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Predictable Success

Synopsys and STMicroelectronics

Synopsys' DesignWare® IP Helps STMicroelectronics Speed Time-to-Market for STM32 Connectivity Line of SoCs

We evaluated IP vendors based on feature set, technical support and maturity of the IP. Synopsys came out ahead in all three areas. They provided us with high quality, fully verified IP solutions that enabled us to focus our efforts on the differentiated portions of our design."

Ludovic Ruat
Digital IP Design Manager, Microcontrollers Division, STMicroelectronics

Business

STMicroelectronics is a global leader in developing and delivering semiconductor solutions across a broad spectrum of microelectronics applications.

Challenges

- Meet time to market goals for a complex design
- Deploy a new product line incorporating advanced connectivity functionality
- Acquire scalable IP solutions that would easily support future generations of the product

DesignWare IP Solutions

- USB digital controller
- Ethernet digital controller

Benefits

- Achieved first-pass silicon success with proven, high-quality IP
- Enabled internal resources to focus on core competencies and met the project schedule
- Selected an IP vendor that provided a strong product roadmap to support future designs

Overview

ST is a leader in multimedia convergence and power applications. The company offers one of the world's broadest product offerings, including application-specific products, a portfolio of ST's proprietary Intellectual Property (IP) and multi-segment products that range from discrete devices to high-performance microcontrollers, secure smart card chips and microelectromechanical systems (MEMs).

The STM32 family of 32-bit Flash Microcontrollers is based on the breakthrough ARM Cortex™-M3 Processor, which is specifically developed for embedded applications. The STM32 family offers a complete 32-bit product range that combines high-performance, real-time, low-power and low-voltage operation, while maintaining ease of integration. Compatibility of pin-assignments, peripherals and software across all STM32 devices is a key technical feature throughout this family of microcontrollers. The STM32 Connectivity Line features USB OTG, CAN2.0B and Ethernet interfaces.

By using Synopsys' high quality DesignWare USB and Ethernet IP, we were able to meet our project schedule and achieve first pass silicon success. Synopsys DesignWare IP is well trusted in the design community and has been silicon-proven in a wide range of applications."

Ludovic Ruat, Digital IP Design Manager, Microcontrollers Division, STMicroelectronics

Leading DesignWare IP Solution

ST was adding a fourth product line to its 32-bit STM32 family of microcontroller integrated circuits, which would include new connectivity interfaces that were previously not available in the STM32 family. The new STM32 Connectivity Line would target networked, real-time and audio applications and consist of a USB On-the-Go (OTG) interface, allowing end products to act as a USB host and device. It would also include an Ethernet interface featuring hardware support for the IEEE-1588 Precision Time Protocol (PTP). Implementing the Ethernet protocol with support for the IEEE-1588 specification reduces CPU overhead and enables faster response for real-time applications, allowing devices on a network to be synchronized with microsecond precision. To meet their time to market schedule, ST wanted to focus their expertise on product differentiation and utilize third party IP for their standards-based, connectivity IP needs.

ST evaluated IP vendors based on features, technical support and maturity of the IP. Since ST wanted the ability to reuse the IP in subsequent designs without making any significant code changes, it was also important that the IP was scalable and configurable to meet specific design requirements. At the end of the vendor evaluation process, ST discovered that Synopsys came out ahead in all key areas.

The highly configurable DesignWare USB and Ethernet IP solution allowed ST to easily configure and integrate the core within weeks. Furthermore, the Ethernet IP was also the only IP solution at the time to support the latest IEEE-1588 specification.

High Quality IP and Excellent Support

For this important design, ST wanted high quality USB and Ethernet IP solutions that worked first time. Synopsys' DesignWare IP enabled ST to complete the project within the required time frame and achieve first pass silicon success for the STM32 Connectivity Line. "Synopsys DesignWare IP is well trusted in the design community and the IP has been silicon-proven in a wide range of applications," stated Mr. Ruat. Furthermore, ST noted that throughout the quality assessment process, Synopsys was very open and willing to share all of the verification reports, providing full transparency.

ST considered Synopsys' technical support team experts in the field and whenever ST had an issue, Synopsys was always quick to respond with a solution. Mr. Ruat commented, "We were very well supported and appreciated the efforts of the Synopsys' IP corporate applications engineering team."

With the successful launch of the STM32 Connectivity Line, ST now offers 75 MCUs across all STM32 families, enabling more customers to benefit from the 32-bit ARM Cortex-M3 processor and complete pin-to-pin and software compatibility. Undoubtedly ST will be building on this success with new product developments in the future. When asked if DesignWare IP will be a part of these future projects Mr. Ruat replied, "Whenever possible, we will definitely use DesignWare IP."

"We wanted a long term relationship with our IP vendor. Synopsys presented a very strong product roadmap that we could rely on for future product developments.

Ludovic Ruat, Digital IP Design Manager, Microcontrollers Division, STMicroelectronics