

### ■ FTC Approves Intel/Digital Deal

After six months of investigation, the U.S. Federal Trade Commission (FTC) has approved Intel's acquisition of Digital's semiconductor assets (see MPR 11/17/97, p. 1). The FTC approved all terms of the proposed deal, allowing Intel to take over Digital's main fab, located in Hudson, Massachusetts. Using this fab, Intel is required to build Alpha processors for Digital for at least five years. Intel will use extra capacity at this fab to build its own products, with initial production available by the end of this year.

Intel also acquires several Digital products, including its StrongArm CPU and some networking chips. While Intel plans to sell these products and develop follow-ons, the company has no rights to develop Alpha processors or sell them to companies other than Digital. Intel is simply a foundry.

The FTC's only caveat in approving the deal is to require alternate sources for Alpha processors, since Digital plans to stop selling Alpha chips. The Commission requires that Digital license its Alpha technology to AMD (see next item) and Samsung. If either of these companies backs out, Digital must select another "Commission-approved licensee." The FTC (see [www.ftc.gov/opa/9804/digitala.htm](http://www.ftc.gov/opa/9804/digitala.htm)) also requires that Digital negotiate a foundry agreement with IBM "or another Commission-approved company."

Although the FTC claims it has stepped in to "ensure that Digital's Alpha chip remains competitive," it appears to be simply taking credit for events that were already in motion. AMD's negotiations with Digital predated the initial announcement of the Intel deal. And Samsung had already completed its acquisition of a full Alpha technology license (see MPR 3/9/98, p. 4). Similarly, Digital was already negotiating a foundry agreement with IBM to avoid having Intel as a sole source for its Alpha processors.

The FTC's approach is also somewhat misguided. Mandating additional sources of supply for Alpha processors will do little to improve Alpha's future prospects. Since its inception, Alpha's biggest problem has been a lack of customers, not a lack of suppliers. Other than Digital, no other large computer company is committed to the Alpha architecture.

Given Compaq's pending acquisition of the remainder of Digital's assets (also awaiting FTC approval), Alpha's future is clearly in Compaq's hands. Compaq has strongly endorsed Merced and plans to use the Intel processor in its workstations and servers. Digital plans to build similar products based on its Alpha processors. These two sets of products are likely to have significant overlap in performance, price, and features.

We believe the most likely scenario is that Compaq will emphasize its Merced systems for most applications, maintaining the Alpha systems for legacy Digital customers and, if Alpha can deliver a performance advantage, for high-end performance points unachievable with Merced. Both of

these markets are small and likely to shrink over time, leaving Alpha's long-term existence questionable.

Alternatively, Compaq may be so determined to distance itself from Intel that it would turn its back on Merced and emphasize Alpha in all of its workstations and servers, possibly even building some Alpha PCs as well. If Compaq takes such a strong stand, at least a few other major companies could follow. Without Compaq's strong backing, however, Alpha's prospects appear slim. —L.G.

### ■ AMD in Alpha Negotiations

The FTC's announcement on the Intel/Digital deal exposed previously secret negotiations by AMD to obtain rights to the Alpha architecture. After the announcement, AMD confirmed its interest in Alpha.

Negotiations between AMD and Digital have apparently been in progress for several months. AMD announced last October plans to license Digital's 21264 bus for use in its so-called Slot A (see MPR 10/27/97, p. 19). It is now apparent that AMD's discussions with Digital extended beyond simply licensing the bus to licensing the Alpha processor itself.

AMD's plans for Alpha are unclear. The company says only that its desire to build Alpha chips is contingent on a sizable customer base emerging. AMD currently has its hands full simply trying to get its x86 processors into volume production while keeping pace with Intel's constant price and performance improvements. Taking on a completely new processor family would be an unwise diversion of resources.

In the long run, however, AMD will have more than enough fab capacity for its x86 chips (see MPR 3/30/98, p. 3) and could possibly support a second processor line. Alpha could give AMD a weapon against Intel's forthcoming Merced processor, due in 2H99. Merced will use the new IA-64 instruction set to achieve much higher performance than any x86 chip. Alpha is the only current architecture likely to exceed or even come close to IA-64 in performance.

If Compaq chooses to back Alpha over Merced, it would generate significant volume for Alpha and could encourage other vendors to follow suit. This scenario is likely to be at the root of AMD's interest in Alpha. It may be a long shot, but there is little cost to AMD in taking an Alpha license and hoping for the best. —L.G.

### ■ First New Katmai Instructions Appear

With little fanfare, Intel has inserted into its Deschutes CPU core two new instructions. These instructions, FXSAVE and FXRSTOR, accelerate saving and restoring the floating-point registers. Because the MMX registers are mapped onto the FP registers (see MPR 3/5/96, p. 1), these instructions can also be used to save and restore the MMX registers.

The most interesting facet of the new instructions is that they define a new memory format for the FP registers,

which allocates 512 bytes of memory. The current registers consume only 80 bytes, plus a few extra for control words, so the new format is chock full of “reserved” areas. In fact, there is enough space in the new save format for up to 30 registers of 128 bits each.

Thus, the new instructions could foreshadow a massive expansion of the FP/MMX register file in Katmai, Intel’s next processor core. Intel has acknowledged that Katmai, expected in 2Q99, will include new instructions that are widely assumed to include parallel FP capability. Expanding the registers to 128 bits would allow four single-precision FP operands per register, similar to PowerPC’s AltiVec architecture (see MPR 05/11/98, p. 1). Adding more registers would make up for the x86’s rather meager allotment of eight.

By including the new instructions in Deschutes, Intel can begin working with operating-system vendors to make the necessary modifications to handle the larger register file. This plan should smooth the Katmai rollout. —L.G.

### ■ Xeon to Plug Into Slot 2

Sprouting another odd-sounding brand name, Intel has revealed it will brand its upcoming Slot 2 parts as Pentium II Xeon (“ZEE-on”) processors. The brand comes on the heels of Intel’s Celeron announcement (see MPR 3/30/98, p. 1), which established a new brand for low-cost processors.

Unlike Celeron, which is a standalone brand name, Xeon is properly used as a subbrand in conjunction with Pentium II. For the consumer space, Intel wanted to keep it simple, using a single brand name. The Xeon parts are aimed at more sophisticated server buyers, who can presumably keep two brand names in their heads at the same time.

We expect Intel to announce the first Xeon products next month. The Xeon processors (see MPR 3/30/98, p. 14) will combine the standard Deschutes CPU with large (up to 2M) full-speed level-two caches to improve performance on technical and server applications. Prices are rumored to be as high as \$4,000 for the top-of-the-line configuration.

Like Celeron, the Xeon name was created by a professional branding firm and is guaranteed to be meaningless in 23 languages. Our favorite joke confuses the new processors with the popular, powerful Warrior Princess Xena. But Intel is perfectly serious in its quest to brand its products with names rather than numbers, hoping to better differentiate its products from those of its competitors. —L.G.

### ■ Sun Raises UltraSparc Speeds

Taking steps to upgrade its entire product line, Sun has announced faster versions of both its high-end UltraSparc-2 processor and its integrated UltraSparc-2i chip. The new speed grades are achieved through better yields of the same design. Over the past several months, foundry Texas Instruments has tweaked its process to reduce the drawn transistor size from 0.29 microns to 0.25 microns (see MPR 9/16/96, p. 11), although the metal layers (and thus the die size) remain the same.

The process improvements allow UltraSparc-2 to reach a clock speed of 360 MHz, 20% faster than the previous parts. At this speed, and with 4M of L2 cache, the processor achieves scores of 12.8 SPECint95 (base) and 21.9 SPECfp95 (base), as measured in Sun’s latest Ultra60 workstations. The 360-MHz workstations—with 128M of memory, a 9.2G hard drive, and Creator 3D graphics (no monitor)—start at a list price of \$13,595.

Sun offers the 360-MHz US-2 on a module with 4M of cache for \$3,961 in quantities of 1,000. SME also offers a 300-MHz version with just 2M of cache for \$2,629, and a 250-MHz part with 1M of cache for \$1,900. Systems using these modules will compete with systems based on Intel’s forthcoming Xeon processors (see previous item).

The UltraSparc-2i also received a speed boost, but only to 333 MHz. Since the integrated part uses the same CPU core as US-2, it should achieve the same clock speeds. TI may not be able to deliver 360-MHz US-2i parts in the higher volumes needed for Sun’s low-cost workstations, however.

At 333 MHz, UltraSparc-2i delivers 11.2 SPECint95 (base) and 15.7 SPECfp95 (base). A 400-MHz Pentium II, in comparison, roughly reverses those scores, doing much better on integer-only programs but lagging on FP applications. The 333-MHz US-2i carries a list price of \$720, about the same as the Pentium II, but the SPARC chip includes system logic not found on the Intel chip. The Pentium II does, however, include 512K of cache.

The new US-2i carries a steep premium over the \$470 price of the 300-MHz version. The 333-MHz US-2i is also available with 2M of L2 cache in a module that lists for \$1,250. The original versions of UltraSparc-2i are currently shipping in low-cost “Darwin” workstations from Sun; the company has not yet announced plans for 333-MHz systems. —L.G.

### ■ 3Dlabs, TI Settle Lawsuit

In a quick resolution to the lawsuit filed by 3Dlabs against Texas Instruments earlier this year (see MPR 3/9/98, p. 4), the two companies have agreed to continue and expand their relationship for the production and marketing of the Permedia 2 graphics chip. The two companies revised their licensing arrangement to give TI a greater share of 3Dlabs’ business, most of which had been moved to second source SGS-Thomson prior to filing the lawsuit.

Texas Instruments continues to be widely used as a foundry despite several publicized problems. Before its tiff with 3Dlabs, TI had been sued by Cyrix (see MPR 12/27/93, p. 11) for not meeting its contractual obligations, a lawsuit that eventually ended their relationship. TI was also famously unable to deliver SuperSparc chips to Sun when that product first debuted. Unlike Cyrix, Sun continues to use TI as a fab (see previous item), and the 3Dlabs relationship appears to be patched up as well. Fabless vendors such as 3Dlabs need reliable fab partners to compete effectively in the PC 3D market. —P.N.G. 