Using the AMD Ross Agentic AI Assistant for Vivado Design Suite

ROSS-VIVADO-AI (v1.0)

Course Specification

Course Description

This course introduces the AMD Ross™ agentic AI assistant for Vivado™ Design Suite for streamlining and accelerating FPGA and adaptive SoC design workflows. The course explores the use of Ross-assisted methodologies for design creation, analysis, timing closure, and debugging within the Vivado Design Suite environment.

Participants will also learn how to leverage MCP-based knowledge grounding and guided prompts to obtain reliable and reproducible results and will also explore how Ross-assisted workflows enable efficient RTL-to-bitstream development and hardware validation.

The emphasis of this course is on:

- Explaining the role and benefits of using the Ross agentic AI assistant in programmable device design workflows
- Describing MCP architecture and knowledge grounding for trusted AI agent interactions
- Demonstrating Ross-assisted project creation, block design, and IP integration
- Applying Ross-driven design analysis techniques, including linting and log analysis
- Performing multi-run comparisons and identifying optimization opportunities
- Implementing timing closure strategies using iterative Ross-guided workflows
- Debugging simulation, AXI protocol, and hardware issues using Ross-assisted methodologies

License requirement: To complete the hands-on labs in the CloudShare environment, participants must use their own **GitHub Copilot Pro+** license. Refer to the *Lab Setup Guide* for additional setup and licensing details.

Level – FPGA 1

Course Details

- 1 day live instructor led training (online or in person)
  - 2 lectures
  - 5 labs

Price – $1000 or 10 AMD Training Credits

Course Part Number – ROSS-VIVADO-AI

Who Should Attend? – FPGA and adaptive SoC design engineers and anyone who wants to evaluate AI agent-assisted design workflows

Prerequisites

- Basic knowledge of AMD FPGAs and adaptive SoCs
- Familiarity with Vivado Design Suite
- Understanding of RTL design and simulation concepts

Software Tools

- Vivado Design Suite 2026.1
- Vivado AI Assistant Extension
- Visual Studio Code (VS Code)
- GitHub Copilot (for Ross-assisted workflows)

Hardware

- Demo board: Versal™ VCK190 Evaluation Platform and Kria™ KV260 Vision AI Starter Kit

* Check with Morgan Advanced Programmable Systems, 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:

- Explain how the AMD Ross agentic AI assistant integrates into programmable device design workflows
- Set up and validate a Ross-enabled AMD Vivado development environment
- Create and implement designs using Ross-guided workflows
- Analyze design data using linting, logs, and multi-run techniques
- Apply structured timing closure methodologies using Ross agentic AI assistance
- Debug simulation and protocol issues (e.g., AXI) using Ross-guided workflows
- Perform hardware debug using Ross-assisted ILA and VIO insertion

Course Outline

- **AMD Ross Agentic AI Assistant for Vivado Design Suite Introduction**
  Introduces Ross-assisted design workflows, the MCP architecture, and trust models {Lecture}
- **Agentic AI Workflows for Advanced Adaptive SoC Design**
  Examines the Vivado MCP server, agent capabilities, and knowledge base assistance {Lecture}
- **AMD Ross Agentic AI Assistant for Vivado Design Suite Knowledge Base Exploration**
  Demonstrates use of the Ross AI assistant through the Vivado IDE setup verification and knowledge base interaction, highlighting practical workflows and citation-driven insights. {Lab}
- **Spec-Driven Design Creation Prototyping on the Kria KV260 Vision AI Starter Kit**
  Applies VS Code prompts to build, implement, and validate a complete Vivado design on the Kria KV260, including custom RTL integration and DMA-based hardware verification. {Lab}
- **AMD Ross Agentic AI Assistant for Vivado Design Suite Design Analysis**
  Employs the Ross AI assistant via VS Code to perform RTL linting, diagnose optimization issues, and compare implementation strategies in a structured timing closure workflow. {Lab}
- **AXI4 Protocol Debug and Ross-Driven Timing Closure**
  Presents a two-stage design closure workflow using the Ross AI assistant, covering AXI protocol debugging in simulation followed by iterative timing closure and validation. {Lab}
- **AXIS-ILA and AXIS-VIO Insertion Flow on the Versal VCK190 Evaluation Kit**
  Explores building and instrumenting a PL-only AXI4-stream debug pipeline on the Versal VCK190 using the Ross AI assistant, focusing on AXIS-based runtime monitoring and JTAG-driven observation. {Lab}

Register Today

Morgan Advanced Programmable Systems, Inc. (Morgan A.P.S.) delivers public and private courses in locations throughout the central US region; including Iowa, Illinois, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota, and Wisconsin.

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Visit **morgan-aps.com/training**, for full course schedule and training information.

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- You must have your tuition payment information available when you enroll. We accept credit cards (Visa, MasterCard, or American Express) as well as purchase orders and AMD training credits.

Student Cancellation Policy

- Student cancellations received more than 7 days before the first day of class are entitled to a 100% refund. Refunds will be processed within 14 days.
- Student cancellations received less than 7 days before the first day of class are entitled to a 100% credit toward a future class.
- Student cancellations must be sent here.

Morgan A.P.S. Course Cancellation Policy

- We regret from time-to-time classes will need to be rescheduled or cancelled.
- In the event of cancellation, live on-line training may be offered as a substitute.
- Morgan A.P.S. may cancel a class up to 7 days before the scheduled start date of the class; all students will be entitled to a 100% refund.
- Under no circumstances is Morgan A.P.S. responsible or liable for travel, lodging or other incidental costs. Please be aware of this cancellation policy when making your arrangements.
- For additional information or to schedule a private class contact us here.

Online or in person training with real hardware

- Morgan Advanced Programmable Systems, Inc. has set up a training VPN where engineer participants can take classes online using the same computers and devCards used during in-person training.
- Even better, and upon request, you can use these computers after hours on training days to experiment with labs. This is not possible for in-person training.
- Additionally, just like in-person training, the laptops and devCards, tools, OS, and licensing are set up in advance.
- In some ways, live online-training is better than in-person…for example, you can grant the instructor permission to look at your Vivado, PetaLinux terminal, or Vitis for extended periods of time if your lab is not going exactly has planned to a missed step.
- This is often more comfortable than two engineers crowding around a laptop screen.
- Taking remote training also allows you to learn some tips and tricks for working remote. Whether your devCard is in the lab down the hall, or across the world via VPN, you can control your AMD based device quickly and efficiently.

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