

Handheld Heaven

FOR MEHUL KHAKHKHAR, A high school sophomore who lives near Chicago, the Palm Pilot handheld computer is much more than a personal organizer; it's a portable scientific instrument that can record pH, temperature and the oxygen content of the pond in his school's courtyard. Using a special adapter that snaps onto the bottom of the Pilot and a program that simulates an electronic notebook, Khakhkhar can take a series of measurements over several days and graph the changes. "It's actually more convenient than writing all the data down in a notebook with a pencil," says the honors biology student. "It's more fun."

And more useful. Using the built-in infrared interface, Khakhkhar can beam his data to his classmates. And he can upload his results to his family's desktop computer when it comes time to write his report. He also uses the

handheld computer to take notes and keep track of assignments.

Other students in Khakhkhar's high school district are using Palm computers to track their food consumption and physical exercise, creating a comprehensive fitness profile. Erin Singleterry, 15, downloaded a Spanish/English dictionary to help her with her study of *español*. The electronic dictionary is a lot easier than a paper one, she says, "because you can write in the word and [the computer] finds it."

"We have over 400 teachers across our three schools in this program," says Darrell Walery, director of technology for high school district 230. Teachers use Palm computers with two of their classes, where each student either purchases or leases their own handheld device for the year. "This is a chance to give the students a really powerful handheld computer that they can use

throughout the day," says Walery.

The original Palm handheld organizers weren't designed with these sorts of uses in mind. No, the Palm was created to be a simple way for people to carry around their calendar, address book and to-do lists. And it's been so successful that more than 8.7 million Palm organizers have been sold. But over the past year, computers running the PalmOS operating system have stepped over some kind of threshold. Instead of being simple organizers, the PalmOS is now widely regarded as the world's next major computing platform—a platform that's specially optimized for ubiquitous mobile computing.

This transformation has been driven by Palm's third-party developers. In fact, Palm and 3Com have spent much of the past few years trying to sell the organizers for enterprise computing—that is, vertical applications used by large organizations—rather than trying to broaden the Palm's appeal throughout our society.

On the software front, some of the most exciting programs for the Palm are those that take advantage of its "always with you" characteristic. The great power of the Internet is the wealth of information that's available at your fingertips. The great problem with the Internet is that it ties you to your desktop. These new programs and services aimed at Palm users solve this problem by packaging up the Internet and other data services and making them available offline.

One little program that brought this all home to me is an electronic bus-and-train application called Commute. I discovered Commute one day when I was sitting in a coffee shop with a friend in New York City. I asked him if he could stay for dessert; he took out his Palm, clicked a single button, and told me that his train left in 25 minutes. The program consults the PalmOS clock and then displays only



the scheduled trains and buses that have not already left.

Some new applications combine the Palm's ubiquitous presence with the power of Internet access. Two examples are AvantGo and Vindigo. Both programs suck down data from the Internet every time you synchronize your PalmOS device with a desktop computer. AvantGo is great for

They're not just for appointment books anymore. New software and hardware add-ons are plugging the PalmOS devices into the Internet.

news junkies: I use it to download the front page of *The New York Times* and *The Wall Street Journal*, and half a dozen other news-oriented Web sites every morning, giving me several hundred pages of reading material for my morning bus ride. Since I've started using AvantGo, I've pretty much stopped taking printed newspapers or magazines on the bus: it's far easier for me, and less intrusive to my seat mates, to read from the tiny screen than to try to unfold the newspaper. (The big disadvantage is the quality of the black-and-white screen: unless you are in a brightly lit room, it's pretty muddy.)

Vindigo does the same thing for movies and restaurants, automatically downloading schedules and reviews. You can search by movie and get a list of theaters and times. Alternatively, you can click on the name of your favorite revival theater, and get a list of what it is playing that night. Vindigo also has a built-in map: you simply tell the program the nearest pair of cross streets, and it gives you walking directions to your destination.

The second part of the Palm's transformation has been driven by a number of hardware vendors, most notably Handspring—the company formed by a pair of Palm's founders who left shortly after Palm's acquisition by 3Com (see “*That's Not How My Brain Works...*,” TR July/August 1999). Handspring's PalmOS device, called the Visor, comes in an array of different colors, as any good piece of consumer electronics should. But what's

really innovative is the matchbook-sized expansion slot (called the “springboard”) on the back—a feature that invites tinkering and customization by third-party developers.

It's been less than a year since the Visor started shipping, and already companies have delivered Visor modules that turn this PalmOS-based computer into a digital camera, a two-way

pager and a universal remote control. But the most exciting module comes from Handspring itself: the VisorPhone. This clever add-on is a complete cellular telephone that drops into the backside of the Visor. To place the call, just look up somebody's phone number in the PalmOS address book and click the “dial” button. Or you can just tap the number on the Visor's screen.

There's a simple motivation behind the VisorPhone, says Chris Cadwell, Handspring's director of marketing for communication products. Cell phones are arguably one of the most successful consumer products of all time. One reason is ease of use. “Everybody thinks that the cell phone is easy,” says Cadwell. That's deceptive, though; the illusion of ease of use arises from the fact that most people use their cell phones in only the most rudimentary fashion, by punching buttons on a keypad to place a call. But in fact, he says, cell phones are extraordinarily complicated devices to master. Few people use the advanced capabilities of most cell phones—features like phone books that can store a hundred names, three-way calling, and text messaging—because most people can't figure out how to use the typical cell phone's user interface.

The VisorPhone does away with most of these problems by eliminating the cell phone's traditional user interface and instead simply integrating the phone's telephony features in with the other PalmOS functions. The result

is a cell phone as easy to use as a Palm-based computer. That's a huge benefit for people who rely heavily on cell phones but who are not gadget geniuses—in other words, the majority of the cell phone-using population.

To be sure, this isn't the first time that a company has tried to fuse a PalmOS-based computer with a cellular telephone. Qualcomm tried that trick last year, when the company introduced the pdQ smartphone—a device that belly-flopped in the market. “The difference between us and Qualcomm,” says Cadwell, “is that they are a phone company that added a Palm to a phone. We integrated a voice communications device into the Visor.” And Handspring has blended the two devices seamlessly. Another big difference is price: A Visor and VisorPhone can be purchased together for less than \$450, about half the price of the Qualcomm phone.

Unfortunately, all of these devices have an Achilles' heel: an utter lack of security. The PalmOS has no memory protection and no safeguards against viruses or hostile code. That represents a serious problem. After all, a Palm VII, with its wireless link, can initiate stock trades. A VisorPhone can make calls to 900 numbers. Palm says that it intends to address this issue, but any workable solution seems years in the future.

Nevertheless, if the VisorPhone is successful, it could be the start of an important new trend: the morphing of PalmOS from an operating system that's used by handheld organizers into an operating system that's used by a wide class of digital devices. After all, there's a learning curve associated with any user interface—so why should cell phones, microwave ovens and VCRs all have different ones, each requiring separate mastery? We live in a digital Babel; the PalmOS user interface could soon become the *lingua franca* for many of these devices. ■

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