

13MP Color Autofocus MIPI Camera based on Onsemi AR1335 Sensor

Vadzo Bolt-1335CRA is a 4K MIPI Camera based on Onsemi AR1335 Sensor coupled with high-performance ISP. The camera delivers max resolution of 13MP and Video streaming of 4K, 1080p and 720p. Applicable in use cases such as kiosk camera, digital signage camera, retail AI camera, automation camera, robotics camera, inspection camera, document scanning camera, etc. Bolt-1335CRA has been integrated with solutions based on platforms such as Raspberry Pi, Nvidia Nano, Nvidia XavierNX, etc.

Key Features

- Sensor Model: AR1335 Onsemi Sensor
- Max Resolution: 13 MP
- Pixel Size: 1.1 μ m x 1.1 μ m
- Shutter: Rolling Shutter
- Lens FOV: 74 DFOV and 127 DFOV
- Compliance: RoHS 3, REACH



Applications

- **Kiosk & Digital Signages:** Document Scanning, OCR, Barcode Reading, Facial Recognition, Demography Analysis.
- **Smart Surveillance:** Facial 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.
- **Warehouse Robotics:** Object Scanning, Document Scanning, OCR, Obstacle Detection.

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1. Introduction

Bolt-1335CRA is an Auto-Focus MIPI color camera based on AR1335 sensor from Onsemi. The camera incorporates the AR1335 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, black level correction and so on. In addition to this, the ISP also supports Auto functions such as Auto-Exposure, Auto-Focus 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-1335CRA
Sensor	
Sensor	AR1335 CMOS sensor from Onsemi
Sensor Format	1/3.2”
Pixel Size	1.1 µm x 1.1 µm
Max Resolution	13MP – 4208(H) x 3120(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
Focus Control	Manual Control via software, Phase Detection Auto-Focus & Contrast Based Auto-Focus
GPIO	2x NC

Camera Hardware	
Lens	VCM based Auto-Focus with Focus range of 100mm to Infinity
Lens FOV	Variant 1: 74 DFOV Variant 2: 127 DFOV
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 ⁰ C to 70 ⁰ C
Dimension	40mm (L) x 18.5mm (B) x 9.8mm (H)
Weight	12 Grams
Camera Software	
Video Resolutions	VGA, HD, Full HD, 4K and 13MP
Video formats	YUV422
Still Image Resolutions	VGA, HD, Full HD, 4K and 13MP
Image Capture formats	BMP
Image Capture Modes	Software trigger
Camera Controls	Brightness, Exposure, Contrast, Sharpness, Saturation, Gamma, Gain, White Balance, Focus Control, ROI based Auto-Exposure, ROI based Auto-Focus, Denoising, JPEG Compression
Conformity	
Conformity	RoHS 3, REACH

3. Supported Resolutions

Resolution	Frame Rates (FPS) in MIPI 4-Lane
	YUV
640 x 480 (VGA)	90
1280 x 720 (HD)	60
1920 x 1080 (FHD)	60
3840 x 2160 (4K)	30
4208 x 3120 (13MP)	20

4. Supported Camera Functions

The List of functions supported by the Bolt-1335CRA 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
- Focus – Auto & Manual
- Anti Flicker – 50Hz/60Hz
- Contrast Control
- Gamma Control
- Hue & Saturation Control
- Sharpness Control
- ROI Based Auto Functions – Focus & Exposure

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:

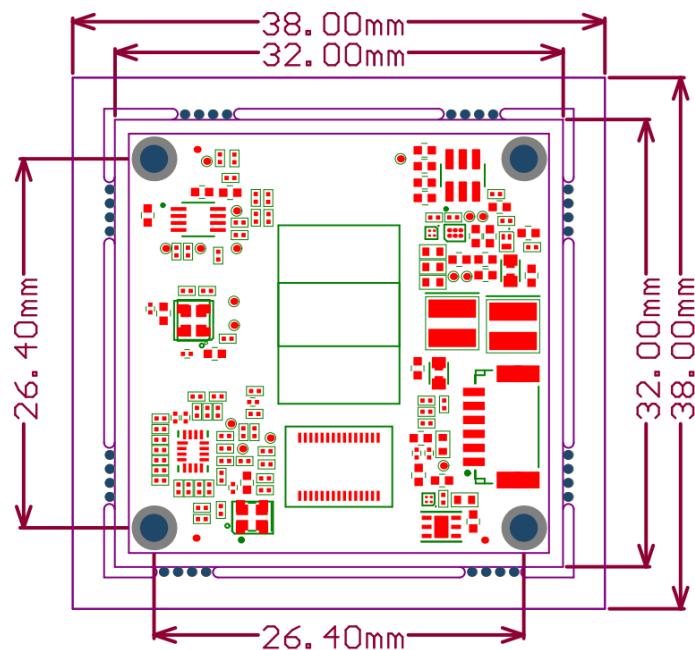
- Red color indicates Device is powered ON with no Streaming.
- Yellow color indicates: Camera is currently Streaming.

7. Temperature and Humidity Specifications

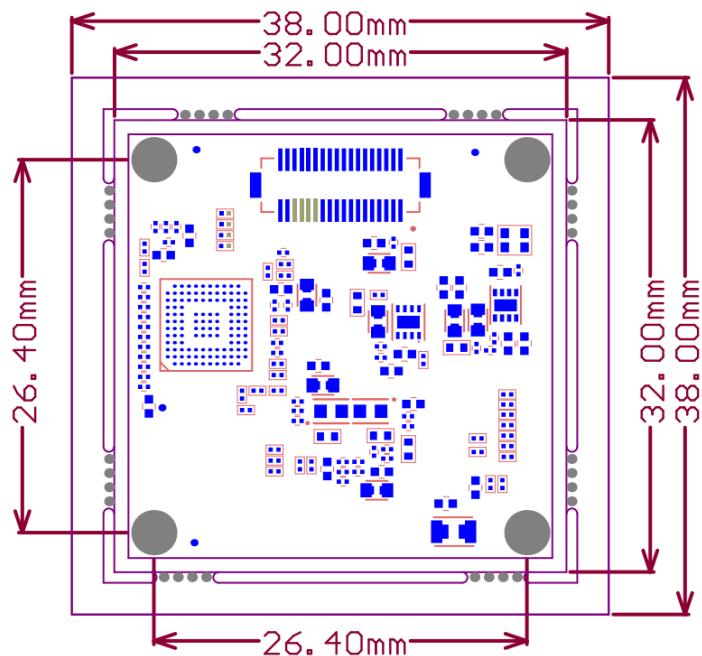
Description	Specification
Operating Temperature	-30°C to 70°C
Storage Temperature	-30°C to 70°C
Humidity	20% to 80%, Relative, non-condensing.

8. Dimensions

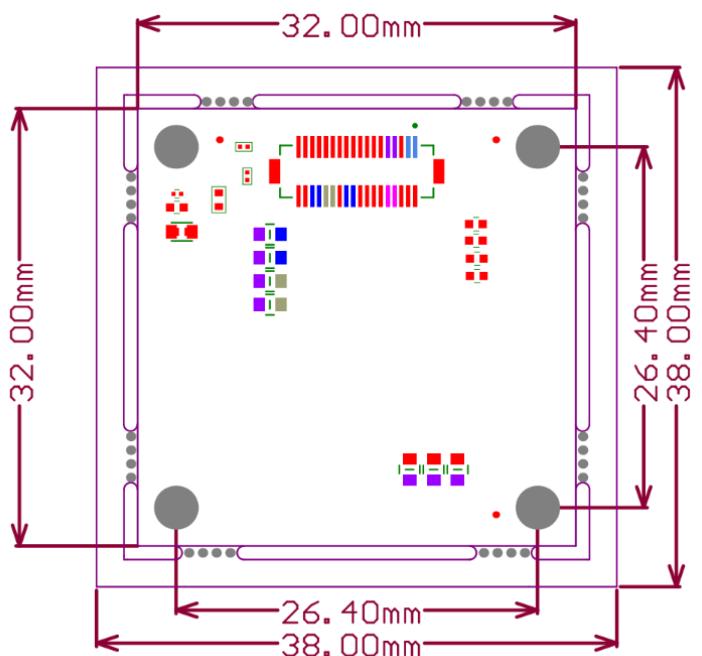
Board Top Side – 2D



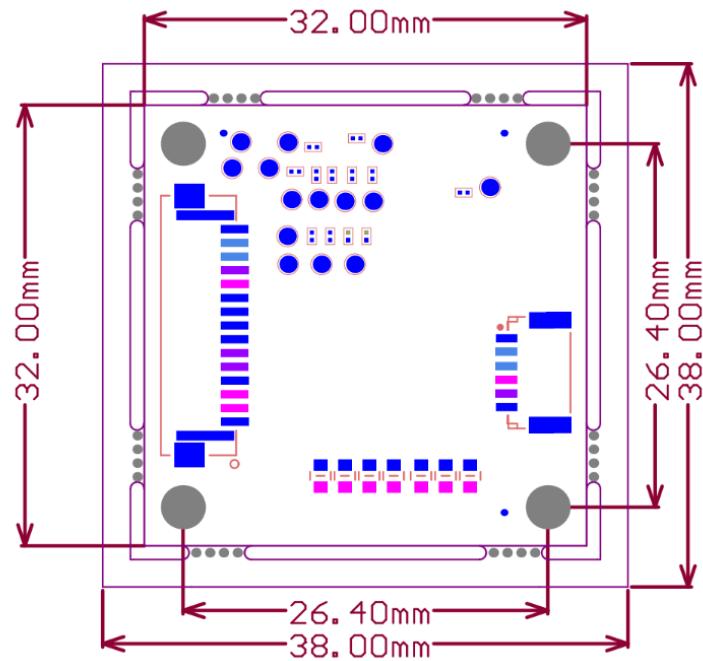
Board Bottom Side - 2D



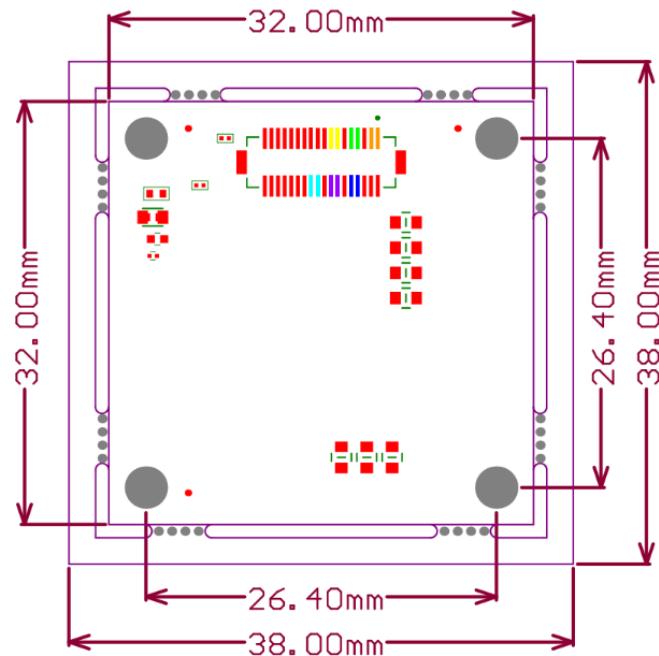
ATR Board 2-Lane Top Side – 2D



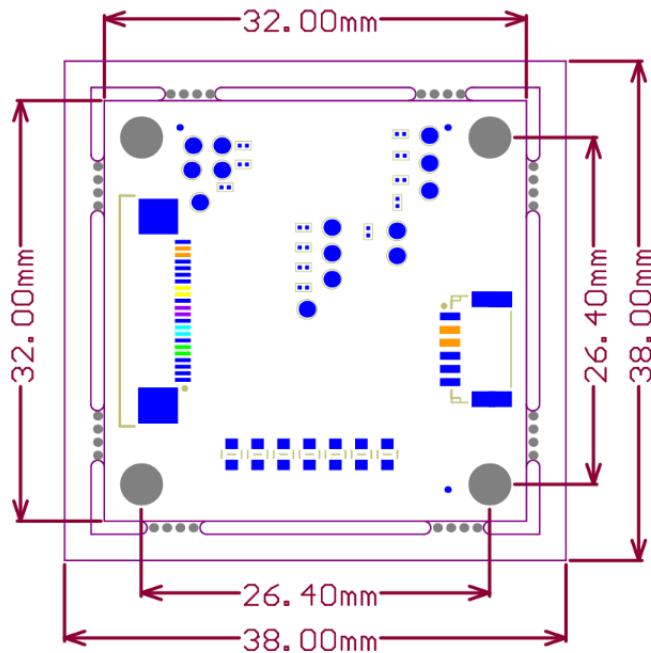
ATR Board 2-Lane Bottom Side – 2D



ATR Board 4-Lane Top Side – 2D



ATR Board 4-Lane Bottom Side – 2D



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