



FALCON-2020MRS

20MP Monochrome UVC USB 3.0 Camera based on Onsemi AR2020 Sensor

Vadzo Falcon-2020MRS is a 20MP USB 3.0 Camera based on Onsemi Hyperlux™ LP AR2020 Sensor coupled with a high-performance ISP. The camera delivers a max resolution of 20MP and Video streaming of 4K, 1080p, and 720p. The camera comes with inherent capabilities such as enhanced dynamic range (eDR), excellent Low-Light and NIR Sensitivity. 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 Y8, capture images in Y8 format, and store in BMP format.

Key Features

- Sensor Model: AR2020 Onsemi Hyperlux™ LP
- Max Resolution: 20MP
- Pixel Size: 1.4 μm x 1.4 μm
- Shutter: Rolling Shutter
- Lens FOV: 74 DFOV
- Compliance: UVC, RoHS 3, REACH



Applications

- **Machine Vision Cameras:** Quality Inspection, Assembly Line Monitoring, Object Recognition and Classification, Surface Inspection, High-Speed Imaging.
- **Smart Surveillance Camera:** Iris Recognition, Day/Night Video Recording, Smart Parking.
- **Medical Devices:** Digital Pathology, Digital Microscopes, Ophthalmic Devices, Fluorescence Imaging.

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1. Introduction

Falcon-2020MRS is a UVC-compliant USB 3.0 Fixed-Focus Mono camera based on Onsemi Hyperlux™ LP AR2020 sensor. The camera is designed to be backward compatible with USB 2.0 as well. The camera incorporates the Onsemi's low-noise CMOS sensor that supports key features like enhanced HDR, Excellent NIR Response @850nm and 900nm, Wake on Motion, and so on. In addition to this, the ISP also supports Auto functions such as Auto-Exposure and Auto-White Balance.

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

2. Camera Specifications

General Information	
Product Family	Falcon series
Camera Model	Vadzo Falcon-2020MRS
Sensor	
Sensor	AR2020 CMOS sensor from Onsemi
Sensor Format	1/1.8"
Pixel Size	1.4µm x 1.4µm
Max Resolution	20MP - 5120(H) x 3840(V)
Shutter	Rolling Shutter
Chroma	Mono
Camera Data	
Interface	USB 3.2 Gen1 Type C Interface Backward Compatible to USB 2.0
Pixel Depth	8bit / 10bit
Output Format	Y8 and Y12
Exposure Control	Manual Control via software & Auto-Exposure

GPIO	6 pins. 1x Digital Input, 1x Digital Output, 3x NC and GND
Camera Hardware	
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	-30 ⁰ C to 70 ⁰ C
Dimension	38mm (L) x 38mm (B) convertible to 32mm (L) x 32mm (B)
Weight	13 Grams (Without Lens)
Camera Software	
Video Resolutions	VGA, HD, Full HD, 4K and 20MP
Video formats	Y8
Still Image Resolutions	VGA, HD, Full HD, 4K and 20MP
Image Capture formats	BMP and Y8
Image Capture Modes	Software trigger
UVC Camera Controls	Brightness, Exposure
OS Supported	Windows, Linux.
Conformity	
Conformity	UVC Compliant, RoHS 3, REACH

3. Supported Resolutions

Resolution	Frame Rates (FPS) in USB 3.0 Mode	
	Y8	BMP
640 x 480 (VGA)	120	120
1280 x 720 (HD)	60	60
1920 x 1080 (FHD)	60	60
3840 x 2160 (4K)	15	30
5120 x 3840 (20MP)	9	20

4. Supported Camera Functions

The List of functions supported by the Falcon-2020MRS camera are:

- Resolution Control
- Image Format Setting
- Video Format Setting – Y8
- Image Capture Software Trigger
- Gain – Auto & Manual
- Exposure – Auto & Manual
- White Balance – Auto & Manual
- Anti Flicker – 50Hz/60Hz

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 Mono indicates Device is powered ON with no Streaming.
- Yellow Mono 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.*

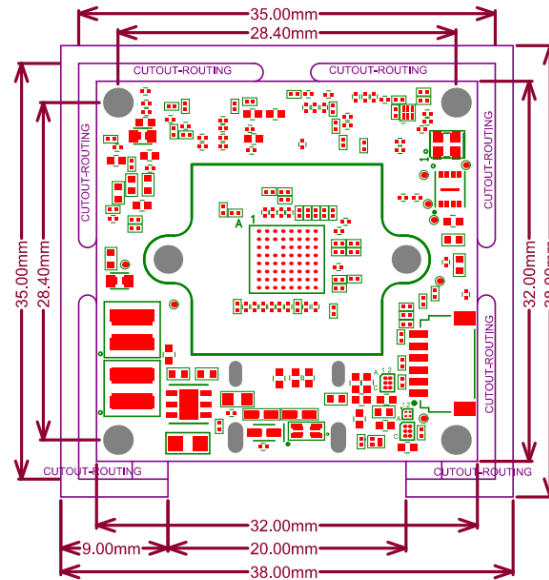
Recommended mating connector from Würth Elektronik part number 665006113322.

8. Temperature and Humidity Specifications

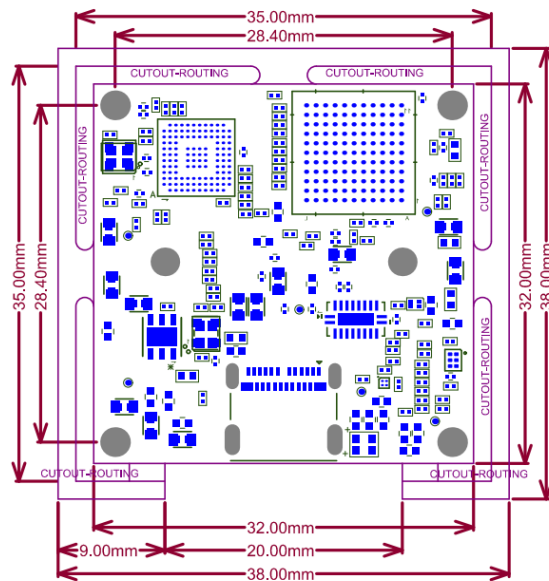
Description	Specification
Operating Temperature	-30°C to 70°C
Storage Temperature	-30°C to 70°C
Humidity	20% to 80%, Relative, non-condensing.

9. Dimensions

Board Top Side – 2D



Board Bottom Side - 2D



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