

Workshop

Signal Integrity and Board Design

The 3-day workshop “Signal Integrity and Board Design” is aimed at developers who want to implement high-speed interfaces between a XILINX FPGA and external semiconductor components and who want to design complex high-speed FPGA at board level. This Workshop is designed for developers who not only design FPGAs but also systems and the layout.

The first part of this course tackles the signal integrity issues in general. You will learn to judge when signal integrity is important and relevant, to interpret, for example, IBIS models, and to select appropriate termination procedures. Signal reflection and crosstalk effects are described and demonstrated by simulation based on Spartan-6 / Virtex-6 examples. Simulation examples are given furthermore for common memory interfaces as well as for MGT interconnection. You will learn how to implement high-speed buses, including clock design, loading and signal termination. Furthermore, the power distribution and bypassing design are main topics.

The second part of this course covers the board design by applying the knowledge from the first part. The participants will learn how to solve signal integrity problems with Xilinx FPGAs. FPGA designers face new implementation possibilities and challenges. This part discusses all steps for a successful board design: power supply, configuration, and interfacing. Solutions and challenges will be discussed for the pin definition. Moreover, rules for designing PCBs and handling thermal design will be commented on.

Applicable technologies

Spartan-6 and Virtex-6, older FPGA families on demand

Requirements

Basic knowledge on FPGA design

Duration and Cost

Duration: 3 days

Cost: € 1.900, – net per person, including detailed training material, drinks in the breaks and lunch.

Agenda

Signal Integrity

- Introduction
- Transmission Lines
- IBIS Models and SI Tools
- Reflections
- Crosstalk
- Signal Integrity Analysis
- Power Supply Issues
- Summary

Labs

- Invoking SI-Tool (Example: HyperLynx)
- Reflection Analysis
- Crosstalk Analysis

Boards Design

- Introduction
- FPGA Power Supply
- FPGA Configuration and PCB
- Signal Interfacing: Interfacing in General
- Signal Interfacing: FPGA-Specific Interfacing
- Die Architecture and Packaging
- PCB Details
- Thermal Aspects
- Tools for PCB Planning and Design
- Summary

Labs:

- Power Prediction
- I/O Pin Planning
- Thermal Design