

Intel Aims Low With Celeron

New Strategies, New Brands for Low End, High End

by Linley Gwennap

For only the second time in its history, Intel has created a new brand name for its processor products: Celeron (pronounced like "celery"). While this may seem like a trivial naming exercise to some, Celeron represents a fundamental change in both Intel's marketing program and its technology strategy. The new brand will be used for products aimed at the low end of the desktop PC market, such as the forthcoming Covington processor.

Intel is also preparing, but has not yet disclosed, a new name for its server processors, starting with the Slot 2 products due to be announced in June. The server name will not be a completely new brand like Celeron but rather a "sub-brand" based on the Pentium II name. An obvious (but unlikely) choice is Pentium II Pro.

These two new product lines represent a splintering of Intel's product strategy. While the company has maintained a separate mobile product line since 1994, it has continued to use essentially a single set of products for everything from \$1,000 PCs to \$100,000 servers. In the future, Intel will deploy specific products designed to better meet the needs of each market segment. The server products will help Intel compete against RISC chips in high-end systems, while Celeron will go head-to-head against low-cost x86 chips from AMD and others.

The new strategy is also a result of Intel's decision to include level-two (L2) cache in all of its processor products as part of the processor module. The new Celeron and server products will use the same CPU cores (and in some cases, CPU chips) as their predecessors but will be differentiated by the size and speed of their L2 caches.

Intel's New Segmentation Model

In Intel's new world order, a "basic PC" is a system that sells for less than \$1,200 without a monitor. This segment encompasses the much-hyped sub-\$1,000 PC (see MPR 3/9/98, p. 3) as well as the more popular \$1,000-\$1,200 price range. This segment covers about a third of current desktop PC

sales and has been growing more rapidly than the rest of the market over the past several months.

These systems typically use processors with a list price of less than \$200. Because these processors have lower prices than Intel's other chips, the total revenue represented is proportionally less than the unit volume. As Figure 1 shows, we estimate the Celeron line, once it is fully ramped, will generate about 20% of Intel's processor revenue.

Intel further divides the mainstream desktop into "performance PCs" and "professional PCs." The former sell for less than \$2,500 and constitute the bulk of the PC market; the latter are more expensive and are sometimes classified as "PC workstations." At this point, Intel expects to serve both segments with the same set of products, although the professional PCs will use faster, more expensive versions. This segmentation blurs the distinction between PCs and low-end workstations, a line that has been erased as several commodity PC makers entered the "workstation" market.

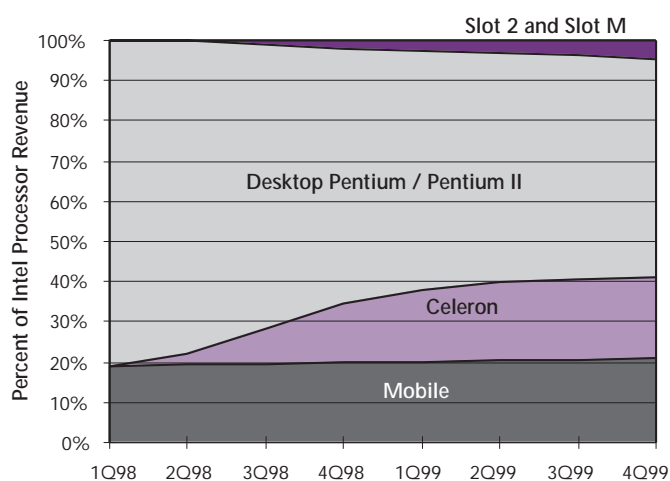


Figure 1. While products in Intel's new Celeron (basic PC) and server brands will quickly make up a significant portion of Intel's sales, the mainstream desktop products will still represent about half of Intel's total processor revenue. (Source: MDR estimates)

Intel instead draws a line between low-end and high-end workstations. To keep costs down, the former are served by the same processors used in high-end PCs, processors that typically sell for \$800 or less. These low-cost workstations sell for less than \$5,000. High-end workstations, in contrast, often use custom motherboards and more expensive processors to achieve maximum system performance.

The same divisions hold in the server market, although the price break between low-cost and high-end servers is around \$6,000. Thus, from Intel's standpoint, there is a separate segment for processors aimed at high-end servers and workstations, which is distinct from the mainstream desktop segment. This high-end segment is relatively cost insensitive but requires the maximum level of performance.

Celeron Line Uses New Products

To move its P6 processor core into the lowest price points, Intel has decided to make some changes to reduce manufacturing cost. The current Pentium II consists of a P6 CPU (Klamath or Deschutes) mounted on a small PC board along with 512K of external SRAM and some discrete components, all wrapped in a plastic case. Celeron products will shed the external SRAM and the sexy black case (including the distinctive hologram).

These changes eliminate the cost of these parts and also allow the module's PC board to use fewer layers and fewer discrete components, further reducing cost. The CPU itself will eventually move to a less expensive package, eliminating the signals used for the external SRAM. We estimate the savings from all of these changes total about \$17, roughly 20% of the manufacturing cost of a Pentium II module.

One problem for PC makers is that the Celeron modules will need different card guides than the Pentium II modules, due to the lack of the plastic case. The Pentium II case is roughly one-quarter of an inch thick, whereas the Celeron module is simply the thickness of the PC board. Both modules can still use the same connector and the

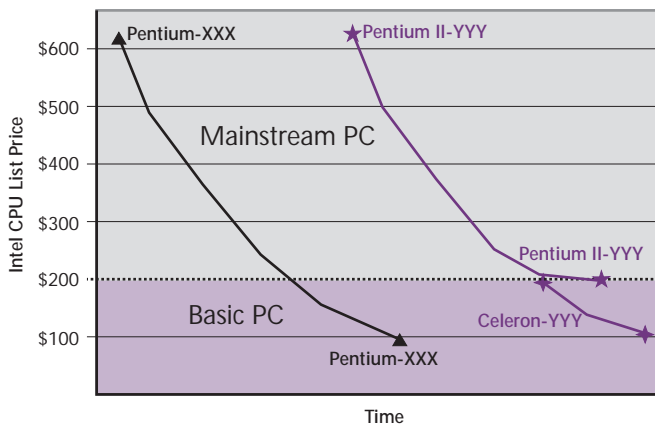


Figure 2. In the Pentium generation, each speed grade started at a high price and ended up in the low end. For the P6, speed grades will convert from Pentium II to Celeron as they reach the boundary between the mainstream and basic PC segments.

same motherboard design, but the board must allow for the two types of card guides. Once the card guides are installed, however, they limit the flexibility of the PC maker to install either a Celeron or Pentium II module. This problem also complicates end-user upgrades from Celeron to Pentium II.

The first Celeron product, code-named Covington, will use the same Deschutes CPU chip as Pentium II. Because this chip has no on-die level-two cache, the performance of Covington will be significantly impaired compared with that of Pentium II. Sources indicate the first Covington part will run at 266 MHz but will perform no better than a 233-MHz Pentium/MMX on typical business applications. We expect Covington to be announced next month at a price around \$150, quickly falling to about \$100 in 3Q98.

Celeron is more than just a new name for Covington. Subsequent Celeron products will be based on a chip code-named Mendocino. We expect this chip to appear in 4Q98 with an on-die L2 cache of 128K. While this cache increases the cost of the die by about \$10, it significantly improves performance. A 300-MHz Mendocino with 128K of on-chip cache should have only slightly less performance on most applications than a 300-MHz Pentium II with 512K of off-chip cache. The gap is small because the on-chip cache runs at twice the speed of the off-chip cache, partially compensating for its smaller size.

To avoid confusion with the 266-MHz Covington, Mendocino is likely to appear only at 300 MHz and above. We expect Mendocino to debut at about \$200, the top of the basic PC segment, and ease down to the \$100 level within two quarters. To keep the entire basic PC segment covered, Intel will need to introduce a new clock speed of Mendocino every quarter or so while ratcheting down the prices of the lower speed grades. Since Mendocino uses the Deschutes CPU core, there is no reason it shouldn't scale to 450 MHz or so over time.

The introduction of the Celeron line changes the pricing lifecycle for Intel's PC processors. In the Pentium generation, new processors appeared at prices of \$600 or higher but after several price cuts eventually reached the \$100 mark. For Pentium II, we expect Intel will not drop prices much below \$200. Instead, as each Pentium II product approaches the \$200 point, its price will stop falling, and the product will disappear from mainstream desktops. At the same time, the corresponding speed grade of Celeron will appear, allowing that performance level to reach the basic PC market. Figure 2 illustrates this handoff.

New Brand Name Creates Marketing Challenges

Intel could have followed this new strategy without a new brand name, but it would have been confusing. For example, a Covington at 266 MHz clearly has lower performance than a Deschutes at 266 MHz; calling both Pentium II would create confusion and ultimately mislead PC buyers. Mendo-

cino will reduce this performance gap, but it will still have different performance characteristics than the standard Pentium II.

The new name has its own problems, unfortunately. To make a good first impression, the Covington part is not the best choice. Sophisticated end users may assume that if a Celeron-266 is no better than a Pentium/MMX-233, Celeron processors must be worse than Pentium/MMX at the same clock speed. This statement will not be true, however, for the Mendocino-based Celerons. Intel could solve this problem by using a different sub-brand for Mendocino, such as Celeron II, but such rapid brand proliferation would cause a different kind of confusion.

Even when Intel gets past the cut-rate Covington, positioning Celeron will remain challenging. Intel wants people to buy a Celeron PC instead of a system with a non-Intel processor, but it would prefer that people buy Pentium II instead of Celeron. Thus, Intel needs to build a brand identity around Celeron, but not at the expense of Pentium II.

Intel wants Celeron to be perceived as a “value” brand, making Pentium II the “versatile everyman” brand. In automotive terms, Celeron is the inexpensive Honda Civic, while Pentium II is the more expensive but popular Accord. The danger is that the performance hype behind Pentium II could position it as the luxurious but overpriced Acura.

Intel’s high-profile ad campaigns will still focus on Pentium II, since that brand will bring in most of the bucks, as Figure 1 shows. We probably won’t see any actors in neon-colored bunny suits dancing around Celeron modules. (Maybe actors wearing colored barrels.) Celeron is likely to be promoted mainly as part of the Intel “family” of brands, gaining its brand value primarily from the Intel name.

The intent is that the lower-performance Celeron parts won’t reflect poorly on the high-end Pentium II products. Over the past few years, the impression of the Pentium brand changed as those parts reached the low end of the PC market. With Celeron, Intel hopes Pentium II will continue to be perceived as the ultimate in performance.

Intel has spent hundreds of millions of dollars advertising the Pentium brand. With Celeron, the company will be starting over, although it can still rely on “Intel Inside.” Unfortunately, Celeron is aimed at those segments where Intel has the most competition from other brands, such as AMD and Cyrix. Discarding the value of the Pentium brand in this market appears unwise.

Intel Targets the High End

If Celeron is a Honda Civic, the expensive and power-hungry server products (see MPR 3/30/98, p. 14) are clearly sport utility vehicles. Using an extension of the mainstream brand for this segment may enhance the value of the Pentium II name by associating it with these high-performance products.

Unlike the basic PC segment, which has existed in Intel’s line for years without having a special name, the high-

end server market is essentially a new opportunity for Intel. To date, the company has released only three products for this market: 166-MHz and 200-MHz Pentium Pro products with 512K of cache (versus 256K in the desktop Pentium Pros) and a 200-MHz Pentium Pro with 1M of cache.

Intel announced the first two of these products in November 1995 at prices as high as \$1,989, but the company cut prices quickly during 1996 in a misguided attempt to build volume. The 1M part was introduced last August at a price of \$2,675, where it remains today. These high-end processors compete against RISC products that also sell for thousands of dollars and don’t change in price very frequently. Furthermore, Intel has discovered that high-end server customers don’t care much about the price of their processors, which are often going into systems that sell for \$20,000 and up.

We expect Intel to announce Slot 2 parts with full-speed 1M caches at prices similar to that of the 1M Pentium Pro. We don’t expect these prices to drop much over time. Instead, Intel will eventually replace these parts with faster versions, such as a Katmai with a large full-speed L2 cache. The next step for the high end will be a new slot, known as Slot M, and two new processors, the x86-based Tanner (see MPR 3/9/98, p. 4) and Merced, the first IA-64 processor. We expect these two processors, unlike Deschutes and Katmai, will appear only in the server segment and will not have corresponding lower-priced versions, at least initially.

By deploying these new parts, Intel hopes to gain an increasing share of the high-end processor market, which we define as processors selling for more than \$1,000. This market is dominated today by the various RISC vendors, although the large-cache Pentium Pro products have made a dent. Intel’s gains have been hindered because its current products fall short of the RISC offerings in two key performance areas: memory bandwidth and floating-point speed.

Slot M and Merced should close these gaps. Given the number of system vendors already committed to Merced, we expect Intel will be the largest supplier of high-end microprocessors by 2001. Intel’s revenues from this market could over time reach \$2 billion, with excellent margins. Because Intel’s PC processor revenue is so huge, however, this still represents a fairly small portion of Intel’s business.

Profit Margins on the High Wire

With competition at the low end becoming increasingly brutal (see MPR 3/30/98, p. 3), margins in the basic PC segment are likely to suffer. Intel expects to slow this decline by reducing the cost of its low-end processors through its creation of the Celeron products. Even so, margins on the Celeron parts will not be as good as Intel’s usual margins. But at the same time, Intel’s addition of new high-margin business in the server and workstation segment could balance the margin losses at the low end. If all goes well, Intel could continue to increase its revenue without a significant decline in margins—but this balancing act will be tricky at best. 