MERLIN-291CRS

2MP Color Low-Light UVC USB 2.0 Camera based on Sony IMX291 Sensor

Vadzo Merlin-291CRS is a low light USB 2.0 Camera based on IMX291 Sony Starvis Sensor coupled with high-performance ISP. The camera delivers max resolution of 2MP and Video streaming of 1080p and 720p. Applicable in use cases such as kiosk camera, digital signage camera, retail AI camera, medical device camera, facial recognition camera, etc.

Key Features

- Sensor Model: IMX291 Sony Starvis Sensor
- Max Resolution: 2 MP
- Pixel Size: 2.9 µm x 2.9 µm
- Shutter: Rolling Shutter
- Lens FOV: 74 DFOV
- Compliance: UVC, RoHS 3, REACH

Applications

- **Kiosk & Digital Signages:** Document Scanning, OCR, Barcode Reading, Facial Recognition, Demography Analysis.
- **Smart Surveillance:** Facial Recognition, Day/Night Video Recording, Smart Parking, Pedestrian Safety.
- **Retail Analytics & Automation:** Inventory Monitoring, Age Verification, Demography Analysis, Shelf Monitoring, Self-Checkout.

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1. Introduction

Merlin-291CRS is a UVC Compliant USB 2.0 Fixed-Focus color camera based on IMX291 Sony Starvis sensor.

The camera incorporates the IMX291 Bayer sensor from Sony integrated with an on-board Image Signal Processor (ISP) cum USB Controller 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. The USB 2.0 controller is programmed to provide UVC Compliant USB 2.0 camera.

2. Camera Specifications

General Information	
Product Family	Merlin series
Camera Model	Vadzo Merlin-291CRS
Sensor	
Sensor	IMX291 CMOS sensor from Sony
Sensor Format	1/2.8”
Pixel Size	2.9 µm x 2.9 µm
Max Resolution	2MP – 1920(H) x 1080(V)
Shutter	Rolling Shutter
Chroma	Color
Camera Data	
Interface	USB 2.0
Pixel Depth	8bit
Output Format	H.264, MJPEG and YUV422
Exposure Control	Manual Control via software & Auto-Exposure
Input/Output	1x Hardware Trigger
Camera Hardware	
Lens	S Mount (M12 Standard)

USB connector	USB 2.0 Micro B Connector
GPIO connector	Connector on-board: Wurth 665306124022 Mating connector: Wurth 665006113322
Power Supply	USB powered
Power Requirement	Max: 1.5 W at 5VDC Min: 1.0 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	11 Grams (Without Lens)
Camera Software	
Video Resolutions	VGA, HD, and Full HD
Video formats	H.264, MJPEG, and YUV422
Still Image Resolutions	VGA, HD, and Full HD
Image Capture formats	BMP and JPEG
Image Capture Modes	Software trigger, Hardware Trigger
UVC Camera Controls	Brightness, Exposure, Contrast, Sharpness, Saturation, Gamma, Gain, White Balance
Extension Controls	Denoising, JPEG Compression
OS Supported	Windows, Linux, Android (need additional SDK)
Conformity	
Conformity	UVC Compliant, RoHS 3, REACH

3. Supported Resolutions

Single Stream Mode:

Resolution	Frame Rates (FPS) in USB 2.0 Mode		
	H.264	MJPEG	YUV
320 x 240 (QVGA)	30	30	NA
640 x 480 (VGA)	30	30	30
1280 x 720 (HD)	30	30	NA
1920 x 1080 (FHD)	30	30	NA

Dual Stream Mode:

Resolution	Frame Rates (FPS) in USB 2.0 Mode		
	Stream 1	Stream 2	
	H.264	MJPEG	YUV
320 x 240 (QVGA)	30	30	NA
640 x 480 (VGA)	30	30	30
1280 x 720 (HD)	30	30	NA
1920 x 1080 (FHD)	30	30	NA

4. Supported Camera Functions

The List of functions supported by the Merlin-291CRS camera are:

- Resolution Control
- Image Format Setting
- Video Format Setting – H.264/ MJPEG/ YUV
- Dual Stream capability can be enabled
- Image Capture Software Trigger
- Gain – Auto & Manual
- Exposure – Auto & Manual
- White Balance – Auto & Manual
- Anti Flicker – 50Hz/60Hz
- Contrast Control and Gamma Control
- Hue & Saturation Control
- Sharpness Control

5. USB 2.0 Interface

The camera module's USB 2.0 connector is a standard USB 2.0 Micro B connector. It provides a nominal 480 Mbps 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 2.0 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 2.0 standard. USB Certified cables are 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	Input1	Hardware Trigger
3	-	Do not use*
4	-	Do not use*
5	-	Do not use*
6	GND	Ground

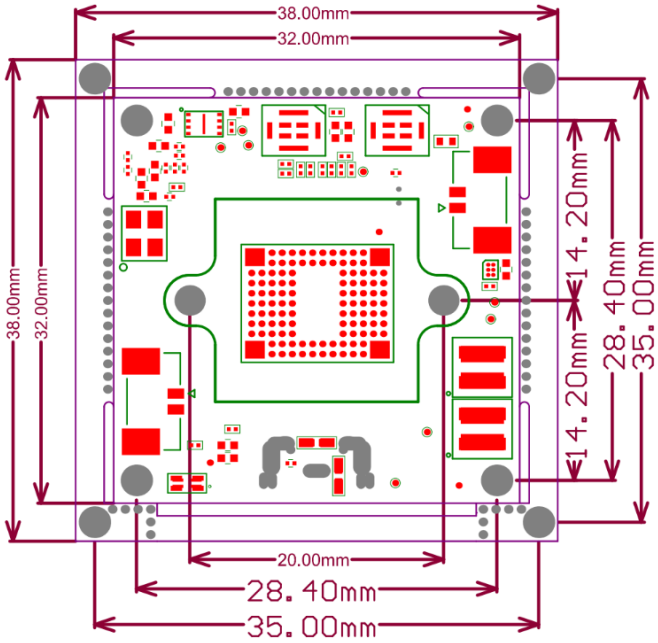
Recommended mating connector from Würth Elektronik part number 665006113322.

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