

SOLUTION BRIEF

ADVANCING BROADCAST & PRO AV WITH AMD SPARTAN™ ULTRASCALE+™ FPGAs

COST-OPTIMIZED AV CONNECTIVITY AND REAL-TIME
4K VIDEO PROCESSING



OVERVIEW

AMD Spartan™ UltraScale+™ FPGAs offer advanced I/O capabilities and low power consumption in small packages. Equipped with high-speed 16.3 Gb/s transceivers, built-in external memory controllers, and PCIe® Gen4 interfacing, the family provides robust solutions and a long-term supply for a wide range of professional AV and broadcast applications from AV-over-IP network bridges, video converters, multiviewers, and PCIe ingest, playout, and processing cards.

HIGHLIGHTS

SUPPORT A WIDE RANGE OF AV CONNECTIVITY STANDARDS

- Integrate 12G-SDI, HDMI™ 2.1 & DisplayPort™ 1.4
- SDI subsystem IP included with AMD Vivado™ tools at no extra cost
- HDMI, DisplayPort, and HDCP* IP available via a cost-effective video IP toolbox
- Bridge to 1-10G Ethernet for cost-optimized AV-over-IP
- Implement Dante Audio, Dante AV Ultra, IPMX, IP10, NDI, and ST 2110

PCI EXPRESS® GEN4 FOR AV CAPTURE, PROCESSING, AND PLOUT

- Higher speed transfer of up to 4-lanes at 16 GT/s means support of higher frame rates, better multi-stream handling, and lower latency compared to previous PCIe generations
- Video capture and streaming, editing and rendering, external storage interfaces, real-time audio processing, and AI video processing can all be enhanced with the use of the Spartan UltraScale+ FPGA for PCIe bridging

REAL-TIME 4K VIDEO PROCESSING

- Integrated 32-bit LPDDR4X/5 memory controller delivering up to 4266 MB/s throughput while substantially reducing FPGA fabric usage, ideal for handling 4K60 video buffering
- Programmable logic fabric for customized low-latency, high-throughput, real-time 4K video processing alongside lightweight mezzanine codecs such as JPEG XS, High-Throughput JPEG 2000 (HTJ2K), and Blackmagic IP10
- Preprocessing of video streams before GPU or CPU ingest for AI workflows

*HDCP is only available to DCP adopters

KEY BENEFITS

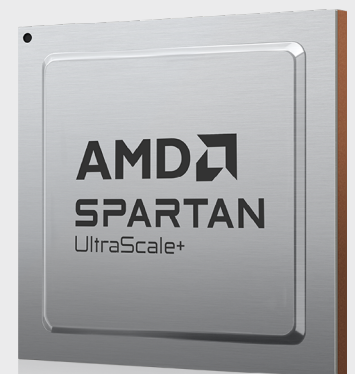
CONNECT TO ANY BASEBAND VIDEO INTERFACE

IDEAL FOR PCIe VIDEO CAPTURE, PROCESSING & PLOUT CARDS

BRIDGE TO AV-OVER-IP STANDARDS

CUSTOMIZABLE REAL-TIME 4K VIDEO PROCESSING

ALL IN A SINGLE DEVICE

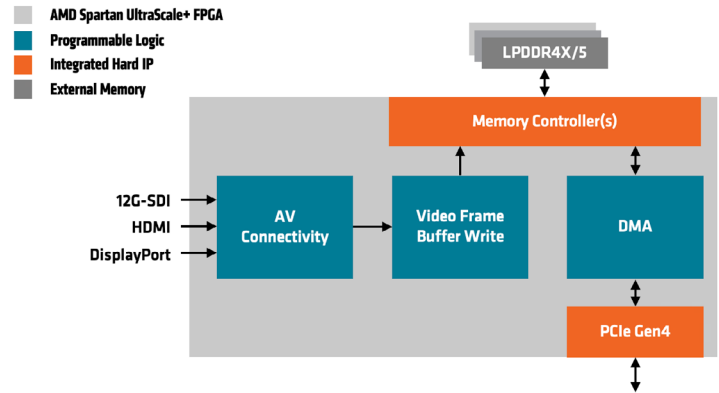


TARGET APPLICATIONS

PCIe VIDEO CAPTURE/PLAYOUT CARDS

Perfect for real-time broadcast and AV processing platforms, Spartan UltraScale+ FPGAs can implement a range of baseband video connectivity, along with integrated hard IP for memory controllers for video frame buffering and PCIe Gen4 interfaces for 4K ingest, processing, and playout. Host-side software via PCIe Gen4 can also manage configuration, making it highly flexible and field upgradable.

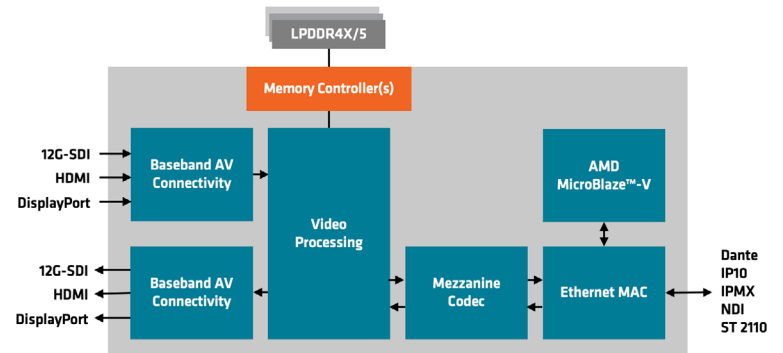
Implementing the memory controller and PCIe interface as hard IP not only saves logic area but is also projected to offer up to 60% power efficiency improvement over previous 28 nm devices.¹



VIDEO CONVERTERS/AV-OVER-IP GATEWAYS

Spartan UltraScale+ FPGAs are the perfect choice for HDMI, DisplayPort, and SDI interfacing, since bridging between various baseband video standards is a key requirement when handling multiple types of cameras and displays.

Spartan UltraScale+ FPGAs can also serve as SDI-IP or HDMI-IP gateways, converting video between baseband and Dante AV, IP10, IPMX, NDI, or ST 2110 streams. This capability makes Spartan UltraScale+ FPGAs ideal for hybrid SDI/IP workflows in live broadcast and HDMI/IP applications in Pro AV.



With up to 572 GPIOs and up to 8x 16.3 Gb/s transceivers, Spartan UltraScale+ FPGAs support legacy and emerging AV protocols.

AMD COST-OPTIMIZED FPGA PORTFOLIO

Scalability across the FPGA Cost-Optimized Portfolio enables design reuse from project to project.

System Logic Cells	Up to 218K	Up to 308K	Up to 102K	Up to 215K
I/O Count	Up to 575	Up to 304	Up to 400	Up to 500
Transceivers	Up to 16.3 Gb/s	Up to 16.3 Gb/s	N/A	Up to 6.6 Gb/s

FEATURES

FEATURE	HIGHLIGHT
HIGH I/O COUNT	<ul style="list-style-type: none"> High I/O count across portfolio - 304 to 572 GPIO Three GPIO types to cover a wide range of requirements: High-density I/O (HDIO) up to 3.3V, high-performance I/O (HPIO) up to 1.8V, and XP5IO up to 1.5V, supporting 3200 Mb/s MIPI and 1800 Mb/s LVDS
MIPI SUPPORT	<ul style="list-style-type: none"> Up to 3200 Mb/s supporting advanced vision sensors (MIPI, SLVS-EC) Up to 4-lane MIPI channels supported
HIGH-PERFORMANCE TRANSCEIVERS	<ul style="list-style-type: none"> GTH transceivers supporting up to 16.3 Gb/s Single oscillator for fabric and SerDes eliminates extra clocking components
PCI EXPRESS GEN4 SUPPORT	<ul style="list-style-type: none"> PCI Express Gen4 x8 support DMA IP further simplifies interfacing
VERSATILE MEMORY	<ul style="list-style-type: none"> On-Chip Memory: Block RAM for low latency, high throughput, and UltraRAM provides massive on-chip memory External Memory: LPDDR4X and LPDDR5 via integrated hard memory controllers up to 4266 Mb/s, and DDR4 soft memory controller IP up to 2400 Mb/s
INTEGRATED HARD IP	<ul style="list-style-type: none"> PCIe Gen4 x8 LPDDR4X/5 Memory Controller Platform Management Controller
STATE-OF-THE-ART SECURITY FEATURES	<ul style="list-style-type: none"> Offers the most security features² of any AMD cost-optimized FPGA product PQC with NIST-approved algorithms and AES-GCM for secure configuration Each device is unique and identifiable through Physical Unclonable Function
ENHANCED PROGRAMMABLE LOGIC ARCHITECTURE	<ul style="list-style-type: none"> Based on proven TSMC's 16 nm FinFET+ process Voltage scaling to tune power and performance on the same device Enhanced CLB/LUTs, routing, and ASIC-class clocking for high utilization

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 Spartan UltraScale+ FPGAs](#)**
- Learn more about **[AMD competitive advantages](#)** over other offerings in the market

ENDNOTES

- Projection is based on AMD internal analysis, January 2024, using a total power calculation (static power plus dynamic power) based on the logic scale count of an AMD Artix UltraScale+ AU7P FPGA to estimate the total power of an AMD Spartan UltraScale+ SU200P FPGA versus an AMD Artix 77A200T FPGA, using Xilinx Power Estimator (XPE) tool version 2023.12. Total power interfacing results may vary when products are released in market and based on configuration, design, usage, and other factors. (SUS-006)
- Based on AMD internal analysis in December 2023, using the product data sheets to compare the number of security features in Spartan UltraScale+ FPGAs to previous generation AMD cost-optimized FPGAs. (SUS-002)

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