Pocket Intelligence—The Next Killer Application

By Michael Slater

In nearly two decades of evolution, personal computers have come a long way. There have been dramatic increases in performance and memory capacity, matched by equally dramatic reductions in size and power consumption, yet the majority of tasks for which computers are used has remained remarkably constant. In all of personal computer history, only the change from character-oriented, keyboard-input, command-driven systems to bit-mapped, mouse-driven systems with pull-down menus and dialog boxes qualifies as a true paradigm shift.

The second major paradigm shift is now upon us, although its ultimate form is not yet clear. This shift is being enabled by the convergence of several technologies—pen input devices, low-power semiconductors, high-density memories, and fast microprocessors.

Pen-based computers, as they exist today, are not the new paradigm. Taking the keyboard off of an 8.5" x 11" notebook computer and adding pen-driven software is interesting, but such machines aren't likely to take the world by storm. What may change the world is a new class of pocket-sized machines, using a turbocharged, yet shrunken version of the pen-based notebook computer along with new classes of software and communications capabilities. Apple's Newton is perhaps the first example of such a machine.

What is truly revolutionary about such systems—whether they are called personal digital assistants, pocket intelligence, or personal communicators—is that they aren't hampered by the barriers in ease of use or portability that limit today's personal computers. Most importantly, users won't view them as computers—they will be information appliances.

The earliest examples of this genre of machine are personal organizers such as the Sharp Wizard. These devices fall short in several areas, however, and in their current form, won't penetrate far beyond the gadget freaks. Their functions and connectivity are too limited, and their user interfaces are too awkward for the majority of prospective users to put up with.

With the addition of higher-resolution displays, pen-based input, more sophisticated software, larger memories, and enhanced communication capabilities, these devices may cross a magic threshold of ease-of-use and capability that will propel them into ubiquity.

These devices will be revolutionary because they will appeal not just to computer users, but to almost everyone who communicates with others. Relatively few people have a genuine need to compute in a literal sense, but almost everyone has a need to organize, schedule, and communicate. The real revolution in pen-based devices won't be something that will replace computers, but something that will replace notepads, address books, daytimers, business card files, dictation recorders—and mail.

This "pocket intelligence" promises to be the largest, fastest growing microprocessor application since the personal computer. It also promises to upset the balance of power in the microprocessor business by unseating the x86 architecture as the dominant force.

As in all reprogrammable microprocessor applications, the success of various microprocessor architectures in pen-based systems will be tied to system and application software. Today, the two dominant pen-based operating systems are Microsoft's "Windows for Pen Computing," which is an adaptation of the standard Windows product, and GO Corp.'s PenPoint, which is an entirely new operating system designed from the ground up to be pen-based. Apple's Newton system software is likely to be another important player.

So far, pen-based computers using the standard 8.5" × 11" form factor tend to use 386-family microprocessors, which allows them to run both the Windows and PenPoint operating systems. Makers of these computers don't want to bet on one operating system or the other, and the 386 architecture lets them run both.

The really exciting market is for much smaller machines, however, and these systems are likely to require entirely new application software—modified versions of existing Windows applications aren't likely to be very competitive. If the software is all new, then the need to stick with the 386 architecture disappears. Apple is basing its Newton products on the ARM architecture, and GO will offer its PenPoint operating system on AT&T's Hobbit processor. These chips will offer higher performance, lower power, and lower cost than 386-family processors, giving them a compelling advantage for applications that don't need PC software compatibility. At the low end of the pocket intelligence market, products such as Chips and Technologies' PC/Chip may be significant, but the most exciting products will demand more computational power than this class of chips provides.

Intel and the other makers of 386/486 microprocessors have been focused on a market that will pay premium prices for software compatibility, and where power consumption is a secondary factor. The emerging pocket intelligence market is providing a window of opportunity for new microprocessor architectures to gain a foothold, and the ARM and Hobbit architectures are poised to seize this opportunity. ♦