SEGGER Drives Single-Chip Debug, Trace, and Programmer Solutions with AMD Zynq™ Adaptive SoC

AMD Technology Helps SEGGER Deliver Cutting-Edge Solutions for Embedded Systems Design

PARTNER

SEGGER

INDUSTRY

Embedded System Design

CHALLENGES

SEGGER wanted to exploit the value of FPGAs across its hardware portfolio to improve design flexibility and performance.

SOLUTION

The company deployed the FPGA-based AMD Zynq™ adaptive SoC into its J-Link and J-Trace tools, Flasher programmers, and emPower-Zynq evaluation board, using the device as a high-end MCU with FPGA logic, without the need for external SDRAM.

RESULTS

The AMD solution has enabled SEGGER to achieve a cost-optimized design while boosting performance, flexibility, and power efficiency across its product portfolio.

AMD TECHNOLOGY AT A GLANCE

AMD Zynq™ adaptive SoC

SEGGER Microcontroller offers embedded software (such as a real-time operating system (RTOS), communication and security software), software tools, the J-Link and J-Trace debug and trace probes, and the Flasher line of in-circuit device programmers for embedded systems designers.

The company started as a pure software provider, selling its efficient RTOS embOS to manufacturers targeting mass markets such as white goods. It's now deployed in several billion devices.

With the introduction of the Flasher standalone programmers in 1999, SEGGER began producing hardware tools. In 2004, the company introduced the J-Link debug probe to the then-emerging Arm market, and it has since become the de-facto standard debug probe for ARM-based development.

Customers use SEGGER's J-Link and J-Trace probes during software development, and Flasher programmers to program final hardware in production.

CHALLENGE

SEGGER wanted more design flexibility in its products. Step one was to design FPGAs into the J-Trace. Next, the company developed even higher-end models of its other products, including the Flasher programmer, in order to elevate them to their full potential.

"When programming a chip, there is a theoretical speed limit," said Rolf Segger, founder of SEGGER. "One of our design goals for the Flasher is to achieve at least 95% of the maximum speed possible. We designed our Flasher to be the fastest and most flexible programmer on the market."

For the trace probes, the AMD Zynq™ 7000 adaptive SoC provides the ability to adjust signal timing in small steps of 100 picoseconds within a 2.5 ns window. "It's been great to have a feature in hardware that can do that," Segger said. "It makes our trace probes even better."

SOLUTION

All J-Trace probe models use an FPGA-based AMD Zynq adaptive SoC. It is also used in two high-end J-Links as well as most of SEGGER's Flasher models. The company uses its own embedded software (e.g., RTOS, TCP/IP stack, USB stack, file system, etc.) in its hardware products, and uses its own debug probes to debug the software.

In order to use the AMD Zynq adaptive SoC in the J-Link, J-Trace, and Flasher products, SEGGER ported its software to the device, and even released a general-purpose evaluation board as a demonstrator for both SEGGER software and the device itself. With the SEGGER emPower-Zynq board and matching SEGGER emPower-OS software suite, SEGGER turned the AMD Zynq SoC into a high-end microcontroller with FPGA.

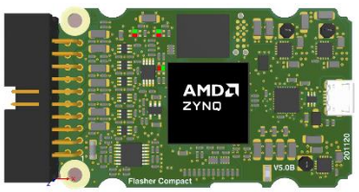
SEGGER unleashed the power of this device with its software and made the software available to the market. This allows customers to prototype a

complete embedded application and thereby ease the process of creating a custom product.

"Using the on-chip memory of the Zynq SoC, we were able to implement our design with our own RTOS, and without using external memory," Segger said. "It's a great example of how to do a cost-optimized design."

The Zynq adaptive SoC helps the Flasher programmer as well. "Minimized power consumption is an important aspect of our design process," Segger said. "Our Flasher runs at less than a half a watt, which is excellent for such a powerful product. The AMD Zynq SoC helps us keep the standby current relatively low. With this design, we can achieve top performance while keeping clock speeds as low as they need to be."

RESULT



"All of our J-Trace, Flasher, and high-end J-Link models now use Zynq, and run firmware without external code/data RAM. J-Trace is augmented with SDRAM to provide unlimited, streaming real-time trace. This is an important feature for us. Zynq lets us run two processors simultaneously, plus it has all of the benefits of an FPGA, including 512KB of cache and 256KB of RAM," Segger said. "We load our program from a small external QSPI Flash, it fits completely into the cache, and everything runs at full speed on a single chip."

"The Zynq adaptive SoC offers the perfect performance combination," Segger said. "The pairing of fast Arm cores with the flexibility of an FPGA that allows us to run multiple of our "Speedy" soft cores is unbeatable. We couldn't ask for a better device…especially in combination with the 256KB of RAM that allows us to go single-chip. It's the perfect solution for all of our applications."

The SEGGER software enabling this chip to run without external memory is available for licensing.

WANT TO LEARN MORE?

About AMD Zynq adaptive SoC

About SEGGER

About SEGGER Microcontroller

SEGGER Microcontroller GmbH has three decades of experience in Embedded Systems, producing cutting-edge RTOS and Software Libraries, J-Link and J-Trace debug and trace probes, a line of Flasher In-System Programmers and software development tools. The company was founded by Rolf Segger in 1992, is privately held, and is growing steadily. SEGGER also has a U.S. office in the Boston area and branch operations in Silicon Valley, Shanghai, and the UK, plus distributors on most continents, making SEGGER's full product range available worldwide. For more information on SEGGER, please visit www.segger.com.

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