

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 All Programmable SoC processing system.

Level – Embedded Software 4

Course Duration – 1 day

Price – \$900 or 9 Xilinx Training Credits

Course Part Number – EMBD34000-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

- Vivado® Design or System Edition 2014.3

Hardware

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

* This course focuses on the Zynq-7000 All Programmable SoC. Check with North Pole Engineering, Inc., 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
- Demo: Create a Boot Image
- **Lab 1:** Boot Loading from Flash/SD Card
- 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:** Introduction to lwIP (lightweight IP stack)

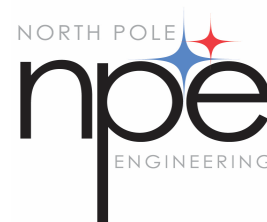
Lab Descriptions

- **Lab 1:** Boot Loading from Flash/SD Card – 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:** Introduction to lwIP – Add the lightweight Internet Protocol (lwIP) stack to an embedded system and use it in a simple Standalone library application. The complete design includes both hardware and software.

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