

## FROM THE EDITOR

# The Incredible Shrinking PC

By Michael Slater

Not so long ago, the term "PC" referred to a single physical configuration: a desktop box with a CRT monitor on top. Today, there is a wide range of physical configurations, and this diversity will continue to increase. The driving force behind new form factors is the ever-shrinking size of the electronics, as well as tiny disk drives and solid-state memory cards.

It is almost comical now to look back on the first "portable" PCs, such as the original Compaq system. Even the once-popular laptops, which typically weighed 15 pounds or more, seem incredibly clumsy today.

Now, there is a seemingly endless number of 6-pound notebook computers available. While these systems are far more practical to carry around than the previous-generation laptops, before long they will look as absurd as do the 15-pound laptops today.

Notebook systems today are based predominantly on 386SX and 386SL microprocessors, with 486SX-based systems beginning to appear and the 486SL rumored to be on the horizon. Notebooks are able to run essentially all desktop PC software, including Windows. High-end notebooks will be capable of running even Windows NT. These machines appeal to users who want to be able to run all of their desktop applications on the road.

Today's smallest full-function PCs are the subnotebooks, which typically weigh well under 2 pounds if they do not include a disk drive and 2 to 3 pounds if they do. Some subnotebooks have full-size keyboards, while others have slightly shrunken keyboards.

Subnotebooks are typically based on 8088-compatible processors, such as NEC's V30 or C&T's PC/Chip. These systems lack the power to run Windows, but they are fine for most DOS applications. By giving up Windows capability, you can shed a few pounds and a few hundred dollars. Such systems are ideal for users who need a portable system primarily for entering text, maintaining schedules, and using e-mail. They are giving new life to low-end x86 microprocessors, and they also represent the best chance for other operating systems, such as GeoWorks.

The 8088- or 286-class subnotebooks have a window of opportunity, since they offer compelling price, weight, and battery life advantages over 386-based systems. Within two or three years, however, systems based on these processors will all but disappear as highly integrated processors based on 386 cores emerge.

The epitome of PC miniaturization today is HP's 95LX, which puts the equivalent of an original IBM PC

in a calculator-size package. Machines of this size are often called palmtops. Several applications, including Lotus 1-2-3, are provided in ROM. This is perhaps the first PC-compatible device that deserves the term "PDA" (personal digital assistant). Other PDAs, such as the Sharp Wizard, are not PC-compatible and are significantly more limited in their capabilities.

Systems like the 95LX have tiny keyboards that are hard to use for significant amounts of text or data entry, and they lack a pointing device. Pen-based systems have the advantage of allowing the keyboard to be eliminated entirely while providing a very effective pointing device. Pens aren't great for large amounts of text entry, but for taking notes, maintaining a calendar, or selecting items they are nearly ideal.

Tacking a pen interface onto a standard notebook computer has not been a successful strategy. Momenta is the most striking failure in this product category. The market for pen-based systems has suffered from a lack of application software, overweight and overpriced systems, and inadequate displays and digitizers (the pen position sensor). Pen-based systems have been successful only in application-specific niches, such as systems for delivery-truck drivers and insurance adjusters.

A new generation of pen-based systems is about to emerge that may catapult them into widespread use. These systems will range from Apple's Newton, to the much-discussed personal communicators expected from EO, General Magic, and others. By offering built-in applications, these systems will be immediately useful, and they are likely to be both lighter and cheaper than today's pen-based systems. Because these products will generally run different applications than conventional PCs, the value of x86 compatibility is greatly reduced, and this will give other processor architectures—notably ARM and Hobbit—a chance to set new standards. Data compatibility is critical, but this does not require instruction-set compatibility.

This proliferation of configurations has enormous implications for the industry. Not only are smaller systems establishing new memory and I/O standards, such as flash memory and PCMCIA cards, but they are also providing markets for a broader range of microprocessors. New types of PCs also raise the likelihood that a typical user will have more than one system, which may be critical to future growth as the PC market becomes saturated. Subnotebook PCs, PDAs, and personal communicators aren't going to replace PCs; they are going to supplement them, making microprocessor-based systems more pervasive than ever. ♦