Spectral Design & Test

Leveraging Differentiated Embedded Memory IP and Software Automation Tools for High Performance Low Power Micro Chips

Silicon chip manufacturing is seeing exponential growth, fueled by demands for intelligent sensors, autonomous computing and big data analytics. Furthermore, the high demand for processing power continues to be limited by the memory-access bottleneck. The cost of manufacturing continues to escalate, resulting in a major consolidation in the industry and therefore a smaller skilled workforce with hard-pressed time-to-market pressures. Design automation and efficiency have become imperative for IC designer to meet the time-to-market challenges in the systems on a chip business.

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Deepak Mehta, an industry stalwart with extensive embedded SRAM/ROM design and automation experience, established Spectral Design & Test, Inc.in 2008 after a long and successful career at startups and well-established design automation companies. At Spectral, Deepak, his Co-founder William Palumbo, and a team of top-notch circuit designers spent the first few years building and refining a software platform that was built grounds up to tile, analyze, characterize, and verify embedded MemoryIP. A packaged expert system to generate thousands of Memory macros on a targeted technology (also known as Memory Compilers) is a laborious task that requires a team of over a dozen design and software engineers. Spectral's Proprietary Software platform enables Memory Compiler developers to reduce the cycle time by 50 percent with half the number of resources compared with the industry-standard solutions. This software platform is commercially sold as well as internally used to build custom Memory macros and compilers for some of the world's largest Fabless semiconductor design and manufacturing companies.

Deepak and his design team next focused their efforts on using this platform to build highly differentiated SRAM designs targeted on the highly competitive low-power market. One of their first design projects was with a leading hearing aid company whose goal was to cut their dynamic power consumption by half to increase battery life. An area competitive SRAM design was developed such that the design would operate at extremely low voltage levels. Architectural innovations in combination with a robust design methodology resulted in a 70 percent reduction in power with a very nominal increase in real estate. The success of this project propelled the company into a new segment of customizing memory architectures to meet aggressive power-performance metrics. Armed with a highly efficient Memory development platform and a low-power SRAM architecture, Spectral has delivered customized macros in FinFet and System on Insulator (SOI) architectures.

Deepak commented, "Spectral promotes a flexible business model. We are constantly under pricing and product feature pressures as the big IP vendors align with semiconductor foundries, and provide foundry-sponsored, silicon-proven IP with a royalty-based payoff. We provide our silicon-proven architectures customized to meet aggressive targets set by our customers with the option to modify the IP on our software development platform." Spectral can provides complete soups-to-nuts methodology to model, analyze, tile, characterize, and test array structures. The most advanced design porting methodology encapsulated in software has grown to be over half a million lines of C++ code as we continue to build automation that starts from bitcell creation, analysis, tiling, and characterization."

Spectral has strong relationships with leading software automation companies that allow them to offer their solutions without upsetting the ecosystem. Spectral is a trusted IP and software development partner for a multitude of clients from various verticals including industrial IOT, Vision processors, bio-medical, aerospace, and military application.

The demand for high-performance, low-power applications and growth in the processor-in-memory continues to be a major driver to integrated large chunks of monolithic memory on a micro-chip. Deepak explained. "Spectral designers and management forge collaborative relationship with ecosystem partners and become an extension to the clients' internal teams, ensuring that extreme product and time-to-market requirements are met with the highest quality."

Spectral continues to innovate and is growing behind revenue targets in an extremely competitive market. Deepak summarized "The depth of experience in embedded RAM design, coupled with partnerships with customers who are targeting cutting-edge technologies, is helping us fast expand our portfolio of IP products on the world's most advanced commercial grade Memory Development Platform." si

Deepak Mehta,
President & CEO