



BOLT-522MRS

5MP Monochrome MIPI Camera based on Onsemi AR0522 Sensor

Vadzo Bolt-522MRS is a 5MP MIPI Camera based on Onsemi AR0522 Sensor coupled with high-performance ISP. The camera delivers max resolution of 5MP and Video streaming of 1080p, 720p and VGA. Applicable in use cases such as pathology camera, digital microscope camera, medical device camera, patient care camera, security camera, surveillance camera, etc. Bolt-522MRS has been integrated with solutions based on platforms such as Raspberry PI, Nvidia Nano, Nvidia XavierNX, etc.

Key Features

- Sensor Model: AR0522 Onsemi Sensor
- Max Resolution: 5 MP
- Pixel Size: 2.2 μm x 2.2 μm
- Shutter: Rolling Shutter
- Lens FOV: 74 DFOV
- Compliance: RoHS 3, REACH



Applications

- **Medical & Life Science Devices:** Ophthalmology Camera, Intraoral Camera, Dermatoscope Camera, Digital Microscope Camera, Pathology Camera.
- **Warehouse Robotics Camera:** Object Scanning, Document Scanning, OCR, Obstacle Detection.
- **Smart Surveillance:** Iris Recognition, Day/Night Video Recording, Smart Parking, Pedestrian Safety.

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1. Introduction

Bolt-522MRS is a 5MP NIR Monochrome MIPI camera module based on AR0522 CMOS sensor from Onsemi.

The camera supports image capture and video streaming in Y8 format. The camera supports both 2-Lane as well as 4-Lane MIPI CSI-2 Interface and has been tested with platforms such as Raspberry PI, Nvidia Nano, and Nvidia XavierNX.

This is a two-board camera solution that comprises of the camera module board and the adapter board. There are two variants of the adapter board to 2-Lane MIPI CSI 2 as well as 4-Lane MIPI CSI 2 interfaces.

2. Camera Specifications

General Information	
Product Family	Bolt series
Camera Model	Vadzo Bolt-522MRS
Sensor	
Sensor	AR0522 CMOS sensor from Onsemi
Sensor Format	1/2.5"
Pixel Size	2.2 μm x 2.2 μm
Max Resolution	5MP – 2592(H) x 1944(V)
Shutter	Rolling Shutter
Chroma	Mono
Camera Data	
Interface	2 Lane MIPI CSI-2 & 4 Lane MIPI CSI-2
Pixel Depth	8bit
Output Format	Y8
Exposure Control	Manual Control via software & Auto-Exposure
GPIO	2x NC
Camera Hardware	
Lens	S Mount (M12 Standard)

MIPI connector	XF3M(1)-1515-1B (2 Lane) & 54548-2271 (4 Lane)
Power Requirement	Max: 1.45 W at 3.3VDC Min: 0.80 W at 3.3VDC
Operating Temperature	-30°C to 70°C
Dimension	38mm (L) x 38mm (B) convertible to 32mm (L) x 32mm (B)
Weight	8 Grams (Without Lens)
Camera Software	
Video Resolutions	VGA, HD, Full HD, and 5MP
Video formats	Y8
Still Image Resolutions	VGA, HD, Full HD, and 5MP
Image Capture formats	Y8
Image Capture Modes	Software trigger
Camera Controls	Brightness and Exposure
Conformity	
Conformity	RoHS 3, REACH

3. Supported Resolutions

Resolution	Frame Rates (FPS) in 4-Lane MIPI CSI 2
640 x 480 (VGA)	120
1280 x 720 (HD)	60
1920 x 1080 (FHD)	60
2592 x 1944 (5MP)	30

4. Supported Camera Functions

The List of functions supported by the Bolt-522MRS camera are:

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

5. MIPI Interface

The camera module supports both 4-Lane MIPI CSI 2 as well as 2-Lane MIPI CSI 2 interface.

Vadzo has designed the camera hardware such that it can be directly integrated with Raspberry PI as well Nvidia Jetson development kit via the 2-Lane MIPI CSI 2 interface. Vadzo has used the XF3M (1)-1515-1B from Omron for this interface.

Vadzo has integrated the capability of functioning in the 4-Lane MIPI CSI 2 bandwidth as well to ensure that you can achieve faster frame rates.

6. Status LED

Status LED's indicate the below:

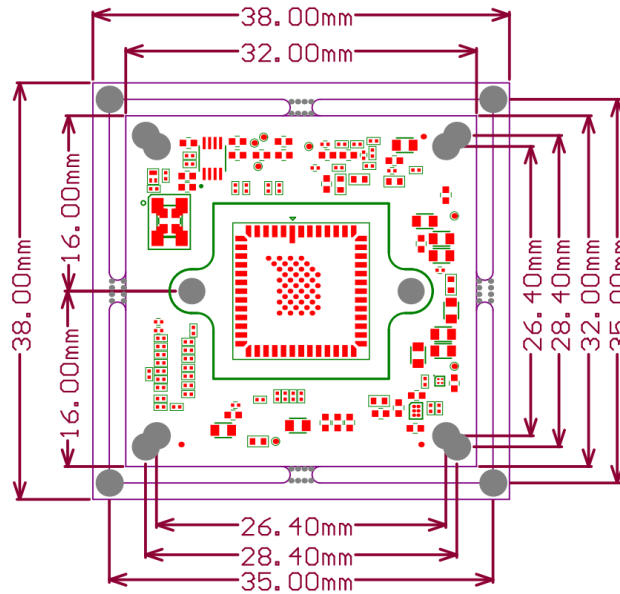
- Red color indicates Device is powered ON with no Streaming.
- Yellow color indicates: Camera is currently Streaming.

7. Temperature and Humidity Specifications

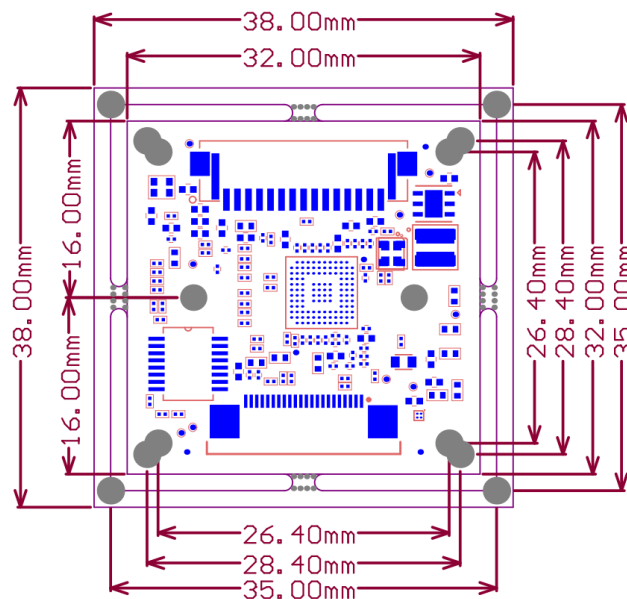
Description	Specification
Operating Temperature	-30 ⁰ C to 70 ⁰ C
Storage Temperature	-30 ⁰ C to 70 ⁰ C
Humidity	20% to 80%, Relative, non-condensing.

8. Dimensions

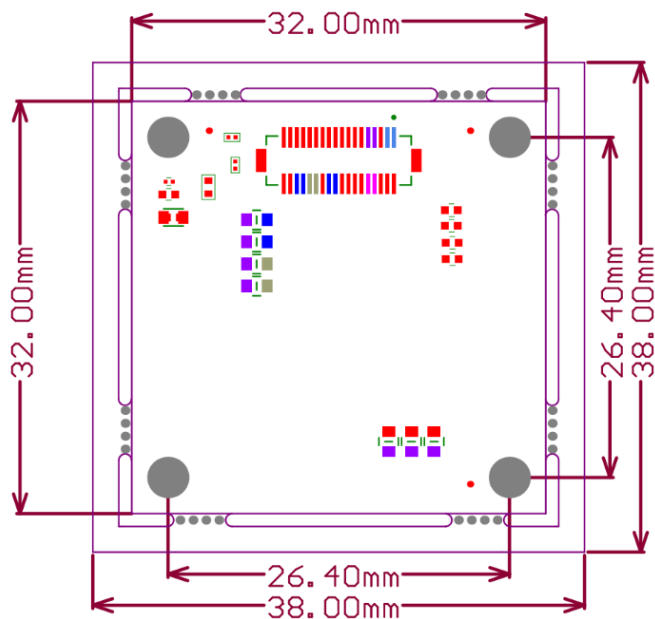
Board Top Side – 2D



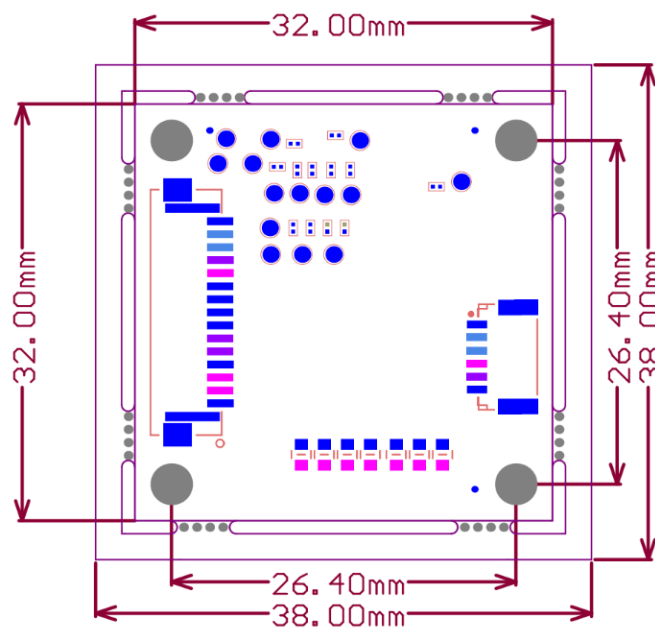
Board Bottom Side - 2D



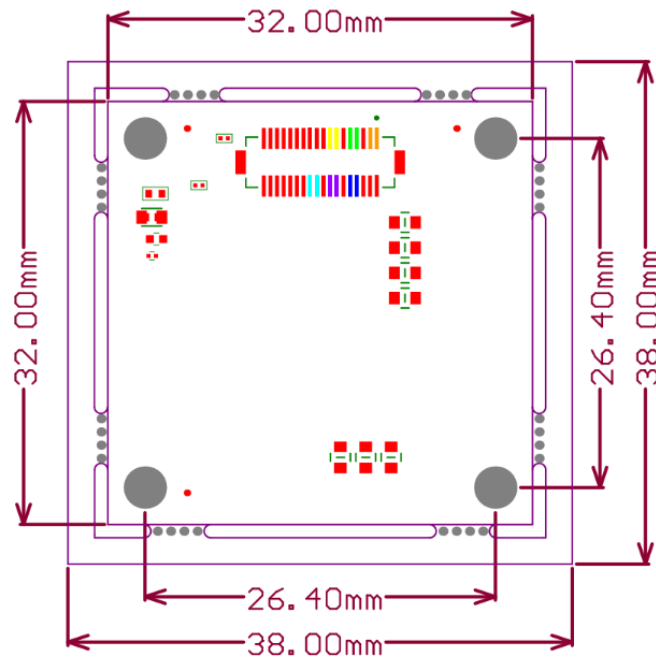
ATR Board 2-Lane Top Side – 2D



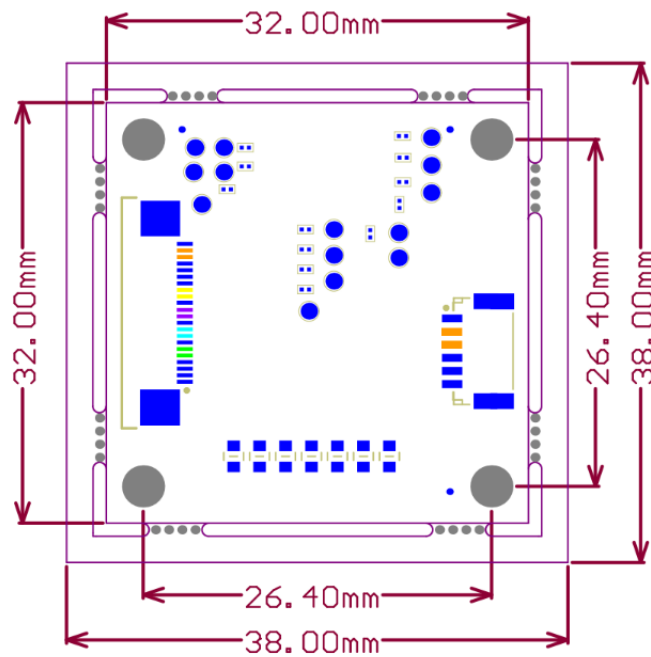
ATR Board 2-Lane Bottom Side – 2D



ATR Board 4-Lane Top Side – 2D



ATR Board 4-Lane Bottom Side – 2D



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