

Intel Gets Aggressive With Celeron

New 400-MHz Part, Lower Prices Attempt to Rebuff AMD

by Linley Gwennap

Just days after 1999 began, Intel sent a strong signal that this is indeed a new year and not a replay of 1998. Last year, Intel's low-end offerings were weak as the company tried first low-performance Pentium/MMX chips and then low-performance Covington (Celeron) processors. As a result, AMD and Cyrix dominated the low-end market, gaining share from Intel. To fight back, Intel has accelerated plans for a 400-MHz Celeron, introducing that part on January 4 at a list price of just \$158, along with a 366-MHz version. For very low cost PCs, Intel cut the price of the 300-MHz Celeron to just \$71, a level not seen since Intel stopped selling 386s.

These moves indicate a new aggressiveness on Intel's part. The number-one CPU vendor is no longer willing to give the expanding sub-\$1,000 PC market to its competitors. Indeed, the new low prices will enable Intel to compete for PCs selling for as little as \$599. At 400 MHz, Celeron's clock speed now matches the top speed of AMD's K6-2, showing that Intel doesn't want to rely on Pentium II to compete with the K6-2 at any speed. By strengthening Celeron, however, Intel runs the risk of eviscerating its more profitable Pentium II line.

Return of Operation Crush?

Intel's market share shrank from 86% in 1997 to 79% in 1998 (according to our estimates), with AMD the main beneficiary of this change (see MPR 12/28/98, p. 1). Most of this loss came at the low end of the PC market, where Intel's products were weakest. As Figure 1 shows, Intel's share of the sub-\$1,000 market dropped to 32% in November, after

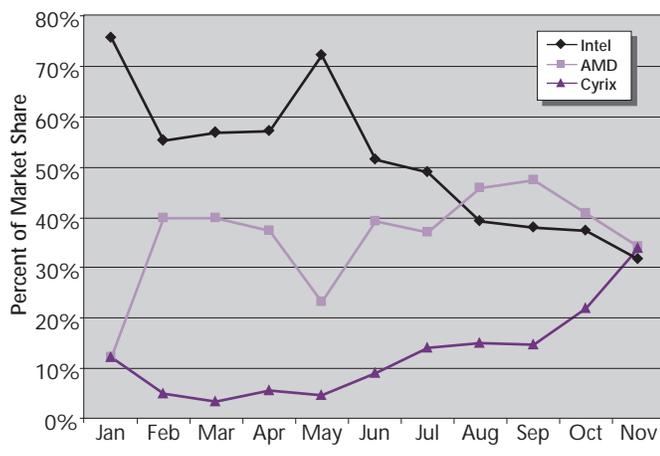


Figure 1. Intel has fared poorly in the sub-\$1,000 PC market, trailing both AMD and Cyrix in this small but growing segment. Data is for U.S. retail and indirect channels only. (Source: PC Data)

declining severely during 1998. Even including all price points, Intel's share in the U.S. retail market was only 54% in 3Q98 (according to ZD Market Intelligence). Intel fared better in the direct channels, where most business customers buy PCs, and in some overseas markets.

A shortage of manufacturing capacity kept Intel from being more aggressive in 1998. Capacity was tight, due to the conversion from Pentium/MMX to the larger P6 core used in the Pentium II and Celeron lines. AMD's increase in shipments helped Intel make this transition more quickly, without worrying about an undersupplied PC market. With the P6 transition now complete, and with more 0.25-micron capacity ramping up in Leixlip, Ireland, Intel wants to put the brakes on AMD's expansion.

The 400-MHz Celeron did not improve the mood at One AMD Place. AMD recently introduced its 400-MHz K6-2 (see MPR 12/7/98, p. 4) at a list price of \$283, hoping to get a premium price for a processor nearly as fast as Intel's top of the line. But to keep pace with Celeron, AMD has cut the price of its premiere product in half, matching Intel's \$158 price, with corresponding reductions across the rest of the K6 line.

At the low end, Intel has not even competed for many design wins, leaving the field to AMD and Cyrix. With its \$71 Celeron, Intel will now go head-to-head with its competitors for every significant design win, making further share gains more difficult. Intel may push its prices even lower over the next few months, further pressuring its competitors.

While Intel's competitors have been offering x86 CPUs for \$60, and even \$40, Intel's lowest list price for its Pentium and Celeron processors was previously \$85, and even the 486 never went below \$75. Of course, the real issue is what price Intel is offering to its largest customers; sources indicate the company is willing to discount heavily from list to win key designs. The situation is reminiscent of Operation Crush, Intel's all-out effort to gain share from Motorola's 68000 twenty years ago.

AMD Will Fight Back

AMD has no plans to give up share easily. Although it has been forced to price the K6-2 on a par with Celeron, that part will still be profitable, as the smaller AMD chip costs about a third less to manufacture, according to the MDR Cost Model. Furthermore, the K6-2 has some advantages over Celeron, including a 100-MHz system bus and the 3DNow extensions for 3D acceleration. Even at 400 MHz, Celeron is restricted to a 66-MHz bus, constraining its performance, and that line will not gain 3D extensions (in the form of Katmai New Instructions) until 2000. On basic productivity

applications, the K6-2 keeps up with Celeron in performance as long as the clock speeds are the same.

Intel apparently plans to use the Celeron line to match AMD's K6 family, at least in terms of CPU megahertz. With AMD planning to release a 450-MHz K6-2 soon, Intel will probably respond with a 450- or 466-MHz Celeron, using the latter speed if it wishes to stay with a 66-MHz bus. If Intel can trap AMD in the Celeron space, that competitor will not be able to charge more than \$200 for its products.

This strategy will be difficult to maintain, however, once AMD launches its K6-3. That part should deliver better performance than Mendocino at the same clock speed, as its on-die level-two (L2) cache breaks the bottleneck of Socket 7. The K6-3's L2 cache is 256K, twice as capacious as Mendocino's, yet the part still has a smaller die size and the advantage of 3DNow.

AMD has been hesitant to deploy the K6-3, as its die is larger than the K6-2's and would reduce the company's processor output. But if Intel blunts AMD's share growth, the resulting situation would free up enough capacity for AMD to shift more quickly to the K6-3.

Like the K6-2, the K6-3 will use a 100-MHz Socket 7 bus. Intel has been keeping Celeron's bus at 66 MHz to differentiate it from the Pentium II, which now exclusively uses a 100-MHz bus. Around the middle of this year, Intel will introduce Pentium III (Katmai) processors that use a 133-MHz bus. Presumably, this will allow the Celeron line to move to a 100-MHz bus and better match the K6-3.

Undercutting Pentium II a Risk

Intel's new pricing, shown in Table 1, appears to undermine Pentium II. After only token price cuts, a Pentium II-400 lists for more than twice the price of a Celeron-400. Even a 350-MHz Pentium II lists for 28% more than the new Celeron. With its slower bus and smaller cache, the Celeron part won't quite match the performance of the Pentium II-400, but it comes close, and it outruns the Pentium II-350 on most applications. Only the Pentium II-450 is clearly superior to the fastest Celeron processors, and its price remains at a relatively towering \$576.

On the planet Vulcan, this situation would logically produce a massive market shift to the Celeron line. Here on Earth, Intel feels that emotions will rule the day. The vendor believes it can direct the high-speed Celerons into the consumer market, where AMD is strong, while feeding the more expensive Pentium II processors into the business market, which still consumes two-thirds of all PCs.

According to Intel's studies, the business market values the Pentium II brand enough to pay a small premium. Furthermore, PC makers tend to combine Pentium II with the more flexible 440BX chip set and a richer peripheral mix, resulting in higher system prices. Intel believes these PC makers will not substitute fast Celeron parts into high-end configurations, although there is no technical reason why they couldn't.

Product	Bus Speed	List Price (1,000s)		Percent Change
		10/25/98	1/3/99	
Pentium II-450	100 MHz	\$562	\$562	0%
Pentium II-400	100 MHz	\$375	\$353	-5%
Pentium II-350	100 MHz	\$213	\$202	-5%
Pentium II-333	66 MHz	\$181	—	—
Celeron-400	66 MHz	—	\$158	—
Celeron-366	66 MHz	—	\$123	—
Celeron-333	66 MHz	\$159	\$90	-43%
Celeron-300A	66 MHz	\$138	\$71	-49%

Table 1. Intel's latest desktop CPU price list shows only token cuts for Pentium II, no Pentium II processors with a 66-MHz bus, two new Celeron parts, deep cuts for the remaining Celerons, and no Covington parts (Celeron-300). The new Celerons are available now. The Celeron prices are for parts in a PPGA (Socket 370) package; Slot 1 modules cost an extra \$8. (Source: Intel)

The CPU maker had better be correct. If only 10% of its sales shift from Pentium II to Celeron, Intel will lose more than \$1 billion in 1999 revenue due to the lower prices of the Celeron parts. There would be some small reduction in manufacturing cost, but most of that revenue shortfall would impact the bottom line. Thus, a 10% shift to Celeron could cause a 15% reduction in Intel's profits.

First Shots in a Price War

Even if Intel can manage the Pentium II/Celeron split in its favor, the coming year could be rough on profits. The dip in Intel's market share below 80% has set off a flashing red light in the office of new CEO Craig Barrett, and he is responding in the same fashion as his predecessors: Damn the profits; don't give the competition another share point. This aggressiveness has served the company well in the past, as it kept AMD too weak to put up much of a fight. Whether such a strategy will deter a reinvigorated AMD remains to be seen.

There is no doubt, however, that Intel has ignited a price war. With plans already in place to increase their own fab capacity, AMD and Cyrix will have plenty of parts to sell. These vendors will probably offer lower and lower prices to avoid losing customers; as a result, it will be difficult for any of the CPU vendors to gain much ground.

This active discounting will be bad for the bottom line—for both Intel and its competitors. Intel can more easily afford a reduction in profits, particularly considering its recently announced record-breaking profits in the fourth quarter of 1998. Perhaps its strategy is to force AMD back into the red, hoping AMD will cut back its investments in manufacturing and product development.

PC buyers will be the only big winners in this price war. Intel could come out ahead if it can force AMD to compete against Celeron and not Intel's more expensive processors. This strategy requires carefully aiming the fast Celerons at markets where AMD is strong while deploying more profitable Pentium II processors elsewhere. Crossing this high wire will require all of Intel's marketing savvy; falling off will cost a big chunk of the company's profits. 