DepthVista

DepthVista Console Application
User Manual

e-con Systems

Think Camera. Think e-con.

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Contents

Introduction to DepthVista

DepthVista 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, which has over two decades of experience in designing, developing, and manufacturing OEM cameras.

DepthVista is an RGB-D camera containing 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 special features of sample console application when it is used with DepthVista.

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 a 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.

Table 1: DepthVista Supported Format, Resolutions, and Frame Rates

S.No	Format	Camera Mode	Resolution	Frame Rate (fps) USB 3.2 Gen 1
1	UYVY	RGB Mode	2.3MP (1920 x 1200)	30
			FHD (1920 x 1080)	30
			HD (1280 x 720)	60
			VGA (640 x 480)	60
2	Y16 (RAW 12-bit)	TOF Mode	Depth (640 x 480)	30
			IR (640 x 480)	30
			Depth + IR (640 x 960)	30
3		RGB-D Mode	1280 x 600 (RGB-D)	30
			1443 X 960 (RGB-D)	30

The TOF camera in DepthVista can be used in two depth modes as follows:

- **Far Mode**: Effective depth range is between 1000 mm to 6000 mm.

- **Near Mode**: Effective depth range is between 200 mm to 1200 mm.

The TOF camera controls of DepthVista are as follows:

- TOF Data Mode
- TOF Depth Range
- TOF Mask
- TOF Gain

The RGB camera controls of DepthVista are as follows:

- Brightness
- Contrast
- Saturation
- Gamma
- Gain
- Sharpness
- White Balance
- Exposure
- Power line frequency

This document explains the following sections:

- Selecting the supported preview resolutions.
- Using supported controls.

Installing DepthVista Application

This section describes the installation steps of DepthVista application in Ubuntu. The installation steps are explained in detail as follow.

1. Welcome Screen
2. Installation Path Selection
3. Component Selection
4. Installation Process
5. Installation Complete

Step 1 - Welcome Screen

As a first step, extract the given package using the following command.

```
unzip -X <packageName.zip>
```

<ExtractedPath>/DepthVista_Application_Package_Ver_x.x.x.x/Linux/Bin/Ubuntu 20.04 will have **DepthVistaViewer_x64_x.x.x.x_xxxxxxxx.run** file. Run the **DepthVistaViewer_x64_x.x.x.x_xxxxxxxx.run** file.

Note: For Ubuntu 22.04 the **DepthVistaViewer_x64_x.x.x.x_xxxxxxxx.run** file will be in
<ExtractedPath>/DepthVista_Application_Package_Ver_x.x.x.x/Linux/Bin/Ubuntu 22.04.

When you run the **DepthVistaViewer_x64_x.x.x.x_xxxxxxxx.run** file, the Welcome screen appears as shown below.
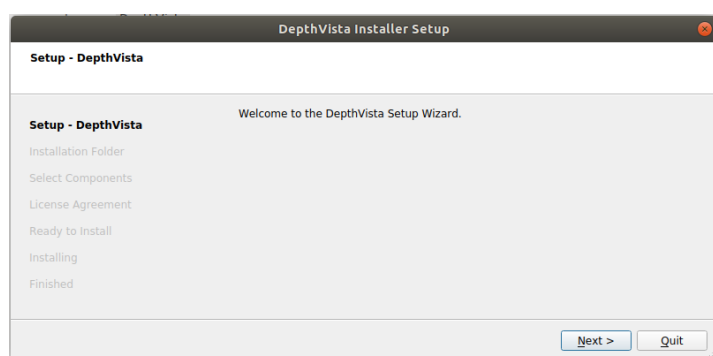

Figure 1: Welcome Screen

Click the **Next** button.

Step 2 - Installation Path Selection

On clicking the **Next** button, you can view the screen similar to the installation path selection window as shown below.
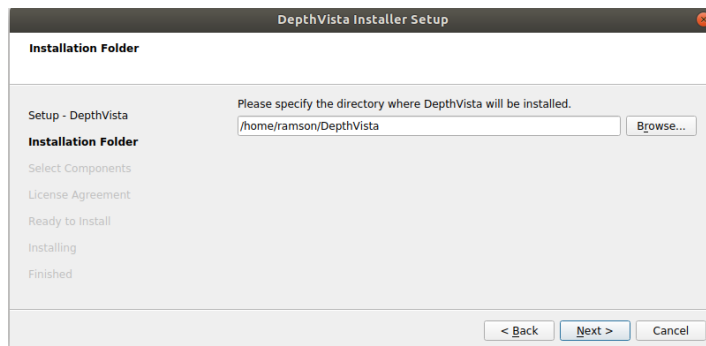
Figure 2: Installation Path Selection Window

You can either use the default installation path **home/user/DepthVista** or change to another installation path by clicking the **Browse** button.

Click the **Next** button.

Step 3 - Component Selection

On clicking the **Next** button, the components selection window will appear.

Make sure to select the **DepthVista Installer** as shown below.
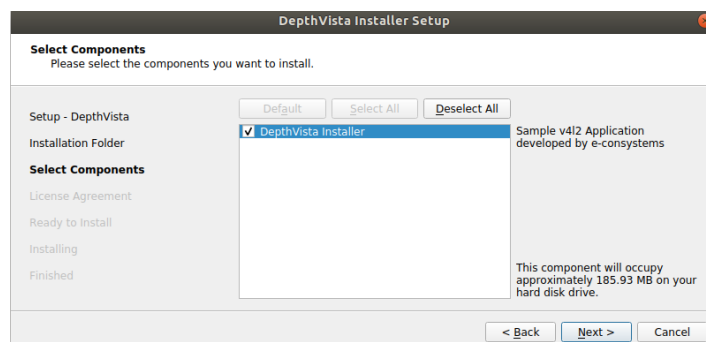
Figure 3: Components Selection Window

After selection, click the **Next** button.

Step 4 - Installation Process

On clicking the **Next** button, the ready to install window appears as shown below.
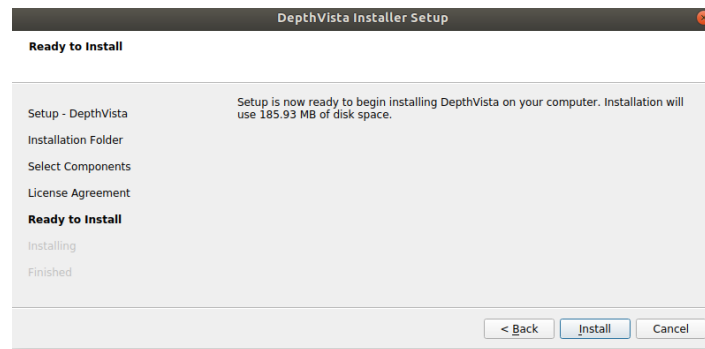
Figure 4: Ready to Install Window

Click the **Install** button to install the DepthVista application.

Now, all the required files are extracted and copied to specific location. The progress of installation appears as shown.
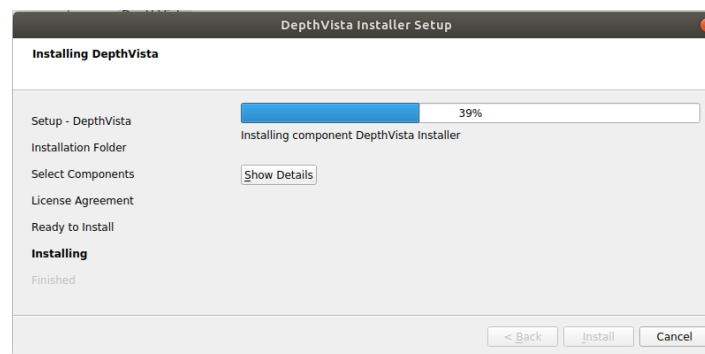
Figure 5: Installation Process Window

Step 5 - Installation Complete

After the DepthVista installation, you can view the DepthVista setup completion window as shown below.
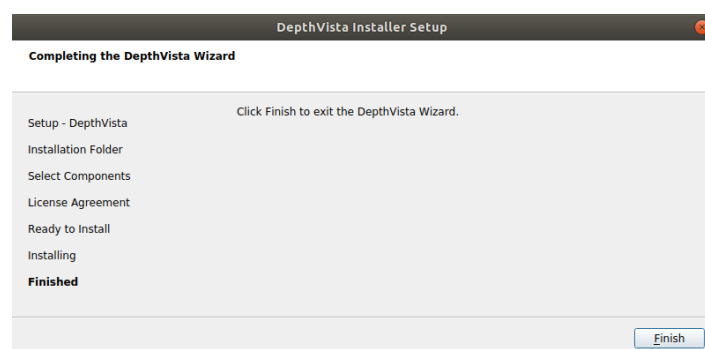
Figure 6: DepthVista Setup Completion Window

Click the **Finish** button to exit the setup wizard after the completion of installation.

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Using DepthVista Console Application

This section describes how to use the DepthVista console application.

Launching DepthVista Console Application in Ubuntu

The steps to launch DepthVista Console Application in Ubuntu are as follows:

1. Run the following command from the directory where DepthVista Application is installed to run the application.

```
sudo ./DepthVistaConsoleApp
```

Launching DepthVista Console Application in Windows

The steps to launch DepthVista Console Application in Windows are as follows:

1. Extract the given Package.

   <Extracted Directory>/Windows/Bin/CMD/x64 will contain the DepthVistaConsoleApp.exe file.

2. Double click the DepthVistaConsoleApp.exe.

Selecting Exploration Mode

After starting the application, if multiple (more than 1) DepthVista devices are connected the command line prompts the user to select the **Exploration mode.** User can select any of the two exploration modes.

- Option **0** to explore Single device.

- Option **1** to explore Multiple devices.

Figure 7: Device Exploration Choice.

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If the user selects **Multiple devices,** stream starts from all the devices and Camera Properties will be listed.

If the user selects **Single device,** the command line prompts the user to select a device to explore.

e-con's Sample Application for DepthVista

Demonstrates the working of e-con's DepthVistaSDK

        DepthVista SDK-Version = 1.0.7

Number of Camera Devices Connected to the Port : 3

How would you like to explore the devices
        0 - Single Device
        1 - Multiple Devices

 Pick a relevant Option: 0

Camera Devices Connected to the PC Port :

        0 - Exit
        1 . See3CAM_TOF_25CUG (1A2D49062C000900)
        2 . See3CAM_TOF_25CUG (1B2249062C000900)
        3 . See3CAM_TOF_25CUG (191C49062C000900)

 Pick a Camera Device to Explore :   1

Figure 8: Selecting Single device to explore

After selecting the device to explore in single device mode, stream will start from the selected device, and Camera Properties will be listed.

Selecting Camera Properties

Camera properties that can be explored will be listed as shown below.

        0   - Exit
        1   - Back
        2   - Streaming Mode
        3   - TOF Controls
        4   - UVC Controls
        5   - RGB-D Mapping
        6   - Post Processing
        7   - Capture Frames
        8   - Unique ID
        9   - Read Firmware Version
        10   - Get Depth value

Pick a Relevant Choice of Camera Properties : █

Figure 9: Selecting Camera Property

Selecting Streaming Mode

The steps to select the Streaming mode are as follows:

1. If user is exploring in **Multiple devices** exploration mode, enter **1** in **Pick a Relevant Choice of Camera Properties** to select the **Streaming Mode**. If user is exploring in Single Device exploration mode, enter **2** in **Pick a Relevant Choice of Camera Properties** to select the **Streaming Mode**.

   After selecting the Streaming mode option, all the streaming modes supported by the device will be listed as shown below.
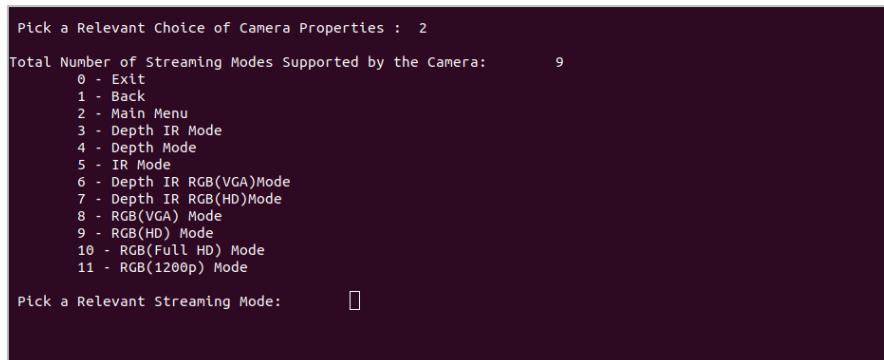
```
Pick a Relevant Choice of Camera Properties :  2

Total Number of Streaming Modes Supported by the Camera:        9
        0 - Exit
        1 - Back
        2 - Main Menu
        3 - Depth IR Mode
        4 - Depth Mode
        5 - IR Mode
        6 - Depth IR RGB(VGA)Mode
        7 - Depth IR RGB(HD)Mode
        8 - RGB(VGA) Mode
        9 - RGB(HD) Mode
        10 - RGB(Full HD) Mode
        11 - RGB(1200p) Mode

Pick a Relevant Streaming Mode:
```

Figure 10: Supported Streaming Modes

2. The options to set the streaming mode are as follows:

- Option **0** to exit from the application.
- Option **1** to go back to the previous menu.
- Option **2** to return to Main Menu.
- Option **3** to set Depth IR streaming Mode.
- Option **4** to set Depth streaming Mode.
- Option **5** to set IR streaming Mode.
- Option **6** to set Depth IR RGB(VGA) streaming Mode.
- Option **7** to set Depth IR RGB(HD) streaming Mode.
- Option **8** to set RGB (VGA) streaming Mode.
- Option **9** to set RGB (HD) streaming Mode.
- Option **10** to set RGB (Full HD) streaming Mode.
- Option **11** to set RGB (1200p) streaming Mode.

After selecting the preferred streaming mode, user can view the preview based on the selected streaming mode.

Selecting TOF Controls

The steps to select the TOF Controls are as follows:

1. If user is exploring in **Multiple devices** exploration mode, enter **2** in **Pick a Relevant Choice of Camera Properties** to select **TOF Controls**. If user is exploring in Single Device exploration mode, enter **3** in **Pick a Relevant Choice of Camera Properties** to select **TOF Controls**.

After selecting the TOF Controls option, all the available TOF controls will be listed as shown below.

```
Pick a Relevant Choice of Camera Properties :  3
       0 - Exit
       1 - Back
       2 - Main Menu
       3 - Depth Range
       4 - TOF Coring
       5 - IR Gain
       6 - IMU Embedded data

Pick a Relevant TOF Control:    █
```

Figure 11: TOF Controls

The options in TOF Controls are as follows:

- Option **0** to exit from the application.
- Option **1** to go back to the previous menu.
- Option **2** to return to main menu.
- Option **3** to select Depth Range.
- Option **4** to Get or Set TOF Coring value.
- Option **5** to Get or Set IR Gain value.
- Option **6** to enable or disable IMU Embedded data.

Selecting Depth Range

The steps to select the Depth Range are as follows:

1. Enter **3** in **Pick a Relevant TOF Controls** to select the **Depth Range**.

After selecting the Depth range option, all the depth ranges supported by the device will be listed as shown below.

```
Pick a Relevant Choice of Camera Properties :  3

Total Number of Depth Range Supported by the Camera:    2
       0 - Exit
       1 - Back
       2 - Main Menu
       3 - Near Mode
       4 - Far Mode

Pick a Relevant Depth Mode:    █
```

Figure 12: Supported Depth Ranges

The options to set the depth range are as follows:

- Option **0** to exit from the application.
- Option **1** to go back to the previous menu.
- Option **2** to return to main menu.
- Option **3** to set Near Mode.

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- Option **4** to set Far Mode.

After selecting the preferred depth range, stream will be updated based on the depth range selected.

Selecting TOF Coring

The steps to Get or Set TOF Coring value are as follows:

1. Enter **4** in **Pick a Relevant TOF Controls** to get or set **TOF Coring** value.

   After selecting the TOF Coring option, Get or Set option will be listed as shown below.

Figure 13: TOF Coring menu

The options in TOF Coring menu are as follows:

- Option **0** to exit from the application.
- Option **1** to go back to the previous menu.
- Option **2** to return to main menu.
- Option **3** to get the current TOF Coring value.
- Option **4** to set TOF Coring value between the range 0 to 16383.

After setting the preferred TOF coring value, stream will be updated.

Selecting IR Gain

The steps to Get or Set IR Gain value are as follows:

1. Enter **5** in **Pick a Relevant TOF Controls** to get or set **IR Gain** value.

   After selecting the IR Gain option, Get or Set option will be listed as shown below.

Figure 14: IR Gain menu

The options in IR Gain menu are as follows:

- Option **0** to exit from the application.
- Option **1** to go back to the previous menu.
- Option **2** to return to main menu.
- Option **3** to get the current IR Gain value.
- Option **4** to set IR Gain value between the range 1 to 100.

After setting the preferred IR Gain value, stream will be updated.

Selecting IMU Embedded data

The steps to enable or disable IMU Embedded data are as follows:

1. Enter **6** in **Pick a Relevant TOF Controls** to enable or disable **IMU Embedded data**.

   After selecting the IMU Embedded data option, enable or disable option will be listed as shown below.

```
Pick a Relevant TOF Control:   6
       0 - Exit
       1 - Back
       2 - Main Menu
       3 - Disable IMU Embedded data
       4 - Enable IMU Embedded data

Pick a Relevant Option:
```

Figure 15: IMU Embedded data menu

The options in IMU Embedded data are as follows:

- Option **0** to exit from the application.
- Option **1** to go back to the previous menu.
- Option **2** to return to main menu.
- Option **3** to disable IMU Embedded data.
- Option **4** to enable IMU Embedded data.

After enabling IMU Embedded data, IMU data values will be appended along with frame data.

UVC Controls

The steps to select the UVC Controls follows:

1. If user is exploring in **Multiple devices** exploration mode, enter **3** in **Pick a Relevant Choice of Camera Properties** to select **UVC Controls**. If user is exploring in Single Device exploration mode, enter **4** in **Pick a Relevant Choice of Camera Properties** to select **UVC Controls.**

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After selecting the UVC Controls option, all the available UVC controls will be listed as shown below.


```
 0  - Exit
 1  - Back
 2  - Main Menu
 3  - BRIGHTNESS
 4  - CONTRAST
 5  - SATURATION
 6  - WHITE BALANCE MODE
 7  - WHITE BALANCE CONTROL
 8  - GAMMA
 9  - GAIN
10 - POWER LINE FREQ
11 - SHARPNESS
12 - EXPOSURE MODE
13 - EXPOSURE CONTROL
```

Figure 16: UVC Controls

2. UVC controls will be available only when RGB stream is enabled.

3. The options in UVC Controls are as follows:

   - Option **0** to exit from the application.
   - Option **1** to go back to the previous menu.
   - Option **2** to return to main menu.
   - Option **3** to get and set Brightness value. Brightness value range from -15 to 15.
   - Option **4** to get and set contrast value. Contrast value range from 0 to 30.
   - Option **5** to get and set saturation value. Saturation value range from 0 to 50.
   - Option **6** to enable or disable auto white balance.
   - Option **7** to set white balance value in manual mode.
   - Option **8** to get and set gamma value. Gamma value range from 40 to 500.
   - Option **9** to get and set gain value. Gain value range from 1 to 100.
   - Option **10** to get and set power line frequency. Power line frequency value range from 0 to 2.
   - Option **11** to get and set sharpness. Sharpness value range from 0 to 127.
   - Option **12** to enable or disable auto exposure.
   - Option **13** to set exposure value in manual mode.

   After changing any UVC values, stream will be updated.

   Note: Dual streaming mode does not support manual exposure mode. Gain control cannot be used when Auto exposure is enabled.

Selecting RGB-D Mapping

The steps to select the RGB-D Mapping are as follows:

1. If user is exploring in **Multiple devices** exploration mode, enter **4** in **Pick a Relevant Choice of Camera Properties** to select **RGB-D Mapping**. If user is exploring in Single Device exploration mode, enter **5** in **Pick a Relevant Choice of Camera Properties** to select **RGB-D Mapping.**

After selecting the RGB-D Mapping option, you will have the options listed as shown.

Figure 17: Enabling and Disabling RGB-D Mapping

2. The options in **RGB-D Mapping** are as follows:

- Option **0** to exit from the application.
- Option **1** to go back to the previous menu.
- Option **2** to return to main menu.
- Option **3** to disable RGB-D Mapping.
- Option **4** to Enable RGB-D Mapping.

After selecting the preferred RGB-D Mapping option, stream will be updated.

Selecting Post Processing

The steps to select the Post Processing are as follows:

1. If user is exploring in **Multiple devices** exploration mode, enter **5** in **Pick a Relevant Choice of Camera Properties** to select **Post Processing**. If user is exploring in Single Device exploration mode, enter **6** in **Pick a Relevant Choice of Camera Properties** to select **Post Processing.**

After selecting the Post Processing option, you will have the options listed as shown.

Figure 18: Post Processing menu

2. The options in Post Processing are as follows:

- Option **0** to exit from the application.

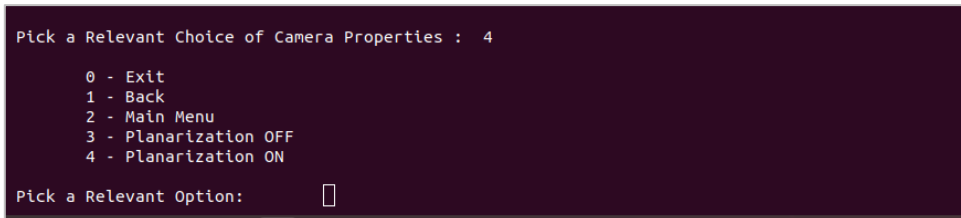DepthVista Console Application User Manual

- Option **1** to go back to the previous menu.
- Option **2** to return to main menu.
- Option **3** to enable or disable Planarization.
- Option **4** to enable or disable Spatial Filter.
- Option **5** to enable or disable Temporal Filter.
- Option **6** to enable or disable Edge detection Filter.
- Option **7** to enable or disable Undistort depth.

Selecting Planarization

The steps to enable or disable Planarization are as follows:

1. Enter **3** in **Pick a Relevant Option** to select **Planarization**.

   After selecting the Planarization option, you will have the options listed as shown.

```
Pick a Relevant Choice of Camera Properties :  4

     0 - Exit
     1 - Back
     2 - Main Menu
     3 - Planarization OFF
     4 - Planarization ON

Pick a Relevant Option:        []
```

Figure 19: Enabling and Disabling Planarization

2. The options to enable or disable planarization are as follows:

- Option **0** to exit from the application.
- Option **1** to go back to the previous menu.
- Option **2** to return to main menu.
- Option **3** to disable Planarization.
- Option **4** to Enable Planarization.

After selecting the preferred planarization, stream will be updated.

Selecting Spatial filter

The steps to enable or disable Spatial filter are as follows:

1. Enter **4** in **Pick a Relevant Option** to select **Spatial Filter**.

   After selecting the Spatial filter option, you will have the options listed as shown.

Figure 20: Enabling and Disabling Spatial filter

2. The options to enable or disable Spatial filter are as follows:

- Option **0** to exit from the application.
- Option **1** to go back to the previous menu.
- Option **2** to return to main menu.
- Option **3** to disable Spatial filter.
- Option **4** to Enable Spatial filter.

After selecting the preferred Spatial filter option, stream will be updated.

Selecting Temporal filter

The steps to enable or disable Temporal filter are as follows:

1. Enter **5** in **Pick a Relevant Option** to select **Temporal Filter**.

   After selecting the Temporal filter option, you will have the options listed as shown.

Figure 21: Enabling and Disabling Temporal filter

2. The options enable or disable Temporal filter are as follows:

- Option **0** to exit from the application.
- Option **1** to go back to the previous menu.
- Option **2** to return to main menu.
- Option **3** to disable Temporal filter.
- Option **4** to Enable Temporal filter.

After selecting the preferred Temporal filter option, stream will be updated.

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Selecting Edge detection filter

The steps to enable or disable Edge detection filter are as follows:

1. Enter **6** in **Pick a Relevant Option** to select **Edge detection Filter**.

   After selecting the Edge detection filter option, you will have the options listed as shown.

```
Pick a Relevant Option:        6

      0 - Exit
      1 - Back
      2 - Main Menu
      3 - Edge detection OFF
      4 - Edge detection ON

Pick a Relevant Option:
```

Figure 22: Enabling and Disabling Edge detection filter

2. The options to enable or disable Edge detection filter are as follows:

   - Option **0** to exit from the application.
   - Option **1** to go back to the previous menu.
   - Option **2** to return to main menu.
   - Option **3** to disable Edge detection filter.
   - Option **4** to Enable Edge detection filter.

   After selecting the preferred Edge detection filter option, stream will be updated.

Selecting Undistort Depth

The steps to enable or disable Undistort Depth are as follows:

1. Enter **7** in **Pick a Relevant Option** to select **Undistort Depth**.

   After selecting the Undistort depth option, you will have the options listed as shown.

```
Pick a Relevant Choice of Camera Properties :  5

      0 - Exit
      1 - Back
      2 - Main Menu
      3 - Undistortion OFF
      4 - Undistortion ON

Pick a Relevant Option:
```

Figure 23: Enabling and Disabling Undistortion

2. You can enable or disable Undistort filter using the following options:

   - Option **0** to exit from the application.

- Option **1** to go back to the previous menu.
- Option **2** to return to main menu.
- Option **3** to disable Undistort Depth.
- Option **4** to Enable Undistort Depth.

After selecting the preferred Undistort Depth option, stream will be updated.

Capturing Frames

The steps to capture frames are as follows:

1. If user is exploring in **Multiple devices** exploration mode, enter **6** in **Pick a Relevant Choice of Camera Properties** to capture images. If user is exploring in Single Device exploration mode, enter **7** in **Pick a Relevant Choice of Camera Properties** to capture images**.**

Images will be saved based on the streaming mode and the location of the images will be shown as follows.


```
Pick a Relevant Choice of Camera Properties :  6
DepthColorMap frame is successfully saved as
            .bmp
Raw Depth frame is successfully saved as
     .raw
RGB frame is successfully saved as                                              .b
mp
IR frame is successfully saved as                                               .png
Frame Capture ends
```

Figure 24: Capturing Frames

2. The files will be saved with the name as shown below.

- RGB Frame – DepthVistaCam<Device number>_RGB_yyyy_mm_dd_hrs_min_sec.bmp
- IR Frame – DepthVistaCam<Device number>_IR_yyyy_mm_dd_hrs_min_sec.png
- Depth Raw Frame – DepthVistaCam<Device number>_Raw_yyyy_mm_dd_hrs_min_sec.raw
- Depth Color map - DepthVistaCam<Device number>_Depth_yyyy_mm_dd_hrs_min_sec.bmp
- 3D File – DepthVistaCam<Device number>_PLY_yyyy_mm_dd_hrs_min_sec.ply

Reading Unique ID

If user is exploring in **Multiple devices** exploration mode, enter **7** in **Pick a Relevant Choice of Camera Properties** to read the Unique ID of that specific device. If user is exploring in **Single device** exploration mode, enter **8** in **Pick a Relevant Choice of**

Camera Properties to read the Unique ID of that specific device. Unique ID of the device will be displayed as shown below.

```
Pick a Relevant Choice of Camera Properties :  7

Unique ID of the Camera is 1816721988852121600
```

<p align="center">Figure 25: Reading Unique ID of Device</p>

Reading Firmware Version

If user is exploring in **Multiple devices** exploration mode, enter **8** in **Pick a Relevant Choice of Camera Properties** to read the firmware version of that specific device. If user is exploring in **Single device** exploration mode, enter **9** in **Pick a Relevant Choice of Camera Properties** to read the firmware version of that specific device. Firmware version of the device will be displayed as shown below.

```
Pick a Relevant Choice of Camera Properties :  8

Firmware Version : 1.3.387.9
```

<p align="center">Figure 26: Reading Firmware Version of Device</p>

Get Depth Value

The steps to get Depth Values are as follows:

1. Before trying to get Depth value, start any stream that enables depth streaming mode, else a message saying "Start Depth stream to get depth value" will appear.

2. If user is exploring in **Multiple devices** exploration mode, enter **9** in **Pick a Relevant Choice of Camera Properties** to select **Get Depth Value**. If user is exploring in **Single device** exploration mode, enter **10** in **Pick a Relevant Choice of Camera Properties** to select **Get Depth Value**.

   After selecting the Get Depth Value option, a list of options will be listed as shown below.

```
Pick a Relevant Choice of Camera Properties :  9
        0 - Exit
        1 - Back
        2 - Main Menu
        3 - Centre
        4 - Custom co-ordinate

Pick a Relevant Depth value position: 
```

<p align="center">Figure 27: Get Depth value options</p>

You can get the Depth value using the following options:

- Option **0** to exit from the application.

- Option **1** to go back to the previous menu.
- Option **2** to return to main menu.
- Option **3** to Get the depth value of centre pixel.
- Option **4** to Get the depth value of any pixel. whose X co-ordinates range from 0 to 639 and Y co-ordinates range from 0 to 479.

After selecting option **4** the command line will prompt the user to enter width and height of average kernel, X co-ordinate and Y co-ordinate to get the depth value.

Exiting the Application

Enter **0** in **Pick a Relevant Choice of Camera Properties** to exit the application.

In the DepthVista sample application, the device is selected but the preview window is black.

- Please make sure that the external power supply is connected to the device and then restart the application.

- Please check whether the device is connected to USB 2.0. If so, as this device supports only USB 3.2 Gen 1 interface, please connect the device to USB 3.2 Gen 1 port and then restart the application.

- You need to install the latest version of DepthVista sample application from the Developer Resources website.

Make sure external power supply is connected and the device is connected to USB 3.2 Gen 1 Interface. Then in the DepthVista sample application, the preview window is black.

It seems like no image is received from the camera. Contact e-con Systems online support support@e-consystems.com.

Error: error while loading shared libraries: libdc1394.so.25: cannot open shared object file: No such file or directory

Warning: libdc1394.so.25, needed by /usr/lib/libopencv_world.so.4.2.0, not found

Run the following command in terminal to solve the issue.

```
sudo apt-get install libdc1394-25
```

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Think Camera. Think e-con.

FAQ

1. **Does external power supply require for this camera?**

   Yes, we need external power supply to get depth frames and it will be provided with the kit**.**

2. **What is the supported external power supply current ratings?**

   The supported external power supply current ratings are listed below.

   Input: AC 100-240v, 50/60HZ
   Output: DC 12V, 4A

3. **What is the current operating temperature range supported by DepthVista?**

   The current operating temperature range supported is 0**°**C to 50**°**C.

4. **What is the light source used in this camera?**

   This camera uses 2 VCSEL laser diodes that work in the NIR (Near InfraRed) spectrum (850nm) and is safe for human eyes.

5. **Can the depth range be improved further?**

   Yes. Depth range can be improved by changing the no of VCSEL LEDs and their intensity. This is going to involve a customization effort.

6. **Is DepthVista suitable for outdoor environment?**

   As the laser diodes used in this camera operate in the 850nm NIR range, the likelihood of interference from sunlight is very high if you use it in outdoor applications. Hence, this camera is more suitable for indoor environments.

7. **What's the maximum accuracy that can be achieved?**

   DepthVista offers an accuracy of <1%.

8. **Is the DepthVista camera pre-calibrated?**

   Yes, this camera is factory calibrated. Do not disturb the casing or the lens, which would alter the calibration done.

9. **What is the minimum distance that the lens could focus?**

   The minimum working distance (distance between the camera and the object) for this camera is 20 cm.

10. **Are these ToF and RGB sensors synchronized?**

Yes. Both these sensors work synchronously to make the best use of the depth and RGB data streams.

11. What is IMU?

Inertial Measurement Units (IMUs) is a self-contained system that measures linear and angular motion usually with a triad of gyroscopes and triad of accelerometers and sometimes the magnetic field surrounding the body, also magnetometers.

IMU chip used is a 6d of (degree of freedom) IMU (Inertial Measurement Unit) featured with triaxial accelerometer and triaxial gyroscope, supports different modes of configuration.

12. Why is this camera not supported in USB 2.0?

Due to Bandwidth limitations of RGB-D streaming in USB 2.0, this camera supports only USB 3.2 Gen1 speed.

13. What is the depth resolution and frame rate supported by DepthVista?

DepthVista supports a resolution of 640x480 at a frame rate of 30 fps for depth measurement.

14. What are the output formats supported by DepthVista camera?

The output formats supported by DepthVista camera are as follows:

Mode	Format
TOF	Y16(RAW 12-bit)
RGB	UYVY
RGB-D	Y16

15. What is DepthVista SDK?

DepthVista Software Development Kit (SDK) package is built on OpenCV(**opencv-4.2.0**) Images Processing Library is bundled with DepthVista USB 3.2 Camera. SDK currently uses C++ API's of OpenCV.

16. How to install the DepthVista?

DepthVista Installer package will be available with DepthVista deliverables. Follow the procedure in the document named *DepthVista_Windows_Installation_Manual.pdf* for Windows OS and *DepthVista_Linux_Installation_Manual.pdf* for Linux.

17. Do we share the DepthVista sample application source code?

Yes, DepthVista sample application source code will be shared along with the SDK.

18. What are the operating systems supported by DepthVista?

The operating systems are Windows 11, Windows 10, Ubuntu 18.04 Ubuntu 20.04 and Ubuntu 22.04.

19. What is the shutter type on the sensor?

Both the TOF and RGB camera sensors are global shutter sensor.

20. Does DepthVista comes with an enclosure?

Yes. This camera comes with a metal enclosure.

21. What is the lens used in the DepthVista camera – TOF and RGB?

The lens used in the camera is S-mount (M12).

Description	RGB Camera Lens	Depth Camera Lens
Focal Length	3.252mm	2.16mm
Diagonal FOV	90.09	99.75

22. What is the lens mount used?

The lens mount used in the DepthVista Camera reference design is S-mount M12 lens holder (M12 P0.5 lenses are supported by default).

23. What is calibration? Why should I do that?

In DepthVista camera, we do depth calibration. Depth calibration process is carried out to get the accurate depth from the depth camera. Once the depth calibration is completed, calibration result parameters are programmed to the memory allotted for calibration in the SPI-flash.

24. Can I get the depth of each and every pixel in the depth measurement resolution?

Yes, use the DepthVista sample application in the SDK, where the depth of the point selected by the you are displayed.

25. What are the warranty terms of DepthVista camera?

For warranty, please refer the warranty page.

After understanding the usage of DepthVista console application, you can refer to the following documents to understand more about DepthVista.

- DepthVista Windows Installation Manual
- DepthVista Linux Installation Manual
- DepthVista SDK API Manual

Glossary

SDK: DepthVista Software Development Kit

TOF: Time of Flight.

ROI: Region of Interest.

USB: Universal Serial Bus.

UVC Compliant: USB Video Class Compliant.

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

Revision History

Rev	Date	Description	Author
1.0	06-July-2022	Initial Draft	Camera Products
1.1	02-November-2022	Added Installation steps	Camera Products
1.2	04-November-2022	Modified Installation steps for Linux	Camera Products
1.3	18-May-2023	Document Update	Camera Products
1.4	05-June-2023	Document Update	Camera Products
1.5	15-June-2023	Document Update	Camera Products
1.6	20-January -2024	Added RGB-D Mapping	Camera Products
1.7	15-March-2024	Document Update	Camera Products
1.8	30-July-2024	Added Exposure control	Camera Products

DepthVista Console Application User Manual