THE PUBLISHER'S VIEW

The Race for Third Place

With x86 and IA-64 Safe Bets, Race Is Between PowerPC and Alpha

For the next several years, the x86 architecture's grip on the mainstream desktop computer market seems secure. Around the end of the decade, however, other architectures may begin to play a more significant role. Microsoft will have switched to its portable code base for its mainstream operating system, ending the reign of Windows 95 and its direct successors, and the long-awaited trend toward a more diverse processor world for PCs may finally arrive.

The bad news, from the perspective of other processor vendors, is that Intel will have its own contender for unseating the x86—the Intel/HP architecture, also called IA-64, which will debut in the Merced processor *(see* **1001MSB.PDF***)* around 1998. Because it will be several years newer than the youngest of today's mainstream RISCs, IA-64 has the opportunity to leapfrog current designs, since it will be optimized for highly parallel processors implemented with many millions of transistors *(see* **101003.PDF***)*.

The PC industry may not welcome IA-64 with open arms—switching to another Intel-proprietary architecture would certainly give pause to many PC companies—but given the combined power of Intel and HP, it would be foolish to count it out. Unless the two companies blunder badly, IA-64 seems likely to be the second most popular desktop computer architecture around the year 2000. The x86 will continue to be a strong, if not dominant, player for some time, even if Intel puts all its weight behind IA-64.

Given this premise, the best that any other architecture can hope to achieve for at least the next several years is the number-three position in the mainstream desktop market. One likely scenario is that the top two architectures will hold 80–90% of the market, number three will hold most of the remaining 10–20%, and all others will be confined to small niches or disappear entirely. If this scenario holds true, the number-three position is the only volume opportunity that will exist beyond the Intel architectures.

Several of today's architectures can be easily discarded as contenders for the third-place position. PA-RISC is out, of course, since HP will be switching to IA-64 and tapering off its investment in PA-RISC. SPARC is handicapped by Sun's disinterest in Windows NT; it is hard to imagine Solaris taking on a volume desktop role. It is possible that Windows NT will be ported to SPARC, but it seems unlikely that SPARC could achieve a leadership position in the NT market. MIPS does run Windows NT, but its position in this market—never very strong—is slipping even further behind.

This leaves PowerPC and Alpha as the two contenders. As recently as a year ago, PowerPC seemed to have the best long-term position because of the depth of its backing and the existence of an immediate, moderate-volume market—Macintosh—for the chip vendors to live off while waiting for Windows NT, or its successors, to move into the mainstream.

The execution of the PowerPC group has been miserable, however. The processors have lagged in performance and been late to market. While the recent 604e improves its competitive position considerably, the PowerPC camp has not delivered a meaningful performance boost beyond Intel and lags far behind Alpha. Apple's business crisis, slow licensing of the MacOS, product quality problems, and delays in shipping Copland all raise doubts about the growth potential of the Mac market. And IBM continues to have no apparent strategy for PowerPC in the PC market.

The PowerPC team has one key asset: deep pockets. IBM and Motorola appear committed to developing at least two more generations of PowerPC chips *(see* **101103.PDF***)* and to have recognized that they need to deliver more aggressive designs. They are even working on a future generation starting from "a clean sheet of paper"—implying a new architecture that would maintain backward compatibility but would be better optimized for the technology environment beyond the year 2000. Of course, the best of intentions are no guarantee that future chips will actually be any more competitive than PowerPC is today.

Digital's Alpha architecture has always looked like a long shot for penetrating the mainstream. It was introduced at a time when the world just didn't need another architecture; Digital has been struggling financially for most of the time since Alpha's introduction; and no other significant mainstream system makers have signed on.

Digital has, however, done a superb job of building the world's fastest processors. Alpha has a defensible niche in the NT market as the power platform of choice (if your applications have been ported to it). With the shipment of FX!32, due this fall, the available software range will broaden dramatically, and next year's emergence of the 21164PC promises to move Alpha systems closer to mainstream PC prices.

If Digital can move Alpha down the price curve (without sacrificing performance) faster than PowerPC can move up the performance curve, Alpha could take the number-three slot toward the end of the decade. The number-four slot isn't likely to be very profitable. M