Embedded Systems Development

EMBD21000-8-ILT (v1.0)

Course Specification

Course Description

Embedded Systems Development introduces experienced FPGA designers to developing embedded systems using hard (embedded IBM PowerPC™) or soft (MicroBlaze™) processor cores and soft peripheral cores within the Embedded Development Kit (EDK) design environment. The course includes *hands-on* labs to provide personal experience with the development, debugging, and simulation of the embedded system.

Level – Intermediate
Course Duration – 2 days
Price – $1200 USD or 12 Training Credits
Course Part Number – EMBD21000-8-ILT
Who Should Attend? – FPGA design engineers, system architects, and system engineers who are interested in Xilinx embedded systems development flow

Prerequisites

- FPGA design experience
- Completion of the *Fundamentals of FPGA Design* course or equivalent knowledge of Xilinx ISE™ software implementation tools
- Basic understanding of C programming
- Basic microprocessor experience and understanding of PowerPC-processor and MicroBlaze-processor systems

Software Tools

- Xilinx ISE 8.1 SP1
- Mentor Graphics ModelSim PE 6.0
- EDK 8.1

After completing this comprehensive training, you will have the necessary skills to:

- Describe the various tools that encompass the Xilinx Embedded Development Kit (EDK)
- Rapidly architect an embedded system containing an IBM PowerPC or a MicroBlaze soft processor and a Xilinx-supplied CoreConnect bus architecture IP by using the Base System Builder (BSB)
- Utilize the Eclipse-based Software Development Kit (SDK) to develop software applications and to debug an application using the Xilinx Microprocessor Debugger (XMD) and GNU Debugger (GDB)
- Describe the hardware and software debugging flow and requirements
- Create and integrate your own IP into the EDK environment

Course Outline

Day 1

- EDK Overview
- **Lab 1**: Simple Hardware Design
- Hardware Design
- Hardware Design Using EDK
- **Lab 2**: Adding IP to a Hardware Design
- Adding Your Own IP to the OPB Bus
- **Lab 3**: Adding Custom IP to an Embedded System

Day 2

- Software Development
- Address Management
- **Lab 4**: Writing Basic Software Applications
- Software Development and Debugging Using SDK
- **Lab 5**: Advanced Software Writing and Debugging Using SDK
- System Simulation
- **Lab 6**: Performing System Simulation

Lab Descriptions

- **Lab 1**: Simple Hardware Design – Create an XPS project by using the Base System Builder to develop a basic hardware system for a target board.
- **Lab 2**: Adding IP to a Hardware Design – Learn to add IP, such as bridges, OPB peripherals, OPB buses, and others, to the basic hardware design.
- **Lab 3**: Adding Custom IP to an Embedded System – Explore adding a custom IP to your design by using the Create and Import Peripheral wizard.
- **Lab 4**: Writing Basic Software Applications – Write a basic C application that utilizes the UART and GPIO.
- **Lab 5**: Advanced Software Writing and Debugging Using SDK – Use the OPB timer and interrupt controller, develop an interrupt service routine, and debug software by using the Software Development Kit (SDK) and debugging tools.
- **Lab 6**: Performing System Simulation – Generate simulation scripts with XPS and perform behavioral simulation.

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