

THE EDITOR'S VIEW

Pentium Falls Short of P5's Promises

By Michael Slater

It has been several years now since the much-heralded RISC assault on the PC market began, and the results so far have been unimpressive. Intel has lost far more sockets to AMD's 386 clone than it has to all the RISCs combined. The situation is far from stable, however, and the changing systems environment will make the RISC challenges stronger than ever in the coming year.

The key to the RISC opportunity is Windows NT. For the first time, mainstream PC software will be available for a variety of architectures, and there will be a significant non-UNIX operating system for the RISCs. If any company wields as much power in the personal computer business as Intel, it is Microsoft, and Microsoft has vigorously pursued a path of architectural independence.

Looking back two years or so, there was a ground swell of opposition to the x86's dominance. RISC vendors were promising both much higher performance and dramatically better price/performance. Many PC vendors felt victimized by Intel's high prices and the often limited supplies of leading-edge processors, which made them especially receptive to RISC alternatives.

In response to the RISC threat from ACE, Intel accelerated its P5 program and began showing up at every PC industry conference touting the P5 as being only a few months behind the R4000 and offering higher performance. At the same time, AMD, Chips and Technologies, and Cyrix introduced 386-compatible processors, leading to a collapse of prices and the end of availability problems. The PC industry seemed to buy Intel's story, and the emergence of multiple x86 processor vendors relieved much of the pressure to move away from that architecture. As a result, the ACE effort collapsed, and the P5—still a paper tiger—appeared to have triumphed.

In the meantime, however, the P5 slipped from the originally promised fall '92 shipments to late in the first quarter of 1993, while the RISCs continued to advance. The P5 is turning out to be not a few months behind the R4000, but over a year later—and by the time the P5 is shipping, the MIPS semiconductor partners will be shipping the R4400 (see [061503.PDF](#)) with perhaps 50% better performance than the P5. Intel's pre-emptive strike against the ACE initiative turns out to be, at best, a result of wishful thinking, and at worst, a fraud.

So, we are back to the situation of several years ago: RISCs will provide significantly higher performance than the fastest x86 processor. The emergence of Windows NT adds a considerable twist, but even if we assume that NT application vendors will support multiple binary plat-

forms, the key issue remains the same: Will there be a compelling price/performance advantage at the system level?

Some RISCs, such as Alpha, may have as much as a two-to-one performance advantage over the P5, with perhaps roughly equal chip prices. Other RISCs, such as QED's Orion, may provide comparable performance at processor chip prices that are hundreds of dollars lower.

The problem is that the PC industry is full of vendors that live on tiny margins—margins that no workstation maker can survive on. Unless one of the RISC vendors can get someone to build systems with comparable margins to the PC industry, they don't have a chance of providing a system-level price advantage. RISC-based systems that significantly outperform P5-based systems are likely to be noticeably more expensive, and price/performance won't be enough to generate volume if the price point is too high.

The only other serious contender for the high-volume desktop market is the Macintosh. Apple's planned migration to the PowerPC microprocessor for its future Macintosh line should give it the raw horsepower it needs to compete very effectively with the performance levels that will be offered by x86-based systems. Apple's biggest problem is that while the Macintosh has an outstanding user interface, it is built on a very shaky foundation. With no memory protection, poor multitasking, and no multithreading, today's Macintosh operating system won't stand up very well against Windows NT.

With nearly all important Macintosh applications becoming available on Windows, high-end Mac users might start switching to Windows NT unless Apple makes some major improvements soon. Apple has talked in very general terms about a planned migration to a micro-kernel-based OS foundation that would add all the needed features, but they warn that this will be a slow transition and that existing applications may have to be modified to work with the new OS. Apple needs to bite the bullet on necessary incompatibilities and move as quickly as possible to a more robust operating system foundation.

In the end, it appears that while the P5 won't live up to its initial hype, it may be good enough. The RISCs will be faster, as they always have been and probably always will be, but their advantages aren't likely to be strong enough to move much of the market. Windows NT, while it too is late, remains the best chance for the MIPS and Alpha architectures to reach million-unit volumes. PowerPC is likely to inherit the Macintosh user base, but Apple's struggle to increase its share of the desktop systems business depends on improved system software as well as on new processors. ♦