AMD
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Designing with the Versal Adaptive SoC: Power and Board Design

VER-PWR-BD (v1.0)

Course Specification

Course Description

This course provides a system-level understanding of power and thermal issues related to designing with the AMD Versal™ adaptive SoC. PCB design considerations for the Versal devices are also covered.

The emphasis of this course is on:

- Estimating power using power analysis
- Managing thermal design
- Understanding Versal device packaging
- Implementing proper pin-to-board connection
- Using the Schematic Review Checklist to validate a PCB design

What's New for 2025.2

- New lab: Simulating PDN Decoupling
- All labs have been updated to the latest software versions

Level – VER 2

Course Details

- 2 days ILT or 3 sessions/19

Course Part Number – VER-PWR-BD

Who Should Attend? – Hardware designers and system architects wanting to develop an effective power distribution network for the Versal device

Prerequisites

- *Designing with the Versal Adaptive SoC: Architecture*
- *Designing with the Versal Adaptive SoC: Design Methodology*
- Familiarity with the AMD Vivado™ Design Suite

Software Tools

- Vivado Design Suite 2025.2
- Power Design Manager tool 2025.2

Hardware

- Architecture: Versal adaptive SoC

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

- Design an efficient power distribution network for AMD Versal adaptive SoC designs
- Leverage the Power Design Manager tool for power estimation
- Dynamically manage power consumption
- Solve thermal challenges
- Apply PCB design guidelines for board interfaces with Versal devices

Course Outline

Day 1

- **AMD Versal Adaptive SoC Architecture Overview for Existing Users**
  Introduces to students who already have familiarity with AMD architectures the new and updated features found in the Versal devices. Also provides an overview of the Versal portfolio. {Lecture}
- **Power Solutions Overview**
  Introduces key power concepts and explores some of capabilities of the Versal devices and introduces the power distribution network flow. {Lecture}
- **Packaging**
  Describes key elements when modeling a PDN and dives deeper into packaging considerations. {Lecture}
- **Thermal Solutions Overview**
  Introduces key thermal concepts and explores some of capabilities of the Versal devices. {Lecture}
- **Power Management**
  Discusses power domains and how they can be controlled along with basic techniques used to lower overall power consumption. {Lecture, Demo}
- **Power Design Manager**
  Discusses using the new Power Design Manager tool, including import and export functions. {Lecture, Lab}
- **Power Reduction Techniques**
  Describes various options to reduce power during the design process. {Lecture}
- **Power Supply Backgrounder**
  Reviews linear and switching power supplies and common terms used to specify power supply characteristics. {Lecture}

Day 2

- **Board System Design Overview**
  Introduces PCB design topics. {Lecture}
- **Designing the Power Supply**
  Consolidates the thermal management concepts of the course for achieving a successful design. {Lecture, Lab}
- **Designing PL Interfaces**
  Focuses on bank structure and physical organization of the PL package pins. {Lecture}
- **Designing PS Interfaces**
  Covers the unique features of the dedicated PS I/O interface along with pin-planning techniques. {Lecture}
- **Designing Memory Interfaces**
  Discusses high-speed connections, routing, and design guidelines for DDR4/LPDDR4 and DDR5/LPDDR5 memories. {Lecture}
- **Designing Transceiver Interfaces**
  Describes the serial transceiver organization and proper trace requirements. {Lecture}
- **PCB Simulation – Introduction to Signal Integrity**
  Discusses reflection and crosstalk effects and provides options to minimize both effects. Introduces memory and serial transceiver IBIS simulation. {Lecture}

- **PCB Simulation – Introduction to Power Integrity**
  Discusses power distribution network modeling and simulation options. {Lecture, Lab}
- **PCB Simulation – Introduction to Thermal Simulation**
  Discusses aspects of thermal simulation. {Lecture}
- **Board System Design Guidance**
  Outlines the steps and documentation for specific PCB topics. {Lecture}
- **PCB Verification – Schematic Review Checklist**
  Reviews PCB design verification using the Schematic Review Checklist. {Lecture, Lab}