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DepthVista (See3CAM_TOF_25CUG_CHLCC_H01R1)



Datasheet

Revision 1.3
27th June 2022



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1 Revision History

Rev	Date	Description	Author
1.0	20-April-2022	Initial draft	Camera Team
1.1	11-May-2022	Product Image and name changed	Camera Team
1.2	13-May-2022	Application Name changed	Camera Team
1.3	27-June-2022	Orientation diagram changed	Camera Team



2 Introduction

DepthVista (See3CAM_TOF_25CUG_CHLCC_H01R1) is a 3D camera based on Time of Flight (TOF) technology, USB Video Class (UVC) compliant, USB 3.2 Gen 1 SuperSpeed USB camera from e-con Systems, a leading Embedded Product Design Services Company which specializes in advanced camera solutions.

DepthVista is a RGB-D camera contains both RGB and TOF depth cameras. RGB camera has 1/2.6" AR0234CS CMOS digital image sensor with global shutter from onsemi™. It has dedicated high performance color Image signal processor. TOF depth camera has 1/4" CCD sensor and dedicated depth processor. DepthVista is a two-board solution containing camera board with the USB 3.2 Gen 1 interface and Laser board along with enclosure.

This document describes the features of DepthVista camera and the pinouts of the connectors including with mechanical diagram.

3 Disclaimer

The specifications and features of DepthVista 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

DepthVista has USB interface controller with USB Type-C connector to interface with the host PC. It is a ready-to-manufacture camera board with all the necessary firmware built-in and is compatible with the UVC version 1.0 standard. You can integrate this camera into the products, and this helps to cut short the time-to-market.

DepthVista is UVC compatible and will work with the standard drivers available with Windows and Linux OS. There is no need for any additional driver installation. So, video streaming through UVC is possible without any special drivers on OSes that have built-in support for UVC standards.

The block diagram of the e-con's DepthVista is given in the below figure.



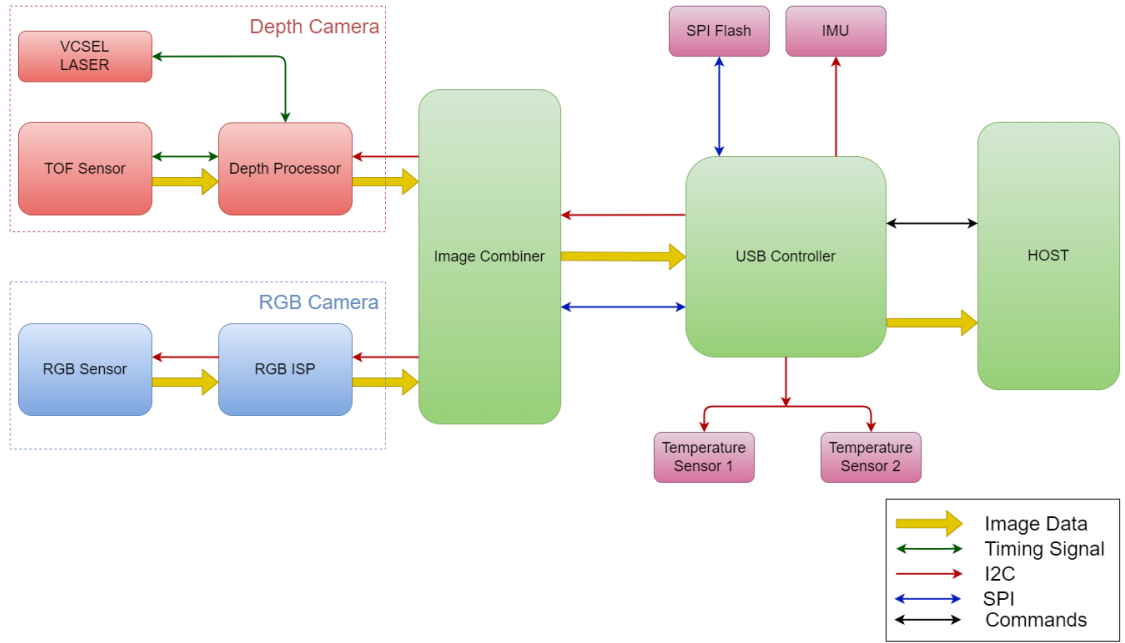


Figure1: Block Diagram of DepthVista

The front and rear views of DepthVista device with casing are shown in below figures.



Figure2: Front View of DepthVista



Figure3: Rear View of DepthVista



5 Product Specifications

5.1 Basic Information

Part Number	DepthVista (See3CAM_TOF_25CUG_CHLCC_H01R1)
USB Speed	USB 3.2 Gen 1 Superspeed USB
VID	0x2560
PID	0xC12D
UVC Compliant	Yes. Complaint to UVC version 1.0
Output Format	RGB-D
3D Output	Yes. RGB-D 3D Point Cloud
Device Identification	Unique ID for each camera

Table 1: Product's Basic Information

5.2 TOF Camera Features

- TOF Camera Specifications

TOF Camera Specifications	
Optical Format	1/4"
Resolution	0.6 MP
Sensor Type	CCD Sensor
Pixel Size	5.6 μm x 5.6 μm
Sensor Active Pixels	640 H x 480 V

Table 2: TOF Camera Specifications

- Preview Formats and Resolutions

Format	Resolution	Frame Rate (fps) USB 3.2 Gen 1
Y16 (RAW 12-bit)	Depth (640 x 480)	30
	IR (640 x 480)	30
	Depth + IR (640 x 960)	30

Table 3: Supported Resolution and Crop in FOV

5.3 RGB Camera Features

- RGB Camera Specifications

RGB Camera Specifications	
Type/Optical Size	1/2.6"
Resolution	2 MP
Sensor Type	CMOS Color Global shutter sensor

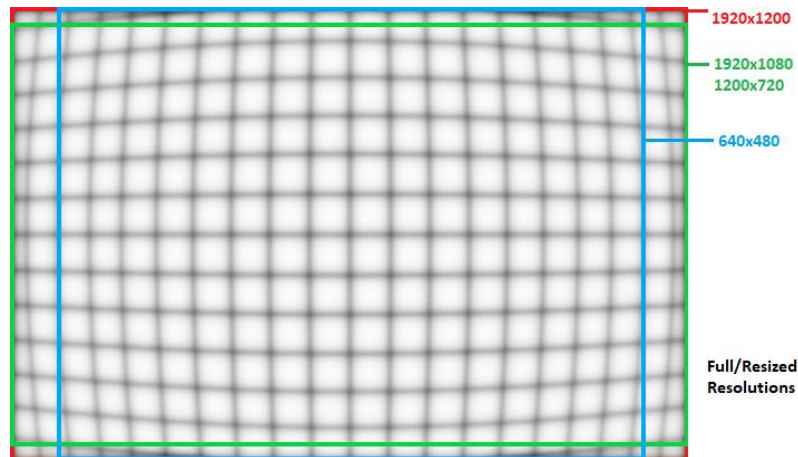


Pixel Size	3 μm x 3 μm
Sensor Active Pixels	1920 H x 1200 V
Auto Controls	Auto Exposure and Auto White-balance controls

Table 4: RGB Camera Specifications

- Preview Format and Resolutions

Format	Resolution	Frame Rate (fps) USB 3.2 Gen 1	Crop in FOV	
			Horizontal	Vertical
UYVY	2.3MP (1920 x 1200)	30	0%	0%
	FHD (1920 x 1080)	30	0%	10%
	HD (1280 x 720)	60	0%	10%
	VGA (640 x 480)	60	16.66%	0%

Table 5: Supported Resolution and Crop in FOV**Figure 4: FOV of RGB Camera**

5.4 RGB-D Mode Features

This mode streams both Depth and IR frames from TOF Depth camera and RGB color frames from RGB camera synchronously.

Format	Resolution	Mode	Frame Rate(fps) USB 3.2 Gen 1
Y16	1280 x 600 (RGB-D)	Depth + IR + RGB VGA	30
	1443 X 960 (RGB-D)	Depth + IR + RGB HD	30

Table 6: Supported Resolution and Crop in FOV

5.5 Optical Features

The optical specification of RGB and TOF lenses are listed below.

Description	RGB Lens Specifications	TOF Lens Specifications
Imager Format	1/2.5" (1/2.6" for AR0234CS)	1/4"
Focal Length	3.252 mm	2.16 mm
Aperture (F/#)	2.8	1.2
FOV	90.09°(D), 80.61°(H), 55.69°(V) (with 1/2.6" AR0234CS)	99.75°(D), 84.29°(H), 64.14°(V)
Distortion	< 1.73 %	-20 %
Chief Ray Angle	< 15.55°	10°
Lens Barrel Thread	M12 x 0.5	M12 x 0.5

Table 7: Optical Specifications of RGB and TOF lens

5.6 Illumination

Illumination Specifications	
Type	VCSEL laser diodes
Wavelength	850nm - Pulsed Laser
No of VCSELS	2

Table 8: Illumination specifications

5.7 Accuracy

Working Mode	Working Distance	Accuracy
Near Mode	0.2m to 1.2m	<1%
Far Mode	1m to 6m	<2.5%

Table 9: Depth Accuracy details

5.8 Interfaces and Sensors

Interfaces Specifications	
USB 3.2 Gen 1	Type C Reversible connector
HID	RGB camera specific controls through HID
IMU	Houses 6-axis Inertial Measurement Unit
Temperature	Houses two dedicated temperature sensors

Table 10: Interface and Sensors Specifications

5.9 Software

Software Specifications	
Supported OS	Windows 10, Linux Ubuntu 18.04
Streaming Application	DepthVista for both OSs
SDK	C, C++ SDK for both OSs
IMU Sample Application	TOF IMU Application for both OSs



Still Capture Support	Provided by SDK
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Table 11: Software Specifications

5.10 Conformance

Conformance Tests	
Radiated Emission (RE)	FCC(2006) Part15
Radiation Susceptibility (RS)	EN 61000-4-3
Electrical Fast Transient (EFT)	EN 61000-4-4
Electrostatic Discharge (ESD)	EN 61000-4-2

Table 12: Conformance Tests Specifications

6 Pin Description

DepthVista has two connectors one USB Type-C connector and one DC power jack connector as shown below.



Figure 5: DC Jack and USB Connector

6.1 DC Power Jack Connector Pin Description

The below table lists the pin types and description of GPIO header.

Pin no	Signal Name	Pin Type	Description	Remarks
1	VCC_12V	Power	Supply voltage for DepthVista	It can source up to 2A. Any surge current drawn from this voltage source will affect the camera.
2	GND	Power	Ground return	
3	GND	Power	Ground return	

Table 13: Pin Types and its Description



6.2 USB Type-C Connector Pin Description

The below table lists the pinouts of USB Type-C connector which is used to connect DepthVista board with PC through 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 14: USB Type-C Connector Pin Description

7 Connector Part Numbers

The USB connector is the standard USB Type-C connector as specified in the USB 3.2 Gen 1 standards. Any USB standard compliant USB 3.2 Gen 1 Type-A to Type-C cable will be compatible with this connector.

The below table lists the connectors used in the DepthVista camera board and its compatible mating connectors.

Connector	Description	Manufacturer	Part Number	Compatible Mating Part No's
USB 3.2 Gen 1 Type-C Connector	CONN USB Type-C 3.2 Receptacle 24Pos Right Angle SMT	Molex	2012670005	Any standard USB 3.2 Gen 1 Type C cable supported
DC power jack connector	Power barrel connector Jack 2.00mm (about 0.08 in) ID (0.079"), 5.50mm (about 0.22 in)	CUI Devices	PJ-102AH	



	OD (0.217") Through Hole, Right Angle			
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Table 15: Connectors and its Part Number Details

8 Electrical Specification

The electrical specification of DepthVista 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.

DepthVista require two power supply to power up the camera, first an external power supply of 12 V is connected to the DC power Jack Connector and then the 5V power is supplied by the USB cable which is connected to the Type C USB Connector.

8.1 Recommended Operating Condition

The below table lists the recommended operating condition of DepthVista under various operating condition.

Parameter	Typical Operating Voltage	Current (A)	Typical Power Consumption (W)
Streaming maximum power in Depth only Far Mode at 30 fps in USB 3.2 Gen 1	5V ± 250 mV	0.466	4.562
	12V ± 250 mV	0.186	
Streaming minimum power in RGB Full HD mode at 30 fps in USB 3.2 Gen 1	5V ± 250 mV	0.315	1.575
	12V ± 250 mV	0	
Power at Idle condition	5V ± 250 mV	0.281	1.405
	12V ± 250 mV	0	

Table 16: Recommended Operating Condition

8.1.1 RGB-D Mode with USB 3.2 Gen 1

The below table lists the current consumed by DepthVista in RGB-D camera mode with USB 3.2 Gen 1 under various operating condition.

S. No	Resolution	Frame Rate (fps)	Depth Mode	Supply Voltage (V)	Typical Current (A)	Power Consumption (W)
1	1280 x 600 (Depth IR RGB VGA)	30	Far	12	0.185	4.5
				5	0.456	
			Near	12	0.009	2.308
				5	0.440	
2	1443 X 960 (Depth IR)	30	Far	12	0.185	4.54
				5	0.464	



	RGB HD)		Near	12	0.009	2.363
				5	0.451	

Table 17: Dual Camera mode with USB 3.2 Gen 1

8.1.2 TOF Mode with USB 3.2 Gen 1

The below table lists the current consumed by DepthVista in Depth IR mode with USB 3.2 Gen 1 under various operating condition.

S. No	Resolution	Frame Rate (fps)	Depth Mode	Supply Voltage (V)	Typical Current (A)	Power Consumption (W)
1	640 x 960 (Depth and IR)	30	Far	12	0.185	4.555
				5	0.467	
			Near	12	0.009	2.368
				5	0.452	
2	640 x 480 (Depth only)	30	Far	12	0.186	4.562
				5	0.466	
			Near	12	0.009	2.363
				5	0.451	
3	640 x 480 (IR only)	30	Far	12	0.185	4.55
				5	0.466	
			Near	12	0.009	2.368
				5	0.452	

Table 18: IR Mode with USB 3.2 Gen 1

8.1.3 RGB Mode with USB 3.2 Gen 1

The below table lists the current consumed by DepthVista in RGB mode with USB 3.2 Gen 1 under various operating condition.

S. No	Resolution	Frame Rate (fps)	Depth Mode	Supply Voltage (V)	Typical Current (A)	Power Consumption (W)
1	640 x 480 (RGB VGA)	60	Far	12	0	1.73
				5	0.346	
			Near	12	0	1.73
				5	0.346	
2	1280 x 720 (RGB HD)	60	Far	12	0	1.75
				5	0.350	
			Near	12	0	1.75
				5	0.350	
3	1920 x 1080 (RGB Full HD)	30	Far	12	0	1.575
				5	0.315	
			Near	12	0	1.575
				5	0.315	
4	1920 x 1200 (RGB 1200p)	30	Far	12	0	1.575
				5	0.315	
			Near	12	0	1.575
				5	0.315	

Table 19: RGB Mode with USB 3.2 Gen 1



8.2 Operating Temperature Range

The below table lists the operating temperature range of DepthVista.

Parameter Description	Temperature Range
Operating temperature range ¹	0°C to 50°C

Table 20: Operating Temperature Range

¹This is the maximum temperature range up to which the camera sensor can be operated. This value is measured at junction.

9 Mechanical Specifications

The board drawing and dimensions are given in the below sections.

9.1 DepthVista Dimension

DepthVista size is 101.5 mm x 34.2 mm x 30.8 mm. The mechanical dimension of DepthVista with enclosure is shown in the figures below.

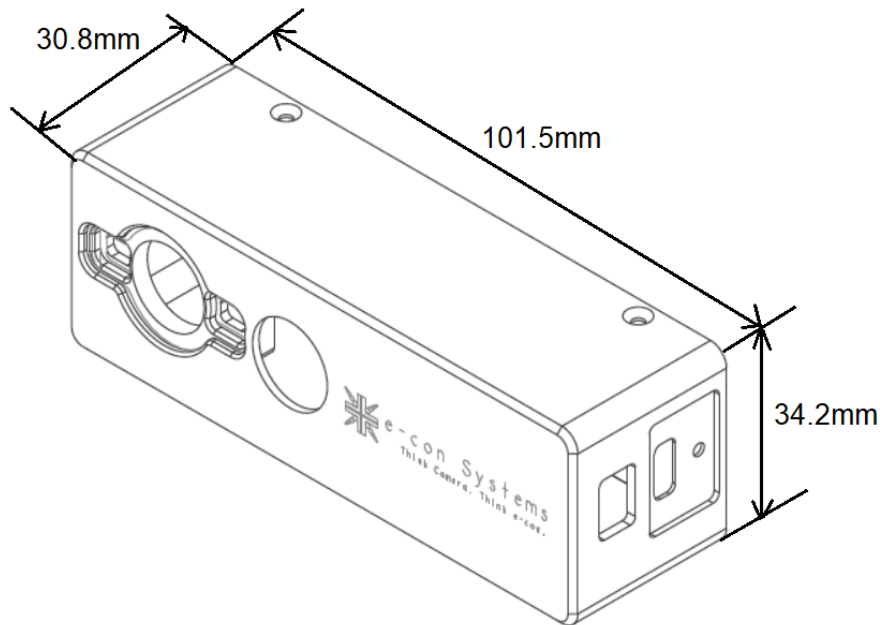


Figure 6: DepthVista Dimensions



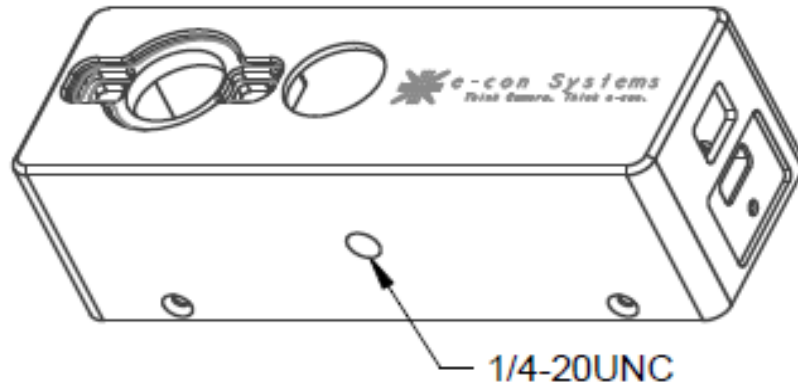


Figure 7: Tripod Holder dimension

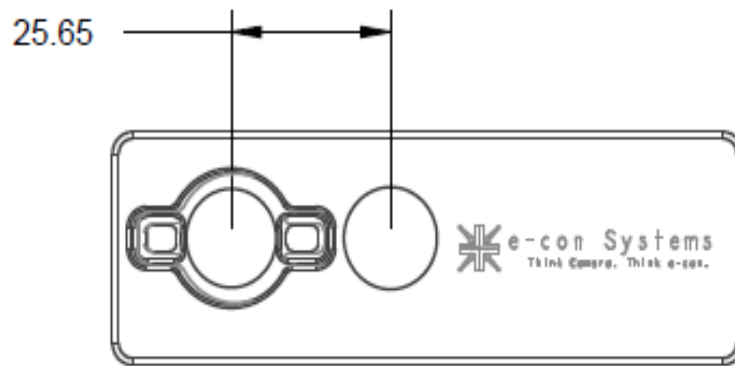


Figure 8: Baseline Measurement between TOF and RGB cameras

Note: All dimensions are in millimeter (mm).

9.2 Orientation of DepthVista

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





Figure 9: Camera Image Orientation with respect to USB Cable



Support

Contact Us

If you need any support on DepthVista 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>

