

Real-Time Ethernet with Spartan FPGAs



The Challenges of Industrial Network Design

- Bridging multiple interface standards and protocols with a common hardware design for a range of enterprise bridges, factory floor gateways, field buses and industrial components
- Need standardized high performance, cost-effective Ethernet-based communication

The Xilinx Solution

- The Spartan™-3 Generation FPGA enables the design of a highly flexible and cost-effective SoC (System on a Chip) by allowing designers to integrate a hub, processor, EMAC, and other discrete functions
- Support multiple and future interface protocols with a common hardware design
- Implementation of leading real-time Ethernet Protocols - EtherCAT, Ethernet POWERLINK and SERCOS III provide deterministic data for efficient and reliable industrial networking solutions

Accurate, Real-time Networking for Industrial Applications

Fast and reliable communication infrastructure in industrial applications is both critical and urgent. Applications such as Ethernet Gateways, Factory Automation, Protocol Bridging, and Robotics, require information that is both accurate and deterministic. The low-cost Spartan-3 Generation FPGAs implement real-time Ethernet protocols, which enable customers to implement highly efficient hardware for demanding industrial networking applications.

Enabling Flexible and Cost-Effective SoC Design

A single Spartan FPGA can implement Real-Time Ethernet as an SoC by integrating functional blocks such as process control, hubs, and Ethernet MAC, among others. At the heart of this design is the highly customizable, on-board 32-bit MicroBlaze™ soft processor. MicroBlaze eliminates the need for an external processor, and enables the seamless bridging of multiple interface standards. The flexibility of FPGA programmability also helps to “future-proof” applications by ensuring compliance to the evolving and changing standards.

Unmatched Network Performance

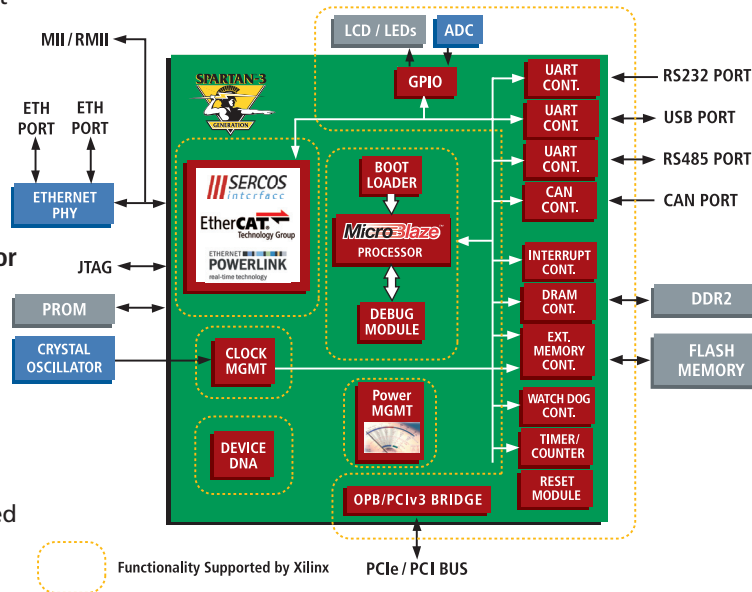
Customers can upgrade their current networks while maintaining existing hardware. Hardware-centric implementations of various real-time protocols ensure leading-edge network performance unmatched by software-based competitive solutions.

Complete System Solution

The highly customizable 32-bit MicroBlaze soft processor, along with real-time Ethernet Intellectual Property cores, enables the implementation of a real-time Ethernet SoC. This solution can integrate system blocks such as DSPs, MACs, non-volatile memory, and interface support for DDR2 and PCI Express®, among others, to help build a complete system solution.

Real-time Ethernet for Reliable Networking

Pre-tested IP supporting real-time Ethernet protocols are available to designers. This IP can be easily implemented on a Spartan-3 Generation FPGA.



- EtherCAT <http://www.ethercat.org/>
- Ethernet POWERLINK <http://www.epl-tools.com/>
- SERCOS III <http://www.sercos.de/>

Robust, Low-cost Security

A 57-bit unique Device DNA serial number in every Spartan-3A/3AN/3A DSP device offers a low-cost, yet robust security solution to deter cloning, overbuilding, and reverse-engineering. Customers have complete flexibility in implementing their security algorithm to help protect both hardware and software IP.

Dual Power Management Modes Save Power

Significant power can be saved using the highly efficient power management modes in Spartan-3A/3AN/3A DSP FPGAs. The Suspend mode helps reduce static power by over 40% while the Hibernate mode offers savings up to 99%. Both modes are easy-to-use and provide quick wake-up times for the customer application.

TAKE THE NEXT STEP

For more information on Xilinx's Real-Time Ethernet solutions, visit our website www.xilinx.com/esp/ism.htm#industrial, or call your local sales office or distributor. To learn more about Spartan FPGAs, visit www.xilinx.com/spartan. Download your free ISE WebPACK™ design tools today from www.xilinx.com/ise and begin designing immediately.

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