

Course Description

Learn how to build and deploy complex multimedia applications targeting AMD Versal™ AI Edge Series Gen 2 and Prime Series Gen 2 adaptive SoCs.

This course focuses on the architecture and capabilities of key multimedia blocks, including the Video Codec Unit 2 (VCU2), Image Signal Processor (ISP), Graphics Processing Unit (GPU), Display Controller (DC), and connectivity IPs. You will learn how to leverage these architectural enhancements to design efficient streaming pipelines using the VCU2 software stack and the open-source GStreamer framework for high-performance, real-time multimedia processing.

The emphasis of this course is on:

- Understanding the multimedia solutions offered by AMD
- Working with the multimedia blocks available in Versal AI Edge Series Gen 2 and Prime Series Gen 2 adaptive SoCs
- Explaining the functionality of the video encoder and decoder within the Video Codec Unit 2 (VCU2)
- Describing the capabilities and processing pipeline of the Image Signal Processor (ISP)
- Explaining the features and operational modes of the integrated Graphics Processing Unit (GPU)
- Identifying and understanding the various connectivity and processing soft IPs provided by AMD
- Exploring the VCU2 software stack, including its control layers and OpenMAX™ integration
- Using GStreamer plugins to develop and implement efficient video streaming pipelines

What's New for 2026.1

- New labs:
 - Introduction to the GStreamer Framework
 - Video Coding with the VCU2 Using the GStreamer Framework
- All labs have been updated to the latest software versions

Level – MMEDIA 3

Course Details

- 1 day ILT or 2 sessions

Course Part Number – VER2-MMEDIA

Who Should Attend? – Anyone who needs to develop multimedia application targeting Versal AI Edge Series Gen 2 and Prime Series Gen 2 adaptive SoCs

Prerequisites

- Basic knowledge of video technology
- Basic knowledge of a generic video codec unit (VCU)
- Basic knowledge of the Versal AI Edge Series Gen 2 and Prime Series Gen 2 architecture

Software Tools

- Vivado™ Design Suite 2026.1
- Vitis™ Unified IDE 2026.1

Hardware

- Architecture: Versal AI Edge Series Gen 2 and Prime Series Gen 2 adaptive SoCs
- Demo board: Versal VEK385 Evaluation Platform

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

- Identify the multimedia solutions offered by AMD
- Utilize the multimedia blocks available in AMD Versal AI Edge Series Gen 2 and Prime Series Gen 2 adaptive SoCs
- Explain the functionality of the video encoder and decoder within the Video Codec Unit 2 (VCU2)
- Describe the capabilities and processing pipeline of the Image Signal Processor (ISP)
- Explain the features and operational modes of the integrated Graphics Processing Unit (GPU)
- Identify the various connectivity and processing soft IPs provided by AMD
- Describe the VCU2 software stack, including its control layers and OpenMAX integration
- Utilize GStreamer plugins to develop and implement efficient video streaming pipelines

Course Outline

Day 1

▪ Multimedia Overview and Solutions

Provides an overview of multimedia trends and the system architectures required to support them. Also evaluates the multimedia solutions offered by AMD. {Lecture}

▪ Multimedia Hard Blocks

Covers the multimedia-specific hard IP blocks in the Versal AI Edge Series Gen 2 and Prime Series Gen 2 devices and outlines the high-speed multimedia interfaces they support. {Lecture, Lab}

▪ Video Codec Unit 2 (VCU2)

Provides an overview of why codecs are essential, explains the architecture and configuration of the VCU2, and outlines the key use cases for the VCU2. {Lecture}

▪ Image Signal Processor (ISP)

Explains the ISP core architecture, differentiates its operating modes and software stack, and details the configuration steps for the Versal ISP Subsystem IP. {Lecture}

▪ Graphics Processing Unit (GPU)

Highlights the significance of the Arm® Mali™-G78AE GPU in the Versal AI Edge Series Gen 2 and Prime Series Gen 2 devices and summarizes its key features. {Lecture}

▪ Multimedia Connectivity and Processing IPs

Reviews the different input and output subsystems that are used to capture and display audio and video data. The corresponding connectivity and processing IPs provided by AMD are also covered. {Lecture}

▪ VCU2 Software Stack

Explains the layered structure of the VCU2 software stack for the Versal AI Edge Series Gen 2 and Prime Series Gen 2 devices. {Lecture}

▪ Streaming Pipeline Using GStreamer

Describes in detail the streaming pipeline application flow using GStreamer, including how to build a GStreamer application. {Lecture, Lab}

- **Using the AMD Embedded Development Framework (EDF)**
Discusses the AMD Embedded Development Framework (EDF) and its role in accelerating platform-level development. Also explains the developer personas in the EDF. {Lecture}
- **Video Coding with the VCU2 Using the GStreamer Framework**
Illustrates the use of the VCU2 and GStreamer pipelines for hardware-accelerated video decoding, encoding, and transcoding. {Lab}