

## 20MP NIR Color MIPI Camera based on Onsemi Hyperlux™ LP AR2020 Sensor

Vadzo Bolt-2020MRS is a 20MP MIPI CSI-2 Camera based on Onsemi Hyperlux™ LP AR2020 Imaging Sensor. The camera comes with inherent capabilities such as enhanced dynamic range (eDR), excellent Low-Light and NIR Sensitivity. The camera delivers max resolution of 20MP and Video streaming of 20MP, 5K, 4K, 1080p and 720p. The camera comes with a M12/S-Mount lens holder that supports a 74DFOV lens by default. The camera supports image capture and video streaming in YUV422 format. Bolt-2020MRS can be integrated with solutions based on platforms such as Raspberry PI, Nvidia Nano, Nvidia XavierNX, Nvidia Orin AGX, etc.

### Key Features

- Sensor Model: AR2020 Onsemi Hyperlux™ LP
- Max Resolution: 20MP
- Pixel Size: 1.4  $\mu\text{m}$  x 1.4  $\mu\text{m}$
- Shutter: Rolling Shutter
- Lens FOV: 74 DFOV
- Compliance: 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

Bolt-2020MRS is a Fixed-Focus Color MIPI CSI-2 camera based on Onsemi AR2020 sensor. The camera incorporates the Onsemi Hyperlux™ LP AR2020 low-noise CMOS sensor that supports key features like enhanced HDR, Excellent NIR Response @850nm and 900nm, Wake on Motion, and so on. The camera supports 4-lane MIPI CSI-2 Interface and has been tested with platforms such as Raspberry PI, Nvidia Nano, Nvidia Orin AGX and Nvidia XavierNX.

## 2. Camera Specifications

| General Information |                                             |
|---------------------|---------------------------------------------|
| Product Family      | Bolt Series                                 |
| Camera Model        | Vadzo Bolt-2020CRS                          |
| 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              | Color                                       |
| Camera Data         |                                             |
| Interface           | 4 Lane MIPI CSI-2 & 2 Lane MIPI CSI-2       |
| Pixel Depth         | 8bit / 12bit                                |
| Output Format       | YUV422                                      |
| Exposure Control    | Manual Control via software & Auto-Exposure |
| GPIO                | 2x NC                                       |
| Camera Hardware     |                                             |
| Lens                | S Mount (M12 Standard)                      |

|                        |                                                        |
|------------------------|--------------------------------------------------------|
| MIPI connector         | 686115148922 (2 Lane) & 528932295 (4 Lane)             |
| Power Requirement      | Max: 1.45 W at 3.3VDC<br>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                 | 18 Grams (Without Lens)                                |
| <b>Camera Software</b> |                                                        |
| Video Resolutions      | VGA, 720p, 1080p, 4K, 5K and 20MP (5120x3840).         |
| Video formats          | YUV422                                                 |
| Image Capture formats  | BMP                                                    |
| Image Capture Modes    | Software trigger                                       |
| OS Supported           | Windows, Linux.                                        |
| <b>Conformity</b>      |                                                        |
| Conformity             | RoHS 3 and REACH                                       |

### 3. Supported Resolutions

| Resolution         | 4-Lane MIPI CSI-2 Frame Rates (FPS) |
|--------------------|-------------------------------------|
|                    | YUV422                              |
| 640 x 480 (VGA)    | 120                                 |
| 1280 x 720 (HD)    | 60                                  |
| 1920 x 1080 (FHD)  | 60                                  |
| 3840 x 2160 (4K)   | 15                                  |
| 5120x2880 (5K)     | 10                                  |
| 5120 x 3840 (20MP) | 5                                   |

\*The FPS table also varies based on the host platform and the optimizations performed.

Contact Vadzo sales team for more details.

## 4. Supported Camera Functions

The List of functions supported by the Bolt-2020CRS 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 686115148922 from Würth Elektronik for this interface.

Vadzo has integrated the capability of functioning in the 4-Lane MIPI CSI 2. Vadzo has used the 528932295 from Molex for this interface. Bandwidth as well to ensure that you can achieve faster frame rates.

## 6. Status LED

Status LEDs indicate the below:

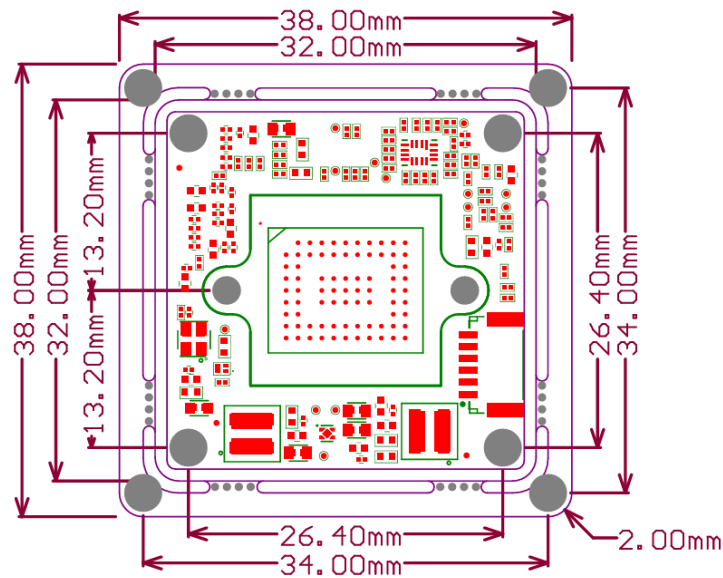
- Red LED indicates Device is powered ON with no Streaming.
- Yellow LED indicates: Camera is currently Streaming.

## 7. Temperature and Humidity Specifications

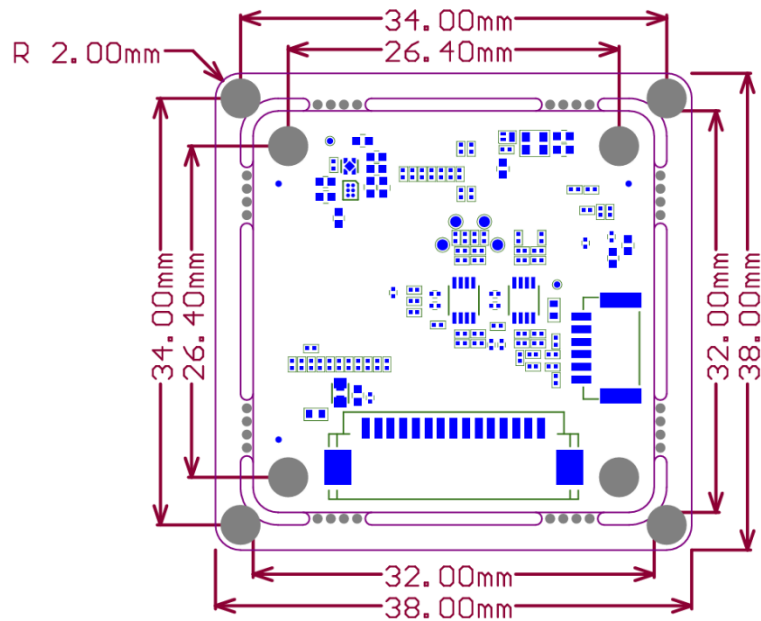
| Description           | Specification                           |
|-----------------------|-----------------------------------------|
| Operating Temperature | -30 <sup>0</sup> C to 70 <sup>0</sup> C |
| Storage Temperature   | -30 <sup>0</sup> C to 70 <sup>0</sup> C |
| Humidity              | 20%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

## 8. Dimensions

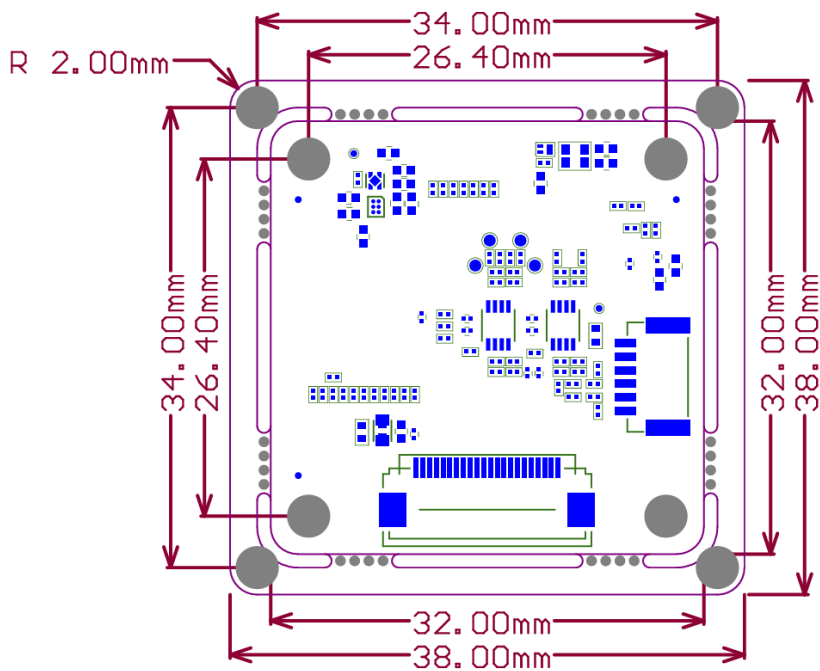
### Base Board Top Side – 2D



## ATR Board: 2-Lane Bottom Side – 2D



## ATR Board: 4-Lane Bottom Side – 2D



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