

■ AMD Gains Gateway, Loses Money

In the latest chapter of its good-news/bad-news story, AMD has broken into one of the last Intel strongholds but still can't make a profit. The company proudly announced that Gateway 2000 is using AMD's K6-2 in a desktop PC for the Japanese business market. Sources indicate that, now that the long-time Intel stalwart has accepted AMD as a vendor, the PC maker will also use the forthcoming K6-3 in yet-to-be-announced consumer PCs. If so, this would make AMD a strong player in the direct channel; to date, the K6 family has been successful mainly in the retail channel.

AMD now has design wins at nine of the top ten PC makers; the only remaining holdout is Dell. We understand this situation is likely to continue until AMD loses a certain outspoken founder or Dell freezes over.

As we predicted, Intel's aggressive Celeron plan (see MPR 1/25/99, p. 18) has forced AMD to cut its prices, pushing it back into the red. Although AMD reported a slim profit for 4Q98, it now expects to lose money in 1Q99. The company has been busy revamping its pricing and product plans to address Intel's fast, cheap Celeron processors.

AMD had hoped its new faster processors would increase its average selling price and improve profits. Instead, Intel's price cuts foiled the company's plans. As it continues to invest heavily in R&D and in its Dresden fab, AMD must rely on the K6-3 and K7 to lead it back to profitability. —L.G.

■ Motorola Boosts PowerPC to 400 MHz

Using the same trick it has used many times in the past, Motorola upped the frequency of its PowerPC 750 from 366 MHz (see MPR 8/24/98, p. 13) to 400 MHz. The trick was to replace the transistors with those from its next-generation process. The new hybrid process, called HIP 3.5, marries the aluminum interconnect system from the company's 0.28-micron HIP 3 process with transistors from its upcoming 0.22-micron HIP 5 (see MPR 9/14/98, p. 1).

The new speed grade brings the measured SPECint95 (base) performance to 17.7 and SPECfp95 (base) to 11.7—up 10% and 18% over the estimates Motorola provided for the 366-MHz part. At 5.8 W (typ), 8.0 W (max), the faster processor is still a viable candidate for Apple G3 notebooks. The 400-MHz part lists for \$495 (quantity 1,000), while the prices for the 366- and 333-MHz parts have been dropped 25%, to \$381 and \$286, respectively.

Because HIP 3.5 uses HIP 3 interconnect rules, the die size of the new 400-MHz part remains at 67 mm². Thus, with this trick, Motorola matches the current speed of IBM's copper-based CMOS-7S Lonestar (see MPR 9/14/98, p. 4) but not its tiny 47-mm² die size. Motorola says, however, that the yields of the 750 in the new HIP 3.5 are good enough to compensate for any die area that would be saved by pushing to its CMOS-7S equivalent, HIP 5, at this time. We expect,

however, that the smaller size and copper wiring in Lonestar will soon allow IBM to boost it to 450 or 500 MHz, again grabbing the PowerPC performance lead from Moto.

The situation reflects a different strategy at the two semiconductor companies. IBM is using Lonestar as the process driver for its new copper technology, an approach that allows the company to stay ahead in performance, using the higher prices it can get to offset the lower yields of its bleeding-edge technology. Motorola, on the other hand, is using SRAMs as the process driver for its copper HIP 5 process, opting to remain a speed grade behind IBM to reap the yield and cost benefits of its more mature aluminum technology.

On the copper front, Motorola has commenced production of its first copper product, a 333-MHz 8-Mbit late-write SRAM. Burning only 2 W (at 3.3 V), the four-layer-metal chip has exceeded Motorola's goals for copper interconnect, delivering high speed at lower power than any other 4- or 8-Mbit late-write part on the market, according to Motorola.

The SRAM's success bodes well for the company's upcoming G4, the first PowerPC processor with the new AltiVec instruction set and the first to be built in copper HIP 5. Since the company has now demonstrated 400-MHz operation of HIP 5 transistors on the 750, we expect the new G4 processor, in full copper HIP 5, to easily achieve 400 MHz or more at introduction. Sources indicate that the part is on track for summer delivery; watch for more information at Apple's worldwide developer conference in May.

Growing tired of sniffing IBM's process exhaust, Motorola is jumping into the lead on a process innovation of its own: strong-phase-shift masks. The company has teamed with Numerical Technologies (www.numeritech.com) to develop the process, which the duo says can be used to pattern features far finer than is possible with standard lithography. Motorola will be the first vendor to ship a microprocessor based on the technique when it ships the G4. With this technology, Motorola says, it will be able to build 0.10-micron gates with extremely tight manufacturing tolerances (and therefore high yields), using its existing 248-nm steppers.

Strong-phase-shift mask technology will also be applicable to 193- and 157-nm DUV lithography. If the rest of the industry follows Motorola's lead, the technology could add two to three years of breathing room to the time the industry would otherwise have been forced to move to 13-nm EUV steppers, which was expected by 2005. —K.D.

■ Intel Cuts Celeron to \$63

Keeping the pressure on AMD and other competitors, Intel put the pedal to the floor with additional desktop Celeron price cuts just five weeks after its most recent set (see MPR 1/25/99, p. 18). The new prices bring the least expensive Celeron, the 300-MHz Mendocino, to a list price of just \$63. This represents a decline of 20% per month since last Octo-

ber. The brand new 400-MHz Mendocino now carries a list price of \$133 (see [MPR 2/15/99, p. 19](#) for details).

The latest price move, effective February 7, did not affect the desktop Pentium II processors, expanding the enormous premium for those parts. A 400-MHz Pentium II still lists for \$353, 165% more than the Celeron-400, despite offering similar performance on most applications. The aggressive price cuts will cause further pain for Intel's competitors as they are forced to match them or lose share. But the pain will be Intel's if PC buyers decide the less expensive (and less profitable) Celeron is a better deal than Pentium II. —*L.G.*

■ Intel 815 Extends Whitney's Reach

Sources indicate that Intel is preparing a new chip set known as the 815 that would fit between the 810 ("Whitney") and the 820 ("Camino"). This product is said to be based on the Whitney design but with support for Pentium II and Pentium III processors; the 810 is designed for Celeron systems.

Contrary to some rumors, Camino is still on track for a mid-1999 launch, as is Whitney. The 815 is likely to appear after these two parts, offering an alternative to the 820 for PC makers that desire the integrated graphics of the Whitney design. The 815 also supports SDRAM, giving PC vendors an

alternative to the more exotic (and more expensive) Direct RDRAM required by Camino. —*L.G.*

■ SiS Gets Intel P6 Bus License

Silicon Integrated Systems and Intel announced a licensing agreement between the two companies that gives SiS access to Intel's P6 bus technology in exchange for royalty payments plus a cross-license to SiS's patent portfolio.

SiS had previously announced P6 core-logic products, both with and without integrated graphics acceleration (see [MPR 6/1/98, p. 26](#)). The company claimed it had worked around all of Intel's patents; the license means SiS will not have to test this claim in court.

The license brings SiS to parity with VIA and S3, which received P6 bus licenses late last year (see [MPR 12/28/98, p. 4](#)). Acer, one of SiS's competitors in the low-end market segment, is now the only independent core-logic vendor without an announced P6 bus license. —*P.N.G.*

■ Erratum: UltraSparc-3

In our last issue (see [MPR 1/25/99, p. 1](#)), we erroneously referred to Sun's forthcoming UltraSparc-3 as an out-of-order processor. It is, in fact, an in-order CPU. ☐