Deschutes to Come in Slot 1, Slot 2

New Slot 2 Aimed at Servers, While Slot 1 Remains in Desktop PCs

by Linley Gwennap

Clarifying its plans for faster Pentium II processors, Intel released some high-level information on the next-generation device code-named Deschutes. Much of the information merely confirmed what we have reported (see MPR 2/17/97, p. 1): Deschutes will be a 0.25-micron shrink of the current Pentium II, offering similar features and marketed under the Pentium II name but with internal clock speeds in excess of 333 MHz and system-bus speeds of up to 100 MHz.

Slot 2 to Offer Large, Full-Speed Caches

More intriguing is Intel's clarification of the much-rumored Slot 2. Current Pentium II processors plug into Slot 1, which defines a connector and a form factor. Intel will offer Deschutes in both the current Slot 1 and the new Slot 2 formats. Slot 2 supports up to four processors, twice as many as Slot 1, and has physically larger modules. The latter change allows Intel to put more cache RAMs on the module, allowing for much larger caches than the current 512K.

Slot 2 is also designed to draw and dissipate more power than Slot 1; the greater surface area aids in heat dissipation. As Table 1 shows, Slot 2 processors will run the level-two (L2) cache at the same speed as the CPU, rather than at half speed, as in today's Slot 1 devices. This will require L2 cache SRAMs operating at speeds in excess of 333 MHz, a daunting and no doubt expensive proposition.

These key changes position Slot 2 processors for servers and high-end workstations rather than desktop PCs. These products will benefit from the higher bandwidth of the L2 cache bus. Slot 2 provides not only the cache-consistency signals required for four processors but also the larger L2 caches and faster system bus required for four high-performance Pentium II processors to share a single bus effectively. Given these target markets, Slot 2 processors are likely to be much more expensive than Slot 1 processors.

	Slot 1	Slot 2
System bus	66 MHz & 100 MHz*	100 MHz
L2 cache bus	Half CPU speed	Full CPU speed
L2 cache size	512K	1M and up
MP support	2 CPUs	4 CPUs
Module size	5.73" × 2.47"	Bigger
Connector	240 pins	330 pins
Target systems	Desktop PC & W/S	W/S & server
Availability	Now*	Mid-98

Table 1. The forthcoming Slot 2 offers several new features that are advantageous for high-end workstations and servers. *100-MHz Slot 1 available 1H98.

For this reason and others, Slot 2 won't obsolete Slot 1. Over time, Slot 1 will move to the 100-MHz system bus, but this change is not critical in a uniprocessor PC until the CPU clock speed reaches 400 MHz or so. The smaller Slot 1 devices fit better within a standard PC enclosure. With fewer pins that are further apart, the Slot 1 connector is less expensive, reducing motherboard cost.

At this point, Intel is not committed to putting larger or full-speed L2 caches on Slot 1 products. These features would boost performance on standard PC applications, but not by enough to justify their high cost. As the density of commercial SRAMs rise, Intel is likely to build Slot 1 processors with 1M of cache, perhaps around the beginning of 1999. Inexpensive SRAMs are unlikely to ever match the speed of Intel's desktop processors, however, preventing Intel from offering mainstream processors with full-speed caches.

Deschutes Will Appeal to Range of System Users

Intel was vague about other details of Deschutes. The part will be announced sometime in 1H98; we expect the announcement will be very early in the year. Intel would admit only that clock speeds will be 333 MHz and faster; with Pentium II achieving 300 MHz in the current process, we expect the shrink version to reach 400 MHz and possibly 450 MHz over time.

The 333-MHz version will use the 66-MHz bus, but since the chip supports only integer and half-speed clock multiples, the 100-MHz bus will not work with a 333-MHz CPU. Products that use the 100-MHz bus are likely to operate at CPU speeds of 350, 400, 450, etc. Intel may not offer a 366/66-MHz part, since such a device would deliver less performance than a 350/100-MHz processor.

Deschutes will be the first Pentium II processor for mobile systems. Intel declined to provide additional details, other than to confirm that Deschutes will be sold on a Mobile Module that meets the same thermal specifications as previous Mobile Modules (see MPR 2/17/97, p. 9). Achieving this low power dissipation may require a lower operating voltage than used in the desktop versions (which are likely to operate at 1.8 V), which would prevent Mobile Deschutes from reaching the same peak clock speeds as on the desktop.

The plan for Slot 2 indicates Intel is serious in its assault on the high-end server market, which has been limited to date by the relatively modest memory bandwidth and L2 cache sizes of Pentium Pro and Pentium II. Slot 1 will continue as a cost-sensitive alternative for mainstream desktop systems. Both slots will benefit from the 100-MHz system bus by mid-1998, providing plenty of headroom for future increases in CPU performance. ◫