Motorola, AMD Swap Technology

Motorola and AMD have announced a seven-year plan to exchange process technology. Their cooperation should make both firms more competitive in the embedded marketplace but it will not directly alter either's product roadmap. Specifically, neither company will be manufacturing or second-sourcing the other's processors.

The agreement covers four areas: semiconductor process technology, including copper interconnect; flash memory; network controllers; and patent cross-licensing.

AMD and Motorola will combine their expertise for next-generation semiconductor processes. The agreement covers 0.18-micron and 0.13-micron process geometries, with smaller feature sizes possible in the future. The agreement covers Motorola's "HiPerMOS" process as well as that company's copper-interconnect technology.

The two companies will pool their resources to develop future processes, which will then be deployed by both companies. This will not result in identical processes for Motorola and AMD, although their process will be similar. The process development will be carried out primarily at Motorola's MOS-13 APRDL (advanced process research and development laboratory) in Austin (Texas).

The second part of the agreement covers flash memories. AMD will share with Motorola its process technology for high-density flash memory cells, which both companies will use in integrated embedded controllers.

Motorola, of course, already has an embedded-flash design; the company has produced several 16-bit and 32-bit processors with flash memory on chip, including the whopping PowerPC 555 (see MPR 4/20/98, p. 11). AMD's flash memory, however, is generally regarded as superior to Motorola's, especially for larger memory arrays. Motorola says that its future processors with on-chip flash memory will use the AMD design, although low-end parts with less flash memory will probably continue to use the Motorola flash design for some time. The flash design work will be carried out primarily at AMD's submicron development center in Sunnyvale (Calif.).

Third, AMD will license to Motorola several of its network-controller designs. AMD has a large portfolio of Ethernet controllers, which in some cases compete with Motorola's own network chips. The agreement covers both programmer-visible designs and low-level circuit designs at the physical-layer level. We expect this agreement will lead to new Motorola chips that are software-compatible with existing AMD Ethernet chips. It should also allow designers to use the same physical-layer (PHY) interfaces for future AMD and Motorola controllers.

Finally, the two firms plan to sign a patent cross-license agreement that exempts either party from patent infringement suits from the other. Such agreements are common in the industry to help avoid nuisance lawsuits from unintentional patent infringement. They do not impart access to a company's copyrights or other intellectual property.

The deal is good news for both companies but it does not significantly alter the processor landscape. For its part, AMD will get access to copper processes earlier than it might otherwise have, helping to speed its K7 processor . For Motorola, the smaller flash-cell geometry will help it to reduce the die size (and therefore, the cost) of future embedded controllers with flash memory. Since many of Motorola's automotive and communications controllers are dominated by memory area, any improvement in flash density spells better margins for Motorola. —*J.T.*

IBM Trades PowerPC for ST's x86

In a similar vein (see previous item), IBM Microelectronics and STMicroelectronics (formerly SGS-Thomson) have concluded an agreement to swap logic designs and patents. The Franco-American accord aims to create single-chip controllers for hard disk drives as well as PC-compatible controllers for network appliances and set-top boxes.

Starting immediately, IBM will become a second source for the STPC Consumer, an integrated processor with a 486 core and most of a PC motherboard on the device (see MPR 8/4/97, p. 1). The agreement calls for the two to share four new x86 cores at the rate of one per year. ST expects to add Pentium-class performance and MMX extensions within that time frame. The two companies will each integrate these CPU cores with their own peripheral controllers, competing for integrated design wins in the commercial market.

The other half of the deal calls for an exchange of IBM's PowerPC for ST's DSP cores and read-channel electronics, which the companies will pool to create single-chip disk-drive controllers. Between the PowerPC, DSP, and read-channel, the two companies should be able to integrate all the electronics required, including head, motor, data separation, and interface functions. Finally, the two are exchanging patent portfolios in cross-license agreement.

The deal makes ST a new PowerPC licensee, although with one caveat: it can use the PowerPC architecture only in data-storage controllers, not in general-purpose microprocessors that might compete with IBM's.

The IBM/ST alliance comes on the heels of a similar deal among ARM, Cirrus, and Lucent to create single-chip disk controllers (see MPR 7/13/98, p. 15). IBM is also an ARM licensee and could potentially play both sides of this schism. The company feels, however, that its PowerPC/DSP design will be more successful than the new ARM approach. Given that ARM currently has no presence in data storage, while ST's chips are quite popular, this is probably a correct assessment.

The deal also gets IBM into the PC-on-a-chip business that ST and National Semiconductor have been pursuing

with mixed results. The two partners feel that PC compatibility is a vital feature for new set-top boxes and related appliances, a theory that has yet to be proved. —*J.T.*

QED's RM52xxs Get More Cache, Faster Clocks

Coincident with its announcement of the RM7000 (see MPR 8/3/98, p. 12), Quantum Effect Design has updated its RM5230, RM5260, and RM5270 chips. All three have undergone a process shrink that allowed QED to raise the maximum clock speed and double the cache capacity.

As part of a process shrink from 0.35 to 0.25 micron, QED took the opportunity to double the size of the chips' caches to 32K each while keeping the die size the same, at about 45 mm^2. The redesigned chips now run faster than their predecessors, with top clock speeds reaching 266 MHz. The 0.35-micron chips will remain in production; the new parts are dubbed RM5231, '61, and '71 to distinguish them from their previous incarnations.

The new RM52x1 chips are priced from $26 to $94 in 10,000-unit quantities. Where the old and new parts are available at the same clock rate, the upgraded version is usually only about $8 more expensive. Whereas the RM52x0 parts peak at 200 MHz, the new chips now offer 250- and 266-MHz speed grades. For customers already using QED chips, these are simple, inexpensive upgrades. For new users, the RM52xx series is competitively priced and offers a selection of six related chips based on the same CPU. —*J.T.*

Intel Appears Bullish on StrongArm

Apparently breaking its vow of silence regarding StrongArm, Intel has revealed that it has formed a second design group for StrongArm CPU cores in Chandler (Ariz.). We believe the new group is developing a second-generation "SA2" core that will be used in future integrated processors, which may appear sometime in 2000.

Intel still produces and sells the SA-110 and SA-1100 processors it acquired from Digital Semiconductor (see MPR 11/17/97, p. 1). Quantity prices are $27–$39 and $29–$40 respectively, the same as Digital's announced prices. The SA-1500 media processor, however, is nowhere to be found, putting it behind Digital's original prediction of samples in 1H98 (see MPR 12/8/97, p. 12).

The two existing StrongArm chips are still built on the original Hudson (Mass.) fab that belonged to Digital, a situation we expect to persist for the lifetime of these parts. Digital's designers were notorious for fine-tuning their circuits (Alpha and StrongArm among them) for the characteristics of their process technology, making it difficult for Intel to shift these chips to another fab. Future StrongArm parts, whether from the new Chandler center or from the primary design center in Massachusetts, will likely be targeted for Intel fab processes, at which time the Hudson fab may be either retired or refitted.

If the new SA chips appear in 2000, they may debut in 0.18-micron technology, making them among the most advanced embedded processors at that time. As with the original StrongArm, the combination of architecture, clever circuit design, and advanced fab processes could make the new StrongArm chips potent competitors for low-power systems. Although, there is no guarantee the Chandler team (late of the i960) can match Digital's design skills. Until Intel reveals more of its plans, potential customers will have to speculate—and wait. —*J.T.*

Motorola Vows to Rationalize Design Process

As either cause or effect of its latest reorganization, Motorola has concluded that it will use a compatible set of design tools within the company for future microprocessor development. Each of the company's various divisions had heretofore used separate—and mutually incompatible—design tools, complicating design reuse within the company. A serial peripheral designed for, say, a ColdFire processor could not easily be used with a PowerPC part, or vice versa.

In the future, Motorola will use tools that are compatible with the popular Synopsys, Cadence, and Mentor tool chains. This new level of compatibility should make it easier for various Motorola design teams to share circuit designs (intellectual property in the current parlance) and to integrate designs that customers bring with them.

None of this rationalization has actually taken place, and Motorola says the process will likely take "several years" to complete. In the meantime, some microprocessor core designs and peripheral functions (of which Motorola has many) will be converted to the new design methodology. The change should be mostly invisible to Motorola's customers. When the transformation is complete, Motorola anticipates some shortening in development cycles. Until that time, things are likely to be even more complicated as the company gets up to speed on all the new tools. —*J.T.*

ARM Sneaks Into PlayStation Video Game

Later this year, Sony will roll out an inexpensive add-on to its immensely successful PlayStation video game. The creatively named PDA (personal digital assistant) is a Tomagotchi-like device that plugs into the handheld controller of a standard PlayStation. The PDA contains an ARM7 processor, 2K of SRAM, 128K of flash memory, an IrDA port, and a 32 × 32-pixel monochrome LCD display. The $30 unit will act as a combination memory card and a game/clock/toy in its own right. North American sales should begin in 2Q99.

Although Sony has been an ARM licensee for many years, this is the first public announcement of an ARM-based product from the company.

The PlayStation has been hugely profitable for Sony, considered the most successful product in the company's history and bringing in 22% of the Japanese giant's revenue in fiscal 1998. PlayStation sales are at 30 million and rising, making it the most popular game console worldwide. Sony's PDA should add a bit of life to the system before the company overhauls the PlayStation sometime in 2001. —*J.T.*