VADZO

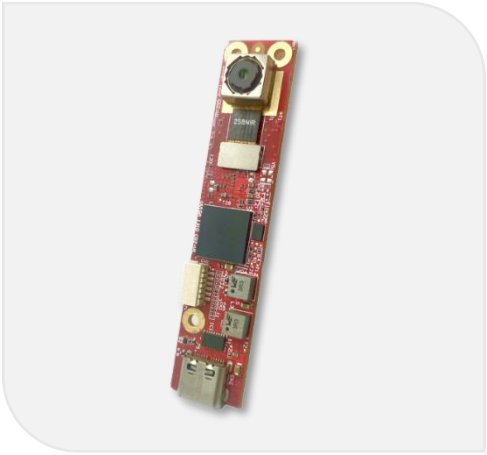
FALCON-258CRA

13MP Color PDAF UVC USB 3.0 Camera based on Sony IMX258 Exmor Sensor

Vadzo Falcon-258CRA is a 4K PDAF USB 3.0 Camera based on Sony IMX258 Exmor Sensor coupled with high-performance ISP. The camera supports features such as phase detection Autofocus, AE, AWB, etc. The camera delivers max resolution of 13MP and Video streaming of 4K, 1080p and 720p. The camera comes with a VCM based Autofocus lens assembly that supports either 78DFOV lens by default. You shall be able to stream video in YUV and MJPEG format and capture images in BMP and JPEG format.

Key Features

- Sensor Model: IMX258 Sony Exmor Sensor
- Max Resolution: 13MP
- Pixel Size: 1.12 µm x 1.12 µm
- Shutter: Rolling Shutter
- Lens FOV: 78 DFOV
- Compliance: UVC, RoHS 3, REACH



Applications

- **Medical & Life Science Devices:** Ophthalmology Camera, Intraoral Camera, Dermatoscope Camera, Digital Microscope Camera, Pathology Camera.
- **Retail Analytics & Automation:** Inventory Monitoring, Age Verification, Demography Analysis, Shelf Monitoring, Self-Checkout.
- **Kiosk & Digital Signages:** Document Scanning, OCR, Barcode Reading, Facial Recognition, Demography Analysis.
- **Warehouse Robotics:** Object Scanning, Document Scanning, OCR, Obstacle Detection.

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1. Introduction

Falcon-258CRA is a UVC Compliant USB 3.0 Phase Detection Auto-Focus color camera based on Sony IMX258 sensor. The camera is designed to be backward compatible with USB 2.0 as well.

The camera incorporates the IMX258 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 Auto functions such as Auto-Exposure and Auto-White Balance. This camera supports both Phase Detection Auto-Focus as well as Contrast Auto-Focus.

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.

Vadzo Falcon-258CRA incorporates VCM based Auto-Focus lens that enables Phase Detection AF as well as Hybrid Contrast Based AF. In both options, the camera can support modes such as continuous AF, On-Shot triggered AF, and Manual focus control. The camera also supports configurations such as with NIR cut Filter and Without NIR Cut Filter.

2. Camera Specifications

General Information	
Product Family	Falcon series
Camera Model	Vadzo Falcon-258CRA
Sensor	
Sensor	IMX258 CMOS sensor from Sony
Sensor Format	1/3.06”
Pixel Size	1.12 µm x 1.12 µm
Max Resolution	13MP – 4208(H) x 3120(V)
Shutter	Rolling Shutter
Chroma	Color

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Camera Data	
Interface	USB 3.0 Gen1 Backward compatible to USB 2.0
Pixel Depth	8bit / 10bit
Output Format	YUV422 & MJPEG
Exposure Control	Manual Control via software, Phase Detection Auto-Focus & Contrast Based Auto-Focus
GPIO	6 pins. 1x Digital Input, 1x Digital Output, 3x NC and GND
Camera Hardware	
Lens	VCM based Phase Detection Auto-Focus and Contrast Based Auto-Focus with Focus range of 100mm to Infinity.
Lens FOV	Variant 1: 78 DFOV
Lens Filter	Variant 1: With NIR Cut Filter Variant 2: Without NIR Cut Filter
USB connector	Type C
GPIO connector	Connector on-board: Wurth 665106131822 Mating connector: Wurth 665006113322
Power Supply	USB powered
Power Requirement	Max: 1.75 W at 5VDC Min: 1.05 W at 5VDC
Operating Temperature	-30^{o}C to 70^{o}C
Dimension	70mm(L) x 15mm (B) x 9.8mm (H)
Weight	18 Grams
Camera Software	
Video Resolutions	VGA, HD, Full HD, 4K and 13MP
Video formats	YUV422 and MJPEG
Still Image Resolutions	VGA, HD, Full HD, 4K and 13MP
Image Capture formats	BMP and JPEG

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Image Capture Modes	Software trigger
UVC Camera Controls	Brightness, Exposure, Contrast, Sharpness, Saturation, Gamma, Gain, White Balance, Focus Control
Extension Controls	ROI based Auto-Exposure, ROI based Auto-Focus, Denoising, JPEG Compression
OS Supported	Windows, Linux, Android (need additional SDK)
Conformity	
Conformity	UVC Compliant, RoHS 3, REACH

3. Supported Resolutions

Resolution	**Frame Rates (FPS) in USB 3.0 Mode**	
	YUV	**MJPEG**
640 x 480 (VGA)	60	60
1280 x 720 (HD)	60	60
1920 x 1080 (FHD)	30	60
3840 x 2160 (4K)	15	30
4208 x 3120 (13MP)	8	20

4. Supported Camera Functions

The list of functions supported by the Falcon-258CRA camera are:

- Resolution Control
- Image format setting
- Video format setting – YUV/MJPEG
- Image capture software trigger
- Gain – Auto & Manual
- Exposure – Auto & Manual
- White Balance – Auto & Manual
- Focus – PDAF Auto Focus, Contrast Auto Focus & Manual

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- Anti-Flicker – 50Hz/60Hz
- Contrast control
- Gamma control
- Hue & Saturation control
- Sharpness control
- ROI Based Auto-Functions – Focus & Exposure
- Q Factor 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 665106131822.Refer to the below table for GPIO Connector Pin Numbering and Assignments.

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

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4	Output1	General Purpose I/O (GPIO) line with 1.8V tolerant directly connected to MCU Preset: Input Line
5	-	Do not use*
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.*

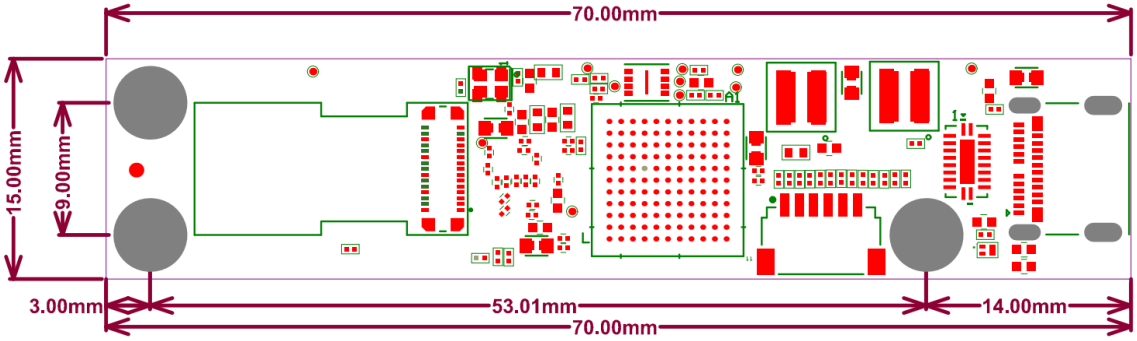
Recommended mating connector from Würth Elektronik part number 665006113322.

8. Temperature and Humidity Specifications

Description	**Specification**
Operating Temperature	-30°C to 70°C
Storage Temperature	-30°C to 70°C
Humidity	20% to 80%, Relative, non-condensing.

9. Dimensions

Board Top Side – 2D



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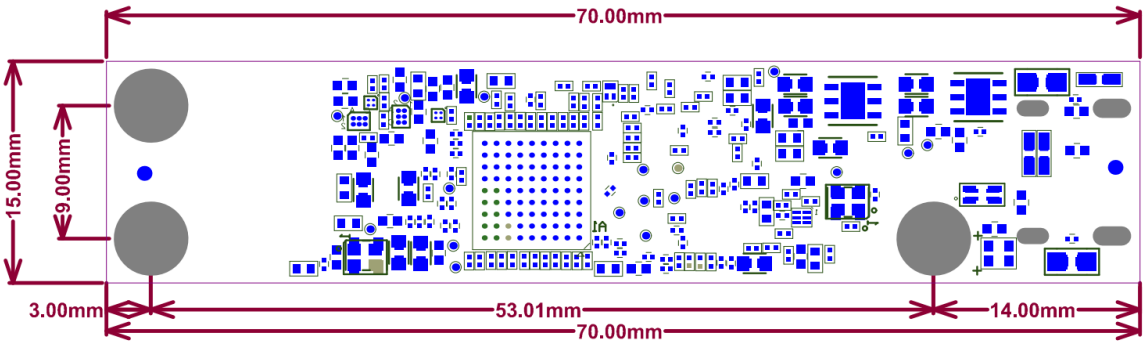
Board Bottom Side - 2D



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