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INDUSTRY REFLECTIONS

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An inside look at fabless start-ups on the horizon

Usually, I find it challenging to drum up my favorite start-up for the quarter. Sometimes nothing excites me, but other times, several companies catch my attention. I find some market segments compelling, yet have difficulty choosing the “winning” start-up in the space. Sure, there are lots of 802.11a WLAN start-ups, but how can I possibly determine the winner? I’m certainly no expert in orthogonal frequency division multiplexing (OFDM) technology.

However, there’s nothing like simple, pure, blazingly fast speed to demonstrate clear technology leadership. That’s why **Intrinsity** is my favorite start-up for this issue. Intrinsity recently introduced the FastMATH microprocessor, a 2GHz adaptive signal processor for real-time, adaptive signal processing applications. Two gigahertz — that’s no small feat.

Intrinsity (previously called EVSX) was founded in May 1997 with 22 original founders to develop high-performance, low-power microprocessors for embedded systems. The company has received \$30 million in equity and development fees to date, a relatively modest amount, given its accomplishments. Intrinsity has more than 80 employees, many of whom came from now-defunct Exponential Technologies.

The FastMATH adaptive signal processor consists of a native matrix and parallel vector math unit coupled with a RISC processor based on the MIPS32 ISA, which provides ease of programming and flexibility. The Math Unit provides exceptional parallel data computational performance on the commonly used matrix and vector math data types found in adaptive algorithms. The Matrix Coprocessor features a single-instruction multiple-data (SIMD) architecture based on an array of 32-bit processing elements, each with local register file. The coprocessor achieves 64 GOPS (peak) and 596,000 radix-4 1024-point 16-bit FFTs/second at 2GHz.

Other features include a 1MB on-chip L2 Cache, DDR Memory Controller and ION Ring Interconnect, a slotted ring network over which peripherals communicate with each other and the L2 cache. The ION Ring features 25GB/s peak aggregate throughput. Dual RapidIO Ports, GPIO & Memory Interface, a DMA Unit and EJTAG Debug Interface connect to the ION Ring. The dual 8-bit, 500MHz RapidIO interfaces offer an aggregate throughput of 4GB/s with low pin-count.

The FastMATH Adaptive Signal Processor is designed to scale beyond 4GHz, and, according to Intrinsity, delivers six times the performance of the fastest digital signal processors (DSPs) on common, math-intensive operations, such as the FFT algorithm. Intrinsity has also introduced the 2GHz FastMIPS MIPS32 ISA-based embedded processor, which is essentially FastMATH without the matrix math unit.

Both devices are based on Intrinsity’s Fast14 Technology, which enables multi-GHz, dynamic logic technology for embedded processor markets. According to Intrinsity, dynamic logic yields two to five times the performance of static designs, however, the gains in performance have rarely exceeded the increased costs in design time and effort required to generate a functional design. Fast14 Technology offers dynamic logic performance with the design productivity of static design flows for the entire chip. Intrinsity has over 80 patents filed, 51 granted and 600,000 lines of proprietary electronic design automation (EDA) software for the creation of high-speed digital logic.

Intrinsity will begin sampling its FastMATH and FastMIPS processors in Q4 2002. Both devices are fabricated in a standard 0.13-micron CMOS process.

Sure, Intel has introduced a 2GHz processor. But how many other companies have? And Intrinsity is wisely avoiding the mainstream desktop processor market, unlike Exponential Technologies. Yes, we still need to see not just silicon, but silicon with reasonable yields at speed and in high-volume production — a key stumbling block for Exponential Technologies. But setting these issues aside, I must admit, Intrinsity’s achievements are no doubt, truly impressive. ■

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