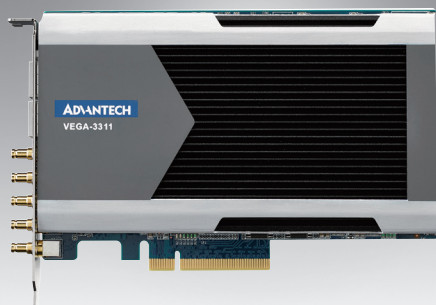# VEGA-3311

4K HEVC Broadcast Video Encoding/ Decoding Card

Preliminary

Features

- 1-ch 4Kp60 or 4-ch 1080p60 real-time 4:2:2 10-bit HEVC, AVC & MPEG-2 encode & decode
- AIMS roadmap support including SMPTE 2022-5/-6/-7 & VSF TR-03/-04 w/ AES67 audio & SMPTE 2059 sync
- Optional TICO or Sony LLVC compression
- 4K video capture over built-in, 4-ch SDI-3G or 1-ch SDI-12G, 1x mini-HDMI 2.0 input and 1x mini-HDMI 2.0 output (VEGA-3311-S)
- 4K video capture over built-in, 4-ch SDI-3G or 1-ch SDI-12G and 2x 10GbE (VEGA-3311-I)
- Simple-to-use API and example code for FFmpeg and GStreamer multimedia frameworks

Introduction

VEGA-3311 enables HEVC, AVC, MPEG2 real-time 1-ch 4K UltraHD (2160p60) and 4-ch FHD (1080p60) encode and decode. It is particularly relevant for 4K UltraHD transmission which requires a much higher stream capacity.

VEGA-3311 is tailored for professional media processing and are capable of performing professional grade 4Kp60 Main10 profile HEVC encoding and decoding at less than 35W power consumption. The VEGA-3311 adapter additionally features 4K video capture over built-in 4-ch SDI-3G or 1-ch SDI-12G or mini-HDMI2.0 video inputs for acquisition-based encoding and 4-ch SDI-3G video outputs for acquisition-based decoding in contribution workflows. VEGA-3311 can also support low latency transmission of uncompressed or lightly compressed video over standard IP networks according to industry agreed standards. This card feature a simple-to-use API and example code for FFmpeg and GStreamer multimedia frameworks to streamline product development and their integration into existing applications.

Specification

Live Video Input - SDI-3G/SDI-12G	Video Encoding	H.265/HEVC	Resolution (x1ch)	3840x2160 /1920x1080 / 1280x720 /720x480
			Resolution (Multi-channel more than x2ch)	1920x1080 /1280x720 /720x480
			Frame rate/Scan mode	60p/59.94p/50p/30p/29.97p/25p/24p / 59.94i/50i
			Bit depth	8, 10 bits
			8-bit encoding from 10-bit raw data	Supported
			Chroma Sampling	4:2:0 / 4:2:2
			Rate control	CBR / VBR / Capped VBR
			GOP length	One Picture (I only) / 0.5sec / 1 sec
			GOP structure	I picture only / IPPP /IBB/IBBB/IBBBBBBB (Hierarchical GOP:supported) / Closed GOP/Open GOP / Temporal ID on/off for hierarchical GOP / Scene change / Adaptive GOP
			CPB delay control	3s, 1s, 0.5s
			Filter	Fixed strength
			Low latency	5,6 frame (with IPPPP)
			Ultra low-latency	< 1 frame
		H.264/AVC	Resolution (x1ch)	3840x2160 /1920x1080 / 1280x720 /720x480
			Resolution (Multi-channel more than x2ch)	1920x1080 /1280x720 /720x480
			Frame rate/Scan mode	60p/59.94p/50p/30p/29.97p/25p/24p / 59.94i/50i
			Bit depth	8, 10 bits
			8-bit encoding from 10-bit raw data	Supported
			Chroma Sampling	4:2:0 / 4:2:2
			Rate control	CBR / VBR / Capped VBR
			GOP length	One Picture (I only) / 0.5sec / 1 sec
			GOP structure	I picture only / IPPP /IBB/IBBB / Closed GOP/Open GOP / Scene change / Adaptive GOP
			CPB delay control	1s, 0.5s
			Filter	De-blocking filter / Fixed strength
			Low latency	5,6 frame (with IPPPP)
		MPEG-2	Resolution (x1ch)	1920x1080 / 1280x720 /720x480
			Resolution (Multi-channel more than x2ch)	1920x1080 /1280x720 /720x480
			Frame rate/Scan mode	30p/29.97p/25p/24p / 59.94i/50i
			Bit depth	8 bits
			Chroma Sampling	4:2:0
			Rate control	CBR
			GOP length	One Picture (I only) / 0.5sec / 1 sec
			GOP structure	I picture only / IPPP /IBB / Closed GOP/Open GOP / Scene change / Adaptive GOP

Specifications (Cont.)

Live Video Input - SDI-3G/SDI-12G	Video Decoding	H.265/HEVC	Resolution (x1ch)	3840x2160 /1920x1080 / 1280x720 /720x480
			Frame rate/Scan mode	60p/59.94p/50p/30p/29.97p/25p/24p / 59.94i/50i
			Bit depth	8 / 10 bits
			Chroma Sampling	4:2:0 / 4:2:2
		H.264/AVC	Resolution (x1ch)	3840x2160 /1920x1080 / 1280x720 /720x480
			Frame rate/Scan mode	60p/59.94p/50p/30p/29.97p/25p/24p / 59.94i/50i
			Bit depth	8, 10 bits
			Chroma Sampling	4:2:0 / 4:2:2
		MPEG-2	Resolution (x1ch)	1920x1080 / 1280x720 /720x480
			Frame rate/Scan mode	30p/29.97p/25p/24p / 59.94i/50i
			Bit depth	8 bits
			Chroma Sampling	4:2:0
	Audio Encoding	Control	Single ch	Supported
	Audio Decoding	Control	Single ch	Supported
	Video Capture	Control	Pixel Format	NV12 / YV12 / I420 / P010 / NV16 / YV16 / YUY2/P210
	Audio Capture	Control	Sample Frequency	48KHz / 96KHz
			Sampling Depth	16 bit
			Channel Layouts	8-ch / 16-ch
Live Video Input - mini-HDMI (VEGA-3311-S)	Video Encoding	H.265/HEVC	Resolution (x1ch)	3840x2160 /1920x1080 / 1280x720 /720x480
			Frame rate/Scan mode	60p/59.94p/50p/30p/29.97p/25p/24p / 59.94i/50i
			Bit depth	8, 10 bits
			8-bit encoding from 10-bit raw data	Supported
			Chroma Sampling	4:2:0 / 4:2:2
			Rate control	CBR / VBR / Capped VBR
			GOP length	One Picture (I only) / 0.5sec / 1 sec
			GOP structure	I picture only / IPPP /IBB/IBBB/IBBBBBBB (Hierarchical GOP:supported) / Closed GOP/Open GOP / Temporal ID on/off for hierarchical GOP / Scene change / Adaptive GOP
			CPB delay control	3s, 1s, 0.5s
			Filter	Fixed strength
			Low latency	5,6 frame (with IPPPP)
			Ultra low-latency	< 1 frame
		H.264/AVC	Resolution (x1ch)	3840x2160 /1920x1080 / 1280x720 /720x480
			Frame rate/Scan mode	60p/59.94p/50p/30p/29.97p/25p/24p / 59.94i/50i
			Bit depth	8, 10 bits
			8-bit encoding from 10-bit raw data	Supported
			Chroma Sampling	4:2:0 / 4:2:2
			Rate control	CBR / VBR / Capped VBR
			GOP length	One Picture (I only) / 0.5sec / 1 sec
			GOP structure	I picture only / IPPP /IBB/IBBB / Closed GOP/Open GOP / Scene change / Adaptive GOP
			CPB delay control	1s, 0.5s
			Filter	De-blocking filter / Fixed strength
			Low latency	5,6 frame (with IPPPP)
		MPEG-2	Resolution (x1ch)	1920x1080 / 1280x720 /720x480
			Frame rate/Scan mode	30p/29.97p/25p/24p / 59.94i/50i
			Bit depth	8 bits
			Chroma Sampling	4:2:0
			Rate control	CBR
			GOP length	One Picture (I only) / 0.5sec / 1 sec
			GOP structure	I picture only / IPPP /IBB / Closed GOP/Open GOP / Scene change / Adaptive GOP
	Audio Encoding	Control	Single ch	Supported
	Video Capture	Control	Pixel Format	NV12 / YV12 / I420 / P010 / NV16 / YV16 / YUY2 / P210
	Audio Capture	Control	Sample Frequency	48KHz / 96KHz
			Sampling Depth	16 bit
			Channel Layouts	8-ch / 16-ch
File Based Video Input (PCI Express)	Video Encoding	H.265/HEVC	Resolution (x1ch)	3840x2160 /1920x1080 / 1280x720 /720x480
			Resolution (Multi-channel more than x2ch)	1920x1080 /1280x720 / 720x480
			Frame rate/Scan mode	60p/59.94p/50p/30p/29.97p/25p/24p / 59.94i/50i
			Bit depth	8, 10 bits
			8-bit encoding from 10-bit raw data	Supported
			Chroma Sampling	4:2:0 / 4:2:2
			Rate control	CBR / VBR / Capped VBR
			GOP length	One Picture (I only) / 0.5sec / 1 sec
			GOP structure	I picture only / IPPP /IBB/IBBB/IBBBBBBB (Hierarchical GOP:supported) / Closed GOP/Open GOP / Temporal ID on/off for hierarchical GOP / Scene change / Adaptive GOP
			CPB delay control	3s, 1s, 0.5s
			Filter	Fixed strength
			Low latency	5,6 frame (with IPPPP)
			Ultra low-latency	< 1 frame

File Based Video Input (PCI Express)	Video Encoding	H.264/AVC	Resolution (x1ch)	3840x2160 /1920x1080 / 1280x720 /720x480
			Resolution (Multi-channel more than x2ch)	1920x1080 /1280x720 /720x480
			Frame rate/Scan mode	60p/59.94p/50p/30p/29.97p/25p/24p / 59.94i/50i
			Bit depth	8, 10 bits
			8-bit encoding from 10-bit raw data	Supported
			Chroma Sampling	4:2:0 / 4:2:2
			Rate control	CBR / VBR / Capped VBR
			GOP length	One Picture (I only) / 0.5sec / 1 sec
			GOP structure	I picture only / IPPP /IBB/IBBB / Closed GOP/Open GOP / Scene change / Adaptive GOP
			CPB delay control	1s, 0.5s
			Filter	De-blocking filter / Fixed strength
			Low latency	5,6 frame (with IPPPP)
		MPEG-2	Resolution (x1ch)	1920x1080 / 1280x720 /720x480
			Resolution (Multi-channel more than x2ch)	1920x1080 /1280x720 /720x480
			Frame rate/Scan mode	30p/29.97p/25p/24p / 59.94i/50i
			Bit depth	8 bits
			Chroma Sampling	4:2:0
			Rate control	CBR
			GOP length	One Picture (I only) / 0.5sec / 1 sec
			GOP structure	I picture only / IPPP /IBB / Closed GOP/Open GOP / Scene change / Adaptive GOP
	Video Decoding	H.265/HEVC	Resolution (x1ch)	3840x2160 /1920x1080 / 1280x720 /720x480
			Frame rate/Scan mode	60p/59.94p/50p/30p/29.97p/25p/24p / 59.94i/50i
			Bit depth	8, 10 bits
			Chroma Sampling	4:2:0 / 4:2:2
		H.264/AVC	Resolution (x1ch)	3840x2160 /1920x1080 / 1280x720 /720x480
			Frame rate/Scan mode	60p/59.94p/50p/30p/29.97p/25p/24p / 59.94i/50i
			Bit depth	8, 10 bits
			Chroma Sampling	4:2:0 / 4:2:2
		MPEG-2	Resolution (x1ch)	1920x1080 / 1280x720 /720x480
			Frame rate/Scan mode	30p/29.97p/25p/24p / 59.94i/50i
			Bit depth	8 bits
			Chroma Sampling	4:2:0
	Audio Encoding	Control	Single ch	Supported
	Audio Decoding	Control	Single ch	Supported
Feature			Operating System	Windows Server 2012 & 2012 R2 (64-bit), Windows Server 2008 R2 (64-bit) Linux Kernel 3.13.0 (64-bit)
			Development Kits	FFmpeg, Microsoft DirectShow
Physical Characteristic			Networking Interface	2x 10Gbps Ethernet port (VEGA-3311-I)
			Forward Error Correction	Level A and Level B FEC (steam basis)
			Connectors	SFP+ Module
			Internet protocol	Support IPV4 static IP setting
			Streaming Protocols	RTSP/RTP/RTCP over UDP
			Video-over-IP	SMPTE 2022-5/-6/-7 & VSF TR-03/-04 w/ AES67 audio & SMPTE 2059 sync Optional TICO or Sony LLVC compression
			Video Input Interfaces	PCIexpressGen3 x8 4x SDI-3Gor 1x SDI-12G 1x Tri-sync 1x mini-HDMI 2.0 input (VEGA-3311-S) 2x 10Gbps Ethernet port (VEGA-3311-I)
			Video Output Interface	PCI express Gen3 x8 4x SDI-3G or 1x SDI-12G 1x mini-HDMI 2.0 (VEGA-3311-S)
			Power Consumption	<35W
			Dimensions	PCI Express Half Length Full Height 167.65 x 111.15 mm
Environmental			Operating Temperature	–10 to 70 degrees Celsius
			Non-operating Temperature	–40 to 85 degrees Celsius
			Operating Humidity	50 to 95% (non-condensing)
			Non-operating Humidity	50 to 95% (non-condensing)

Ordering Information

Part number	Description
VEGA-3311E	4Kp60 HEVC Broadcast Video Encoding / Decoding Card (M30)

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