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ZYNQ®

Xilinx and Lidix

Product: ML-Series Fitness Sorter banking machine

Lidix (Seoul, Korea) revolutionized currency fitness sorting and improved productivity within the banking industry with its ML Series currency fitness sorter. Based on the Zynq®-7000 All Programmable SoC, the ML Series doubles the performance of previous devices at half the BoM. The series uses fifteen percent lower power and provides exponentially more functionality than Lidix's previous products based on a DSP with a companion FPGA. The new products deliver a feature set that exceeds much higher-priced products from competitors.

Challenges

To ensure banks run efficiently, currency sorters have to be extremely accurate and reliable. With each new product generation, improvements must be made on all fronts, adding new ease-of-use and automated sorting features as well as improving the system performance. Previous systems sorted 10 types of currency at a rate of 600 notes per minute. The next-generation Lidix sorter had to be faster, easier-to-use, support more types of currency, and include advanced monitoring features using multiple types of sensors.

"Our previous generation product processed 600 notes per minute, but banks want even faster performance. With the Zynq All Programmable SoC we can process at twice the speed of the previous generation - 1500 notes per minute. That's a big competitive advantage for us."

Ralph Kim, design engineering manager at Lidix

Lidix ML-Series with Zynq All Programmable SoC

Executive Summary

Customer

- Lidix

Challenges

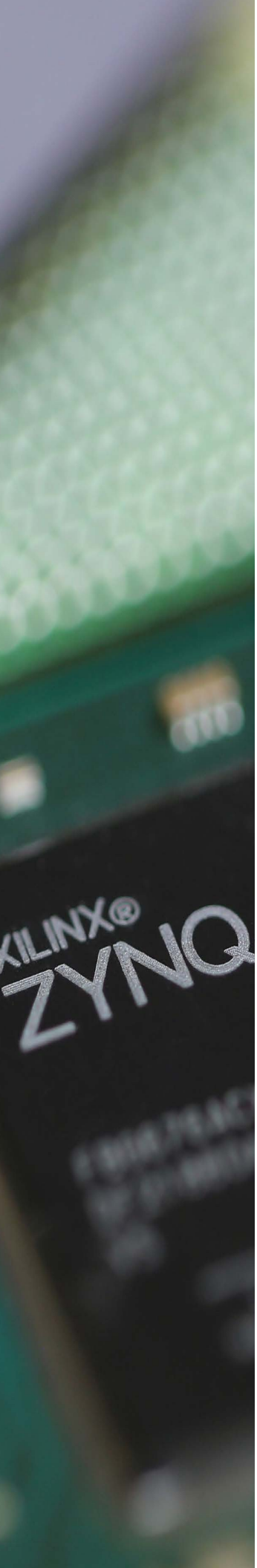
- Develop a next-generation currency sorter
- Increase the number of bills counted per second
- Increase the number of currencies types supported
- Increase the number of sensors to ensure the highest quality and performance

Xilinx Solutions

- Multi-processing & logic increases system performance
- High performance AXI bus to control multiple sensors
- Single Xilinx board replacing two competitive boards

Results

- 50% lower BoM and 15% lower power consumption
- Laptop-size machines with best-in-class features
- 2.5x increase in bill sorting rate with 2x the currencies



Xilinx Solutions

For its new ML-Series systems, Lidix placed the Zynq All Programmable SoC at the heart of their device architecture. The single board solution replaced a two-board solution, reducing the size of the new system while delivering 2.5x the sorting performance with 2x the number of supported currencies. Lidix leveraged the Zynq AP SoC's multi-processing capabilities (Dual-core ARM® Cortex® A9 linking 3000 interconnects over 80 Gb/s to Zynq SoC's programmable logic) to introduce industry-leading functionality over compact single-bin systems. The Zynq AP SoC's processing system and logic can access (via the on-chip DDR controller) the off-chip DDR3 memory, improving system performance. Xilinx's programmable logic enabled the Lidix design team to enhance and upgrade functionality after products deployed.

Using the Zynq AP SoC, Lidix leveraged the ARM ecosystem and Xilinx tools creating a best-in-class user interface. The Zynq AP SoC also integrated multiple devices performing several different functions into a single chip enabling smaller, more cost, and power efficient systems.

Results

With the Zynq All Programmable SoC at its core, Lidix introduced the ML Series - a low cost, compact sorter with industry leading perfo rmance, functionality and ease of use.

Lidix used the Zynq All Programmable SoC's dual-core processing system and FPGA logic to create a multi-processing architecture that can process 1500 bills/notes per minute and sort 20 currencies at the push of a button. The architecture boots in just three seconds - competing systems can take 30 seconds to boot.

The single-board architecture reduced form factor to the size of a notebook computer and controls and runs five types of sensors (UV, FL, MG, MT, IR) simultaneously as 1500 bills-per-second sorting occurs. These sensors help determine count, type, denomination, and bill condition (fitness for use in ATM machines). The system can also be configured to scan and photocopy each side of a bill and uses an updateable serial-number database to identify counterfeit or stolen bills/notes.

The system boasts a 5" color touch screen monitor. It also supports parallel operation and can be easily updated via Ethernet or USB. With the Zynq AP SoC-based system, the company lowered the overall system power by fifteen percent. While the value to the customer increased exponentially, the Zynq All Programmable SoC-based architecture reduced the overall BoM by fifty percent.

More about Lidix:

A branch of CosmoIT, Lidix (Seoul, Korea) is an industry leader in fitness sorters used by banks and currency exchanges worldwide to quickly sort multiple currencies by type, facing/orientation, denomination, count, bill condition and identify stolen or counterfeit bills/notes.

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Learn more at www.xilinx.com.

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