



# BOLT-522CRS

## 5MP Color MIPI Camera based on Onsemi AR0522 Sensor

Vadzo Bolt-522CRS 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 medical device camera, pathology camera, digital microscope camera, patient care camera, security camera, smart surveillance camera, etc. Bolt-522CRS 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  $\mu\text{m}$  x 2.2  $\mu\text{m}$
- 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.
- **Retail Analytics & Automation:** Inventory Monitoring, Age Verification, Demography Analysis, Shelf Monitoring, Self-Checkout.
- **Medical & Life Science Devices:** Ophthalmology Camera, Intraoral Camera, Dermatoscope Camera, Digital Microscope Camera, Pathology Camera.

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## 1. Introduction

Bolt-522CRS is a MIPI Fixed-Focus color camera based on Onsemi AR0522 sensor.

The camera incorporates the AR0522 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-522CRS                           |
| Sensor              |   |
| Sensor              | AR0522 CMOS sensor from Onsemi              |
| Sensor Format       | 1/2.5"                                      |
| Pixel Size          | 2.2 $\mu\text{m}$ x 2.2 $\mu\text{m}$       |
| 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)  |
| MIPI connector          | XF3M(1)-1515-1B (2 Lane) & 54548-2271 (4 Lane)                                    |
| Power Requirement       | Max: 1.45 W at 3.3VDC<br>Min: 0.80 W at 3.3VDC                                    |
| Operating Temperature   | -30 <sup>0</sup> C to 75 <sup>0</sup> 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, 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 |
| 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                                     |

## 4. Supported Camera Functions

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

- Resolution Control
- Image Format Setting
- Video Format Setting – YUV422
- 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:

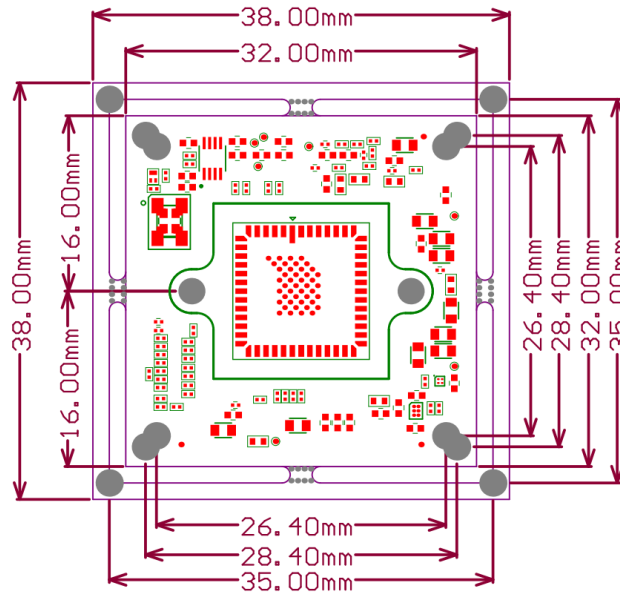
- Red color indicates Device is powered ON with no Streaming.
- Yellow color indicates: Camera is currently Streaming.

## 7. Temperature and Humidity Specifications

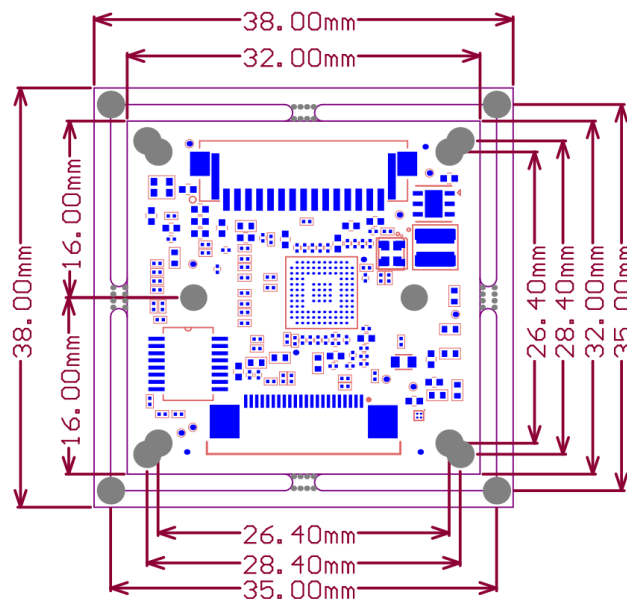
| Description           | Specification                         |
|-----------------------|---------------------------------------|
| Operating Temperature | -30°C to 70°C                         |
| Storage Temperature   | -30°C to 70°C                         |
| Humidity              | 20% to 80%,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

## 8. Dimensions

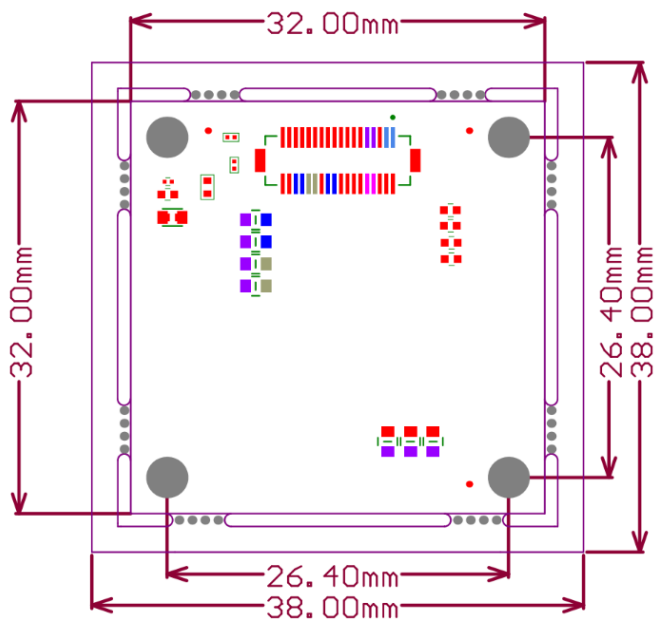
### Board Top Side – 2D



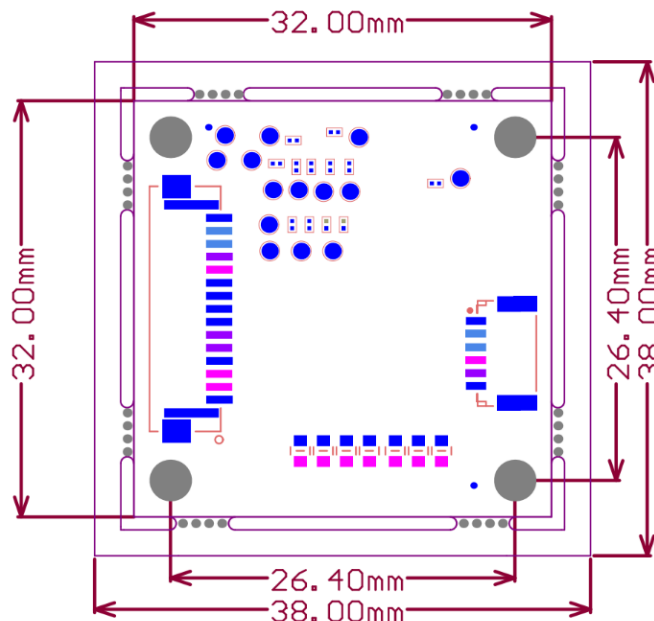
### Board Bottom Side - 2D



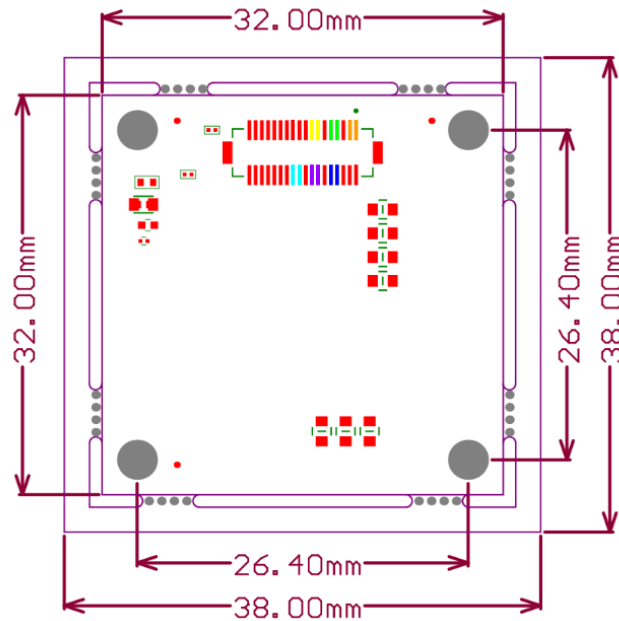
## ATR Board 2-Lane Top Side – 2D



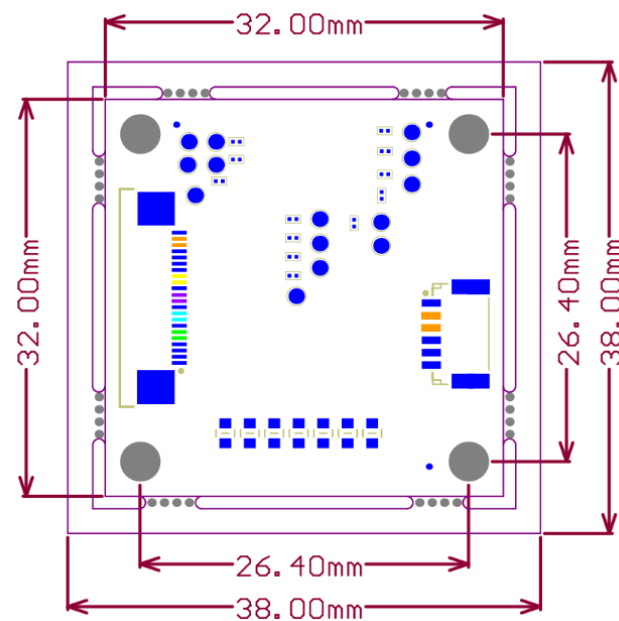
## ATR Board 2-Lane Bottom Side – 2D



## ATR Board 4-Lane Top Side – 2D



## ATR Board 4-Lane Bottom Side – 2D





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