

Synopsys and STMicroelectronics

ST Meets High Analog Performance and Low Power Goals for STM32 Microcontrollers with DesignWare Data Converter IP



Meeting aggressive analog performance targets, while reducing power dissipation were key challenges. We were able to achieve these goals for our STM32 microcontrollers by using Synopsys' DesignWare® Analog-to-Digital Converter IP."



Daniel Colonna

Microcontrollers Division Marketing Director, STMicroelectronics

Business

STMicroelectronics is a leading supplier of semiconductors for industrial applications, inkjet print heads, MEMS for portable and consumer devices, general purpose and secure microcontrollers, MPEG decoders, automotive integrated circuits, computer peripherals and wireless.

Challenges

- ▶ Achieve critical performance, power, and area requirements
- ▶ Meet aggressive time-to-market-window with a high-quality IP solution
- ▶ Select an established IP vendor who would support future product evolutions

DesignWare® IP Solution

- ▶ 12-bit Successive-Approximation-Register (SAR) Analog-to-Digital Converter (ADC)

Benefits

- ▶ Met 12-bit, 1 MSPS high performance, with very high absolute accuracy
- ▶ Achieved first-pass silicon success
- ▶ Received excellent support from an experienced engineering team

Overview

Offering one of the industry's broadest product portfolios, STMicroelectronics serves customers across the spectrum of electronic applications with innovative semiconductor solutions by leveraging its vast array of technologies, design expertise and combination of intellectual property portfolio, strategic partnerships and manufacturing strength.

STMicroelectronics offers a comprehensive portfolio of microcontrollers ranging from robust, low-cost 8-bit microcontrollers to a family of 32-bit microcontrollers (STM32), which include a vast choice of peripherals. The STM32 family of 32-bit flash microcontrollers is based on the breakthrough ARM Cortex™-M3 core, specifically developed for embedded applications. Furthermore, new families based on ARM Cortex™-M0 and -M4 cores will also complement STMicroelectronics' offering. The STM32 family combines high-performance, real-time, low-power and low-voltage operation, while maintaining ease of integration. The scalable microcontrollers deliver advanced functionalities that are optimized to meet the needs of specific applications, providing a scalable solution for cost-sensitive designs.



Synopsys' knowledgeable technical support team was very responsive throughout the design cycle."

Daniel Colonna

Microcontrollers Division Marketing Director, STMicroelectronics

Leading DesignWare IP Solution

The STM32 family of microcontrollers includes an advanced processor core, multiple peripheral devices including one or more instances of a 12-bit ADC. STMicroelectronics' challenge was to integrate an analog peripheral with very high accuracy, without impacting the low power dissipation of the system.

To help them focus their engineering resources on the differentiating features of their design, STMicroelectronics set out to find a data converter IP solution that would offer very high performance, low power dissipation, small silicon area and support a broad range of applications including battery powered devices. In addition, STMicroelectronics wanted an IP vendor that had a proven track record of delivering high-quality, silicon-proven analog data converter IP to ensure low integration risk and time-to-market.

Synopsys was able to offer a competitive solution which supported a 12-bit SAR ADC featuring up to 19:1 input multiplexer and a sampling rate of up to 1 MSPS.

High-Quality IP and Excellent Support

STMicroelectronics wanted a high-quality ADC solution that worked right first-time. With the DesignWare 12-bit SAR ADC IP, they were able to achieve first pass silicon-success and meet their aggressive performance targets.

The high-quality DesignWare 12-bit SAR ADC IP featured a very high accuracy and low total-unadjusted error providing the flexibility and performance required for an advanced microcontroller analog interface. Furthermore, the low-power DesignWare 12-bit SAR ADC IP makes it suitable for applications on mobile devices.

Synopsys' technical staff was supportive helping to address specific needs throughout the design and integration process. STMicroelectronics is looking forward to the continued success of their STM32 family of microcontrollers.



"Synopsys enabled us to meet our aggressive performance target by providing a robust 12-bit SAR ADC IP with a sampling rate of up to 1 MSPS."

Daniel Colonna

Microcontrollers Division Marketing Director,
STMicroelectronics



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