

■ THE EDITOR'S VIEW

Windows CE Creates Opportunities

New Microsoft OS Allows Many CPU Vendors to Compete with Intel

Together, Microsoft and Intel have become highly successful by extracting most of the profit from the PC market. Microsoft's efforts with Windows CE, however, have brought the software vendor to territory where Intel isn't likely to follow: computing devices that sell for less than \$500. Microsoft is determined to make Windows CE succeed, with or without Intel, opening the door for non-x86 processors. Unlike Windows NT, which supports RISC processors but is used predominantly with x86 CPUs, WinCE should allow RISC chips to thrive—at least as much as the operating system itself does.

The first WinCE devices, announced at Comdex, have many drawbacks. These handheld PCs (HPCs) have small displays that lack color. Despite the API similarities between WinCE and the full-blown Windows 95, few software applications are available for HPCs. While other PDAs are beginning to offer solid handwriting recognition, HPCs offer none; data must be entered through a tiny keyboard unsuited to touch typing. This deficiency essentially limits the device to being a “reader” of information developed on a PC. The Palm Pilot is nearly as good for this task and is smaller, lighter, and less expensive.

We believe many of these limitations will be overcome as the Redmondians improve WinCE in future releases. The Microsoft *modus* is to first get a product to market, then rapidly refine that product until it dominates the competition. Indeed, WinCE itself is the vendor's third run at the handheld market, counting the ill-fated WinPad and Pulsar. The company claims WinCE 2.0, due late next year, will support color displays, improved wireless messaging, and Java. Over time, a much broader range of application software will appear.

The opportunities for WinCE go far beyond HPCs. By eschewing the disk-centric nature of Windows, the new OS is suited to a range of embedded applications, from wristwatches to copy machines—anything that needs a user interface or networking. WinCE could be useful for smart phones, for example, downloading telephone numbers from a PC database and even offering Internet access. Set-top boxes could provide a Web browser plus compatibility with some PC games. To satisfy the needs of this range of products, Microsoft plans to develop different versions of WinCE: one without a user interface, for embedded applications, and one with additional support for multimedia programs.

Although there are plenty of other operating systems for these products, WinCE offers two key advantages. First, developers can build their applications using familiar Windows tools. In addition, Microsoft's enormous bankroll

should, over time, help WinCE meet or exceed the feature set and reliability of other embedded operating systems.

WinCE is currently available on Hitachi's SuperH and on MIPS processors; Microsoft recently announced plans to offer PowerPC, ARM, and x86 ports as well (see [1017MSB.PDF](#)). The last seems almost superfluous; processors such as the R4100, SH7708, and StrongArm 110 offer the same performance as a 486 (or even better) at a lower price while sipping much less power. For these reasons, handheld-system makers have chosen these processors while ignoring chips from Intel and other x86 vendors.

For a line-powered device such as a copier or set-top box, the power consumption of the 486 is less important, but price and performance are still issues that will cause most vendors to look to a RISC chip. One potential advantage of the x86: it may be easier to port PC games to an x86-based set-top box, since many games include x86 assembly code.

With many potential applications, the long-term market for WinCE devices is potentially much larger than the PC market, and most of this volume could go to RISC processors. The opportunity for RISC vendors is tempered by two factors. Sales of WinCE systems will be well under a million units in 1997, a tiny fraction of PC sales; even with reasonable growth rates, gains will be small in the near term. Furthermore, the average selling price (ASP) of processors in WinCE devices will be \$20–\$50, much less than the ASP of processors for PCs. The revenue of WinCE processors will probably never exceed the revenue from PC processors.

For RISC processor vendors, even a million-unit market is attractive. Intel, on the other hand, can afford to ignore such a market. In fact, Intel's entire business model is built around processors with an ASP of about \$200; the company can't sell a significant number of CPUs for \$20–\$50 without damaging its gross margins and, ultimately, its stock price. As long as WinCE systems enhance PCs and don't replace them, Intel can thrive without marketing low-cost CPUs.

Microsoft, in contrast, has near-zero manufacturing costs; it sees a great opportunity in low-cost computing devices. Although the software vendor's partnership with Intel is beneficial, WinCE allows Microsoft to share some of its success with a new set of processor vendors. The new operating system gives RISC CPU makers an unusual opportunity to work in partnership with Microsoft without opposing Intel: a good recipe for prosperity. ■

