

# Software Spiral, Intel Profits Both Stall

*Without Compelling New Software, Demand for High-End PCs Weakens*



Intel recently spooked investors by reporting weak results for the third quarter and saying the fourth quarter wouldn't be much better, as we anticipated (see MPR 7/14/97, p. 1). The principal cause is a precipitous drop in the average selling price (ASP) of Intel

processors, due to a shift in PC sales toward less expensive systems. Many have characterized this shift as an increase in demand for sub-\$1,000 PCs, but I see the other side of the coin: weak demand for more expensive systems.

Intel's business model is built around continually offering more performance at the same price points. Its frequent improvements in technology drive this supply side of the equation, but Intel counts on corresponding increases in the performance requirements of popular software to build demand for its faster processors. Without this increase in demand, PC buyers might simply choose to buy the same processors quarter after quarter as their price declines.

That appears to be exactly what is happening today. Intel introduced the Pentium/MMX-200 in January of this year at a price of \$539. At the time, this chip was the fastest Intel processor for Windows 95 PCs (Pentium Pro being aimed at Windows NT systems). Pentium/MMX runs Windows 95 and most PC applications quite capably, including those that use the new MMX instructions.

Over the course of the year, the price of that chip has dropped to \$213, and it still handles current applications with few problems. The 166-MHz Pentium/MMX, which is only about 10% slower, sells for just \$112 and is starting to appear in sub-\$1,000 PCs. These powerful yet low-cost processors are spurring demand for inexpensive PCs.

Low-end PCs have also benefited from recent drops in DRAM and hard-drive prices. Despite the collapse of DRAM prices in 2Q96, memory prices have not stabilized and are now about an eighth of their 1Q96 level. Thus, even an inexpensive PC now comes with 32M of memory, more than enough for Windows 95 and typical applications. Similarly, it's hard to find a system with less than a gigabyte of disk, which is plenty even for obese Microsoft software.

Thus, there are few compelling reasons for PC buyers to acquire \$2,000 Pentium II systems with monster hard drives and boatloads of DRAM. These high-end systems appeal to the usual professionals that run Photoshop or AutoCAD all day, and to the dedicated 3D gamers that need (and can afford) the fastest machine on the block. But with the least-expensive Pentium II processor priced at \$401,

these systems are still too expensive for the mainstream consumer or business user.

What Intel needs is compelling software that requires the performance of Pentium II. God knows they've tried to promote CPU-hungry applications such as digital photography, videoconferencing, DVD playback, and voice recognition, but these applications haven't caught on, in many cases due to a lack of infrastructure. Digital cameras with reasonable picture quality are still too expensive, and current photo-editing software is too hard to use. Few PCs have enough bandwidth for reasonable videoconferencing. Most people want to watch movies on their TVs, not their PCs. And voice recognition hasn't been integrated into interesting applications.

The emergence of Microsoft's Windows 95 was a key factor in obsoleting the 486. The perpetually imminent release of Windows 98 won't help Intel, however, because it is just an incremental release that doesn't change the hardware requirements; like the current version of Windows, it should run fine on Pentium systems. In the corporate market, however, an ongoing shift toward the more powerful Windows NT may aid Intel's Pentium II push.

Another way to build demand for more expensive processors would be to introduce new features, such as the much-rumored MMX2. Sure, MMX2 will help only the handful of programs that use 3D graphics, but who cares? MMX was a big success even though the number of programs that actually use it is small. Intel's competitors all plan to offer MMX2-like features, some as early as 1Q98, but it looks as if Intel won't have MMX2 until 1999.

Technically, it's fairly simple to add the parallel floating-point operations said to be the key component of MMX2. The problem for Intel is finding a release vehicle. Klamath was the first P6 processor with MMX and was too early for MMX2. To avoid delays, Deschutes is as similar as possible to Klamath. Katmai, the next train, doesn't leave the station until early 1999.

Thus, not enough customers are buying Pentium II systems, and Intel's ASP has sagged. In 1998, Intel plans to drop Pentium II prices so low that customers will have to buy them, but that won't do much to raise Intel's ASP. The company must hope that the infrastructure issues holding back emerging high-end applications are solved, or that some compelling new software emerges—soon. □

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