO THE DISTANCE?

TO PARAPHRASE the Elvis album title, 7850 people can’t be wrong. That’s how many users responded to our first Reliability and Service survey focusing on printers (both color and monochrome). We asked 15 questions on everything from whether a printer worked the first time it was turned on to how courteous a vendor’s tech support staff was. The answers helped us to rank seven printer makers on the reliability of their products, and to rate four of those companies on their service quality. The bottom line: Epson was a hit in reliability, while Lexmark led the pack in service. Okidata ranked low on reliability (but, like two other vendors, it did not get enough responses to service questions to tally a service score).

Printers That Keep Working

WE DEEM a printer reliable if it works when you first turn it on—and continues to do so, with minimal interruption, for its entire life. Survey participants rated Epson’s printers the most reliable overall. Its models worked right out of the box 98 percent of the time. Okidata’s printers weren’t bad; about 91 percent of them worked on the first try. But based on the data we obtained, Okidata’s printers tend to have more problems per printer than those of other vendors. Finally, when our readers rated their level of satisfaction with their printers’ overall reliability, HP and Epson topped the list with 93 percent very or somewhat satisfied. Okidata was again last, but even so, 84 percent of its users were very or somewhat satisfied.

Desperately Seeking Service

GOOD SERVICE means different things to different people, but our survey ran the gamut, covering timely problem resolutions, courteous and knowledgeable tech support staff, and customers’ satisfaction with the way they were treated. Lexmark scored high in every regard. An impressive 88 percent of Lexmark users who had problems said the company straightened them out in five days or less. Less than half of Epson users said the same thing, while Canon and HP users came in at 71 percent and 67 percent, respectively. Everyone knows that good help is hard to find. In our survey, most readers said they talked to pleasant technical support representatives, but fewer were impressed with the technicians’ knowledge about their printer. For example, more than 80 percent of Canon users deemed that company’s reps extremely courteous, but less than 70 percent thought that those reps were exceptionally knowledgeable. Still, overall service satisfaction was pretty good. None of the vendors got ratings of less than 75 percent very or somewhat satisfied, and Lexmark stood out with 85 percent. Note to printer vendors: It helps if your well-mannered technicians know exactly what they’re talking about. —Karen Silver
example, we clocked the OkiPage 12i at 9 ppm on text—slightly faster than the top-ranked Brother HL-1040—but the 12i costs $300 more. Kyocera’s FS-1700+ comes close to 10 ppm but carries a hefty $1019 price tag. Meanwhile, Lexmark’s E310 trails at 6.7 ppm and costs $399. If you plan to print a lot of images, avoid the OkiPage 12i: Most SOHO lasers print graphics four to five times faster.

Ease of Use: Getting Better

You’d think using one laser would be about the same as using any other. Not so. On the Okidata OkiPage 12i’s confusing control panel, for example, some buttons perform two functions, while others do only one. Worse, the Lexmark Optra E310 has a lone, baffling button; some tasks involve sequences of turning on the printer and off, opening and shutting its cover, and pushing the button quickly or slowly. It’s impossible to use without the manual. The Kyocera FS-1700+’s control panel proved cryptic even with the manual, but it does earn points for an illuminated schematic that shows the location of paper jams.

Fortunately, you can do most routine tasks—like picking paper trays—through a printer’s software. Each of the three new models’ drivers makes sense and lets you perform all the necessary functions.

All three new SOHO printers feature a thoughtful internal design: The toner and drum slip in and out easily; adjusting and filling the paper trays doesn’t feel like assembling a jigsaw puzzle; and you can get your fingers inside to clear paper jams. The Kyocera’s insides even slide out on rails.

Okidata Holds Its Own

Two Okidata printers bring up the rear of our SOHO chart. The quick OkiPage 10ex (left) and the cheap OkiPage 6e fill different needs, but they’re both fine for small-business or home use. And Okidata fixed an annoying design flaw that plagued most previous Okidata printers: The auxiliary tray on the 12i now opens easily—no more broken fingernails or scraped knuckles.

Operating Costs: Cash or Credit?

The SOHO printers in this review range from $250 to more than $1000, but cost-per-page figures on all but one of the printers come out roughly the same (between 1.9 and 2.6 cents per page). The exception, Kyocera’s FS-1700+, prints at just a penny a page thanks to two factors. First of all, its toner is exceptionally inexpensive, at $100 for a 20,000-page cartridge, compared to almost $30 for Brother’s 2400-page unit. More important, Kyocera’s ceramic imaging drum, though expensive at $500, is supposed to last a phenomenal 300,000 prints—that’s 15 times longer than Brother’s $160 drum.

If you expect to use your printer heavily and keep it for years, buying a high-priced model like the Kyocera may save you money over the long haul. But if you’re like most people and print a few dozen pages a day, it makes sense to buy a less expensive printer and pay more for consumables.

(See www.pcworld.com/jul99/printers for additional details.)

Corporate Juggernauts

Big offices have different printer needs than small ones do. When you share a printer with lots of colleagues, a fast print engine and quick driver can make the difference between being on time and holding everyone up. Print quality and paper-handling options are also important. Reliability counts, but it’s not quite the top concern that it is with small offices—when your printer goes on the fritz, you can probably redirect your jobs to another unit. And when it’s time to install...
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If you've been holding out for the cable or telephone company to bring high-speed Internet access to your neighborhood, chances are it's been a while. Which is a shame, because if you'd chosen DirecPC, you could be surfing at up to 400 Kbps right now. That's up to 14 times faster than a standard 28.8 modem and almost three times faster than an ISDN line.

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How does it work?

The engineers at Hughes figured out that the real bottleneck in the speed of the Internet wasn't the request out to the Web — telephone modems handle that just fine. Everything slows down when the Web tries to use the telephone system to send you back the media-rich information you requested. So, we use a much faster satellite connection for sending you the Web content you want. Check out the diagram — this is the system that makes DirecPC the fastest Internet access available nationwide.
DirecPC gets pushy.

Sure, you love the idea of surfing the Web at up to 400 Kbps. But what if you could get your favorite Web sites and Usenet Newsgroups delivered straight into your PC by satellite — automatically, without even having to tie up your phone line to ask for them? That’s just what DirecPC’s Turbo WebCast™ and Turbo NewsCast™ services do — so you’re never behind on the news and information that’s important to you. The best thing about these two services? They’re free with your paid subscription to any Turbo Internet™ service package.

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What are you waiting for?

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that 2000-sheet paper feeder, chances are that the chore will be handled by your organization's support staff.

**Print Quality: Big Brother**

With precision-tuned imaging components and a full complement of memory, most corporate lasers can produce exquisite documents. Though we've long admired the fine output of Lexmark's Optra S 1855 and 1625, Brother's new HL-1660e dazzled us with its flawless text, garnering the only Excellent rating for text quality among corporate printers.

Among the six new corporate models we tested, Minolta's PageWorks 25 and HP's LaserJet 4050 also impressed us. The Minolta draws the cleanest, straightest lines we've ever seen—a plus if you plan to print gigantic 11-by-17-inch spreadsheets. The HP LaserJet 4050's fine, evenly weighted text impressed us as well, appearing crisp even at very small type sizes.

**Quick Lasers for Big Business**

The affordable Brother HL-1660e (bottom right) comes in second on our corporate chart, while the high-quality Lexmark Optra S 1625 (bottom left) takes third. In fourth and fifth places are the inexpensive Samsung QwikLaser-7000 (top right) and the speedy, if pricey, HP LaserJet 4050.

By contrast, the Compaq LN16 prints too dark, while the Genicom MicroLaser 170 tends to lose fine details—and even very small characters. And Kyocera's FS-3700+ produces a slight shadow around its letters and images.

Though none of the new printers handles gray-scale images (like photographs) as well as either of the top Lexmarks do, all deliver adequate quality for most uses.

**Price/Performance: Brother Encore**

The Brother HL-1660e debuts in second place on the strength of its impressive print quality, high speed, and low price. It prints text at 12.3 ppm—somewhat slower than the top-ranked Lexmark Optra S 1855—but it costs $230 less, at $899.

The Minolta PageWorks 25 is the zippiest performer we've seen, though its 16.1-ppm text speed falls short of its theoretical 25-ppm maximum. If you don't need the Minolta's ability to print tabloid-size pages, the $370 premium over the Optra S 1855 is a lot for the 2.4-ppm speed gain. The Compaq LN16 and the Genicom MicroLaser 170 don't win any ribbons for performance. In fact, the Compaq is so slow—9.4 ppm on text and 1.4 ppm on graphics—that it evokes Kyocera's pricey SOHO printer, the FS-1700+. Interestingly, Kyocera's FS-3700+ prints text at 14.2 ppm, or almost half again as fast as the FS-1700+, but sells for just $170 more. The FS-3700+ is still more expensive than anything on the corporate chart, but not by much, and it offers the same low lifetime cost as the FS-1700+.

**Ease of Use: Effortless HP**

Though its price and speed impressed us, the Brother HL-1660e wasn't easy to use. An indecipherable control panel, poorly organized documentation, and software that feels like a throwback to the eighties all kept the printer out of the top spot on the corporate chart. Still, the 1660e's design shouldn't hamper your ability to do simple things like add paper or replace the toner cartridge. But compared to the HP LaserJet 4050's effortless mechanical design and crystal-clear control panel, Brother clearly could have done better. The Lexmark Optra S 1855 and 1625 are just as easy to use as the HP. Meanwhile, Minolta's PageWorks 25 comes with one of the best manuals that we've seen—a luxury, perhaps, since the printer is remarkably easy to operate. We did encounter a design flaw in the Minolta, however: The toner/drum assembly catches on the door as it slides into the printer on rails. You might want a third hand when replacing it.

**Operating Costs: Shell Game?**

Despite higher purchase prices and comparable maintenance costs, corporate-style office printers, since they're designed to produce more prints over their lifetime, cost slightly less per page than SOHO.
In a developing story, 

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models. For example, Compaq's LN16 comes in at about 1.6 cents per page, and the Brother HL-1660e at close to 1.7 cents. That said, cost per page can vary depending on how many pages you print and how long your printer lasts.

**Paper Handling: Options and Extras**

One final consideration for a busy office: What to do when the standard 250-sheet paper input tray can't accommodate everyone who needs to use the printer. The more paper your printer holds, the less often print jobs get shipwrecked on an empty tray, stranding anyone waiting for pages to print. Extra paper feeders can come to the reserve. Winning solutions include the Minolta PageWorks 25's extra 2500-sheet paper well ($989) and Lexmark's offerings for the Optra S 1855: up to three 500-sheet paper feeders ($249 each), and a 2000-sheet well ($852). Making extra paper available isn't the only way to boost your office's printing prowess. Various other kinds of attachments can perform tricks you'd otherwise have to do by hand while standing at the printer. For example, an envelope feeder lets you print letterhead and an envelope from your computer in one step without reloading, and a collator can arrange multiple copies of the same document in separate stacks and in the correct page order.

Besides paper trays, Minolta sells more add-ons for the PageWorks 25 than Mattel does for Barbie, including job stackers that can accommodate five ($899) or ten ($1619) users at the same time, and a duplexing unit ($359) that enables you to print on both sides of a page automatically. The Brother HL-1660e's relatively modest offerings include a 500-sheet feeder ($329) and a duplexer ($549). And Lexmark sells so much hardware for its Optras that a fully loaded Optra can look buried. The Optra S 1855 supports an envelope feeder ($249), three output bins ($204 each), and a duplexer ($283). For the Qwik-Laser-7000, our number four corporate choice, Samsung offers only an extra 500-sheet paper tray ($199), but the printer does include a built-in duplexer—making this $799 laser a bargain.

For a complete cost-per-page analysis and reviews of additional printers, visit PC World Online at www.pcmag.com/july/printers. Freelance writer Dan Littman writes PC World's monthly Top 10 Printers. Karen Silver is a senior associate editor for PC World.
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This compact wonder makes using digital pictures in documents, e-mail or Web sites easier than ever before—because the digital camera is built right in. Just swivel the camera toward your subject and capture video clips or still shots. Pre-installed software allows you to create animated special effects or even a 360° panorama from still images. Not much bigger than a paperback book, it also delivers full notebook functionality that lets you run Windows 98.

VAIO C1 PICTUREBOOK

PRE-INSTALLED SOFTWARE:
- Windows 98
- Adobe PhotoDeluxe
- Sony Smart Publisher
- Sony Smart Capture

As low as $41.51 a month*
- Intel Celeron processor 366 MHz
- 64 MB SDRAM (expandable to 96 MB max.)
- 6.4 GB fixed hard drive
- 4X DVD-ROM (max.)
- 14.1" XGA TFT screen
- Integrated V.90 modem
- High-capacity Lithium-Ion battery, dual battery capability
- 256-bit graphics chip
- Built-in stereo speakers
- Digital touch pad
- LINK (IEEE-1394) interface for DV motion capture and editing
- High-capacity Lithium-Ion battery, dual battery capability
- Built-in stereo speakers
- Digital touch pad
- i.LINK (IEEE-1394) interface for DV motion capture and editing

Customize with:
- Upgrade 128 MB RAM add $200

$100 Rebate with purchase of VAIO C1 PictureBook. (Offer expires 9/30/99)

As low as $63.17 a month*
- Intel Pentium II processor 333 MHz
- 64 MB SDRAM (expandable to 128 MB max.)
- 6.4 GB fixed hard drive
- 4X DVD-ROM (max.)
- 14.1" XGA TFT screen
- Integrated V.90 modem
- High-capacity Lithium-Ion battery, dual battery capability
- 256-bit graphics chip
- Built-in stereo speakers
- Digital touch pad
- Built-in stereo speakers
- Digital touch pad
- LINK (IEEE-1394) interface for DV motion capture and editing

Customize with:
- Upgrade 128 MB RAM add $200

$100 Rebate with purchase of VAIO C1 PictureBook and CD-ROM Drive (PCG-CD6). (Offer expires 9/30/99)
take your computer further than ever before.

DIGITAL CAMERAS

SONY DIGITAL MAVICA CAMERA

The Digital Mavica® camera is the only digital camera in the world to use a standard floppy disk for film. Designed for the serious photo enthusiast, this semi-pro model is loaded with top-of-the-line features, like MPEG audio/video capabilities, a 14X Optical Zoom lens, Optical SteadyShot® and special manual controls.

SONY CYBER-SHOT DIGITAL CAMERA

Thanks to its compact size and ease of use, the Sony Cyber-shot® Digital Still camera makes a great companion for your Sony notebook computer. To quickly transfer images to your PC, simply take the Sony Memory Stick® media from the Cyber-shot camera and plug it into your notebook’s PC Card slot (Sony PC Card adapter required).

IC CHIP RECORDER AND PC GLASSTRON MONITOR

SONY IC CHIP RECORDER

The Sony IC Chip Recorder captures every word with digital clarity—and links right to your Sony PC. This palm-sized device (just 85g.) provides a swift, effortless way to save, download and e-mail your audio messages. Highlights include: 2.5 hours of recording time; digital VOR for start-stop speech; and playback control for seamless editing.

SONY PC GLASSTRON PERSONAL MONITOR

A bigscreen display that's portable? The PC Glasstron™ monitor creates a virtual 30” high-resolution image—for your eyes only. It's head-mounted to offer you the most in mobility and privacy. And its built-in headphones make your multimedia experience even more amazing. Just plug it into your notebook and other video sources and let the games begin.

MEMORY STICK IC RECORDING MEDIA

Introducing the next generation of digital data storage—Memory Stick Media. Smaller than a stick of gum, but with five times the storage capacity (MSA-8A model) of a standard 3.5" floppy disk, Memory Stick Media is expected to become the new industry standard for storage and transfer media. Plus, it makes it even easier for you to transfer images, sounds, data and text between cameras, computers and more.

| 4 MB Memory Stick Media | Model: MSA-4A | Price: $29.99 |
| 8 MB Memory Stick Media | Model: MSA-8A | Price: $39.99 |
| 16 MB Memory Stick Media | Model: MSA-16A | Price: $79.99 |
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VAIO SLIMTOP LCD COMPUTER

Reclaim your desk space with a pretty, powerful computer.

The new Slimtop LCD computer is designed with your desktop in mind. Create the perfect viewing angle with the sleek, Ergo-Angle™ Multimedia LCD display. You'll easily handle the most demanding applications with its Intel Pentium III processor 500 MHz, lots of RAM, roomy hard drive, and 24X CD-ROM. AutoAlert™ Email Notification instantly tells you when you have email. And the palm rest for the VAIO Smart™ Convertible Keyboard turns into a keyboard cover. And with Sony's Memory Stick Slot built right into the computer, you can easily store and transfer images, sounds, data and text between cameras, computers and more. Best yet, this stylish computer fits neatly into a space 75% smaller than a standard tower PC.

PCV-L600 $2,999.99
- Ergo-Angle 14.1" TFT Multimedia LCD Display
- Intel Pentium III Processor 500 MHz
- 128 MB RAM (expandable to 256 MB max.)
- 10.8 GB Ultra DMA hard drive
- 24X CD-ROM (max.)
- 1.9 USB ports (front and rear)
- 2X AGP 3D Graphics (ATi Rage LT Pro)
- 4MB Video Memory (SGRAM)
- High-fidelity 3D PCI Audio
- VAIO Smart Convertible Keyboard
- Type II PCMCIA slot
- Built-in Memory Stick slot

PCV-L400 $2,299.99
- Ergo-Angle 14.1" TFT Multimedia LCD Display
- Intel Pentium II Processor 400 MHz
- 64 MB RAM (expandable to 256 MB max.)
- 6.4 GB Ultra DMA hard drive
- 24X CD-ROM (max.)
- V.90 modem
- 2 USB ports (front and rear)
- 2X AGP 3D Graphics (ATi Rage LT Pro)
- 4MB Video Memory (SGRAM)
- High-fidelity 3D PCI Audio
- VAIO Smart Convertible Keyboard
- Type II PCMCIA slot
- Built-in Memory Stick slot

PCV-L600S $2,199.99
- Does not include LCD Display
- Intel Pentium III Processor 500 MHz
- 128 MB RAM (expandable to 256 MB max.)
- 10.8 GB Ultra DMA hard drive
- 24X CD-ROM (max.)
- V.90 modem
- 2 USB ports (front and rear)
- 2X AGP 3D Graphics (ATi Rage LT Pro)
- 4MB Video Memory (SGRAM)
- High-fidelity 3D PCI Audio
- VAIO Smart Convertible Keyboard
- Type II PCMCIA slot
- Built-in Memory Stick slot

Pre-installed Software:
- Sony Digital Media Park™
- Sony ImageStation™ on PhotoNet®
- Sony PictureGear
- Adobe PhotoDeluxe
- Adobe Acrobat Reader
- Microsoft Works 4.5
- Intuit "Quicken" Basic 99
- Microsoft Money 93
- Microsoft Encarta® 99 Encyclopedia
- Microsoft Outlook 99

Order Any Slimtop LCD Computer today and get a 4 MB Memory Stick—FREE.
(Offer expires 9/30/99)

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So light, yet so powerful.

The newest Sony VAIO 505 SuperSlim Notebooks are even lighter and slimmer than before. Each sports a light, durable magnesium-alloy case inside which you'll find: an Intel processor, crisp, clear display; 90% sized keyboard; heavy-duty hard drive; built-in modem; i.LINK (IEEE-1394) interface for DV still image capture; Programmed Power Key (PPK) for one-button access to your email, calendar or browser; plus Signature Capture so you can sign off on original documents in your own handwriting. What more (or less) could you want in a portable PC?

Z505SX $2,999.99
- Intel Pentium II processor 366 MHz
- 128 MB RAM (expandable to 256 MB max.)
- 5.4 GB fixed hard drive
- 1" thin: 3.5 lbs.
- Built-in Ethernet (10Base T/100Base TX)
- 12.1" XGA TFT Display
- V80 modem
- High-capacity Lithium-Ion battery
- Digital touch pad
- Bundled i.LINK Port Replicator and external floppy disk drive
- One type II PC Card slot with card bus support
- Memory Stick Slot
- Two USB ports
- Built-in stereo speakers

Z505S $2,499.99
- Intel Celeron™ processor 333 MHz
- 64 MB RAM (expandable to 128 MB max.)
- 6.4 GB fixed hard drive
- 1" thin: 3.5 lbs.
- Built-in Ethernet (10Base T/100Base TX)
- 12.1" XGA TFT Display
- V80 modem
- High-capacity Lithium-Ion battery
- Digital touch pad
- Bundled i.LINK Port Replicator and external floppy disk drive
- One type II PC Card slot with card bus support
- Memory Stick Slot
- Two USB ports
- Built-in stereo speakers

505TR $1,999.99
- Intel Pentium processor with MMX technology 300 MHz
- 64 MB SDRAM (expandable to 128 MB max.)
- 6.4 GB fixed hard drive
- 0.5" thin; 3.1 lbs.
- 10.4" XBR XGA TFT Active Matrix Display
- V80 modem
- Double-capacity Lithium-Ion battery
- Touch panel with pen operation
- Bundled Port Replicator with external floppy disk drive
- One type II PC Card slot with card bus zoomed Video Support

Customize with:
- Upgrade to 128 MB RAM add $300

$100 Rebate with purchase of VAIO 505TR and CD-ROM Drive (PCGA-CD5 or CD51).
(Offer expires 9/30/99)

Pre-installed Software (All models):
- Windows 98
- Microsoft Outlook 98
- Microsoft Works
- Adobe PhotoDeluxe
- Sony DVgate Still
- Sony Picture Gear

Pre-installed Software (Z505sx and Z505S models):
- Sony Smart Capture
- Sony Smart Connect
- Sony Smart Publisher
- Sony Smart Write

Sony Exclusive Features: (All models):
- i.LINK (IEEE-1394) interface for DV still image capture
- Programmed Power Key (PPK) for unattended e-mail retrieval

Sony Exclusive Features: (505TR):
- Pen-based signature and drawing capture

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SN-799-APW
Smart recruiting has gone online—but don't think that makes hiring new employees on the Web a no-brainer.

By Michael Goodwin
Whether you're a department manager for a big company or a small-business owner in need of a hand with your firm, finding and hiring top-drawer talent is getting harder and harder. Most of the best candidates are happily employed, with high salaries and lucrative stock options; and college students are wading through job offers before they even don cap and gown.

That's where "e-recruiting"—electronic recruiting on the Internet—comes in. E-recruiting gives you access to an array of online hiring resources and provides ways to find and build relationships with candidates who may already be employed. But it takes more than a modem. Successful strategies start with Web-based classifieds (aka job boards), and move beyond them into new areas of recruiting technology.

GOOD JOB HUNTING

If you're looking to hire new employees online, you aren't alone. According to The Industry Standard, a sibling publication of PC World that covers the Internet economy, the volume of online job postings grew by 60 percent in the space of a single year. And we're not just talking about mailroom temps here, either. Job listings on the Web range from $1,500-a-year entry-level positions to senior executive posts paying well into six figures.

Most e-recruiters start their talent hunts at big general-interest job boards like Monster.com or CareerPath.com. For up to $600 a month, a job board will run a posting (often of unlimited length) on a virtual shingle viewable by anyone who can steer a browser. Interested candidates can filter listings by area, job type, and so on, and then respond via e-mail. Some job boards allow recruiters to search through a database of résumés posted by job seekers. Monster.com, for instance, currently stores 1 million résumés; and CareerPath.com, about half that many. If you want to search résumés on either site, however, you may have to pay a monthly subscription fee of from $200 to $1000.

To take full advantage of the Web, use boards that are tailored to your recruiting needs. For some positions, that may mean using a big general-interest board; but more often than not, smaller is better. The best of the national boards, like Dice.com (for techies and engineers) and Exec-U-Net (for high-

Trial by Hire: The Big Job Boards

<table>
<thead>
<tr>
<th>JOB BOARD</th>
<th>Number of résumés listed</th>
<th>Cost to post one listing</th>
<th>Cost to search résumé database</th>
<th>Notice via e-mail</th>
</tr>
</thead>
<tbody>
<tr>
<td>America's Job Bank</td>
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</tr>
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<td>$95/month</td>
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</tr>
<tr>
<td>Yahoo Classifieds</td>
<td>less than 2500</td>
<td>free</td>
<td>free</td>
<td>●</td>
</tr>
</tbody>
</table>

- Yes  ○ No  n/a = not applicable  *For a higher price.
level executives), are extremely specialized. Indeed, some of the most effective boards are city- and industry-specific.

Hitting the job boards is only the beginning of your quest for the perfect employee. To find the best candidate online, you must focus your search on exactly the type of individual you want and build a customized strategy for finding and attracting that person. The most successful online recruiting occurs through an open-ended process—one that you should set in motion well before you’ve got an opening to fill.

**HOT ECONOMY, COLD PROSPECTS**

In an economy where unemployment among trained, talented people is almost nonexistent, competition to hire them has become cutthroat. Top online recruiters are scrambling to stay on top by reinventing their hiring strategies. Senior recruiters at Sun Microsystems, for instance, currently use the Internet for 80 to 90 percent of their recruiting.

According to Sandie L. Wade, an employment manager at Sun, the IT giant goes after active job-seekers by linking its Web page to a number of job boards and other Internet sites. But to find the best passive candidates—the hard-to-find engineers and writers who already have jobs and may not be looking for new ones—Sun’s recruiters have to be more creative.

“It’s all about finding names,” says Wade. “We start by sorting through the virtual communities, the online services, e-mail directories, university alumni chapters, discussion groups, and not-so-public Web servers. It’s not automated, it’s not easy, and it’s extremely time-consuming.”

In a world where the most talented people skip the want ads, top-notch hires are like true love: hard to find. Recruiters, online and off, face a circumstance they’ve never had to deal with before, says John Sumser, who runs the Internet.com Web site. Sumser’s site includes a daily newswire for recruiters, a library of software tools, and scads of other useful e-recruiting information. “Up to now,” he says, “the unspoken assumption in growing a business was that there would always be more workers if you needed them. But that’s no longer the case. For some positions, employers will need to recruit two to three years in advance.”

Professor John Sullivan knows there’s a lot more to successful recruiting than scanning job boards. Head of the Human Resource Management program at San Francisco State University’s College of Business, Sullivan advises firms like Microsoft, Hewlett-Packard, Nike, Cisco Systems, and Charles Schwab about recruiting, especially online recruiting.

Here’s what he tells them: If you’re really good in your field, whether it’s computers or basketball, you don’t go looking for a job—because you don’t have to. “The only people who read want ads or offline are unemployed people,” he says, “and the odds of an unemployed person being great are pretty close to zero. If Michael Jordan had gotten laid off from the Bulls, he wouldn’t have had to look in the newspaper to find a job.”

**ALL A-BOARD**

**DOES THIS MEAN posting an opening on a job board—or searching its résumé database—is a waste of time? Not at all.**

“Sometimes, using a board works wonderfully,” says Joanie Pacheco-Anderson, manager of human resources at Chronicle Books in San Francisco. “Especially if you can find Web sites that are more like your company, more like your industry, more like your culture. But if I go to a general site like Monster, I get people who aren’t quite what we’re looking for.”

John Sumser recommends testing the site before you post: Buy a help-wanted ad, scan the responses, and tweak the ad until you start getting the kind of people you want. “The search engines on
these job boards work somewhat differently," he says, "so you have to optimize the job posting for the search engine. And the audiences for the job boards are different, so you have to optimize the job posting for the audience as well."

Finally, think local. Bernadette Samson, the human resources manager for Portal Publications in Nor- to, California, didn't plan on importing an employee from the East Coast, but when she posted a job opening on Monster and CareerMosaic, most of the résumés she got were from out-of-towners interested in relocating. "I was getting résumés from all over the country," she says. How do you avoid casting too wide a net? By posting your ad on a local job board instead of a national one. Most cities have at least one, and you can use an Internet search engine to find it.

So if your company waxes widgets in Wichita, go to your favorite Internet search engine, type employment+Wichita in the search box (you may need to customize the syntax for your specific search site), and look for a local board specializing in widgets.

Ready to get started? Hold onto your hat. If you include area-specific boards and corporate sites that list job openings, altogether almost a million sites are dedicated to matching job seekers with jobs. Fortunately, you don't need to check out all of them. We've identified top sites in four categories: general-interest boards and those specializing in execs, techs, and finance wizards. Depending on what kind of job you're trying to fill and where it's located, these particular boards may not be the best match for you; but once you connect with them, you can link to local sites more closely tailored to your needs.

**General-Interest Boards**

**RECRUITING 101**

Interbiznet.com (www.interbiznet.com), John Sumser's Web site, includes a daily newswire for recruiters and a library of software tools, plus publications, seminars, on-site consulting services, presentations on recruiting strategies, and scads of other useful information—some (but not all) of which is free.

Advanced Internet Recruitment Strategies (www.airsdirectory.com) is a national training company for serious recruiters, offering seminars, corporate training, and publications designed to teach you "active search tools and strategies to find passive candidates, not just job-seekers."

Dice.com (www.dice.com/careerlinks/recruiter.html) provides a page of recruiter links that give you instant access to a grab bag of training tips and e-recruiting resources.

**Career Builder Network** (www.careerbUILDER.com) carries no résumés and no job listings; instead, it serves as a medium for posting job openings on any of 21 professional, diversity-minded career Web sites, including American Banker Online, Black Enterprise Online, Hispanic Magazine Online, and Women Connect Online. Depending on how many positions you list, you pay between $30 and $150 for a 30-day posting on each site. Job seekers apply directly to you.

CareerMosaic (www.careermosaic.com) offers only about 100,000 résumés, but it provides a raft of useful information for recruiters and job seekers alike. You'll find links to sites focusing on job opportuni-
IF YOU WANT TO SEE THE SPEED OF LIGHT
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Whatever speed you need,
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- Supports ATI-TV WONDER, the TV tuner board which gives you TV on your PC.

- No matter how much speed you need ATI has the power to deliver the performance to make your PC come alive in 16.7 million colors.

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<table>
<thead>
<tr>
<th>COLOR</th>
<th>1024x768</th>
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ties in healthcare, human resources, insurance, and more. Looking for local talent? Try CareerPath.com (www.careerpath.com). It links to the classified sections of more than 70 of the nation's top newspapers.

HotJobs.com (www.hotjobs.com) has a functional user interface that makes posting jobs, searching résumés, and tracking applicants a breeze. Recruiters can create customized multiple-choice tests to keep inexperienced job seekers from swamping them with formal applications. To encourage a confidential and noncompetitive hiring process, the site excludes headhunters, too. Monthly memberships cost $600, but if you don't need to search the 230,000-résumé database, you can pay for postings individually.

JobBankUSA (www.jobBankUSA.com), with a pool of only 90,000 résumés, is no Monster.com; and to search the database, you have to sign up for a year. Still, the fee charged for accessing the résumé database is relatively low ($1900 per year), and all of the recruiters we spoke with regard the site highly. When you arrange to post a job listing (at $125 per ad for 60 days of exposure), the posting is sent to a number of Usenet newsgroups and also appears on the site. An alternative tool available at the site is the Stealth résumé spider. The spider, which runs on the AltaVista search engine, seeks out Web sites and user group listings containing résumés not findable by conventional search methods. JobBankUSA—like HotJobs.com—won't let you include a direct link to your company's Web site in a job posting.

JobWeb (www.jobweb.org) and Jobtrak (www.jobtrak.com) offer two of the best ways to reach college students who are just entering the job market. Aimed at recruiters and career services offices, JobWeb forges job listings and résumés. Instead, employers can post an organization profile—who they are, what types of graduates they hire, and where to send a résumé—and include a link to the company Web site. For its part, Jobtrak supplies access to 130,000 résumés and 850 college and career centers.

Monster.com (www.monster.com) has the biggest database around, with more than a million résumés. Recruiters pay by the job listing or purchase a 90-day, $4200 membership entitling them to post 15 listings and use the job seeker database. The interface is friendly, and the site has lots of features to make hirers' lives easier—including a recruiting forum and a correspondence manager that automatically sends unsuitable candidates a thanks-but-no-thanks rejection letter.

NationJob Network (www.nationjob.com) caters to recruiters who are too busy to sieve out the keepers from dozens of résumés. You post a job, and the site funnels appropriate résumés to you. Costs start at $95 per listing.

Yahoo Classifieds (www.classifieds.yahoo.com/employment.html) is the big board of choice among companies for which price is a priority. It carries only a fraction of the number of job postings you'll find on Monster.com, but you can post a job and search the résumé database for free. All the usual keyword filters apply, and you can browse for applicants and résumés by metropolitan area or state.

America's Job Bank (www.jobsearch.org) and HeadHunter.net (www.headhunter.net) give cash-strapped recruiters other options. They offer free job postings and access to thousands of résumés.

Executive Class

The upper echelon of administrators is a job category where a national search makes sense. Since most businesses pay top dollar for head honchos, throwing a relocation package with the new VP's already voluminous salary probably won't generate seismic unrest in the corner office. Two executive job search sites have good reputations among recruiters for making necessary connections between qualified executives and the companies that seek them worldwide:

Exec-U-Net (www.execunet.com) offers recruiters free...
Get a Princeton EO series 19” or 21” (various viewables) display and you’ll have the big picture.
High-Tech Connections

To find top technical talent, you need to do your hunting on a specialized board. Three tech-centric sites came up in our conversations with practically every IT recruiter we interviewed:

- **ConsultLink (www.consultlink.com)** specializes in connecting you with contractors and independent consultants. You can post a job opening for $50; if fewer than five qualified consultants respond, your ad is free. Alternatively, you can search the résumé database for two days for a flat fee of $150. Obtaining contact information for someone who interests you costs just $15. Or for $295 a month, you can buy a Basic Charter membership, which entitles you to unlimited search privileges and discounts on job announcements.

- **Dice.com (www.dice.com)** aims exclusively at computer professionals. It lists more than 18,000 programmers, software engineers, systems administrators, Web developers, hardware engineers, and others. For $95 a month, recruiters can post open positions and scan a list of candidates and their skills, then contact the job seekers to request résumés. Every job opening listed on Dice.com is broadcast to Classified 2000 and Yahoo Classifieds.

- **Techies.com (www.techies.com)** supports confidentiality features designed to attract passive candidates who don’t want their current employers spotting their résumé on a public job board. Recruiters pay $6000 for a one-year subscrip-

NEED TO HIRE one of the top ten candidates in a given field? Or want to avoid the crowds on conventional employment sites and start finding passive (currently employed) job candidates? Here’s how:

- **BE CREATIVE.** If you’re in the market for a programmer who can build an esoteric Googleplex database, find an online e-magazine with an article on advanced Googleplex functions and buy a banner ad that pops up when someone accesses that article.

- **BUILD A TICKLER FILE.** A database of passive candidates—and check in with them periodically. A passive candidate who isn’t in the job market now might take the plunge in another six months.

- **NEVER STOP HIRING.** Use the Net to build personal relationships with good candidates. Send out e-mail newsletters, marketing brochures, product samples, and reports on new technologies.

- **ESTABLISH PROFESSIONAL relationships with select college students.** Many of the 2 million college students in the United States maintain personal Web pages provided by their educational institutions. Set up a “spider” to find home pages, sift through them, and pick the ones with keywords that match your hiring needs; then add the most promising students to your passive talent database.

- **SELL THE TEAM as well as the job.** Top people want to work on cutting-edge projects, but they also seek a dynamic manager.

- **ASK NEW EMPLOYEES to identify talented people at their previous company.** If a new employee lists references, consider the references as potential hires.

- **USE YOUR COMPANY Web site as a recruiting resource.** Load it with useful information and software that will encourage candidates to keep checking back.
“Job boards can work wonderfully... if you can find sites that are more like your company.”

Joanie Paccheco-Anderson, Human Resources Manager, Chronicle Books

STRATEGIES FOR A TIGHT JOB MARKET

SO THE JOB BOARDS AREN’T working for you, and you’re anxious to develop longer-term strategies? San Francisco State’s John Sullivan recommends moving from coincidence hiring (“Oops, we need a database programmer! Where can we find one?”) to continuous hiring. To accomplish this, you need to identify people you’d like to hire before you need them, before other companies find them, and before they know they want a new job. Once you spot a promising candidate, you can start building a personal relationship that will help incline him or her toward signing on with your company.

Fortunately, the Internet is full of resources to help you do just that. Searching for résumés is only the start. Surf the Web and read the user groups: When you run across someone whose ideas stand out, add him or her to your talent database. (See “Hire Education,” page 166, and “Recruiting Tips,” page 170.) While the Internet is a critical part of e-recruiting, it’s not the only part. Successful strategies often involve nonelectronic elements, too. Many of the best people, for example, are found through referrals: Ask new hires to name the most talented people at the company they just left, and treat their references as potential hires. If you hear someone give a great talk at a seminar or convention, get the speaker’s name. Then use the Internet to establish a relationship.

One of the biggest benefits of continuous recruiting: You can assess candidates over time, and get to know their work before you offer them a full-time position. Sullivan recommends hiring promising people as short-term consultants, even if they’re happily employed by someone else—and even if they’re a little different. “A really creative tech person may come in with his nose pierced,” he says, “and many interviewers will go, ‘Gasp!’ So you need to get your managers involved in doing assessments of people over time.”

E-recruiting may not be easy, but it works. Like all recruiting, however, using the Web to find the right employee takes time and effort—even in a world with a shrinking supply of talented candidates. So while the Web may not be the answer to your hiring woes, it does add another potent weapon to an increasingly multifaceted arsenal of recruiting tools. Which may not be so revolutionary after all.

Freelance writer Michael Goodwin is a regular contributor to PC World.
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Most people fail at presentations because they start where they should end."

Sounds odd, but that's the view of veteran presentation master James Lengel, assistant professor at Boston University’s School of Public Communications. Lengel, formerly Vermont's Deputy Commissioner of Education and an in-house consultant at Apple Computer, can create an effective 45-minute multimedia presentation in less time than it takes to present it. He does so with Microsoft PowerPoint, plus content easily available from the Internet, CD clip art, and his own digital camera.

Anyone can, he says. You just need to know how to look at your material the way the audience will.

**TIPS AND TECHNIQUES FOR CREATING WORLD-CLASS PRESENTATIONS WHEN YOU ARE THE CREATOR**

Where people make a mistake is by creating too many slides, writing too much text, and turning their slide presentations into a bulleted summary of what they're saying while they're presenting.

For starters, Lengel believes that text is the last thing most people want to see at the beginning of a presentation. “You have to predispose them to intellectual persuasion by reaching them on an emotional level first. A good presentation starts with some drama—images and/or sounds that get the audience guessing and set a mood. Using images to surprise the audience gets their attention and draws them in. They want to know what you’re doing, so when you tell them they’ll listen.”
“PRESENTERS SHOULD NOT BE AFRAID TO TAKE RISKS. AUDIENCES LIKE THE UNEXPECTED. DON’T BE AFRAID TO IMPROVISE, TO JUMP AROUND IN YOUR PRESENTATION—EVEN ASK QUESTIONS FROM TIME TO TIME.” —JAMES LENGEL

Recently Lengel gave a presentation to a group of high-school educators on what’s wrong with how the Internet is being used in the classroom. His first slide: the sound of a violent crash and a photograph of a frustrated man and a wrecked computer. As Lengel talked, the images became more “content-oriented”—a picture of a Web browser, a simulated online session, and eventually words about recommended actions. In all, he recommends about 20 slides for a 45-minute presentation, or about two slides per minute.

Three Parts to Success
Good presentations have three parts, and also three different outlines: ideas, methods, and a spec. Ideas are the points you want to make; the methods are the ways you want to make them (e.g., images, simulation, text); and the spec is the list of physical elements needed to execute each of the methods—clip art, video, sound files, text blocks, etc. Lengel recommends collecting all of these elements in a single folder first before starting work in your presentation software package.

Indexed clip art libraries are best and can be found in stores and on the Web. “Photographs are better than drawings,” Lengel says, “especially photographs of people. They’ll engage your audience.” Another good source for pictures and sounds is the Lycos advanced search engine. We typed in “Boston skyline,” for example, and got back links to a dozen GIF and JPEG images from various Web sites.

Other sources: scanners and digital cameras. All of these sources let you make copies—either by dragging an item with the mouse or using a “copy” command, as in a browser. Once a file is in your spec folder, bring it into your presentation slides by clicking open the “Insert” menu and picking the appropriate object type. When an item is in a slide, you can move it around, resize it, and add surrounding text (select “Text Block” from the Insert menu). If the object is a sound or a video, open the “Slide Show” menu and select “Action Button.” That lets you add a button you can click on during a presentation to play the sound or video. You can also add buttons that allow you to open your computer’s browser and hyperlink to the Web (or any other content on your computer) in a separate window.

Another useful button to add to each slide is a “home” button which hyperlinks you back to a menu slide. That’s useful if you ever want to jump around in your presentation, say, when someone asks a question. A menu slide is simply one which lists each of the other slides by title (you should give a title to each slide). Clicking an action button next to the title hyperlinks you to its slide. When you are finished with that slide, you can either continue on in sequence from that point or hyperlink back to the menu and go to any other slide.

“Presenters should not be afraid to take risks,” Lengel says. “Audiences like the unexpected. Don’t be afraid to improvise, to jump around in your presentation—even ask questions from time to time. Remember, the more interactive you make it, the better.”

Written by Randall D. Cronk, a Boston-based freelance writer on information technology topics. His Web site is www.greatwriting.com.
Okay, so Sony's been putting good things in small packages since the Walkman® personal stereo made history some 20 years ago. But the Ultra Personal™ projector is getting people to do more than just listen. With 600 ANSI lumens of brightness and XGA resolution, this lightweight projector boasts some of the most brilliant images to ever hit the road. Which means the Ultra Personal projector looks as impressive on screen as it does in the overhead bin. So you can make a little history of your own.

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TWO DECADES AGO A TI PHYSICIST SAW A LIGHT IN HIS MIRROR THAT LEAD TO A BREAKTHROUGH IN DIGITAL PROJECTION

THE FORCE REALLY IS WITH DLP

The year was 1977. Texas Instruments physicist Larry Hornbeck was driving alone in his truck when he looked up in his rearview mirror and noticed something interesting about the pattern of lights reflected there. That was the same year Star Wars was being introduced in movie theaters all across the U.S. Dr. Hornbeck did not know it then, but the lights he saw in his mirror that night set the stage for his own encounter with the Force at an undisclosed location 22 years later—this June 18, actually. That's the date the mega blockbuster Star Wars: Episode 1—The Phantom Menace will be publicly screened in theaters equipped with Texas Instruments' Digital Light Processing™ (DLP™) projectors—each with millions of microscopic mirrors called DMD™s or Digital Micromirror Devices™ by Texas Instruments. And if Hornbeck and George Lucas get their way, it won't be the last. That's because DLP projects images digitally—and like LucasFilm's THX, or other digital sound technology—ensures consistently true fidelity between what was originally recorded and what ultimately is experienced in the theater.

If press accounts are accurate, Lucas is adamant about digital projection playing a big role in future projects. He's not the only one in Hollywood under the influence of DLP. Last year Texas Instruments won an Emmy award for Outstanding Achievement in Engineering from the Academy of Television Arts and Sciences for DLP. And DLP is a hit with Corporate America, too—accounting for about 20 percent of the portable projector business—or about 500,000 to be sold this year—up from virtually zero three years ago, according to industry observers. Over 165,000 projectors enabled by DLP technology have been sold in two years. More than 25 of the top projector manufacturers incorporate DLP into their design and there are now over 50 DLP-based products in the marketplace.

So what's Hornbeck's connection to Lucas? And what did he see that fateful night in his truck's rearview mirror? DLP is Hornbeck's invention. The movement of the truck tilted the mirror just enough to make the headlights of the cars behind him appear to turn on and off. Hornbeck wondered if the same effect could be achieved by shining a light on microscopic mirrors attached to the backs of chips. Turn the chips on (binary "1") and the mirrors would tilt so that light is projected. Turn the chips off (binary "0") and the mirrors would tilt away so that

continued on page 8
100% digital display technology delivers lighter, brighter ultraportable projectors.

For dramatic, high-quality images look for a projector featuring Digital Light Processing™ (DLP™) technology from Texas Instruments. DLP technology is the revolutionary all-digital projection system that has enabled a new generation of market-leading ultraportables. Unlike LCD systems that contain heavy, complicated optics, DLP technology delivers incredible images through a more compact optical system for smaller, lighter projectors.

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ONE OF THE BENEFITS OF DLP IS THAT THE ROOM CAN STAY LIGHTED, EVEN FOR LARGE AUDIENCES AND EVEN WHEN USING A PORTABLE PROJECTOR. THAT MEANS THE PRESENTER IS FREE TO MOVE AROUND AT WILL.

**DLP Flexibility—Use it to Your Advantage**

One of the advantages of Texas Instruments' Digital Light Processing™ (DLP™) technology is that it gives the speaker almost total control of the presentation. The lights can stay up. The projector can easily be positioned in different places around the room. And the presenter does not have to depend on the kindness of strangers to ensure the proper equipment is set up the way it should be ahead of time.

But none of this flexibility matters if the speaker doesn’t know how to use it to advantage. Take the issue of lighting. One of the benefits of DLP is that the room can stay lighted, even for large audiences and even when using a portable projector. That means the presenter is free to move around at will—without crashing into things. That’s something more speakers should do, according to James Lengel, assistant professor at Boston University’s School of Public Communications. “The speaker is an actor, part of a presentation,” says Lengel. “They need to be physically involved, maintaining eye contact and walking around the room. They shouldn’t just speak. And they should never be sitting down.”

Lengel recommends talking with your face to the audience, with your back to the “big” screen, and your laptop in front of you—but not to be frozen in place. “Try to position yourself facing your audience—as if you were talking most of the time during your presentation. But sometimes you want to walk to the back, so the audience is between you and the screen. You play with that—that’s part of the experience. And when you do leave the front of the room, make sure you have something interesting up on the screen for them to look at. Most slides should be on the screen for about two minutes. That means you have to be able to get back up front in that amount of time. If it is a presentation for 20 to 30 people, you should be able to walk around the room in two to three minutes.”

Eye contact is critical, Lengel adds. “You want to stand up and capture their attention, to keep them with you. You talk to them, look at them in the face—you need to understand how they’re taking it, whether what you’re saying is going down.”

Another advantage of DLP is portability—the ability to set up the room so that everyone has the optimum view—even if that means moving the projector a couple of times to make sure everyone can see. “The only way to test that,” Lengel says, “is to sit in every seat. The projector should be squarely focused on the screen and everyone’s view should be unobstructed. Not everyone sets up their presentation rooms that way. You may have to move something around to make it happen.”

That’s easy if you bring along your own portable projector, and if it is as light and bright as the current DLP models.
SUBSTANCE: 4.9 Pounds.
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A notebook projector that's light on weight, heavy on style. The new InFocus® LP330 "Dragonfly" with XGA resolution projects a truly stunning image, even before you turn it on. From the number-one name in projectors. It's your image. Project yourself.™

For corporate users, the standard of comparison isn’t film, but liquid crystal display (LCD) technology. DLP’s advantages are its brightness and ability to project motion without lagging or “smearing.”

Continued from page 4

No light is projected. Color is possible by employing three chips, each projecting a different primary color—or by synchronizing the rotation of a color wheel passing in front of a single chip. Use enough mirrors, make them small enough, and pack them closely enough together, and you can project an image that corresponds exactly to whatever pattern of ones and zeros you want—whether that’s a Jedi battle or a corporate Road Warrior’s latest sales projections.

A Feat of Engineering

In either arena, DLP has become a force in its own right. In the movies, digital content may someday be distributed to theaters by satellite—potentially saving filmmakers the $1,500 to $2,000 cost of each print. Add to that the cost of distributing prints, each of which weighs about 60 pounds. That’s a lot of money, considering that a major release requires some 5,000 prints in the U.S. alone. Even if movies were burned into optical disks, there would still be substantial savings. Other benefits: no effects from wear and tear, and no degradation in picture or sound quality caused by repeated movie showings.

For corporate users, the standard of comparison isn’t film, but DLP’s major digital rival—traditional liquid crystal display (LCD) technology. DLP’s advantages are its brightness and ability to project motion without lagging or “smearing.” DLP is a reflective technology—so more of the light from the projector’s lamp ends up on the screen. LCD is transmissive—so that light from the lamp is partially blocked by the LCD panel’s circuit elements and absorbed by the liquid crystal material. In addition, the LCD light source must be polarized, which also reduces brightness. Taken together, these barriers subtract as much as half the lamp light before it ever leaves the LCD projector. Another DLP advantage is “fill factor,” a measure of how much image is lost in the spaces separating pixel elements. The mirrors that create the images in DLP are only separated by 1 µm gaps—meaning that 90% of the image is actually projected (instead of lost in the cracks). This compares to LCD’s 70% fill factor, which results in lower perceived resolution and more of a “screen door” effect.

But if DLP is so great, why did it take until the second coming of Star Wars to make the big time? For one thing, DMDs are a remarkable feat of engineering—and those take time. Each DMD consists of thousands of tilting aluminum alloy mirrors that only measure 16 µm on each side. Behind the mirror are multiple layers of material—out of which are fashioned the mechanical assembly required to make the mirror tilt on command. Those include: a yoke to support the mirror, a “spring” or torsion hinge, a landing pad to stop the mirror at exactly a 10 degree tilt, a magnet to pull the mirror on its hinge, and various support posts to hold everything in place. Finally, at the bottom of all this is a complementary metal oxide semiconductor (CMOS) address circuit that holds the charge, that turns on one magnet, that tilts one mirror. Over three-quarters of a million of these assemblies are required to make a single XGA projector (the DMD chips used in the Star Wars screening contain i.3 million)—and each one of them can be individually switched on or off in less than 20 µsec. Not exactly a truck mirror.

DMDs not only have to work, they have to work reliably—a potential issue with mechanical parts this small that must constantly move back and forth at such incredible speeds. Not so, says TI. To test hinge failure, TI subjected approximately 100 different DMDs to a simulated one-year operational period. Some devices have been tested for more than 1 trillion cycles, equivalent to 20 years of operation. An inspec-

The LP425z from InFocus Systems shines at 900 lumens and weights 7.4 pounds. It delivers true XGA (1024 x 768) resolution.

ViewSonic’s PJL802+ ViewBook projector weighs 12.8 pounds and features 650 lumens and 200:1 high contrast ratio.
Ten years of worry-free presentations.

DISTINCT DETAILS
XGA resolution provides the image detail and compatibility you need.

BRILLIANT IMAGES
800 ANSI lumens make it easy to see the bright, vivid colors.

LIGHTWEIGHT CHAMPION
Weighs just 8.1 pounds for go-anywhere presentations.

CLOSE UP VIEWS
digital zoom lets you magnify image details.

LOW COST OF OWNERSHIP
4,000-hour lamp saves costs and hassles.

Proxima’s UltraLight LX1. An enduring value.

The Proxima UltraLight™ LX1 in a nutshell: low price, high resolution, low maintenance, and incredibly high value. With an industry-leading 4,000-hour lamp life, you’re set for about ten years* of presentations without once having to stop and change the lamp. And that long-lasting lamp puts out 800 ANSI lumens of brightness—powerful enough to present with the room lights on.

XGA (1024 x 768) resolution, with Proxima’s Fit-to-View® digital scaling, means sharp images from any computer. The Proxima UltraLight LX1 even has a zoom lens for flexibility in set-up, and a digital zoom for close-up views of the smallest details. It’s hard to believe this sleek, 8.1-pound package contains so much. So pack a Proxima UltraLight LX1 for your next presentation. And pack your worries away.

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*based on usage of eight hours a week
"THERE ARE NO SLIDES TO FALL OUT OF CAROUSELS OR GET STUCK IN THE SLIDE PROJECTOR, AND THERE ARE NO OVERHEADS TO SHUFFLE DURING MY PRESENTATION." —GREG INGRAM, REGIONAL VP, SUNAMERICA ASSET MANAGEMENT CORP.

Abandon the Dark Side

For companies selling DLP projectors, two issues clearly dominate: brightness and portability. You don’t have to dim the lights. And you don’t have to know how to levitate large objects. Take the new InFocus LP330 from InFocus Systems Inc., Wilsonville, Ore. It’s a package that weighs less than five pounds, whose largest dimension is under a foot, and which projects a 4-foot (1.2 m) size image at a distance of only 8 feet (2.4 m) with an intensity of 650 lumens. It’s a projector you can easily put into the overhead compartment on an airplane and pack in the same carrying case as your laptop. The LP330 follows its slightly bigger brothers, the LP425z (7.4 pounds, 900 lumens) and LP435z (7.4 pounds, 1000 lumens), introduced in February. All three deliver true XGA (1024 x 768) resolution.

“When you use an InFocus projector, you are completely organized and immediately present yourself as professional,” says Greg Ingram, a regional vice president for SunAmerica Asset Management Corp., based in New York City, one of the financial services industry’s largest and most influential users. Ingram relies on the InFocus LP425 to deliver complex investment presentations to both small and large groups. “InFocus is saving me lots of time because I don’t spend time making slides or copies. Also, there are no slides to fall out of carousels or get stuck in the slide projector, and there are no overheads to shuffle during my presentation.”

Brighter but Lighter

Another company that has recently introduced DLP projectors in the sub-10 pound category is ViewSonic, Walnut, Calif., with its PJL830 and PJL1030 models. Both employ Zeiss optics to generate highly focused images with very high contrast. The Zeiss optics, plus ViewSonic’s own proprietary circuitry for converting analog input signals into digital output, result in more consistent illumination and purer whites.

Also a member of the “brighter but lighter” crowd is PLUS Corporation of America, Allendale, N.J. The company’s latest projectors are the 5.7 pound PLUS U2-1080 XGA and the 5.6 pound PLUS U2-870 SVGA. Each measures 2.28 inches in “thinness” and delivers 800 and 700 lumens of brightness, respectively. Both feature a 500:1 contrast ratio (full on/off), digital keystone correction, automatic adjustment set-up, manual and digital image zooming, new advanced compression technology, direct mouse control, freeze function, pick-mute function, on-screen pointer—plus a host of other features.

DLP technology is a key feature in the UltraLight DX1 projector from Proxima, based in San Diego. The 10.6 pound projector’s 1000 lumens light up the room with photo-realistic color and smooth video at resolutions up to XGA (1024 x 768).

That kind of competition can keep an engineer awake at night—and customers happy. Whose lights are those in the mirror? It’s your future and it’s coming to you in digital. May the Force be with you as well.

Written by Randall D. Cronk
Introducing the powerfully featured ultra-compact, ultra-light, and amazingly thin PLUS® U2-1080 XGA (800 ANSI lumens) and PLUS® U2-870 SVGA (700 ANSI lumens) Digital Projectors.

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800 ANSI LUMENS OF BRIGHTNESS
5.7 POUNDS OF LIGHTNESS
2.28" (58 mm) THIN PROFILE
500:1 CONTRAST RATIO
ENHANCED PLUS OPTICAL ENGINE
ADVANCED COMPRESSION TECHNOLOGY
DIGITAL KEYSTONE CORRECTION
AUTOMATIC ADJUSTMENT SET UP
MANUAL & DIGITAL ZOOM
FREEZE & PICK-MUTE
ON-SCREEN POINTER

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WHEN PITCHING LARGE ACCOUNTS OR EXPLAINING COMPLEX TOPICS, INCREASING THE NUMBER OF PRESENTERS CAN FAVORABLY INFLUENCE THE MEETING'S OUTCOME.

DON'T BE A LONE RANGER

You're facing a room filled with upwards of a dozen people. It's a good bet that most people in the audience have something else on their minds. What's more, some participants have other places they'd rather be. Yet they wait for you to inform, captivate, and possibly entertain them.

So, why should you go it alone when you can reinforce your message by including other experts and add their expertise to yours? After all, even the Lone Ranger had Tonto for support.

Hired Hands
Although its been more than 100 years, some aspects of business haven't changed much since the days of the Old West. Modern day claim jumpers—your competitors—seek to acquire your market share instead of the gold mine. And now, just as then, you sometimes need extra "guns" to make sure your business rivals don't get the gold for which you're mining.

Before you assemble a presentation posse, and impose on your busy colleagues and bosses to contribute their time, decide if you should deliver the pitch yourself or share the stage.

Here's a brief guide to help you decide:

>Caring enough to send the best. Will the client's big guns attend the presentation? If so, you better roll out your own big artillery. Use the same strategy when deciding to include technical and financial experts on your team. If the client has invited their experts to attend, it's likely that they expect detailed and specific insights into the underlying technology or finances. By bringing your own experts, you can avoid the risk of having to respond with, "I'll have to get back to you on that," when faced with specific, highly focused questions.

>Going live. Information is organic; it ages at the speed of light and fast-changing market conditions require constant watchfulness. It's not unusual for a merger, buy out, or market survey, announced just hours before your meeting, to impact the accuracy and timeliness of your presentation. If you and your colleagues deliver your presentation live, you can enjoy the luxury of finessing it in real time to reflect the impact of recent events. If you accept the proposition that a presentation is more than just delivering static data, you can increase its value and its importance to your client by keeping it current.

>Getting to know you. The days when you could relax yourself by imagining everyone in your audience wearing pajamas and then wow them with flying headlines and blinking text are ending. Today's time-pressed, techno-savvy clients want specific answers to their specific questions. Such clients expect more than static presentations; they want an interactive information exchange. That requires understanding your client's practices, processes, and problems. So, have your experts ready to respond to their experts in a common language.

For more guidelines, visit the Epson-sponsored Web site www.presentersonline.com/resources. Designed expressly to meet the needs of professional presenters, you'll find a wealth of first rate tips, clip art,
Get in focus with... **ViewSonic on top!**

Power: A powerful presentation demands a powerful, digital projector like the ViewSonic PJL830. For example, 575 ANSI Lumens guarantees brilliant projection and 400:1 contrast ratio ensures the clearest text and crisp images. A dependable UHP lamp rated at 2,000 hours provides consistent performance and stays brighter longer. All at the standard 800 x 600 resolution.

Light Weight: Ultra-compact and weighing just 10 lbs., the PJL830 is the ultimate in portability.

Digital Light Processing: ViewSonic’s first Digital MicroMirror Device (DLP) projector. This new technology facilitates brighter, richer, more uniform color images to help turn your presentation into a home run. DLP technology is also featured in our higher resolution PJL1030.

Confidence: Buy your projector with confidence from the display company that’s won over 500 industry awards. At ViewSonic, we offer the #1 best selling monitors and flat panel displays in the U.S.A.*

Any Questions? For more information on the company that’s won over 500 industry awards visit our website at: [www.ViewSonic.com](http://www.ViewSonic.com)

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<th>Model</th>
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(Notebook Sold Separately)
ASSEMBLING AN EFFECTIVE TEAM FOR A MAJOR PRESENTATION POSES A DAUNTING ORGANIZATIONAL TASK. FORTUNATELY, WITH NEWER LCD PROJECTORS, ONE FACTOR YOU NEED NOT WORRY ABOUT IS THE EQUIPMENT YOU USE.

Assembling the Posse
In her book, Who Owns Information?: From Privacy to Public Access, Anne Branscomb chronicles the transformation of data into information and ultimately into knowledge. She notes that “information has taken on a new character. It has passed from being an instrument through which we acquire and manage other assets (data) to being a primary asset itself (knowledge).”

Because of information’s heightened rank in the business hierarchy, assembling an effective team for a major presentation poses a daunting organizational task. You have to tiptoe through the delicate job of balancing each participant’s knowledge and their speaking ability with their political status.

Fortunately, one factor you need not worry about is the equipment you use. Newer LCD projectors, such as Park Ridge, N.J.-based Sony Electronics Inc.’s high-output, high-resolution VPL-X1000U XGA projector, will allow your team's experts to concentrate on the message and not spend valuable time tinkering with the medium.

Here’s some suggestions on structuring your presentation team:

Do your homework. Determine beforehand what the client wants to know, then balance that with what you want them to know. If you’re not sure, ask. If this meeting rates high enough to bring your top brass, then it warrants putting in the time and effort to understand and answer the client’s concerns. It can also prevent some embarrassment and hard gibe if you overestimated the opportunity or the need for all the sharpshooters you invited. Your research will also suggest what order to introduce your guests, balanced against political realities, and how long each of them should speak.

The one or two individuals who have the greatest familiarity with, and to, the client should open and run the meeting. These are probably the salespeople. The other participants of your presentation team will depend on the makeup of the audience and their interests. Hold the total number of presenters to five, including yourself.

While assembling your group and creating content will demand the bulk of your attention, don’t ignore the details. If you address a large group, you will want a projector that can accept a microphone to project your CEO’s words. Los Angeles-based Panasonic’s PT-L557U, a 1500 lumen, 1.5 megapixel unit offers a stereo audio input port which supports a voice-over monologue during the unit’s self-running mode and continuous play mode.

But lest you get swept up in the organizational details and technology, you need some way to remind yourself that the purpose of the meeting is to sell an idea or a product to a group of people. Most often, the audience will be a client, but at times you may speak to government groups, partners, or colleagues within your organization. One method to help insure that you fulfill your audiences’ expectations is to see your team as storytellers. Instead of vintage works of fiction and conflict, however, your story focuses on reality and conflict. And like in the Old West, there’s safety—and prosperity—in numbers.

Written by Howard Millman, who maintains, networks, and designs computer systems that help clients achieve the maximum return on their automation investment.
Just like her, this incredible projector can easily hold an audience. Because instead of having only one imaging processor like other ultraportables, the PowerLite® 5550C was born with three — for the brilliance of a large projector, without the bulk. In fact, at 800 ANSI lumens and only 9 1/2 pounds, this little baby will have everyone going ga-ga.

THE NEW EPSON POWERLITE 5550C ULTRAPORTABLE PROJECTOR. 3 LCDs BRIGHT - 9 1/2 LBS LIGHT.

Epson®, the world leader in high-performance portable projectors, brings you a full-featured ultraportable with: Our exclusive SizeWise™ technology that allows compatibility with computer resolutions up to 1024 x 768 • Zoom lens, long-life lamp, remote control and amazing SRS 3D sound • Private Line® phone support just seconds away.

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Speed on the Cheap

Edited by Michelle Campanale-Surkan

BRAND-NAME BARGAINS:
Hewlett-Packard's Vectra VLIB SFF (top) is the least expensive desktop PC on our power chart, and its OmniBook XE2 costs under $2000.
IT'S NOT EVERY month we showcase top-notch values for businesses on both ends of the price spectrum. PCs on our Top 20 charts, with Pentium III-450 and -500 processors, just got more affordable. You'll find PIII-450 PCs for less than $2000, and a handful of PIII-500s for just a few hundred dollars more. On the budget side, many robust desktops cost less than $1500, while sub-$2000 notebooks from top-name vendors are starting to make a serious pitch for your business.

What's pushing prices down? At the high end, companies are making room for systems with the Pentium III-550 processor, which should debut in our August Top 20. According to Ken Bosley, North American product manager for Hewlett-Packard's Vectra line, "The Pentium III-550 will come in at a slight price premium. By August the price points of PIII-500 and PIII-450 PCs will fall, and low-end processors like the PII-400 will start to drop out of the market."

The Pentium III-550 is expected to offer an incremental speed increase over the PIII-500 (see Top of the News, page 48). What does that mean for business buyers? According to Mario Morales, International Data Corporation's director of semiconductor research, "Processors, and even some components, have exceeded the usual range—from word processing to Web surfing—can keep PC costs down by opting for bargain-basement PII-450 machines or lower-priced PIII-500 systems.

WHERE THE BUYS ARE

The best deals on the power chart this month are top-brand PCs powered by Intel's Pentium III-450 processor. Toshiba's $2133 Equium 7100M, another new PIII-500 power system, costs $500 less than similarly configured peers. Its PC WorldBench score of 254 (running Windows NT) makes it the slowest PIII-500 we've reviewed, but it compensates for this shortcoming with a low price and nice design extras like an easy-open case.

BUSINESS-SAVVY BUDGET

As they did last month, PCs based on Intel's Celeron CPU take three of the top five spots on the budget chart. In addition, two new Celeron-433s make the Top 20: Dell's $1420 Dimension V433C—a Best Buy—and the $1450 Compaq Presario Desktop 310, at number 20. Both have enough speed and features to please small or medium-size companies.

But if $1500 is still more than you're willing to shell...
WHO DO THE VOO-D00? 3dfx debuts its VooDoo 3 3000, an AGP board with kick (see this month’s Top 10 Graphics Boards, page 227).

out for a new system, perhaps you should consider something in the sub-$1000 range. We rounded up 21 such computers for the review “How Low Can They Go: The Best PCs for Under $1000” (page 114) and were pleasantly surprised to find some great values.

NOTEBOOK DEALS

As on the budget desktops chart, Celeron-based systems fare well on this month’s budget notebook list. We also had our first look at two business-friendly sub-$2000 Celeron-333 and -300 portables: HP’s $1899 OmniBook XE2 and Compaq’s $1799 Armada 1500c, respectively. Thanks in part to Intel’s latest Celeron processor, the OmniBook offers a price and performance that beats those of some of its Pentium II-300–based competitors. (Check out this month’s Top 10 Notebook PCs, on page 212, for the exact numbers.)

PRINTERS NOIR

Printers go black-and-white this month, and vacate their traditional Top 10 locus for a comprehensive roundup of laser models (see “Blazing Lasers,” page 149). Answering the challenge from low-cost color ink jets, monochrome lasers provide a strong value for businesses, with benefits that include quicker print speeds, better text quality, more paper-handling options, and lower long-term costs. For small-business/home users, we recommend Brother’s $299 HL-1040, a speedy little printer that offers very good text quality. Meanwhile, Lexmark’s $1129 Optra S 1855 is our choice as the top laser for corporate users; it comes with quick printing speeds and numerous paper-handling options.

KEEPING UP APPEARANCES

This month we review 15-inch monitors, and they’re cheaper than ever. The first-rate ViewSonic P655 sheds $60. This $185 professional model offers top-notch color quality. Alternatively, MaxTech’s XT-5862 is just $139, but you’ll sacrifice text quality if you buy this unit. Thanks to fierce competition, all of the monitors in our Top 10 cost less than $200 this month.

Michelle Campanale-Surkan is an associate editor for PC World. Senior Associate Editors Vince Bielski and Karen Silver; Associate Editor Aoife McEvoy, Staff Editors Grace Aquino and Mick Lockey, Editorial Assistant Kalari Marugan, and freelancers Jo-Anne Robb and Gordon Meyer contributed to the Top 100. Testing done by Ulrike Diehlmann, Robert James, Elliott Kirschling, Jeff Kuta, Nancy Miller, and Mike Salayko of the PC World Test Center. See page 12 for all contact information.

LASERS NOT LOSERS: There are still many reasons to buy a monochrome laser printer. See our review for details.

YOUR GUIDE TO THE TOP 100

QUESTIONS ABOUT OUR CHARTS? The following section should answer most of them.

How do the charts work? The Top 20 and Top 10 charts are evolving lists of the best PCs, printers, monitors, graphics boards, and modems we’ve tested. System charts are divided by price. Power desktops cost $1800 or more; power notebooks cost $2300 or more. We compare new products to previously reviewed units, updating the charts to reflect price cuts and other changes.

Where do you get your prices? We estimate street prices based on vendor information and our own research, including surveys of retail outlets. We recheck all prices every month. Look for updated pricing information on all desktop PCs online.

What does the overall rating mean? This 100-point scale reflects results from our hands-on evaluations and performance tests. A score in the 90s is exceptional, while one in the 80s is among the best and one in the 70s above average.

What does the PC WorldBench 98 score mean? It’s a measure of how fast a PC is in relation to our baseline machine, a Gateway PMMX-200 configured with 32MB of RAM, a 2GB hard drive, and 512KB of secondary cache. A PC that scores 200, for instance, is twice as fast as the baseline system.

Where do the scores for reliability, support quality, and support policies come from? Reliability and support quality scores are based on surveys of PC World readers and anonymous support calls made by PC World staff. The policies score is based on vendor support policies.

What do all those word scores mean? Word scores for performance and price are based on a product’s rating in relation to other products in its category. For instance, we score the performance of Windows NT PCs separately from that of Windows 95 machines. (Based on our PC WorldBench 98 tests, Windows NT machines are faster on average than Win 95 PCs.)

Check out PC World’s Top 400 reviews online. Point your browser to PC World Online (www.pcworld.com/top400) to explore our Top 400, which provides comprehensive reviews and ratings for products in 16 different categories. You’ll also find reviews not available in print.
AS THE INDUSTRY MAKES way for upcoming Pentium III-550 PCs, prices on systems with slightly older CPUs are starting to drop. Several PIII-500 machines on the chart are $100 to $200 cheaper this month. New PIII-450 systems are coming in at bargain-basement prices. But these machines are about 7 percent slower than PIII-500s currently in the Top 20. Second-tier vendors continue to provide competition in the market for power PCs as they roll out cheaper PIII-500s. iDot.com, for example, debuted its speedy 500P3BX at number 8 for just $2298. At the same time, a top-name company—Hewlett-Packard—offers the most affordable power PC on the chart: Its Vectra VLI8, at number 20, sells for $1834.
This Month's Best Buys

1 DELL OPTIPLEX GX1P 500

PRO: Great performance, easy-access case, top-notch company reliability and support policies

CON: PCI-based graphics, so-so monitor

If you're looking for a high-performance corporate workstation, put Dell's $2635 OptiPlex GX1p 500 on your shopping list. No other system here matches its combination of speed, features, vendor reliability, and support.

The GX1p 500 is a great choice for any firm with a large host of PCs that regularly need upgrading: The case's side panels lift off quickly, and you can easily pull out the card-slot tray for fast board-swapping.

Our test machine came with Microsoft's Natural Keyboard, which arranges the keys to promote ergonomically proper positioning of your hands and arms while typing. Though we found it comfortable to use and reasonably easy to adjust to, the layout will not please everybody; you should definitely test-drive a Natural Keyboard before deciding to buy one.

Besides a whopping 20GB hard drive, you also get a 100MB Zip drive. The system offers six open slots—plenty of room for additional adapters—but a scant two open drive bays. In keeping with the OptiPlex line's corporate focus, a network interface card comes standard on the GX1p; for $89 you can opt for an Aztech Rockwell V.90 modem instead.

The unit's only significant flaw is the 17-inch Dell 1028L monitor—it produced somewhat dark images and slightly fuzzy text. Upgrading to the superior 19-inch Dell UltraScan 1200HS costs $200.

Setting up the OptiPlex is straightforward. All the ports are color-coded, making it easy to hook up devices. Dell supplies surprisingly detailed documentation for this corporate PC: user guides for all the peripherals, an in-depth system installation manual, a big foldout chart, and a guide for assistance once you're up and running. Plus, Dell maintains around-the-clock technical support. Respondents to our most recent survey give the company outstanding marks for reliability; its service, while not perfect, still ranks among the best in the industry.

2 DELL DIMENSION XPS T500

PRO: 4.8X DVD-ROM drive with decoder card, outstanding company reliability, good support

CON: None major

Need a feature-rich, multimedia-capable system for your growing business? The $2688 Dell Dimension XPS T500 may be just the ticket. Dell cut the price by $138 but still equips this thin, off-white midsize tower for the office and tosses in a few extras for after-hours fun. The T500, with its swift PII-500 processor, earned a PC WorldBench 98 score of 234, just a couple of ticks above the competition. On your desk, it's a fast, flexible, fully featured PC.
behind the fastest Windows 98 unit on the chart, Micron's Millennia Max 500.

Color-coded, labeled, and icon-marked ports—plus a good array of peripheral manuals and an illustrated, foldout setup guide—help you get up and running fast. And the XPS T500's sturdy, easy-open case and tidy interior make accessing the main memory a cinch when you're ready to add more. While many other companies offer flimsy and clacky keyboards, Dell's solid QuietKey keyboard felt very comfortable to type on.

The system includes a CineMaster hardware DVD decoder card with a 4.8X DVD-ROM drive for smooth video. We played a movie at full screen size, running other programs in the background; the picture remained flawless. The giant 22GB hard disk and the standard 10-mega Zip drive provide plenty of storage space. The 17-inch Dell UltraScan 1000HS monitor generates sharp text and rich colors, but most competing models in this price range come with 19-inch monitors. Upgrading to the 19-inch Dell UltraScan 1200HS costs $200.

Meanwhile, the Altec Lansing ACS295 speaker-subwoofer system, teamed with the top-tier Turtle Beach Montego II PCI audio card, delivers full-bodied sound.

PC World readers recently gave grades of outstanding and good, respectively, to Dell's system reliability and service.

3 GATEWAY E-4200 500

PRO: Great speed, good management features

CON: Expensive

Gateway's $2789 E-4200 Pentium III-500 remains one of the most expensive PII-500 machines appearing on this month's power list. Nevertheless, this imposingly tall and wide midsize tower has a great deal to recommend it. In fact, the system easily qualifies as one of our top choices for consumers who are on the lookout for a power-packed, multimedia-equipped business workstation.

Besides bearing such corporate accoutrements as an ethernet card and DM1 management software, the E-4200 500 delivers top-notch performance—as measured by the PC World Test Center—and
an excellent audiovisual experience. This unit’s PC WorldBench 98 score of 235 puts it in a virtual dead heat with the other three Best Buys that ran on Windows 98.

The system’s AT! Rage 128 graphics card helps the 19-inch Gateway monitor display images vividly, and the Altec Lansing GCS100 speakers and subwoofer offer rich sound. Gateway supplies excellent documentation, and the company’s record for reliability and service in support of its work PCs remains strong.

More price-conscious PC users should consider the Pentium III-450 version of the E-4200. At $2550, it costs $239 less than its 500-MHz sibling. Moreover, it contains an equally large hard drive (22GB), and it chalked up a creditable PC WorldBench 98 score of 220.

**MICRÓN MILLENNIA MAX 500**

**PRO:** Blazing speed, multimedia components including a 6X DVD-ROM drive, good manual. **CON:** Most expensive PC on the chart

If you plan on wringing every last ounce of performance out of your next PC, check out Micron’s Millennia Max 500. It sells for a hefty $2899, but it’s the fastest Win 98 PC on the chart and has a wallopload of features, including a Zip drive; a crisp, bright 19-inch monitor; and one of the few 6X DVD-ROM drives we’ve seen. However, subscribers in our most recent Reliability and Service survey rated Micron’s support quality as just fair.

The Micron Millennia Max 500 multimedia capabilities impressed us. Our unit’s Diamond Viper V550—although no longer the most up-to-date model—was the number three AGP card in our Top 10 Graphics Boards in March. The combination of the Monsoon MM1000’s massive subwoofer and satellite speakers produces rich, full-range tones. Micron includes comprehensive documentation with the Max 500 and offers solid warranties covering labor for one year and parts for three years (main RAM and CPU are covered for five years).
5 CYBERMAX ENTHUSIAST PIII-500

PRO: Terrific performance, competitive price, attractive features

CON: Case cover tricky to get on and off, tech support difficult to reach

With a $100 price cut, CyberMax's speedy small-office/home-office entry, the Enthusiast PIII-500, makes an even better bargain this month. This $2099 midsize tower charged to a second-place finish in test-suite performance among the Windows 98 systems on the chart and is priced exceptionally well for a full-featured Pentium III-500 computer.

Its 236 score on PC WorldBench 98 puts the Enthusiast PIII-500 only a point below our fastest Windows 98 PC, Micron's Millennia Max 500. The bottom line: No one will be able to detect a whit of speed difference between these two PCs. The Enthusiast offers so much power that, even with several applications running in the background and without a dedicated MPEG decoder board, DVD movie images appear both vibrant and silky smooth. We played the movie Twister at full-screen size with no problem. And the included Altec Lansing ADA305 Digital PowerCube speakers and subwoofer's great sound made the tornado in the

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**TOP 20 POWER DESKTOPS**

<table>
<thead>
<tr>
<th>SYSTEM</th>
<th>CPU</th>
<th>Operating system</th>
<th>RAM (MB)</th>
<th>Level 2 cache (KB)</th>
<th>PC WorldBench 98 score</th>
<th>Average of all tested Pentium III-500</th>
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<tbody>
<tr>
<td>1 Dell OptiPlex GX1p 500*</td>
<td>Pentium III-500</td>
<td>Win NT 4.0</td>
<td>128</td>
<td>512</td>
<td>284</td>
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<td>Win 98</td>
<td>128</td>
<td>512</td>
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<td>128</td>
<td>512</td>
<td>235</td>
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<td>128</td>
<td>512</td>
<td>237</td>
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<td>5 CyberMax Enthusiast PIII-500*</td>
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<td>128</td>
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<td>Win NT 4.0</td>
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<td>8 IDot.com 500P3BX</td>
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<td>128</td>
<td>512</td>
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<td>Win 95</td>
<td>64</td>
<td>512</td>
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<td>Win 98</td>
<td>64</td>
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<td>18 MidWest Micro Business XPP-500</td>
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<tr>
<td>20 HP Vectra V18 5FF</td>
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<td>64</td>
<td>512</td>
<td>268</td>
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*Best Buy

**HOW WE TEST** All systems are tested with PC WorldBench 98, PC World's application-based benchmark. A higher PC WorldBench score is better. All PCs are tested with Windows 95, Windows 98, or Windows NT 4.0, and video resolution is set to 800 by 600 in 65,536 colors. We run automated scripts on six popular business applications, performing common tasks such as spelling checks, scrolls, saves, sorts, and recalculations. The PC WorldBench 98 score is a sum of the weighted, normalized result of each script: Word 97 (10 percent), Excel 97 (10 percent), 1-2-3 97 (10 percent), Paradox 8.0 (20 percent), and Picture Publisher 7.0 (20 percent). For more details on our benchmark and how we run it, see PC World Online (www.pcworld.com/testing). Under Windows 98 with 128MB of RAM, this also includes systems tested in this and previous months that do not currently rank among the Top 20.
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Data Storage Group
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CyberMax also supplies a generous software bundle, including Corel's WordPerfect Suite 8 and such useful home and reference titles as Compton's World Atlas and Compton's Encyclopedia.

We had to fiddle a bit with the Enthusiast PIII-500's case cover to remove it, but the system's interior layout looked good, providing easy access to memory slots and sensibly organized cabling. CyberMax includes clear documentation with the PC and, like most companies in the Top 20, backs its systems with a long parts warranty and around-the-clock support.

Our one beef with CyberMax: its tech support. Staffers, although courteous and informative, tended to miss our tougher questions in our anonymous calls to technical support. Also, we waited up to 35 minutes and had to call three times before reaching a live person. In our recent Reliability and Service survey, PC World readers rated the reliability of CyberMax's home PCs and the quality of the company's support as good and fair, respectively.

**New This Month**

The following systems made our Power Desktops chart for the first time this month. For brief reviews of all previously tested machines on the chart, visit our Web page (www.pcworld.com/top400).

**8 IDOT.COM 500P3BX**

**PRO:** Inexpensive for a PIII-500, DVD-ROM drive with hardware decoder

**CON:** Support needs to be improved, case has cluttered interior

Priced almost $500 less than the average Pentium III system, IDot.com's $2298 500P3BX has a lot to offer small and home businesses. Like many other PCs on the chart, the system sports a DVD-ROM drive. But unlike most of its competitors, the 500P3BX comes with a robust hardware decoder for smooth video playback. More business-oriented features bundled with the system include Corel WordPerfect Suite 8 and a V.90 modem. And with a PC WorldBench 98 score of 232, The IDot.com can run productivity applications as quickly as similar configured PIII-500s.

Unfortunately, mediocre support quality and a somewhat cluttered interior keep the 500P3BX out of Best Buy territory. Getting inside is simple, thanks to the easy-open case. But inside, power supply cables to the hard drive and MPEG-2 decoder card block the system memory's sockets; you'll have to remove them to ease the task of adding RAM. IDot.com's sturdy midsize tower has three free bays, which should serve you well when the need to expand arises. The system also comes with three open slots, one of which is a PCI slot that is difficult to access because the graphics card's heat sink and jumper pins are in the way.

The system's crisp, 17-inch monitor comes with Colorifice software, which we used to calibrate colors and tweak 3D effects and lighting in our testing. The 4.8X DVD-ROM drive, with the included DVD decoder card, produced very little jitter and displayed smooth, crisp images, even when we had other programs running in the background.

A handy foldout setup guide gets you up and running fast, and well-written manuals make the system easy to use from the get-go. The manuals, especially, are a boon because you might not get through to a live person when you call tech support. In our anonymous calls to IDot.com's support line, we waited 20 minutes on three separate occasions without ever getting a response. The company offers a five-year warranty on the CPU and main memory, a three-year warranty on all other hardware, and a one-year labor warranty.

**12 MICRON MILLENIA MAX 450**

**PRO:** Well-priced, swift performance, excellent-quality DVD-ROM drive and graphics board

**CON:** Stiff chassis makes the cover a little tough to remove, readers rate vendor reliability as fair

The Micron Millennia Max 450 grabs your attention right from the start. At $1999, it costs about $200 less than the average Pentium III-450 machine. You don't sacrifice performance and features at that price, either. The Millennia Max 450 earned a dead-on average (for a PIII-450 system) PC WorldBench 98 score of 216 and comes loaded with some impressive components, making it a good choice for anyone who is seeking power on a budget.

Those desirable components include Diamond Multimedia's Viper V550 graphics card, which boasts excellent business and good 3D performance, and a crisp 17-inch monitor. In addition, the 6X DVD-ROM drive delivers impressive video playback despite using a software-based MPEG decoder. Even when we maximized the image and ran other programs in the background, we couldn't find fault with the quality. The 13GB hard drive is about average for a PIII-450 system and should provide plenty of storage space for most people's needs.

Getting inside the Millennia Max is straightforward. We simply turned a thumbscrew, pressed a tab, and removed the side. Our unit's stiff cover took some tugging to pull off, but once inside we found the interior well-designed for tinkering. All the cables are tied and tucked away so that you can easily access the four free card slots and two free DIMM sockets. Reaching the four available drive bays is a different matter, however, since you'll have to push away bunches of cables.

The system manual that comes with the Millennia Max includes comprehensive information and illustrations. Should you need further help, Micron's technical support lines are open around the clock. In our most recent round of anonymous calls, we found that the quality of the service has improved: The tech support reps gave us more information than we asked for, and they answered our calls consistently in under 9 minutes. In our recent Reliability and Service survey, PC World readers rated the reliability of Micron's work PCs and its support quality as fair.
EXPERIENCE EXTREME 3D GRAPHICS and system performance increases of up to 280%.

The Kingston TurboChip® 366 incorporates AMD's 366MHz K6-2 processor with 3DNow!™ technology offering computing on a new dimension for Pentium® systems running at 166MHz or higher. TurboChip 366 equips your system with the power to take on your most intense applications. You can achieve ultimate performance for only $249 MSRP. A chip for chip replacement, TurboChip 366 adds life to your system and keeps your upgrade costs to a minimum. Plus, Kingston offers a lifetime warranty and free technical support. Call your Kingston sales representative for more details at (800) 533-8680 or visit our Web site at www.kingston.com/tc.

To purchase TurboChip 366 online, visit us at buycomp.com and type in Kingston TurboChip. Get ready for an out of this world experience.
13 TOSHIBA EQUIUM 7100M

PRO: Affordable PIII-500, easy-open case, Zip drive, PC Card reader

CON: Features more suited to a PIII-450

Despite being the second least expensive PIII-500 system we've reviewed for the Top 20 Power Desktops, the $2133 Equium 7100M from Toshiba lands low on the chart, due mainly to the relative mediocrity of its feature set. But if you don't need a 19-inch monitor, massive hard disk, or DVD-ROM drive, you may find the Equium to your liking.

On the plus side, the system does feature some nice extras like an integrated network card, a Zip drive, and a PC Card reader. A suspend button conveniently located on top lets you put your system in sleep mode when it's not in use. This tall midsize tower houses two free expansion bays and a whopping six free slots.

The top of the case swings out of the way for easy access to RAM, and the inside top of the case displays handy upgrade instructions. The 17-inch Toshiba TekBright 700P monitor is adequate but not outstanding: Its controls take some time to master, and images became a bit blurry in the corners. The system comes with a three-year warranty on parts and labor as well as around-the-clock telephone support.

18 MIDWEST MICRO BUSINESS SOLUTION XPP-500

PRO: Inexpensive for a PIII-500, zippy performance, top-quality support policies, top warranty

CON: Uninspiring features and documentation

Targeted at small to medium-sized networked businesses, MidWest Micro's $2399 Business Solution XPP-500 is less expensive than the average Pentium III-500 system on the chart and includes both a SuperDisk drive and a CD-Rewritable drive. However, its PC WorldBench 98 score of 276 running Windows NT 4.0 is average for its processor class.

MidWest Micro throws in other features businesses will appreciate—a 3Com Fast EtherLink XL card (but no modem), and Microsoft's Office Small Business Edition, IntelliMouse, and Natural Keyboard. The back of the case has helpful icon-labeled ports and a reset button—and handy for hard-rebooting your machine without unplugging it.

Not all of its features are up to par. Whereas most of its chartmaking peers include 14.4GB or greater hard drives, the Business Solution XPP-500 offers a comparatively small 10.1GB hard drive. And though most PIII-500 systems on the chart come with 19-inch screens, MidWest Micro bundles a 17-inch model.

The company's tech support staff is on hand around the clock. A top-notch warranty covers the CPU and main RAM for five years (other parts for three years) and labor for three years. In our anonymous calls, the techs gave us helpful advice. That's a good thing, since the small system manual, though easy to read, covers just the basics.

20 HP VECTRA VL18 SFF

PRO: Fast, affordable, comes with enhanced keyboard, network-ready

CON: Unimpressive set of features, limited expandability, support policies and system reliability only fair

If you're looking for a small, affordable, network-ready PC for your business, Hewlett-Packard's Vectra VL18 SFF may fit the bill. This PIII-450 PC is not only the least expensive system on the power chart at $1834, it's also a screamer. With a PC WorldBench 98 score of 268 running Windows NT 4.0, it proved faster than many costlier competitors such as Quantex's $2239 QP6-450 SB-4, a system that earned a WorldBench score of 234 and failed to make the chart.

HP kept its costs low by including integrated graphics and sound—Matrox's MGA G-200 with 8MB of SDRAM and Sound Blaster PCI Audio. And while about half of its power chart competitors offer a 14.4GB or greater hard drive or a DVD-ROM drive, HP provides a comparatively small 8.4GB disk and a 14X-32X CD-ROM drive. Expandability is rather limited, with no free bays and just two open slots. On the upside, HP bundles 3Com's capable integrated Fast EtherLink 10/100 Base-T LAN adapter and throws in corporate-friendly management capabilities like Wake On LAN, case lock, and intruder alert.

Although what's offered in the way of multimedia and expandability leaves us a little cold, we were also impressed by some of the extras that the VL18 SFF does have, such as the enhanced keyboard with sleep keys, volume control, programmable function keys, and microphone and headphone jacks.

Even with all these goodies, the keyboard was quiet and felt sturdy. In fact, the entire system ran so quietly that we could hardly tell it was turned on. Color-coded ports on the back help to make the PC simple to set up right out of the box. The easy-to-read user manual includes charts and illustrations.

Unfortunately, the company's reliability rating and support policies are another matter. Unlike most other vendors whose PCs made the chart, HP offers just 12 hours of tech support per day on weekdays only. Furthermore, support is free for just the first year. Luckily, we were able to reach reps right away when we called and found their advice consistently helpful. In our latest Reliability and Service survey, our readers gave HP's support quality a good rating but rated the reliability of HP's systems as just fair.

BEYOND THE TOP 20

We evaluated the following systems along with the others, but they didn't score high enough to reach the Top 20 Power Desktops chart. For write-ups, visit PC World Online (www.pcworld.com/t20pcs).

- Axis Orion 100A DVD 500
- Compaq Deskpro EP6450
- Quantex SB450
- Quantex ZX450
- Tagram ThunderBolt H2810
- Xi Computer 500 MTower SP
When it comes to speed, this printer PUSHES the ENVELOPE.
Also the letter, legal, and 11x17 sheet.

There's no question, it's a fast-paced world. And it's only getting faster. Whether we're waiting for our food or waiting for our printer, we want it, and we want it now. Slow and steady no longer wins the race—we're talking fast, fast, fast.

Well, finally, there's a laser printer designed to keep up the pace, the Minolta PageWorks™ 25 printer. In fact, at a blistering 25 pages per minute, this thing sets its own pace, leaving all the other sub-$1,500 printers totally in the dust.

Okay, so it's fast, but what else, you might be asking. Well, the Minolta PageWorks 25 printer is also the most expandable printer in the sub-$1,500 category, easily upgradable from a 750-sheet paper capacity to 3,750 sheets. It features 11"x17" paper handling and even has 5- or 10-bin mailbin capabilities. Oh, and did we mention power? With its 90MHz Power PC processor with QuickPrint®, the Minolta PageWorks 25 printer pushes the envelope even further. For more information or a free CD-ROM, call 1-888-264-6658, or visit us at: www.minoltaprinters.com
IT'S STILL A CELERON SHOW THIS MONTH, with three of the four chart newcomers sporting some flavor of Intel's bargain-friendly processor. Breaking with recent trends, PC prices on the budget Top 20 this month rose about $15 over last month. Look closely, though, and you'll still find a bumper crop of deals. The number three finisher, Gateway's corporate-oriented E-1200 366, is the least-expensive Best Buy at just $1114. Two models new to the chart—one from Dell (the Celeron-433-based Dimension V433c), the other from Micro Express (the MicroFlex-34A powered by AMD's K6-III-400)—are also Best Buys, filling the number four and number five spots. Both speedy systems sell for less than $1600.
**Scorecard**

<table>
<thead>
<tr>
<th>Overall rating</th>
<th>PC WorldBench 98/operating system</th>
<th>Features and design</th>
<th>Price</th>
<th>Performance</th>
<th>Vendor's system reliability</th>
<th>Vendor's support quality/policies</th>
<th>Product line number</th>
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<tr>
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<td>198/Win 98 very good</td>
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<tr>
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<td>690</td>
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**This Month's Best Buys**

1 QUANTEX M400C

**PRO:** Fast and well appointed for a budget PC

**CON:** None major

PC hunters looking for a budget small-office/home-office system will be hard-pressed to do better than Quantex's Celeron-400 machine. Renamed after debuting last month as the QP6/400 M-1c, this S1499 midsize tower is fast and bears features commonly found on much more expensive systems. The M400C's PC WorldBench 98 score of 198 means that only seven computers on the chart can match or beat its speed on applications—and most of those systems cost hundreds of dollars more.

Controls on the spacious Quantex XP90N 19-inch monitor are intuitive and easy to use. The unstinting software bundle includes Corel WordPerfect Suite 8 and reference titles such as Compton's World Atlas and American Heritage Talking Dictionary. The system also comes with an Iomega Zip drive and a 4.8X DVD-ROM drive with software decoder.

A simple-to-follow system manual and illustrated foldout setup guide accompany the M400C, but if you need to call tech support for help, the support policies are fairly standard.

You can reach technicians 24 hours a day, and the company backs its system with a three-year parts and one-year labor warranty. In our anonymous calls to tech support, reps were easy to reach and responded courteously, but didn't always give accurate answers to our tough or intermediate-level questions. Respondents in our latest Reliability and Service survey gave Quantex's home PCs good ratings in both of these categories.

2 GATEWAY GP6-400

**PRO:** Fast and feature-rich, thorough documentation, company has strong system reliability and support record

**CON:** Pricey for a budget system

Once of interest only to corporations, networked PCs are becoming increasingly popular in small and home offices—where the GP6-400 makes an excellent fit. Though fairly expensive at $1718, this system delivers speed, features, and expandability.

In our PC WorldBench 98 tests, the GP6-400 achieved a score of 205—well above average for a PII-400 system with 64MB of RAM. Instead of a modem, the machine includes a 3Com Fast EtherLink adapter and a Zip drive. Gateway backs it all with a three-year parts and labor warranty and strong support policies.

The GP6-400 is simple to upgrade. We easily opened its case by hand-turning...
calls to tech support, we reached representatives within five minutes, and they were generally helpful and polite.

3 GATEWAY E-1200 366

PRo: Very inexpensive, easy to manage and use
CON: So-so performance, smallish hard drive, limited expandability

This Celeron-366-based corporate desktop system emphasizes ease of use and service. Its $1114 price is outstanding for any PC, much less for a network-ready model that comes equipped with an ethernet adapter.

But make sure your office's computing needs are modest. As its PC WorldBench 98 score of 177 indicates, the E-1200 is slow even for its processor class, and some of its features are merely adequate. For instance, the 8.4GB hard drive is a bit skimpy compared to those of other PCs these days, and while most budget systems now offer 8MB or 16MB of video RAM, the integrated ATI 3D Rage IIC adapter on this Gateway has just 4MB of SGRAM. Still, if your work consists mostly of spreadsheet, database, and word processing applications, then the E-1200 366 makes an ideal choice.

You can get inside the system in seconds—just twist a screw a few times with your hand, and then press two buttons to release the cover. A clean and tidy layout awaits you inside. In addition, all ports on the back of
DELL DIMENSION V433C

PRO: Quick Celeron machine, excellent manuals, company known for great reliability and support, CD-RW drive

CON: Smallish hard drive and monitor, integrated graphics limits graphics card upgrades

You're not demanding. You ask for only three things in a computer: It should cover all the basics, have a modest price, and offer good support in case something goes wrong. The $1420 Dell Dimension V433c meets all three of those criteria—and with one exception it leaves off the latest and greatest gizmos. That exception is a Sony CD-Rewritable drive—one of the handier types of removable media. The V433c's PC WorldBench 98 score of 196 makes it the fastest Celeron-433 machine we've tested. To top off the package, Dell gets high marks for service and reliability in our reader surveys.

Pretty it's not. Dell Dimension V433c

But the Dimension V433c's plain-looking beige chassis is functional, with easy-to-use controls and color-coded connectors. Beyond the CD-RW drive, the system's features are thinner than most of its chart competitors: a skimpy 6.4GB hard drive (the smallest of any Celeron-433 PC that's come through our lab), and a small but crisp 15-inch monitor. Color-coded Harman/Kardon HK195 speakers deliver clear sound. The system we received included an ethernet network inter-
face card instead of a modem, making this configuration better suited for small-to medium-size networked businesses.

If you decide to upgrade, you won't find the process too painful. To open the case, turn a thumbscrew, press tabs on the top and bottom of the chassis, and pull off the side panel. Once inside, you'll discover that adding boards takes little time or effort. The system has three free card slots—not a lot for a system with integrated sound and graphics. You'll have to push some cabling out of the way to upgrade the system's memory or to add a drive to one of four empty drive bays.

Our readers consistently rank Dell highly in our Reliability and Service surveys. If you do run into trouble, Dell's excellent manuals will provide you with the first line of help, and you can call Dell's toll-free tech support lines any time, day or night. If your experience mirrors ours in our anonymous calls to tech support, you'll encounter a high quality of service.

### MICRO EXPRESS

**MICROFLEX-34A**

**PRO:** Excellent performance, massive hard drive, sturdy case

**CON:** Monitor quality could be better, no overall system manual, sketchy support

The first AMD KG-II-400 PC we've tested for the Top 20, Micro Express's MicroFlex-34A makes a good impression. Its PC WorldBench 98 score of 217 puts it slightly ahead of the average Pentium II-450 machine, helped...
in part by its 1MB of level 3 cache. And its price of $1599 is about average among PII-450 systems.

This generic small-business computer may be called the MicroFlex-34A, but the wide and sturdy machine's nifty design—a light-gray front panel that overlays a dark-gray corrugated surface—has absolutely no flex. The system also boasts a whopping 18GB hard drive, the largest among all PCs in the budget chart.

Though it includes features that a small or home business would appreciate—a V.90 modem, a 19-inch monitor, and an AGP graphics card, for instance—not all of the components qualify as the latest and greatest. The video card, a Diamond Monster Fusion AGP board, will do a fine job for most business work, but you can find better boards for running 3D applications. The MicroFlex-34A's 14X-32X CD-ROM drive works well for the office, but most comparable Pentium II-450 machines come with a DVD-ROM drive. But consider it a trade-off for the quick processor—by forgoing extras like DVD, Micro Express keeps its price low.

If you have a screwdriver handy, the MicroFlex-34A's case opens easily: Removing one small screw lifts off the case. Beneath it, you'll find a handy illustration showing how to pull off the side of the chassis. Inside, everything is spit-and-polish tidy: Cables are neatly tied off and leave plenty of room to access the four free card slots, two free DIMM sockets, and four free drive bays.

The MicroFlex-34A comes with an array of component manuals but no overall system guide. If you run into trouble with your machine, you can call technical support on a toll-free line around the clock. The company also provides a four-year warranty on parts and labor and offers free on-site service for one year. Micro Express's support techs responded accurately but often tersely to questions in our anonymous calls.

### New This Month

17 PREMIO SHADOWHAWK 400C

**PRO:** Speedy performance, good expandability

**CON:** Price could be a bit more competitive, case somewhat tricky to close, lean support hours

If your home decor tends to Gen X style—black walls, black refrigerator, black shower curtains—Premio's sleek-looking Shadowhawk 400C will fit right in. Designed for the ebony-veneer desks of trendy home and small-office users, this $1599 machine offers excellent performance. It turned in a PC WorldBench 98 score of 196, making it the second-fastest Celeron-400 we've tested.

If you could care less about color coordination, the Shadowhawk 400C fades to only a moderately good value. Its price is the highest of the four Celeron-400 systems on the budget chart, and its feature set doesn't exceed the staples for a small business: a 14X-40X CD-ROM drive, a 17-inch monitor, and the standard business software suite—Microsoft Office Small Business Edition.

Inside, the system offers copious expandability, with two internal and three externally accessible free bays, as well as four open slots. Closing the case up requires a bit more effort than it should—you must carefully align the side panel with several points on the chassis before it will slide back on.

Premio delivers a mixed bag of service and support. In our anonymous support calls, the company's reps offered good advice in a timely manner—sometimes in less than a minute. And Premio backs its systems with a three-year parts, three-year labor warranty—competitive with what other vendors offer. We would like to see longer support hours, though. Premio's 10 hours per day, Monday through Friday, won't suffice for always-on-call small-business workers.

### 20 COMPAQ PROSIGNIA DESKTOP 310

**PRO:** Fast, easy-open case, Zip drive

**CON:** Limited expansion capabilities, lackluster reliability and service scores

Compaq's Prosignia Desktop 310 is a different machine this month, with a Celeron CPU upgraded from 366MHz to 433MHz and a PC WorldBench 98 score of 194, higher than the average Celeron-433. But it carries an unremarkable price tag of $1150 and merely satisfactory features.

Compaq receives just fair grades for the quality of its reliability and support.

The Prosignia's high points are a solid business software bundle (including Office 97 Small Business Edition), a Zip drive for backups, and an easy-open case. Unfortunately, easy access to the unit's expansion bays doesn't translate into extensive upgrade opportunities—a single internal drive bay is available, along with three open expansion slots.

Compaq's support policies are typical for the industry: a three-year parts and one-year labor warranty, plus free on-site labor for one year. But in PC World's most recent Reliability and Service poll, our readers rated Compaq as just fair in both categories. Service, however, may be on the upswing if our recent experience with making anonymous calls is any indication. Compaq's technical support reps responded courteously and fairly quickly, and they gave us consistently correct answers to our questions.
BUYING A NOTEBOOK from a vendor's Web site can be nerve-racking. Sure, you have the advantage of being able to configure the notebook almost any way you want it, but you must fork over thousands of dollars for a product you can't see or touch first. At least one direct-sales company, however, now lets you kick the tires before deciding. The Gateway Country stores (go to www.gateway.com for locations) let customers try out display models before placing a custom order. In another new twist, superstores such as Circuit City have kiosks where shoppers can select a custom configuration. You pay at the counter and receive your customized brand-name system in less than a week.

CompuUSA offers this benefit as well, but only for notebooks that are made by its CompUSA PC division. (The company's AmeriNote AN366L-SE, which we reviewed this month, came close to making our chart.) Eventually, says Rob Howe, vice president and general manager of CompUSA PC, the CompUSA stores may also allow shoppers to custom-configure competing brands.

**This Month's Best Buys**

**POWER NOTEBOOKS**

1. **DELL LATITUDE CPI A366XT**
   - **PRO:** Relatively thin and light, speedy performance, top-notch reliability and support
   - **CON:** Shorter-than-average battery life, no internal modem, few multimedia extras

   This 7-pound corporate notebook combines a thin, stylish case with Pentium II-366 performance and good support policies to claim our power

   *Best Buy for the third month in a row.*

   A PC WorldBench 98 score of 184 places the $3098 A366XT, now $100 cheaper, among the fastest notebooks we've tested. It's also versatile, accommodating a range of thin devices in its modular bay. In lieu of the included 10X-24X CD-ROM drive, a floppy drive, or a weight-saving empty module, the bay can hold a second battery ($169), a second hard drive up to 6.4GB ($499), or an LS-120 removable media drive ($199). All of these devices, as well as the optional docking stations ($549 and $649), can be shared across the Latitude CPI notebook line, according to Dell. With a nicely designed dark-gray case and stylized touchpad and mouse buttons, the A366XT exudes understated business chic. A wrist rest slightly thicker than the notebook keeps hands floating comfort-
ably over the well-arranged keyboard. The A366XT's battery, CD-ROM drive, and floppy drive slide out easily. You can access the RAM module without fuss from the bottom of the unit, but you'll need to use a screwdriver to remove the 6.4GB hard drive. If you often work with spreadsheets while on the road, you can squeeze a little more viewable area out of the A366XT's 13.3-inch screen by setting the resolution to 1280 by 1024 and enabling the pan mode.

Intended strictly for corporate buyers, the A366XT lacks some multimedia extras that high-end notebooks now routinely provide, such as advanced video options. Dell does offer a DVD-ROM drive add-on for the Latitude CPI line.

One option you may definitely need is a second battery, since this model has a barely satisfactory battery life of 2 hours and 15 minutes.

Dell's support policies for its Latitude line, one of the industry's best, include 24-hour toll-free support lines, a three-year parts and labor warranty, and three years of free on-site service. The only shortcoming: Dell includes printed documentation on buyer request only.

According to our latest reader survey, this vendor makes the most reliable notebooks in the industry. Lately, the quality of the company's technical support has picked up, too. In our last round of anonymous calls, we got through to technicians much more quickly than usual and received good advice.
overall. However, the placement of the AC adapter connection, with all the audio jacks on the right side instead of separately in the back, struck us as awkward. The notebook boasts a comfortable keyboard and a mouse with programmable buttons. Dell’s beautifully designed manuals and generous support policies, including around-the-clock toll-free phone lines and a three-year parts and labor warranty, complete the package.

**New This Month**

**POWER NOTEBOOKS**

4 GATEWAY SOLO 9150LS  
**PRO:** Speedy; good battery life; good audio comes with Dolby sound option; two USB ports; bundled business applications  
**CON:** Very heavy; very expensive  
Weighing nearly 10 pounds and equipped with an enormous 15-inch screen, the Gateway Solo 9150LS could be mistaken for a small desktop PC. The same could be said for the Dell Inspiron 7000 A366LT (also on the power chart) and an increasing number of new notebooks whose motto seems to be “Live Large or Die.”

At $3374 the 9150LS is the priciest notebook here, but you get cutting-edge features, including an LS-120 drive, a DVD-ROM drive, a 10GB hard drive, and a throng of multimedia jacks. A built-in combination MIDI and joystick port caters to gamers and musicians. And the notebook provides not only a TV-out jack, but also a port to bring video into the system for editing. The audio produced by the laptop’s built-in stereo speakers sounds fine, better than that generated by the Inspiron 7000. DVD movies looked just as good on the 9150LS as on other Pentium II-366 notebooks we’ve tested, with smooth action and mostly high-quality images. The 9150LS thus makes a fine choice for those who need a desktop replacement that can double as an entertainment or image-editing center.

Overall, the Solo 9150LS boasts a nice case design. The well-laid-out keyboard feels good, if a bit springy. If you prefer mouse buttons to a touchpad, however, you might find the pint-size set on this notebook too small for comfort. One other minor complaint: All the audio and video jacks are crammed onto the back of the case over the parallel and serial connections, instead of in more convenient locations like the front or the side.

Removing the hard drive for safekeeping doesn’t require tools, only some finagling: You have to first pop out the stacked LS-120 and DVD-ROM drives from the modular bay, then open a flap door on the front. The bay also accommodates a second battery ($150).

**BUDGET NOTEBOOKS**

3 HP OMNIBOOK XE2  
**PRO:** Affordable, doubles as an audio CD player  
**CON:** Small screen, limited free technical support, shorter-than-average battery life  
If you get more work done when listening to Mozart, the thin, reasonably priced OmniBook XE2—based on Intel’s new mobile Celeron-333 chip—may improve your productivity. Buttons on the front let you play audio CDs and control the volume without turning on the notebook or raising the screen. And the audio on our test unit sounded pleasingly full-bodied.

For the business-minded, the OmniBook XE2 offers impressive performance for the price, and its compact package houses a fairly nice configuration. The model includes built-in, fixed CD-ROM
and floppy drives, yet it weighs only 7.5 pounds and measures just 1.4 inches high. The trade-off: a budget-size 12.1-inch screen, which looks fine but tops out at a resolution of 800 by 600 pixels.

Extra wide key tops make typing on the XE2 especially easy, though the action feels a little too springy. The big mouse buttons prove comfortable, and the included Synaptics utility lets you reprogram them to launch applications. The easy-to-access hard drive can be locked in place with an optional security screw. The XE2 performs about 7 percent faster than last month's third-place budget notebook, the now-discontinued, virtually identical OmniBook XE based on the Pentium II-266PE chip. Unfortunately, battery life takes a hit in the Celeron-333 version—the XE2's battery lasted just over 2.5 hours, or about half an hour less than its predecessor.

HP's score for notebook reliability rose from fair to good in our latest reader survey. But support policies could be better. Most notebook vendors offer unlimited free technical support, but HP cuts the umbilical cord after three years—a drawback for those who hang on to their notebooks for more than a couple of years. The quality of support slipped a little this month, too. In our latest round of anonymous calls, technicians gave several incorrect answers and didn't seem as eager to help as usual.

5 COMPAQ ARMADA 1500C

PRO: Excellent audio, four programmable buttons, decent performance

CON: Battery life barely makes the grade, removing hard drive is difficult

If you're in the market for a sub-$2000 notebook with the best built-in audio available—or just hate manually opening the same programs every day—take a close look at the $1799 Armada 1500C, a budget member of Compaq's desktop replacement line of portables.

Like the higher-end Armada 1750 and Prosignia 140 and 160 notebooks, the 1500C boasts Compaq's superior stereo sound. Another plus: The CD-ROM drive is fixed, but you can swap the floppy drive for a second lithium-ion battery ($186) or a second hard drive ($1260 for 6.4GB).

Some components you might want to upgrade are unusually hard to reach. Both the hard drive and RAM modules sit under the keyboard, which won't lift open until you remove the floppy drive, the battery, and three screws on the bottom.

As shortcuts or for several users, you can launch different sets of apps by programming four buttons at the top of the keyboard with an infinite number of named schemes, Compaq says.

We get consistently good help from Compaq's around-the-clock toll-free service in our anonymous calls. But in our survey, Compaq users complain more about problems with notebook reliability than do users of most other brands.

—Carla Thornton

Contributing editor Carla Thornton writes regularly about notebooks.
IT TAKES A LOT more than marketing hype and an obscenely low price to elbow past the offerings of time-tested computer makers like Dell and Gateway. This month we finally get our hands on a couple of those dirt-cheap machines from Microworkz that you've probably heard so much about lately. But guess what? The chart barely registers a tremor—and the only new computer to debut on our Top 10 list is a rerun of last month's, except that the Micron and Gateway systems have traded places (Gateway unseats Micron at number three after shedding $55).

Celeron PCs dominate the mix, and Dell's Dimension V400c retains the top spot. On the power side, Pentium III-500 systems continue to reign supreme. For the fourth month in a row, Dell's Dimension XPS T500 is number one, thanks to its terrific speed and the company's superior support rating. HP's brand-new Pavilion 8490 slips in at number five—the only system of the six new PCs we tested to crack the chart this month. And it has been a while since an HP Pavilion graced our home PC chart—the last time was way back in November 1998.

**HP COMEBACK**

**THE PAVILION 8490** is the first Pentium III home PC we've seen from Hewlett-Packard. In the recent past, HP systems missed the chart for two reasons: They tended to cost more than similarly configured machines (by mail-order competitors, for instance), and they usually performed a lot slower. Another shortcoming: The company has earned only Fair ratings for both reliability and service in our two most recent surveys. But with the Pavilion 8490, we see a slight improvement in performance and substantially more value for the money.

At first blush, the $2948 price tag seems unduly high, compared to other power PCs listed this month. But the price becomes easier to stomach when you consider the package includes a built-in HP CD-Writer Plus 8100 (in addition to a DVD-ROM drive) and a vast 19GB hard drive. The 8490 posted a PC World Bench 98 score of 218—that's a hair faster than the fourth-place Sony VAIO (which costs $550 more), though at the low end of the PIII-500 range. Still, it offers plenty of power for demanding home-office duties.

Setup was a snap, from unpacking onward. Every item was color-coded and clearly marked. The bundled keyboard comes with complete CD controls, programmable buttons, and an easy-to-use speaker volume control knob—not a button. The Polk Audio speakers showed...
good range for a set of garden-variety computer speakers. Two PCI slots and one memory socket allow adequate expandability, though the fan cover blocks the memory socket.

The 17-inch Pavilion M70 monitor displayed crisp text but run-of-the-mill color quality. If you’re a graphics guru, you’ll be disappointed in the 8450’s multimedia capabilities—the integrated ATi 3D Rage Pro Turbo AGP chip and 8MB of RAM posted graphics scores that trailed the average of the other PCs on this month’s power list.

MICROWORKZ:
BARGAIN BASEMENT

On the budget side, we tested five new systems, but all were stymied by slow performance and other hardware drawbacks. Still, one of these machines does deserve a closer look: Microworkz’s ZPC.

The ZPC’s base configuration includes the Cyrix MII-300 processor, 32MB of RAM, a 2MB PCI graphics card, and a 14-inch monitor. (Note: By the time you read this, the ZPC will come with a Cyrix MII-333 CPU.) The bargain-basement price? An astounding $499. For basic tasks like home finance, word processing, Web surfing, and e-mail, the ZPC minitower will work just fine.

But beyond those functions, you’re toast. The ZPC is slow—its PC WorldBench 98 score of 137 is more typical of a PII-233 system. And its graphics scores ranked among the lowest we’ve seen. The machine we tested had integrated SiS AGP graphics and 8MB of memory, tacking on $50 to the ZPC’s base price.

If you want to add RAM or an upgrade card, you’ll have to twist your hands uncomfortably to work around the cramped and cluttered interior design. The ZPC’s Proview MF550 monitor displayed text poorly, and colors looked washed out. Furthermore, Windows 98 didn’t recognize the monitor on installation and set a refresh rate that produced an annoying amount of flicker. Anyone planning to log more than an hour a day in front of the PC will want a bigger, better monitor.

Predictably, given the price, no bundled software or any detailed setup documentation comes with the machine. Also, we’ve received complaints from readers experiencing long shipping delays with Microworkz (see this month’s On Your Side). If you’re interested in buying from this vendor, expect to wait.

Kirk Steers
Oakland, California, writer Kirk Steers is a contributing editor for PC World.

BEYOND THE TOP 10

We also evaluated the following systems this month, but they did not score high enough to make the Top 10 Home PCs list. For write-ups, see PC World Online (www.pcworld.com/top10homepcs).

- Compaq Presario 5204
- iDeltom 400LX
- Kingdom Pinnacle 400
- Microworkz TheWorkz
Yes! You can create PowerPoint™ presentations and speed through business applications in a fraction of the time. How? With the new ELSA ERAZOR III graphic accelerator card. It's powered by the astonishing technology of ELSA and the processor. Together they turn your PC into a high performance productivity center. Stop waiting and start creating spreadsheets, charts, reports...virtually any kind of business presentation in record time. Find us on the web or call 800-272-ELSA for a dealer near you.
# TOP 10 MONITORS

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<th>15-INCH MONITOR</th>
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**FEATURES:** 14-inch viewable area, 27mm dot pitch tube, up to 100-Hz refresh rate, Plug and Play ready, TCO'95 compliant, three-year warranty, 16-hour daily toll-free support. SUMMARY: Sharpest colors and high refresh rate move this model onto the chart; longer tech support hours would increase its value.

**FEATURES:** 13.9-inch viewable area, 25mm stripe pitch Trinitron tube, up to 85-Hz refresh rate, Plug and Play ready, TCO'92 compliant, three-year warranty, 24-hour toll-free support. SUMMARY: Sharp colors and high refresh rate move this model onto the chart; longer tech support hours would increase its value.

**FEATURES:** 13.9-inch viewable area, 25mm stripe pitch Trinitron tube, up to 112-Hz refresh rate, Plug and Play ready, TCO'92 compliant, three-year warranty, 8-hour weekday toll-free support. SUMMARY: Sharpest colors and high refresh rate move this model onto the chart; longer tech support hours would increase its value.

**FEATURES:** 13.9-inch viewable area, 25mm stripe pitch Trinitron tube, up to 85-Hz refresh rate, Plug and Play ready, TCO'92 compliant, three-year warranty, 24-hour toll-free support. SUMMARY: Competitive price, enticing graphics, and easy-to-adjust on-screen controls. Text isn't as sharp as on higher-rank models.

**FEATURES:** 13.6-inch viewable area, 25mm dot pitch tube, up to 85-Hz refresh rate, Plug and Play ready, TCO'95 compliant, three-year warranty, 24-hour toll-free support. SUMMARY: Very good picture quality and fast service. A good deal if price is top priority.

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## Top 10 Graphics Boards

### PCI Board

<table>
<thead>
<tr>
<th>Rank</th>
<th>Name</th>
<th>Month</th>
<th>Street Price</th>
<th>Overall Rating</th>
<th>3D Rating</th>
<th>Features Rating</th>
<th>Comments</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Creative Labs 3D Blaster BanShee</td>
<td>Mar 99</td>
<td>$100</td>
<td>93</td>
<td>good</td>
<td>excellent</td>
<td>good</td>
</tr>
<tr>
<td>2</td>
<td>Matrox Millennium G200</td>
<td>Feb 99</td>
<td>$119</td>
<td>87</td>
<td>good</td>
<td>good</td>
<td>good</td>
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<td>3</td>
<td>Elsa Erazor II</td>
<td>Jan 99</td>
<td>$110</td>
<td>87</td>
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<td>good</td>
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<td>Creative Labs Graphics Blaster RIVA TNT</td>
<td>Apr 99</td>
<td>$100</td>
<td>86</td>
<td>good</td>
<td>average</td>
<td>good</td>
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<tr>
<td>5</td>
<td>Diamond Viper V550</td>
<td>Dec 99</td>
<td>$130</td>
<td>85</td>
<td>good</td>
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### AGP Board

<table>
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<tr>
<th>Rank</th>
<th>Name</th>
<th>Month</th>
<th>Street Price</th>
<th>Overall Rating</th>
<th>3D Rating</th>
<th>Features Rating</th>
<th>Comments</th>
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<tr>
<td>1</td>
<td>Creative Labs Graphics Blaster RIVA TNT</td>
<td>Feb 99</td>
<td>$100</td>
<td>92</td>
<td>good</td>
<td>excellent</td>
<td>good</td>
</tr>
<tr>
<td>2</td>
<td>Matrox Millennium G200</td>
<td>Oct 98</td>
<td>$129</td>
<td>91</td>
<td>excellent</td>
<td>good</td>
<td>good</td>
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<tr>
<td>3</td>
<td>Hercules Terminator Beast Supercharged</td>
<td>Jun 99</td>
<td>$89</td>
<td>91</td>
<td>good</td>
<td>good</td>
<td>good</td>
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<tr>
<td>4</td>
<td>3dfx Voodoo3 3000</td>
<td>NEW</td>
<td>$180</td>
<td>91</td>
<td>excellent</td>
<td>good</td>
<td>good</td>
</tr>
<tr>
<td>5</td>
<td>Elsa Erazor II</td>
<td>Mar 99</td>
<td>$99</td>
<td>88</td>
<td>good</td>
<td>good</td>
<td>good</td>
</tr>
</tbody>
</table>

**Best Buy** For reviews of products that didn’t make the chart, visit [www.pcworld.com/trends](http://www.pcworld.com/trends). **All products:** 907

### How We Test

We test boards under Windows 95. Business tests include PC WorldBench 98, a PowerPoinl test, and a Macromedia Director script. Our 3D score is based on four games, each evaluated on frame rate and image quality. For AGP cards we add a test using Caligari’s TrueSpace. We tested PCI boards in a Micron Millennia Mme PC with a Pentium MMX-233 and 32MB of RAM. We tested AGP boards in an NEC Direction 333 with a P1-333 and 64MB of RAM. Overall rating is based on performance (PCI 50 percent, AGP 55 percent), features (25 percent), price (PCI 15 percent, AGP 10 percent), and support policies (10 percent). For all scores, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

3DFX’s NEW VOOOOOD3 3000 debuts on the AGP side of this month’s chart. It’s the costliest board in the Top 10, but you get fast 3D performance and fabulous features such as a video-out connector for viewing games on a TV. The 3000’s lower-priced sibling, the $130 Voodoo3 2000, performs well but lacks bundled software and TV features. Meanwhile, Creative Labs hangs on to the numero uno spots on both the PCI and AGP lists.
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In fact, fun is what Wrangler is all about. So it’s easy to overlook important features like Command-Trac shift-on-the-fly four-wheel drive, axle ratios geared low enough for rock crawling, and Quadra- Coil suspension for literally soaking up the bumps.

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MAXTECH PREVAILS on our internal modems list. Its XPV56P NetPacer costs just $S8 and performs well at 56 kbps. At number seven, IBM's new V.90 PCI Data Fax Modem offers speedy 56-kbps downloads and comes with terrific support policies. On our PC Card list, 3Com's Megahertz 56K Cellular Modem retains its top position, while Psion Dacom's new Gold Card, featuring such extras as worldwide connectivity, debuts in third place.
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(It’s Time We Introduce Ourselves)

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Of course we know what you would really like is the very best monitor at the most attractive price. Check the model listings and specifications shown here and you will see we have some great monitors at head-turning prices!

Whether you’re buying a new PC or upgrading to a new CRT or eye-popping flat panel display, get the full Argon story at www.argontechnologies.com, or contact one of our resellers. We’ve introduced ourselves — now we’d love to hear from you!

---

<table>
<thead>
<tr>
<th>Model</th>
<th>Size</th>
<th>Specs</th>
<th>Est SP</th>
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<tbody>
<tr>
<td>T554</td>
<td>15&quot; Flat Tube 13.8&quot; Viewable 1024 x 768 28mm Pixel</td>
<td>$149</td>
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<tr>
<td>T770</td>
<td>17&quot; Flat Tube 15.8&quot; Viewable 1280 x 1024 27mm Pixel</td>
<td>$249</td>
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<tr>
<td>T770M</td>
<td>17&quot; speakers &amp; microphone 1280 x 1024 27mm Pixel</td>
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<td>T786</td>
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<tr>
<td>T996</td>
<td>19&quot; Flat Tube 18.3&quot; Viewable 1600 x 1200 26mm Pixel</td>
<td>$469</td>
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<tr>
<td>T107</td>
<td>21&quot; Flat Tube 20&quot; Viewable 1920 x 1440 25mm Pixel</td>
<td>$839</td>
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<tr>
<td>TP15-LCD</td>
<td>15&quot;, speakers &amp; microphone TFT/Active 1024 x 768</td>
<td>$1049</td>
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</tbody>
</table>

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  310-725-5200
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  888-999-8344
- **FirstSource**  
  800-559-9866

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- 1926 Monitor (18” display)
- Sony CD-R/RW Drive (4X Write/2X Rewrite/24X Read)
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- 48X Max CD-ROM Drive
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Open a Single File Type in Multiple Apps

**WHEN YOU DOUBLE-CLICK** a file in Explorer to open it, by default, Explorer launches the one application associated with it. But what if you want to open that file with another program?

If a text file is too big, for example, Notepad won’t load it, though WordPad will. Don’t be bullied by Windows’ single-app default. Set up Windows so that by right-clicking a file, you can open it with an alternative application.

**Windows 9x.** Open Explorer and choose `View • Options` (Win 95) or `View • Folder Options` (Win 98). Click the `File Types` tab and select the type of file you’d like to open in multiple programs. Click `Edit`. Under the Actions list, click `New` to open the New Action dialog box. In the box, type the command you want to appear in the context menu. If you occasionally want to open .txt files in WordPad, for instance, type something like `Edit in WordPad`.

In the box labeled ‘Application used to perform action’, type the full path name for the program you want to use to edit this file type (or click `Browse` and then click the app when you find it). Add quotation marks around the path name if the path contains any spaces or long names. With some applications (like WordPad), you may also need to add a space followed by "%1" after the path name. In the WordPad example, the application line should look something like "c:\program files\accessories\wordpad.exe" "%1". Click OK once and Close twice.

From now on, whenever you need to open a file in your alternate app, you can simply right-click the file icon and choose your new command. If you want one letter in the command to be designated as a keyboard shortcut, put an ampersand in front of that letter when you type the command in the context menu. So if you type `Edit in WordPad`, you can select a text file in Explorer, press `Shift`-`F10` to display the context menu, and then type W to launch the file in WordPad. Use a letter that isn’t already underscored on the menu.

**Windows 3.x.** Start File Manager and select a file whose extension you occasionally want to open with an alternate app. Next, start Recorder; if you keep your everyday macros in a special file, open it. Choose `Macro • Record`. Type a name for your macro and designate a shortcut key. Make sure `Playback` is set to Same Application, `Speed` is set to Fast, and `Enable Shortcut Keys` is checked. Under Record Mouse, choose `Ignore Mouse`.

Click `Start`. If File Manager is not the active window, use the mouse (so this step won’t be recorded) to activate it. Press `Alt`-`FR` to open the Run dialog box with the selected file listed on the command line. Press `Home` to move the cursor to the beginning of the Command Line box. Type the name of your application file (and the path, if necessary), followed by a space. For example, to use Write to open any selected file, type `write.exe` and a space. The Command Line box should now display your application name, a space, and...
FIGURE 1: CREATE MULTIPLE ASSOCIATIONS for a single file type in Win 3.x by using Recorder to modify the Run box command line.

The name of the file you selected in File Manager (see FIGURE 1). Press Enter.

The file should open in your designated application. Click the flashing Recorder icon, or hold down Alt and press Tab until Recorder is selected. (Since selecting Recorder interrupts the macro, these keystrokes won’t be recorded.) Save Macro selected and click OK.

Finally, restore the Recorder window and choose File-Save to save your file. From now on, whenever you need to open a file in your alternate app, just make sure that Recorder is running with your macros file open, select the file you need in File Manager, and press the shortcut key you assigned. Voila!

PUT PHONE DIALER TO WORK

Many people have dismissed Windows’ Phone Dialer as practically useless. That may be because (except for eight measly speed-dial buttons) this accessory has no customizable directory for storing names, addresses, and phone numbers for multiple contacts. But with a little work, you can use its Call Log as a dialing directory or a basic address book.

And you’ll find that making calls from this directory requires a lot fewer clicks than trying to place calls via Microsoft Exchange, Outlook 97, or Outlook Express. The trick lies in editing the source file for Call Log, calllog.txt, located in your Windows folder.

Here’s what to do: First, open the calllog.txt file. If you’ve never used Phone Dialer, you must make at least one call with Phone Dialer to create a calllog.txt file. Because this file is tab delimited, you needn’t use a text editor that converts tabs into spaces. Notepad will do just fine.

The log always adds new calls to the top of the list, so to keep your dialing directory entries separate, you’ll want them to appear at the bottom. But because everything you type into calllog.txt shows up in the opposite, top-to-bottom order in Call Log, you’ll have to add your entries in reverse alphabetical order if you want them to appear alphabetically in Call Log.

You can start by typing hyphens or other characters to separate your entries from the calling list; don’t just add multiple carriage returns, because Call Log will ignore these.

When adding entries, you’re restricted to the widths of the various Call Log columns. For instance, because the first column is so narrow, you might want to use it for title abbreviations—Ms., Dr., Lt., and so on. Then press Tab to move to the next column. The second column is the widest; when Call Log is maximized, you should have room for a name, an address, and maybe more (depending on your screen resolution). You must use the third column for the phone number if you want to use this list for dialing. You can skip the i for long-distance numbers; Phone Dialer adds it automatically.

remaining three entries with short items, such as dates. Be sure to press Tab to separate entries. When you're done, save the file and exit.

To use your dialing directory, choose Start-Accessories-Phone Dialer (Start-Accessories-Communications-Phone Dialer in Windows 98). If you don’t see Call Log, choose Tools-Show Log (see FIGURE 2).

Double-click Call Log’s title bar to make it as large as possible, displaying what you typed in. Press End to jump to the end of the list where you added your custom entries. To call one of your new listings, simply double-click its line. If you want the Call Log to open automatically the next time you start Phone Dialer, leave its window open when you exit Phone Dialer.
TROUNCING THE TYRANNY OF TINY TEXT

A FAMILY MEMBER is losing his sight. Because many of the Web pages he reads rely on extrasmall print, I've been copying each page to my hard drive and then using Notepad to alter the HTML by adding the "BIG" tags. Unfortunately, if a Web page's coding is extralong, Notepad can't load it. Do you know of settings (preferably ones that can be switched on and off quickly) that I can use to enlarge every Web page's text? Or can a software package do this? (I'm already using the "Windows Standard - Extra Large" cursor set.)

Name withheld by request

SEVERAL SOLUTIONS are available for those of us who find ourselves squinting harder at the screen with each passing year. Here's a quick rundown:

Try a tool. First, check out the Accessibility Settings Wizard from Start • Programs • Accessories • Accessibility. This wizard lets you select from numerous settings for easier-to-read displays. Another option is to choose Windows 98's Magnifier from the Accessibility menu. It lets you enlarge any portion of the screen. Set a level from 1 to 9, drag to move or resize the magnification level, and click OK. The Magnifier window shows a blown-up version of whatever is under your pointer. When you're done, right-click the magnified area to go back to the nonmagnified setting, or choose Exit.

After exiting Magnifier, you may need to rearrange any desktop icons it displaced. To avoid displacement, resize Magnifier to a floating window rather than letting it snap to a screen edge. (To do this, position the pointer inside the Magnifier window and drag to the middle of your screen.) If you're using another Windows version, you can obtain similar features and more customization from Lens, a $5 shareware utility available on FileWorld. Also, check out Microsoft's Accessibility site (www.microsoft.com/enable) and this month's "Windows Toolbox."

Resize system fonts, part 1. If your visual needs stretch beyond surfing the Web, the fastest way to make Windows (its icons, menus, address bar, and so on) more readable is to right-click the desktop, choose Properties, and click the Appearance tab. From the Scheme drop-down list, choose Windows Standard (large) or Windows Standard (extra large). Adjust the other color and font settings as desired, and choose Save As to save the scheme to a custom name. Naming the scheme enables you to apply those settings quickly in the future. Click OK. This technique won't help you read most Web pages, but it's significant in the big picture.

Resize system fonts, part 2. To enlarge system fonts—such as those used by most Web pages—open the Desktop Properties sheet as before, and click the Settings tab. Look for a drop-down list labeled Font Size; you may need to click the Advanced button, depending on your video driver and Windows version. Choose Large desktop real estate shrinks, desktop icons may smooch together. You can get PowerToys from FileWorld. Though PowerToys and QuickRes work with most Windows 98 systems, Microsoft warns users that it designed the applets specifically to run under Windows 95 OSR2.

Online fixes. Most browsers let you change font size on the fly. In Internet Explorer 3.x or 4.x, choose a size from the View • Fonts menu. In IE 5, use the View • Text Size menu. Other browsers offer more flexibility: In Netscape Navigator 4.x, press <Ctrl>-1 as many times as needed to enlarge the font to the desired size (press <Ctrl>-3 similarly to reduce it). In Opera, pick a magnification level from 20 to 1000 percent from the pop-up list in the lower right corner (see FIGURE 3). In AOL 4.0, select My AOL • Preferences, click the Font button, pick a font and a size, and click OK.

Adjust apps. Some apps offer their own ways for zooming in. Word for Windows, for example, lets you put a zoom control on its customizable toolbar. And most applications from Adobe Systems (such as PageMaker or Photoshop) have a Navigator palette that lets you zoom in and out as well as pan around your page.

Big Character Builder

ARE YOU TIRED of squinting at the small characters in Windows' Character Map utility? Sure, you can click to enlarge a character in the window, but to do this you have to hold the mouse button down on each one individually. For a better (and faster) view, download Extended-CharacterMap, a freeware replacement that enlarges all the characters, shows bold and italic formatting, and lets you type in a sample sentence. This utility works in Windows 9x and NT 4.0. It's available from FileWorld.

FIGURE 3: NO OPERA GLASSES are needed with the Opera browser; just choose a zoom level from the handy menu.

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Add Windows 98 to Your NT System

THE FEBRUARY Windows NT column lists the pros and cons of four different dual-boot scenarios, including one in which Windows 98 is installed on a FAT32 partition and Windows NT is set up on an NTFS partition. But everything I have read says you can't dual-boot NTFS and FAT32 without a third-party boot manager.

Frank Gaffen, Celina, Ohio

REST ASSURED that you can have both NTFS and FAT32 file systems on one PC. Ordinarily, the trick to dual-booting Windows NT and 98 is to install Windows 98 first, then NT. During installation, NT replaces Windows 98's bootup files with its own multiboot operating system loader, NTLDR, and creates entries for Windows 98 and NT on the multiboot menu. However, Windows NT will not boot (or install) if drive C is a FAT32 partition. And if your system came with NT preinstalled, Windows 98's install program won't run in Windows NT.

This is where third-party boot managers can come in handy. But why pay good money for such a utility when NTLDR is a perfectly fine alternative and is free?

With the aid of Windows 98's Fdisk disk-partitioning tool and the free Boot Partition 2.20 utility (available on FileWorld), you can easily install Windows 98 to a FAT32 partition, then add it to the Windows NT boot menu. Assuming that you have sufficient free drive space to create a FAT32 partition, here's how to dual-boot NTFS and FAT32:

1. **Prepare a FAT32 partition.**

   Boot the system with a Windows 98 start-up disk. Next, enter fdisks at the A: prompt. If disk asks whether you want to enable large disk support, type Y. The utility will then ask you if you want to treat the existing NTFS partition as a large volume. It doesn't matter what your answer is, since we're not going to touch the NTFS partition. I typed Y. Next, press 1, then 1 again to create a primary DOS partition—a logical drive in an extended partition. Answer the remaining prompts to finish creating the partition, then reboot the system with the Windows 98 start-up disk. Next, format the new partition using the command format c:. (Don't worry—your NTFS partition is safe and sound, invisible to Windows 98.)

2. **Install Windows 98 on drive C.**

   Remove the Windows 98 start-up disk, insert the Windows 98 installation CD-ROM, go to the CD-ROM drive, and run setup.exe. If the Windows 98 start-up floppy's generic CD-ROM drivers do not work with your drive, consult your system or drive manufacturer's instructions to add the necessary drivers to the floppy's config.sys and autoexec.bat files.

3. **Make NT bootable.**

   Once Windows 98 is installed, reboot your computer with the Windows 98 floppy, launch Fdisk, and press 2, then 1 to make the NTFS drive the active (bootable) partition. Next, answer the remaining prompts, remove the Windows 98 boot floppy, and then reboot. The computer should now boot to Windows NT.

4. **Add Windows 98 to NT's boot menu.**

   Download and unzip Boot Partition 2.20, then copy bootpart.exe to your root directory (C:\). Select Start-Run and type command to open a Windows NT command prompt window, and then enter the command c:\bootpart to display a list of boot sectors that are available on the system (see FIGURE 1). Lastly, type the command bootpart1 boot98.bin Windows 98. Enter exit to return to NT.

   The next time you start Windows NT, you'll see Windows 98 at the bottom of the multiboot menu. You can use Boot Partition to add other operating systems (including Linux or BeOS) to NT's multiboot menu as well. However, Boot Partition author Giles Vollant says the tool can't add OS/2 to the boot menu.

**FIGURE 1: USING A FREE UTILITY called Boot Partition 2.20, you can add another operating system to Windows NT's multiboot menu.**

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**Keep It Current**

WHETHER YOU'RE using Windows NT Server or Workstation, you should have Service Pack 5 installed. Its hundreds of fixes include everything that appeared in Service Pack 1 through 4, plus new fixes, including all current Y2K patches. In addition to being a convenient one-stop collection of current fixes, SP5 is rumored to be pretty stable. You can find a link to the 33MB download at www.fileworld.com/magazine, or order the CD-ROM ($20) from Microsoft (800/370-8758).

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**Find the files mentioned in this article at www.fileworld.com/magazine. We pay $50 for published questions and tips. Scott Spanbauer is a contributing editor for PC World. See page 12 for contact information.**
Clean Out the Debris Left by Deleted Apps

HOW DO I thoroughly get rid of programs I don't use anymore? Not every program has an uninstall routine, and even those that do leave garbage in my Windows and System folders.

Louise Garcia, Whittier, California

Third-party uninstall applications are available, but my experience with them has been wanting. I recommend using the manual method instead. First, if an application doesn't come with an uninstall option (look in the Start menu, in Control Panel's Add/Remove Programs applet, or in the program's own folder), then delete the app's folder. It may be called C:\Program Files\program name, C:\Program Files\vendor name\program name, or simply C:\program name. Use Windows Explorer to find the folder, then select it and press Delete.

Click Yes every time Windows asks you if you really want to delete it.

Next you'll want to remove the program's shortcuts. Right-click Start and select Explore. In Explorer, remove any shortcuts or folders within the Start Menu folder that are named for that program. For instance, if you launch "BadCode" by selecting Start\Programs\BadCode, you'll want to go to the C:\Windows\Start Menu\Programs folder and delete BadCode. But if you launch "SystemCrasher" by selecting Start\Programs\SystemCrasher\SystemCrasher, you'll want to delete the C:\Windows\Start Menu\Programs\SystemCrasher folder.

Now it's time to clean out the System folder. Doing this isn't an exact science—it requires guesswork and caution. While in Explorer, go to C:\Windows\System. Select View Options (or View Folder Options). On the View tab, select Show all files, then click OK. Right-click an empty space in the folder and choose New Folder. Name the new folder Probably Garbage. While you're still in the System folder, select View\Arrange Icons by Name. Look for file names similar to the program's name, then drag each one to Probably Garbage. When you are done, move Probably Garbage to another place on your hard drive (see FIGURE 1) or better yet, to another drive. Wait three months to make sure you don't need any of these files before you delete them for good.

Finally, you should clean up the Registry. Editing the Registry is always dangerous, so make sure you have a good backup first. See "Troubleshoot and Repair Your Registry" (June Windows Tips, www.pcwORLD.com/june99/windows) for more on this.

When you're ready to clean, select Start\Run, type regedit, and press Enter to enter the Registry Editor. Press F3, type the name of the unwanted program, and press Enter. Whatever result the search returns, click it, press Delete.

Then select Yes. Watch out for entries on both panes of the Registry—deleting an entry from the right pane alone may not be enough. Press F3 to continue the search, deleting each reference you find. When you're done, close the Registry Editor and reboot.

WHERE TO GO FOR VIRUS INFO

I'M WORRIED about a virus named Weed.5850.D. Where can I learn more about this and other viruses?

Hazel White, Independence, Missouri

An obstacle to finding complete information on viruses is that a virus can have more than one name. For instance, Weed.5850.D is also known as HLL.5664 and RustyBug.5350.A. These names are determined by various antivirus vendors, who don't always coordinate their efforts.

The first place to look for information on a given virus is your own antivirus program. For instance, in Norton Anti-
Virus 5.0, you can click the Virus List icon for a list of known viruses. Just double-click the one you’re curious about for more details (see FIGURE 2). In McAfee VirusScan 4.0, launch the VirusScan Central program, click Tools, then Virus Info. Click Find Virus, enter a name, and press Enter. Double-click the name for details. Be vigilant about keeping your antivirus program current, to ensure that it has the latest information and updated antivirus abilities.

In addition, several virus encyclopedias on the Web will provide you with more information than will your antivirus program. Because of name variations and some less-than-complete definitions, it’s advisable to check more than one such encyclopedia. Among the best are Symantec’s AntiVirus Research Center (www.symantec.com/avcenter/vinfo.html), the AVP Virus Encyclopedia (www.avp.ch/avpve), Dr. Solomon’s Virus Encyclopedia (www.drsolomon.com/viren/enc), the Trend Micro Virus Encyclopedia (www.antivirus.com/cgi-bin/vinfo.pl), and McAfee Virus Information Center (vilot.mcafee.com/vilot).

RESTORING FROM AN OLD DOS BACKUP
BACK IN 1995, I used the MS-DOS 6.22 backup utility to archive important files onto floppies. Now I need those files, but the Windows 98 backup program can’t restore them. Any ideas?

Joel Taimanglo, Colorado Springs, Colorado


Once you’ve got MSBackup installed and configured (the program runs only in DOS compatibility mode), you have to restore the catalog. At the main menu, select Restore Catalog Retrieve, and then your floppy drive. Click OK. Insert the last floppy of your backup set and select Continue.

If you don’t have the last floppy, or if there is a problem with the floppy and MSBackup can’t retrieve the catalog from it, select Rebuild rather than Retrieve. MSBackup will recreate a catalog as best it can from the information on all of the surviving floppies.

When the catalog has been retrieved or rebuilt, select OK, then Load. Click Select Files and then pick the files you wish to restore. Be careful about restoring anything to the Windows folder or to its subfolders. You may overwrite a file whose particular version you need.

Select Start Restore. Follow the prompts for feeding your floppies to the program one at a time. When it’s done, click OK, then Quit to return to Windows. You should now have your files.

SHARING A PRINTER
I HAVE TWO PCs, but only one printer. How can I print from the computer that isn’t connected to the printer? I don’t want to bother with a network. And please don’t tell me to move the file to the PC that has the printer. I need to print from programs that aren’t on that PC.

David Caya, Haddonfield, New Jersey

HERE ARE TWO solutions. One is hassle-free, and the other is just free.

The hassle-free solution is to buy an electronic switch box. Do not buy a mechanical switch box. If you do, you’ll have to manually switch it to print from the other computer, and this mechanical switching can send voltage spikes down the cable that can damage your hardware.

An electronic switch box, such as those in ASP Computer Products’ Intelligent AutoSwitch line, does the switching automatically and protects you from spikes. You can buy a low-end model—enough to support two computers and one printer—for as little as $25. (You’ll shell out another $12 to $15 for extra cables.) Of course, the PCs must be in the same room.

If you’d rather not spend any money or if the machines are in different rooms, you can use good old-fashioned sneakernet—carrying a “print file” (rather than the data file, which would require its app to be on the second PC) between computers on a floppy. This trick won’t work with very large print files (such as those with pages of graphics), but it will work with most of them. Here’s how:

On the system that is not attached to the printer, select Start • Settings • Printers. Double-click Add Printer and use the resulting wizard to install the drivers for the printer connected to the other computer. When the wizard asks for a port, select FILE.

On the PC attached to the printer, select Start • Programs • Accessories • Notepad. Enter the line copy a:file.lpt1: /b followed by cls on its own line. Make sure that cls is the last line—don’t press Enter after it. Select File • Save. For the ‘Save in’ option, select Desktop. For ‘Save as type’, select All Files (*.*). For ‘File name’, enter Print From Disk.bat. Save the file and exit Notepad.

Once you’re set up, printing is easy. First, tell your application to print the file. When it asks for a file name, pop an empty floppy into drive A.; and name the file afile.prn. When the “printing” is done, remove the floppy, and walk it over to the other computer. Put the floppy into the drive and double-click Print From Disk.bat.

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Use ICQ to Stay in Touch With Colleagues, Friends

ICQ—acronym-speak for “I Seek You”—is one of the most popular Web utilities around. What makes this instant chat tool a favorite among Netizens is its ability to locate friends and colleagues online and alert you when they’re available to chat. Unlike some other chat tools, which seem to cater to teenagers, this one is gaining popularity among business users as a handy communication tool.

The utility—whose full name is ICQ 99—is offered free of charge by ICQ, a division of AOL. Like AOL’s Instant Messenger and Microsoft’s NetMeeting, ICQ logs you in to a central server whenever you connect to the Net, and tells you when your pen pals are online. Unlike e-mail, you can use a chat tool to “converse” in real time, sending short messages that appear on the recipient’s screen almost instantaneously. ICQ can also work hand in hand with conferencing software, such as NetMeeting and Netscape’s Cooltalk, for both audio and video. ICQ 99 offers better Web integration than previous versions, including built-in search tools for finding news, software, and Usenet groups. It provides some nonchat tools, too, such as desktop notes, a reminder feature, and a to-do list.

At press time, the program was still described as being in beta, though it’s already widely used. You may download it from PC World Online’s FileWorld.

In case you’ve never used an instant messaging tool, or ICQ in particular, the rest of this column consists of helpful tips and tricks.

The first thing you’ll want to do after installing ICQ is add names to your contact list. Open the ICQ window by double-clicking the green flower in the system tray (in the lower right of your screen). Click the Add Users button. In the next dialog box, enter your contact’s name, e-mail address, or ICQ identification number (if you have it) to add him or her to your list. Then click Next. Repeat this procedure for everyone you want added to your list. If ICQ finds people who match the information you’ve provided, you’ll receive a listing of all matches. If you see a match you’re interested in contacting, click that entry, then click Next. If ICQ can’t find any matches for the information you provided, you’ll have the opportunity to send an invitation via e-mail. The other party will receive a message asking him or her to download and install ICQ so the two of you can start communicating.

GET MORE FUNCTIONALITY

Before we go any further, it’s a good idea to put the program in Advanced mode. Don’t fret—it’s no harder to use than Simple mode. The advanced setting just gives you access to more functions, like file transfer and e-mail. From the main ICQ window, click the button that says To Advanced Mode.
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not a secure environment. It provides a handy means of sending messages and files instantaneously, but—in theory, at least—unknown third parties could intercept any information you send through ICQ. Therefore, we recommend that you use more secure methods (for example, PGP-encrypted e-mail) to send confidential messages and files.

**Privacy Issues** To keep strangers from finding out when you're online, set ICQ to require your authorization before others can add you to their contact list. To do so, click the ICQ button in the lower left of the ICQ window. Select Security & Privacy. Head to the Security tab and select My authorization is required. Then click Save. Alternatively, you can go to the Ignore List tab and check Accept messages only from users on my contact list to block unsolicited messages from strangers.

To prevent others from sitting down at your PC and posing as you on the Net, password-protect your ICQ program. Click ICQ·Prefs, Security & Privacy, and then click the Security tab. Type in a new password and uncheck Save Password. Under Security Level, select High. Now, every time ICQ loads, it will prompt you to give your password before letting the world know that you’re online.

With ICQ's “floating” feature you can create a desktop icon for your boss or that persnickety client, so you can monitor their availability. To do this, drag their names, one by one, from the main ICQ window and drop them onto your desktop. Floating icons on your desktop will remain visible above all other open windows. If you’d like them to be anchored on the desktop, permitting other windows to cover them, select ICQ·Prefs; then, on the Contact List tab, deselect Make “Floating Users” Always on Top.

**Out to Lunch** You can configure ICQ to display different messages when you’re away from your desk or otherwise wish not to be disturbed. Click ICQ·Prefs and select the Status tab. ICQ uses several availability modes to let the world know what you’re up to (see **FIGURE 2**). They include Away, N/A (Extended Away), Occupied (Urgent Msgs), and DND (Do Not Disturb). Select a mode listed in the drop-down menu that appears to the right of ‘Enter Default Availability Mode Message For’. Then use the text box to enter the text you’d like other users to see when you’re in that mode. For example, if you would like to let people know you’re out to lunch when you set ICQ to N/A mode, select N/A and enter I’m on my lunch break. Will return shortly, or some such in the text box (see **FIGURE 3**). ICQ also offers preset text messages that you can choose from.

To put ICQ into a different availability mode, open the main window by double-clicking the flower icon in the system tray, then click the flower box to the right of the ICQ Menu button. Now select a new mode. ICQ can automatically switch to Away or N/A modes after a specified period of PC inactivity or whenever the screen saver kicks in. To find these options, select ICQ·Prefs, and look on the Status tab.

You may find that you have trouble sending messages to some users in corporate environments. In organizations where computers share IP numbers, ICQ has difficulty figuring out where to send your messages. Fortunately, the messages can be sent through the main ICQ server rather than directly to the target PC. If ICQ finds that one of your messages needs to go through the server, you’ll receive a dialog asking whether you really want to take that action. You do; set ICQ to send messages through the server automatically when it encounters trouble, select ICQ·Prefs, click the Events tab, and select Auto Send Messages Through Server.

**FIGURE 3: BEYOND CHAT, ICQ can serve as your answering machine, letting you leave messages for friends and colleagues.**

ICQ notifies you of incoming messages, requests, and files in many ways. By default, the main ICQ window pops up when an event occurs. You can choose to have ICQ just flash its flower icon in the system tray instead. Select ICQ·Prefs, click the Contact List tab, and then deselect Popup Contact List upon Incoming Event. Sick of that “Uh-oh!” sound already? Select ICQ·Prefs, click the Events tab, and uncheck Play Sounds.

Want to clean up your contact list window a little bit? Remove the ‘ICQ Now!’ button, the search box, and some other less-useful controls. Click ICQ·Prefs, and on the Contact List tab, select Remove Contact List Buttons.

For more ICQ information and tech support, check out the message boards and the frequently asked questions section on the ICQ Web site (www.icq.com).

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Easier macro control • Dealing with missing fonts • See millions of colors in Word

Six Easy Steps for Creating Vertical Text in Word

A vertical banner in large type can be a great means of calling attention to a section of text in your newsletter, memo, flyer, or other document (see FIGURE 1). Earlier versions of Word provided no good way to create one, but Word 97 and 2000 make it easy to get vertical with your text:

1. Start by selecting Insert • Text Box. Click and drag to draw a text box where you want your banner, and then type the desired text inside the text box, ignoring the horizontal orientation of the text.

2. Click the Text Direction icon in the Text Box toolbar until the banner’s text is oriented the way you want it.

3. Select the text inside the text box, and format it with a font and size that works with the style of your document. Drag the sizing handles of the text box to get the best fit, and reposition the box by dragging it on the screen.

4. Right-click the shaded border around the text box and select Format Text Box.

5. Within the Format Text Box dialog box, click the Colors and Lines tab in order to format the outer border of the box and specify a fill color, if desired.

6. Click Layout (Word 2000) or Wrapping (Word 97) and select a wrapping option that works with your document.

FIGURE 1: IT'S EASY TO CREATE vertical text banners in Word 97 and 2000 by using the Text Box tool.

3. Select the text inside the text box, and format it with a font and size that works with the style of your document. Drag the sizing handles of the text box to get the best fit, and reposition the box by dragging it on the screen.

4. Right-click the shaded border around the text box and select Format Text Box.

5. Within the Format Text Box dialog box, click the Colors and Lines tab in order to format the outer border of the box and specify a fill color, if desired.

6. Click Layout (Word 2000) or Wrapping (Word 97) and select a wrapping option that works with your document.

DISPLAY DIALOG BOXES IN VBA MACROS

UNTIL OFFICE 97 introduced Visual Basic for Applications—Office’s macro language—the task of creating a standard Word dialog box to accept user input was tedious, involving several lines of obscure code. With VBA, available in Word 97 and 2000, it’s a simple one-line operation, but you might miss the commands if you don’t know where to look. Here’s the drill to use while editing a macro (see also FIGURE 2):

1. Select Tools • Macro • Macros.

2. Choose an existing macro and click Edit or type in a new macro name and click Create.

3. Type Dialogs (at the start of any line in the Macro Editing window.

4. Double-click the desired dialog box constant name in the drop-down list. (In the example shown in Figure 2, wdDialogFileOpen.)

5. Type ). (a right parenthesis followed by a period).

6. Double-click Show in the drop-down list.

PRESERVE EMBEDDED OBJECTS IN WORD

Object linking and embedding makes it possible to insert objects like Excel worksheets or charts into Word documents and easily update them in place. But when you send a document with an embedded object to others, either by e-mail or on a disk, they won’t be able to see the object when they open the file—unless you take a few steps first:

1. Select File • Save as and save the document with a new file name.

2. Select the first embedded object.


4. Repeat steps 2 and 3 for each object.

5. Save the document and send it.

This sequence breaks the links to the objects, converts the embedded objects into graphics, and stores them with the document, making them accessible to others.

SEE FILES IN MULTIPLE DIRECTORIES

Most people store documents they’ve created in separate folders, identified by the project or another criterion. Normally, Word’s File • Open dialog box shows

FIGURE 2: ADDING MACRO CODE for a Word dialog box now takes only a minimum of typing and a few mouse clicks.
you only one of these folders at a time, forcing you to open other directories separately to see their documents. Word 7 and 97 (running in Win 95 or 98) offer a handy option that shows a complete directory tree. Here's how to make it work:
1. Select File·Open. If it's not already displayed, click the folder that contains your document subdirectories.
2. Click the Commands and Settings icon on the dialog box's toolbar.
3. Select Search Subfolders from the menu.
4. Scroll down to select your document.

**COPING WITH MISSING FONTS**

A COWORKER HAS sent you a Word document by e-mail. When you open it, some of the fonts look very strange, making you think somebody's flipped their formatting lid. Don't send for the shrink-your colleague has simply used a font not installed on your computer. When this happens, Word takes its best guess and substitutes it has chosen (see FIGURE 3).

1. Select Tools·Options and click the Compatibility tab in the Options dialog box.
2. Click Font Substitution. If Word has encountered any fonts it doesn't have, it provides you with a Font Substitution dialog box that lists them and the substitutions it has chosen (see FIGURE 3).
3. To change a substitution, select a Missed Document Font from the list.
4. Drop down the Substituted Font list and choose a suitable replacement font.
5. To replace any other substituted fonts, repeat steps 3 and 4 as necessary.
6. Click OK to temporarily apply the substitutions to the current document, or click Convert Permanently to replace the fonts permanently in the document.
7. Click OK in the Options dialog box to complete the substitutions.

**WHAT COLOR DO YOU WANT TODAY?**

WHILE YOUR monitor and printer have long been able to handle millions of colors, Word has always been limited to a basic set of 16 colors for text. Finally, Word 2000 provides access to an extended palette of 16 million colors. Want to try them out? Start by selecting the text you want to color, then do this:
1. Select Format·Font and drop down the Font color list (see FIGURE 4).
2. If you see a color you like, click the color patch and OK, and you're done.
3. Click More Colors to see additional colors. To choose one of these, click its octagonal region, then click OK in the Colors dialog box and again in the Font dialog.
4. If you're still not satisfied, click the Custom tab in the Colors dialog box. Click a region in the large color palette that's close to the color you want, and then move the slider on the right to adjust the hue. Watch the sample box for the actual color. Click OK in both dialog boxes to apply the color.

**CONTROL PAGE BORDER PLACEMENT**

IN WORD 97 and 2000, you can easily add a border to your pages: Simply select Format·Borders and Shading. With some printers, however, the default border location is too close to the paper's edge, so parts of the border are cut off when you print. If you want more control over placement of page borders, follow these steps:
1. Select Format·Borders and Shading and click the Page Border tab. If you haven't chosen a Setting and Style, do so now.
2. Click Options.
3. In the Border and Shading Options dialog box, choose Text in the Measure from drop-down list. This will position the border close to the text margins on the page, rather than close to the edge of the paper.
4. Change the four Margin settings to increase the amount of separation between the text and the border lines (see FIGURE 5). A reasonable starting point is 12 points, but you're free to experiment with any value between 1 and 31 points. When you're done, click OK in both dialog boxes to complete your settings changes.
5. Check your new border setting by selecting File·Print Preview.

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How to Create a Time Sheet in Excel

If you don’t fully understand how dates and times work in Excel, attempting to use them is about as intuitive as setting the clock on a VCR. This month’s column describes how to create a useful employee timesheet—and in the process tries to clear up some of the confusion associated with adding and subtracting times in a spreadsheet.

FIGURE 1 shows the finished product: a worksheet that computes total hours worked each day, as well as a weekly total broken down into regular hours and overtime hours.

Start by entering the descriptive labels. Rows 2 through 7 contain text only (no formulas). You can, of course, format the text to your liking. While you’re at it, enter the text in the Weekly Total box.

Now you’re ready for the formulas. Activate cell B8 and enter =SUM(B9:B14). This formula simply picks up the week’s starting date, which is entered in cell D5. In cell B9, enter =B8+1 and then copy this formula to the range B10:B14. Next, activate cell C8 and enter =B8. Copy this formula to the range C9:C14. You’ll need to format the range C9:C14. You’ll need to format the text to your liking. While you’re at it, enter names. To accomplish this task, select the range C8:C14 and choose Format Cells, in the Number tab, enter =88+1. This formula simply picks up the week’s starting date, and enter the formula =IF(E8<08, E8+1-D8, E8-08)+IF(G8<F8, G8+1-G8, G8-F8).

HOW IT WORKS

The first part of this formula subtracts the time in column D from the time in column E to get the total number of hours worked before lunch. The second part subtracts the time in column F from the time in column G to get the total number of hours worked after lunch. The IF functions accommodate graveyard-shift cases that span midnight—for example, an employee may start work at 10 p.m. and begin “lunch” at 2 a.m. Without the IF statement, the formula would return a negative result.

Copy the formula in cell H8 to the range H9:H14. Now you need to format these cells to display time values. Select the range H8:H14, choose Format Cells, and then enter the format code 24-hour hours:hh:mm. Next, click the Number tab and enter =05. This formula subtracts the number of regular hours from total hours to yield the number of overtime hours. If your standard work week consists of something other than 40 hours, you’ll have to change the formula in cell H18 accordingly.

One critical step remains: formatting the time values in the range H17:H19. Since these cells are likely to display time values that exceed 24 hours, you’ll need to use a custom time format. Select the range H17:H19, choose Format Cells, and then enter the format code 24-hour hours:hh:mm. Next, click the Number tab and enter =MIN(H17, 1+TIME(40, 0, 0)). This formula, which assumes a 40-hour week, returns the smaller of two values: the total number of hours worked, or 40 hours. The final formula, in cell H19, is =H17-H18. This formula subtracts the number of regular hours from total hours to yield the number of overtime hours. If your standard work week consists of something other than 40 hours, you’ll have to change the formula in cell H18 accordingly.

If all this seems too cumbersome and you don’t feel like creating your own time sheet, you can download the completed workbook from PC World Online’s FileWorld (search for TimeSheet.zip) and adjust it as needed.

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Defining RAM types • How much memory do you need? • What are the benefits?

RAM Upgrade Tips to Remember

Over the past few years, the cost of RAM has plummeted from over $40 per megabyte to around $2, making it one of the most affordable PC upgrades around. Most mainstream systems now come with 64MB of RAM, and some high-end models offer 128MB. So if you're running Windows 9x on an old Pentium with 16MB and you think that your PC may be somewhat underequipped, you're right. Here's what you need to know to prepare for a successful memory upgrade.

The Right Type of RAM

Look to your PC's motherboard to determine the particular form of upgrade RAM you should use to produce a configuration appropriate for your system. Know your motherboard's requirements before you buy RAM, and you'll do fine. Purchase blindly, and you could prevent your system from booting, cause constant memory-error messages, or (in the worst case) even destroy the RAM itself.

Here's what you should know about the motherboard before you buy memory:

RAM type. A chip set determines the type of memory the system supports. Most first-generation Pentium chip sets support Fast Page Mode DRAM (usually called DRAM for short) or a slightly faster version known as EDO DRAM.

Some later Pentium—and all Pentium II—chip sets also support one of the two forms of SDRAM. Pentium and Pentium II systems running at clock speeds up to 333 MHz use SDRAM designed for a 66-MHz motherboard. Never Pentium II systems running at 350 MHz or faster use PC-100 SDRAM, built for a 100-MHz motherboard. PC-100 SDRAM works in most older SDRAM systems, but SDRAM for 66-MHz motherboards doesn't function on newer PIIX systems.

Socket type. Memory chips come on two types of modules: SIMMs and DIMMs (see FIGURE 1). Most 386 and 486 system motherboards use 30-pin SIMM sockets, while most early Pentium motherboards are built to use 72-pin SIMM sockets. A 168-pin DIMM carries EDO DRAM or SDRAM; such DIMMs show up on later first-generation Pentium systems and on all Pentium II systems.

Though DIMMs can be installed singly, 72-pin SIMMs must be installed in pairs (called banks) of equal capacity. Some motherboards require you to fill the sockets in a specific order—usually with the largest modules in the first banks. A few make you use modules that are all the same size.

Speed. Memory chips run at different speeds. DRAM and EDO DRAM chips typically run at 80, 70, or 60 nanoseconds (often the exterior of a DRAM or EDO DRAM chip is stamped with a number giving the chips' speed). Adding faster memory to a slower motherboard is okay but won't boost performance. Adding slower memory to a faster motherboard can cause trouble. So buy memory that's the same speed as the installed memory.

Error checking. Some RAM modules support built-in error checking (called parity) and some don't. Don't mix them. Fortunately, the majority of Pentium systems use nonparity memory, so this issue does not affect most memory buyers. You can also check the CMOS setup program; error checking has to be enabled in BIOS.

Pin coating. Old SIMMs and DIMMs have gold-colored pins matching the
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Motherboards recognize only certain combinations of memory modules in their memory sockets. The system manual should list total system RAM amounts supported and specific memory module combinations to make up those amounts.

If your motherboard has two or more empty SIMM sockets or one or more empty DIMM sockets, you must figure out the combination of modules your motherboard needs to equal the amount of RAM that you want to add. For example, if you want to add 48MB to a motherboard that has four free 72-pin SIMM sockets, you'll probably find that the board can't accept the combination of four 12MB SIMMs or two 24MB SIMMs.

In that case, you'll instead have to fill two of the vacant banks with 8MB SIMMs and the other two with 16MB SIMMs.

To add the same 48MB to a motherboard with only two free SIMM sockets, though, you'll have to take a different route. Since 24MB SIMMs are not an option, finding a SIMM pair that adds up to the 48MB needed is clearly impossible. So you'll have to settle for a SIMM pair that yields a total capacity, or you'll have to remove two existing SIMMs and fill four sockets with some combination of SIMMs that equals 48MB plus the amount of the two removed SIMMs.

You'll need to corral all this info before you pop the top off your system and start the upgrade. If you lack the necessary documentation, call your PC manufacturer or contact memory vendors Kingston Technology (www.kingston.com) or Crucial Technology (www.crucial.com). Both of these well-known sellers of memory upgrades employ experts who'll help you find the right RAM. They charge a few dollars more for their chips than discount dealers do, but the peace of mind they provide may justify the extra expense.

Now that you know what to look for when upgrading your PC's memory, turn to Upgrade Guide, page 256, for a step-by-step guide to installing it in your PC.

Kirk Steers is a PC World contributing editor. We welcome your tips and questions and pay $50 for published items. See page 12 for contact information.
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Upgrade Your PC Memory

One of the cheapest and easiest ways to boost your computer’s performance is to add RAM. Before you start, check out this month’s Hardware Tips (page 252) for the lowdown on buying the right kind of RAM. Then come back here, roll up your sleeves, and follow the steps below to upgrade your PC’s memory.

Stan Miastkowski is a contributing editor for PC World.

The Top Down

Benefits: better system performance
Cost: $60 (32MB) to $200 (128MB)
Time required: 30 to 60 minutes
Tools required: large Phillips and small flathead screwdrivers, antistatic wrist strap (recommended)
Expertise level: intermediate

1. Be static-free. Memory modules are among the most susceptible of all PC components to damage from static electricity. Before you take your new modules from their antistatic bag, put on your antistatic wrist strap (shown) and clip it to a grounded metal object (such as a screw—slightly loosened and preferably unpainted—that holds the faceplate on an AC outlet). If you choose not to use a wrist strap, remember to ground yourself by touching a grounded metal object before touching your new memory modules or any of your system’s internal components.

2. Locate the memory sockets. Turn off your computer, unplug the AC power (very important if you have a Pentium II-based system), and remove the cover. A Pentium system’s memory sockets—white SIMM sockets (A), or perhaps a combination of SIMM and longer, black DIMM sockets (B)—can be anywhere, but they’re usually located toward the front of the system as you face it. The sockets of a Pentium II, Pentium III, or K6 machine—almost always DIMM—tend to be near the CPU.

PC memory modules go into sockets in sets called banks. DIMM sockets simply require one DIMM per bank; 72-pin SIMM sockets require two SIMMs per bank. That means you can add or remove just one DIMM at a time, but for 72-pin SIMMs, you’ll need to add or remove two at a time from the same bank. Right next to the sockets, you should find labels on the motherboard indicating the sockets’ bank numbers (C and D). Fill the banks with the lowest numbers first.
3. Remove the old RAM. (See Hardware Tips to determine whether this step is necessary.) If you need to remove SIMMs, work carefully. They're held in place by fragile metal or plastic clips that you must release before you remove the SIMM. Use your fingertips (again, remember to dispel static first) or a very small flathead screwdriver to gently push the clips aside (A). Then pivot the SIMM sideways (B); it should lift out easily without force. Take note of the notch on one edge of the SIMM—you'll need to remember its orientation to install the new SIMMs.

Most DIMM sockets have clips on either side that you easily push aside (C), although some older-generation DIMM sockets don't use them. DIMMs usually can be pulled straight up from their slots (D). If necessary, you can rock them very gently to release them.

4. Insert the new RAM. Install each SIMM by first orienting the notch (A) in the correct direction (from step 3) and inserting it at an angle into the socket (B). Then press down firmly and pivot it upright until it snaps into place. Don't use force; if the module doesn't fit, try inserting it again. Repeat until you've installed all the SIMMs. DIMMs simply plug into their sockets, and their two notches (C shows one) allow them to be inserted in only one way. Press straight down firmly (D), but don't force them. If your DIMM sockets have clips, click them into place. If they won't fit, it means you haven't pushed the DIMMs in far enough.

Some older PCs require that you set jumpers or miniature switches to inform your PC about the new memory. If your computer is over three years old, check your manual to see if this additional step is necessary.

Before you power up your computer, take a good look at the memory modules you've just installed. They should be straight and upright. Double-check that all SIMMs and DIMMs are correctly seated.

5. Start it up. Plug in your PC and power it up without putting the cover back on. Most newer systems will automatically recognize the new memory and show it on the screen. Some older machines will display an error message and require that you enter your system's BIOS setup. Usually, you don't have to actually specify the new amount of RAM in your BIOS setup; just exit and reboot.

6. Problems? If your PC refuses to recognize the new RAM (or won't start at all), turn it off, unplug it, and make sure that all the SIMMs or DIMMs are firmly seated in their sockets. (It's easy to overlook a misaligned module.) If that doesn't solve the problem, take out all the memory modules and start again. If you still don't have any luck, you may have defective memory, which is rare but possible. Contact the memory vendor's technical support for help.
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- 11.2" Dual Scan Display
- 56Kbps modem
- Windows 98

**IBM**

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- 32MB RAM
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- 24X CD-ROM
- 12.7" TFT display
- Windows 98

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**Order**: 44071

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- SSE V2

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**Price**: Starting at $1,796

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<table>
<thead>
<tr>
<th>Desktop computer</th>
<th>Processor</th>
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<th>Hard drive</th>
<th>Windows</th>
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Brio BA Series notebooks

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<td>4GB</td>
<td>14&quot; AM</td>
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<td>380/K6</td>
<td>64MB</td>
<td>4GB</td>
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IBM

Notebooks 150G series

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Extensa notebooks

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TOSHIBA

Laptops mini-notebooks

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OmniBook XE notebooks

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FUJITSU

Acer notebooks

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<td>4GB</td>
<td>14&quot; AM</td>
<td>1496.26</td>
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HP LaserJet 2100se printer

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<th>Features</th>
<th>Price</th>
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</thead>
<tbody>
<tr>
<td>Resolution: 1200 x 1200 dpi</td>
<td>$699.00</td>
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N/A
25
25
75
250
1000

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Max. per domain cost @ $2.00/domain
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N/A
$50.00
$50.00
$190.00
$900.00
$2000.00

Max. possible cost to your month
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Your monthly gross profit @ $19.95 domain
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TEXTURE MAPPING | YES | NO | NO | NO | YES
ANTIALIASING | YES | NO | NO | NO | YES
SURFACE HAMMER | YES | NO | NO | NO | NO
SURFACE INTERSECTION | YES | NO | NO | NO | NO
SELECT HIDDEN EDGES | YES | NO | NO | NO | NO
3D KEYBOARD CURSOR MOVEMENT | YES | NO | NO | NO | NO
AUTO-MEAS SHAPE TO ONE PERIMETER | YES | NO | NO | NO | NO
CUT ONE PLANE FROM ANOTHER | YES | NO | NO | NO | NO
DIRECT SCANNER SUPPORT | YES | NO | NO | NO | NO
IMAGE AUTO-TRACE | YES | NO | NO | NO | NO
DIGITIZER TRACKING SUPPORTED | YES | NO | NO | NO | NO
ZOOM ALL VIEWS TO SELECTION | YES | NO | NO | NO | NO
PANELING, MULTI-PAGE PRINTER OUTPUT | YES | NO | NO | NO | NO
FAST REDRAW OPTIONS | YES | NO | NO | NO | NO
NUMERICAL SYMBOLS HANDLED | YES | NO | NO | NO | NO
MULTIPLE DOCUMENT INTERFACE | YES | NO | NO | NO | NO

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### MOTHERBOARDS & SIMM MODULES

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### NOTEBOOK, LAPTOP MEMORY

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### PC CARDS (PCI / ISA) Version 2.0

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### HARD DRIVES for Laptop & Notebook

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**IBM APTIVA, PC, P/S1 & P/S2**

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- CPU Socket: 7
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- Onboard Video: No
- Memory: 2 DIMM / 4 SIMM
- Max Memory: 128/256 MB

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- CPU Socket: 7
- Bus Speed: Up to 75MHz
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- Memory: 2 DIMM / 4 SIMM
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- Form Factor: ATX
- CPU Socket: 7
- Bus Speed: Up to 100MHz
- Onboard Video: AGP
- Max Memory: 768MB

**Motherboard**: Tiger 6KE LX, 6BA+ BX Slot 1
- Form Factor: ATX
- CPU Socket: 7
- Bus Speed: Up to 75MHz
- Onboard Video: No
- Memory: 2 DIMM / 4 SIMM
- Max Memory: 128/256 MB

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- Form Factor: ATX
- CPU Socket: 7
- Bus Speed: Up to 100MHz
- Onboard Video: AGP
- Memory: 2 DIMM / 4 SIMM
- Max Memory: 128/256 MB

**Motherboard**: Tiger 767 AT, 760 ATX Slot 1
- Form Factor: ATX
- CPU Socket: 7
- Bus Speed: Up to 100MHz
- Onboard Video: AGP
- Memory: 2 DIMM / 4 SIMM
- Max Memory: 128/256 MB

**Motherboard**: Tiger 598 AT
- Form Factor: ATX
- CPU Socket: 7
- Bus Speed: Up to 100MHz
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- Memory: 2 DIMM / 4 SIMM
- Max Memory: 128/256 MB

**Motherboard**: Tiger 571 AT
- Form Factor: ATX
- CPU Socket: 7
- Bus Speed: Up to 75MHz
- Onboard Video: No
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**Motherboard**: Tiger 5EMa+ ATX
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- Max Memory: 128/256 MB
Will Your Next PC Be a Cell Phone?

WOULD YOU BUY A PC that lacks a keyboard, mouse, serial port, or Windows? You might, but you wouldn’t call it a PC. Take the new digital TV recorders from Replay Networks and TiVo. These devices cost about $700 each, including downloadable program listings, and they share plenty of characteristics and parts with garden-variety PCs—like off-the-shelf microprocessors, modems, and hard drives. They even have operating systems: TiVo is based on the increasingly popular Linux.

Where those devices differ from PCs is in their simplicity, purposefulness, and inflexibility. They’re appliances meant for a single purpose—recording TV shows, in this case—not computationists that can do everything from processing photos to ordering pizzas.

A few years ago, the buzzword was “network computer.” Now that the network computer has turned out to be—surprise!—the networked PC, attention has turned to the evergreen concept of the “information appliance.” The idea is that our PCs, jack of all trades but masters of none, will be supplanted by devices designed to do just one thing and do it extremely well.

NICHES AND GLITCHES

IN AN ERA OF PLUMMETING PC prices, die-hard users find it hard to believe that consumers will choose a plethora of dedicated devices over a single versatile computer. But game consoles have already shown how hard users find it hard to believe that one shape-shifting device assumes characteristics of another. In this corner: The dedicated game console with aspirations to become a Web-connected communications tool. In the other: The Web-connected PC that aspires to be a great game machine. Set-top boxes that surf the Web will duke it out with both. The winners? Consumers, who’ll benefit from healthy competition.

The idea is that PCs will be supplanted by devices that are designed to do just one thing and do it extremely well.

nobody’s managed to come up with a remotely sensible replacement to perform any of the office functions—word processing and the like—that the PC does so well in a single package.

But we’ll likely see standoffs as one shape-shifting device assumes characteristics of another. In this corner: The dedicated game console with aspirations to become a Web-connected communications tool. In the other: The Web-connected PC that aspires to be a great game machine. Set-top boxes that surf the Web will duke it out with both. The winners? Consumers, who’ll benefit from healthy competition.

BUY OR CELL?

THERE WILL ALSO be clear victories for appliance makers. With the right hardware and software built in, a PC could perform the same tasks that ReplayTV and TiVo can do. But most couch potatoes would probably prefer to watch TV on a big screen with the help of a dedicated remote, not a wireless keyboard and mouse.

The computer-centered do-it-all entertainment center, pioneered a few years back by Gateway’s big-screen Destination machines, did not exactly set the world on fire. When was the last time you heard someone say “I’ll reboot the TV?”

In the mobile market, portable PCs of every size and shape will begin mixing it up with phones that are light and handy but have underdeveloped keyboards and displays. This time, the cell phone may play the PC’s customary role of Swiss Army Knife. Why carry a separate pager, organizer, e-mail device, and Web browsing tool when a single phone can do them all? And as voice recognition improves, the phone may become even more compelling. Why be tethered to a keyboard when you can dictate your work, have it converted to text, and read it on your phone’s Web-connected screen in a matter of minutes?

Will PCs go away? Hardly. People the world over will continue to rely on them as the most functional and affordable single solution. To reach the vast market of customers who don’t depend on them, PC vendors will need a way to deliver truly useful machines in far simpler and more dependable packages.

If that doesn’t happen soon, bet on the phones.

PC World Contributing Editor Stephen Manes is cohost of Digital Duo, a new series appearing on public TV stations nationwide, and coauthor of Gates, a biography of Microsoft’s chairman.
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