Advanced Features and Techniques of Embedded Systems Software Design

Embedded Software 4

EMBD34000-14-ILT (v1.0)

Course Specification

Course Description

This course will help software engineers fully utilize the components available in the Zynq™ All Programmable System on a Chip (SoC) processing system (PS). This course covers advanced Zynq All Programmable SoC topics for the software engineer, including advanced boot methodology, the NEON co-processor, programming PS system-level function control registers, the general interrupt controller, the DMA, Ethernet, and USB controllers, and the various low-speed peripherals included in the Zynq processing system.

Level – Embedded Software 4

Course Duration – 1 day

Price – $600 or 6 Xilinx Training Credits

Course Part Number – EMBD34000-14-ILT

Who Should Attend? Software design engineers interested in fully utilizing the Zynq extensible processing platform

Prerequisites

- *Embedded Systems Software Design* or equivalent knowledge
- C or C++ programming experience
- Conceptual understanding of embedded processing systems, including device drivers, interrupt routines, Xilinx Standalone library services, user applications, and boot loader operation
- Experience developing software for embedded processor applications

Software Tools

- Xilinx ISE® Design Suite: Embedded or System Edition 14.2

Hardware

- Architecture: Zynq-7000 All Programmable SoC*
- Demo board: Zynq-7000 All Programmable SoC ZC702 or Zed board*

* This course focuses on the Zynq-7000 All Programmable SoC. Check with your local Authorized Training Provider for the specifics of the in-class lab board or other customizations.

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

- Implement an effective Zynq All Programmable SoC boot design methodology
- Create an appropriate FSBL image for flash
- Identify advanced Cortex™-A9 processor services for fully utilizing the capabilities of the Zynq All Programmable SoC
- Analyze the operation and capabilities of the DMA controller in the Zynq All Programmable SoC
- Examine the various Standalone library services and performance capabilities of the Ethernet and USB controllers in the Zynq All Programmable SoC
- Describe the Standalone library services available for low-speed peripherals that are contained in the Zynq All Programmable SoC PS

Course Outline

- Advanced Boot Methodology on the Zynq All Programmable SoC
- Zynq All Programmable SoC Boot Details
- **Lab 1:** Zynq All Programmable SoC Boot Memory
- Advanced Cortex-A9 Processor Services
- Advanced DMA Controller Configuration on the Zynq All Programmable SoC
- **Lab 2:** Configuring DMA on the Zynq All Programmable SoC
- High-Speed Peripheral Configuration on the Zynq All Programmable SoC
- Low-Speed Peripherals on the Zynq All Programmable SoC
- **Lab 3:** Peripheral Programming on the Zynq All Programmable SoC

Lab Descriptions

- **Lab 1:** Zynq All Programmable SoC Boot Memory Lab – Explore the principles of creating a bootable flash image based on a First Stage Bootloader (FSBL) project.
- **Lab 2:** Configuring DMA on the Zynq All Programmable SoC – Program the DMA controller on the Zynq All Programmable SoC PS and explore the various Standalone library services that support the Zynq All Programmable SoC PS DMA controller.
- **Lab 3:** Peripheral Programming on the Zynq All Programmable SoC – Program the Gigabit Ethernet controller on the Zynq All Programmable SoC and verify in hardware. Explore the various lwip Standalone library services that support the Zynq All Programmable SoC Gigabit Ethernet controller.

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