

PC MAGAZINE

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The 1999 Shareware Awards



The Best New Downloads: ● E-Mail
● Internet Tools ● Games ● and More

Sights and Sounds

Cool Players and
Cool Sites for Web
Tunes and Video

Fast Connections

Internet Caching
Speeds Access to
The Online World

FIRST LOOKS:

- 650-MHz IBM Aptiva
- Instant Messengers:
AOL vs. Microsoft
- Adobe Photoshop 5.5
- Creative Nomad
- Princeton & ViewSonic
Digital LCD Panels
- Ultraportable,
5-Pound Projectors



THE INDEPENDENT GUIDE TO PERSONAL COMPUTING AND THE INTERNET

VOL.18 NO.16 SEPTEMBER 21, 1999

The Fastest computers Ever!

PC Labs Reveals:

- The Right Chip for You
- How AMD's Surprising
New Athlon Chip Stacks
Up to Pentium III

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What Good Is a Faster Chip?

Recently, a number of friends have asked me a question that I thought was silly: "What good is a faster chip?" A few years ago, the answer was easy: You need a faster chip to take advantage of a new operating system and new applications.

Windows 95 and Office 95 were huge steps forward from their predecessors

and ran much better on faster systems than on the 486s that were prevalent at the time.

But as systems and the processors on which systems are based have gotten faster over the past few years, the applications haven't been sapping the processing power the way they used to. Yes, today's applications require more horsepower and more disk space than the programs of four years ago, but the hardware has more than kept up. Pretty much any Pentium II, K6, or Celeron system can handle Windows 98 or NT, Office 2000, or any other office productivity application you can throw at it. The old saying "Intel giveth, Microsoft taketh away" may still have a ring of truth, but it isn't as pronounced as it used to be.

Besides, a lot of what all of us do with our machines these days involves the Internet, and those things are more dependent on the speed of the connection than on the speed of the processor.

So what good are the new processors? Despite Intel's claims to the contrary, it isn't that new processors will somehow make Web sites download faster or look better. PC Labs has found almost no difference in either the speed or the quality of the Internet experience with a Pentium III/450 compared with a Pentium II/450, even on sites specifically designed to work with the Pentium III's new features. (For more information, see our cover story on page 100 and Inside PC Labs on page 29.) That may change sometime in the future, but for now, the new Intel processor does not mean faster Web access.

Instead, the biggest benefit is for people who create or work with digital content. If you've ever edited a digital photo in Adobe Photoshop (or even Adobe PhotoDeluxe or Microsoft Picture It!), you know that the process could be faster. Even if you're doing something as simple as recording your CDs for use in a PC jukebox, you know that systems could be faster. Have you tried to edit digital video? No system on the planet is fast enough. Combine images,

videos, maybe music, and lots of content to create a great Web site or presentation and suddenly almost every system seems more sluggish than you'd like.

None of these applications are fast enough or easy enough to use, and they don't do everything you want, in large part because the systems aren't fast enough.

We expect to see a lot of other applications become more mainstream—those that require much more processing power than anything on the market. Speech recognition has made great strides in the past several years, but there still isn't a program that accurately transcribes normal talking. We've seen some small steps with automated "bots" and agents that find things you're interested in, but there is nothing comparable to the applications we'll want in the future.

In the meantime, the biggest use of processing power isn't for any one particular application but for multitasking. We used to talk about multitasking in the abstract, but most of us mostly did task switching—keeping multiple applications open but working on only one.

Look at what's running on your system. If you're like most users, you keep an e-mail program and a Web browser open. Perhaps you run an instant messaging program as well. You probably should be running a virus checker. In a large organization, you probably have some sort of network management agent running in the background checking the status of your system. Maybe you're playing music in the background, or you have a TV window or stock ticker running. Oh, yes, and you still have your primary application open—most likely a word processor, spreadsheet, or database program.

If you're like me, usually everything works smoothly, but every once in a while, things seem to slow down. Often this means that one background program or another suddenly needs extra processing power. And today, that's why many of us still want faster processors. **PC**

The answer lies in a long-forgotten purpose of new operating systems: multitasking.



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questions every Tuesday,
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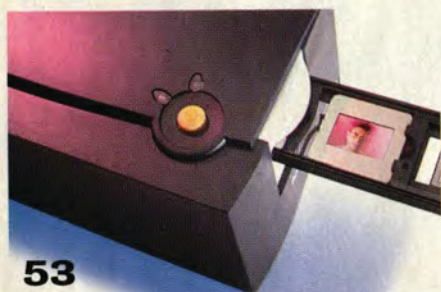
PC Mall

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Photography: Mert Kerim (bottom), Thom O'Connor (top); illustration: Jean Tuttle

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Download A/V Test Files

In this issue, we tested all the tools that bring audio and video content to your Web surfing. How did we do it? Download the test files we used and try them out.

Shareware Winners

Read about the winners of the 6th Annual Shareware Awards; then visit us online to download your favorites from our site.

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COVER STORY: PROCESSORS

100 The Right Speed for You

Is Intel's Pentium III worth the price, or will a Celeron or AMD K6 do the job? Is Athlon the hot ticket AMD wants you to think it will be? To help you decide on the right CPU, we test them all. *By Michael Slater*

WEB AUDIO AND VIDEO

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The revolution will not be televised; it will be Webcast. We show you the best formats for digital music and streaming audio and video, the best sites to find them, and more. *By Jan Ozer*

CACHE SERVERS

150 The Low-Cost Road to the Internet

We test six cache servers that provide speedy access to the Internet. Is one right for your business? *By Jeffrey Witt*

SOFTWARE

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Clear some space on your hard disk: We show you the best of the best in 20 categories of shareware. *By Sheryl Canter*

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The Compaq MP1600 Microportable Projector is one of a new breed of lightweight portable projectors.

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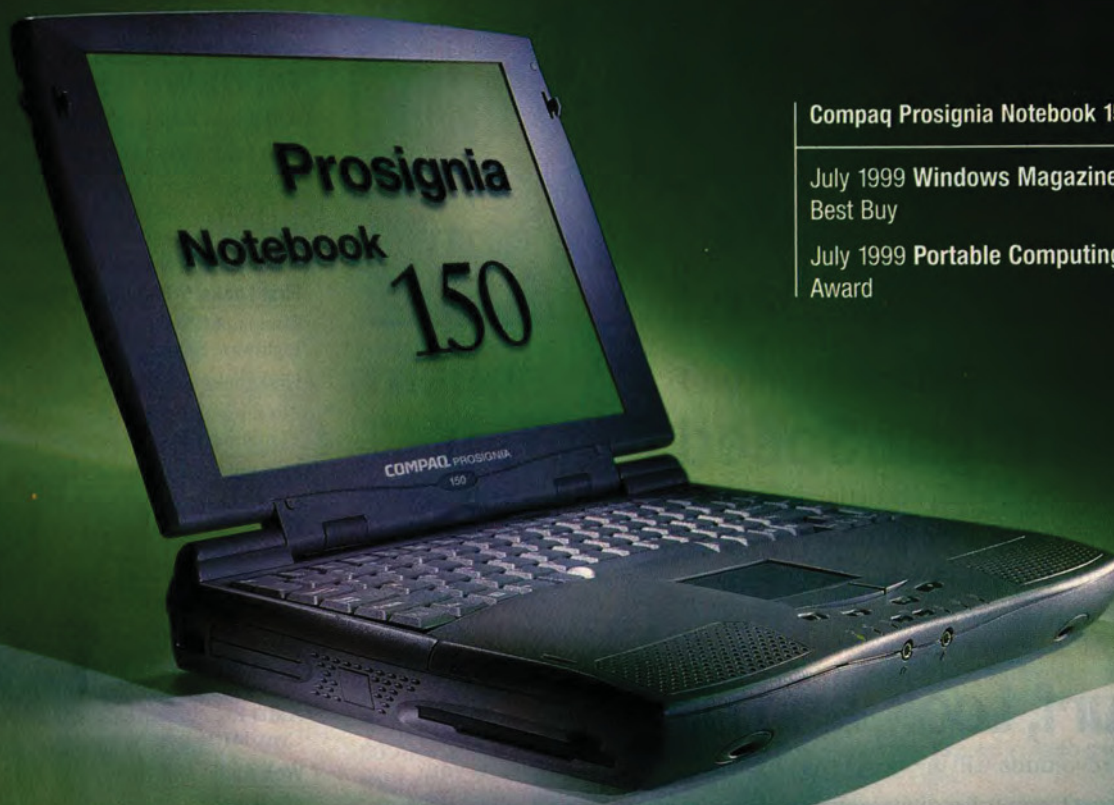
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Compaq Prosignia Notebook 150 Awards:[†]July 1999 Windows Magazine — WinList:
Best BuyJuly 1999 Portable Computing — Lizzie
Award

\$1499. Compromises not included.

Call now to get a great price on the award-winning Prosignia Notebook 150 and get all the power of an AMD® processor. Looking for an affordable notebook without sacrificing advanced performance and technology? Well, look no further. Because for only \$1499 the Compaq Prosignia Notebook 150 — powered by a 350/100MHz AMD processor — includes all you need to help your business grow more productively. For one, it's ready to go right out of the box, with pre-loaded software that immediately gets the power of the Internet working for your business. What's more, the CD-ROM drive, diskette drive, and modem are built right in. Add all that to business advantages including 24x7 dial-up tech support, and you'll agree that the Prosignia Notebook 150 is a bargain at any price. And a steal at this one.

PROSIGNIA NOTEBOOK 150

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- AMD-K6®-2 350/100MHz Processor
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- 32MB/160MB SDRAM
- 12.1" CTFT (800 x 600) Display
- 24X Max CD-ROM*/3.5" 1.44MB
- Compaq V.90 Data/Fax Modem[§]
- Li-Ion Battery
- Microsoft® Windows® 98
- Free* Trial of Compaq Online Services
- One-Year Worldwide Limited Warranty[†]

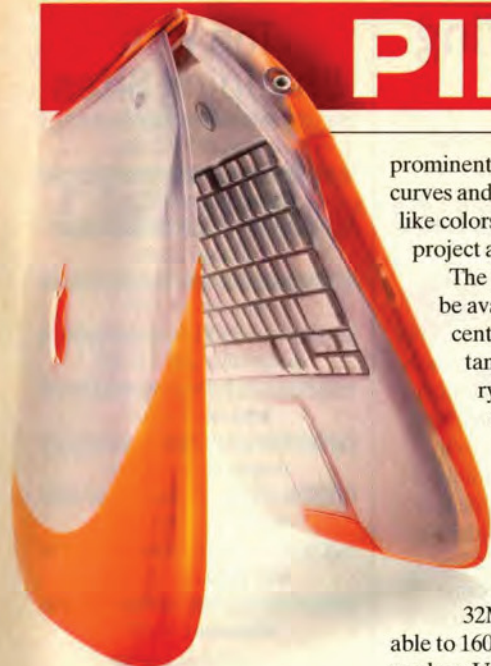
PROSIGNIA NOTEBOOK 150

\$1999**\$67** Monthly lease[‡]

- AMD-K6-2 400/100MHz Processor
- 4GB SMART Hard Drive[§]
- 64MB/192MB SDRAM
- 14.1" CTFT (1024 x 768) Display
- 24X Max CD-ROM*/3.5" 1.44MB
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Groovy Portables

The rumor mill proved correct: At New York's recent MacWorld trade show, Apple CEO Steve Jobs took the wraps off the company's much-ballyhooed iBook portable computer. Targeted squarely at consumers and students, the new iBook portables will sell for \$1,599 and start shipping in September.

The new iBook itself isn't square, though. It has curved edges and corners, with rubber figuring



APPLE'S AIRPORT: Wireless networking on a shoestring.

prominently in the design. The curves and the Austin Powers-like colors are intended to project a distinctly hip image.

The 6.6-pound iBook will be available in two translucent color schemes—tangerine and blueberry—and will have a 12.1-inch TFT display with a resolution of 800 by 600 pixels, an ATI Rage graphics chip, a 300-MHz G3 processor, a CD-ROM drive, 32MB of RAM (expandable to 160MB), a built-in modem, USB and 10/100 Ethernet ports, and a full-size keyboard. The operating system is Mac OS 8.6. Jobs touted the battery life as over 6 hours (Mac OS 8.6 includes advanced power-management schemes).

Just as many portable PCs are shipping with wireless technologies, iBook users can roam up to 150 feet from \$299 base stations that plug into telephone jacks (users must also purchase \$100 cards for their iBooks to communicate with the base stations). Dubbed AirPort, the wireless technology is

radio-based and has a data-transfer rate of 11 Mbps. Apple developed the wireless components in partnership with Lucent.

A Wider Web Search

Internet search engines can certainly cough up plenty of hits, but in fact, they're probing only about 16 percent of the entire Web, at best. Given the relentless increase in the number of Web pages posted daily, existing search engine technology simply can't keep up. Espin Brodin, CEO of Oslo-based FAST Search and Transfer, thinks he has the answer and has

set out to prove it with the recent launch of FAST Search, a search engine that probes 200 million Web pages for every query tossed its way.

Unlike other search engines, FAST technology scales linearly and thus, say developers, will be able to cover the entire Web—all 800 million pages. The company plans to form partnerships with Web sites for building, say, the world's largest shopping site. A demo of the technology is available at www.alltheweb.com.



of respondents to a recent PC Magazine Online poll told us the portal they use most is Yahoo!. Of the six other portals we asked about, only two made it into double digits—Excite and MSN.com, with 13 percent each. Trailing far behind were AOL.com (9 percent), Net-center (8 percent), GO Network (3 percent), and Lycos (3 percent).

IBM's 11-Terabyte Storehouse

Last year, IBM wowed the industry with its matchbook-size 340MB Microdrive. This year, IBM launched what the company claims is the world's largest storage server, the Enterprise Storage Server (code-named Shark), which is about the size of a shower stall and handles up to 11 terabytes of data. In practical terms, the system could hold all the contents of the Library of Congress—and then some. With the announcement, IBM has positioned itself as a serious competitor to EMC, which already dominates the enterprise storage market.

The fledgling enterprise storage market is booming, and all signs point to more of the same. One ripple effect of the Internet's growth is the surge in demand for storage, propelled by the millions of transactions zipping around cyberspace. Companies are eager to capitalize on one-to-one marketing by turning the massive amounts of data that Web sites collect into useful information for targeting customers. According to Forrester Research, the demand for disk storage in large companies is growing more than 100 percent annually.



Sites to Sit On

Sure, you've bought books, CDs, and flowers, but have you started to think bigger? Why not buy a \$3,000 couch online? If you're not crazy about the idea, you're not alone. So far, only 1 percent of the \$75 billion furniture market has found its way onto the Web. Nevertheless, *Forbes* magazine recently identified furniture as one of the hottest up-and-coming online retail categories, and a flurry of new Web sites is proving that prediction correct. On June 24,

HomePoint.com (www.homepoint.com), which offers not

only furniture but also accessories and art, debuted online. It was followed a month later by Living.com (www.living.com), a site that offers thousands of upscale furniture choices in 23 categories and an online design magazine. These two sites have joined the aptly named Furniture.com (www.furniture.com), which recently redecorated its site and now features a personal shopping service and a short course in Furniture 101, along with 50,000 items from 100 manufacturers.

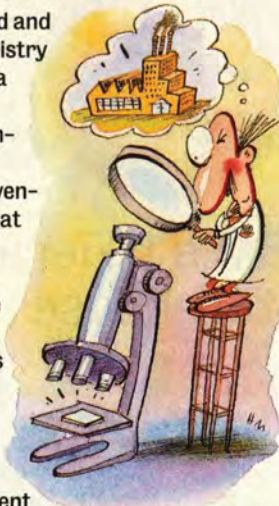


LOOKS COMFY: Furniture shopping hits the Web.

PIPELINE

Chemical Computers

Scientists at Hewlett-Packard and UCLA's Department of Chemistry and Biochemistry recently made a significant breakthrough in the fledgling field of chemically assembled electronic nanocomputers (CAENs), a technology that may eventually produce tiny processors that are billions of times faster than those of today and that could be manufactured at a fraction of the cost. As reported in the journal *Science* recently, the researchers successfully produced a logic gate—the building block of a processor—out of a synthetic molecule called rotaxane.

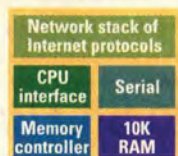


The significance of the experiment lies in the molecular dimensions of the gate, but the technology is also promising because it's cheap. You probably know Moore's Law, which predicts that transistor density will double every 18 months, but you may not be familiar with Moore's Second Law, which states that manufacturing costs increase on a semi-log scale. In other words, the cost of making chips is skyrocketing. According to some predictions, the price tag of a new plant producing conventional chips could be between \$30 billion and \$50 billion by 2010.

Internet-on-a-Chip

The Internet has become such an important resource to so many people that we're looking to connect all sorts of devices to it, from cell phones to household appliances. The problem is that the hardware requires many features to make this possible, including a TCP/IP stack, a browser, an e-mail client, and more.

Seiko Instruments, in partnership with iReady, has packed all this into a single chip: the iChip. Because all the software is right on the chip, the iChip needs only 64K of shared memory. According to Seiko, such integration results in one-fourth the component costs and requires just one-hundredth of the power used in conventional hardware designs. And by offloading the complex commu-



With the iChip, all sorts of appliances can tune into the Web.



nications tasks, the device can use a much simpler and less expensive CPU.

The iChip is likely to show up initially in cell phones and pagers, but it could also be used in appliances that can notify a repair service of any breakdown and in gaming devices that can easily communicate for multiplayer competition.

Safe Surfing For Kids

Parents now have a single Web site where they can get the latest information on and tools for protecting their kids from the dark side of the Web. At the recently launched GetNetWise.org (www.getnetwise.org) site, you'll find the Internet Safety Guide, which explains the potential safety risks of e-mail, chat rooms, and Web sites. Another section describes technologies that monitor Internet usage, filter objectionable content, and control computer use. The site also has links to law enforcement and advocacy groups in case you need to report online trouble. A guide to



GUIDING HAND: GetNetWise.org is a one-stop site for kid-safe Web surfing.

kids' content provides links to sites designed for children.

Nearly 30 industry players, including America Online, AT&T, Bell Atlantic, Disney Online, ExciteAtHome, Lycos, MCI WorldCom, Microsoft, Network Solutions, and Yahoo!, cooperated in launching the site.

Top Web Shopping Sites

- 1 amazon.com (562,000)
- 2 ticketmaster.com (280,000)
- 3 buy.com (273,000)
- 4 sony.com (226,000)
- 5 mothernature.com (196,000)
- 6 iprint.com (174,000)
- 7 drugstore.com (154,000)
- 8 hallmark.com (153,000)
- 9 netmarket.com (138,000)
- 10 cdnow.com (116,000)

Source: PC Data; June 1999
Projected number of purchasers.

Magic Chips

Sun Microsystems wants to know if you believe in MAJC. The company recently announced a chip dubbed MAJC, an acronym for *microprocessor architecture for Java computing*. The all-in-one chip features a unique parallel processing architecture for graphics, voice, and video. Sun Fellow Bill Joy built the chip to handle tasks such as 3-D graphics processing and digital communications more efficiently than competing media-processing chips. But the company is entering choppy waters. Several similar chips have failed, as multimedia standards have reshuffled with lightning speed.

Top Web Health Topics

If you've visited any health-related Web sites, you probably spent most of your time finding out about your own or your family's ailments. Here are some of the most popular health topics researched on the Web.



3 Nutrition



4 Treatments



1 Ailments



2 Drugs



5 Exercise



6 Natural remedies

Source: Jupiter Communications, April 1999.

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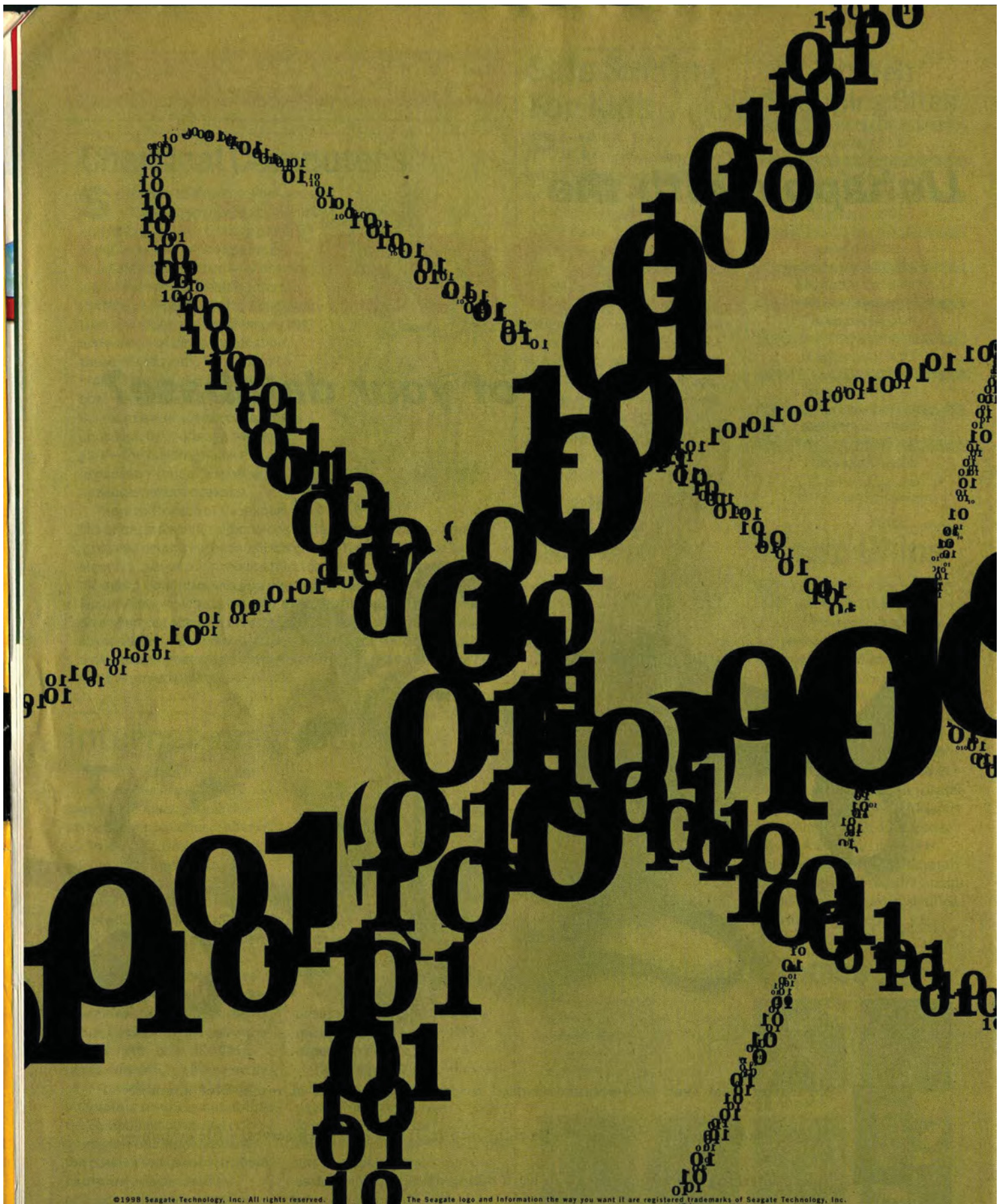
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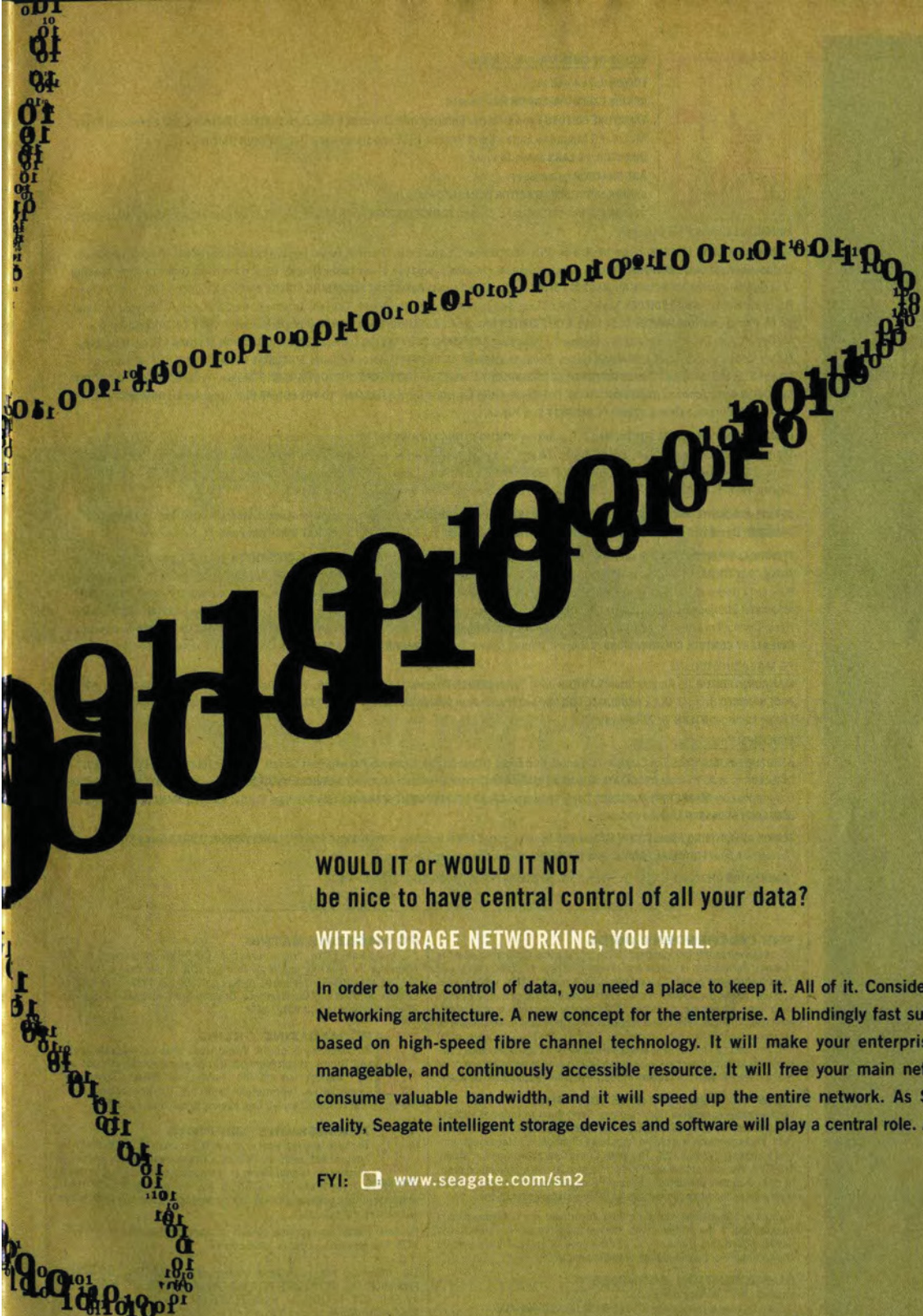
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WEB APPLIANCES

Internet Phones: Coming Soon

If you're one of those people who just can't stand to be off-line for even a minute, hang in there. By the end of this year, mobile phones with built-in Internet microbrowsers, e-mail, and fax capabilities will be commonplace. To get a feel for this upcoming evolution of personal communications, we took a look at three prerelease Internet phones—the Motorola i1000plus, the Qualcomm pdQ 1900, and the Samsung SCH-3500—all of which should be available on major nationwide digital wireless networks by the end of this year.

We should point out that in each case, the phones were final or very-near-final production models. The delay in getting these phones to customers centers primarily on the wireless networks' abilities to support the extra wear and tear on the network that data access will introduce. Even though the phones we evaluated will be available on nationwide networks (Nextel and SprintPCS), don't expect the extra data services to come online in every market simultaneously. In some cases, the phones will hit the market several months before any Internet features are accessible.

Even without the Internet connectivity, each of these phones is impressive. If you're in the market for a new digital phone and you have an eye toward the future, you'll want to give serious thought to these models.

Considering the small size of the i1000plus (\$299 list), it's hard to imagine the engineers at Motorola cramming any more features into this impressive handset. Not only is it a full-feature digital mobile phone, it also offers wireless IP connectivity, two-way radio, alphanumeric pager, and fax capabilities. The phone's data services come care of Phone.com's UP.Browser. With the service, you can check stock quotes, sports scores, and news headlines on the phone's four-line LED.

Each of these services offers neatly formatted, menu-driven information custom-tailored to fit the i1000plus display. E-mail services let you send and receive messages directly through the handset; you can also synchronize the in-box on

your phone with your desktop PC. Tegic Communications' predictive T9 Text input is used to simplify typing on the keypad.

In addition, you can browse standard Web URLs, though we don't recommend it. Throughput is not the problem, but the microbrowser inserts a text-only "image" label for every graphic on a Web page. This result is a rather cluttered display. Still, you can connect the i1000plus to a laptop, 3Com Palm device or Windows CE device and use it as a wireless modem.

Though the phone's data services were still being tested as we went to press, the i1000plus is already available on Nextel's digital network. Expect data services to become available by the end of 1999.

Palm organizers are awfully handy devices, and surviving these days without a mobile phone is becoming increasingly difficult. Wouldn't it be nifty for a company to somehow combine the two so that you wouldn't have to carry both? Qualcomm must think so, because the forthcoming pdQ 1900 (\$799 list) is just that: A state-of-the-art digital mobile phone with a built-in Palm Computing device. Flip down the phone's keypad, whip out your pen, and you've got a mini-Palm.

Though much bulkier than the Motorola and Samsung phones, the pdQ 1900 seems light for a device with so many features. The 160-by-240-pixel LCD touch screen provides access to an address book, date book, microbrowser, and other apps. And since the phone is designed around the Palm Computing platform, you can load thousands of existing apps.

You can dial a phone number by tapping on an entry in your address book. Using a pen for this seems somewhat clunky when so many other mobile phones offer simpler speed-dialing options, but the fact that you can carry a single device that does the work of a Palm unit and a mobile phone is a big advantage.

Data services include e-mail, pager, and Web browsing capabilities. The pdQ 1900 can also synchronize with your desktop PC using standard Palm HotSync technology. Graffiti writing software supplies the data input. The pdQ 1900 will most likely be available on the SprintPCS network and through US West by the end of 1999. Qualcomm will also roll out the dual-mode pdQ 800, but no price has been set for that model.

Samsung makes some very slick little mobile phones. The SCH-3500 (\$149 list), a palm-size silver flip-phone, is no exception. This dual-band phone offers voice dialing for up to 20 numbers and a voice memo feature.

Its many data features include Internet access through Phone.com's UP.Browser and wireless e-mail and fax capabilities. For Internet browsing, the SCH-3500's tiny four-line LED may not be ideal, but it works about as well as the i1000plus screen. Next year, Samsung plans to introduce in the U.S. market an Internet phone with a touch-sensitive screen the size of the phone itself; Samsung currently sells that model only in Korea. The SCH-3500 uses the SprintPCS network and is slated to ship in mid-September. —Michael E. Ryan



QUALCOMM PDQ1900

- \$799 list
- Phone.com's UP.Browser
- 2.5 hours talk time
- 40 hours standby
- Internet access via Sprint PCS, US West

SAMSUNG SCH-3500

- \$149 list
- Phone.com's UP.Browser
- 4 hours talk time
- 100 hours standby
- Internet access via Sprint PCS

MOTOROLA I1000PLUS

- \$299 list
- Phone.com's UP.Browser
- 2.5 hours talk time
- 60 hours standby
- Internet access via Nextel

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- Removable Lithium ion battery
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NETWORKING FIRST LOOKS

Affordable Networking

Share your cable or DSL modem across your small network with the BeadleNet SOHO 2000.

By Bill Machrone

Cable modems and DSL lines are proliferating faster than anyone predicted—and so are home and SOHO networks. Sharing that bandwidth among your machines is the logical, inviting thing to do. If only it were easy. Software solutions such as CommSocks, ShareTheNet, WinGate, WinProxy, and others abound, but they require configuring a machine with two network cards. Routers do the job in hardware, but they have been too expensive and too complex for small peer networks.

The BeadleNet SOHO 2000 joins a new generation of router/firewall/access-sharing devices tailored to small networks. These devices are less expensive, small and unobtrusive, and

most important, they're easy to install and maintain. Unlike some competitors, the SOHO 2000 (\$399 direct for four users) also includes a four-port hub.

When you plug the SOHO 2000 into your DSL or cable modem, it acquires your IP address from your ISP. Some modems may have to be reset for this to occur, but our Motorola CyberSurfr just dished up the address without a fuss. When you plug your PCs into the SOHO 2000's Ethernet ports, they're assigned nonroutable IP addresses in the 192.168.111.x space. You have to set the TCP/IP properties of your PCs to obtain an IP address automatically and to use DHCP for WINS resolution. If you've installed the Client for Microsoft Networks and turned on file and print

sharing, your machines network seamlessly behind the firewall while sharing the high-speed connection via Network Address Translation.

You can stack hubs behind the unit to connect everyone. Some versions have a basic, robust firewall; others allow configuration and Web hosting. The firewall is currently too tight to allow tunneling protocols for virtual private networks, but a fix is in the works.

You control the SOHO 2000's settings through a password-protected internal Web page, visible only to the administrator machine on your network. You can manually enter IP addresses and control the firewall settings. The firewall, which uses Stateful Packet Inspection, denies all open requests from the outside, with specific exceptions for services such as FTP or ICQ. You can

open holes for hosting, pass port requests to a specific machine, or enable IP DMZ passthrough for fully exposing a server to the outside.



▲ VERSATILE: You can buy the SOHO 2000 with support for 4, 10, 25, or 175 users.

In several weeks of service, the BeadleNet SOHO 2000 has been fast and flawless.

BeadleNet SOHO 2000. Direct price: 4 users, \$399; 10 users, \$655; 25 users, \$850. BeadleNet LLC, Laguna Hills, CA; 949-348-4240; www.beadlenet.com.

Catch the Wireless Wave

The NDC InstantWave products hook to your wired network to provide wireless connectivity.

By Les Freed

After several years of false starts, we're finally starting to see new wireless networking products that are IEEE 802.11-compliant. The latest is the NDC InstantWave package, an attractively priced system designed for office PCs.

The InstantWave line consists of three products. The NDC InstantWave Access Point (\$1,195 list) hooks up to your existing LAN and provides connectivity between the wired and wireless worlds. Each PC will need an InstantWave wireless LAN card (\$429 list), available in both ISA and PC Card formats. The NDC Access Point (AP) and ISA cards come with an external antenna and 4-foot cable; the PC Card has a built-in antenna.

The Access Point is a nondescript gray box with eight

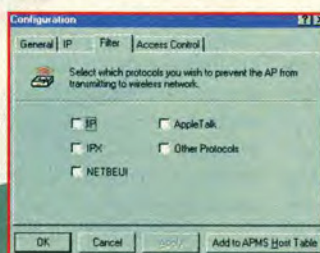
LEDs and an antenna connector on the front. The rear panel provides Ethernet, serial, and power connectors. The Access Point has two levels of management: With one AP on the network, you can use the APComFig tool, a simple management tool that lets you set up and monitor AP operations from a PC connected to the AP via a serial cable.

If you have more than one Access Point on the network, you can use NDC's AP Management software, a SNMP-based tool that operates over TCP/IP and lets you set and change security and protocol settings. A separate Trap Server lets you configure the AP to send SNMP trap mes-

sages to an SNMP console on predetermined error or traffic-load conditions.

The InstantWave client cards are easy to install, and they include drivers for Windows 3.1, 95, 98, and NT 4.0, as well as ODI-layer drivers for use with older NetWare systems.

SECURITY: The Access Point lets administrators restrict wireless traffic to specific protocols.



The ISA cards are Plug-and-Play capable, and we had no problems installing them in several client PCs. Like most ISA network cards, the InstantWave ISA

cards require a free IRQ.

The client software package includes troubleshooting, signal strength and site-survey tools. These tools let you check wireless signal and traffic levels from each client.

Our test LAN performed well, delivering about 1.6 Mbps of throughput. This is comparable to other 802.11 systems we've tested. Unfortunately, the Access Point cannot interoperate with 802.11 wireless systems from other vendors. NDC hopes to remedy this with a firmware update in the near future. In the meantime, this product offers excellent performance and usability in a competitively priced package.

NDC InstantWave Access Point. List price: \$1,195. **NDC InstantWave ISA and PC Cards.** List price: \$429 each. NDC Communications Inc., Sunnyvale, CA; 800-632-1118; www.ndclan.com.

Revisiting Streets & Trips

By Marge and Bruce Brown

Readers' reaction to Microsoft Expedia Streets & Trips 2000 spotlighted the strong points and the drawbacks of the program and of consumer mapping software in general. Among the admired traits are an elegant, uncluttered interface and improved location-seeking and route calculation, as well as the convenience of a single product with both street-level addresses and trip planning.

But no product is perfect. Among the lamented missing

features are GPS support and the ability to load part of or the entire program to a hard disk. Microsoft purposely left GPS support out of Streets & Trips 2000 because the company claims that few general consumers use GPS devices.

Respondents also complained about having to assign pushpins manually. And within the construction update feature, a year/date-reporting anomaly mentioned by two readers reported the years 3897 and 3899 instead of 1997 and 1999. (We could not replicate the error.)

But the harshest opinions had to do with routing errors and missing or incorrect addresses or place data. Some writers mentioned specific addresses that were misplaced or absent, or that had unusual place names that weren't familiar to locals.

The reality is that no consumer mapping software is perfect, even when you don't count traffic conditions and construction. On a recent trip, we found that Streets & Trips 2000 couldn't find a street address that DeLorme's Street Atlas USA 6.0 found handily. But products from all four of the major consumer mapping software com-

panies (adding Rand McNally and TravRoute to the group) contain errors and will likely make some routing errors.

So far, mapping and routing is an imperfect exercise that only becomes a dire problem if you rely on that information solely, without backing it up with paper maps and without a willingness to stop and ask for directions. And most of the address and routing data in all of the consumer mapping products is right on the mark. Features and interfaces differentiate the products more than accuracy levels do, despite software publisher claims to the contrary.

PDA Versus PDA

By Bruce Brown

We struck a major chord with this topic, and readers responded with strong opinions about the relative value and usefulness of Windows CE and 3Com Palm PDA devices. Although color-display palm-size Windows CE machines are just beginning to be available, several of our respondents have used the newest devices and in some cases are reverting to their Palm PDAs. Color screens are great, many say, but not at the expense

of battery life or system performance. Other users are excited, as we are, by the display and audio capabilities of Windows CE PDAs.

The votes are not all in, of course, and as palm-size Windows CE units become more widely available, we'll watch this field closely. At this point, two nuggets of con-

ventional wisdom regarding this nascent category remain true. First, the "personal" in PDA remains foremost; users are likely to have strong

afforded by the Type II CompactFlash slot on all current models is another major difference between them and the Palm models. Several manufacturers now sell CF modems

with drivers for Windows CE and at least two—Socket and Xircom—sell CF LAN adapters. Several manufacturers sell CF memory cards, which enable both hand-held and palm-size Windows CE devices to serve as digital image storage, management, editing, and even presentation devices.

The long-awaited IBM MicroDrive

340MB CompactFlash hard disk has been announced as shipping and is purportedly for sale (\$500 street), although as this was written, no resellers list the drive as available. Long-awaited CF pager cards are still vapor, reportedly due to RF interference problems, but Socket has announced its Digital Phone Card, expected to ship in September 1999 along with Microsoft's Wireless Communications Kit for Windows CE, with cable connection options for wireless access using CDMA and GSM digital phones.



ONE OR ANOTHER: Palm (left) and Windows CE devices each appeal to different users.

preferences and opinions, and they can add software and (to varying extents) hardware to personalize their PDAs even more. Second, Palm devices are faster, smaller, and easier to use, and they have longer battery life than Windows CE devices, but the Windows CE devices have greater capabilities and features.

In addition to the color displays and audio playback of Windows CE devices, the expansion and connectivity edge

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Tell us what you think... How do you like the new products you're using? Second Looks is your forum for feedback. Join us online to tell us about your experiences. We discuss a different new product every week and summarize your comments here. Below are just a few of the comments from our discussion of Microsoft Expedia Streets & Trips.

After using another (older) product, I think Expedia Streets & Trips 2000 is fantastic. Perfect? No, not by a long shot. Pushpins are clumsy and very difficult to place exactly. Some areas in the database are covered beautifully; others don't even exist. I was fascinated by the ability to pull in aerial photos of selected geographic areas—a capability that came as a surprise.

—D. Purdy

I've plotted a couple of routes since I got Expedia Streets & Trips. One was flawless from start to end. A second route to a wedding at Old World Wisconsin (which is a listed attraction) was less successful. The trip from home to a town near Old World Wisconsin was fine, but the directions from there to the final destination were hopelessly muddled.

—Doug R.

Five Tips for Productivity

Wherever you want to go today, you want to get there faster and with fewer hassles. As I think about what makes me more productive, I find it's less a matter of CPU horsepower, disk rotational speed, or the number of colors my monitor can display than it used to be. Here's a checklist to amplify your productivity.

1. Chuck the desktop PC. Get a notebook. Unless you live your life at your desk—and you have almost no meetings in conference rooms and don't travel—you should be carrying a notebook PC. Take electronic notes in meetings, not paper notes. If your company culture makes people uneasy about the clacking of keys in a meeting, the culture needs to change. You can meet 'em halfway: Learn to type softly. No, notebooks aren't as fast as desktop PCs, but they're fast enough and the screens are big enough that you won't be suffering a big trade-off.

2a. In the office: Get a wireless LAN adapter. You've got a go-anywhere computer. So why shouldn't you be connected anywhere you go? Add a *wireless* Ethernet network adapter to your laptop. Conference-room productivity improves immeasurably when you have access to your server-based files and to the Internet. Information truly can be available at your fingertips. The phrase "I'll get back to you on that" should become a relic of the past. Here at *PC Magazine*, when companies show us hot new products, we take electronic notes during the meetings and post them to a password-protected Lotus Notes database. In the past, we all had the best of intentions about transcribing hand-scribbled notes after the meetings, but something else always came up, and very few meeting summaries were recorded and shared.

You'll need both a wireless network adapter, preferably one meeting the IEEE 802.11 standard (about \$500), and an *access point*, a link uniting the wired and wireless networks (about \$1,500). We've been impressed with products from Aironet Wireless Communications (www.aironet.com), BreezeCom (www.breezecom.com) and Proxim (www.proxim.com). Apple could put price pressure on the Intel side of the industry—no small irony—with the late-July announcement of \$100 802.11 AirPort cards and \$300 access points for the new iBook portable.

The 802.11 products work across brands at 1 Mbps and 2 Mbps; an 11-Mbps standard is evolving. If you want to guarantee 11 Mbps, stick with a single brand for now.

2b. On the road (away from LANs or wired phones): Wait a while. You *can* use a cellular phone for wireless data transfers, but it's not very fast, and reliability is a mixed bag. The solution you want is one to two years away: Bluetooth, the 2.4-GHz short-range wireless RF communications standard-in-waiting. Your Bluetooth-equipped laptop will signal your Bluetooth-equipped cell phone, which will handle the wireless data transfer. Be patient.

3. At home: Switch to a cable modem or DSL. When you work from home, you won't suffer any noticeable speed bumps compared with being connected in the office. Take your pick: Both are always on and far faster than a dial-up phone connection. A cable modem has more speed theoretically, but it's a shared pipe that bogs down; DSL (digital subscriber line) is yours alone. Satellite data (DirecPC) is a passable alternative if you can't get a cable modem or DSL and if you're mostly downloading (not sending) big files.

4. Get a big monitor. Size matters. Don't settle for any notebook unless it displays at least 1,024-by-768, which means you'll need at least a 13-inch display. By year's end, we'll see the first notebooks with 15- to 16-inch displays at 1,280-by-1,024 resolutions. With desktop PCs, monitor prices are so low that it's silly to buy anything smaller than 17 inches, and savvy companies will standardize on 19-inch monitors as the prices head down toward \$500.

5. Make backups. Run virus protection. Use password protection. Sooner or later, you'll get nailed. It's a matter of *when*, not *if*. There's no net productivity gain when your download takes 30 seconds via DSL rather than 5 minutes by modem but the file you then unzip includes a nasty virus that takes half a day to recover from. Use your network for backups; use Internet backup services; use a high-capacity floppy disk alternative (the Imation SuperDisk, Sony HiFD, Iomega Zip); use PC Card memory; use PC Card hard disks; use CD-RW. This fall, you'll be able to buy notebook PCs with half-inch-high (12.7-mm) CD-RW drives. That's one more reason never to take a traditional floppy disk drive on the road. **PC**



Get a wireless LAN. Get a cable modem or DSL. And always make backups.

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MOBILE PROCESSORS

Mobile processors present a unique set of design challenges. Foremost is the power consumption issue. Low power consumption is desirable because it aids long battery life; it also produces less heat in an environment where heat dissipation is a problem. As a result, mobile processors typically operate at a lower supply voltage, use different packaging, and run at lower clock speeds than their desktop brethren.

For example, the Pentium II in its original form could reach a speed of only 300 MHz in the mobile environment because of power dissipation limits. To exceed this, Intel created a chip, code-named Dixon, that has 256K of on-chip L2 cache. (You can think of this chip as a Celeron processor with twice as large a cache. Because it performs like a Pentium II, however, Intel markets it as such, rather than as a Celeron.)

Intel has recently begun shipping a 0.18-micron version of Dixon; it is the first chip to use this process, and it operates at

a slightly lower voltage than the 0.25-micron version. Intel offers both 0.18-micron and 0.25-micron Mobile Pentium II processors at 400 MHz; the 0.18-micron version consumes less power but costs a little more. The mobile Celeron processor is actually the same Dixon chip with half of its cache disabled.

The 0.25-micron Pentium III is too power-hungry for the mobile environment. The 0.18-micron Coppermine version of the Pentium III will appear as a mobile processor (due this fall) first at a clock speed of 500 MHz; it will include 256K of on-board L2 cache and SSE. Faster versions will be delayed because of the same speed problems that have delayed the desktop Coppermine.

AMD offers mobile versions of both the K6-2 and the K6-III. AMD's mobile processors typically consume more power than Intel's do, but the reduction in battery life is modest, and the cost savings can be considerable.—MS

of corporate notebooks remains small.

The K6-2 uses the Socket 7 bus—the interface Intel defined for its older Pentium processor—but runs the bus at 100 MHz instead of the 66 MHz Intel used. AMD calls systems using this bus, which typically also have AGP, the Super7 platform.

Unlike Pentium II and Pentium III, the K6-2 does not have a separate interface for the L2 cache, so the cache speed is limited to 100 MHz and must share the bus bandwidth with memory and I/O traffic.

Thus as clock speeds increase, its performance does not rise as steeply as that of the Intel processors. The AMD K6-2/475, for example, scored only 3 percent above the K6-2/400 on our ZD Business Winstone 99 tests, whereas the Intel Celeron/466 beat the Celeron/400 by almost 7 percent. And tick for tick, the Celeron tended to outpace the K6-2 by 5 to 10 percent. The K6-2 processor also has slower floating-point and MMX units than Intel's chips, so its performance fell further behind on many 3-D, image processing, and multimedia applications.

AMD's follow-up, the K6-III, debuted in early 1999. It added an on-chip, 256K L2 cache, providing a significant performance boost. For example, a 450-MHz K6-III was 21 percent faster than a 450-MHz K6-2 on ZD Business Winstone 99.

And the K6-III/400 performed about 11 percent better on Business Winstone 99 than a Celeron/400.

Nevertheless, systems based on the K6 III are relatively rare for two reasons: semiconductor economics and retail PC buyer behavior. The on-chip L2 cache makes the chip much larger, which both increases the cost of manufacturing and decreases the number of chips AMD can produce given its capability. At the same time, PC buyers look at clock speed more than benchmark test performance.

CYRIX M II



PROS: Affordable; adequate for low-end machines.

CONS: Sale of the company may make PC makers wary.

BOTTOM LINE: Worth considering for a budget-priced home machine.

▮ The Cyrix M II was quite successful in the low-cost PC market in 1998, especially in the least expensive systems. As Intel became more aggressive with Celeron prices and clock speeds, though, Cyrix's market share plummeted. National Semiconductor, Cyrix's parent company, decided in May to exit the PC proces-

sor market and put Cyrix up for sale. As of this writing, the sale of Cyrix to chip set maker VIA Technologies is pending.

Unlike AMD's chips, the M II is rated by its "equivalent performance," not its clock speed; the M II/433 actually runs at 300 MHz. Our tests showed that it didn't quite live up to this rating; on ZD Business Winstone 99, the M II/433 scored about 5 percent lower than its closest competitor, AMD's K6-2/400, and 8 percent lower than Intel's Celeron/400. It fell much farther behind on tasks that make extensive use of floating-point or MMX functions.

The M II design is clearly showing its age, and Cyrix plans to replace it this fall with a chip code-named Gobi. This new device uses an enhanced M II-based CPU core, code-named Cayenne, and adds faster floating-point and MMX units and 3DNow! instructions. In addition, the Gobi will include a 256K on-chip L2 cache, which will run at full processor speed. Gobi also marks a shift from the Socket 7 bus; it will be the first non-Intel chip to use the P6 bus and plug into the same socket as a Celeron.

CYRIX



(Price as of July 1999, in lots of 1,000)

Cyrix M II/400 (300 MHz) \$85

IT'S A BUYERS MARKET

With its Celeron and Pentium III lines, Intel covers both the low-cost and the high-performance ends. AMD's K6-2 is a strong offering for home systems, and Cyrix's M II is acceptable as long as 3-D and multimedia performance aren't critical. The most exciting new part, however, is AMD's Athlon, giving performance-driven buyers a new alternative. The PC processor business remains challenging for Intel's competitors, but for PC buyers, the competition has increased choices and lowered prices.