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XILINX RECONFIGURES TRISCEND

Acquisition Surprise: Xilinx Snatches Triscend From the Arms of ARM

By Tom R. Halfhill {3/15/04-02}

Only weeks after ARM announced the acquisition of Triscend, Xilinx loosened ARM's grip with a higher bid and wrestled the small chip vendor away from ARM. The Xilinx deal is final, averting a further bidding war or the intercession of other suitors.

Not until April will Xilinx disclose how much money it paid to pry Triscend out of ARM's arms, but it's apparently more than \$13.2 million, the amount of cash ARM had promised to fork over for the suddenly attractive company. (See *MPR 2/17/04-02*, "ARM Grabs Triscend.") As ARM had planned, Xilinx will absorb almost all 41 Triscend employees and phase out Triscend's corporate identity.

Although Xilinx says it will continue supplying Triscend's customers with Triscend chips, the product line will undergo significant changes. Over the next 12–24 months, Triscend's engineering team will develop new products to support the Xilinx strategy of combining embedded-processor cores with reprogrammable logic. Both companies currently sell chips that embody that strategy, albeit with some differences.

Triscend's chips combine a 32-bit ARM7 or 8-bit 8051-compatible CPU core with some reprogrammable logic. Xilinx has a line of V2 Pro chips that embed one or two 32-bit PowerPC 405 processor cores in an FPGA. Both product lines allow customers to optimize the chips for specific applications by implementing soft peripherals and additional function units in the reprogrammable logic, thereby eliminating the high development cost of an ASIC project. The Xilinx V2 Pro chips tend to offer higher performance and larger amounts of reprogrammable logic, thanks to their PowerPC 405 cores and more advanced fabrication technology.

One attraction of Triscend was its proprietary development tools. Triscend created the tools for developing application-specific microcontrollers, and the tools include

royalty-free libraries of intellectual property (IP) for rapid integration into reprogrammable logic. The Xilinx development tools, such as *Platform Studio*, were created primarily for FPGA, ASIC, and SoC developers. Xilinx may adapt Triscend's tools to lure more microcontroller designers into FPGA territory.

In addition, Xilinx can make chips that are more competitive than Triscend's. Xilinx is manufacturing its V2 Pro chips in a 0.13-micron fabrication process, with a 90-nanometer process on the horizon. Xilinx is already using a 90nm process for its Spartan-3 FPGAs. Triscend is still using older-generation 0.18- and 0.25-micron technologies.

The Xilinx deal interferes with ARM's plans to use Triscend as a wedge into the lucrative microcontroller market, but it's not a fatal blow to ARM's strategy. ARM is trying to establish its low-power 32-bit RISC architecture as the CPU of choice for 32-bit microcontrollers, especially for potential customers upgrading from 8- and 16-bit chips. Acquiring Triscend seemed like a good idea, because its 32-bit microcontrollers already use ARM7 cores and have some existing customers. A customer that found itself using the Triscend chips in larger quantities could migrate the design to an ASIC. At the same time, other ARM licensees that make 32-bit microcontrollers would be less likely to view Triscend as direct competition, because no other ARM licensee surrounds the CPU core with reprogrammable logic. Now, after losing Triscend to Xilinx, ARM will have to pursue the 32-bit microcontroller market by other means.

Some interesting meetings lie ahead for ARM and Xilinx. Triscend's ARM license requires Xilinx to renegotiate some terms with ARM, because Xilinx is one of the last chip vendors in the universe lacking an ARM license. Xilinx will need an unencumbered ARM license if it intends to use ARM cores in future products or to ship Triscend's new ARM7-based chips, which are ready to make their debut. (See *MPR 9/15/03-02*, "Triscend Revs Up for Motors.") Xilinx says it doesn't foresee any difficulties reaching an agreement with ARM, which stands to gain royalties from any ARM-based products that Xilinx ships.

Xilinx may drop Triscend's foundry relationship with Sharp; it already has a relationship with rival foundry UMC,

where Triscend has migrated production of chips formerly manufactured by Sharp. Xilinx also has foundry relationships with TSMC and IBM Microelectronics. Had ARM's acquisition of Triscend come to pass, ARM would have needed to maintain Triscend's foundry relationships, because ARM is strictly an IP-licensing company without manufacturing relationships of its own.

In a way, Triscend is returning to the fold by joining Xilinx. Triscend's three founders—Chris Balough, Danesh Tavana, and Stanley Yang—came from Xilinx when they started the company in 1997. Only Tavana, however, remains at Triscend, as chief technology officer and vice president of engineering. ♦

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