

The essentials of embedded design for Xilinx Zynq™ -7000, Zynq™ MPSoC and Versal™ components

GENERAL OBJECTIVE OF THE TRAINING

Learn system architecture, hardware and software design of Zynq™ -7000, Zynq™ MPSoC and Versal™ components, and tool usage through theory and exercises on your choice of ZedBoard or ZCU104.

COURSE DURATION



4 days - 28 hours

CONCERNED PUBLIC

- Technicians and Engineers in Digital Electronics
- All our training courses are given at a distance and are accessible to people with reduced mobility.
- People with disabilities may have special training needs. Our partner AGEFIPH accompanies us to implement the necessary adaptations related to your disability. Don't hesitate to discuss your requirements.



PREREQUISITES

- Digital system architecture design experience
- Basic understanding of microprocessor and FPGA architecture
- Basic understanding of C programming
- Basic HDL modeling experience

NOTES

- Release date: 15/11/2024

TEACHING STAFF

- **William Duluc, Electronics and Telecoms Engineer, AMD Expert since 2009 and AMD Trainer since 2017 :**
 - Expert AMD FPGA - Language VHDL/Verilog - RTL Design
 - Expert AMD SoC & MPSoC - Language C/C++ - System Design
 - Expert DSP & AMD RFSoc - HLS - Matlab - Design DSP RF
 - Expert AMD Versal - AI Engines - Heterogenous System Architect

TARGET OBJECTIVES AND SKILLS

- 1 - Describe the Xilinx architecture and embedded components
- 2 - Describe the various tools that comprise a Xilinx embedded design
- 3 - Select and effectively define an interface between the processor system (PS) and the programmable logic (PL)
- 4 - Design an efficient system by leveraging hardware and software resources
- 5 - Use debugging tools
- 6 - Boot your projects independently
- 7 - Maintain and update IP design based on the AXI interface and its driver
- 8 - Discover OS and write a Linux application

COURSE CONTENT

DAY 1

- Objective 1
 - Embedded UltraFast Design Methodology {Lecture}
 - Zynq-7000 SoC Architecture Overview {Lecture}
 - Zynq UltraScale+ MPSoC Architecture Overview {Lecture}
 - MicroBlaze Processor Architecture Overview {Lecture}
- Objective 2
 - Overview of Embedded Hardware Development {Lecture}
 - Driving the IP Integrator tool {Lecture, Lab}
 - Overview of Embedded Software Development {Lecture}
 - Driving the Vitis Tool {Lecture, Lab}
 - System Debugger {Lecture, Lab}

DAY 2

- Objective 3
 - Inside the Application Processor Unit (APU) {Lecture, Lab}
 - Processor Input/Output Peripherals {Lecture}
 - Introduction to AXI {Lecture}
 - Zynq AP SoC PS/PL AXI Interfaces {Lecture, Lab}
 - AXI: Connecting AXI IP {Lecture}
 - Standalone Software Platform Development {Lecture, Lab}



DAY 3

- Objective 4
 - Introduction to Interrupts {Lecture}
 - Interrupts: Software Considerations {Lecture, Lab}
 - Zynq Memory Resources {Lecture}
 - DMA {Lecture}
 - Meeting Your Performance Goals {Lecture}
 - Using Linker Scripts {Lecture, Lab}
- Objective 5
 - Debugging the Zynq {Lecture, Lab}

DAY 4

- Objective 6
 - Zynq booting {Lecture, Lab}
- Objective 7
 - Using the Create and Import Wizard to Create a New AXI IP {Lecture, Lab}
 - AXI BFM Simulation Using Verification {Lecture, Lab}
 - Understanding Device Drivers {Lecture}
 - Custom Device Drivers {Lecture, Lab}
- Objective 8
 - Operating Systems: Introduction and Concepts {Lecture}
 - Linux: A High-Level Introduction {Lecture}
 - Linux Software Application Development Overview {Lecture, Lab}

TEACHING METHODS

- **Inter-company online training :**
 - Fast Internet connection, webcam, headset
 - Presentation by Webex by Cisco

 - Provision of course material in PDF format
 - Labs on individual Cloud PC by RealVNC

- **Intra-company face-to-face training on customer site : (details to be confirmed prior to training)**
 - Suggested supply by the customer :
 - Training room
 - Video projector
 - Whiteboard
 - Individual PC with AMD tools
 - Provided by MVD Training :
 - Course material in PDF format
 - Practical work on individual PCs (loan of equipment available on request)

RECOMMENDED COMPUTER HARDWARE

- **Inter-company online training :**
 - Recent computer OS Linux or Windows 64-bits
 - Fast Internet, webcam, headset
 - Software tool WebEx Cisco
 - **AMD remote tools :**
 - Software tool RealVNC Viewer
 - **AMD local tools :**
 - Software tool AMD Vitis 2022.2
- **Face-to-face training on customer site :**
 - Recent computer OS Linux or Windows 64-bits
 - Software tool AMD Vitis 2022.2

TEACHING METHODS AND SUPPORT - ASSESSMENT & RECOGNITION

- **Teaching methods :**
 - Alternating lectures, technical questionnaires and exercises on individual machines.
- **Pedagogical follow-up :**
 - Signed attendance sheet
- **Pedagogical assessment :**
 - Continuous assessment and progress sheet :
 - Technical questionnaire
 - Practical work results
 - Validation of objectives
- **Satisfaction survey :**
 - At the end of training: assessment form completed by the trainee
 - At 3 months: evaluation form completed by the trainee after application to the company
- **Certificate :**
 - Training certificate with assessment of learning provided to trainee
 - Certificate of completion provided to employer

TECHNICAL, EDUCATIONAL, ADMINISTRATIVE AND FINANCIAL CONTACT

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