SOLUTION BRIEF

NEXT-LEVEL BROADCAST AV PERFORMANCE WITH AMD VERSAL™ PRIME SERIES GEN 2

More compute, faster memory, and higher definition video

AMD
together we advance_

OVERVIEW

AMD Versal™ Prime Series Gen 2 adaptive SoCs deliver the performance and efficiency needed for multi-channel live video production, AV network control, multi-channel 4K and 8K LED wall processing, and software-defined broadcast workflows. As a result, Versal Prime Series Gen 2 adaptive SoCs are a logical choice when upgrading from the AMD Zynq™ UltraScale+™ MPSoC family, widely used across the Broadcast and Pro AV industries today.

HIGHLIGHTS

HIGHER PERFORMANCE ARM® PROCESSING SYSTEM

Delivers up to 10X scalar compute uplift from the quad-core Arm Cortex®-A53 processor used in Zynq UltraScale+ MPSoCs.[1]

FASTER CONNECTIVITY SPEEDS

In the processing system (PS), high-speed transceivers support up to USB 3.2 Gen2 @10 Gb/s (up to 2X bandwidth improvement), 10G Ethernet (up to 10X bandwidth improvement), and PCIe® Gen 5x4. In the programmable logic (PL), PCIe Gen5 & 10G/25G/50G/100G Ethernet are implemented as hard IP blocks, offering up to 4X the throughput per PCIe lane and democratizing high-speed Ethernet connectivity across the entire device series.

IMPROVED VIDEO & GRAPHICS HANDLING

Integrated as hard IP blocks in the PS, a display controller, DisplayPort™ 1.4 transmitter, and Arm Mali® G78 GPU offer a substantial upgrade from the Zynq UltraScale+ MPSoC, with up to 4X increase in video throughput (from HD to 4K) and up to 50X improvement in the rendering of 3D graphics.[2]

MORE MEMORY BANDWIDTH

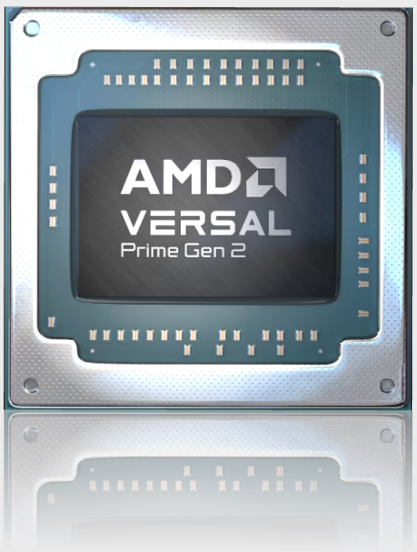
Up to five 32-bit LPDDR5X-8533 controllers offer up to 170 GB/s of memory bandwidth (a 10X increase from Zynq UltraScale+ MPSoCs), enabling higher video channel density. Multi-channel designs benefit from the programmable network on chip (NoC), which offers lower latency and reduces the PL resources required.

INTEGRATED VIDEO CODECS

Dedicated H.264/H.265 video codec units (VCUs) support 4:4:4 12-bit simultaneous encoding and decoding, with select devices offering up to two VCUs for increased streaming density. In addition, the Versal Prime Series Gen 2 provides compatibility with a range of leading lightweight mezzanine codecs—implemented in the PL through collaboration with industry partners—making it a highly adaptable and scalable solution for managing compressed AV content.

KEY BENEFITS

- Faster Compute Speeds
- Better Graphics and Video
- Supports More UHD Channels
- Higher Density Streaming



AMD SoC UPGRADE PATH

FEATURES	AMD ZYNQ UltraScale+	AMD VERSAL Prime Gen 2
PS COMPUTE	Dual/Quad Arm Cortex-A53 (up to 1.5 GHz) Dual Arm Cortex-R5F (up to 600 MHz)	Quad/Octal Arm Cortex-A78 (up to 2.2 GHz) Hex/Deca Arm Cortex-R52 **Up to 10X Scalar Compute Performance[1]**
PS VIDEO & GRAPHICS	DisplayPort 1.4 Tx @ 4K30 (2x 5.4 Gb/s) Arm Mali-400 MP2 GPU Display Controller (Overlay, CSC, etc.)	DisplayPort 1.4 Tx @ 8K30 (4x 8.1 Gb/s) Single or Quad Arm Mali-G78AE GPU Display Controller (Overlay, CSC, etc.) **Higher Resolution DisplayPort and Graphics**
VIDEO CODECS	Dedicated H.264/H.265 4:2:2 10-bit VCU (EV Devices Only)	Dedicated H.264/H.265 4:4:4 12-bit VCU (All Devices) **Improved H.264/H.265 capabilities**
PS CONNECTIVITY	10/100/1000M Ethernet USB 3.0 @ 5 Gb/s (no PHY)	1G/2.5G/5G/10G Ethernet USB 3.2 Gen2 @ 10 Gb/s (inc. PHY) PCIe Gen 5x4 **Up to 10X Connectivity Bandwidth**
PL CONNECTIVITY	Dedicated 100G Ethernet (No Dedicated Ethernet + VCU Options) PCIe Gen3 x16	Dedicated 10G/25G/50G/100G Ethernet (Dedicated Ethernet + VCU on All Devices) PCIe Gen5 x4 Programmable NoC **Up to 4X Connectivity Bandwidth**
MEMORY INTERFACING	Processing System: LPDDR4-2400 (9.6 GB/s) or DDR4-2400 (19.2 GB/s) Programmable Logic: DDR4-2667 (up to 64 GB/s)	Unified PS & PL via Programmable NoC: LPDDR5X-8533 (up to 170 GB/s) or DDR5-6400 (up to 128 GB/s) **Up to 10X Memory Bandwidth**

THE OBVIOUS CHOICE FOR YOUR NEXT BROADCAST AV DESIGN

While AMD Zynq UltraScale+ MPSoC handles the 4K AV designs of today, it's clear that AMD Versal Prime Series Gen 2 adaptive SoCs offer the right balance of high-performance compute processing and AV throughput required for next-generation Pro AV and Broadcast equipment that need to handle higher resolutions and more channels. Integrated hard IP cores supporting professional-grade H.264/H.265 codecs, 10G/25G/100G Ethernet for AV-over-IP, PCIe Gen5 for capture/processing/playout cards, and enhanced video and graphics capabilities in the processor system mean that AMD Versal Prime Series Gen 2 is the obvious choice for your next design platform, with room to innovate and differentiate through both software and programmable logic hardware.

AMD VERSAL PRIME SERIES GEN 2 ADAPTIVE SoC FEATURES

FEATURE	HIGHLIGHTS
PROCESSING SYSTEM (PS) OF INTEGRATED CPUS	• Up to 8x Arm Cortex-A78AE application processors – up to 200k DMIPs • Up to 10x Arm Cortex-R52 real-time processors • Support for USB 3.2, DisplayPort 1.4, 10G Ethernet, PCIe Gen5, and more
PROGRAMMABLE LOGIC (PL)	• Low-latency, deterministic, parallel processing • Fully customizable to enable differentiated, proprietary algorithms • Field-upgradeable: Adaptable to changing conditions and evolving workloads
VIDEO CODEC UNIT (VCU)	• Each VCU tile offers hard IP for encoding & decoding • Support for HEVC & AVC up to 4K60, 4:4:4, 12-bit • Up to two VCU tiles per device; aggregate both tiles for limited 8k30 support
INTEGRATED GPU	• Up to 4-core Arm Mali-G78AE GPU with up to 268 GFLOPs of compute (FP32 MACs) • Up to 4 shader cores in 2 slices – configurable as 1 or 2 independent partitions • Support for: OpenGL® ES 3.2, OpenGL SC 2.0, Vulkan® 1.2, Vulkan SC, OpenCL™ 3.0
DDR5/LPDDR5X MEMORY CONTROLLERS	• Support for DDR5 @ 6400 Mb/s and LPDDR5X @ 8533 Mb/s • Up to 170 GB/s memory bandwidth in the largest devices • Flexible pin planning – swap hard controller pins to support other interfaces
PROGRAMMABLE I/O	• New high-performance X5IO support DDR5/LPDDR5X, LVDS, and other standards • New MIPI C-PHY support (4.5 GSPS) to complement 4.5 Gb/s D-PHY support • HDIO and MIO support lower speeds and logic levels up to 3.3V
NETWORK ON CHIP (NoC)	• High-bandwidth software-programmable network on chip • Data movement alternative to PL-based routing • Assured quality of service (QoS) to prioritize critical traffic
HIGH-SPEED SERIAL TRANSCEIVERS	• Production-proven 32G GTYP transceivers • Up to 24 PL-facing transceivers per device • 8 additional PS-facing transceivers per device for PS-based 10 GbE, PCIe Gen5
100G MULTIRATE ETHERNET	• Channelized for 1x100 GbE, 2x50 GbE, 1x40 GbE, 4x25 GbE, or 4x10 GbE • Integrated FECs for robust error correction (KR FEC, KR4 FEC, KP4 FEC) • FEC bypass mode for custom use
PCIe GEN5	• PL-based support for PCIe Gen5x4, Gen4x8, and other configurations • PCIe controller hard IP blocks integrated into programmable logic • Up to 4 PL-based controllers per device; additional PCIe Gen5 controllers in PS

ADAPT TO CHANGING REQUIREMENTS

Optimize systems anytime without the need for new hardware. With AMD Versal Prime Series Gen 2 devices, designers have the flexibility to fine-tune systems for specific applications—even after deployment. Quickly customize 4K and 8K video pipelines, adapt to emerging AV-over-IP standards, embrace edge AI processing to differentiate your product, and update algorithms as workloads evolve. Take video, control, and software-defined multimedia applications to the next level with adaptive SoCs, built to perform in embedded environments.

COMPETITIVE STRENGTHS

AMD Zynq UltraScale+ MPSoC and Versal Prime Series Gen 2 adaptive SoCs include dedicated hard IP for a variety of video functions that cannot be matched by the competition. These hard IP blocks save valuable "soft" PL resources, particularly for H.264/H.265 codecs, therefore speeding up development time and reducing development costs.

FEATURE	AGILEX 3, 5, 7	AMD ZYNQ UltraScale+	AMD VERSAL Prime Gen 2
DISPLAYPORT TX (4K60)	Soft	Soft	Hard
DISPLAYPORT TX (4K30)	Soft	Hard	Hard
VIDEO CODEC (H.264/H.265)	Soft	Hard	Hard
GPU	Soft	Hard	Hard

NEXT STEPS

Explore a list of **IP in Pro AV and Broadcast systems** offered through AMD & partners

Learn more about **AMD in Professional AV and Broadcast**

Learn more about **AMD Versal Prime Series Gen 2** adaptive SoCs

ENDNOTES

1. Based on the combined total DMIPs of the Versal AI Edge Series Gen 2 and Versal Prime Series Gen 2 processing systems when configured with 8 Arm Cortex-A78AE applications cores @2.2 GHz and 10 Arm Cortex-R52 real-time cores @1.05 GHz, compared to the published combined total DMIPs of the processing systems in the Zynq UltraScale+ MPSoC. Versal AI Edge Series Gen 2 and Prime Series Gen 2 operating conditions: Highest available speed grade, 0.88V PS operating voltage, split-mode operation, maximum supported operating frequency. Zynq UltraScale+ MPSoC operating conditions Highest available speed grade, 0.9V PS operating voltage, maximum supported operating frequency. Actual DMIPs performance will vary when final products are released in market. (VER-105)
2. Based on AMD comparison of the published peak performance values and Vertex processing rates at a 400 MHz operating frequency for Versal Prime Series Gen 2 and Zynq UltraScale+ MPSoC devices, as of August 2025. Performance result is subject to change with operating frequency and will vary by device. (VER-103)