



# FALCON-233CRS

2MP Color HDR UVC USB 3.0 Camera based on Onsemi AR0233 Sensor

Vadzo Falcon-233CRS is a 1080p HDR USB 3.0 Camera based on Onsemi AR0233 Sensor coupled with high-performance ISP that supports features such as Auto Corrections, LFM, HDR, etc. The camera delivers max resolution of 2MP and Video streaming of 1080p, 720p, and VGA. The camera comes with a M12/S-Mount lens holder that supports a 74DFOV lens by default. You shall be able to stream video in YUV format and capture images in BMP format.

## Key Features

- Sensor Model: AR0233 Onsemi Sensor
- Max Resolution: 2MP
- Pixel Size: 3.0  $\mu$ m x 3.0  $\mu$ m
- Shutter: Rolling Shutter
- Lens FOV: 74 DFOV
- Compliance: UVC, RoHS 3, REACH



## Applications

- **Warehouse Robotics:** Object Scanning, Document Scanning, OCR, Obstacle Detection.
- **Telematics & Fleet Management:** Dashcam, Driver Monitoring, Cargo Monitoring Camera, Fleet Management.
- **Kiosk & Digital Signages:** Document Scanning, OCR, Barcode Reading, Facial Recognition, Demography Analysis.

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## 1. Introduction

Falcon-233CRS is a UVC Compliant Fixed-Focus color HDR USB 3.0 camera based on Onsemi AR0233 sensor. The sensor supports HDR of 100+dB. The camera is designed to be backward compatible with USB 2.0 as well.

The camera incorporates the AR0233 Bayer sensor from Sony integrated with an on-board Image Signal Processor (ISP) to perform functions such as debayering, demosaicing, color correction, contrast correction, gamma correction, denoising, lens corrections and so on. In addition to this, the ISP also supports functions such as Auto-Exposure, Auto White Balance, LED Flicker Mitigation.

The Image Signal Processor is integrated with the USB 3.0 controller to provide UVC Compliant USB 3.0 camera. The USB controller is also programmed to support HID Pipeline that shall support UVC extension functions that are not supported in the standard UVC drivers.

## 2. Camera Specifications

<b>General Information</b>	
Product Family	Falcon series
Camera Model	Vadzo Falcon-233CRS
<b>Sensor</b>	
Sensor	AR0233 Sensor from Onsemi
Sensor Format	1/2.5”
Pixel Size	3.0 $\mu$ m x 3.0 $\mu$ m
Max Resolution	2MP – 2048(H) x 1280(V)
Shutter	Rolling Shutter
Chroma	Color
<b>Camera Data</b>	
Interface	USB 3.0 Gen1 Backward compatible to USB 2.0
Pixel Depth	8bit / 10bit
Output Format	YUV422

Exposure Control	Manual Control via software & Auto-Exposure
GPIO	6 pins. 1x Digital Input, 1x Digital Output, 3x NC and GND
<b>Camera Hardware</b>	
Lens	S Mount (M12 Standard)
USB connector	Type C
GPIO connector	Connector on-board: Wurth 665306124022 Mating connector: Wurth 665006113322
Power Supply	USB powered
Power Requirement	Max: 1.75 W at 5VDC Min: 1.05 W at 5VDC
Operating Temperature	-40 <sup>0</sup> C to 85 <sup>0</sup> C
Dimension	38mm (L) x 38mm (B) convertible to 32mm (L) x 32mm (B)
Weight	13 Grams (Without Lens)
<b>Camera Software</b>	
Video Resolutions	VGA, HD, and Full HD
Video formats	YUV422
Still Image Resolutions	VGA, HD, and Full HD
Image Capture formats	BMP
Image Capture Modes	Software Trigger
UVC Camera Controls	Brightness, Exposure, Contrast, Sharpness, Saturation, Gamma, Gain, White Balance, Focus Control
Extension Controls	Denoising, LFM
OS Supported	Windows, Linux, Android (need additional SDK)
<b>Conformity</b>	
Conformity	UVC Compliant, RoHS 3, REACH

### 3. Supported Resolutions

<b>Resolution</b>	<b>Frame Rates (FPS) in USB 3.0 Mode</b>
	<b>YUV</b>
<b>640 x 480 (VGA)</b>	60
<b>1280 x 720 (HD)</b>	60
<b>1920 x 1080 (FHD)</b>	30

### 4. Supported Camera Functions

The List of functions supported by the Falcon-233CRS camera are:

- Resolution Control
- Image Format Setting
- Video Format Setting – YUV422
- Image Capture Software Trigger
- Gain – Auto & Manual
- Exposure – Auto & Manual
- White Balance – Auto & Manual
- Anti Flicker – 50Hz/60Hz
- Contrast Control
- Gamma Control
- Hue & Saturation Control
- Sharpness Control

### 5. USB 3.0 Interface

The camera module's USB 3.0 connector is a standard USB Type C connector. It provides a nominal 5 Gbit/s SuperSpeed data transfer connection to supply power to the device and to transmit video data and control signals. The power supply must comply with the Universal Serial Bus 3.0 Specification. The nominal operating voltage is 5 VDC, effective on the camera module's connector.

Connection assignments and numbering adhere to the Universal Serial Bus 3.0 standard. USB Certified 3.0 Gen 1 or higher cables to be used. Vadzo does not recommend non-certified USB cables.

## 6. Status LED

Status LED's indicate the below:

- Red color indicates Device is powered ON with no Streaming.
- Yellow color indicates: Camera is currently Streaming.

## 7. General Purpose I/O Lines

GPIO lines are terminated through Six (6) pin socket connector from Würth Elektronik part number 665306124022. Refer to the below table for GPIO Connector Pin Numbering and Assignments.

Pin	Line	Function
1	Power	Do not use.
2	-	Do not use*
3	-	Do not use*
4	Input1	General Purpose I/O (GPIO) line with 1.8V tolerant directly connected to MCU  Preset: Input Line
5	Output1	General Purpose I/O (GPIO) line with 1.8V tolerant directly connected to MCU  Preset: Output Line
6	GND	Ground

*\*Vadzo engineering team shall be able to enable the IOs on the firmware level as per the end user technical requirements under the purview of Vadzo Imaging customisation program.*

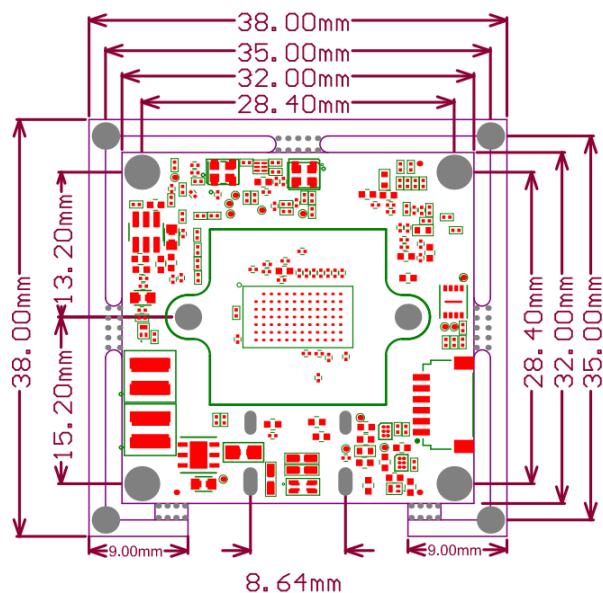
Recommended mating connector from Würth Elektronik part number 665006113322.

## 8. Temperature and Humidity Specifications

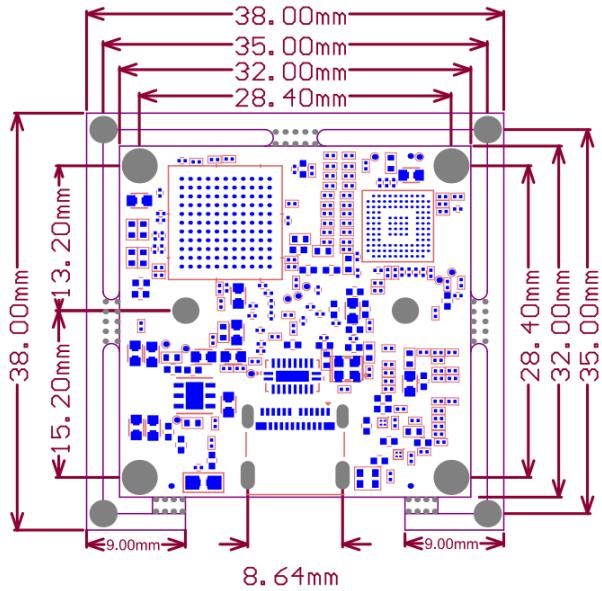
Description	Specification
Operating Temperature	-40 <sup>0</sup> C to 85 <sup>0</sup> C
Storage Temperature	-40 <sup>0</sup> C to 85 <sup>0</sup> C
Humidity	20% to 80%, Relative, non-condensing.

## 9. Dimensions

### Board Top Side – 2D



### Board Bottom Side - 2D



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