

# User Manual

## VEGA-3318

8-ch 4K HEVC/AVC/MPEG-2  
Encoding, Decoding &  
Transcoding Accelerator

**ADVANTECH**

*Enabling an Intelligent Planet*

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## Product Warranty (2 years)

Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandise authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

# Declaration of Conformity

## CE

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables. This kind of cable is available from Advantech. Please contact your local supplier for ordering information.

## CE

This product has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

## FCC Class A

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

# Technical Support and Assistance

1. Visit the Advantech website at <http://support.advantech.com> where you can find the latest information about the product.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
  - Product name and serial number
  - Description of your peripheral attachments
  - Description of your software (operating system, version, application software, etc.)
  - A complete description of the problem
  - The exact wording of any error messages

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## Warnings, Cautions and Notes

**Warning!** *Warnings indicate conditions, which if not observed, can cause personal injury!*



**Caution!** *Cautions are included to help you avoid damaging hardware or losing data. e.g.*



*There is a danger of a new battery exploding if it is incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.*

**Note!** *Notes provide optional additional information.*



## Document Feedback

To assist us in making improvements to this manual, we would welcome comments and constructive criticism. Please send all such - in writing to: [support@advan-tech.com](mailto:support@advan-tech.com)

## Packing List

Before setting up the system, check that the items listed below are included and in good condition. If any item does not accord with the table, please contact your dealer immediately.

- VEGA-3318 adapter
- Retainer Holder

## Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. **DO NOT COVER THE OPENINGS.**
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following situations arises, get the equipment checked by service personnel:
  - The power cord or plug is damaged.
  - Liquid has penetrated into the equipment.
  - The equipment has been exposed to moisture.
  - The equipment does not work well, or you cannot get it to work according to the user's manual.
  - The equipment has been dropped and damaged.
  - The equipment has obvious signs of breakage.
15. **DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -20° C (-4° F) OR ABOVE 60° C (140° F). THIS COULD DAMAGE THE EQUIPMENT. THE EQUIPMENT SHOULD BE IN A CONTROLLED ENVIRONMENT.**
16. **CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER, DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.**

The sound pressure level at the operator's position according to IEC 704-1:1982 is no more than 70 dB (A).

DISCLAIMER: This set of instructions is given according to IEC 704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

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## Safety Precaution - Static Electricity

Follow these simple precautions to protect yourself from harm and the products from damage.

- To avoid electrical shock, always disconnect the power from your PC chassis before you work on it. Don't touch any components on the CPU card or other cards while the PC is on.
- Disconnect power before making any configuration changes. The sudden rush of power as you connect a jumper or install a card may damage sensitive electronic components.

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# Chapter 1

## Product Introduction

## 1.1 General Introduction

The VEGA-3318 is the world's first commercial-off-the-shelf video accelerator able to perform low-latency, professional-grade 8-ch 4Kp60 HEVC transcoding in an ultra-low power PCI Express format that can be integrated into standard servers via Linux API. Up to four VEGA-3318 accelerators can be integrated into a 1U server supporting up to 32 live UHD HEVC ABR streams per rack unit - the highest density available in the market. This enables agile, scalable, energy and cost efficient data center deployments to address the growing demand of live UHD OTT video streaming in the cloud. The CAPEX and OPEX savings are significant. VEGA-3318 accelerated solutions benefit from an up to 30x performance boost and up to a 20X reduction in power consumption and rack space when compared to non-accelerated solutions.

The VEGA-3318 supports UHD, HD and SD formats and HEVC, AVC and MPEG-2 codecs including 10-bit profiles, 4:2:2 chroma subsampling and ABR streaming. Developers can leverage Advantech's SDK which supports Linux and Windows operating systems, FFmpeg and GStreamer. In addition, Advantech has created software drivers that are virtualization friendly and support OpenStack. Advantech also offers hardware and software design and customization services for maximum deployment flexibility.

## 1.2 Packing List

Before you begin installing your card, please make sure that the following items have been shipped:

- VEGA-3318 adapter
- Retainer Holder

If any of these items is missing or damaged, please contact your distributor or sales representative immediately.

**Note!** Acrobat Reader is required to view any PDF file. Acrobat Reader can be downloaded at: [www.adobe.com/Products/acrobat/readstep2](http://www.adobe.com/Products/acrobat/readstep2).



## 1.3 Software Driver and SDK Package

Before you begin installing your card, please request the software driver package from [video.solutions@advantech.com](mailto:video.solutions@advantech.com). This triggers a registration and ensures you can be informed about driver and SDK updates.

## 1.4 Product Specifications

### File Based Video Input (PCI Express)

Video Encoding	H.265/HEVC	Channels	8 (up to 4Kp60, 8bit/10bit, YUV) / 32 (up to 1080p60, 8bit/10bit, YUV)
		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	Channels	8 (up to 4Kp60, 8bit/10bit, YUV) / 32 (up to 1080p60, 8bit/10bit, YUV)
		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	Channels	32 (up to 1080p60, 8bit/10bit, YUV)
		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	Channels	8 (up to 4Kp60, 8bit/10bit, YUV) / 16 (up to 1080p60, 8bit/10bit, YUV)
		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	Channels	8 (up to 4Kp60, 8bit/10bit, YUV) / 16 (up to 1080p60, 8bit/10bit, YUV)
		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	Channels	16 (up to 1080p60, 8bit/10bit, YUV)
		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

## Others

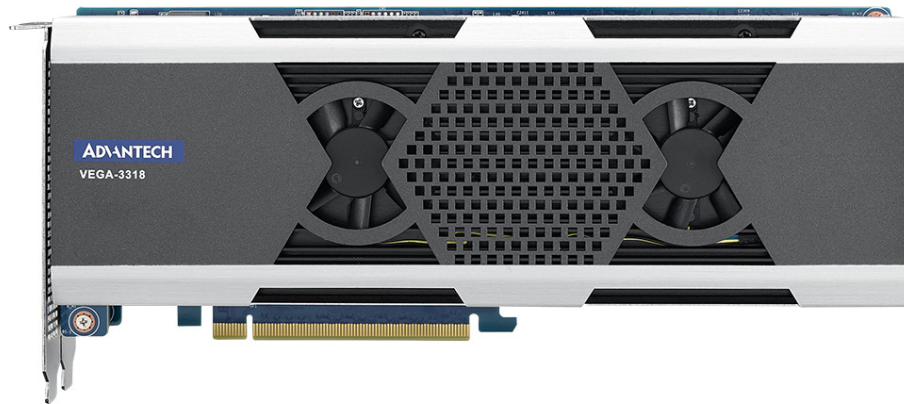
Feature	Operating System	Windows Server 2012 & 2012 R2 (64-bit), Windows Server 2008 R2 (64-bit) Linux Kernel 3.13.0 (32-bit, 64-bit)
	Development Kits	FFmpeg, Microsoft DirectShow
Physical Characteristic	Video Input / Output Interfaces	PCI express Gen3 x16
	Power Consumption	65W
	Dimensions	PCI Express 10.5" Length Full Height, double-deck / 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)

# Chapter 2

Installing VEGA-3318

## 2.1 Installing VEGA-3318

The board is a standard PCI Express add-on card conforming to a conventional half-length form factor. The heatsink design is shown below. The installation procedural steps are listed below.



Please follow the below steps to prepare the card for operation:

1. Identify a suitable slot in the target appliance. VEGA-3318 requires a PCIe x16 Gen 3 slot with 65W slot power. The majority of standard x16 PCI Express slots meet this base requirement.
2. Fit the board with the correct end-plate for the target slot.
3. Power off the system.
4. Install the board with normal ESD precaution.
5. Power on the server and ensure there are no additional errors during boot sequence.
6. Request the SW package from [Video.Solutions@advantech.com](mailto:Video.Solutions@advantech.com)
7. Install the software package described in this manual.
8. Check the software has been installed correctly by running the demo and checking the output.

If there are no errors reported, then VEGA-3318 is now ready for performing video encoding tasks.





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## **[www.advantech.com](http://www.advantech.com)**

Please verify specifications before quoting. This guide is intended for reference purposes only.

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