



LIPSedge™ AE400 / 450

Ruggedized 3D Stereo Camera

User's Manual

June 2026
Revision 1.0



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June 2026

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Revision History

Revision	Description	Date
1.2.3	Content refactoring.	2026/6/15
1.2.2	Support IMU feature 5.1 B (pg 83). Edited images in 19, and 83 to 89	2025/12/22
1.2.1	1. Change the depthviewer drawing from page 27 to page 30. 2. Modified the sample naming from pages 82 to 89.	2024/07/30
1.2	Add the Linux x64& Jetson arm64 installation guide in Chapter3 3.1-B & Chapter3 3.1-C.	2024/04/19
1.1	Re-Modified the User Guide Frame	2024/03/08

1. Package & Hardware Overview

1.1 Package Overview

A. Packing List

The packing list serves as a reference for package contents. If anything is missing, contact info@lips-hci.com.

No.	Item	Qty.
1.	LIPSedge™ AE400 / AE450 3D Stereo Camera	1
2.	LIPSedge™ AE400/ AE450 3D Stereo Camera Quick Start Guide	1

B. Camera Accessories

The following supplementary options facilitate the installation process but are **NOT** included in the package. Prepare the following accessories before proceeding to the installation process:

- **Camera tripod:** Secures the camera to a stable position.

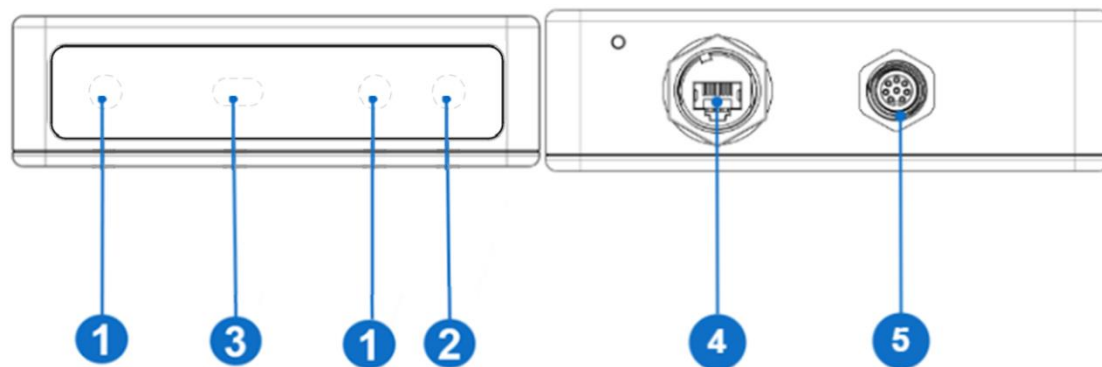
C. Supplementary Options

This section is **NOT** applicable to this model.

1.2 Hardware Overview

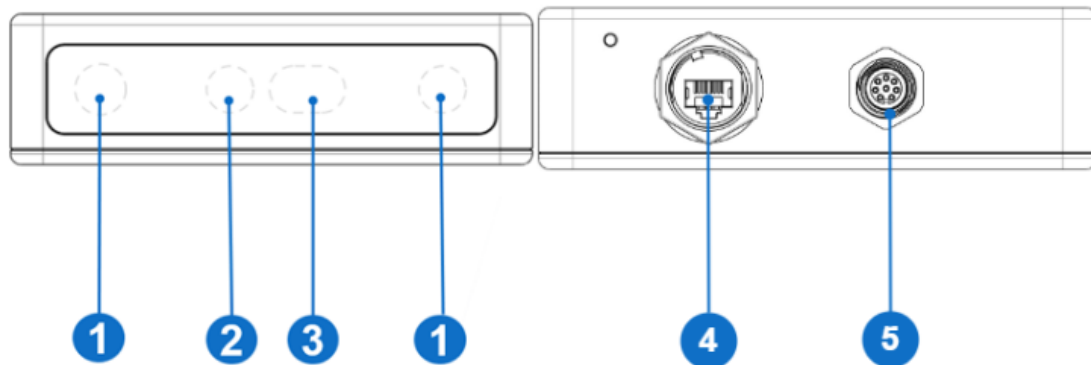
A. Hardware Features

LIPSedge™ AE400



No.	Name	Functions
1.	IR Stereo Sensor	Receives the IR image.
2.	RGB Sensor	Receives the RGB image.
3.	Infrared Projector	Projecting a static infrared pattern.
4.	Ethernet Interface	Provides power and data transmission through Cat-5e ethernet cables.
5.	M12 Connector	Connects to an M12 cable for power input or Ethernet reset.
Note: Do NOT obscure or block the openings of the camera's optical components to ensure the optimal performance of the camera.		

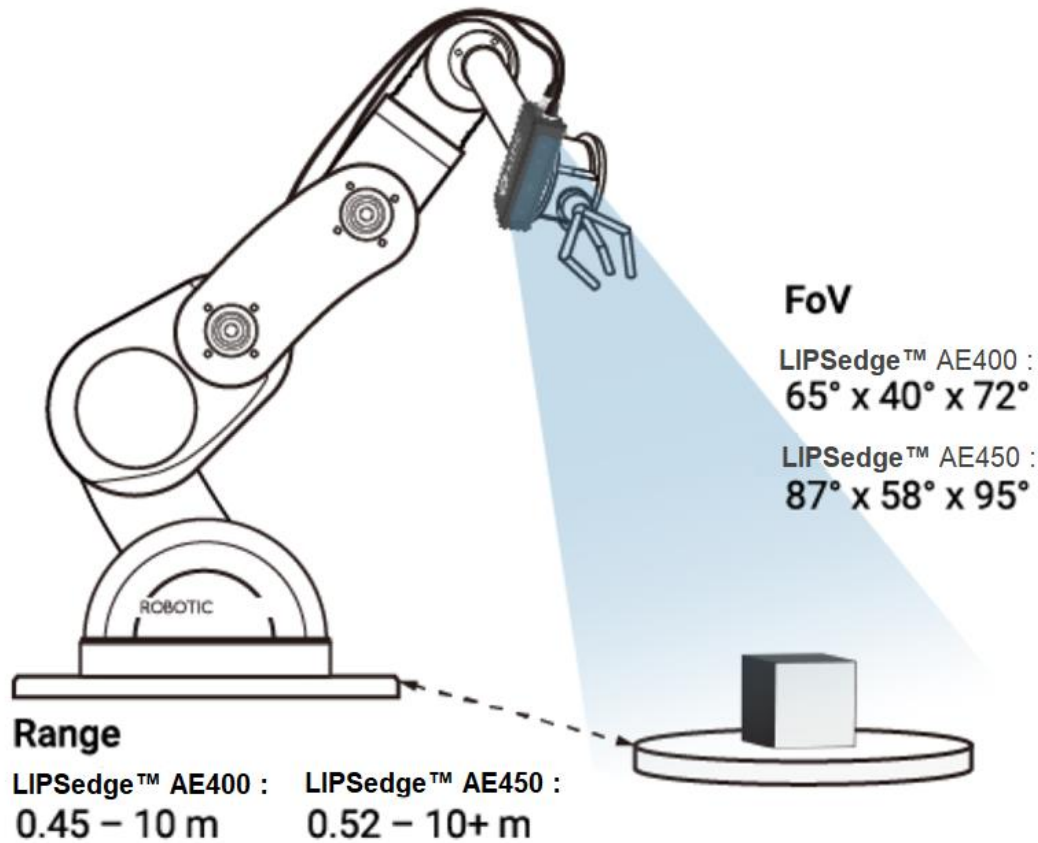
LIPSedge™ AE450



No.	Name	Functions
6.	IR Stereo Sensor	Receives the IR image.
7.	RGB Sensor	Receives the RGB image.
8.	Infrared Projector	Projecting a static infrared pattern.
9.	Ethernet Interface	Provides power and data transmission through Cat-5e ethernet cables.
10.	M12 Connector	Connects to an M12 cable for power input or Ethernet reset.
Note: Do NOT obscure or block the openings of the camera's optical components to ensure the optimal performance of the camera.		



B. Hardware Installation

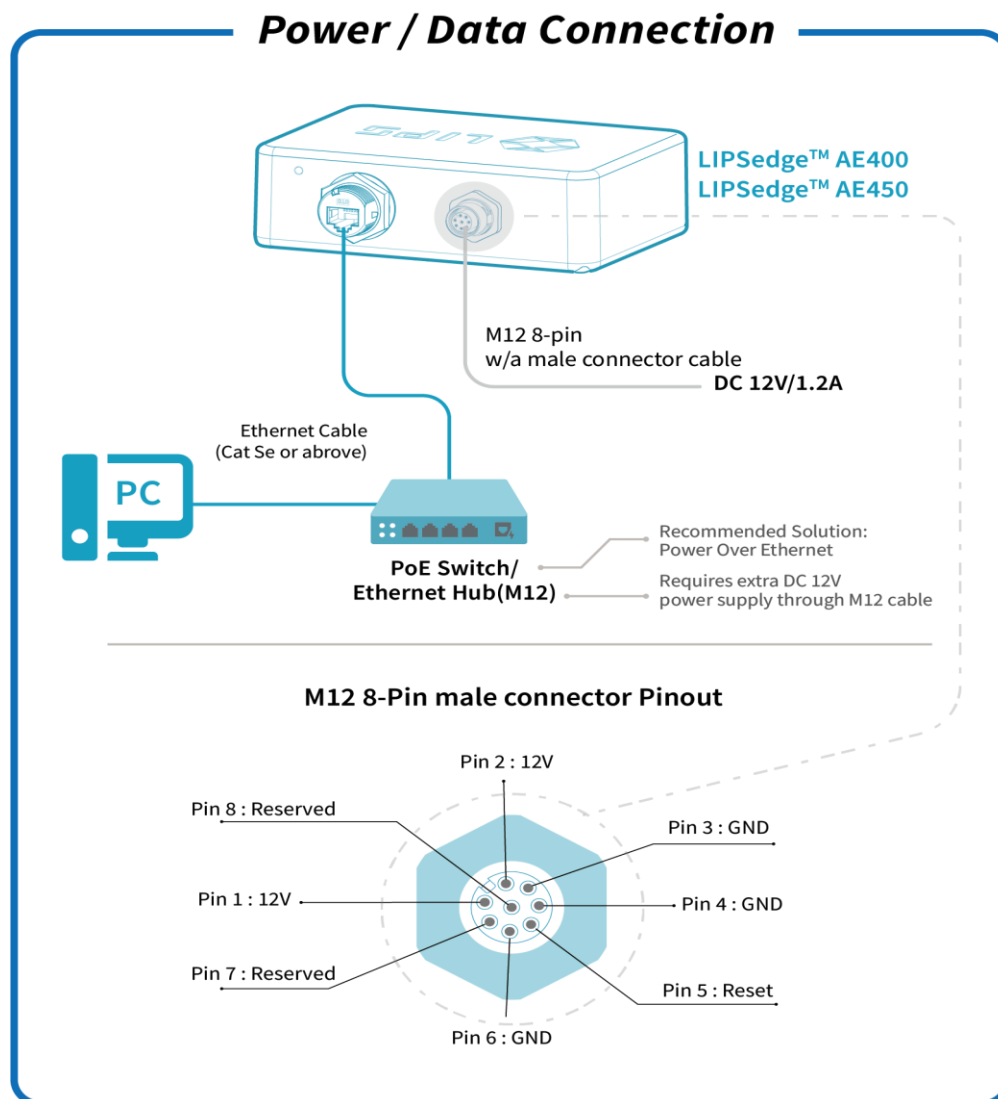


- ◆ **Camera working distance:** LIPSedge™ AE400 / AE450 works best within the following range:
 - LIPSedge™ AE400: 0.45 – 10 m
 - LIPSedge™ AE450: 0.52 – 10+ mKeep the target within the optimal range or the scanning performance may decrease.
- ◆ **Camera position:** Install the camera to a stable platform, facing the target. Note that LIPS Corp. does **NOT** provide a tripod within the package, and you need to get your own tripod for hardware installation.
- ◆ **Illumination:** **AVOID** installing the camera at places under direct sunlight or complete darkness.

C. Camera Connection

LIPSedge™ AE400 / AE450 has two power supply channels: **PoE (Power over Ethernet)** or **M12 interface**. We recommend using **PoE** as the standard scenario. An M12 cable can optionally be used to separate the power supply/data transmission channel.

WARNING: When shipped, a thin layer of film is applied to the camera lens for protective purposes. Remove the film **ONLY** when you are ready to use the camera. Keeping the thin film while streaming may decrease the image quality.



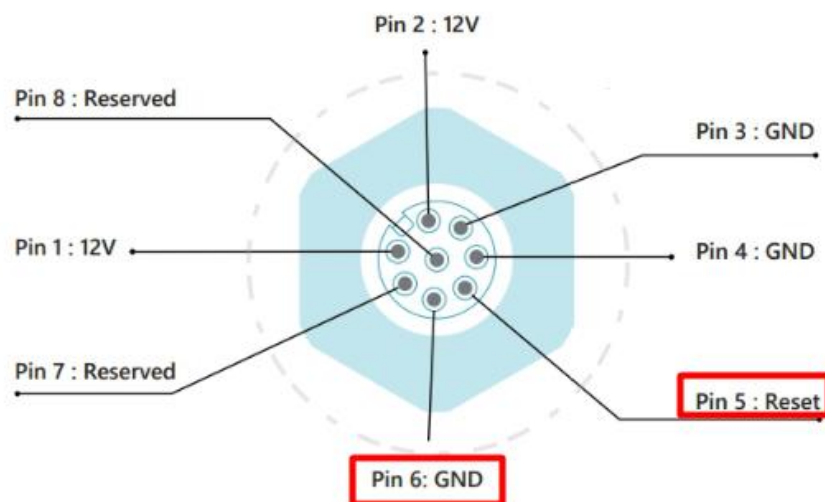
Power M12 A-Code Male connector

Pin no.	Description
1	DC 12V Power supply
2	DC 12V Power supply
3	GND
4	GND
5	Ethernet Reset
6	GND
7	Reserve
8	Reserve

[Hardware reset]

A factory reset erases all customized configurations and returns the camera to its default settings. Adjusting camera settings results in irreversible issues, so a factory reset can be performed by simultaneously shorting **Pin 5 (Reset)** and **Pin 6 (Ground)** in the M12 interface.

M12 8-Pin male connector Pinout

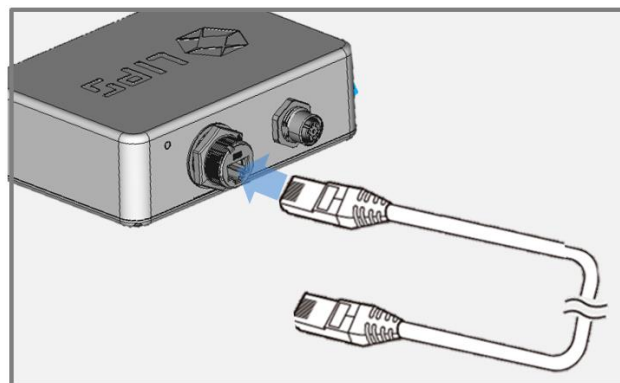


1. Insert a pin into **the camera's Pin 5 (Reset) and Pin 6 (Ground)** and **hold 30 seconds**.

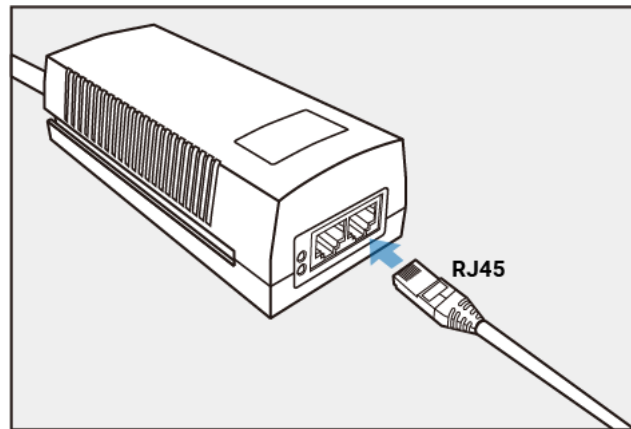


Note: It is essential to maintain the pin/camera connection for the full 30 seconds to allow the camera's reset process to complete. If the pin was released prematurely, the reset may not be successful.

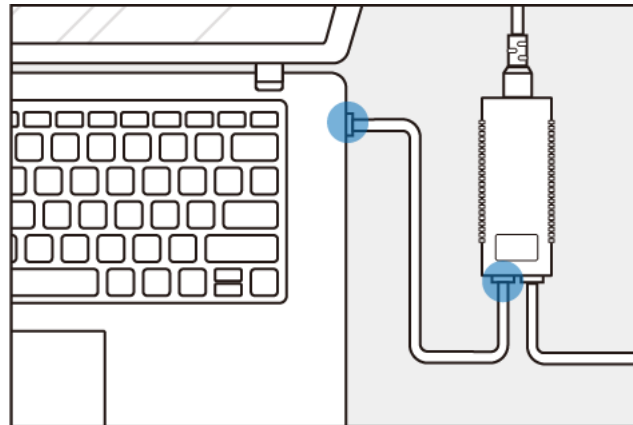
2. Replug the camera. The camera is restored to its default settings.
Follow the instructions below to set up the LIPSedge™ AE400 / AE450.
3. Connect the **RJ45 Ethernet cable** to the camera's **POE connector**.



4. Connect the **RJ45 end** of the **Ethernet cable** to the **PoE switch's Power / Data Output port**.



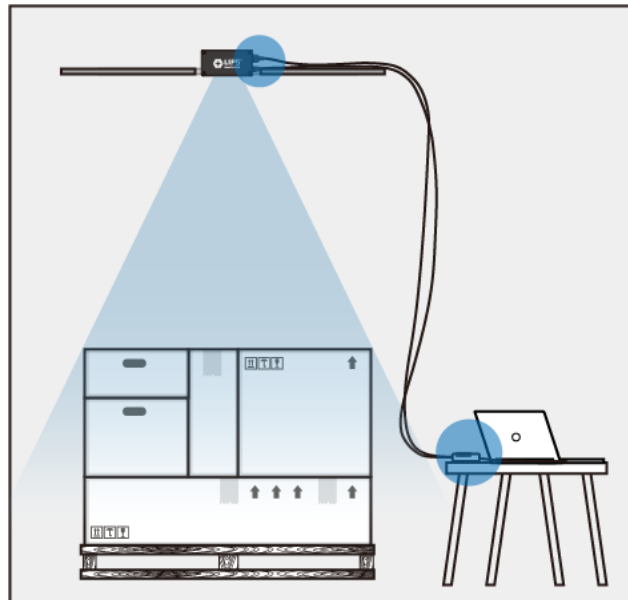
5. Connect the **Data Input Port** of the PoE Switch with **your PC / laptop**.



D. Mounting Options

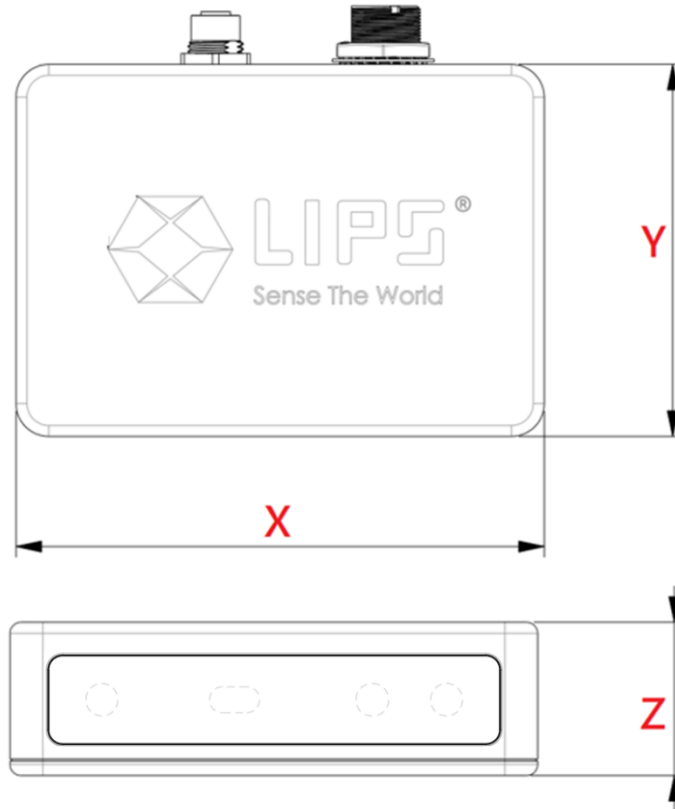
LIPSedge™ AE400 / AE450 supports an **overhead mount**.

1. Find an installation location on your ceiling and drill a hole.
2. Use a camera holder to secure the camera to the installation location.
3. To connect the camera to your PC or laptop through the PoE Switch, refer to the installation process in *Chapter 1 1.2-C*.



E. Hardware Dimensions

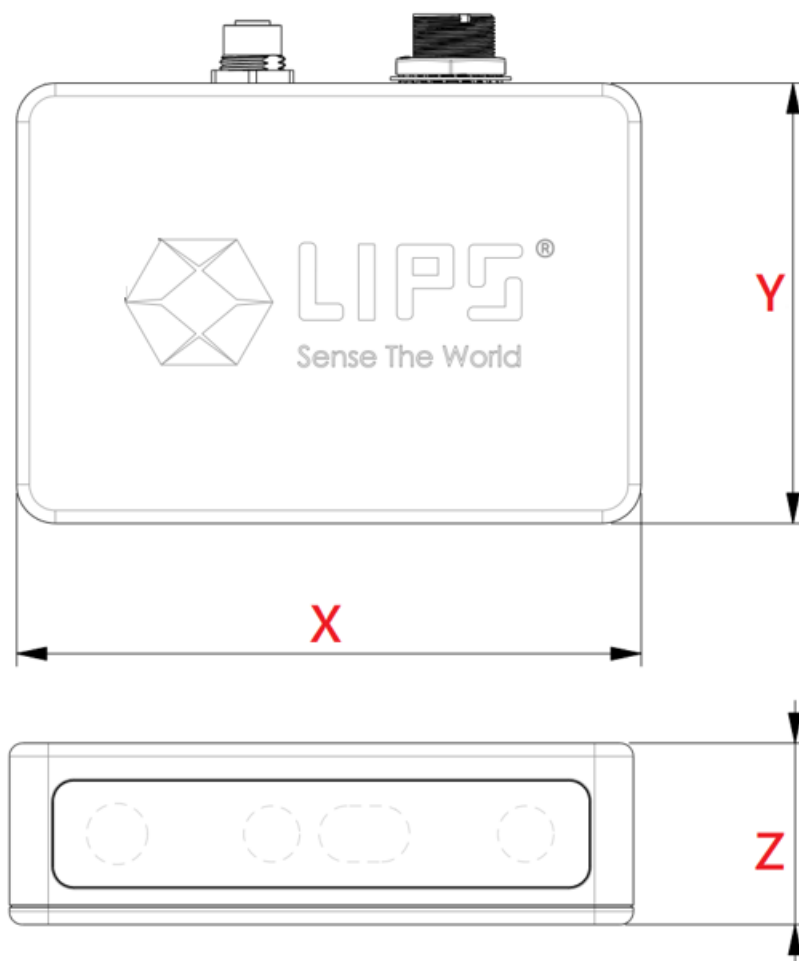
LIPSedge™ AE400



Dimension	MIN	NOM	MAX	TOLERANCE	UNIT
X	134.5	135	135.5	±0.5	mm
Y	95.5	96	96.5	±0.5	mm
Z	41.5	42	42.5	±0.5	mm



LIPSedge™ AE450



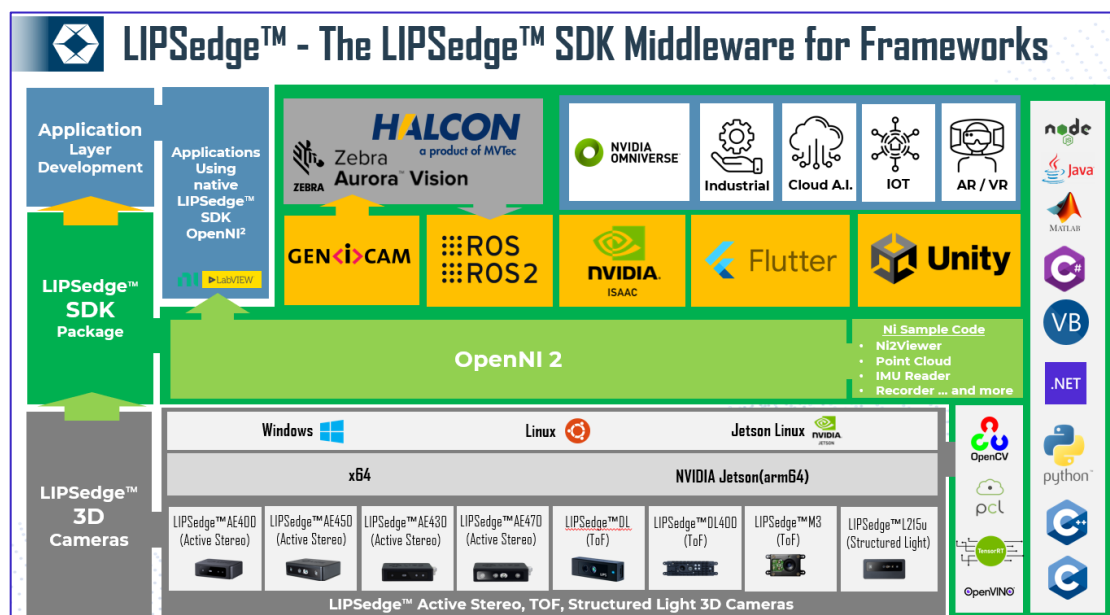
Dimension	MIN	NOM	MAX	TOLERANCE	UNIT
X	144.5	145	145.5	±0.5	mm
Y	101.5	102	102.5	±0.5	mm
Z	41.5	42	42.5	±0.5	mm

2. SDK Structure

LIPS 3D camera / SDK offers a system for developing depth-sensing applications. As the LIPS system architecture illustrates, the system comprises the hardware and software layers.

The hardware layer oversees data capture, transfer, and processes.

In the software layer, the captured data is fetched by the LIPS SDK (Software Development Kit) on the OS environment. Depending on the project's complexity, wrappers, and third-party utilities may be engaged before the data is eventually presented in the application layer for business applications.



The system's core, the LIPS SDK, is comparable to a toolbox full of software modules comprised of middleware, libraries, wrappers and APIs, and miscellaneous programming languages/platforms for application development. With extensive wrapper support, the LIPS SDK enables developers to access bottom-layer data with APIs, thus eliminating the hassle of changing third-party functions. The result is a highly effective project scoping, monitoring, and execution workflow compatible with the fast-pacing AIoT market and machine vision demands.

3. SDK Installation

3.1 Platforms

A. Windows Installation (x64)

a. SDK Installation

To access the SDK, visit [3D Depth Camera SDK Free Download | LIPSedge™ SDK \(lips-hci.com\)](https://www.lips-hci.com) and procure the package for the preferred version, framework, and compatible operating system.

1. Visit [LIPSedge™ SDK](https://www.lips-hci.com) website.
2. Under **LIPSedge™ Camera SDK**, select SDK file to download the installation file based on the preferred version, framework, and compatible operating system.

Note: For each LIPSedge™ 3D Camera User Manual refer to the respective product document

- Video Presentation ([Link](#))

Download the LIPSedge™ SDK as below

v1.1.1

- [Windows](#)
- [Linux](#)

Release Notes

- [Release Note](#)

v1.1.0

v1.02

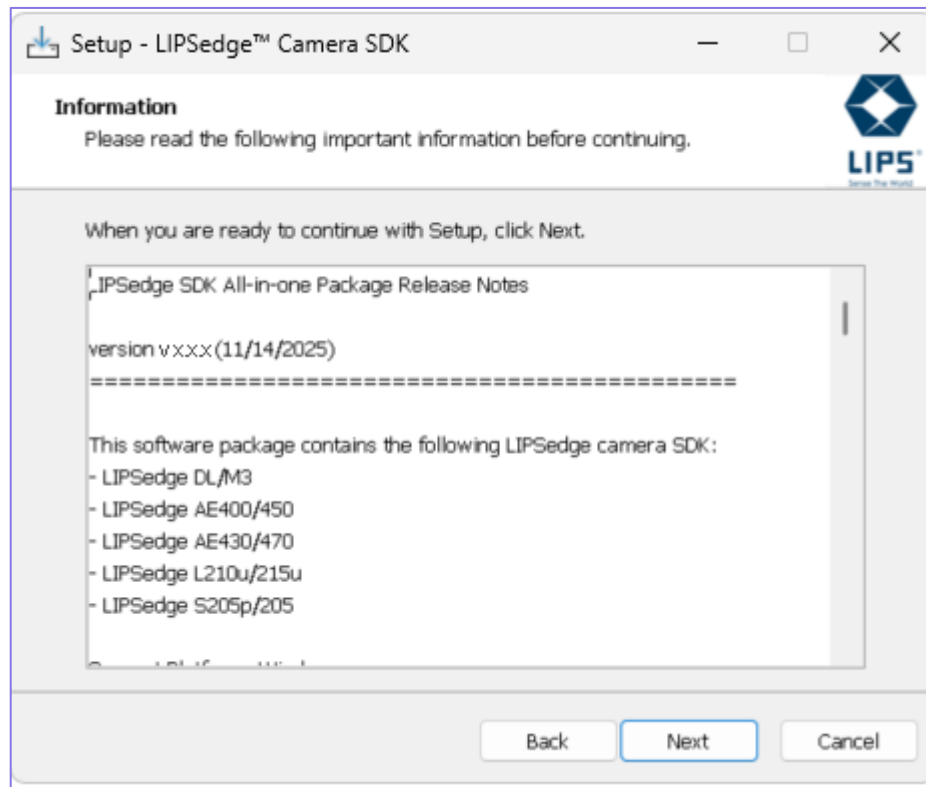
3. Extract and execute the downloaded file.

Desktop		
Name	Type	Date modified
 LIPSedge-Camera-SDK-Win64-1.X.X.exe	Application	2023/9/27 2:11 PM

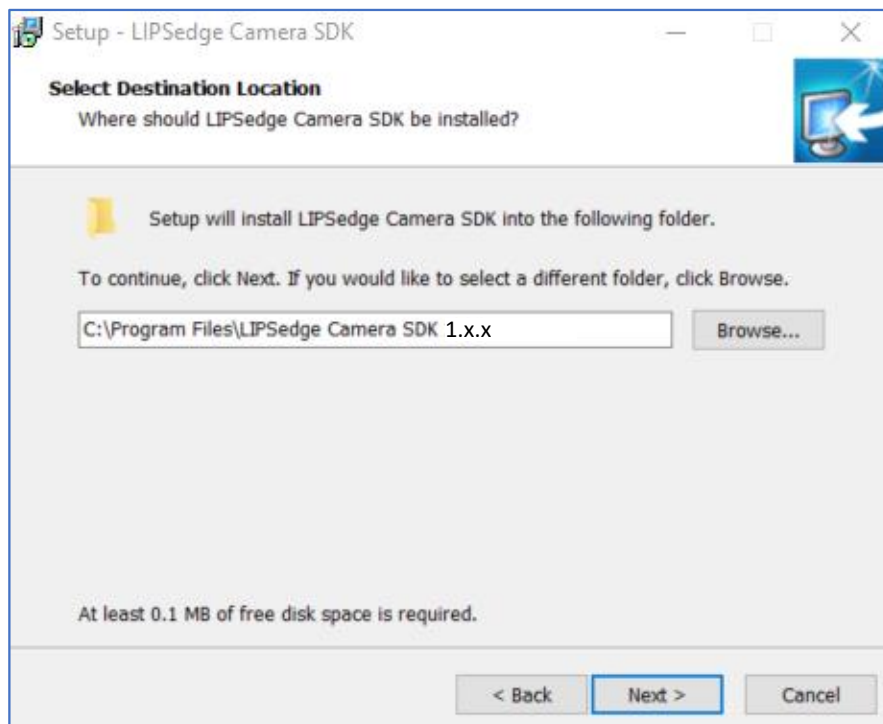
4. Click **Next**.



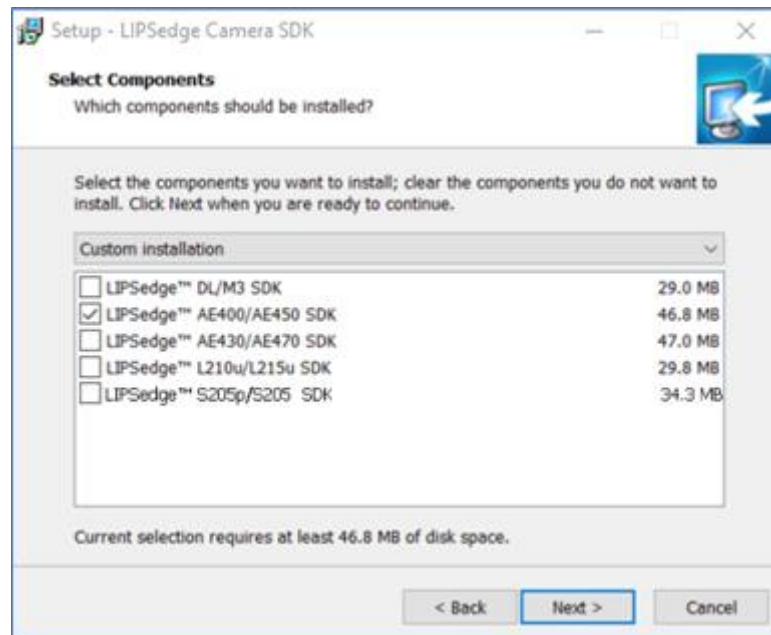
5. Click **Next**.



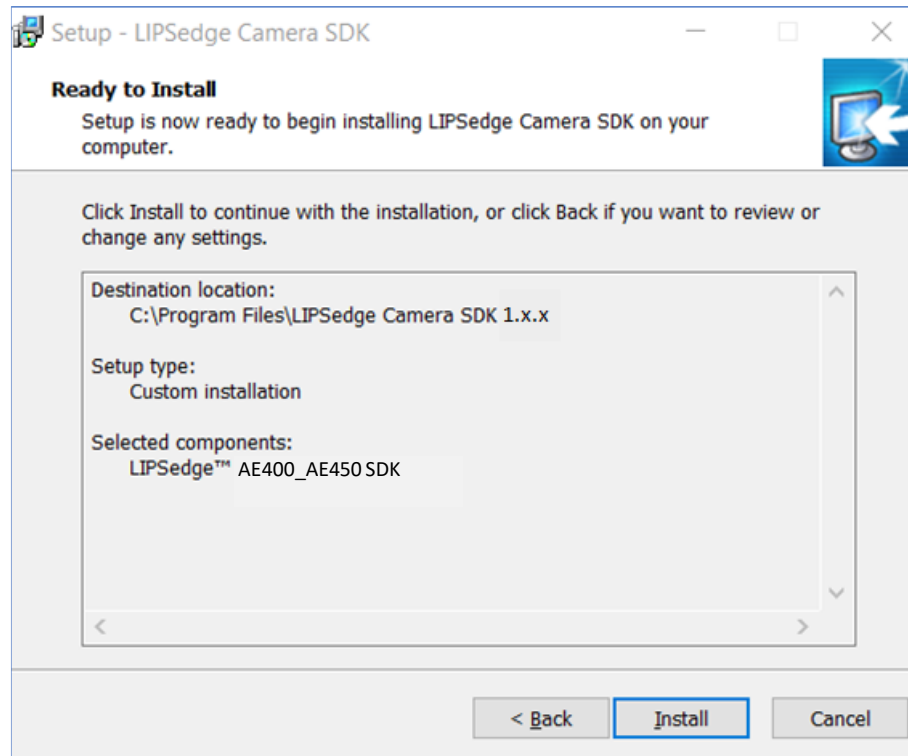
6. Select the **SDK installation location** and click **Next**.



7. From the top menu, select the type of installation for the host PC. In this case, Selecting Custom Installation > LIPSedge™ AE400 / AE450 SDK is recommended.
 - **Full Installation:** Install all LIPSedge™ SDKs with all system dependencies for all available LIPSedge™ camera models.
 - **Compact Installations:** Install LIPSedge™ SDK with minimum system dependencies for the chosen model.
 - **Custom Installation:** Install LIPSedge™ SDK with limited functionality for the chosen model.



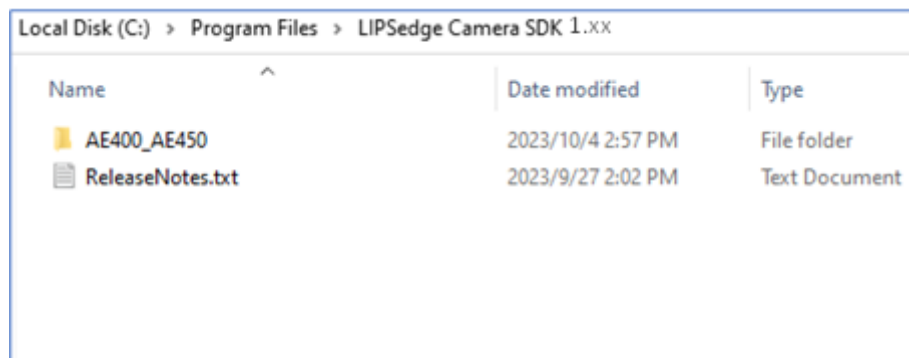
8. Click **Install**.



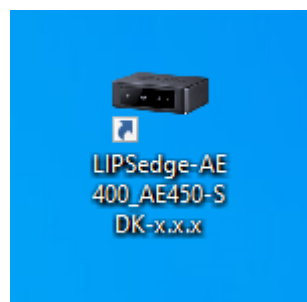
9. Click **Finish**.



10. Once the installation is successful, the LIPSedge™ SDK and its relevant components is accessible at C:\Program Files\LIPSedge Camera SDK 1.xx.



11. The LIPSedge™ SDK is also accessible from the desktop shortcut.



12. The desktop shortcut folder contains:

- **Browse LIPSedge SDK Samples:** A link to [LIPS Corp.'s GitHub for example applications](#)
- **Browse LIPSedge SDK Wrappers:** Link to [LIPS Corp.'s GitHub for the supported wrapper's source code.](#)
- **Download Latest SDK:** Link to [LIPS Corp's official website for the latest SDK](#)
- **LIPS tools source code:** Contains a series of executable tools and the source code of these tools.
- **lips-hci.com:** Link to LIPS Corp's official website.
- **DepthViewer:** An image viewer for streaming RGB / depth images. Refer to *Chapter3 3.1-A-c.*
- **OpenNI2 Programming API:** A link to OpenNI API's programming guide.
- **Release Notes:** Announcement of the latest feature.
- **Run LIPS tools:** Contains a series of executable tools.
- **Uninstall LIPSedge™ SDK:** A quick uninstallation link for LIPSedge™ SDK.

Name	Date modified	Type	Size
 Download LIPSedge™ SDK	11/18/2025 9:20 AM	Internet Shortcut	1 KB
 LIPS® Developer Resources	11/18/2025 9:20 AM	Internet Shortcut	1 KB
 lips-hci.com	11/18/2025 9:20 AM	Internet Shortcut	1 KB
 SDK Samples on GitHub	11/18/2025 9:20 AM	Internet Shortcut	1 KB
 Software Wrappers on GitHub	11/18/2025 9:20 AM	Internet Shortcut	1 KB
 DepthViewer	11/18/2025 9:20 AM	Shortcut	2 KB
 PointCloudViewer	11/18/2025 9:20 AM	Shortcut	2 KB
 Programming API for C++	11/18/2025 9:20 AM	Shortcut	2 KB
 ReleaseNotes.txt	11/18/2025 9:20 AM	Shortcut	2 KB
 Run LIPSedge™ SDK Samples	11/18/2025 9:20 AM	Shortcut	3 KB
 Run LIPSedge™ SDK Tools	11/18/2025 9:20 AM	Shortcut	3 KB
 SDK Contents	11/18/2025 9:20 AM	Shortcut	2 KB
 SDK Samples for C++	11/18/2025 9:20 AM	Shortcut	2 KB
 Uninstall LIPSedge™ AE400_AE450 SDK 1.1.0	11/18/2025 10:34 AM	Shortcut	2 KB

b. Camera Access

The LIPSedge™ AE400 / AE450 SDK enables the LIPSedge™ AE400 / AE450 camera to stream live 3D, RGB, and point-cloud images efficiently. The SDK supports a **single stream**. To ensure a seamless visualization experience, follow the instructions for configuring the camera's IP settings before streaming.

Follow the instructions below to access the camera image.

1. Go to **LIPSedge™ AE400_AE450 SDK > OpenNI2 > Tools** and click **lips-ae400-toolkit**.

Name	Date modified	Type	Size
OpenNI2	7/19/2024 2:35 PM	File folder	
DepthViewer	7/1/2024 6:37 PM	Application	232 KB
glut64.dll	2/23/2024 5:07 PM	Application exten...	267 KB
lips-ae400-toolkit	7/11/2024 4:29 PM	Application	377 KB
OpenNI	2/23/2024 5:24 PM	Configuration sett...	1 KB
OpenNI2.dll	6/18/2024 8:11 PM	Application exten...	311 KB
PointCloudViewer	6/28/2024 6:26 PM	Application	415 KB
RawFileViewer	6/28/2024 1:18 PM	Application	603 KB
realsense2.dll	7/11/2024 4:28 PM	Application exten...	21,132 KB
realsense2-gl.dll	7/11/2024 4:15 PM	Application exten...	2,554 KB
rs-depth-quality	7/11/2024 4:29 PM	Application	17,077 KB

2. Wait for the toolkit to search for available cameras in the subnet.

```

C:\Program Files\LIPSedge Camera SDK\AE430_AE470\OpenNI2\Tools>lips-ae400-toolkit
Scanning your network to find AE4XX ...
(this may take 10~20 secs)

===== Scan Result =====

IP address   = 192.168.0.100
Version      = v5.13.0.50.12
Description  = LIPSedge AE4XX/2700LN1700005/3C:FA:D3:70:05:41

===== Scan End =====

Press any key to continue . . .
  
```

- If the device IP changes, find **network.json** in **LIPSedge™ AE400_AE450 SDK\OpenNI2\Tools\OpenNI2\Drivers**

Name	Date modified	Type	Size
LIPSedge-AE400_AE450.dll	7/11/2024 4:29 PM	Application exten...	168 KB
LIPSedge-AE400_AE450	7/9/2024 7:30 PM	JSON File	2 KB
network	7/4/2024 7:45 PM	JSON File	1 KB
OniFile.dll	6/18/2024 8:11 PM	Application exten...	245 KB
OniFile	2/23/2024 5:07 PM	Configuration sett...	1 KB
realsense2.dll	7/11/2024 4:29 PM	Application exten...	21,132 KB

Note:

- LIPSedge™ AE400 / AE450 is assigned a default IP address of **192.168.0.100**. For camera connection, ensure the host PC / laptop is under the same subnet as the camera.
 - On rare occasions, the application may not be able to detect the camera when a new camera is connected. In that case, **unplug the network cable restart** the host PC / laptop, and scan again.
- Edit **network.json** to modify the camera's IP address (IP1) to match the camera intended for connection.

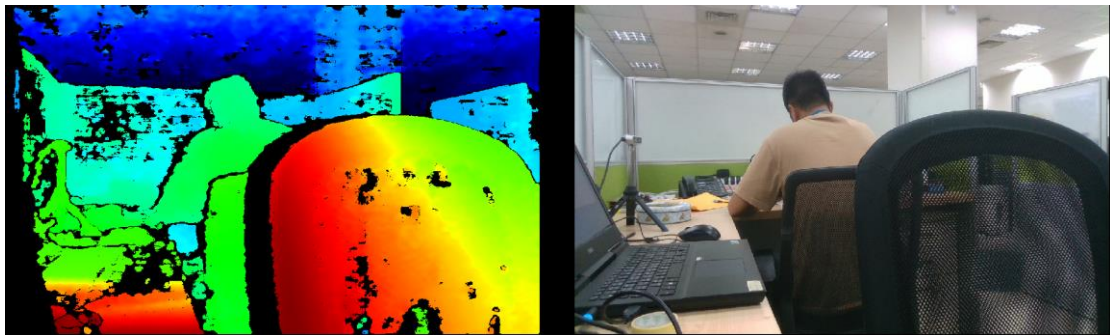
```
*network - Notepad
File Edit Format View Help
{
  "count": "1",
  "config": {
    "ip1": "192.168.0.100"
  }
}
```

- Save the modified information.

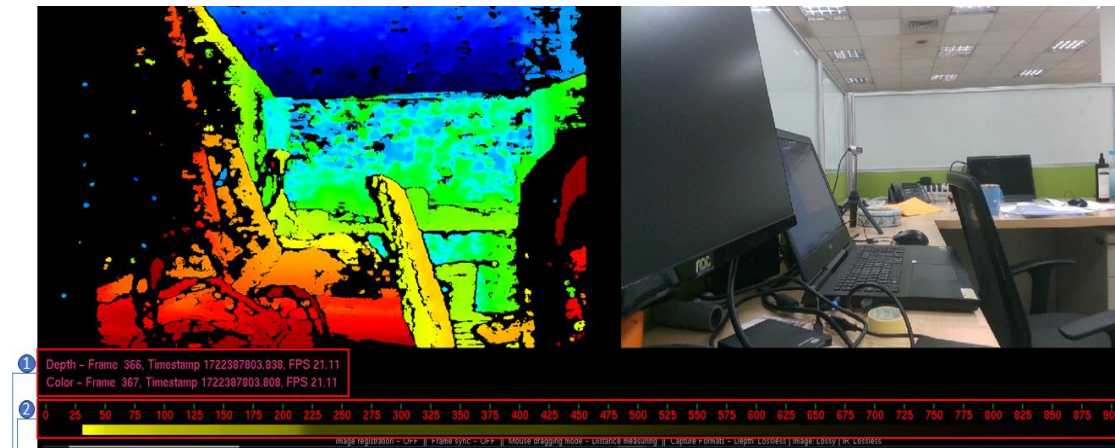
6. Go to **LIPSedge™ AE400_AE450 SDK > OpenNI2 > Tools** and start **DepthViewer**.

Name	Date modified	Type	Size
OpenNI2	7/19/2024 2:35 PM	File folder	
DepthViewer	7/1/2024 6:37 PM	Application	232 KB
glut64.dll	2/23/2024 5:07 PM	Application exten...	267 KB
lips-ae400-toolkit	7/11/2024 4:29 PM	Application	377 KB
OpenNI	2/23/2024 5:24 PM	Configuration sett...	1 KB
OpenNI2.dll	6/18/2024 8:11 PM	Application exten...	311 KB
PointCloudViewer	6/28/2024 6:26 PM	Application	415 KB
RawFileViewer	6/28/2024 1:18 PM	Application	603 KB
realsense2.dll	7/11/2024 4:28 PM	Application exten...	21,132 KB
realsense2-gl.dll	7/11/2024 4:15 PM	Application exten...	2,554 KB
rs-depth-quality	7/11/2024 4:29 PM	Application	17,077 KB

7. DepthViewer will display 3D / RGB images once the camera is properly connected.
The different colors in the depth images represent different distances. The distance from near to far will be represented by red, yellow, green, and blue, respectively.



8. Press **[p]** to activate **the pointer mode**. The meter below shows the depth data of the given point marked by the indicator.



Information includes Depth & RGB: Frame/ TimeStamp/ FPS

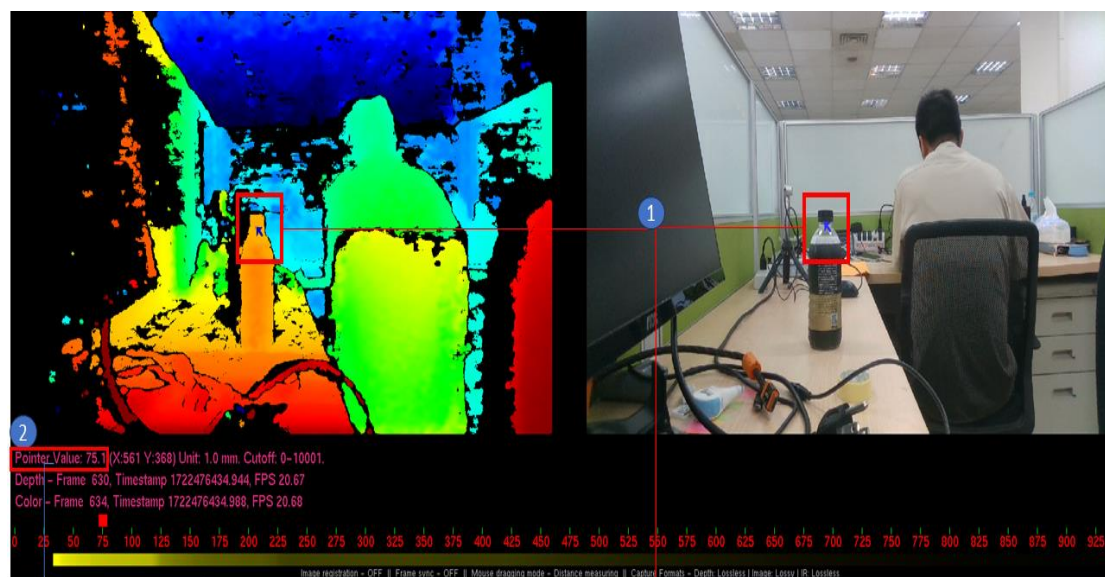
The scale means distance: Size is from 0 to 950mm

- The yellow bar represents the distance range from all objects in the depth viewer.
- The deep yellow bar represents the distance that includes many objects.
- The slight yellow bar represents the distance that includes fewer objects.

Example:

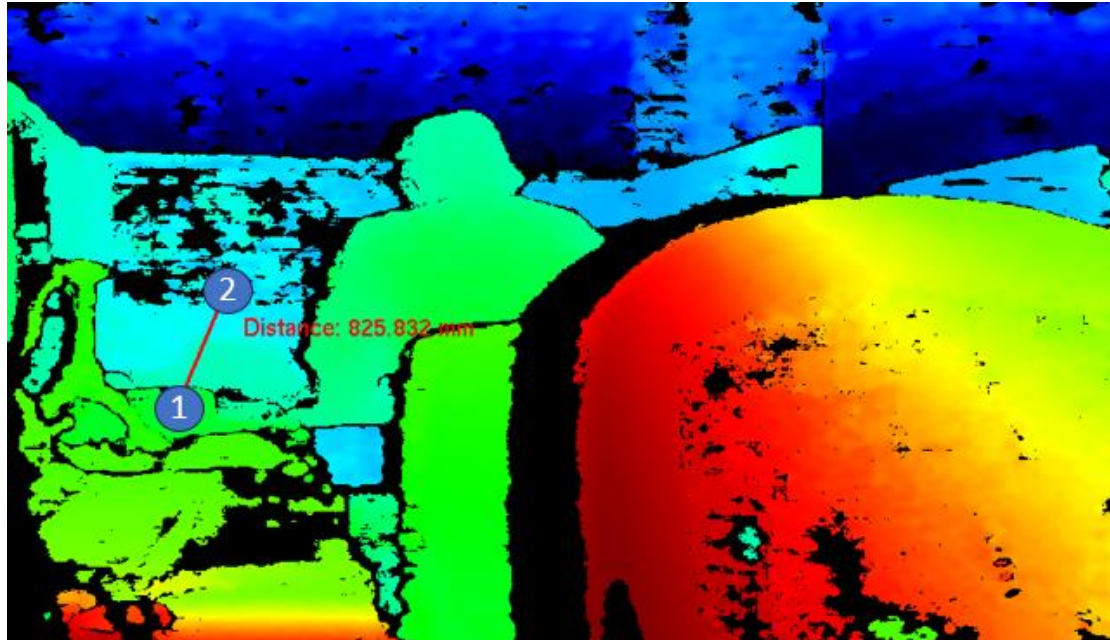
The above scene shows the object's distance from 25mm to 575mm, which 25mm to 225mm include many objects, from 225 to 575mm shows fewer objects.

9. Users can get the depth value by Moving the blue cursor to the object.



Move the blue cursor to the object; Users can get the distance from the pointer value.

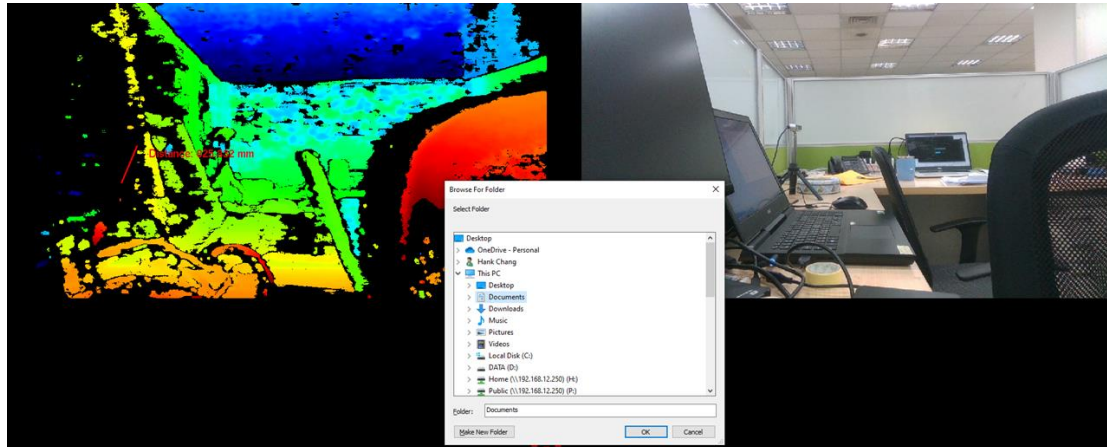
10. If users want to measure the distance between 2 points, please drag a mouse cursor from point 1 to point 2, as below. (The distance line will disappear when points move to the black area.)



11. Optionally press F to maximize/minimize the viewer's window.

Note: If the Ethernet cable is forcibly removed while the DepthViewer is functioning, an ERROR! The device disconnected message appears on the screen. To resume live streaming, re-plug the Ethernet cable and restart the DepthViewer.

12. Press C to capture the current screen as a raw file. To access the raw file, go to **LIPSedge™ AE400_450 SDK > OpenNI2 > Tools** and drag the captured image file to the RawFileViewer.exe. For details, refer to *Chapter 5 5.1-F*.

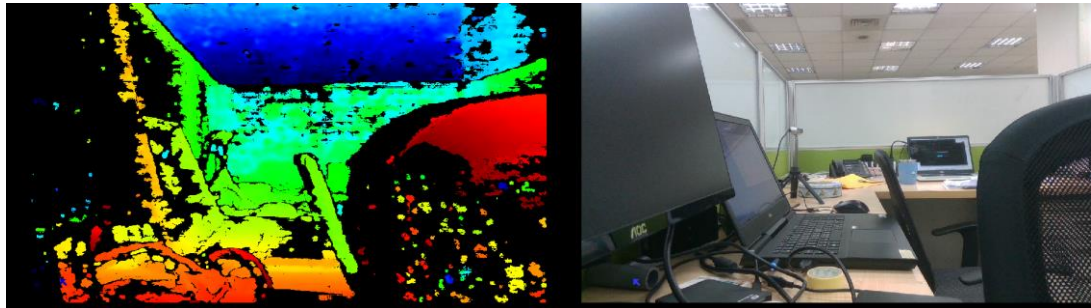


Press "c." A window will pop up,
and users can choose any folder with authority to save the depth/RGB raw data.

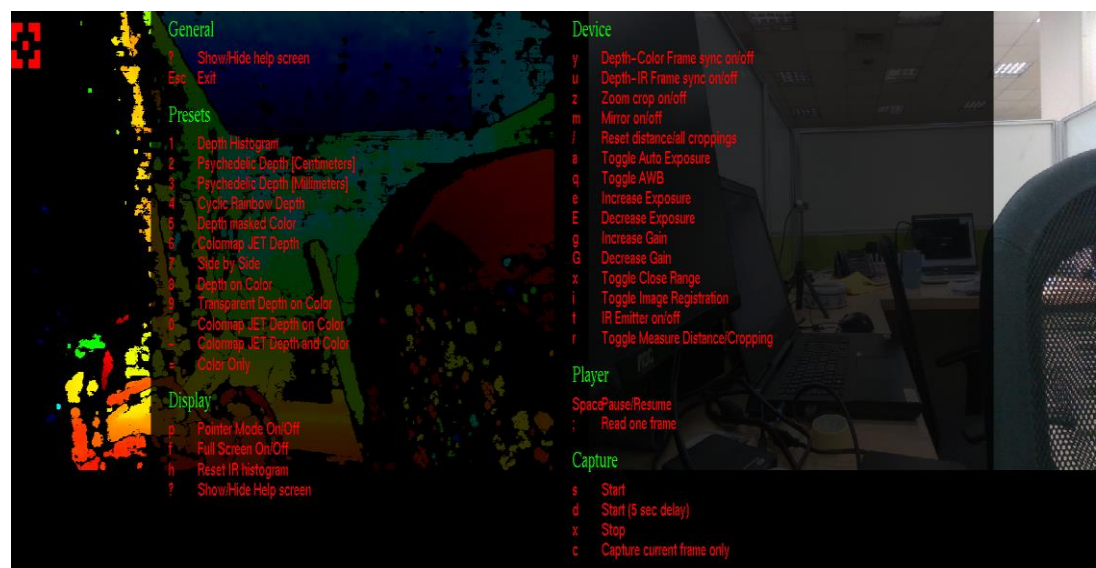
c. DepthViewer Settings

DepthViewer relies on hotkeys, listed in the help menu, to control its functionality and adjustments. By default, the menu in DepthViewer is hidden to provide an unobstructed viewing experience. To access this menu, press Shift + ?.

default – The help menu is hidden



The help menu is displayed (Press “Shift + ?”)



The help menu provides the following functionalities:

General

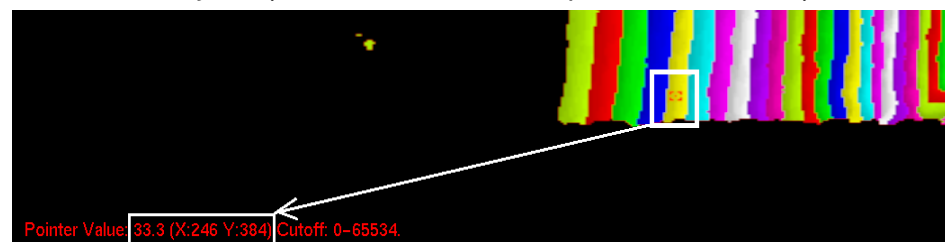
- ◆ **Show / Hide Help Screen [Shift + ?]:** The Help Screen describes keyboard shortcuts and their functions.
- ◆ **Esc:** Exits the DepthViewer.

Preset

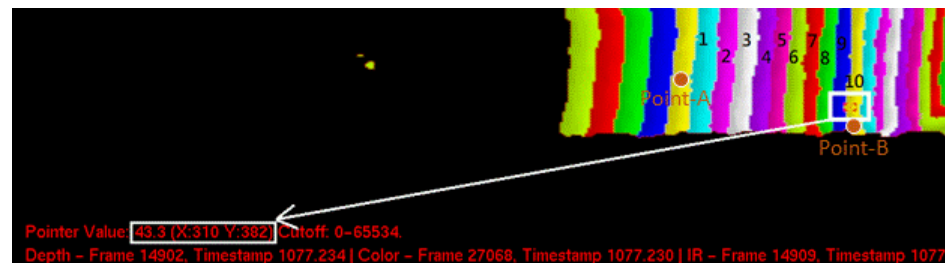
- ◆ **Preset:** Displays the depth/color images in 11 styles. Press the hotkey mentioned by the screen hint to select the image styles. By default, depth/color images are displayed **Side By Side**. In this example, LIPS Corp. demonstrates a way to assess the depth image quality using the psychedelic depth style with the pointer mode [p].

- **Psychedelic depth [3]:** Visualizes the depth images in a psychedelic style, aiding in the evaluation of image capturing presentation and quality.

The value below, 33.3, represents the depth value from the camera lens to the object. (The unit is cm. X&Y represent ordinate.)

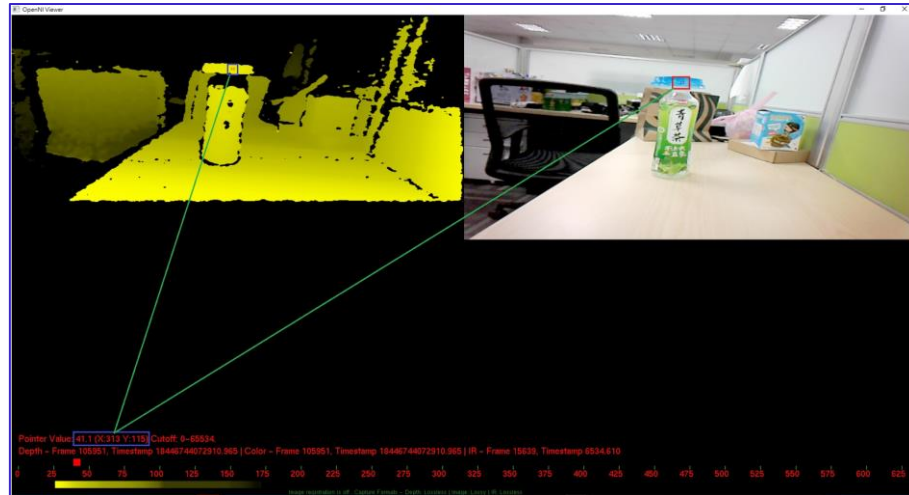


There will be 9 intervals from one color area to the same one-color area; each interval means 1cm unit. This means the depth value will increase by 10cm from one color area to the same color. For example, the depth value will become 43.3 from Point A to Point B.



Display

- ◆ **Pointer Mode On / Off [p]:** This enables **Pointer Mode** to show a red dot, which indicates the depth value (unit: cm), representing the distance from the camera lens to the object at a specific point on the image.



- ◆ **Full Screen On / Off [f]:** This option displays the camera images in full screen or turns off the full-screen display.
- ◆ **Reset IR histogram [h]:** Clears the IR histogram.
- ◆ **Show/hide help screen [?]:** The Help Screen contains a description of keyboard shortcuts and their functions.

Device

- ◆ **Depth-Color Frame Sync [y]:** Synchronize the timing between depth/color images.
- ◆ **Depth-IR Frame Sync [u]:** Synchronize the timing between depth/color images.
- ◆ **Zoom crop on/off [z]:** Enable/disable a cropping mode that magnifies the displayed area, focusing on a specific image region.
- ◆ **Mirror All [m]:** Flips the streaming image horizontally for every stream.
- ◆ **Reset all croppings [/]:** Reset the cropping area previously assigned.
- ◆ **Toggle Auto Exposure [a]:** Automatically adjusts exposure settings for optimal image quality.
- ◆ **Toggle AWB [q]:** Enables or disables automatic white balance adjustment.
- ◆ **Increase Exposure [e]:** Raises the camera's exposure level for brighter images.

- ◆ **Decrease Exposure [E]:** Lowers the camera's exposure level for darker images.
- ◆ **Increase Gain [g]:** Enhances image brightness by increasing the camera's gain.
- ◆ **Decrease Gain [G]:** Reduces gain to control image brightness.
- ◆ **Toggle Close Range [x]:** Toggles between close-range and default focus settings.
- ◆ **Toggle Image Registration [i]:** Activates or deactivates image registration.
- ◆ **IR Emitter On / Off [t]:** Turns the infrared emitter on or off for depth image capture.

Player

- ◆ **Pause / Resume [Space]:** Pauses the playback of the recording or resumes playback.
- ◆ **Read one Frame [;]:** This function appears only when the playback is paused. Click to load the playback image of the next frame.

Capture

- ◆ **Start [s]:** Assign a path to save the recording files and start recording images.
- ◆ **Start (5 sec delay) [d]:** Recording images 5 seconds upon clicking this function.
- ◆ **Stop [x]:** Stops recording camera image.
- ◆ **Capture current frame only [c]:** Saves the current frame as an image file.

d. IP Address Configuration

The LIPSedge™ AE400 / AE450 comes with a default IP address of **192.168.0.100**. However, exceptions may exist where the camera's IP address differs from the default setting. In such cases, LIPS Corp. offers a LIPSedge™ AE400 / AE450 SDK Toolkit to facilitate IP address detection and access to camera images. Detected camera IP addresses should be saved in a **network.json file** and placed in the following folder:

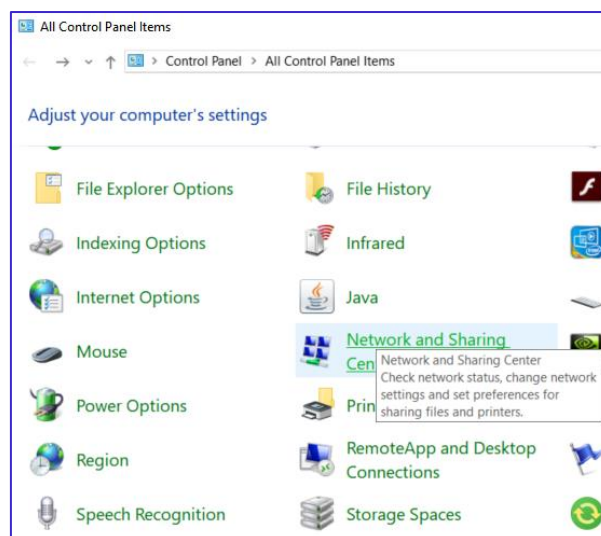
- **LIPSedge™ AE400_AE450 SDK\OpenNI2\Tools\OpenNI2\Drivers**

Once the camera's IP address is configured and saved, camera images can be accessible by launching the DepthViewer.

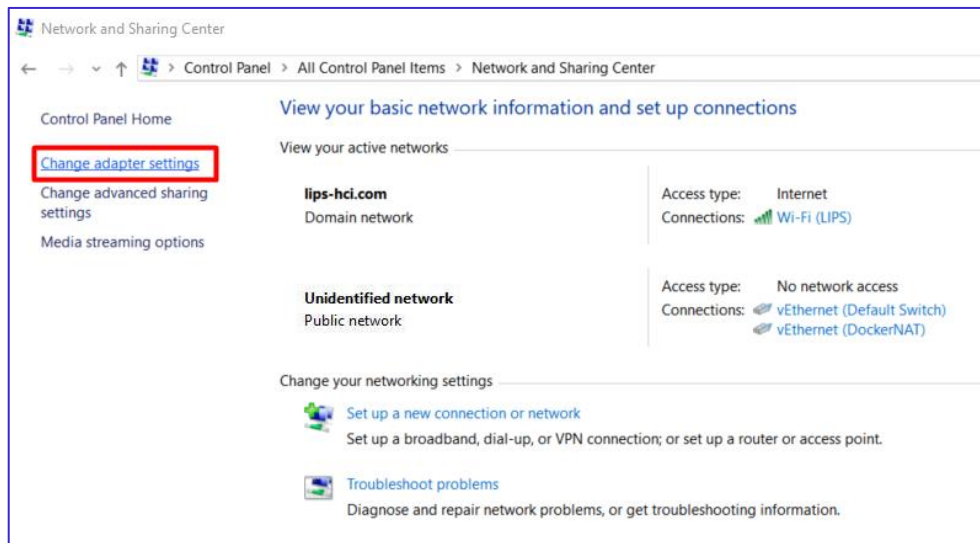
Note:

1. LIPSedge™ AE400 / AE450 is assigned a default IP address of 192.168.0.100. For camera connection, make sure the host PC / laptop is under the same subnet as the camera.
 2. On rare occasions, the application may not be able to detect the camera when a new camera is connected. In that case, **unplug the network cable restart** the host PC / laptop, and scan again.
-

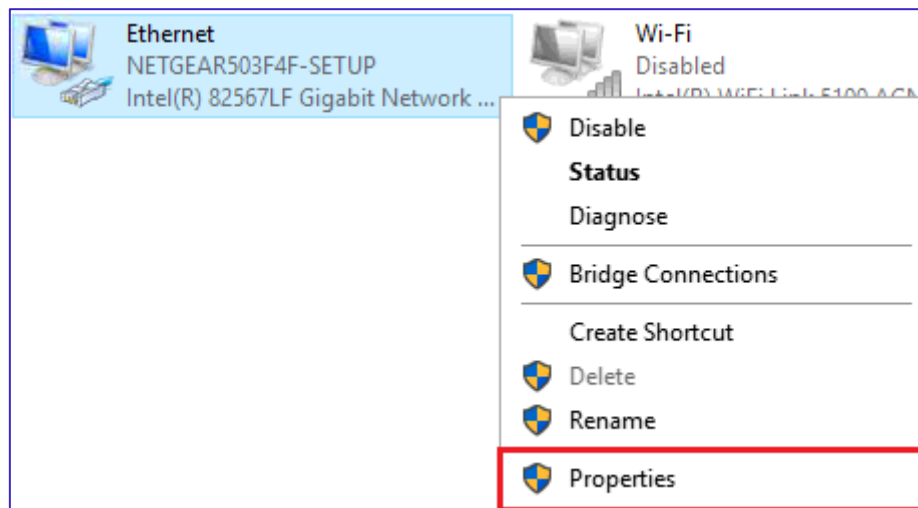
1. Go to the **Control Panel** of the host PC / laptop and select **Network and Sharing Center**.



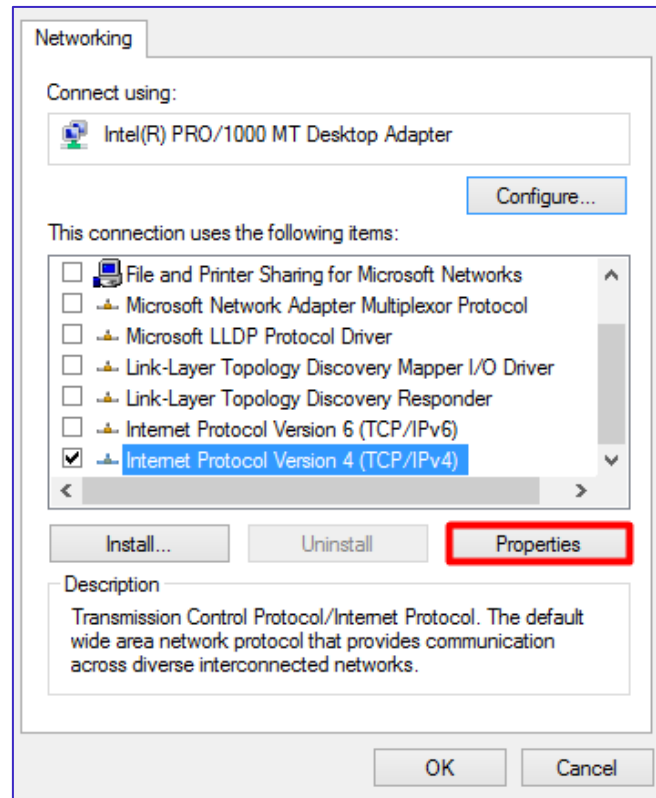
- On the left menu, select **Change adapter settings**.



- Right-click **Ethernet** and select **Properties**.



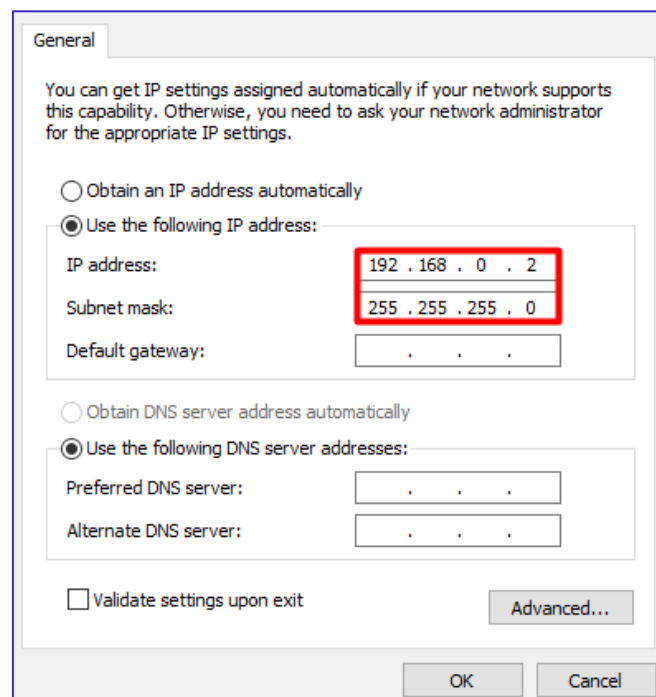
4. Select **Internet Protocol Version 4 Properties (IPv4)** and click **Properties**.



5. Assign the host PC / laptop to the **same subnet as the LIPSedge™ camera** and click **OK**.

IP address: 192.168.0.2

Subnet mask: 255.255.255.0



B. Linux / Ubuntu / Jetson Installation

a. SDK Installation

To access the SDK, visit [3D Depth Camera SDK Free Download | LIPSedge™ SDK \(lips-hci.com\)](https://www.lips-hci.com) and procure the package for the preferred version, framework, and compatible operating system.

1. Visit [LIPSedge™ SDK](https://www.lips-hci.com) website.
2. Select the installation file based on the compatible operating system and download the installation file.

Note: For each LIPSedge™ 3D Camera User Manual refer to the respective product document

- Video Presentation ([Link](#))

Download the LIPSedge™ SDK as below

v1.1.1

- [Windows](#)
- [Linux](#)

Release Notes

- [Release Note](#)

v1.1.0

v1.02

3. Start **terminal** and go to **the installation file's location**.
4. Change the **installation file's access permissions**. Here, **Version 1.1.1** is used as an example. Enter the version downloaded in the previous steps.

```
chmod +x LIPSedge-Camera-SDK-Linux-<version>.run
```

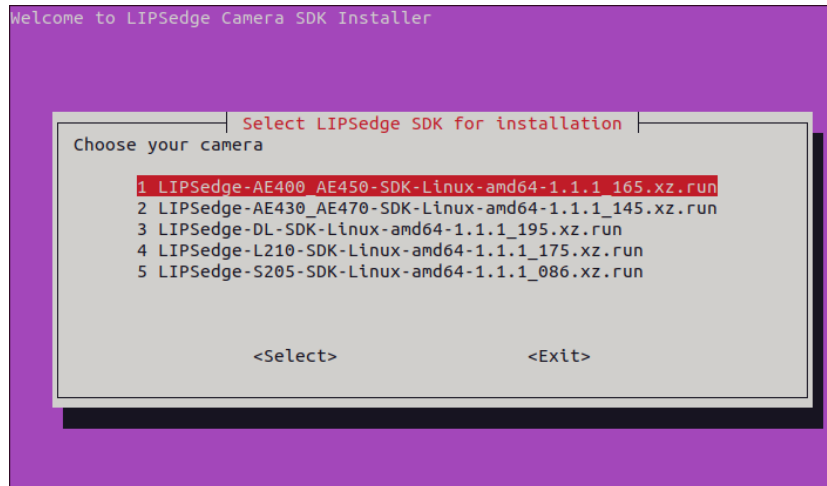
```
lips@lips-Inspiron-7570:~$ chmod +x LIPSedge-Camera-SDK-Linux-amd64_v1.1.1.run
lips@lips-Inspiron-7570:~$
```

5. Execute the installation file.

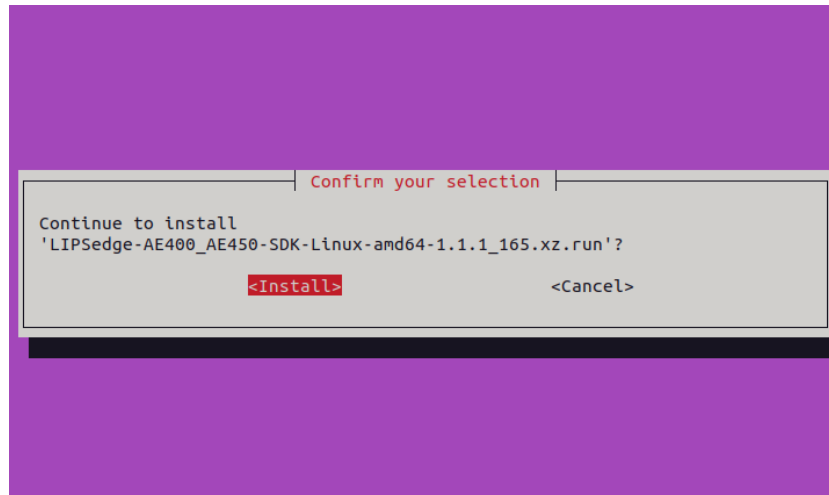
```
./LIPSedge-Camera-SDK-Linux-<version>.run
```

```
lips@lips-Inspiron-7570:~$ ./LIPSedge-Camera-SDK-Linux-amd64_v1.1.1.run
Creating directory LIPSedge-Camera-SDK-Linux-amd64_v1.1.1
Verifying archive integrity... 100% MD5 checksums are OK. All good.
Uncompressing LIPSedge Camera SDK Package v1.1.1 for Linux amd64 51%
```

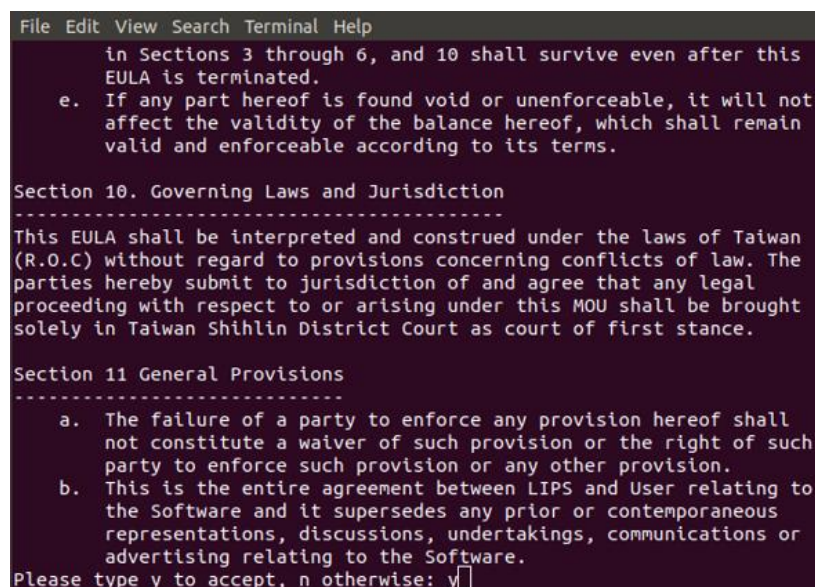
6. LIPSedge™ SDK supports various LIPSedge™ cameras, select the intended model for LIPSedge™ SDK installation.



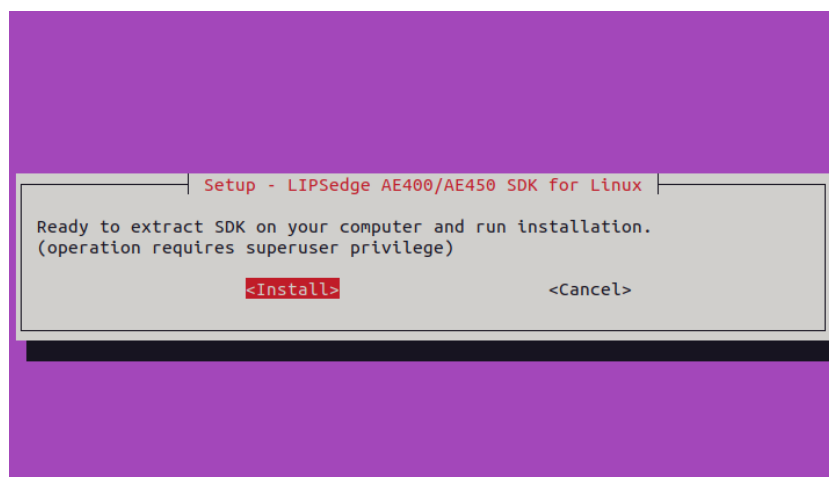
7. Select **Install**.



8. Press **Y**.



9. Select **Install**.



10. Once the installation is successful, the Terminal will prompt a **DONE!** message.

```
Building dependency tree... Done
Reading state information... Done
You might want to run 'apt --fix-broken install' to correct these.
The following packages have unmet dependencies:
 lipsedge-sdk-0 : Depends: libtbb2 but it is not installed
E: Unmet dependencies. Try 'apt --fix-broken install' with no packages (or specify a solution).

install udev rule - OK

install LIPSedge-AE400_AE450 driver to system OpenNI2 (package libopenni2-0 and libopenni2-dev) - OK

LIPSedge-AE400_AE450 SDK is extracted to 'LIPSedge-AE400_AE450-SDK-Linux-amd64-1.1.1_165'

Enter the SDK folder:
$ cd LIPSedge-AE400_AE450-SDK-Linux-amd64-1.1.1_165

Tips: source OpenNIDevEnvironment to get OPENNI2 include/lib path for development

DONE!
```

11. The LIPSedge™ SDK and its relevant components are then accessible at the **installation location**. In this example, the installation location is `./home`. For the folder content, refer to similar content in *Chapter3 3.2-A*.

Name	Size
bin	1 item
Documentation	1 item
Include	23 items
LIPSedgeSamples	11 items
NOTICES	15 items
Redist	3 items
Tools	18 items
Wrappers	5 items
EULA_LIPS_SDK.txt	9.3 kB
install.sh	7.6 kB
OpenNI-CHANGES.txt	19.4 kB
OpenNIDevEnvironment	254 bytes
OpenNI-LICENSE.txt	11.4 kB

b. Camera Access

LIPSedge™ AE400 / AE450 SDK utilizes DepthViewer, OpenNI's signature tool, for examining and assessing the quality of depth, RGB, and point cloud images. Refer to *Chapter3 3.1-A-b* for details.

c. DepthViewer Settings

DepthViewer relies on hotkeys listed in the help menu to control its functionality and adjustments. The hotkey functions for the DepthViewer of the Linux version are identical to its Windows counterpart. Refer to *Chapter3 3.1-A-c* for details.

d. IP Address Configuration

The LIPSedge™ AE400 / AE450 comes with a default IP address of **192.168.0.100**. However, exceptions may exist where the camera's IP address differs from the default setting. In such cases, LIPS Corp. offers a LIPSedge™ AE400 / AE450 SDK Toolkit to facilitate IP address detection and access to camera images. Detected camera IP addresses should be saved in a **network.json file** and placed in the following folder:

- **LIPSedge™ AE400_AE450 SDK\OpenNI2\Tools\OpenNI2\Drivers**

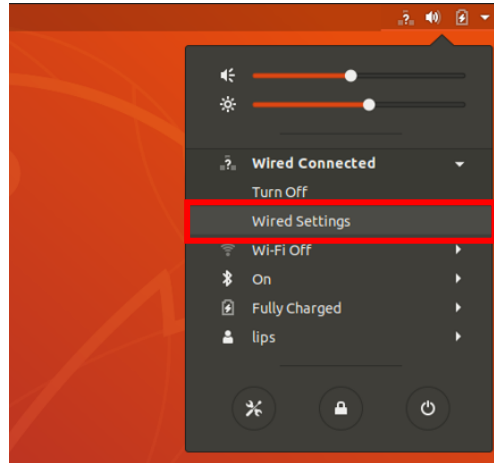
Once the camera's IP address is configured and saved, proceed to set up the host PC / laptop as the same subnet within the camera's network so the camera images can be accessible by launching the DepthViewer.

Note:

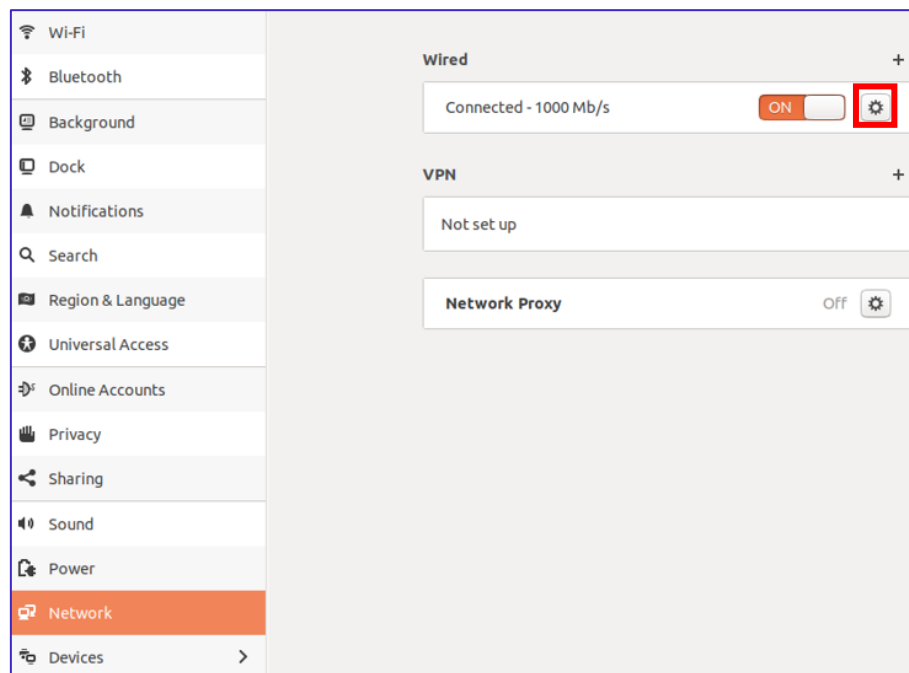
1. LIPSedge™ AE400 / AE450 is assigned with a default IP address of **192.168.0.100**. Make sure the host PC / laptop is under the same subnet as the camera for the camera connection.
 2. On rare occasions, the application may not be able to detect the camera when a new camera is connected. In that case, **unplug the network cable and restart** the host PC / laptop, and scan again.
-

1. Connect the LIPSedge™ AE400 / AE450 camera to the host PC / laptop. For details, refer to *Chapter 1 1.2-C*.

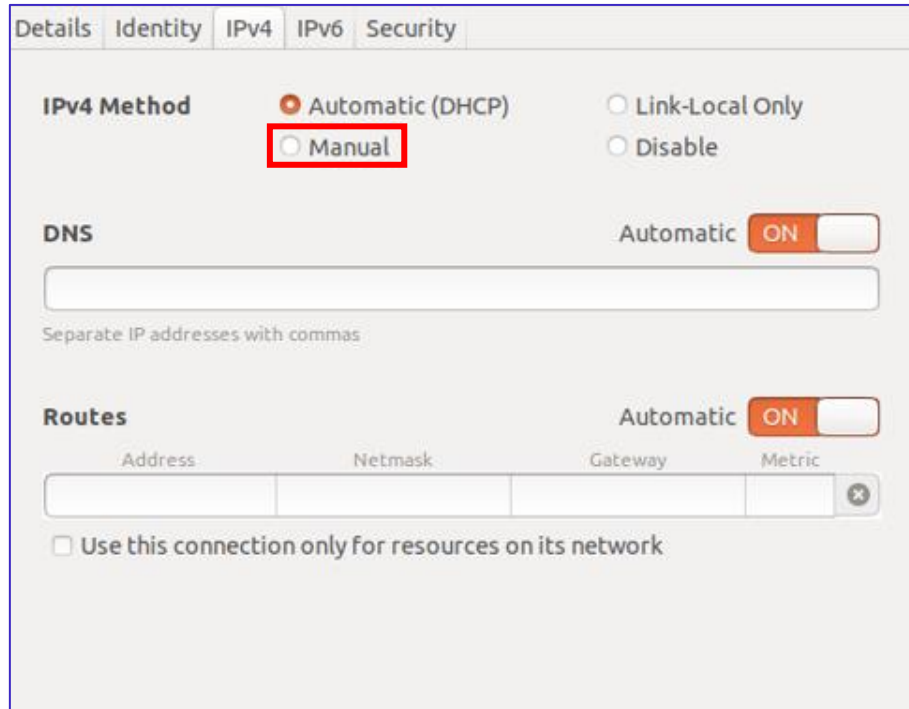
- Go to the upper right corner and click  > **Wired Connected** > **Wired Settings**.



- On the left menu, select Network and click .



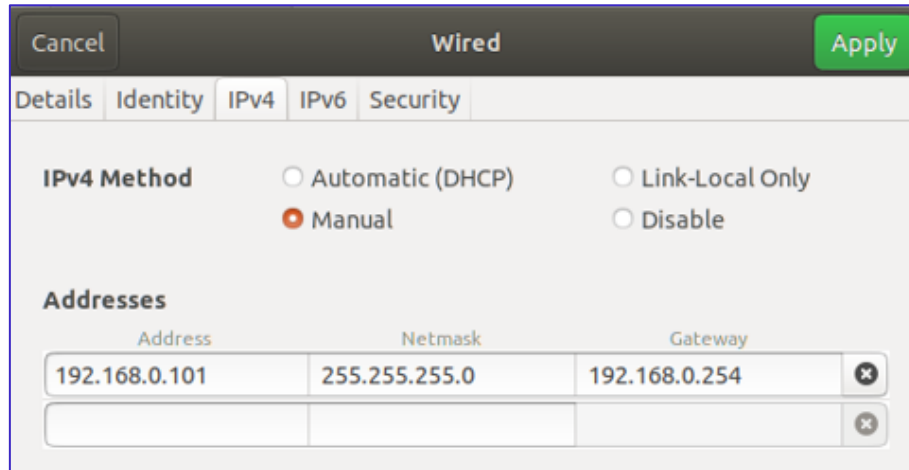
4. Go to the **IPv4** tab and select **Manual**.



The screenshot shows the 'IPv4' tab in a network configuration window. The 'IPv4 Method' section has three radio buttons: 'Automatic (DHCP)' (selected), 'Manual' (highlighted with a red box), and 'Link-Local Only'. There are also 'Disable' and 'Automatic' toggle switches. Below this is a 'DNS' section with a text input field and an 'Automatic' toggle switch. The 'Routes' section has a table with columns for Address, Netmask, Gateway, and Metric, and an 'Automatic' toggle switch. A checkbox at the bottom reads 'Use this connection only for resources on its network'.

5. Type the desired network configuration and click **Apply**.

- **Address:** 192.168.0.101
- **Netmask:** 255.255.255.0
- **Gateway:** 192.168.0.254



The screenshot shows the 'IPv4' tab in a network configuration window. The 'IPv4 Method' section has three radio buttons: 'Automatic (DHCP)', 'Manual' (selected), and 'Link-Local Only'. There are also 'Disable' and 'Automatic' toggle switches. Below this is an 'Addresses' section with a table that has columns for Address, Netmask, and Gateway. The first row contains the values '192.168.0.101', '255.255.255.0', and '192.168.0.254'. A second empty row is visible below it. The 'Apply' button is highlighted in green at the top right.

C.Other OS (by request)

Other OS support by request.

3.2 SDK Knowledge Base

The LIPSedge™ AE400/ AE450 SDK consists of **two** main components: **OpenNI2** and **other dependent files**. Except for the OpenNI2 folder, all the rest of the files are dependent files.

A. SDK Folder Structure

a. Windows

Name	Type	Date modified
NOTICE	File folder	2023/10/4 2:57 PM
OpenNI2	File folder	2023/10/4 2:57 PM
EULA_LIPS_SDK.txt	Text Document	2023/9/11 7:09 PM
LIPS.ico	Icon	2023/9/11 7:09 PM
ReleaseNotes.txt	Text Document	2023/9/26 5:23 PM
unins000.dat	DAT	2023/10/4 2:57 PM
unins000.exe	Application	2023/10/4 2:57 PM

- **NOTICE:** Dependent libraries necessary for LIPSedge™ AE400 / AE450 SDK functionality. Do NOT modify or delete the folder content.
- **OpenNI2:** OpenNI-related files essential for camera integration and function control, including system configuration files and example applications.
- **Auxiliary files:** Supplementary information for the LIPSedge™ AE400 / AE450 SDK.
 - **EULA_LIPS_SDK.txt:** The end user agreement.
 - **LIPS.ico:** LIPS Corp.'s icon, which appears during application operation.
 - **ReleaseNotes:** Announcement of the latest feature.
- **Uninstallation components:** Run unins000.exe for uninstallation. Note that unins000.dat must be present.

[OpenNI2 Folder]

The SDK package for LIPSedge™ AE400 / AE450 provides a comprehensive set of files and folders to support camera integration and development. These resources include OpenNI C++ API documentation, header files, libraries for compilation, sample applications, system files, and important information such as licenses and release notes.

Name	Type
Documentation	File folder
Include	File folder
Lib	File folder
LIPSedgeSamples	File folder
Redist	File folder
Tools	File folder
CHANGES.txt	Text Document
LICENSE	File
NOTICE	File
ReleaseNotes.txt	Text Document

- **Documentation:** Contains essential OpenNI C++ API documentation.
- **Include:** Contains essential OpenNI C++ headers. These headers can be checked along with the associated library files to facilitate development.
- **Lib:** Contains library files, specifically OpenNI2.lib and realsenses2.lib. These libraries are used in conjunction with MS Visual Studio C++ for compilation.
- **LIPSedgeSamples:** Contains a series of executable tools and the source code of these tools.
- **Redist:** Contains network configuration files, camera drivers and system files necessary for image streaming.
- **Tools:** Holds captured frames from example programs and other camera configuration files.
- **CHANGES:** The change log for OpenNI.
- **LICENSE:** Contains information about the licensing terms for the SDK.
- **NOTICE:** Contains copyright and attribution notices relevant to the OpenNI components.
- **ReleaseNotes:** The latest system requirements for OpenNI.

b. Linux

In LIPSedge™ AE400 / AE450 SDK for the Linux system, the folders are structured so that the OpenNI2 and dependency files are **adjacent to the application that requires these external resources**. Go to `./home/LIPSedge-Camera-SDK-Linux-<version>/LIPSedge-<model>_SDK-Linux-<version>/Tools` for OpenNI C++ API documentation, header files, libraries for compilation, sample applications, system files, and essential information such as licenses and release notes.

Name	Size
bin	1 item
Documentation	1 item
Include	23 items
LIPSedgeSamples	11 items
NOTICES	15 items
Redist	3 items
Tools	18 items
Wrappers	5 items
EULA_LIPS_SDK.txt	9.3 kB
install.sh	7.6 kB
OpenNI-CHANGES.txt	19.4 kB
OpenNIDevEnvironment	254 bytes
OpenNI-LICENSE.txt	11.4 kB

- **bin:** Consists of the USB driver files for the LIPS camera.
- **Documentation:** Contains essential OpenNI C++ API documentation.
- **Include:** Contains essential OpenNI C++ headers. These headers can be checked along with the associated library files to facilitate development.
- **LIPSedgeSamples:** Contains a series of executable tools and the source code of these tools.
- **NOTICE:** Contains copyright and attribution notices relevant to the OpenNI components.
- **Redist:** Contains network configuration files, camera drivers and system files necessary for image streaming.
- **Tools:** Holds captured frames from example programs and other camera configuration files.

- **Wrappers:** Contains essential wrapper files that provide language-specific interfaces for integrating the SDK into supported applications.
- **EULA_LIPS_SDK.txt:** The end user agreement.
- **Install.sh:** In cases where the Linux / Ubuntu SDK installation was aborted, execute install.sh to install the SDK.
- **OpenNI-CHANGES.txt:** The change log for OpenNI.
- **OpenNIDevEnvironment:** The OpenNI2 development environment and configuration files for application development.
- **OpenNI-LICENSE.txt:** Contains information about the licensing terms for OpenNI.
- **ReleaseNotes:** The latest system requirements for OpenNI.

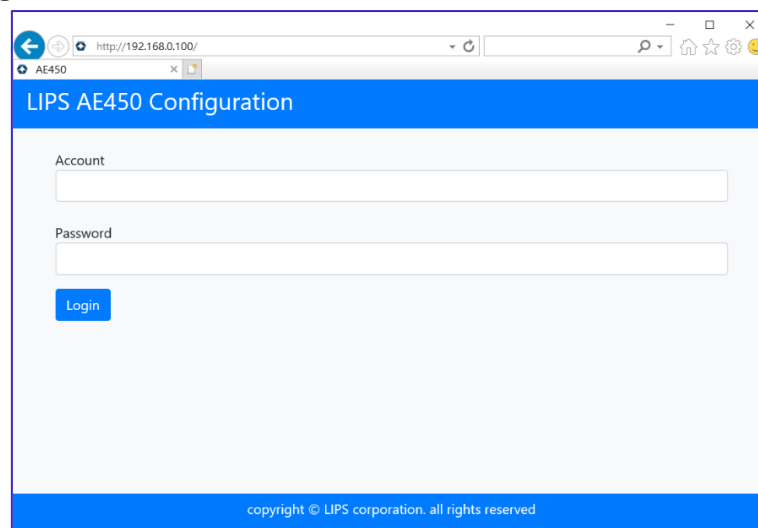
B.SDK Setting Configurations

This section does **NOT** apply to LIPSedge™ AE400 _AE450.

C. Camera Web Interface

LIPSedge™ AE400 / AE450 camera can be accessible through **its web interface**, which facilitates the configuration of various device and network settings. It is recommended to use **Microsoft Internet Explorer 10.0 (or equivalent)** for optimal performance.

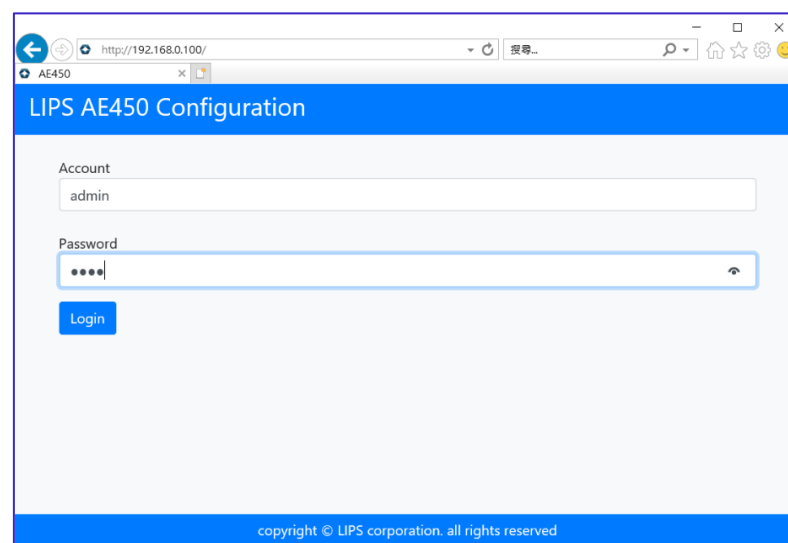
1. Start the web browser. In the **Search Bar**, type the **IP address** of the LIPSedge™ AE400 / AE450 camera.



2. On the login page, type the **default username** and **password** and click Login.

Username: admin

Password: LIPS

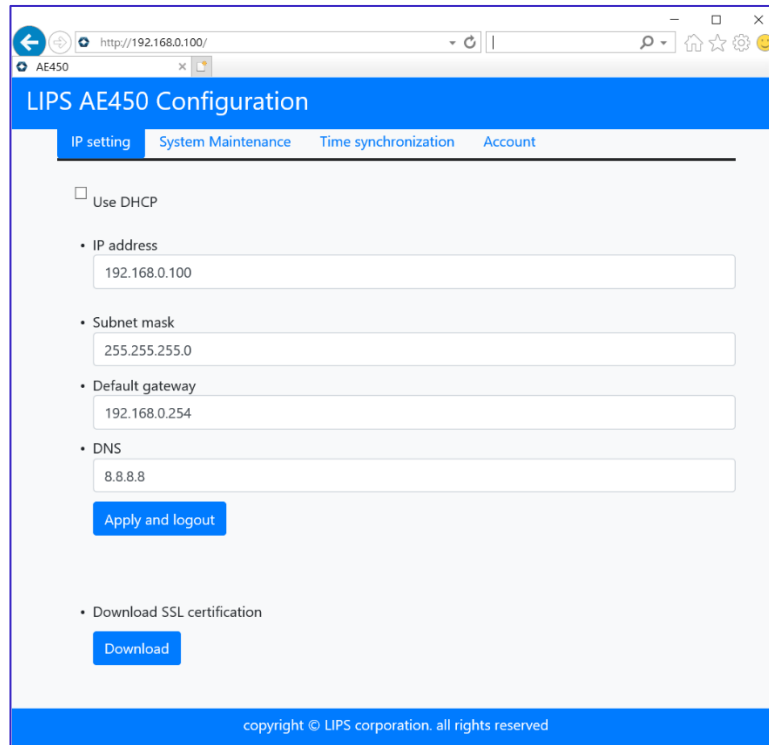


3. Navigate the top bar to change system settings.

4. After modifying the system settings, click **Apply and logout** to save the changes.

a. IP Settings

The **IP Settings** tab allows the adjustment of the network setting of the LIPSedge™ AE400 / AE450.



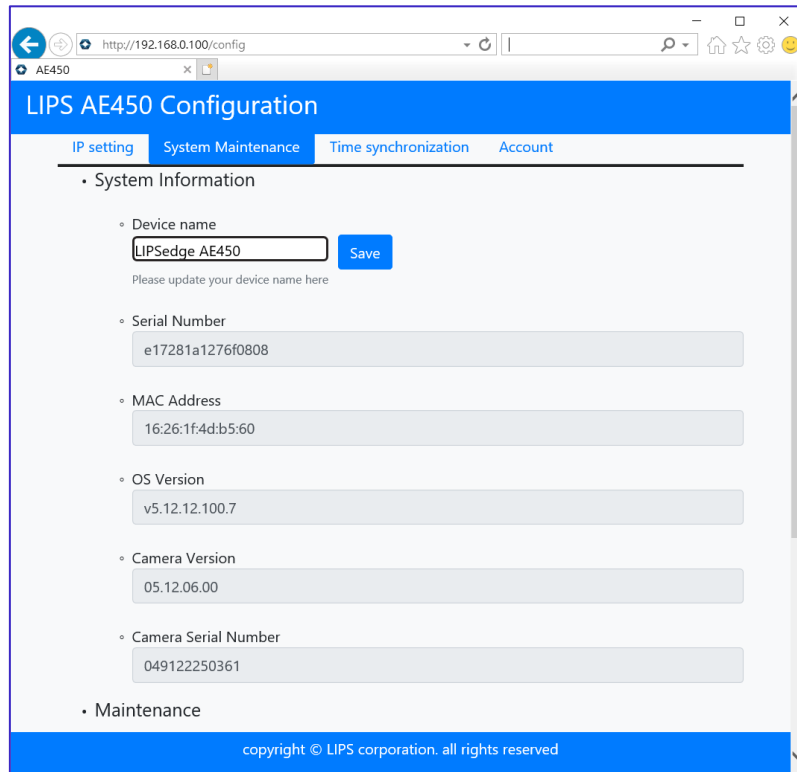
The screenshot shows a web browser window with the address bar displaying 'http://192.168.0.100/'. The page title is 'LIPS AE450 Configuration'. There are four tabs: 'IP setting' (selected), 'System Maintenance', 'Time synchronization', and 'Account'. Under the 'IP setting' tab, there is a checkbox for 'Use DHCP' which is unchecked. Below it, there are four input fields: 'IP address' (containing '192.168.0.100'), 'Subnet mask' (containing '255.255.255.0'), 'Default gateway' (containing '192.168.0.254'), and 'DNS' (containing '8.8.8.8'). There is a blue button labeled 'Apply and logout' below the input fields. At the bottom, there is a section for 'Download SSL certification' with a blue button labeled 'Download'. The footer of the page reads 'copyright © LIPS corporation. all rights reserved'.

- **Use DHCP:** This option assigns an IP address to the camera automatically through the DHCP service. Disabling manually defined network properties will also be disabled.
- **Network Properties:** Manually type the Internet connection's IP address, Subnet mask, Default gateway, and DNS server.
- **Download SSL certification:** Generates an SSL server certification file for upgrading transmission security.

WARNING: The IP address field is empty despite appearing to have a default IP address in grayed-out texts. Type an IP address before clicking Apply and logging out, or the camera's IP address will become unreachable. To fix the IP address issue, the camera must be restored to its default settings. To restore the camera to its default settings, refer to *Chapter1 1.2-C*.

b. System Maintenance

The **System Maintenance** tab offers access to the camera's hardware and system information, firmware updates, camera restart, and the option to restore the camera to its factory default settings.



The screenshot shows the 'LIPS AE450 Configuration' web interface. The 'System Maintenance' tab is selected, showing the 'System Information' section. The 'Device name' field is set to 'LIPSedge AE450' with a 'Save' button. Below it, the 'Serial Number' is 'e17281a1276f0808', 'MAC Address' is '16:26:1f:4d:b5:60', 'OS Version' is 'v5.12.12.100.7', 'Camera Version' is '05.12.06.00', and 'Camera Serial Number' is '049122250361'. A 'Maintenance' section is partially visible at the bottom.

LIPS AE450 Configuration

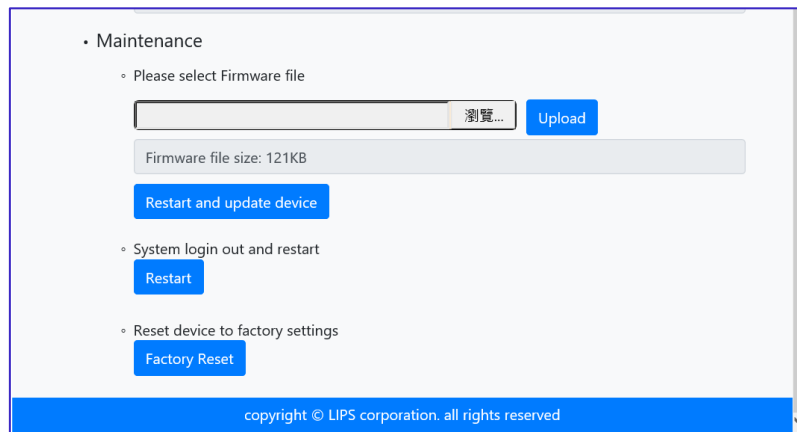
IP setting | **System Maintenance** | Time synchronization | Account

• System Information

- Device name: LIPSedge AE450 [Save]
- Serial Number: e17281a1276f0808
- MAC Address: 16:26:1f:4d:b5:60
- OS Version: v5.12.12.100.7
- Camera Version: 05.12.06.00
- Camera Serial Number: 049122250361

• Maintenance

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This screenshot shows the 'Maintenance' section of the configuration page. It includes a file selection area for firmware updates, with a 'Restart and update device' button. Below that, there are options to 'System login out and restart' (with a 'Restart' button) and to 'Reset device to factory settings' (with a 'Factory Reset' button).

• Maintenance

- Please select Firmware file: [Browse...] [Upload]
- Firmware file size: 121KB
- [Restart and update device]
- System login out and restart: [Restart]
- Reset device to factory settings: [Factory Reset]

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[System Information]

- **Device Name:** Edits the device's name. The default device name is LIPSedge™ AE400 / AE450.
- **Serial Number:** Displays the serial number of the camera's internal Intel® RealSense™ sensor.
- **MAC Address:** Displays the MAC address unique to the camera.
- **OS Version:** Displays the current LIPSedge™ AE400 / AE450 SDK version.
- **Camera Version:** Displays the current camera firmware version.
- **Camera Serial Number:** Displays the camera's serial number.

[Maintenance]

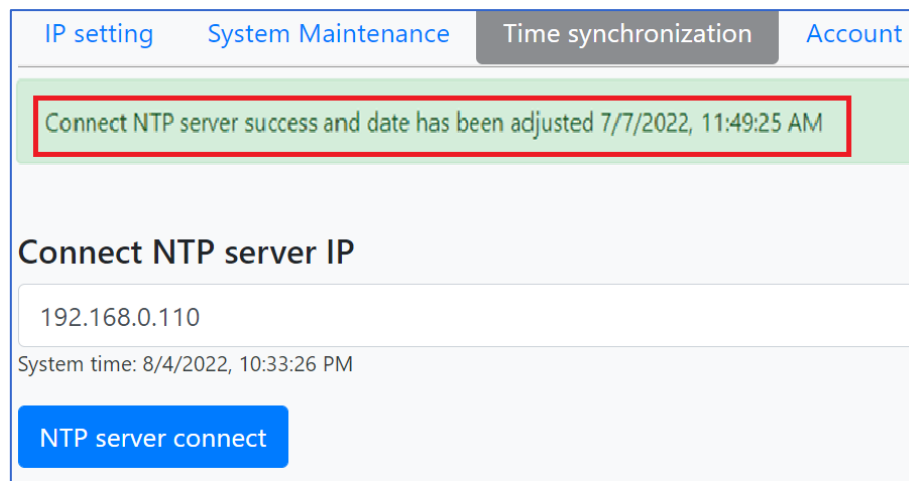
- **Firmware Upgrade:** Upload the latest firmware from your local PC / laptop and click **Restart and Update device for firmware** upgrade. For details, refer to *Chapter3 3.2-C-e*.
- **Restart device:** Clicks **Restart**.
- **Restore the device to factory settings:** Clicks **Factory Reset**.

c. Time Synchronization

This tab allows the camera's internal clock to be aligned with an external NTP server. When connecting to the NTP server, make sure the camera has a good Internet connection. Type the NTP server's address and click **NTP server connect**. The updated system time will be displayed at the bottom of the NTP address field.

[External NTP server]

Type the NTP server's address and click **NTP server connect**. The updated system time will be displayed at the bottom of the NTP address field.



The screenshot shows a web interface with four tabs: "IP setting", "System Maintenance", "Time synchronization" (which is active), and "Account". Below the tabs, a green message box with a red border states: "Connect NTP server success and date has been adjusted 7/7/2022, 11:49:25 AM". Underneath this, the section "Connect NTP server IP" contains a text input field with the value "192.168.0.110". Below the input field, the text "System time: 8/4/2022, 10:33:26 PM" is displayed. At the bottom of the section is a blue button labeled "NTP server connect".

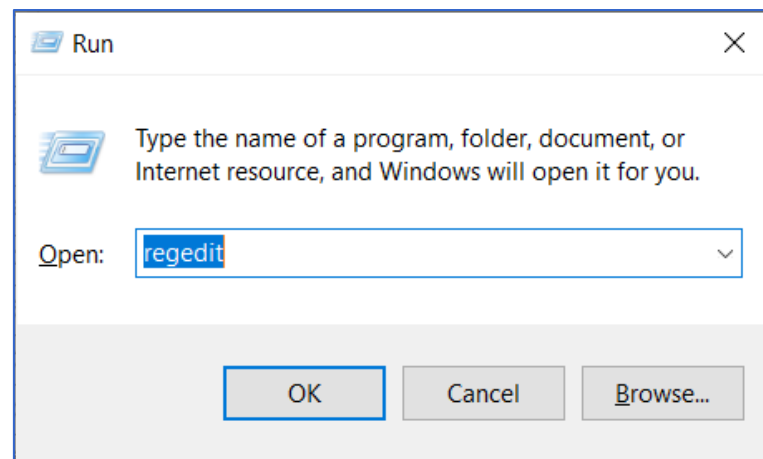
[Local NTP Server]

If the camera fails to access an external NTP server, refer to the following section to set up the local NTP server. Make sure the host PC is connected to LIPSedge™ AE400 / AE450, with proper network configurations.

[Enable Local NTP server]

To enable the local NTP server, modify the **Registry file**:

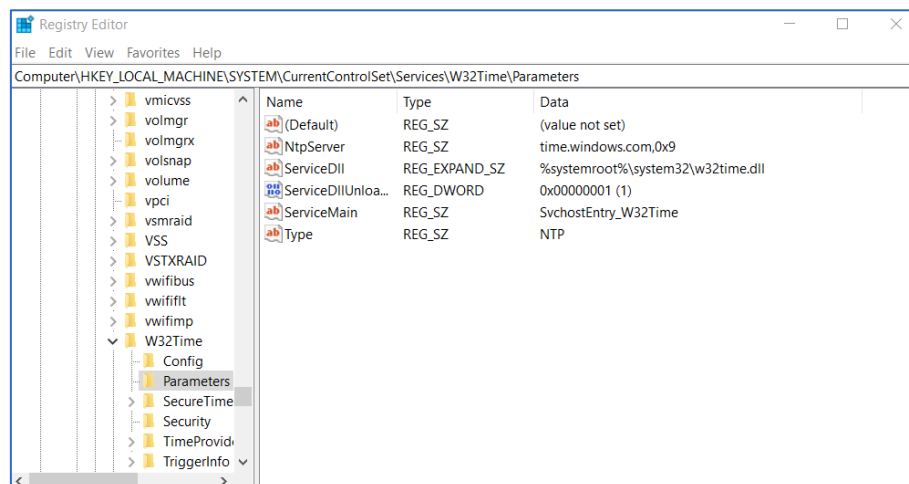
1. Start **Windows Run (Windows Key + R)**.
2. Enter **regedit** and click **OK**.



3. Navigate to the registry

Key:

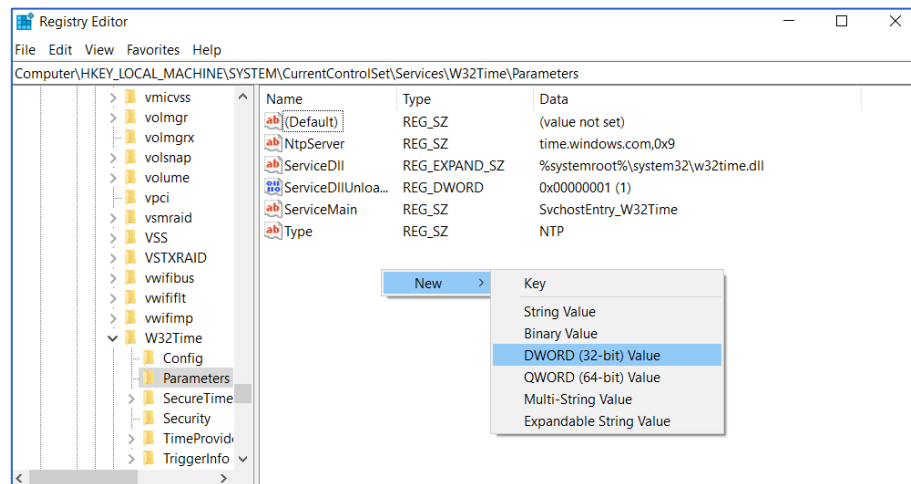
Computer\HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\W32Time\Parameters



4. Confirm the registry value **LocalNTP** (Type: REG_DWORD).

Note: If LocalNTP was absent, create the value.

1. Right-click in the Registry Editor, select **New > DWORD (32-bit value)**, and type **LocalNTP** (note that this name is case sensitive).



2. Double-click **LocalNTP** and change the following parameters:
 - **Value data:**1
 - **Base:** Hexadecimal
 3. Click **OK**.
-

[Update the Windows Registry to Configure the Time Provider]

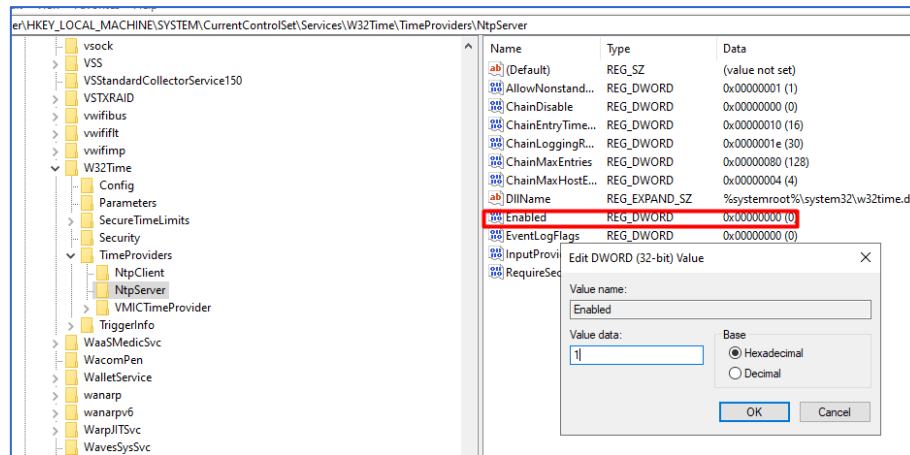
1. Navigate to the registry

Key:

Computer\HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\W32Time\TimeProviders\Ntp Server

2. Double-click **Enabled**, and change the following parameters:

- **Value data:** 1
- **Base:** Hexadecimal



3. Click **OK**.

[Update the Windows Registry to Configure the Announce Flags]

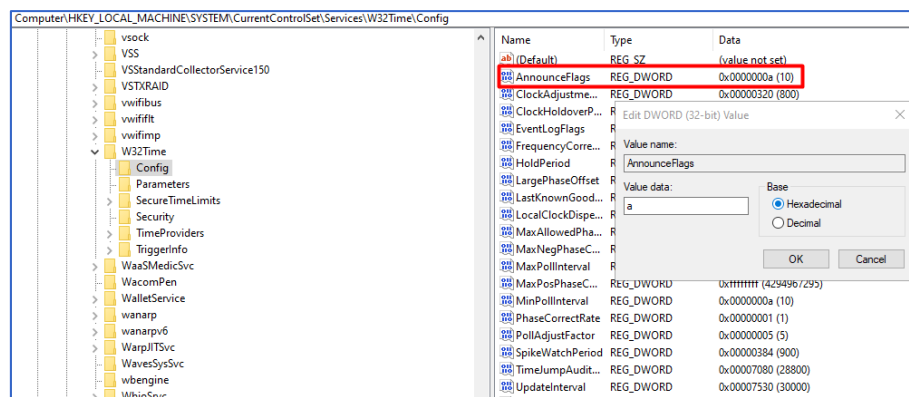
1. Navigate to the registry

Key:

Computer\HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\W32Time\Config

2. Double-click AnnounceFlags, and change the following parameters:

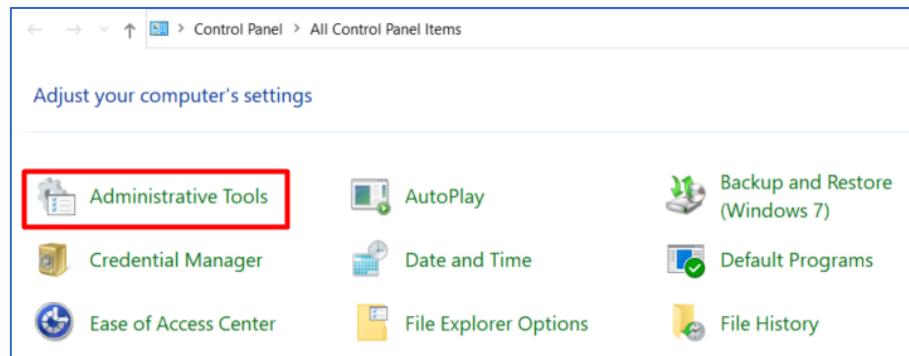
- **Value data:** 5
- **Base:** Hexadecimal



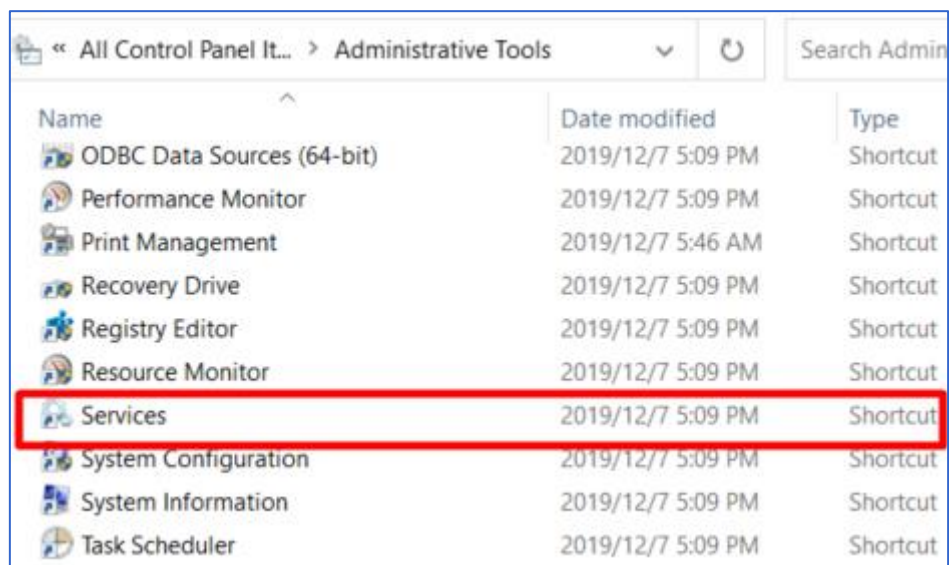
3. Click **OK**.
4. Close the Registry Editor.

[Start the Local Windows NTP Time Service]

1. Start **File Explorer**, and go to **Control Panel\Administrative Tools**.

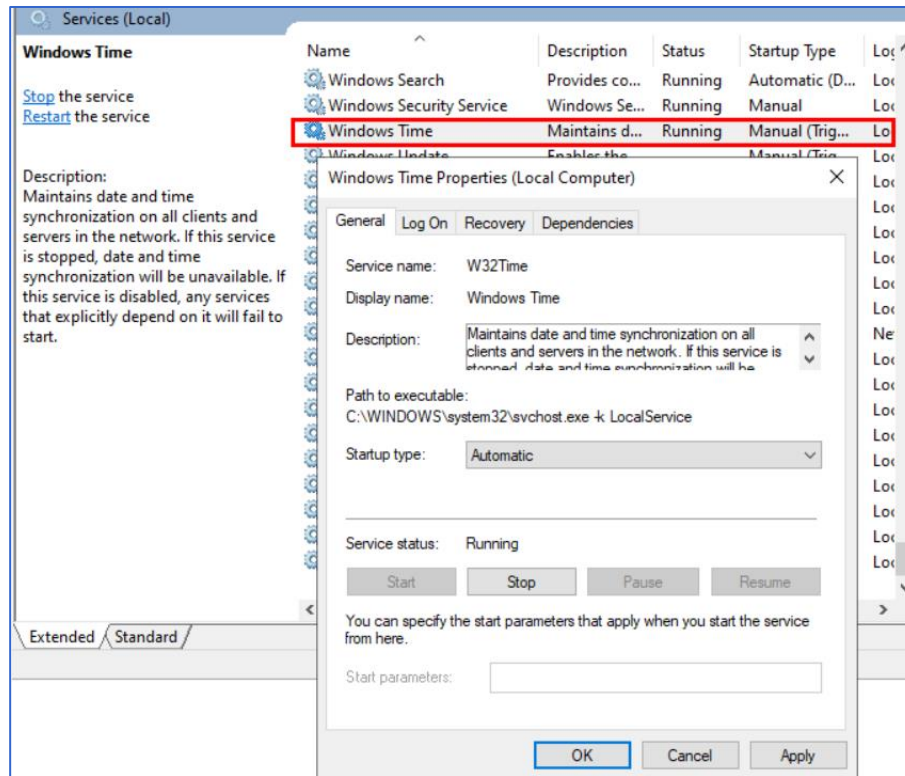


2. Double-click **Services**.



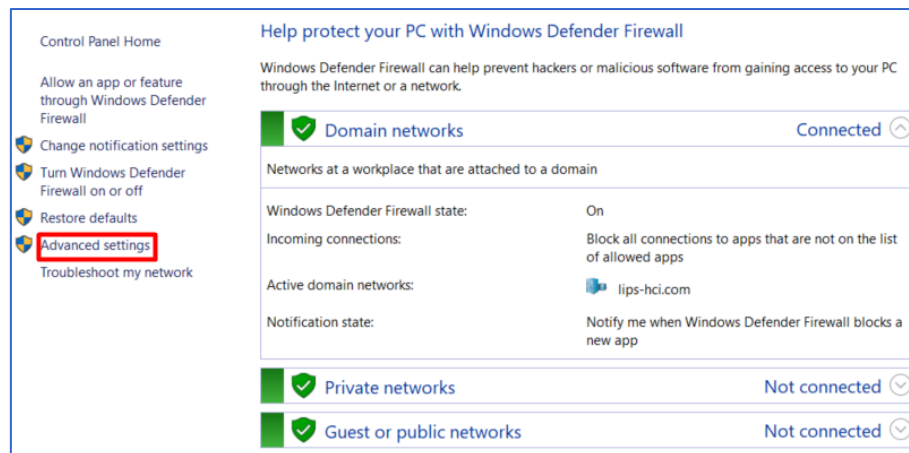
3. On the Services list, right-click **Windows Time > Properties** and configure the following settings, and click **OK**.

- **Startup type:** Automatic
- **Service Status:** Start/Running

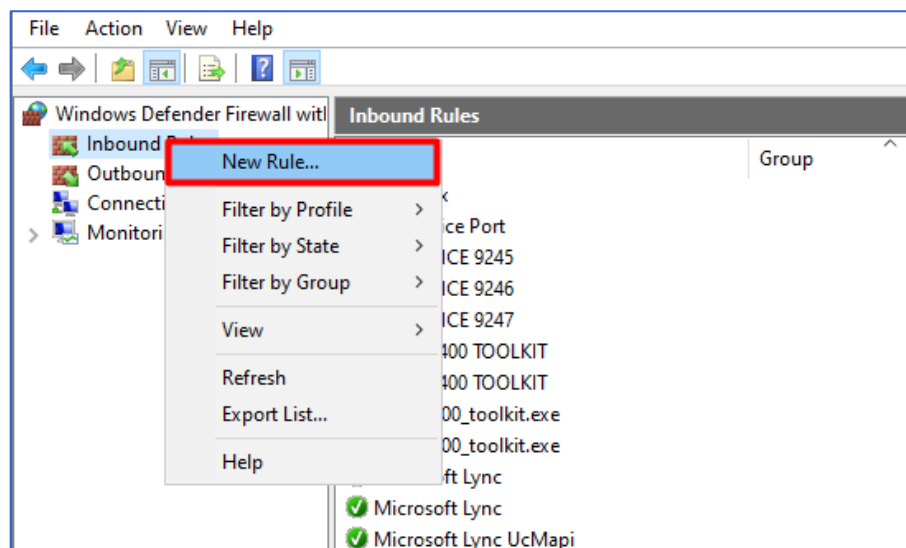


[Create firewall rules to allow inbound network traffic **ONLY** for a specified UDP port number]

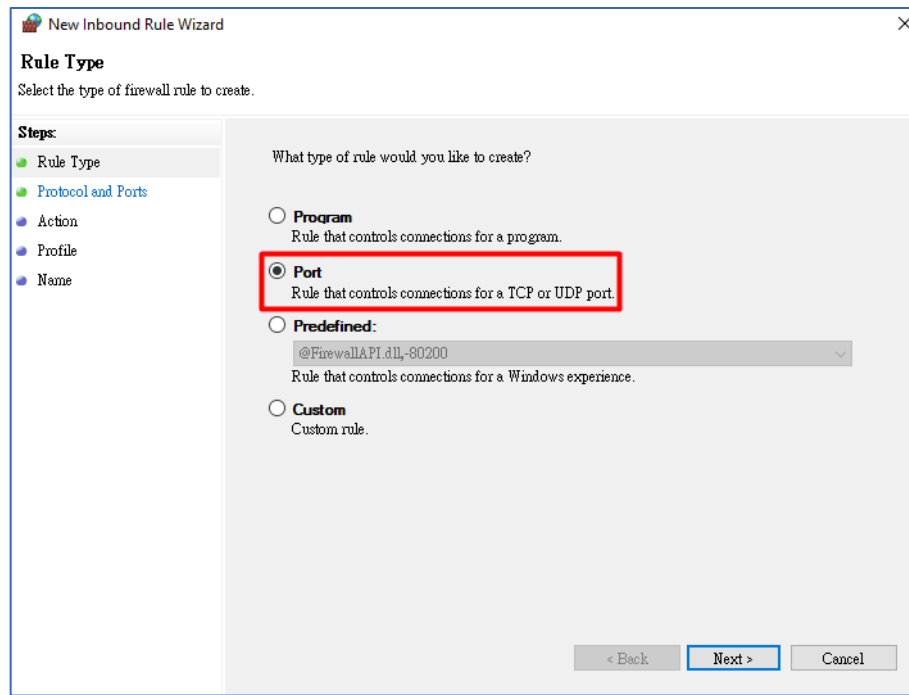
1. Start File Explorer, and go to **Control Panel\Windows Defender Firewall\Advanced setting**.



2. On the left menu, **Inbound Rules > Action > New rule**.



- On the left menu, select **Rule Type > New Inbound Rule Wizard > Port**, and click **Next**.



4. In **Protocols and Ports**, specify the following parameters and click **Next**:

- **Does this rule apply to TCP or UDP:** UDP
- **Specified local port number:** 123

Protocol and Ports
Specify the protocols and ports to which this rule applies.

Steps:

- Rule Type
- Protocol and Ports
- Action
- Profile
- Name

Does this rule apply to TCP or UDP?

☐ TCP

☒ **UDP**

Does this rule apply to all local ports or specific local ports?

☐ All local ports

☒ **Specific local ports:**
Example: 80, 443, 5000-5010

5. In **Action**, select **Allow the connection** and click **Next**.

Action
Specify the action to be taken when a connection matches the conditions specified in the rule.

Steps:

- Rule Type
- Protocol and Ports
- Action
- Profile
- Name

What action should be taken when a connection matches the specified conditions?

☒ **Allow the connection**
This includes connections that are protected with IPsec as well as those are not.

☐ Allow the connection if it is secure
This includes only connections that have been authenticated by using IPsec. Connections will be secured using the settings in IPsec properties and rules in the Connection Security Rule node.
[Customize...](#)

☐ Block the connection

6. In **Profile**, select **Public** and click **Next**.

Profile
Specify the profiles for which this rule applies.

Steps:

- Rule Type
- Protocol and Ports
- Action
- Profile
- Name

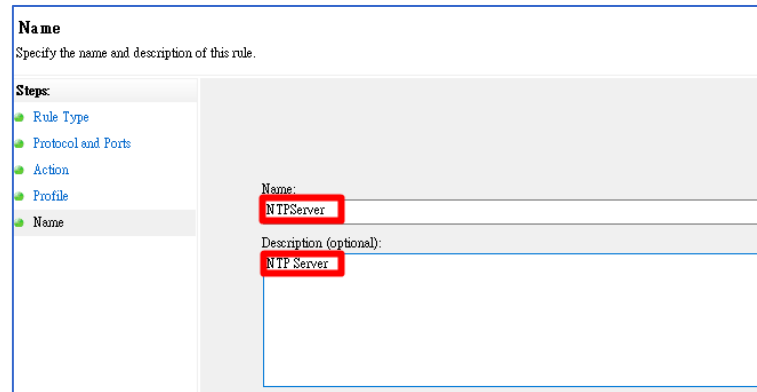
When does this rule apply?

☐ Domain
Applies when a computer is connected to its corporate domain.

☐ Private
Applies when a computer is connected to a private network location, such as a home or work place.

☒ **Public**
Applies when a computer is connected to a public network location.

7. In **Name**, type the following parameters and click **Finish**:
- **Name:** The name for the inbound rules, i.e. NTPServer
 - **Description:** The description for the rule.



Name
Specify the name and description of this rule.

Steps:

- Rule Type
- Protocol and Ports
- Action
- Profile
- Name**

Name:
NTPServer

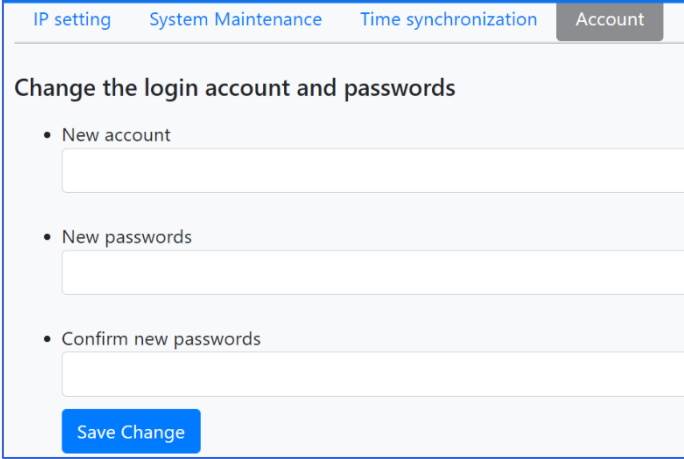
Description (optional):
NTP Server

The local NTP settings are now completed.

d. Account & Password

This tab provides management of user's account name and passwords. Type new account name / password in the related field and click **Save Changes** to change the default account name / password.

Change user name and password to access this web interface.



The screenshot shows a web interface with a navigation bar at the top containing four tabs: 'IP setting', 'System Maintenance', 'Time synchronization', and 'Account'. The 'Account' tab is selected and highlighted. Below the tabs, the main heading is 'Change the login account and passwords'. Under this heading, there are three bullet points, each followed by a text input field: '• New account', '• New passwords', and '• Confirm new passwords'. At the bottom of the form, there is a blue button labeled 'Save Change'.

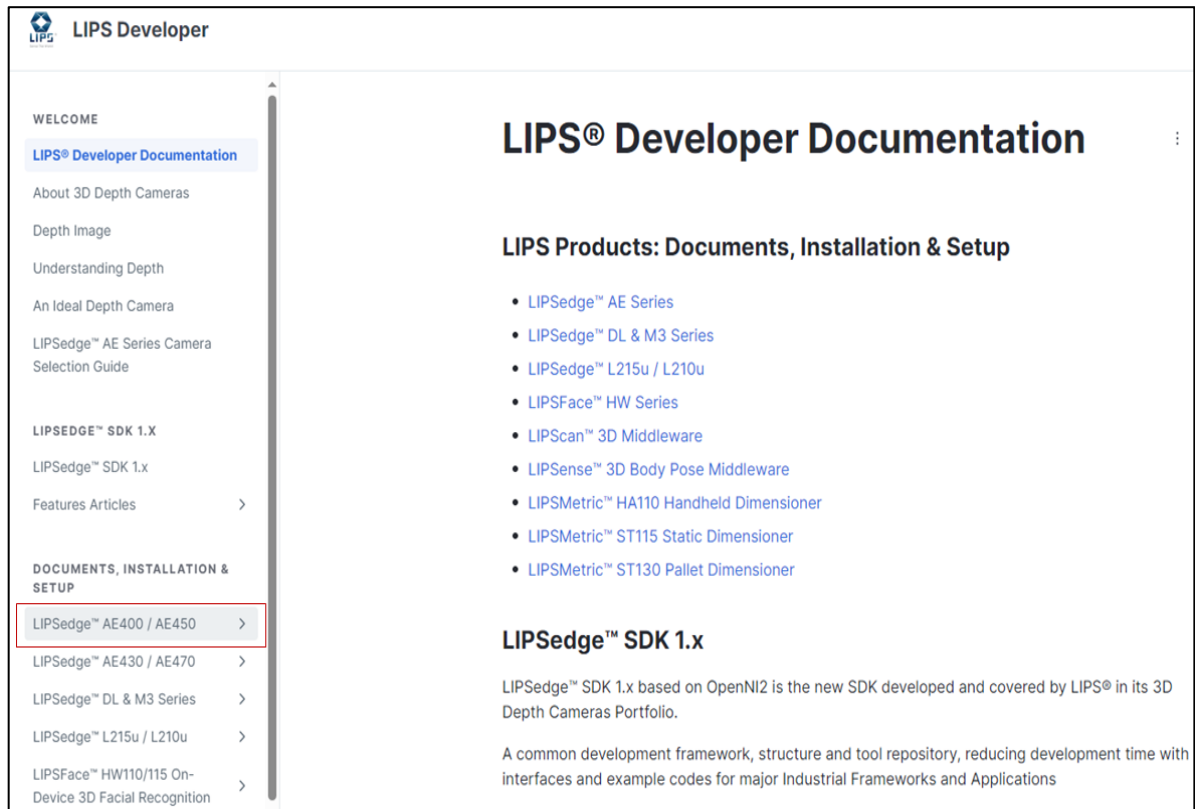
Note: Once the account name / password is renewed, the default account name / password cease working. If the renewed account name / password is lost, logging onto the camera's web interface becomes impossible. In that case, refer to *Chapter1 1.2-C* to restore the camera to factory default.

e. Firmware Update

This tab allows for updating the camera's firmware, which is periodically released on LIPS Corp.'s official website. Specific versions of LIPSedge™ AE400 / AE450 SDK work best with compatible firmware versions.

The updating process takes approximately 7 ~ 9 minutes depending on the host's network condition. While updating firmware, **make sure the power supply is constant** throughout the process. The updating process is an advanced configuration; failure to comply with the instructions below may cause the camera to become unusable. In that case, send the camera back to LIPS Corp. for customer service.

1. Go to [3D Camera/Software Developer Documentation, Code Samples | LIPS Corporation \(lips-hci.com\)](https://www.lips-hci.com/3D-Camera/Software-Developer-Documentation-Code-Samples). On the left bar, select **LIPSedge™ AE400 / AE450**.



LIPS Developer

WELCOME

- LIPS® Developer Documentation**
- About 3D Depth Cameras
- Depth Image
- Understanding Depth
- An Ideal Depth Camera
- LIPSedge™ AE Series Camera Selection Guide
- LIPSEdge™ SDK 1.X**
- LIPSedge™ SDK 1.x
- Features Articles >
- DOCUMENTS, INSTALLATION & SETUP**
- LIPSedge™ AE400 / AE450 >**
- LIPSedge™ AE430 / AE470 >
- LIPSedge™ DL & M3 Series >
- LIPSedge™ L215u / L210u >
- LIPSFace™ HW110/115 On-Device 3D Facial Recognition >

LIPS® Developer Documentation

LIPS Products: Documents, Installation & Setup

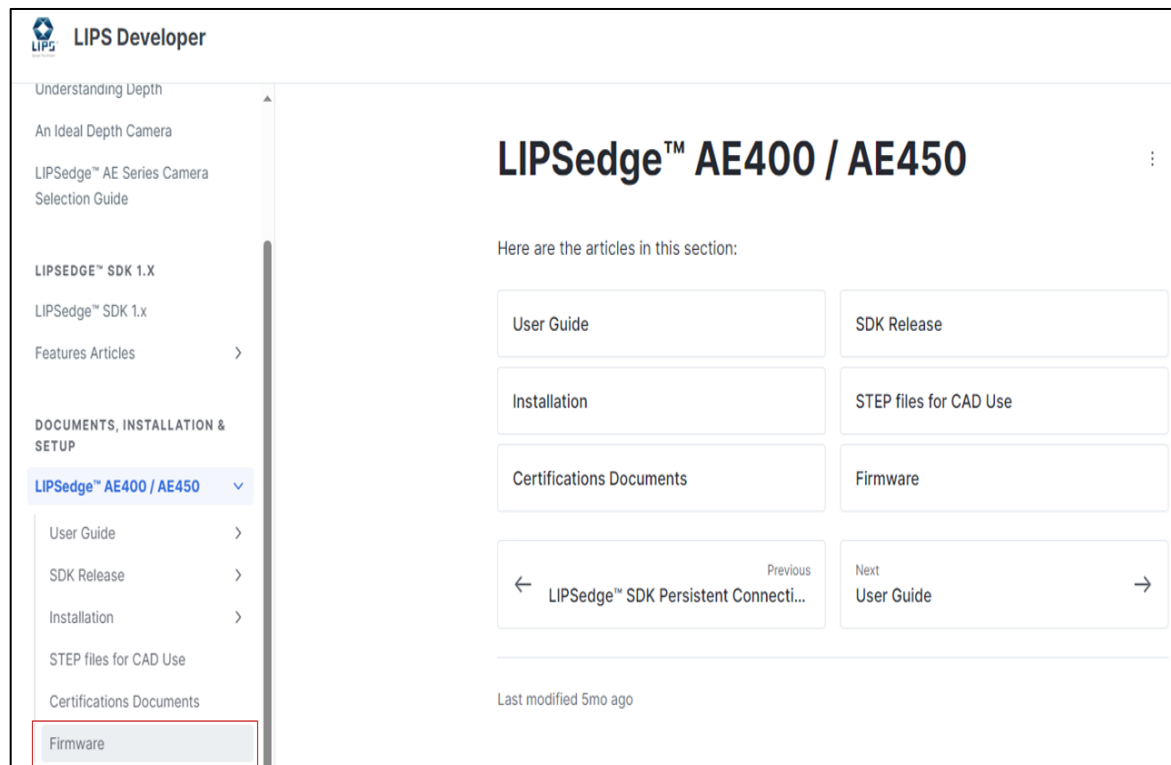
- LIPSedge™ AE Series
- LIPSedge™ DL & M3 Series
- LIPSedge™ L215u / L210u
- LIPSFace™ HW Series
- LIPScan™ 3D Middleware
- LIPSense™ 3D Body Pose Middleware
- LIPSMetric™ HA110 Handheld Dimensioner
- LIPSMetric™ ST115 Static Dimensioner
- LIPSMetric™ ST130 Pallet Dimensioner

LIPSedge™ SDK 1.x

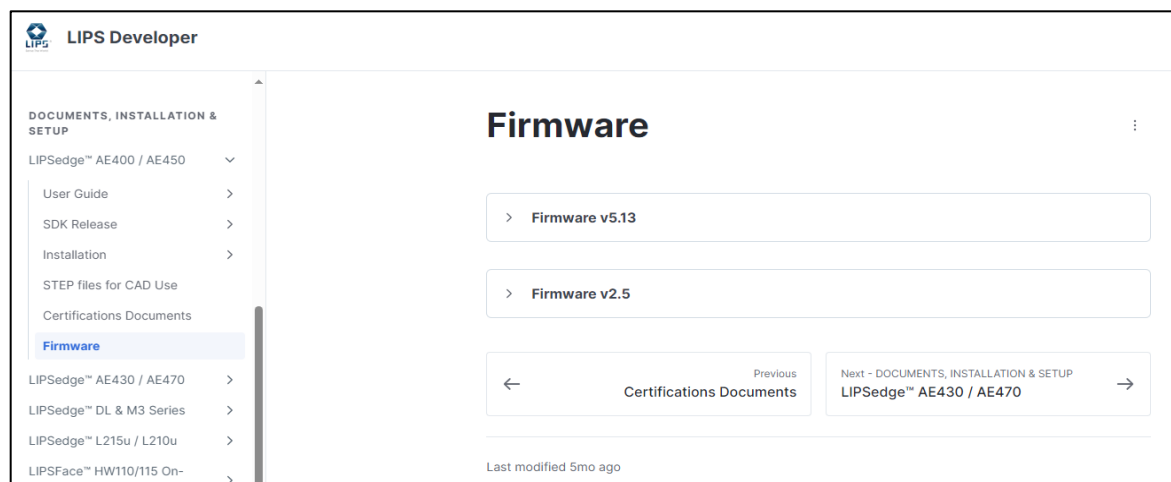
LIPSedge™ SDK 1.x based on OpenNI2 is the new SDK developed and covered by LIPS® in its 3D Depth Cameras Portfolio.

A common development framework, structure and tool repository, reducing development time with interfaces and example codes for major Industrial Frameworks and Applications

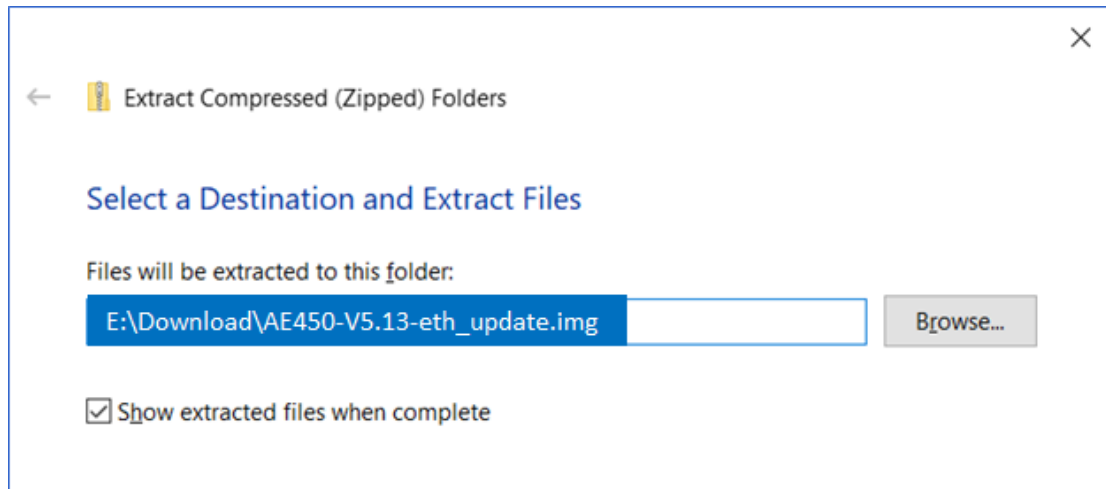
- Click **Firmware** under LIPSedge™ AE400 / AE450 layer.



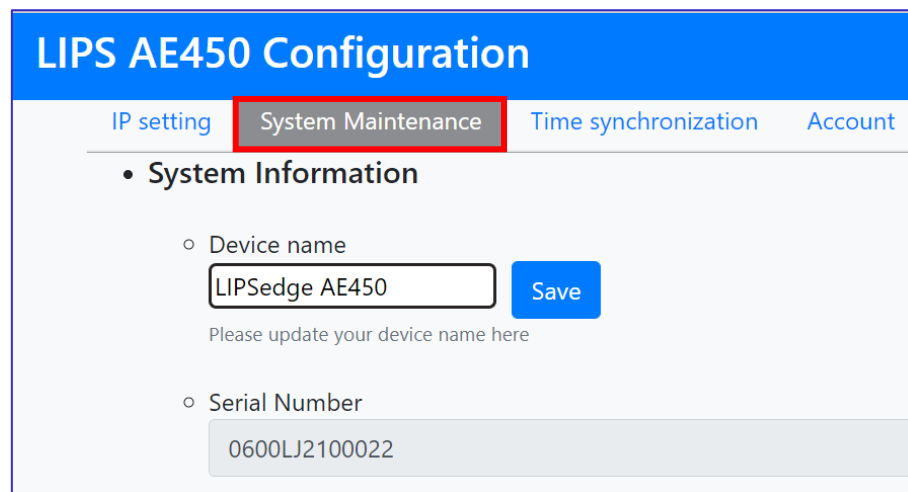
- Select the latest firmware version to download. Here, Firmware V5.13 is used as an example.



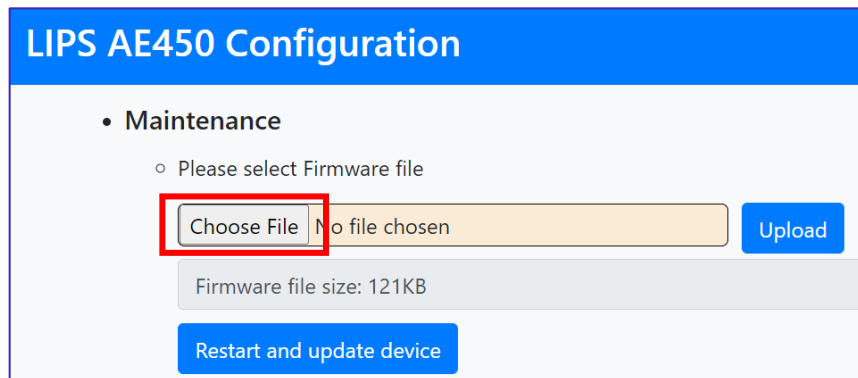
4. Extract the downloaded file.



5. Log onto the camera's web interface. For details, refer to *Chapter3 3.2-C*.
6. From the top bar, select **System Maintenance**.



7. Scroll down to the **Maintenance** section and select the downloaded firmware from your PC / laptop.



LIPS AE450 Configuration

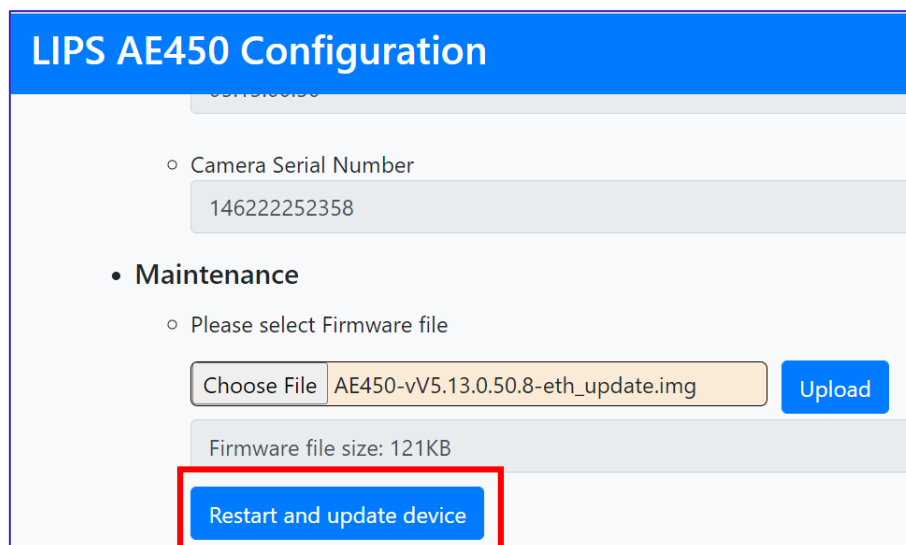
- **Maintenance**
 - Please select Firmware file

Choose File No file chosen Upload

Firmware file size: 121KB

Restart and update device

8. Click **Restart and Update device**.



LIPS AE450 Configuration

- Camera Serial Number

14622252358

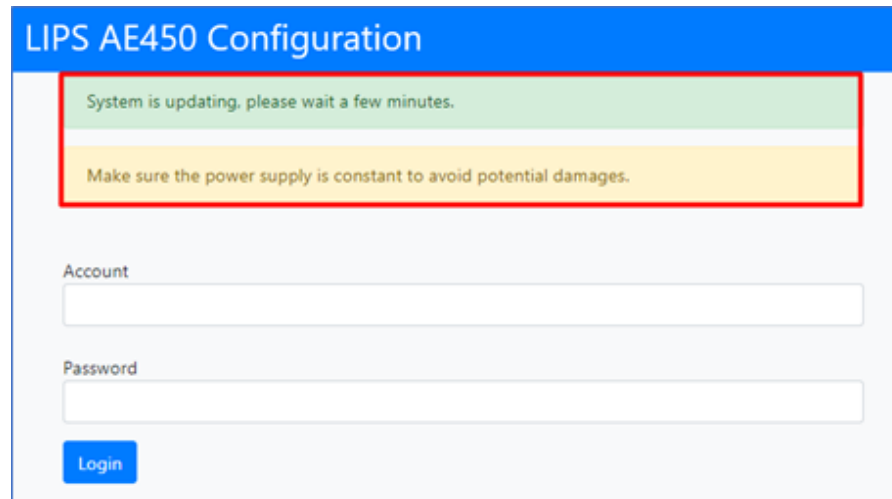
- **Maintenance**
 - Please select Firmware file

Choose File AE450-vV5.13.0.50.8-eth_update.img Upload

Firmware file size: 121KB

Restart and update device

9. The system logs out to start the updating process. The process takes about 8 minutes.



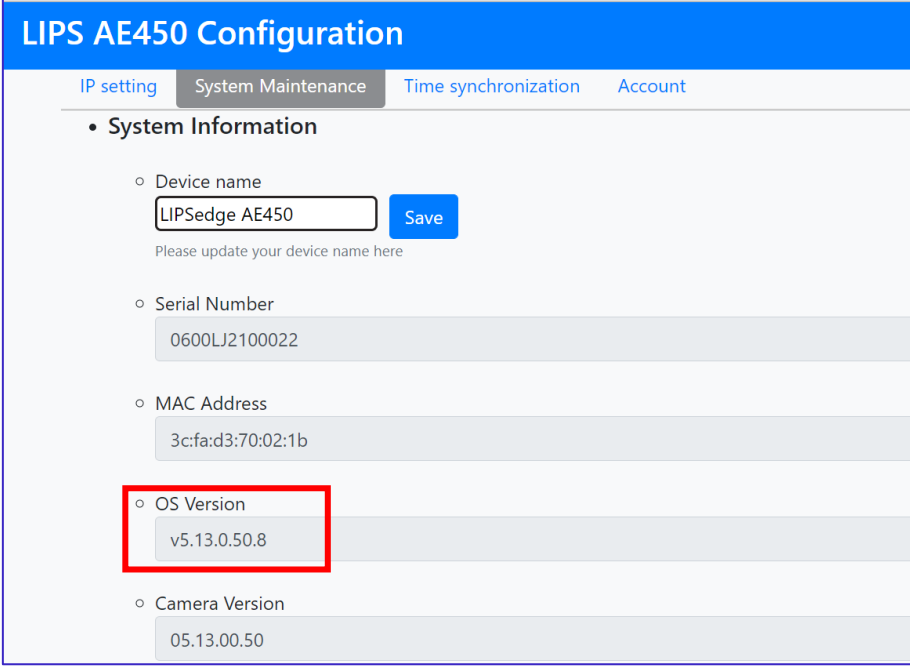
WARNING: Power interruption during the updating process damages the camera. During the 8-minute updating period, make sure the power supply is constant to avoid potential damage. If damages occur to the camera, contact info@lips-hci.com.

10. To verify the update, start the **Command Prompt**. Type the following command and wait until the camera responds. Response after a few time-out requests indicate the update was successful.

ping [Default IP Address] -t

```
C:\Users\000200>ping 192.168.0.100 -t
Pinging 192.168.0.100 with 32 bytes of data:
Request timed out.
Request timed out.
Reply from 192.168.0.100: bytes=32 time<1ms TTL=64
Reply from 192.168.0.100: bytes=32 time<1ms TTL=64
Reply from 192.168.0.100: bytes=32 time<1ms TTL=64
Reply from 192.168.0.100: bytes=32 time<1ms TTL=64
Ping statistics for 192.168.0.100:
    Packets: Sent = 6, Received = 4, Lost = 2 (33% loss),
    Reply from 192.168.0.100: Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
bytes=32 Control-C
^C
C:\Users\000200>
```

11. Log onto the Web Interface of LIPSedge™ AE450 camera. Under System Maintenance, you can see the firmware version if successfully updated.



LIPS AE450 Configuration

IP setting | **System Maintenance** | Time synchronization | Account

• System Information

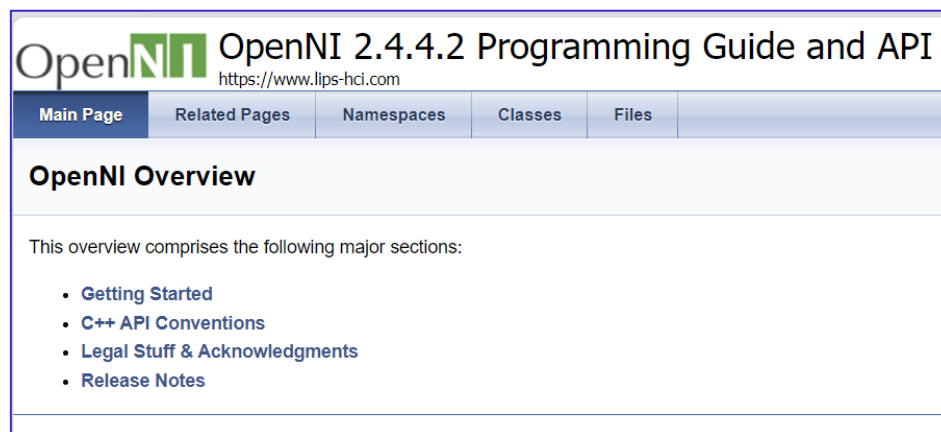
- Device name

Please update your device name here
- Serial Number
- MAC Address
- OS Version
- Camera Version

Note: If the LIPSedge™ AE400 / AE450's IP address had been changed, the camera's IP address will be **restored to the default IP address of 192.168.0.100**. In multiple connection cases, avoid using the default IP address for other cameras as the update process can cause IP address conflict. Make sure the host PC / laptop is under the same subnet as your camera for camera connection.

4. APIs

LIPSedge™ AE400 / AE450 SDK is integrated with OpenNI APIs. The key strength of this robust framework lies in its effortless access to the camera's internal parameters, empowering developers to delve deep into raw data and tailor applications to specific functionalities. Developers can access the programming guide for the API at: **/LIPSedge[Model]-SDK/Documentation.**

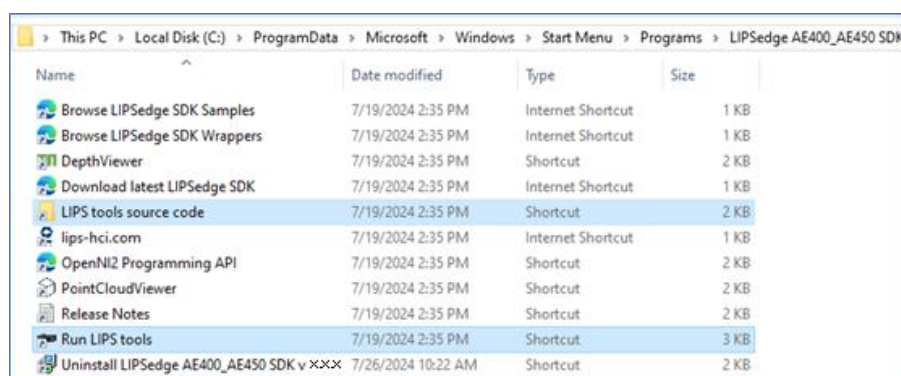


1. **Main Page:** This tab provides a clear overview of the OpenNI API, including a quick installation guide, an introduction to the coding conventions, legal documents, and the release notes.
2. **Related Pages:** This tab provides a selection of the information that is related to OpenNI.
3. **Namespaces:** This tab provides users with a hierarchical structure of namespaces that categorize the API's specific functionalities.
4. **Classes:** This tab dives deeper into each individual class within the OpenNI API, outlining its properties and methods to enable developers to fully understand and utilize each element.
5. **Files:** This tab provides a description of the source code files that make up the OpenNI API.

5. Tools

LIPSedge™ AE400 / AE450 SDK provides a series of executable tools and their source code essential for visualization, data capture, camera parameters acquisition et cetera to facilitate the development of applications and solutions for LIPSedge™ AE400 / AE450 cameras. These tools and their system components are placed in the following folder:

- **Run LIPS tools Source code:** Contains a series of executable tools; users can refer to **Chapter 5.1 Samples codes** for reference.
- **LIPS tools source code:** Contains a series of the source code of these tools. Users can refer to **Chapter 5.2 Compilation** for reference. These codes can also be downloaded from the link below for the latest updates: <https://github.com/lips-hci/LIPSedge-sdk-samples>



Name	Date modified	Type	Size
Browse LIPSedge SDK Samples	7/19/2024 2:35 PM	Internet Shortcut	1 KB
Browse LIPSedge SDK Wrappers	7/19/2024 2:35 PM	Internet Shortcut	1 KB
DepthViewer	7/19/2024 2:35 PM	Shortcut	2 KB
Download latest LIPSedge SDK	7/19/2024 2:35 PM	Internet Shortcut	1 KB
LIPS tools source code	7/19/2024 2:35 PM	Shortcut	2 KB
lips-hci.com	7/19/2024 2:35 PM	Internet Shortcut	1 KB
OpenNI2 Programming API	7/19/2024 2:35 PM	Shortcut	2 KB
PointCloudViewer	7/19/2024 2:35 PM	Shortcut	2 KB
Release Notes	7/19/2024 2:35 PM	Shortcut	2 KB
Run LIPS tools	7/19/2024 2:35 PM	Shortcut	3 KB
Uninstall LIPSedge AE400_AE450 SDK v x.x.x	7/26/2024 10:22 AM	Shortcut	2 KB

5.1 Sample codes

A. CameraParameterViewer

A simple OpenNI2 tool to query supported video modes and list camera intrinsic/extrinsic parameters.

1. In **Bin**, click **CameraParameterViewer.exe**.

OpenNI2	7/19/2024 2:35 PM	File folder	
CameraParameterViewer	6/28/2024 1:18 PM	Application	33 KB
CameraCenterViewer	6/18/2024 8:11 PM	Application	17 KB
CameraSimpleViewer	7/1/2024 10:51 AM	Application	361 KB
OpenNI	2/23/2024 5:24 PM	Configuration sett...	1 KB
OpenNI2.dll	6/18/2024 8:11 PM	Application exten...	311 KB
PointCloudViewer	6/28/2024 6:26 PM	Application	409 KB
RawFileViewer	6/12/2024 2:08 PM	Application	354 KB
LIPSimuReader_AE400_450	6/18/2024 8:11 PM	Application	17 KB
EventBasedViewer-gl	6/18/2024 8:11 PM	Application	17 KB

2. Provides detailed camera parameters for depth, IR, and color cameras.

```

C:\Program Files\LIPSedge Camera SDK 1.01\AE400_AE450
Fx: 387.424744
Fy: 386.486694
Cx: 327.046783
Cy: 240.241409
HFOV: 79.10
VFOV: 63.68
Distortion Coeffs:
Radial: k1 k2 k3 k4
        -0.056398 0.060609 0.000000
Tangential: p1 p2
            -0.000463 0.000328
Extrinsic Parameters:
Extrinsic from "Color" To "Depth" :

```

B. LIPSImuReader

A simple OpenNI2 console program to show depth value at the center point of the frame.

1. In **Tools**, click **lips-imu-reader.exe**.

Name	Date modified	Type	Size
OpenNI2	7/19/2024 2:35 PM	File folder	
CameraParameterViewer	6/28/2024 1:18 PM	Application	33 KB
CameraCenterViewer	6/18/2024 8:11 PM	Application	17 KB
CameraSimpleViewer	7/1/2024 10:51 AM	Application	361 KB
OpenNI	2/23/2024 5:24 PM	Configuration sett...	1 KB
OpenNI2.dll	6/18/2024 8:11 PM	Application exten...	311 KB
PointCloudViewer	6/28/2024 6:26 PM	Application	409 KB
RawFileViewer	6/12/2024 2:08 PM	Application	354 KB
LIPSImuReader_AE400_450	6/18/2024 8:11 PM	Application exten...	311 KB
EventBasedViewer-gl	6/18/2024 8:11 PM	Application exten...	311 KB

2. A window containing 100 frames of IMU detection results pops up.

```

C:\Program Files\OpenNI2\Tools\Ni2ImuReader.exe
Running: Ni2ImuReader 100 100
[1] Gyro (X,Y,Z) = (0.63, -20.3, -18.83), Accel (X,Y,Z) = (0.086681, -0.124196, -1.02206)
[2] Gyro (X,Y,Z) = (0.63, -20.23, -18.83), Accel (X,Y,Z) = (0.08601, -0.124013, -1.00833)
[3] Gyro (X,Y,Z) = (0.63, -20.16, -18.83), Accel (X,Y,Z) = (0.100711, -0.124257, -1.01199)
[4] Gyro (X,Y,Z) = (0.56, -20.16, -18.9), Accel (X,Y,Z) = (0.08601, -0.124623, -1.01412)
[5] Gyro (X,Y,Z) = (0.56, -20.23, -18.83), Accel (X,Y,Z) = (0.085888, -0.140605, -1.03102)
[6] Gyro (X,Y,Z) = (0.63, -20.3, -18.83), Accel (X,Y,Z) = (0.086132, -0.124867, -1.03389)
[7] Gyro (X,Y,Z) = (0.63, -20.3, -18.83), Accel (X,Y,Z) = (0.086132, -0.14091, -1.03468)
[8] Gyro (X,Y,Z) = (0.63, -20.3, -18.83), Accel (X,Y,Z) = (0.087474, -0.124562, -1.03645)
[9] Gyro (X,Y,Z) = (0.7, -20.23, -18.83), Accel (X,Y,Z) = (0.086437, -0.124684, -1.03517)
[10] Gyro (X,Y,Z) = (0.63, -20.16, -18.83), Accel (X,Y,Z) = (0.101443, -0.141032, -1.02541)
[11] Gyro (X,Y,Z) = (0.56, -20.16, -18.9), Accel (X,Y,Z) = (0.086559, -0.141947, -1.0251)
[12] Gyro (X,Y,Z) = (0.63, -20.23, -18.9), Accel (X,Y,Z) = (0.100955, -0.141459, -1.02767)

```

C. CameraCenterViewer

A simple OpenNI2 console program to show depth value at the center point of the frame.

3. In **Bin**, click **CameraCenterViewer.exe**.

Name	Date modified	Type	Size
OpenNI2	7/19/2024 2:35 PM	File folder	
CameraParameterViewer	6/28/2024 1:18 PM	Application	33 KB
CameraCenterViewer	6/18/2024 8:11 PM	Application	17 KB
CameraSimpleViewer	7/1/2024 10:51 AM	Application	361 KB
OpenNI	2/23/2024 5:24 PM	Configuration sett...	1 KB
OpenNI2.dll	6/18/2024 8:11 PM	Application exten...	311 KB
PointCloudViewer	6/28/2024 6:26 PM	Application	409 KB
RawFileViewer	6/12/2024 2:08 PM	Application	354 KB
LIPSimuReader_AE400_450	6/18/2024 8:11 PM	Application exten...	311 KB
EventBasedViewer-gl	6/18/2024 8:11 PM	Application exten...	311 KB

4. A simple OpenNI2 console program to show depth value at the center point of the frame.

```

C:\Program Files\LIPSEdge Camera SDK 1.01\AE400_AE4
network setting is found at network.json
Read local network config.
[1 - 1696571885535705] 0
[2 - 1696571885598398] 0
[3 - 1696571885657896] 0
[4 - 1696571885718331] 0
[5 - 1696571885779117] 0
[6 - 1696571885840109] 0
[7 - 1696571885899929] 0
[8 - 1696571885959931] 0
[9 - 1696571886019631] 0
[10 - 1696571886079505] 0
[11 - 1696571886140021] 0

```

D. EventBasedViewer-gl (Coming Soon)

OpenNI2 device management by event-driven design.

1. In **Bin**, click **EventBasedViewer-gl.exe**.

Name	Date modified	Type	Size
OpenNI2	7/19/2024 2:35 PM	File folder	
CameraParameterViewer	6/28/2024 1:18 PM	Application	33 KB
CameraCenterViewer	6/18/2024 8:11 PM	Application	17 KB
CameraSimpleViewer	7/1/2024 10:51 AM	Application	361 KB
OpenNI	2/23/2024 5:24 PM	Configuration sett...	1 KB
OpenNI2.dll	6/18/2024 8:11 PM	Application exten...	311 KB
PointCloudViewer	6/28/2024 6:26 PM	Application	409 KB
RawFileViewer	6/12/2024 2:08 PM	Application	354 KB
LIPSimuReader_AE400_450	6/18/2024 8:11 PM	Application exten...	311 KB
EventBasedViewer-gl	6/18/2024 8:11 PM	Application exten...	311 KB

2. The EventBasedViewer-gl provides notifications when the device becomes disconnected.

```

----- DeviceDisconnect -----
Vendor : LIPS
Name : edge
VID/PID: 2df2 / 213
URL : \\?\usb#vid_2df2&pid_0213#200901010001#{a5dcbf10-6530-11d2-901f-00c04fb951ed}

2023-10-02 14:21:46.631 INFO Device disconnected: LIPS edge (\\?\usb#vid_2df2&pid_0213#200901010001#{a5dcbf10-6530-11d2-901f-00c04fb951ed})
IR stream stopped.
Depth stream stopped.
Color stream stopped.
2023-10-02 14:21:47.637 INFO Release camera resources
Device closed.

```

3. When users reconnect the device, the system promptly re-establishes the connection, granting access to streaming for Depth, IR, and RGB data.

```

+++++++ DeviceConnect ++++++
Vendor : LIPS
Name : edge
VID/PID: 2df2 / 213
URL : \\?\usb#vid_2df2&pid_0213#200901010001#{a5dcbf10-6530-11d2-901f-00c04fb951ed}
+++++++

2023-10-02 14:27:01.675 INFO Device connected: LIPS edge (\\?\usb#vid_2df2&pid_0213#200901010001#{a5dcbf10-6530-11d2-901f-00c04fb951ed})

===== DeviceStateChange =====
Vendor : LIPS
Name : edge
VID/PID: 2df2 / 213
URL : \\?\usb#vid_2df2&pid_0213#200901010001#{a5dcbf10-6530-11d2-901f-00c04fb951ed}
State : DEVICE_STATE_OK
=====

```

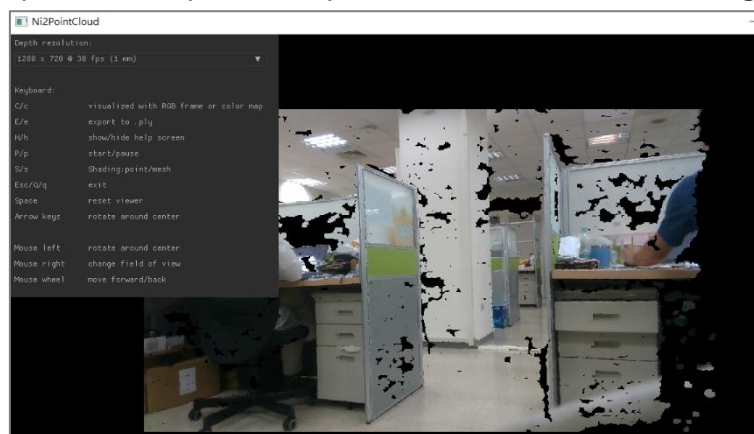
E. PointCloudViewer

A tool for 3D point cloud visualization through OpenGL.

1. In **Bin**, start **PointCloudViewer**

Name	Date modified	Type	Size
OpenNI2	7/19/2024 2:35 PM	File folder	
CameraParameterViewer	6/28/2024 1:18 PM	Application	33 KB
CameraCenterViewer	6/18/2024 8:11 PM	Application	17 KB
CameraSimpleViewer	7/1/2024 10:51 AM	Application	361 KB
OpenNI	2/23/2024 5:24 PM	Configuration sett...	1 KB
OpenNI2.dll	6/18/2024 8:11 PM	Application exten...	311 KB
PointCloudViewer	6/28/2024 6:26 PM	Application	409 KB
RawFileViewer	6/12/2024 2:08 PM	Application	354 KB
LIPSimuReader_AE400_450	6/18/2024 8:11 PM	Application exten...	311 KB
EventBasedViewer-gl	6/18/2024 8:11 PM	Application exten...	311 KB

2. Another OpenNI2 sample for 3D point cloud visualization through OpenGL.

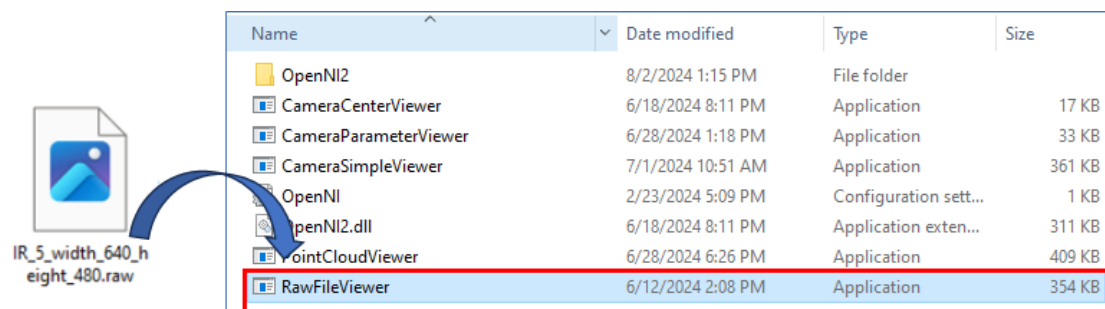


F. RawFileViewer

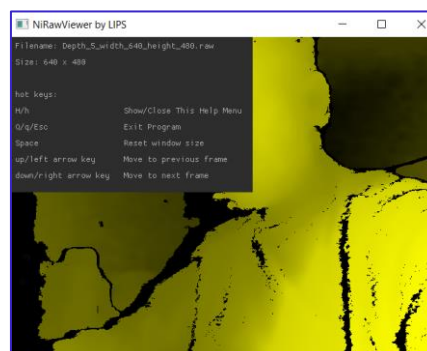
A tool for reading OpenNI2 frames captured in raw data format. To achieve this:

Name	Date modified	Type	Size
OpenNI2	7/19/2024 2:35 PM	File folder	
CameraParameterViewer	6/28/2024 1:18 PM	Application	33 KB
CameraCenterViewer	6/18/2024 8:11 PM	Application	17 KB
CameraSimpleViewer	7/1/2024 10:51 AM	Application	361 KB
OpenNI	2/23/2024 5:24 PM	Configuration sett...	1 KB
OpenNI2.dll	6/18/2024 8:11 PM	Application exten...	311 KB
PointCloudViewer	6/28/2024 6:26 PM	Application	409 KB
RawFileViewer	6/12/2024 2:08 PM	Application	354 KB
LIPSimuReader_AE400_450	6/18/2024 8:11 PM	Application exten...	311 KB
EventBasedViewer-gl	6/18/2024 8:11 PM	Application exten...	311 KB

1. Start DepthViewer. Make sure the camera is properly configured and connected.
2. Press C, and the current image will be captured.
3. Go to **LIPSEdge™ AE400_AE450 SDK > OpenNI2 > Tools**
4. Drag a raw image file to the RawFileViewer.

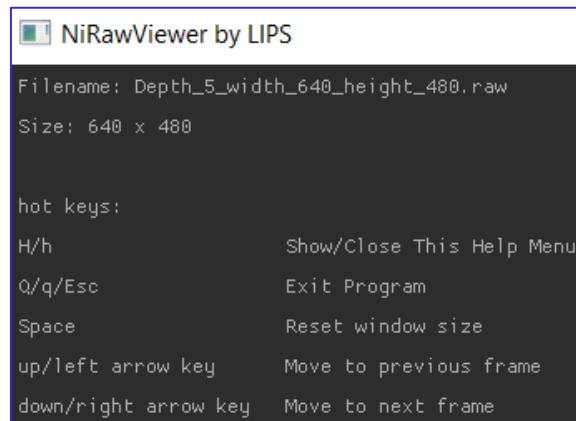


5. The raw image file will be displayed.



6. Users can navigate through the image with the following hotkeys:

- **H / h**: Displays / turn off the help menu.
- **Q / q / Esc**: Exit NiRawViewer-gl.
- **Space**: Reset adjusted window size to its original resolution.
- **Up / Left arrow key**: Displays the previous frame.
- **Down / Right arrow key**: Displays the next frame.



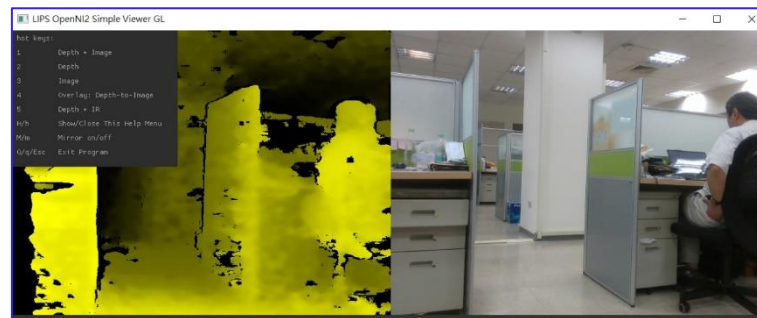
G.CameraSimpleViewer

A simplified version of DepthViewer using OpenCV to display Depth/IR/Color frames.

1. In **Bin**, start **CameraSimpleViewer.exe**

Name	Date modified	Type	Size
OpenNI2	7/19/2024 2:35 PM	File folder	
CameraParameterViewer	6/28/2024 1:18 PM	Application	33 KB
CameraCenterViewer	6/18/2024 8:11 PM	Application	17 KB
CameraSimpleViewer	7/1/2024 10:51 AM	Application	361 KB
OpenNI	2/23/2024 5:24 PM	Configuration sett...	1 KB
OpenNI2.dll	6/18/2024 8:11 PM	Application exten...	311 KB
PointCloudViewer	6/28/2024 6:26 PM	Application	409 KB
RawFileViewer	6/12/2024 2:08 PM	Application	354 KB
LIPSimuReader_AE400_450	6/18/2024 8:11 PM	Application exten...	311 KB
EventBasedViewer-gl	6/18/2024 8:11 PM	Application exten...	311 KB

2. A simplified version of DepthViewer using OpenCV to display Depth/IR/Color frames.



5.2 Compilation

Examples application's source code: The source code of the executable tools in LIPSedgeSamples. Refer to *Chapter5 5.1*. In cases where the source code is corrupted, LIPS Corp. provides the source code on LIPS Corp.'s GitHub.

Application name	Source code
LIPSCameraMatrix	LIPSedge-sdk-samples/LIPSCameraMatrix at main · lips-hci/LIPSedge-sdk-samples · GitHub
LIPSImuReader	LIPSedge-sdk-samples/LIPSImuReader at main · lips-hci/LIPSedge-sdk-samples · GitHub
Ni2CenterRead	LIPSedge-sdk-samples/Ni2CenterRead at main · lips-hci/LIPSedge-sdk-samples · GitHub
Ni2EventBasedViewer-gl	LIPSedge-sdk-samples/Ni2EventBasedViewer-gl at main · lips-hci/LIPSedge-sdk-samples · GitHub
Ni2PointCloud-gl	LIPSedge-sdk-samples/Ni2PointCloud-gl at main · lips-hci/LIPSedge-sdk-samples · GitHub
Ni2RawViewer-gl:	LIPSedge-sdk-samples/Ni2RawViewer-gl at main · lips-hci/LIPSedge-sdk-samples · GitHub
Ni2SimpleViewer-cv	LIPSedge-sdk-samples/Ni2SimpleViewer-cv at main · lips-hci/LIPSedge-sdk-samples · GitHub
Ni2SimpleViewer-gl:	LIPSedge-sdk-samples/Ni2SimpleViewer-gl at main · lips-hci/LIPSedge-sdk-samples · GitHub

6. Supported Language & Wrappers

LIPSedge™ AE400 / AE450 SDK supports various programming Languages/ Libraries/ Frameworks to enhance the development project. These programming language-based SDK and libraries/ frameworks are available at [LIPS-HCI · GitHub](#).

Type	Name	Description	GitHub Link
Language	Python3	Support Python3	python3 · GitHub
	.NET	Support for .NET languages with examples in C#	.NET GitHub
	C#	Support C#	Coming Soon.
	Java	Support Java	Coming Soon.
Library	OpenCV	Integration with OpenCV computer-vision library	OpenCV GitHub
	PCL	Integration with Point Cloud Library	Coming Soon.
Framework	ROS	Integration with Robot Operating System (ROS)	Coming Soon.
	ROS2	Integration with Robot Operating System 2 (ROS 2)	Coming Soon.
	ISAAC	Support NV Isaac robot platform as depth camera data provider	Coming Soon.
	Halcon	Integration with HALCON development environment	Coming Soon.

7. Application & Middleware

In addition to the LIPSedge™ AE400 / AE450, LIPS Corp. also offers a diverse range of advanced 3D cameras and comprehensive solutions that cater to various imaging and sensing requirements. For details, refer to the following chapter:

7.1 Applications

LIPS Corp. offers a wide range of advanced 3D camera kits. These offerings encompass various technologies to cater to diverse imaging and sensing requirements. For details, refer to. <https://www.lips-hci.com/>.

- LIPSMetric™
- LIPSense™

7.2 Middleware

LIPS Corp. offers exclusive middleware solutions. These solutions encompass various technologies to cater to diverse imaging and sensing requirements. For details, refer to. <https://www.lips-hci.com/>.

- LIPSMetric™
- LIPSense™

8. SDK Tutorial

LIPS Corp. provides extensive support for a variety of SDKs. LIPS Corp.'s GitBook tutorial offers practical examples and applications with hands-on guidance based on the following platforms:

Name	Description
C++	https://lips-hci.gitbook.io/lips-developer-documentation/sdk-code-samples-and-languages-wrappers/openni2/overview
Python	https://lips-hci.gitbook.io/lips-developer-documentation/sdk-code-samples-and-languages-wrappers/openni2/overview-1
Java	https://lips-hci.gitbook.io/lips-developer-documentation/sdk-code-samples-and-languages-wrappers/openni2/overview-2
OpenCV	https://lips-hci.gitbook.io/lips-developer-documentation/sdk-code-samples-and-languages-wrappers/openni2/overview-3
GenICam	https://lips-hci.gitbook.io/lips-developer-documentation/sdk-code-samples-and-languages-wrappers/openni2/genicam
ROS	https://lips-hci.gitbook.io/lips-developer-documentation/sdk-code-samples-and-languages-wrappers/openni2/overview-4

9. Appendix

9.1 Regulatory Compliance Notice



FCC Compliance

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

Caution: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.



FCC Label Notice



This device complies with part 15 of the FCC Rules. Operation is subject to the following conditions:

- (1) This device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.



CE Compliance

This is a Class B product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.



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