

Vadzo's Falcon-544CRS is a 5MP low power USB 3.2 Gen1 camera built on the AR0544 sensor from Onsemi's Hyperlux™ LP product family, paired with a high-performance ISP. Powered by a 1/4.2-inch Back-Side Illuminated (BSI) Stacked CMOS sensor with a 2592 × 1944 active-pixel array, the camera delivers up to 5MP resolution and supports video streaming at VGA, 720p, 1080p and Full Resolution(5MP), ensuring sharp, reliable output in challenging lighting conditions. The 1.4 μm BSI pixel delivers excellent performance in low-light and NIR wavelengths at 850nm and 940nm, while advanced modes including Wake-on-Motion (WOM), enhanced Dynamic Range (eDR), and Line Interleaved HDR (LI-HDR) make the Falcon-544CRS a powerful solution optimised for edge deployment at the lowest possible power consumption.

Key Features

- **Sensor Model:** Onsemi AR0544 Hyperlux™ LP,
- **Max Resolution:** 5MP (2592 × 1944 active-pixel array)
- **Sensor format:** 1/4.2-inch BSI Stacked CMOS
- **Pixel Size:** 1.4μm × 1.4μm BSI pixel
- **Lens FOV:** 74° DFOV (Default)
- **Video Streaming:** VGA, 720p, 1080p, and 5MP
- **Dynamic Range:** eDR and Li-HDR modes
- **Compliance:** UVC, RoHS 3, REACH



Applications

- **Automation & Robotics Camera:** Machine Vision, Inspection Robots, Warehouse Robots, AGVs.
- **Smart Security Camera:** Facial Recognition, Wearable Body Camera, Access Control Camera, Day/Night Video Recording, Smart Parking, Pedestrian Safety.
- **Retail Automation Camera:** Retail Analytics, Self-Checkout, Retail Kiosks, Inventory Management.
- **Kiosk Camera:** Document Scanning, OCR, Barcode Reading, Facial Recognition, Demography Analysis

INDEX

1. Introduction.....	3
2. Camera Specifications	3
3. Supported Resolutions	5
4. Supported Camera Functions.....	5
5. USB 3.0 Interface	6
6. Status LED	6
7. General Purpose I/O Lines	6
8. Temperature and Humidity Specifications	7
9. Dimensions	7
Top Board – 2D	7
Bottom Board - 2D.....	8

1. Introduction

The Falcon-544CRS is a UVC-compliant, fixed-focus color USB 3.0 camera built on the onsemi AR0544 Hyperlux™ LP sensor. The camera operates in both USB 3.0 SuperSpeed and USB 2.0 High Speed modes, ensuring broad host compatibility.

The Falcon-544CRS integrates the AR0544 1/4.2-inch Back-Side Illuminated (BSI) Stacked CMOS image sensor from Onsemi with an on-board Image Signal Processor (ISP). The 1.4µm BSI pixel architecture delivers strong performance in low-light conditions and enhanced sensitivity at 850nm and 940nm NIR wavelengths. The ISP handles the complete image processing pipeline, including debayering, demosaicing, color correction, enhanced Dynamic Range (eDR), and Line Interleaved HDR (LI-HDR), producing processed, ready-to-use output without host-side computation. Wake-on-Motion (WOM) keeps the sensor in a low-power state, and triggers capture only on detected movement, minimising power draw in always-on deployments. The camera supports still image capture in BMP and JPEG formats, and video streaming in YUV422(UYVY) and MJPEG formats.

The ISP is integrated with an on-board USB 3.0 controller that presents a fully UVC-compliant device to the host, enabling plug-and-play operation on Windows, Linux, and Android without custom drivers.

2. Camera Specifications

General Information	
Product Family	Falcon series
Camera Model	Vadzo Falcon-544CRS
Sensor	
Sensor	AR0544 Onsemi Hyperlux™ LP
Sensor Format	1/4.2"
Pixel Size	1.4 µm x 1.4 µm
Max Resolution	5MP - 2592(H) x 1944(V)
Shutter	Rolling Shutter
Chroma	Color
Camera Data	
Interface	USB 3.2 Gen1 Backward compatible to USB 2.0
Pixel Depth	10bit

Output Format	YUV422 & MJPEG
Exposure Control	Manual Control via software & Auto-Exposure
GPIO	6 pins. 1x Digital Input, 1x Digital Output, 3x NC and GND
Camera Hardware	
Lens	S Mount (M12 Standard)
USB connector	Type C
GPIO connector	Connector on board: Wurth 665106131822 Mating connector: Wurth 665006113322
Power Supply	USB powered
Power Requirement	Max: 1.75 W at 5VDC Min: 1.05 W at 5VDC
Operating Temperature	-30°C to 70°C
Dimension	38mm (L) x 38mm (B) convertible to 32mm (L) x 32mm (B)
Weight	13 Grams (Without Lens)
Camera Software	
Video Resolutions	5MP, VGA, 720p, and 1080p
Video formats	YUV422 and MJPEG
Still Image Resolutions	5MP, VGA, HD, and Full HD
Image Capture formats	BMP and JPG
Image Capture Modes	Software Trigger
UVC Camera Controls	Brightness, Exposure, Contrast, Sharpness, Saturation, Gamma, Gain, White Balance
Extension Controls	ROI Based Auto-Exposure, Denoising, JPEG Compression
OS Supported	Windows, Linux, Android (need additional SDK)
Conformity	
Conformity	UVC Compliant, RoHS 3, REACH

3. Supported Resolutions

Resolution	Frame Rates (FPS) in USB 3.0 Mode	
	UYVY	MJPEG
640 x 480 (VGA)	60	60
1280 x 720 (HD)	60	60
1920 x 1080 (FHD)	60	60
2592 x 1944 (5 MP)	30	30

Resolution	Frame Rates (FPS) in USB 2.0 Mode	
	UYVY	MJPEG
640 x 480 (VGA)	60	60
1280 x 720 (HD)	16	60
1920 x 1080 (FHD)	8	60
2592 x 1944 (5 MP)	4	30

4. Supported Camera Functions

The List of functions supported by the Falcon-544CRS camera are:

- Resolution Control
- Image Format Setting
- Video Format Setting – UYVY and MJPEG
- Image Capture Software Trigger
- Gain – Auto & Manual
- Exposure – Auto & Manual
- White Balance – Auto & Manual
- Anti Flicker – 50Hz/60Hz
- Brightness Control
- Contrast Control
- Gamma Control
- Saturation Control
- Sharpness Control
- Gamma Control
- Q Factor Control
- Digital PTZ
- Roll Control

5. USB 3.0 Interface

The camera module's USB 3.0 connector is a standard USB Type C connector. It provides a nominal 5 Gbit/s SuperSpeed data transfer connection to supply power to the device and to transmit video data and control signals. The power supply must comply with the Universal Serial Bus 3.0 Specification. The nominal operating voltage is 5 VDC, effective on the camera module's connector.

Connection assignments and numbering adhere to the Universal Serial Bus 3.2 Gen1 standard. USB Certified 3.2 Gen1 or higher cables to be used. Vadzo does not recommend non-certified USB cables.

6. Status LED

Status LEDs indicate the below:

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

7. General Purpose I/O Lines

GPIO lines are terminated through Six (6) pin socket connector from Würth Elektronik part number 665106131822. Refer to the below table for GPIO Connector Pin Numbering and Assignments.

Pin	Line	Function
1	Power	Do not use.
2	-	Do not use*
3	-	Do not use*
4	Input1	General Purpose I/O (GPIO) line with 1.8V tolerant directly connected to MCU Preset: Input Line
5	Output1	General Purpose I/O (GPIO) line with 1.8V tolerant directly connected to MCU Preset: Output Line
6	GND	Ground

Vadzo engineering team shall be able to enable the IOs on the firmware level as per the end user technical requirements under the purview of Vadzo Imaging customisation program.

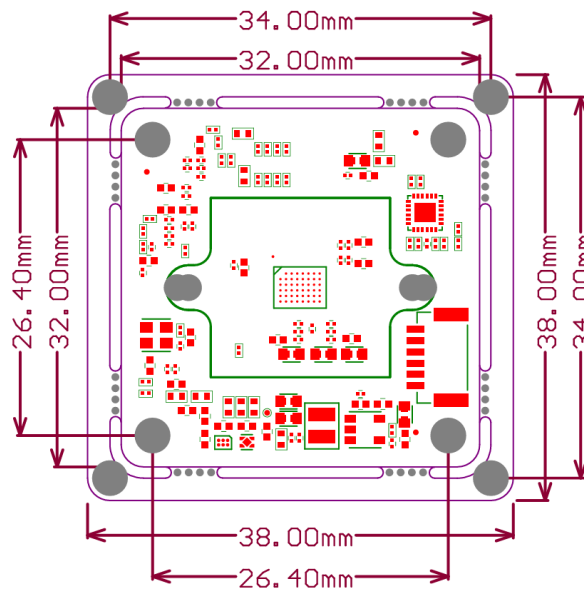
Recommended mating connector from Würth Elektronik part number 665006113322.

8. Temperature and Humidity Specifications

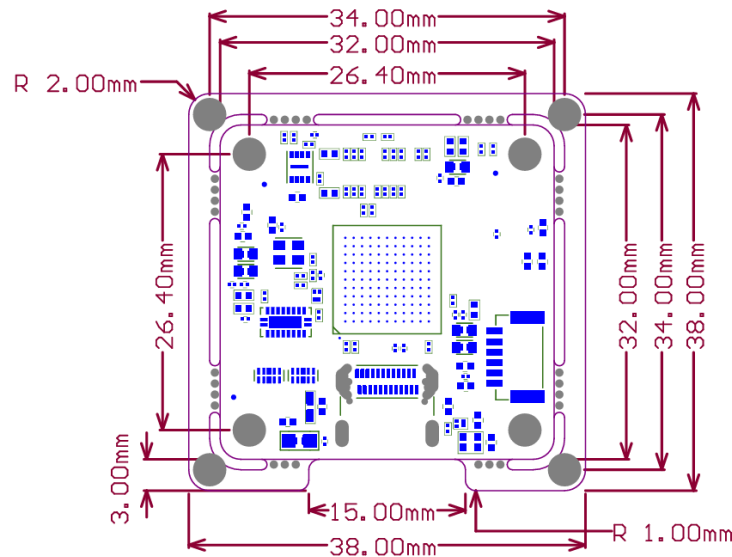
Description	Specification
Operating Temperature	-30°C to 70°C
Storage Temperature	-30°C to 70°C
Humidity	20% to 80%, Relative, non-condensing.

9. Dimensions

Top Board – 2D



Bottom Board - 2D



IMPORTANT NOTICE AND DISCLAIMER

Vadzo Imaging products are sold by description only. Vadzo Imaging reserves the right to change the information in this document, including URL references and/or specifications is subject to change without notice. Customers should obtain the latest relevant information and data sheets before placing orders and should verify that such information is current and complete.

The data contained in this document is exclusively intended for technically trained staff. It is the responsibility of customer's technical departments to evaluate the suitability of the product for the intended application and the completeness of the product information given in this document with respect to such application.

THIS DOCUMENT IS PROVIDED AS IS WITH NO WARRANTIES WHATSOEVER, INCLUDING ANY WARRANTY OF MERCHANTABILITY, NON-INFRINGEMENT, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY WARRANTY OTHERWISE ARISING OUT OF ANY PROPOSAL, SPECIFICATION, OR SAMPLE.

All liability, including liability for infringement of any proprietary rights, relating to the use of information in this document is disclaimed. No licenses express or implied, by estoppel or otherwise, to any intellectual property rights are granted herein.

All trade names, trademarks, and registered trademarks mentioned in this document are the property of their respective owners and are hereby acknowledged.



Copyright © 2017–2026 Vadzo Imaging. All Rights Reserved.