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e-CAM22_CUXVR



Datasheet

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1 Revision History

Rev	Date	Description	Author
1.0	30-Sept-2020	Initial draft	Camera Team
1.1	28-Oct-2020	Pictures updated	Camera Team
1.2	29-Oct-2020	Updated details for Single Camera Support	Camera Team
1.3	29-Oct-2020	Updated Framerate Details	Camera Team



2 Introduction

e-con Systems is a leading Embedded Product Design Services Company, which is specialized in designing the camera solutions for Jetson™ platforms. In continuation to camera solutions, e-con Systems has developed a new camera board called e-CAM22_CUXVR. This camera board targets the NVIDIA® Jetson AGX Xavier™ development kits. It can be directly interfaced with Jetson AGX Xavier™ development kit through a J509 connector.

e-CAM22_CUXVR board connects 2 MP custom lens camera module based on Sony STARVIS® IMX327 CMOS image sensor. This 2 MP color camera has 1/2.8" optical form-factor with electronic rolling shutter and utilizes Jetson™ platforms in-built ISP. This camera module is provided with S-mount lens holder (also known as M12 board lens), which is the most used small form-factor lens mounts for board cameras and offers customized optics.

This document describes the features of e-CAM22_CUXVR board and the pinouts of the connectors including the mechanical diagram.

3 Disclaimer

The specifications and features of e-CAM22_CUXVR camera board are provided here as reference only and e-con Systems reserves the right to edit or modify this document without any prior intimation of whatsoever.

4 Description

e-CAM22_CUXVR is a multi-board camera solution for Jetson™ platforms, which is compatible with Xavier™ development kits, which has three boards as follows:

- Camera base board (e-CAM30_HEXCUXVR_BASE_BRD)
- Adaptor board (e-CAM130_TRICUTX2_ADAPTOR)
- Module board (e-CAM220_CUMI327_MOD)

The below figures show the camera base board, adaptor board and module board.

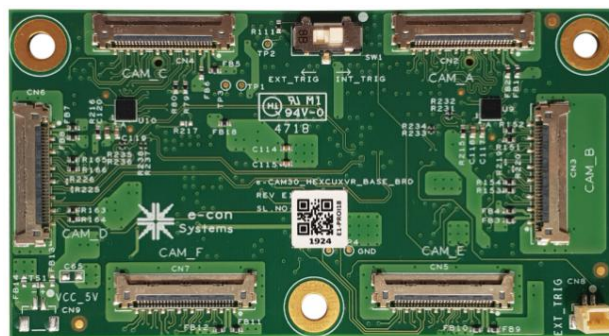


Figure 1: Camera Base Board





Figure 2: Adaptor Board



Figure 3: Module Board

The module board is based on Sony STARVIS® IMX327 CMOS image sensor. These MIPI camera module can be streamed in maximum of FHD resolution at 60 fps.

The e-CAM22_CUXVR camera base board has one 120-pin connector (CN1) that can be directly mated with Jetson™ AGX Xavier Development Kit and six 30-pin micro-coaxial connectors (CN2 (CAM A), CN3 (CAM B), CN4 (CAM C), CN5 (CAM E), CN6 (CAM D), and CN7 (CAM F)) for interfacing with camera modules through 30 cm micro-coaxial cable. Among which, only CN2 (CAM A), CN4 (CAM C), CN5 (CAM E), CN7 (CAM F), CN3 (CAM B) and CN6 (CAM D) are used for connecting six camera modules. The camera connector positions in the e-CAM22_CUXVR board is shown below. Though this base board can support up to 6 cameras, support for connecting only one camera is available for now.

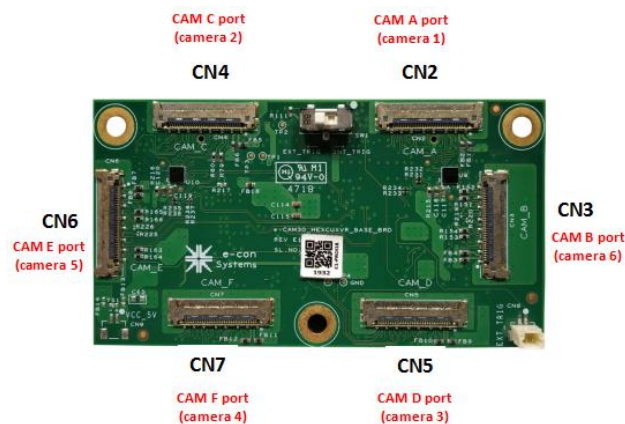


Figure 4: Camera Connector Positions in e-CAM22_CUXVR Board



For detailed interfacing of the e-CAM22_CUXVR camera board, please refer to the *e-CAM22_CUXVR_Getting_Started_Manual.pdf*.

This camera supports below framerates with Jetson™ AGX Xavier development kit.

Platform	Resolution	Frame Rate (fps) in 12-bit Output
With Xavier	HD (1280 x 720)	60
	FHD (1920 x 1080)	60

Table 1: Maximum Frame Rates in Asynchronous Mode

4.1 Features

The features of e-CAM22_CUXVR are as follows:

- Multi-board solution.
- Compactable with Xavier™ platforms.
- Standard M12 lens holder for use with customized optics or lenses for various applications.
- Light weight, versatile, and portable design.
- Asynchronous and synchronous states.
- Control for individual cameras and numbers of cameras to be streamed is selectable.
- Imaging applications:
 - 2 MP CMOS image sensor with RGB 12-bit output format.
 - Still capture supported resolution - HD and FHD.
 - Preview supported resolution - HD and FHD.
 - Field of View (FOV) angle is not the same for all preview resolutions.
- Operating power - 1.94W (six cameras streaming condition).
- Operating temperature -30°C to +85°C.
- Restriction of Hazardous Substances (RoHS) compliant.

5 Key Specifications

The below table lists the key specifications of e-CAM22_CUXVR.

Description	Specification
Base Board Size (L x W)	75.03 mm x 40.69 mm
Video Format	YUV 420
Image Resolution	1920 x 1080 (2 MP)
Supported OS	Linux

Table 2: Key Specifications of e-CAM22_CUXVR

5.1 CMOS Image Sensor Specification

The below table lists the specification of CMOS image sensor used in e-CAM22_CUXVR board.

Sensor Specification	
Type/Optical Size	1/2.8" Optical format CMOS image sensor
Resolution	2 MP
Sensor Type	RAW 12-bit



Pixel Size	2.9 μm x 2.9 μm
Total Number of Pixels	1945H x 1109V
Sensor Effective Area	1945H x 1097V
G Sensitivity	2.376V at 12-bit HCG mode
	0.921V at 12-bit LCG mode

Table 3: CMOS Image Sensor Specification

For more information about IMX327 CMOS image sensor or for *Datasheet*, please contact Sony®.

6 Pin Description

The e-CAM22_CUXVR base board has seven connectors such as interface connector (CN1), CAM A (CN2), CAM B (CN3), CAM C (CN4), CAM D (CN6), CAM E (CN5) and CAM F (CN7) connectors. The pin description of connectors is explained below.

6.1 Pin-out Details of CAM A Camera Connector (CN2)

The below table lists the pin-out details of CAM A connector.

Pin No	Signal Name	Pin Type	Description
1	VCC_3P3	POWER	3.3V Power supply for camera and adaptor boards
2	VCC_3P3	POWER	3.3V Power supply for camera and adaptor boards
3	VCC_1P8	POWER	1.8V Power supply for camera and adaptor boards
4	GND	POWER	Ground signal for digital and analog
5	GND	POWER	Ground signal for digital and analog
6	PWDN	OUTPUT	Camera Power down signal
7	I2C_SCL	OUTPUT	I2C Clock signal
8	I2C_SDA	I/O	I2C Data Signal
9	GND	POWER	Ground signal for digital and analog
10	MIPI_D2_N	INPUT	MIPI Data Lane 2 Differential Pair -
11	MIPI_D2_P	INPUT	MIPI Data Lane 2 Differential Pair +
12	TRIGGER	OUTPUT	Camera trigger signal
13	RSVD	-	Reserved
14	GND	POWER	Ground signal for digital and analog
15	MIPI_D1_N	INPUT	MIPI Data Lane 1 Differential Pair -
16	MIPI_D1_P	INPUT	MIPI Data Lane 1 Differential Pair +
17	GND	POWER	Ground signal for digital and analog
18	GND	POWER	Ground signal for digital and analog
19	MIPI_D0_N	INPUT	MIPI Data Lane 0 Differential Pair -
20	MIPI_D0_P	INPUT	MIPI Data Lane 0 Differential Pair +
21	RESET	OUTPUT	Camera reset signal (Active low)
22	GND	POWER	Ground signal for digital and analog
23	RSVD	-	Reserved
24	MIPI_CLK_N	INPUT	MIPI Clock Lane Differential Pair -
25	MIPI_CLK_P	INPUT	MIPI Clock Lane Differential Pair +
26	GND	POWER	Ground signal for digital and analog
27	MIPI_D3_N	INPUT	MIPI Data Lane 3 Differential Pair -
28	MIPI_D3_P	INPUT	MIPI Data Lane 3 Differential Pair +



29	FLASH	INPUT	Camera Flash signal
30	RSVD	-	Reserved

Table 4: Pin-out Details of CAM A Connector

Note: The above camera connector pin-out details remain same for CAM B (CN3), CAM C (CN4), CAM D (CN6), CAM E (CN5) and CAM F (CN7).

6.2 Connector Part Numbers

The below table lists connectors used in e-CAM22_CUXVR and its compatible mating connectors.

Connector	Description	Manufacturer	Part Number
e-CAM22_CUXVR base board mating connector (CN1) with Xavier™	120-pin SMT connector with 0.5 mm pitch	Samtec	QTH-060-01-H-D-A-K
e-CAM22_CUXVR headers (CN2, CN3, CN4, CN5, CN6, CN7) for mating base board with adaptor boards	30-pin receptacle connector with 0.4 mm pitch fully shielded	I-PEX	20682-030E-02
Micro-coaxial cable assembly to connect base board and adaptor board	30 cm length micro-coaxial cable with pin 1 to 1 compatible	I-PEX	81214-530B-300-1

Table 5: Connector Part Numbers

7 Electrical Specification

The electrical specification of e-CAM22_CUXVR are as follows:

- [Functional Temperature Range](#)
- [Recommended Operating Condition](#)
- [Power Consumption Details in Asynchronous Mode](#)

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.

7.1 Functional Temperature Range

The functional temperature range of e-CAM22_CUXVR is listed in the following table.

Temperature Range	Parameter Description
-30°C to 85°C	Electrically functional operating range

Table 6: Operating Temperature Range

Note: The default lens (optional) supplied with this camera has operating temperature range of -20C to +60C. You can choose wider operating temperature lens as per your requirements.

7.2 Recommended Operating Condition

The below table lists the recommended operating condition of e-CAM22_CUXVR.



Development Kit	Typical Operating Voltage	Typical Power Consumption
With Xavier™	3.3 V	1.940 W

Table 7: Recommended Operating Condition

8 Mechanical Specifications

e-CAM22_CUXVR base board size is 75.03 mm x 40.69 mm. The board drawing and its dimensions are described in the following section.

8.1 e-CAM22_CUXVR Dimension

The front portion of e-CAM22_CUXVR base board with mechanical dimensions is shown below.

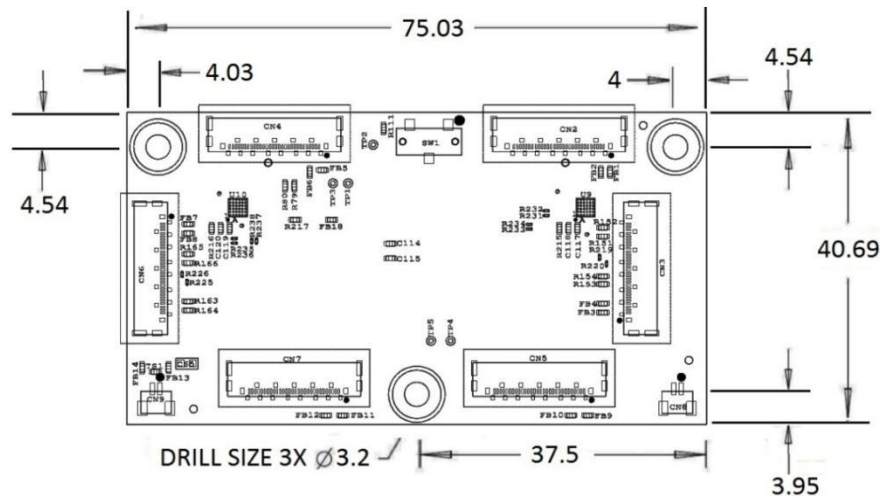


Figure 5: Front Portion of e-CAM22_CUXVR Base Board Mechanical Dimensions

The e-CAM22_CUXVR adaptor board with mechanical dimensions is shown below.

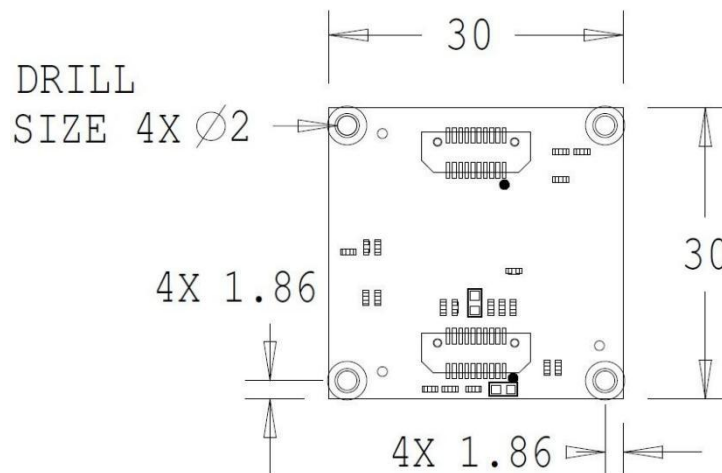


Figure 6: e-CAM22_CUXVR Adaptor Board Mechanical Dimensions

Note: All dimensions are in mm.



For e-CAM22_CUXVR module board mechanical dimension information, please refer to the *e-CAM21_CUMI290_MOD_Datasheet.pdf*.



Support

Contact Us

If you need any support on e-CAM22_CUXVR 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>

