SPEEDSTEP BOOSTS MOBILE PERFORMANCE

By Kevin Krewell {2/7/00-05}

On January 18, Intel's long-anticipated SpeedStep technology, code-named Geyserville, was introduced on mobile Pentium III Processors running at 600 and 650 MHz in high-power mode. In typical Intel fashion, SpeedStep was launched, and multiple OEMs demonstrated

portable computers based on the technology. SpeedStep-based portables from Acer, Compaq, Dell, Fujitsu, Gateway, HP, IBM, Micron, NEC, Quantex, Sony, and Toshiba were introduced at the launch event. A 500-MHz low-voltage Pentium III without SpeedStep was also announced.

The SpeedStep processors are capable of running in two modes—a high-power mode for maximum performance and a low-power mode for better battery life. In the two modes, processors operate at different frequencies and different voltages. According to Intel, SpeedStep will be offered only on mobile Pentium III processors, not on mobile Celerons—not even on future mobile Celerons based on the 0.18-micron Coppermine core. Intel will use this technology as one way to differentiate its performance-segment processors (Pentium III) from its value-branded (Celeron) processors. We also expect the 0.18-micron Celeron, which we refer to as Coppermine-128, to be offered with a 128K L2 cache, rather than the 256K L2 of the Pentium III.

When in the battery-friendly low-power mode, which Intel calls "Battery Optimized Mode," the mobile Pentium III will operate at 500 MHz and 1.35 V, giving it a design thermal dissipation of 7.9 W, but it will typically dissipate 5.1 W. These are the same frequency, voltage, and power ratings of the low-voltage, non-SpeedStep Pentium III. In "Maximum Performance Mode," to use Intel's parlance, the processor shifts to 650 (or 600)-MHz and 1.6-V operation. The 650-MHz processor has a thermal-power design of 14 W and a typical power dissipation of 9.1 W. For the 600-MHz

version, the corresponding design and typical power numbers are 13 W and 8.5 W. The processor-frequency multiplier and the core voltage setting are controlled by the combined efforts of an Intel-developed ASIC, the chip set, and system management mode (SMM) code in the BIOS. The SpeedStep technology control logic automatically detects AC power being added to or removed from the unit and can be manually controlled by a Windows-based SpeedStep application program.

Intel developed a custom ASIC and BIOS for SpeedStep, but it called upon the venerable 440BX to provide the chip-set support. Mobile Pentium III processors will continue to support only a 100-MHz front-side bus (FSB) for two reasons: to conserve power and because Intel does not have a mobile chip set that supports an FSB greater than 100 MHz.

Most of the portable systems introduced were the stocky desktop-replacement size, but a few thin-and-light entries are available from HP, IBM, and Sony. All the designs appeared capable of operating in high-power mode without exotic thermal solutions. The larger units use a combination of heat pipes, air vents, improved airflow designs, and fans to keep the 650-MHz mobile Pentium III cool.

All of the mobile Pentium III processors announced January 18 are available and shipping in volume now. The 1,000-piece prices for the SpeedStep processors are $423 for 600 MHz and $637 for 650 MHz (processor frequencies are listed for high-power mode). The 500-MHz low-voltage mobile Pentium III processor (without Speed-Step) is $294. Just two days prior to the launch, Intel cut

prices on existing mobile processors up to 54%. For example, the mobile Pentium III-500 price was reduced from $530 to $245 in 1,000-piece quantities. All mobile Celeron processors are now priced below $100, with the fastest part (466 MHz) having a list price of $96. ◇