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See3CAM_CU27

Datasheet

Revision 1.3
20th June, 2022

Contents

1 Revision History

Rev	Date	Description	Author
1.0	08-October-2021	Initial draft	Camera Team
1.1	12-October-2021	Sensor Specifications updated	Camera Team
1.2	12-January-2022	Changed Camera image orientation	Camera Team
1.3	20-June-2022	Changed Camera image orientation	Camera Team

2 Introduction

See3CAM_CU27 is a 2 MP, UVC compliant, USB 3.1 Gen 1 SuperSpeed camera from e-con Systems, a leading Embedded Product Design Services Company which specializes in the advanced camera solutions. See3CAM_CU27 is the latest member of the See3CAM family of USB 3.1 Gen 1 SuperSpeed camera products launched by e-con Systems.

See3CAM_CU27 camera is provided with the S-mount (also known as M12 board lens) lens holder. The S-mount is one of the most commonly used small form factor lens mounts for board cameras. See3CAM_CU27 is a two-board solution given in single unit with help of rigid flex cable containing the camera sensor module board with 1/2.8" SONY® STARVIS IMX462LQR CMOS image sensor and the USB 3.1 Gen 1 interface. It is also backward compatible with the USB 2.0 high speed interface, albeit with fewer resolutions at lower frame rates.

See3CAM_CU27 is a UVC compliant USB 3.1 Gen 1 SuperSpeed camera that is also backward compatible with USB 2.0 host ports and it does not require any special camera drivers to be installed on the PC. The native UVC drivers of Windows and Linux Operating Systems (OS) will be compatible with this camera. e-con Systems also provides the sample application that demonstrates some of the features of this camera.

This document describes the features of See3CAM_CU27 camera board and the pin-outs of the connectors including with mechanical diagram.

3 Disclaimer

The specifications and features of See3CAM_CU27 camera board are provided here as reference only and e-con Systems reserves the right to edit/modify this document without any prior intimation of whatsoever.

4 Description

See3CAM_CU27 is 30 mm x 30 mm x 26 mm (without lens) sized USB camera module. The camera has IMX462LQR CMOS image sensor from SONY® and USB interface controller with USB Type-C connector. This See3CAM_CU27 is a ready-to-manufacture camera board with all the necessary firmware built-in and is compatible with the UVC version 1.1 standard. You can integrate this camera into the products, and this helps to cut short the time-to-market.

See3CAM_CU27 is a UVC compliant camera, and it does not require any drivers to be installed on the PC. So, video streaming through UVC is possible without any special drivers on OSes that have built-in support for UVC standards. The camera is exposed as DirectShow capture source to the Windows PC and e-con Systems provides sample DirectShow application that demonstrates the features of this camera.

In Linux, the built-in UVC driver works very well with this camera. This camera is exposed as a Video4Linux2 (V4L2) camera and e-con Systems also provides a sample application for Linux OS. You can also develop customized applications for the See3CAM_CU27 camera using standard V4L2 APIs.

The front and rear views of See3CAM_CU27 are shown in following figures.

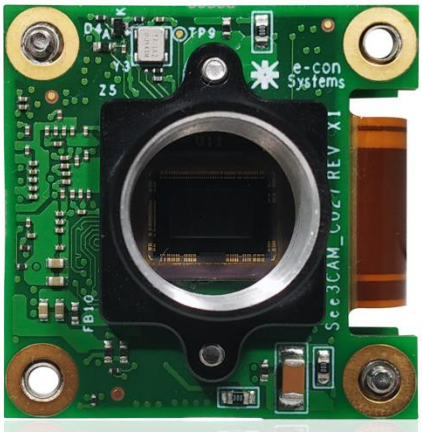

Figure 1: Front View of See3CAM_CU27

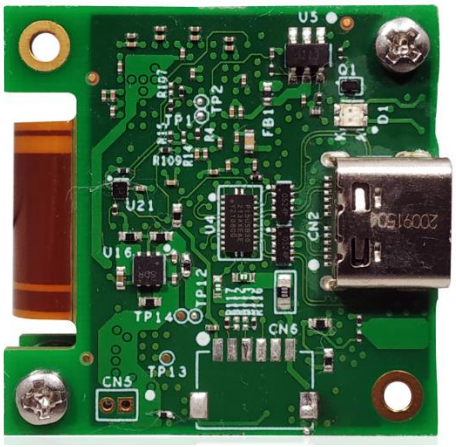

Figure 2: Rear View of See3CAM_CU27

4.1 Features

The features of See3CAM_CU27 are as follows:

- Single-board solution of size 30 mm x 30 mm x 26 mm (Without lens)
- 2 MP camera sensor
- UYVY and MJPEG output format
- Standard M12 lens holder for use with customized optics or lenses for various applications
- USB 3.1 Gen 1 device with Type-C reversible interface connector
- Light weight, versatile, and portable design
- Plug-and-Play setup (UVC compliant) for Windows 8.1 or 10 (64-bit) and Linux 14.04 (64 bit), 16.04 or 18.04 (64 bit).
- Electronic shutter

- Imaging applications
  - Preview format UYVY – VGA (640 x 480), HD (1280 x 720), and FHD (1920 x 1080).
  - Preview format MJPEG - VGA (640 x 480), HD (1280 x 720), and FHD (1920 x 1080)
  - Still capture support – USB 3.1 Gen 1 UYVY and MJPEG - 1080p, USB 2.0 UYVY – VGA and MJPEG – 1080p
  - Field of View (FOV) – 121.35 deg diagonal for the maximum resolution
- Exposure control - Manual and auto exposure control
- Operating voltage - 5V +/ −5%, Current - 424 mA
- Restriction of Hazardous Substances (RoHS) compliant

5 Key Specification

The following table lists the specifications of See3CAM_CU27.

Description	Specification
Size (L x W x H)	30 x 30 x 26 mm (without lens)
Video Format	UYVY and MJPEG
USB	USB 3.1 Gen 1 and 2.0
Image Resolution	VGA (640 x 480)
	HD (1280 x 720)
	FHD (1920 x 1080)
Supported OS	Windows 8.1 or 10
	Linux Ubuntu 14.04 (64 bit), 16.04 or 18.04 (64 bit)
UVC Compliant	Yes, compliant with UVC version 1.1
Product ID (PID)	0x2560
Vendor ID (VID)	0xC12C

Table 1: Key Specifications of See3CAM_CU27

The FOV of See3CAM_CU27 is shown below.

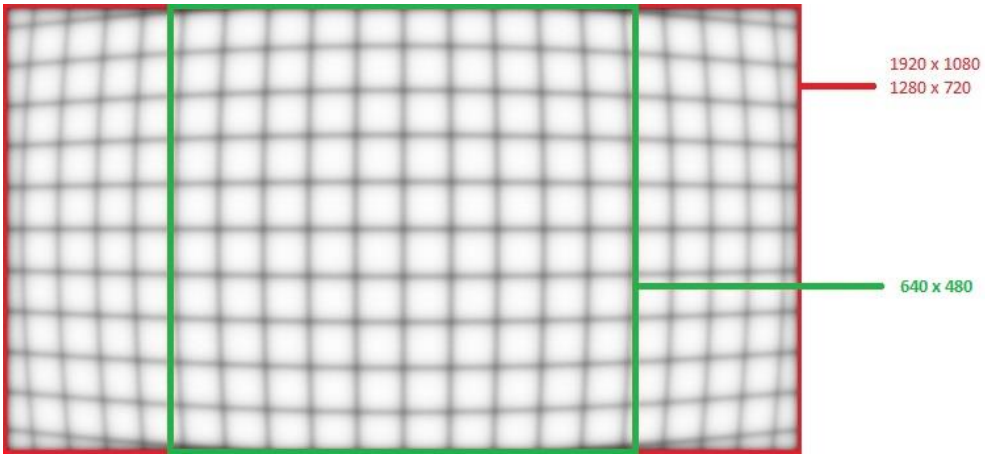

Figure 3: FOV of See3CAM_CU27

5.1 Supported Resolution and Crop in FOV

The supported resolution and crop in FOV are listed in the following tables.

Format	Resolution	Frame Rate (fps)		Crop in FOV	
		USB 3.1 Gen1	USB 2.0	Horizontal	Vertical
UYVY	VGA (640 x 480)	120	30	41.87%	0%
	HD (1280 x 720)	80	-	0%	0%
	FHD (1920 x 1080)	60	-	0%	0%
MJPEG	VGA (640 x 480)	120	30	41.87%	0%
	HD (1280 x 720)	100	30	0%	0%
	FHD (1920 x 1080)	100	30	0%	0%

Table 2: Supported Resolutions and Crop in FOV

5.2 CMOS Image Sensor Specification

The following table lists the specifications of CMOS image sensor used in this See3CAM_CU27 camera board.

Sensor Specification	
Type/Optical Size	1/2.8" Optical format CMOS image sensor
Resolution	2 MP
Sensor Type	Electronic shutter
Pixel Size	2.9 µm
Sensor Active Pixels	1937H x 1097V

Table 3: CMOS Image Sensor Specification

The IMX462LQR sensor is a 2 MP CMOS image sensor. For more information about the IMX462LQR sensor or for *Datasheet*, please contact SONY.

6 Pin Description

See3CAM_CU27 has one USB Type-C connector. The following figure shows the front view of the Type-C connector.

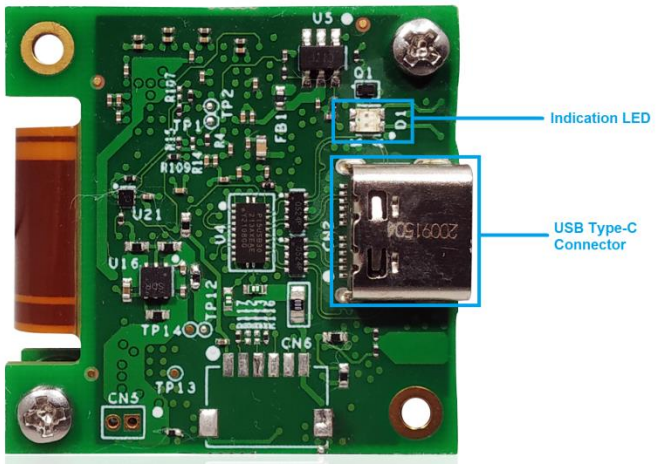

Figure 4: Type-C Connector on See3CAM_CU27

6.1 USB Type-C Connector Pin Description

The following table lists the pin-outs of USB Type-C connector which is used to connect See3CAM_CU27 board with PC through the USB Type-A to Type-C cable. This is a standard USB Type-C connector.

Pin No	Signal	Description	Pin No	Signal	Description
A1	GND	Ground return	B12	GND	Ground return
A2	SSTXp1	SuperSpeed differential pair 1, TX, positive	B11	SSRXp1	SuperSpeed differential pair 2, RX, positive
A3	SSTXn1	SuperSpeed differential pair 1, TX, negative	B10	SSRXn1	SuperSpeed differential pair 2, RX, negative
A4	VBUS	Bus power	B9	VBUS	Bus power
A5	CC1	Configuration channel	B8	SBU2	-
A6	Dp1	Hi-Speed differential pair, position 1, positive	B7	Dn2	Hi-Speed differential pair, position 2, negative
A7	Dn1	Hi-Speed differential pair, position 1, negative	B6	Dp2	Hi-Speed differential pair, position 2, positive
A8	SBU1	-	B5	CC2	Configuration channel
A9	VBUS	Bus power	B4	VBUS	Bus power
A10	SSRXn2	SuperSpeed differential pair 4, RX, negative	B3	SSTXn2	SuperSpeed differential pair 3, TX, negative
A11	SSRXp2	SuperSpeed differential pair 4, RX, positive	B2	SSTXp2	SuperSpeed differential pair 3, TX, positive
A12	GND	Ground return	B1	GND	Ground return

Table 4: USB Type-C Connector Pin Description

7 Connector Part Numbers

The following table lists the connectors used in the See3CAM_CU27 camera board. The USB connector is the standard USB Type-C connector as specified in the USB 3.1 Gen 1 standards. Any USB standard compliant USB 3.1 Gen 1 Type-A to Type-C cable will be compatible with this connector.

Connector	Description	Manufacturer	Part Number
USB 3.1 Type-C Connector	CONN USB-C Receptacle 24Pos Right Angle SMT	Molex	105450-0101

Table 5: Connectors and its Part Number Details

8 Electrical Specification

The electrical specifications of See3CAM_CU27 are as follows:

- Recommended Operating Condition
- Operating Temperature Range

The values described in this section are measured in e-con Systems lab and this can be used as reference only. The current measurements are typical values and are subject to change for different camera boards under different conditions. However, these values can be taken as a reference for power estimation and power supply design.

8.1 Recommended Operating Condition

The following table lists the recommended operating condition of See3CAM_CU27 under various operating condition.

Parameter	Typical Operating Voltage	Current (mA)	Typical Power Consumption (W)
Streaming Maximum Power at 1920 x 1080 at 100 fps in USB 3.1 Gen 1	5V ± 250 mV	424	2.12
Streaming Minimum Power 640 x 480 at 30 fps in USB 2.0		171	0.855
Power at Idle Condition		126	0.630

Table 6: Recommended Operating Condition of See3CAM_CU27

8.1.1 UYVY with USB 3.1 Gen 1

The following table lists the current consumed by See3CAM_CU27 in UYVY format with USB 3.1 Gen 1 under various operating conditions.

S. No	Resolution	Frame Rate (fps)	Supply Voltage (V)	Typical Current (mA)	Power Consumption (W)
1	640 x 480	120	5	276	1.38
2	1280 x 720	80	5	296	1.48
3	1920 x 1080	60	5	323	1.615

Table 7: UYVY with USB 3.1 Gen 1

8.1.2 MJPEG with USB 3.1 Gen 1

The following table lists the current consumed by See3CAM_CU27 in MJPEG format with USB 3.1 Gen 1 under various operating conditions.

S. No	Resolution	Frame Rate (fps)	Supply Voltage (V)	Typical Current (mA)	Power Consumption (W)
1	640 x 480	120	5	270	1.35
2	1280 x 720	100	5	310	1.55
3	1920 x 1080	100	5	424	2.12

Table 8: MJPEG with USB 3.1 Gen 1

8.1.3 UYVY with USB 2.0

The following table lists the current consumed by See3CAM_CU27 in UYVY format with USB 2.0 under various operating conditions.

S. No	Resolution	Frame Rate (fps)	Supply Voltage (V)	Typical Current (mA)	Power Consumption (W)
1	640 x 480	30	5	171	0.855

Table 9: UYVY with USB 2.0

8.1.4 MJPEG with USB 2.0

The following table lists the current consumed by See3CAM_CU27 in MJPEG format with USB 2.0 under various operating conditions.

S. No	Resolution	Frame Rate (fps)	Supply Voltage (V)	Typical Current (mA)	Power Consumption (W)
1	640 x 480	30	5	171	0.855
2	1280 x 720	30	5	208	1.04
3	1920 x 1080	30	5	197	0.985

Table 10: MJPEG with USB 2.0

8.2 Operating Temperature Range

The following table lists the operating temperature range of See3CAM_CU27.

Parameter Description	Temperature Range
Operating temperature range[1]	−30°C to 60°C

Table 11: Operating Temperature Range

[1]This is the maximum temperature range up to which the camera sensor can be operated.

Note: The default lens supplied with this camera has an operating range of −20°C to 60°C. You can select wider operating temperature lens as per the requirements. You are advised to make necessary arrangements on the products to dissipate the heat generated in the module to maintain the operating temperature below 60°C.

9 Mechanical Specifications

See3CAM_CU27 size is 30 mm x 30 mm x 26 mm (without Lens). The board drawing and dimensions are given in the following sections.

9.1 See3CAM_CU27 Dimension

The top and bottom views of See3CAM_CU27 board with mechanical dimensions are shown below.

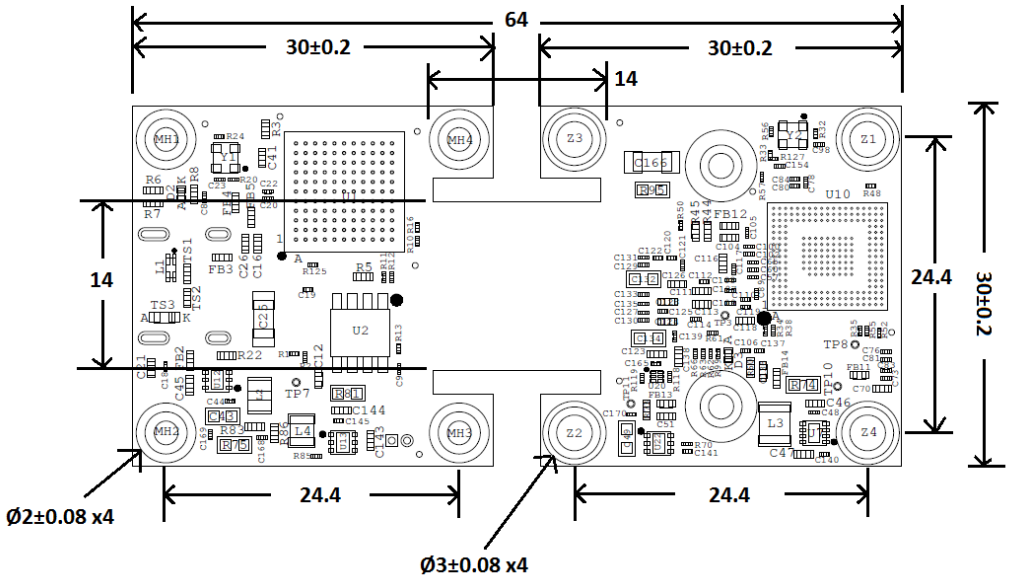

Figure 5: Top View of See3CAM_CU27 Mechanical Dimensions

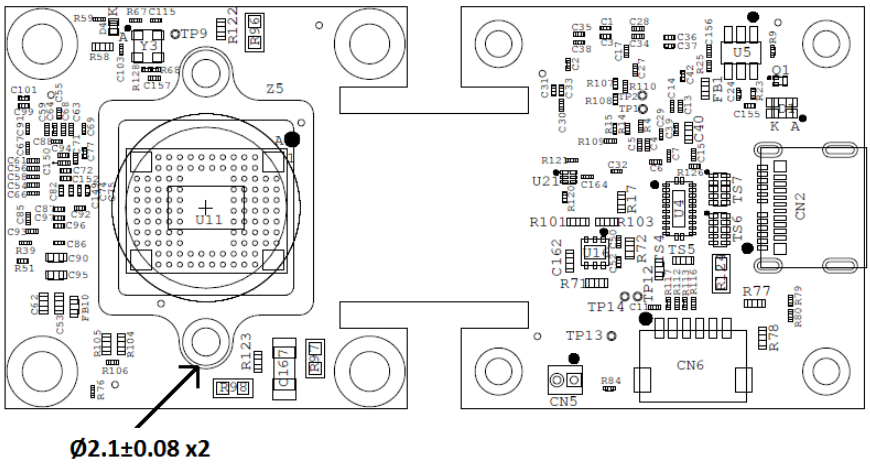

Figure 6: Bottom View of See3CAM_CU27 Mechanical Dimensions

Note: All dimensions are in millimeter (mm). The unfolded camera module dimensions are given above. You will be given with folded camera module with 30 x 30 x 26 mm (without lens) outer dimensions.

The image orientation of See3CAM_CU27 camera with respect to USB cable is shown below.

Figure 7: Camera Image Orientation with respect to USB Cable

9.2 Lens Holder Dimension

The lens holder with mechanical dimensions is shown below.

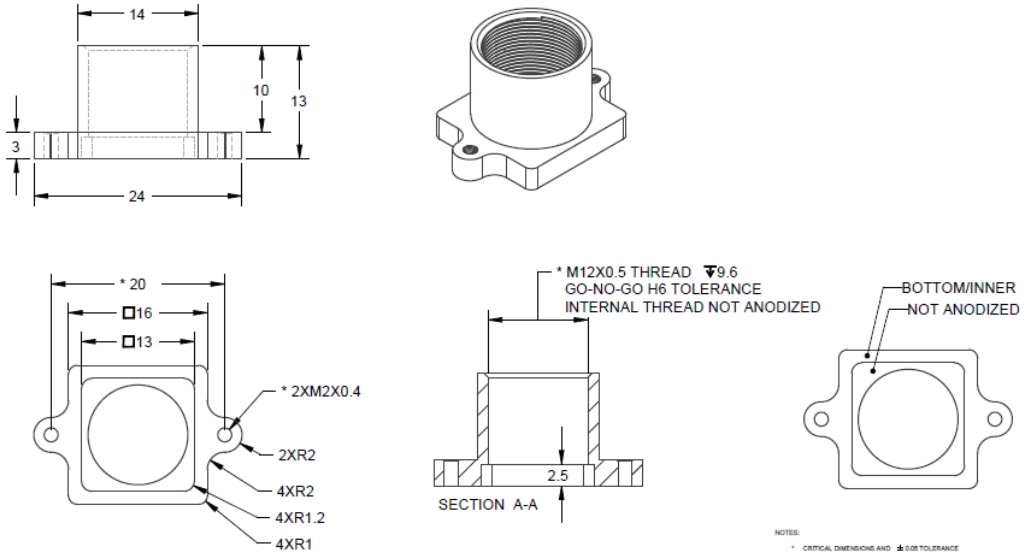

Figure 8: Lens Holder Mechanical Dimensions

Note: All dimensions are in millimeter (mm).

Support

Contact Us

If you need any support on See3CAM_CU27 product, please contact us using the Live Chat option available on our website - https://www.e-consystems.com/

Creating a Ticket

If you need to create a ticket for any type of issue, please visit the ticketing page on our website - https://www.e-consystems.com/create-ticket.asp

RMA

To know about our Return Material Authorization (RMA) policy, please visit the RMA Policy page on our website - https://www.e-consystems.com/RMA-Policy.asp

General Product Warranty Terms

To know about our General Product Warranty Terms, please visit the General Warranty Terms page on our website - https://www.e-consystems.com/warranty.asp