BROADCAST PRO A/V
Flexible, future-proof platform
DID YOU KNOW?

80% of Internet traffic is expected to be video by 2019

50% of homes in the US will own a 4K TV by 2020

The Market Landscape Today

Market Uncertainty
Ever changing product requirements and continuously evolving standards

Exponentially Increasing Bandwidth
Need for infrastructure upgrades

Market Getting Ready for Open Standards Adoption
Intel supports the latest video over IP open standards
FLEXIBLE, FUTURE-PROOF PLATFORM

Intel provides a future-proof, plug-and-play portfolio of intellectual property (IP) for the video conferencing, A/V networking, display and projection, and media processing end markets. You can combine modular blocks with the latest IP to build a flexible video framework with less development time. Additionally, these off-the-shelf building blocks help you respond to rapid design changes. With Intel’s state-of-the-art software tools, you can build a professional, customized solution that scales to any bandwidth and product requirements.

ANY-TO-ANY CONVERSION

Intel® FPGA IP blocks are system verified to convert any income resolutions and frame rates to any outcome resolutions and frame rates over certified video connectivity IP.
Intel FPGAs enable video conferencing applications with a complete SoC solution, incorporating CODEC (e.g., H.265), processing and connectivity in a single FPGA to provide minimal overall system latency and optimum performance. Flexible FPGAs enable multiple transceiver-based inputs and outputs, the integration of customized pre-process and post-process functions (ISPs, format conversion, color conversion, CODEC video conditioning, PiP mixing, graphic overlay, re-sizing, etc.), and the ability to work with external chips for additional connectivity or processing functionality.

Intel FPGAs support an extensive range (varying complexity, features, and application) of A/V networking products. Our connectivity portfolio enables multiple video interfaces giving the ultimate flexibility to input any video stream, conditioning and compressing it to be sent over a cost-effective CAT5 cable. In a space traditionally dominated by proprietary standards, Intel FPGA IP portfolio includes the latest market video over IP standards (SMPTE 2022 -1,-2,-5,-6,-7, SMPTE 2059 -1,-2, eAVB, and SVIP TR-03/04). Furthermore, our diverse range of high compression and mezzanine CODEC and our extensive video processing IP enables the necessary customization to fit your application functional and performance requirements.
Video walls and multi-viewers are typical applications that use Intel's scaling, clipping, and alpha blending and mixing IP blocks. Intel's extensive connectivity IP (as well as the numerous high-speed transceivers in our devices) enable a large variety of applications, from small to large, to be integrated in a single device. Furthermore, our IP portfolio offers the latest video over IP standards featuring the latest bandwidth and video quality functionality. Intel FPGAs provide the ultimate flexibility to meet any of your customers' requirements in a market with many competing standards, such as high-definition multimedia interface (HDMI), display port (DP), serial digital interface (SDI), and video over IP. Intel FPGAs and SoCs are the perfect fit for single device integration of interfacing, video processing, and application software for expanded features and controlling functions such as menu rendering.

Intel FPGAs and SoCs provide the ultimate flexibility for any-to-any interfacing and any-to-any video formatting thanks to our extensive connectivity and video processing IP as well as the numerous high-speed transceivers in our devices. Integrate legacy interfaces, scale and customize your solution with our off-the-shelf IP and state of the art productivity tools while maintaining the highest video and audio quality.
ACCELERATING INNOVATION WITH DEVICES, TOOLS, AND IP

20 nm FPGAs Power Next-Gen Pro A/V Applications
Intel presents a unique solution to your Pro A/V system solution needs combining comprehensive IP and device portfolios. Our 20 nm Arria® 10 SoCs are an exact match for next-generation 4K/UHD applications. With the right feature set, including up to 2,666 Mbps DDR4 SDRAM memory interfaces, system designers are ready to create fast time-to-market, complex, and high-throughput designs. These IP solutions are developed by our in-house video system experts who optimally combine algorithmic and design expertise.

Intel FPGA IP Portfolio
Intel provides an extensive IP portfolio that includes certified connectivity solutions with:
- The latest traditional and video over IP interfaces
- Modular and future proof (4K ready and beyond) Video and Image Processing Suite
- Best-in-class compression and decompression engines

VIDEO AND IMAGE PROCESSING
Intel’s Video and Image Processing Suite is a plug-and-play IP portfolio, and presents a highly integrated alternative to video ASSPs. Together with easily integrated connectivity IP blocks, the Video and Image Processing Suite provides a design philosophy for rapid new design creation and easy integration of custom value-add features. Moving from HD to 4K/UHD processing requires no system re-design. The architecture is future-proofed to 8K, HFR, and HDR requirements.

Key Concepts
- Support for all Intel FPGAs
- Visual quality exceeds ASSPs
- Easy integration with video connectivity IPs and CODECs
- 4K/UHD and 120 fps+ support
- Released as IP MegaCore® functions
- Highly configurable for cost optimal SD to 4K/UHD systems
- Easy interface to connectivity IP

Size Performance Trade-off
- Range of scaling algorithms from nearest neighbor to edge-adaptive polyphase
- De-interlacer has multiple algorithm options including bob, weave, motion adaptive, and video over film support
AUDIO AND VIDEO CONNECTIVITY IP (PRO A/V SELECTION)

HDMI
- HDMI 2.0 (up to 6G rates) in production
- Deep color mode, up to 8-channel audio
- HDMI 2.0a HDR support coming soon
- Certified solutions

HDCP (Bitec)
- HDMI 2.0 and DisplayPort 1.2a IP available with HDCP 1.4 and/or HDCP 2.2
- HDCP 1.4 offering certified and in production
- HDCP 2.2 certification planned first half 2016
- Key storage and management solution

MIPI (Partners)
- CSI and DSI support

DisplayPort
- DisplayPort 1.2a in production
- MST source/sink, link quality analysis
- Deep color mode, up to 8-channel audio
- Certified solutions

SMPTE 2022 (Partner Solution)
- SMPTE 2022 -1, -2 and -5, -6, -7 support
- Integration with SMPTE 2059 and Tico/J2K
- UHD/4K supported today (8K ready)

SVIP TR-03 (Partners)
- System-on-chip media networking solution complete
- Multi-protocol, including Ethernet AVB, AES67, and SMPTE ST 2022
- Customizable digital signal processing

CODEC IP

Intel offers a comprehensive portfolio of in-house and partner IP blocks for Pro A/V media processing. Furthermore, Intel's best-in-class HEVC solutions offer the ultimate flexibility through full FPGA implementations as well as hybrid solutions that combine x86 processors with FPGA acceleration.

H.265
- Xeon® E5 + FPGA broadcast encoder
  - 10 bit, 4kp60, 4.2.0
- Low-latency FPGA encoders
  - 4kp30, 8 bit, 4.2.0
  - 1080p60, 10 bit, 4.2.2
- Configurable FPGA decoder
  - Up to 12 bit, 4kp60, 4.2.2

H.264 (Partner Solutions)
- Low latency (AVC-I or I&P), FPGA encoders
  - Up to 1080p60, 10 bit, 4.2.2
- Broadcast (IP&B), FPGA encoders
  - Up to 1080p60, 10 bit, 4.2.2
- Configurable FPGA decoder
  - Up to 10 bit, 1080p60, 4.2.2

JPEG2K and TICO (IntoPix)
- Up to 8K visually lossless

SYSTEM SOLUTION READY FOR PRODUCTION

Customize and own your solutions with full turn-key and part turn-key (with your engineering team) system solutions available through trusted Intel design partners. Intel plug-and-play IP enables the ownership of your solution's differentiation value for existing and future product developments. Please contact a sales representative for more details.

https://www.altera.com/dsn
## INTEL DEVELOPMENT BOARDS

<table>
<thead>
<tr>
<th>FAMILY / DENSITY</th>
<th>PART NUMBER</th>
<th>IMAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Arria 10 GX FPGA Development Kit</strong>&lt;br&gt;1 DisplayPort TX, 2 FMC, 1 PCIe Gen3x8, 25 Gbps transceivers</td>
<td>10AX115S2F45I1SG</td>
<td><img src="image1.png" alt="Image" /></td>
</tr>
<tr>
<td><strong>Arria 10 SoC Development Kit</strong>&lt;br&gt;1 DisplayPort TX, 2 FMC, 1 PCIe Gen3x8, 25 Gbps transceivers, 1G DDR4</td>
<td>10AS066N3F40I2LG</td>
<td><img src="image2.png" alt="Image" /></td>
</tr>
<tr>
<td><strong>Stratix® V Advanced Systems Development Kit</strong>&lt;br&gt;2 Stratix V devices, 1 FMC, 1 HSMC, 2 PCIe Gen3, 1 USB 2.0</td>
<td>2 x 5SGXEA7N2F45C2N</td>
<td><img src="image3.png" alt="Image" /></td>
</tr>
<tr>
<td><strong>Arria V FPGA Development Kit</strong>&lt;br&gt;2 Arria V devices, 2 GB DDR3, 2 HSMC, 1 FMC</td>
<td>2 x 5AGXFB3H4F40C5NES</td>
<td><img src="image4.png" alt="Image" /></td>
</tr>
<tr>
<td><strong>Cyclone® V GT FPGA Development Kit</strong>&lt;br&gt;301 KLE, 5 Gbps transceiver, PCIe Gen2x4</td>
<td>5CGTFD9E5F35C7N</td>
<td><img src="image5.png" alt="Image" /></td>
</tr>
<tr>
<td><strong>ALSE Advanced Video Development Board</strong>&lt;br&gt;30K LEs, 6.1 Gbps transceivers, 1GB DDR3, 1 Ethernet, 1 HDMI 1.4, 1 DisplayPort 1.2</td>
<td>5CGTFD9E5F31C7N</td>
<td><img src="image6.png" alt="Image" /></td>
</tr>
<tr>
<td><strong>Coveloz BACH SoM</strong>&lt;br&gt;1 GB DDR3, 3xGbE, IEEE 1588, MADI/AES3/TDM/Analog, Audio I/F</td>
<td>5CSEA5U23C8</td>
<td><img src="image7.png" alt="Image" /></td>
</tr>
<tr>
<td><strong>BITEC HDMI 2.0 FMC Card</strong></td>
<td>—</td>
<td><img src="image8.png" alt="Image" /></td>
</tr>
<tr>
<td><strong>BITEC DisplayPort 1.2 FMC Card</strong></td>
<td>—</td>
<td><img src="image9.png" alt="Image" /></td>
</tr>
<tr>
<td><strong>Terasic 12G SDI FMC Card</strong></td>
<td>—</td>
<td><img src="image10.png" alt="Image" /></td>
</tr>
</tbody>
</table>

[www.altera.com/solutions/industry/broadcast/design.html](www.altera.com/solutions/industry/broadcast/design.html)