

INTEL'S PENTIUM 4 FINALLY ARRIVES

By Kevin Krewell {11/27/00-01}

Intel launched the long-anticipated Pentium 4 (see [MPR 08/28/00-01](#), "Pentium 4 [Partially] Previewed") at 1.4 and 1.5GHz on November 20. It will offer the P4 with the 850 (Tehama) chip set, which supports only RDRAM memory. After last year's fiasco with the memory

translation hub (MTH), Intel is forgoing SDRAM for now. As one might expect from an architecture called "Net Burst," Pentium 4 performs well on streaming media benchmarks. Intel compares the 1.5GHz Pentium 4 with the 1GHz Pentium III, and in many of the select benchmarks, the Pentium 4 is 30–40% faster.

One big win for P4 was in an SSE2 (Streaming SIMD Extensions, version 2) -optimized SPECfp2000(base), where the P4 reached 549, an impressive 88% increase over the 292 score of the 1GHz PIII. SPECint2000(base) also increased a respectable 24%: from 418 for the 1GHz PIII to 522 for the 1.5GHz Pentium 4. SSE2 certainly helps Pentium 4's performance, but it's hard to separate the impact of SSE2 from the deeply ("hyper") pipelined architecture and features such as the execution trace cache, the double-pumped integer ALUs (aka rapid execution engine), and the 400MHz system bus.

Intel has priced the 1.5GHz P4 at a reasonably aggressive \$819 (in 1,000-unit quantities), in part to compensate for the increased memory costs associated with the dual RIMMs (RDRAM memory modules) the 850 chip set requires. Intel is so concerned about RDRAM availability that it has taken the extraordinary step of including two RIMMs inside Pentium 4 boxed products sold in the VAR channel. Intel is publicly committed to RDRAM memory for now, but by mid-2001 it should introduce a chip set, code-named Brookdale, that will offer SDRAM and DDR SDRAM support. In addition, Intel has indicated that the Pentium 4 bus has been licensed to third-party chip-set vendors, which can develop DDR SDRAM chip sets within about six months.


The Pentium 4 is currently targeted solely at the uni-processor desktop and workstation market, and Intel will not support dual (or larger) configuration until Foster ships in 2Q01. Foster will be the "Xeon" version of the Pentium 4 architecture, and it is reported to support a large, off-chip L3 cache. Intel will probably differentiate Xeon (Foster) from Pentium 4 on the basis of multiprocessor support in addition to a large L3 cache.

AMD is not mounting an aggressive counterattack on Pentium 4 clock frequency but instead appears content with the overall performance of Athlon. We sincerely hope that AMD does not dredge up the questionable "PR" system to compare Athlon performance with that of Pentium 4. Competitive pricing strategies will get confusing, as AMD's Athlon will inhabit the clock frequency gap between the 1GHz Pentium III and the 1.4GHz Pentium 4.

In general office productivity applications, Pentium 4 does not appear to distinguish itself and, in fact, lags Athlon (especially Athlon with the 760 DDR memory chip set). When it comes to streaming media (audio and video encoding/decoding), double-precision math-intensive scientific applications, and any other bus-bandwidth-intensive application, the Pentium 4, with SSE2, should excel.

This brings us to an important juncture in PC performance measurement. Is additional performance truly required for office productivity, or is Intel right to focus transistor budgets and performance optimizations on streaming-media processing? Intel is certainly attempting to change the ground rules on AMD and has taken a commanding

lead in gigahertz. The question: Has Intel gotten ahead of the market as well?

The Pentium 4 is available now. List prices for 1,000-unit quantities are \$819 for the 1.5GHz version and \$644 for the 1.4GHz. 

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