Accelerating Video Innovations with Intel® FPGAs

Create flexible, high-performance 8K UHD solutions with Intel FPGAs combined with video image processing and connectivity IP cores.

In today's competitive market, it is crucial to continuously innovate to differentiate against new entrants using standardized off-the-shelf products. Video markets continue to evolve with new technologies and trends, such as:

- 8K ultra high definition (UHD) and higher resolutions, the shift to video over IP, and the use of artificial intelligence for video analytics
- New form factors, such as interactive display modules, and new video connectivity standards, such as HDMI* 2.1.

Intel® FPGAs – with its modular intellectual property (IP) architecture, early-to-market pre-canned IP cores, and ready-to-go reference design hardware – enable original equipment manufacturers (OEMs) to quickly add new features or accommodate end customer specific requirements for a wide range of video markets.

Figure 1. Intel® ecosystem hardware form factors such as interactive display modules, Open Pluggable Specification (OPS+) and FPGA Vision Accelerator Boards enable new requirements and applications in high growth markets such as professional displays or retail.

8K UHD Solution

8K UHD 60 frames per second (fps) is becoming a reality, with all major television vendors announcing their 8K/HDMI 2.1 products at CES 2019 and the plan for the first live broadcast at the Japan Olympics in 2020. Intel FPGAs provide fast time to market and a comprehensive portfolio of professional-grade video processing and connectivity solutions across multiple end markets, such as test equipment, Pro A/V applications, and medical diagnostics.
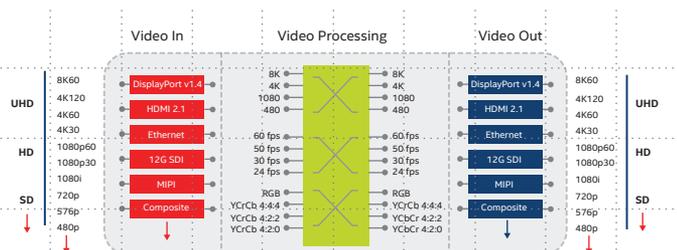
Figure 2. Intel® FPGA pre-canned video processing blocks are system verified to convert any incoming resolution and frame rate to any output

HDMI IP

- Supporting new HDMI 2.1 fixed rate link performance (Figure 3)
- Compliant with HDMI 2.0 solution (in production)
- Deep color mode, up to 8-channel audio

Figure 3. Intel's HDMI 2.1 IP passing QD980 protocol tester 8K data rate

HDCP IP

- Certified HDCP* 1.4/2.3 and interoperability with HDMI 2.0 and DisplayPort* 1.4, including optional display screen compression (DSC)

- Comprehensive hardware key storage and management solution

Video over IP

- Certified SMPTE* 2110

- 1/10/25GE ready

- Virtualized solution coming in 2019

DisplayPort IP

- Compliant with DisplayPort 1.4

- Multi-stream transport source/sink and link quality analysis

Other video connectivity IP

- 12G SDI*, MIPI*, SLVS-EC*, and LVDS*

Smart Video Analytics Using AI, FPGAs, and Intel Vision Accelerator Solutions

The OpenVINO™ toolkit from Intel is a comprehensive set of deep learning and computer vision libraries that extend across Intel's hardware portfolio to maximize performance in a vast range of different vision applications. Accelerate your vision workloads with Intel FPGA accelerator boards available today supporting large networks up to 4-billion parameters. Get more info at https://software.intel.com/en-us/openvino-toolkit.

OpenVINO™
Toolkit

Figure 4. Intel Vision Accelerator Design with Intel® Arria® 10 FPGA

8K-Ready Video and Image Processing Suite

The Intel® FPGA Video and Image Processing (VIP) Suite II is a "plug and play" IP portfolio, offering a highly-integrated and flexible alternative to video application-specific standard products (ASSPs). Combined with easily integrated connectivity IP cores, the VIP Suite II provides a design philosophy for rapid new design creation and easy integration of custom value-add features, such as upgrading designs from 4K to 8K resolutions with no system redesign. VIP Suite II IP blocks (Figure 5) support a wide range of resolutions, fps, bit rate per second (bps), and color planes. By design, the modular architecture allows fast accommodation of future requirements.

- Over 20 Intel FPGA IP functions with support for all Intel FPGAs

- 1080p/4K/8K, HDR ready, 120+ fps, 16 bps

- Easy integration with video connectivity IP cores, such as HDMI, DisplayPort, SMPTE 2110, 12G SDI, and MIPI, and codecs, such as JPEG2000*, TICO*, DSC*, and MPEG*

- Visual quality exceeds ASSPs

- Highly configurable enabling solution differentiation

- Intel Arria® 10 FPGA-based 8K UHD reference design

- Upgrade to 600 Mhz with Intel Stratix® 10 FPGAs
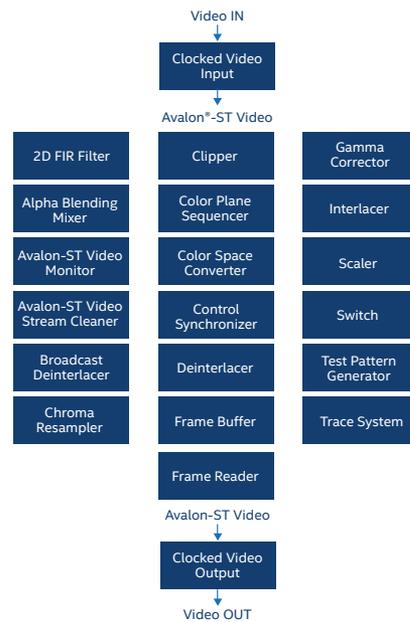
Figure 5. Intel® FPGA VIP Suite II IP Blocks

Learn More

For more information, go to: www.intel.com/content/www/us/en/broadcast/products/programmable/overview.html