BOLT-521CRS

5MP Color MIPI Camera based on Onsemi AR0521 Sensor

Vadzo Bolt-521CRS is a Full HD MIPI Camera based on Onsemi AR0521 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 medical device camera, patient care camera, security camera, surveillance camera, smart parking camera, etc. Bolt-521CRS has been integrated with solutions based on platforms such as Raspberry PI, Nvidia Nano, Nvidia XavierNX, etc.

Key Features

- Sensor Model: AR0521 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

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

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1. Introduction

Bolt-521CRS is a MIPI Fixed-Focus color camera based on Onsemi AR0521 sensor.

The camera incorporates the AR0521 Bayer sensor from Onsemi 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 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-521CRS
Sensor	
Sensor	AR0521 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	Color
Camera Data	
Interface	2 Lane MIPI CSI-2 & 4 Lane MIPI CSI-2
Pixel Depth	8bit / 10bit
Output Format	YUV422
Exposure Control	Manual Control via software & Auto-Exposure
GPIO	2 x NC
Camera Hardware	
Lens	S Mount (M12 Standard)

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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^{o}C to 70^{o}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	YUV422
Still Image Resolutions	VGA, HD, Full HD, and 5MP
Image Capture formats	BMP
Image Capture Modes	Software trigger
Camera Controls	Brightness, Exposure, Contrast, Sharpness, Saturation, Gamma, Gain, White Balance, Denoising
Conformity	
Conformity	RoHS 3, REACH

3. Supported Resolutions

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

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4. Supported Camera Functions

The List of functions supported by the Bolt-521CRS camera are:

- Resolution Control
- Image Format Setting
- Video Format Setting – YUV
- 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. 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.

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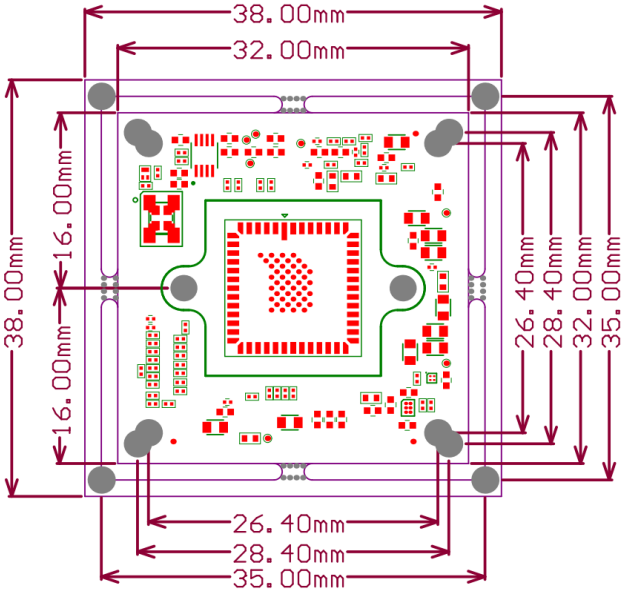
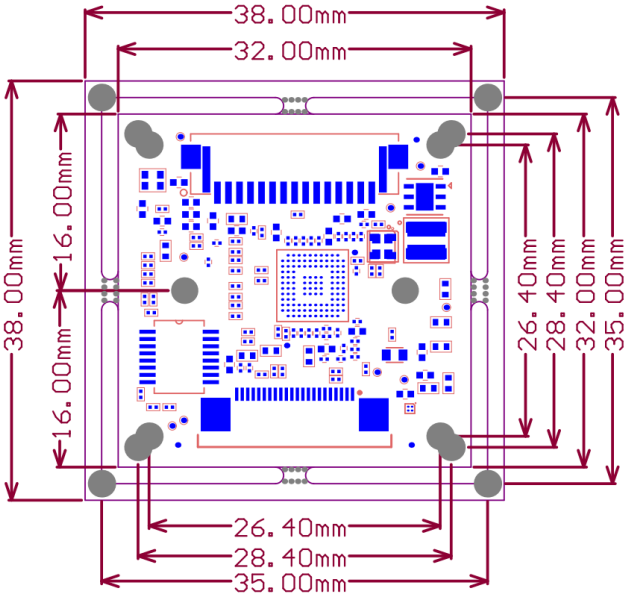
8. Dimensions

Board Top Side – 2D



Board Bottom Side - 2D



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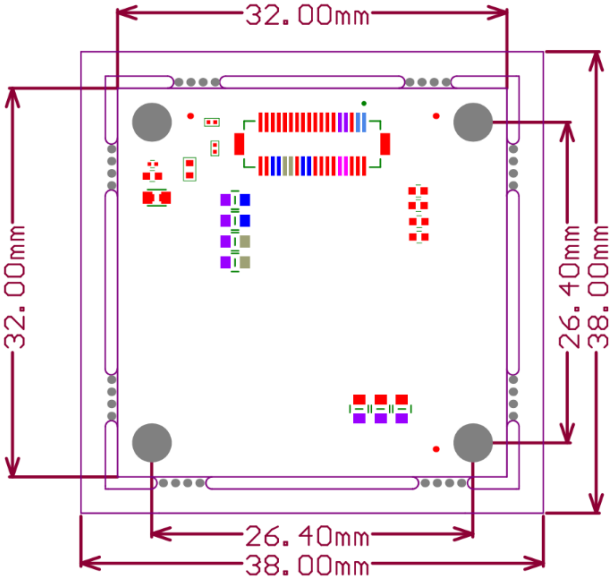
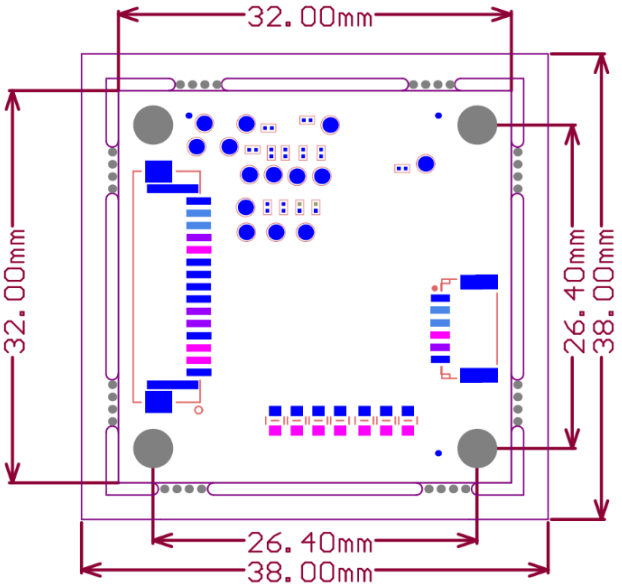
ATR Board 2-Lane Top Side – 2D



ATR Board 2-Lane Bottom Side – 2D



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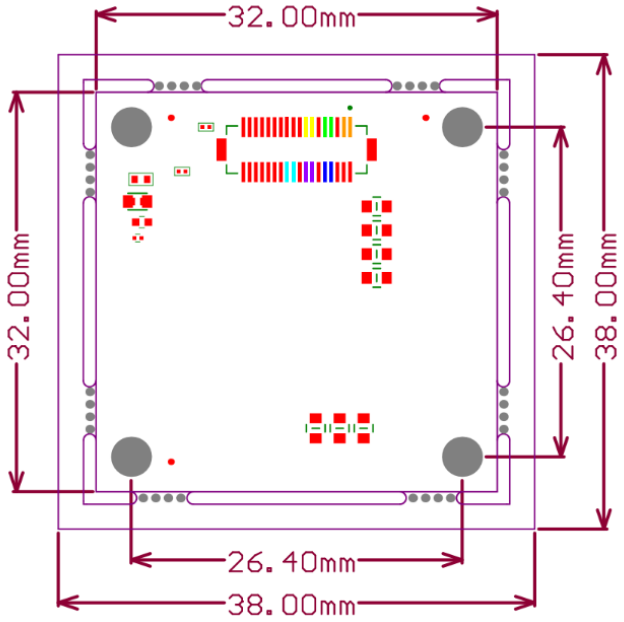
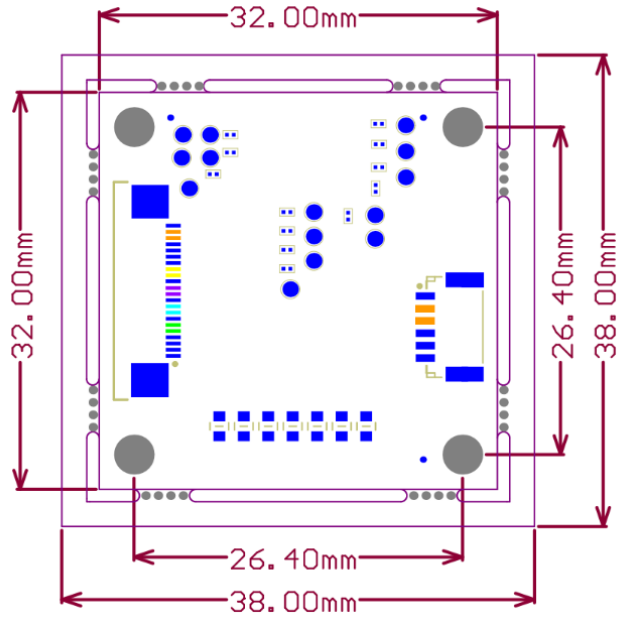
ATR Board 4-Lane Top Side – 2D



ATR Board 4-Lane Bottom Side – 2D



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