AI-DRIVEN INDUSTRIAL AUTOMATION WITH AMD VERSAL[™] AI EDGE SERIES GEN 2

- A step function increase in processing performance for demanding industrial control applications
- Next-generation AI Engines accelerate Digital Twin use cases
- Designed for Functional Safety

AMD together we advance_

KEY BENEFITS

FUNCTION INTEGRATION

Adaptive SoC combines data acquisition, preprocessing, decision making, and networking in a single device

UNIFIED DESIGN SOFTWARE

Powerful design tools are in a unified tools platform for all tasks

AI CAPABLE

Al Engines run neural networks at an optimum power-per-watt ratio

ADVANCED FUNCTION BLOCKS

Integrated function blocks like video codecs, the image signal processor, and the GPU are building blocks for advanced designs

FLEXIBLE CONNECTIVITY

Programmable logic unlocks the ability to connect to any type of sensor or interface

OVERVIEW

Achieving higher productivity is the main target for industrial automation. The more comprehensive an automation algorithm is, the more it will optimize an entire process. The right combination of interfaces, application processing performance, real-time execution, and acceleration of analysis functions, including AI and safety and security functions, defines what an optimal System-on-Chip (SoC) for modern industrial automation will deliver.

AMD Versal[™] AI Edge Series Gen 2 adaptive SoCs are designed with a highly integrated architecture. Next-generation connectivity like PCIe[®] Gen5, MIPI C-PHY up to 4.5 GS/s, and D-PHY up to 4.5 Gb/s allow operation in an environment with new technologies. The processing system offers up to 10X more scalar compute performance than the previous generation¹ and supports DDR5 and optional ECC for high-reliability applications. Next-generation AI Engines, with new data types designed to support up to 3X more performance/watt than the first generation,² are ideal for the execution of advanced models. Finally, a new integrated GPU and a video codec for 4k60³ complement the processing capabilities to provide full IPC functionality.

HIGHLIGHTS

UP TO 10X SCALAR COMPUTE WITH NEXT-GENERATION PROCESSOR SYSTEM¹

- 8-core Arm[®] Cortex[®]-A78AE up to 200k DMIPs
- 10-core Arm Cortex-R52 up to 23k DMIPs
- DDR5 memory support up to 5600-DDR5, 8533-LPDDR5x with ECC

NEXT-GENERATION HIGH-PERFORMANCE AI ENGINES

- Up to 3X TOPS/watt vs. previous generation²
- Adds support for MX6, MX9, FP8, and FP16 datatypes
- Leverages increased DDR bandwidth for higher performance on neural network inference and signal processing workloads

FUNCTIONAL SAFETY AND SECURITY FEATURES

- ASIL D and SIL 3 certification targeted for scalar processors with lock-step
- ASIL B and SIL 2 certification targeted for GPU, AI Engine, and ISP
- New application security unit (ASU) embedded

INTEGRATED VIDEO PROCESSING

- Image signal processors (ISP)
- Video codec unit (VCU) for 4k60 HEVC/AVC³
 Graphics processing unit (GPU) with up to 256 GFLOPs

TARGET APPLICATIONS

CLOUD CONNECTED INDUSTRIAL PC (IPC)

- Linux[®] based automation applications
- Scalable number of Ethernet ports in adaptive SoC
- Al performance using Al Engines

PROCESS AUTOMATION AND CONTROL (PLC, PAC)

- Execution environment for IEC 61131 runtimes
- Cloud / Edge collaboration
- Sensor and actuator interfacing, including optical sensors, ISP, and video processing

NEXT STEPS

- To learn more about Versal AI Edge Series Gen 2, visit www.amd.com/versal-ai-edge-gen2
- To learn more about automation with AMD FPGAs, visit the AMD Industrial Solutions page at www.amd.com/industrial and the Healthcare page at www.amd.com/healthcare
- Contact your local AMD sales representative

ENDNOTES

1. Based on AMD internal pre-silicon performance estimates for combined total DMIPs of the Versal AI Edge Series Gen 2 and Versal Prime Series Gen 2 processing system 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 system in the first-generation Versal AI Edge Series and Versal Prime Series. 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. First-generation Versal AI Edge Series and Prime Series operating conditions: Highest available speed grade, 0.88V PS operating voltage, maximum supported operating frequency. Actual DMIPs performance will vary when final products are released in market. (VER-027)

2. Based on AMD internal performance and power projections for the AIE-ML v2 compute tile architecture in the Versal AI Edge Series Cen 2 using the MX6 data type, compared to performance specifications and AMD Power Design Manager power results for the AIE-ML compute tile architecture featured in the first-generation Versal AI Edge Series using INT8 data type. Assumptions: 2 row, 8 column sub-arrays. Operating conditions: 1 GHz F_{MX}, 0.7V AIE operating voltage, 100°C junction temperature, typical process, 60% vector load, % activations = 0 < 10%. Actual performance will vary when final products are released in market. Performance projections as of March 2024. (VER-023)

3. Video codec acceleration (including at least the HEVC (H.265), H.264, VP9, and AV1 codecs) is subject to and not operable without inclusion/installation of compatible media players. (GD-176)

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HIGH-SPEED CONNECTIVITY

- 32G high-speed transceivers
- Dedicated high-speed interfaces for USB 3.2, 10 GbE, PCIe[®] Gen5, NVMe, UFS, and HSM (no FPGA soft IP needed)

ROBOTICS CONTROLLER

- Execution of control environment for robotic applications
- Industrial Ethernet master, including TSN
- Visual SLAM and navigation in AI Engines

DIGITAL TWIN IN CYBER-PHYSICAL SYSTEMS (CPS)

- Model-based design flow support
- Acceleration through programmable logic and AI Engine
- Python[™] execution for runtime analytics

