

## Live Online Instructor Led Training

Online courses can be taken over the 2 days or broken down in to half day modules potentially taken over a short period of time, depending on the attendees' requirements. Labs can also be done in your own time between sessions if desired, but your lecturer will always assign time to stay online while you do the labs should you so wish. We try to have as much flexibility as possible to best fit the requirements.

## Course Description

This two-day course introduces you to software design and development for Xilinx embedded processor systems. You will learn the basic tool use and concepts required for the software phase of the design cycle, after the hardware design is completed.

Topics are comprehensive, covering the design and implementation of the board support package for resource access and management. Major topics include device driver use and custom development, and user application debugging and integration. Practical implementation tips and best practices are also provided throughout to enable you to make good design decisions and keep your design cycles to a minimum. You will have enough practical information to start developing software applications for a Xilinx embedded system based on a MicroBlaze™ processor.

While this course includes many of the topics presented in the *Embedded Systems Development* and *Advanced Features and Techniques of Embedded Systems Development* courses, the focus is on software development concepts and practices rather than hardware development. Hardware design concepts and procedures are *not* covered.

**Level** – Embedded Software 3

**Course Duration** – 2 days / 13hrs

**Price** – AU\$1190 – Tax free outside of Australia

**Course Part Number** – EMBD23000-13-ILT

**Who Should Attend?** Software and hardware design engineers interested in system design and implementation, board support package creation, and software application development and debugging. This course is not for the hardware-only embedded designer.

### Prerequisites

- C or C++ programming experience, including general debugging techniques
- Conceptual understanding of embedded processing systems including device drivers, interrupt routines, writing / modifying scripts, user applications, and boot loader operation

### Software Tools

- Xilinx ISE® Design Suite: Embedded or System Edition 13.1

### Hardware

- Architecture: Spartan®-6 and Virtex-6 FPGAs\*
- Demo board: Spartan-6 FPGA SP605 or Virtex-6 FPGA ML605 board\*

\* Some labs have a download section at the end for verification. It is not always necessary to complete this stage and does not generally reduce the training opportunity of the course, though if you wish to you complete these lab stages you will need the hardware specified above. Where applicable the presenter will do these sections as a demo or include a prerecorded video of that section of the lab.

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

- Implement an effective software design environment for a Xilinx embedded system using the Xilinx SDK tools
- Write a basic user application using the Xilinx Software Development Kit (SDK) and run it on the embedded system
- Use Xilinx debugger tools to troubleshoot user applications
- Apply software techniques to improve operability
- Reduce embedded software development time

## Course Outline

### Day 1

- Course Agenda
- Processors, Peripherals, and Tools
- Software Platform Development
- **Lab 1:** Basic System Implementation
- Writing Code in the Xilinx Environment
- Software Development Using SDK
- **Lab 2:** Application Development
- Address Management
- Interrupts
- **Lab 3:** Software Interrupts

### Day 2

- Software Platform Download and Boot
- Application Debugging
- **Lab 4:** Debugging
- Application Profiling
- **Lab 5:** SDK Profiling
- Writing a Custom Device Driver
- **Lab 6:** Writing a Device Driver
- Advanced Services and Operating Systems
- Project Management with the Xilinx Design Tools
- **Lab 7:** File Systems

## Lab Descriptions

- **Lab 1:** Basic System Implementation – Construct the hardware and software platforms used for the labs. Begin with Base System Builder to create the hardware design. Specify a basic software platform and add a software application to the system.
- **Lab 2:** Application Development – Create a simple software application project from source files for a software loop-based stopwatch. Research hardware and software documentation to complete the application; then download it to hardware.
- **Lab 3:** Software Interrupts – Replace a software timing loop with an interrupt-driven timer. Add the timer software and write an interrupt handler for the timer. Configure the FPGA, download, and test the application.
- **Lab 4:** Debugging – Set up the SDK debug perspective and the previous lab's stopwatch application for debugging, setting breakpoints, calculating interrupt latency, and stepping through the program's operation.
- **Lab 5:** SDK Profiling – Profile a program, interpret reports, then enable cache and rewrite code to archive optimal performance.
- **Lab 6:** Writing a Device Driver – Create the skeleton driver framework, add an LCD device driver to the BSP, and verify proper device driver operation via a download to hardware test.

- **Lab 7: File Systems** – Implement a standalone software platform that incorporates the XiMFS memory file system. Develop an application that performs file-related tasks on external memory.

## Register Today

### the Logic Portal

The Logic Portal, together with Black Box Consulting, deliver live, instructor led training to attendees' worldwide via a browser based delivery solution using world class instructors based around the world.

For more information, such as our range of courses, current schedules, and other services including consulting and training packages, please use one of the contact methods below:

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