BOLT-2020MRS

20MP NIR Monochrome 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 Y8 & Y12 format. Bolt-2020MRS can be integrated with solutions based on platforms such as Raspberry PI, Nvidia Nano, Nvidia Orin NX, Nvidia Orin AGX, etc.

Key Features

- Sensor Model: AR2020 Onsemi Hyperlux™ LP
- Max Resolution: 20MP
- Pixel Size: 1.4 µm x 1.4 µm
- 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 Monochrome 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 @850n and 900nm, Wake on Motion, and so on. The camera supports 4-lane MIPI CSI-2 and 2-Lane MIPI CSI-2 Interface and has been tested with platforms such as Raspberry PI, Nvidia Nano, Nvidia Orin AGX and Orin NX.

2. Camera Specifications

General Information	
Product Family	Bolt Series
Camera Model	Vadzo Bolt-2020MRS
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	Mono
Camera Data	
Interface	4 Lane MIPI CSI-2 and 2 Lane MIPI CSI-2
Pixel Depth	8bit / 12bit
Output Format	Y8 and Y12
Exposure Control	Manual Control via software & Auto-Exposure
GPIO	2x NC
Camera Hardware	
Lens	S Mount (M12 Standard)

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MIPI connector	686115148922 (2 Lane) & F305-1A7H1-21022-E100 (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	18 Grams (Without Lens)
Camera Software	
Video Resolutions	VGA, 720p, 1080p, 4K, 5K and 20MP (5120x3840).
Video formats	Y8 and Y12
Image Capture formats	BMP
Image Capture Modes	Software trigger
Camera Controls	Brightness, Exposure, Gain, Dynamic ROI Control
Conformity	
Conformity	RoHS 3 and REACH

3. Supported Resolutions

Resolution	**4-Lane MIPI CSI-2 Frame Rates (FPS)**	
	Y8	**Y12**
640 x 480 (VGA)	240	160
1280 x 720 (HD)	120	80
1920 x 1080 (FHD)	120	80
3840 x 2160 (4K)	40	20
5120x2880 (5K)	30	15
5120 x 3840 (20MP)	20	10

*The FPS table also varies based on the host platform and the optimizations performed. Contact Vadzo sales team for more details.

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4. Supported Camera Functions

The List of functions supported by the Bolt-2020MRS camera are:

- Resolution Control
- Image Format Setting
- Video Format Setting – Y8 and Y12
- Image Capture through CLI
- Gain and Exposure Control
- Dynamic ROI Control
- 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 686115148922(2 Lane) from Wurth Elecktronik 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. Vadzo has used the F305-1A7H1-21022-E100(4 Lane) from Amphenol for this interface.

6. Status LED

Status LEDs indicate the below:

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

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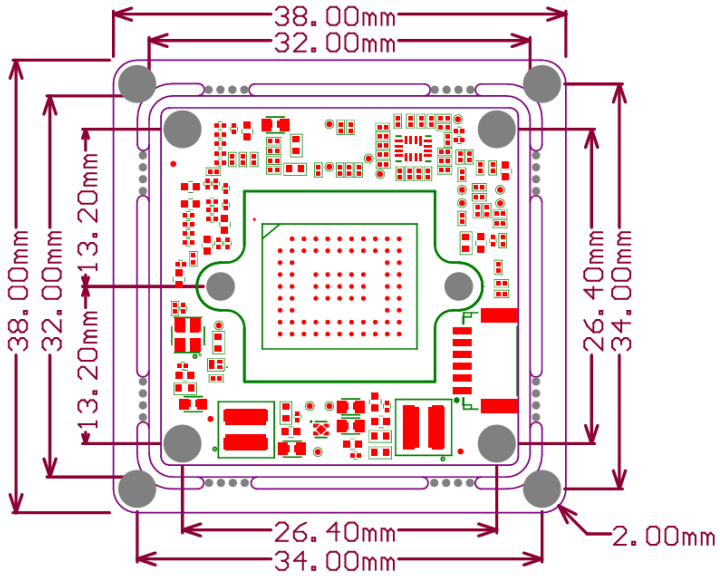
7. Temperature and Humidity Specifications

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

Base Board Top Side – 2D



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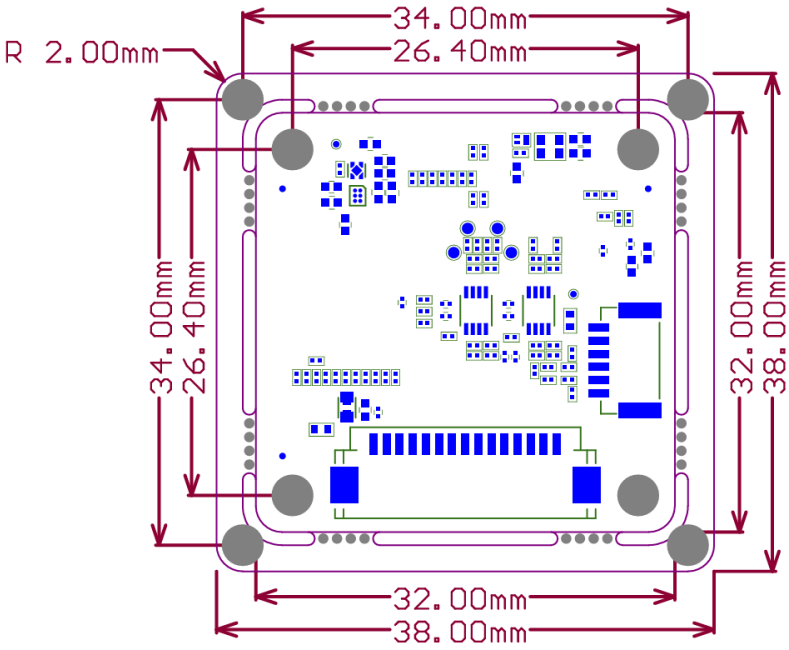
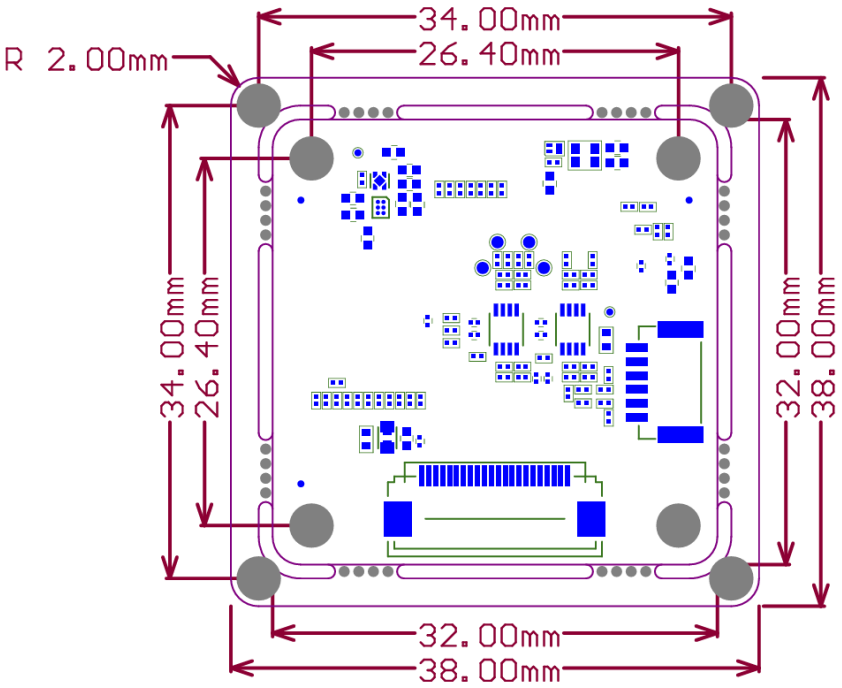
ATR Board: 2-Lane Bottom Side – 2D



ATR Board: 4-Lane Bottom Side – 2D



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