Sense The World

LIPS SDK V1.6.0.0

User’s Guide

Although every effort has been made to ensure the accuracy of this manual, errors and inconsistencies may remain. The manufacturer assumes no liability resulting from errors or omission in this manual, even if damages arise from the use of the information. All contents are subject to constant revision to improve its reliability and may be changed without prior notice.

March 2020

Table of Contents

LIPS SDK Release Note

SDK V1.6.0.0 (for Windows) 2020-02-07

New:

- Support for OpenCV V3.4.1
- Support for system tools execution and sample code compilation on Ubuntu 18.04
- Support for new “Standby Mode” through Ni2PowerTest
- Ni2PowerTest sample code added

Fixed:

- Status Indicator failure when live streaming is turned off on Windows 10

Changed:

- Termination for OpenNI V1.5
- Termination for OpenCV V3.1 support
- Termination for system tools execution and sample code compilation on Ubuntu 14.04
- Recommended compiling tools changed from Microsoft Visual Studio 2012 (VC12) to Microsoft Visual Studio 2015 (VC14)

Known Issue:

- Status indicator continues to indicate depth / IR streaming at work despite the image streaming ends on Raspberry Pi 4

SDK V1.6.0.0 (for LInux) 2020-02-07

New:

- Support for OpenCV V3.4.1
- Support for system tools execution and sample code compilation on Ubuntu 18.04
- Support for new “Standby Mode” through Ni2PowerTest
- Ni2PowerTest sample code added

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- Termination for OpenNI V1.5
- Termination for OpenCV V3.1 support
- Termination for system tools execution and sample code compilation on Ubuntu 14.04

Known Issue:

- Status indicator continues to indicate depth / IR streaming at work despite the image streaming ends on Raspberry Pi 4

For detail information about the items on the release note, contact info@lips-hci.com.

LIPS SDK Installation Guide

Welcome to **LIP SDK Installation Guide**! This document provides a step-by-step guide for installing LIPS SDK on your LIPSedge^{TM} M3 camera.

1. Overview

Each LIPS camera works with a specific **LIPS SDK**, a middleware package compatible with **OpenNI 2.2**. Once installed, developers can access LIPS camera image / data or change camera configurations with LIPS SDK.

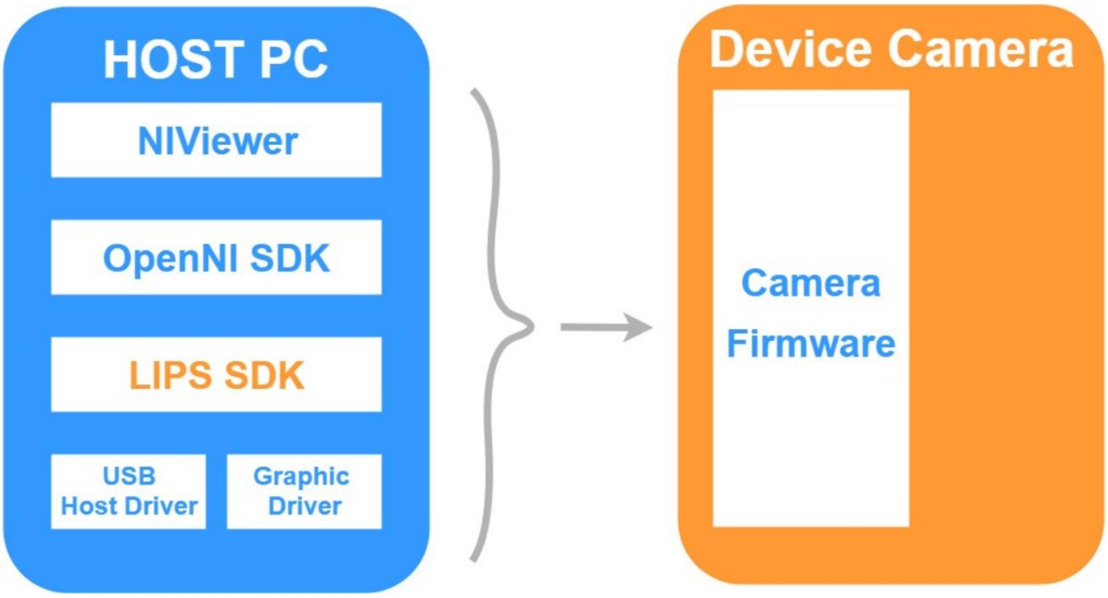


Figure 1-1

The support for LIPS SDK varies depending on the operating system of your PC / laptop. Install the LIPS SDK according on your operating system. For details, refer to *4. Installing LIPS SDK*.

2. Getting Started

2.1 Packing List

LIPS SDK is designed for supporting LIPSedge^{TM} M3 camera. Upon receiving the camera, verify if the package content matches with the items on the packing list. If anything was missing, contact info@lips-hci.com.

- LIPSedge^{TM} M3 camera

- USB 2.0 Y cable

2.2 Camera Accessories

The following list stated the extra accessory (sold separately) required for the installation. Prepare the following accessories before proceeding to the installation process:

No.	Items
1.	**Camera Accessory**
	For the installation of LIPSedge^{TM} M3, a tripod is required. LIPS Corp. does **NOT** provide these accessories in the package of LIPSedge^{TM} M3. You need to prepare your own tripod.
2.	**PC / Laptop**
	LIPS Motion Gesture runs on PC / laptops with 7th Generation 7th Generation Intel® Core™ i5 Processors, and Windows 10 64-bit system.

3. Hardware Installation

3.1 Hardware Overview

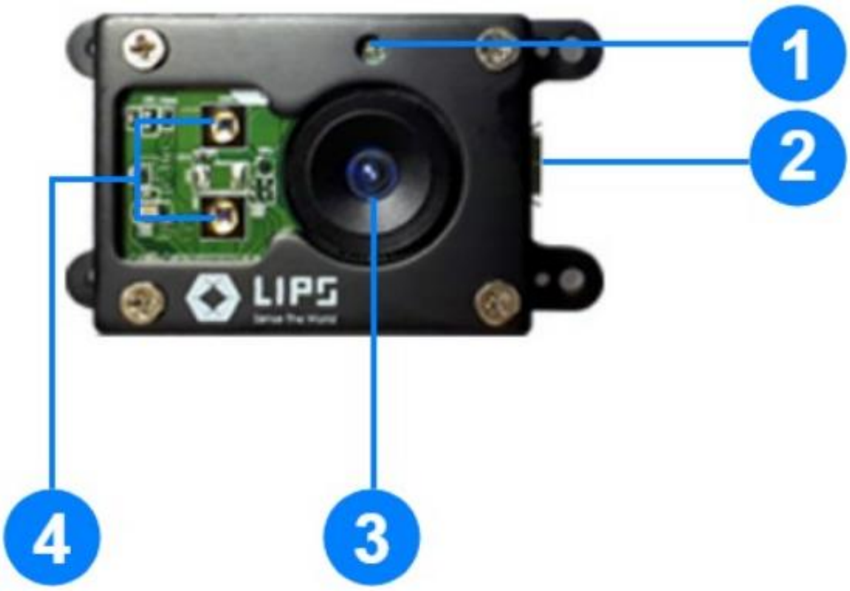


Figure 3-1

No.	Name	Function
1.	**Status Indicator**	Indicates the image streaming channel at work. – **Off**: No streaming taking place. – **Blue**: Depth / IR image streaming.
2.	**USB 2.0 Interface**	Connects to a USB 2.0 Y-Cable.
3.	**Depth Camera**	Collects depth data.
4.	**LED IR Emitter**	Emits IR signal for measuring depth value.

3.2 Hardware Requirements

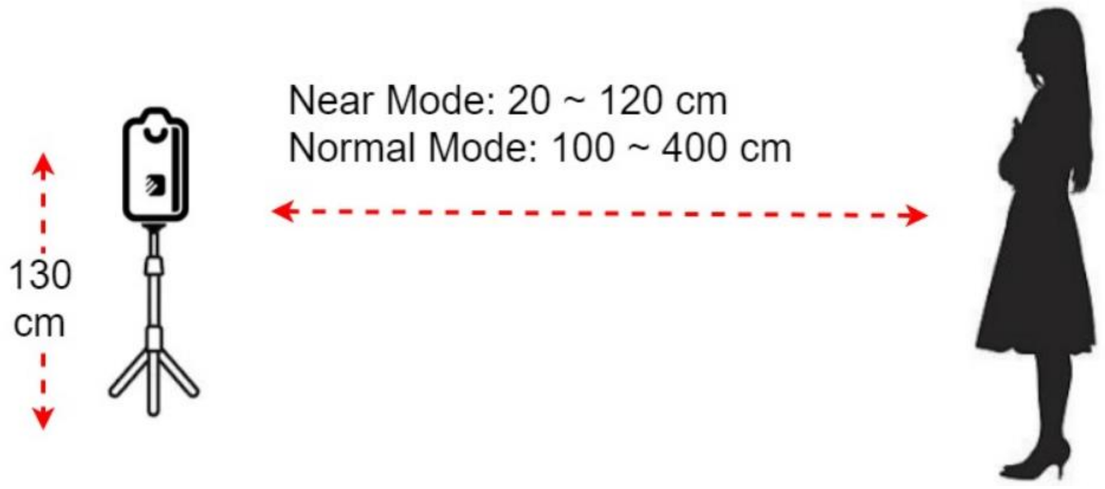


Figure 3-2

- **Working Distance:** Install the camera at approximately **20 ~ 400 cm** from the recognition target, depending on the working range for different scenarios. To adjust the camera's working range, refer to *7.4 Working Range Settings*.
- **Camera Position:** Install the camera on a **tripod**, facing the recognition 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 with an illumination level **above 1000 lux**.

3.3 Connecting the Camera

Follow the instructions to install your LIPS camera to your PC / laptop.

1. Plug the **Micro B end** of the USB Y Cable to the **LIPS camera**.

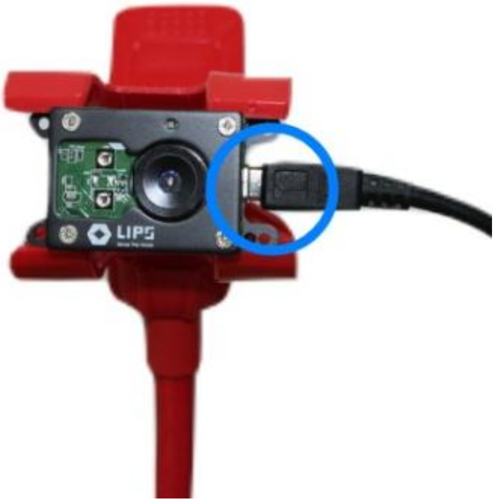


Figure 3-3

2. Plug both **Type-A end** of the **USB-Y Cable** to your PC / laptop.

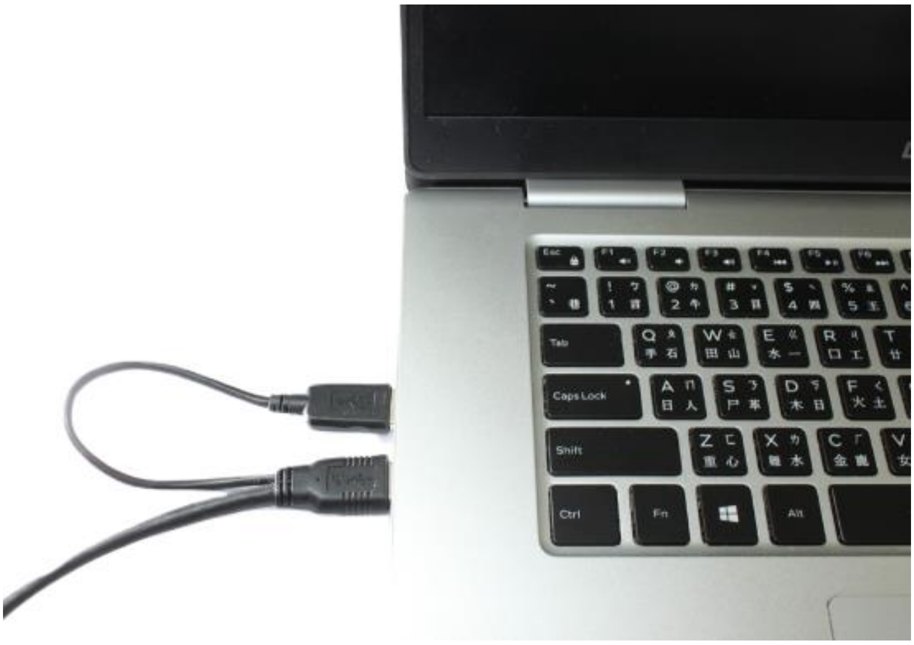


Figure 3-4

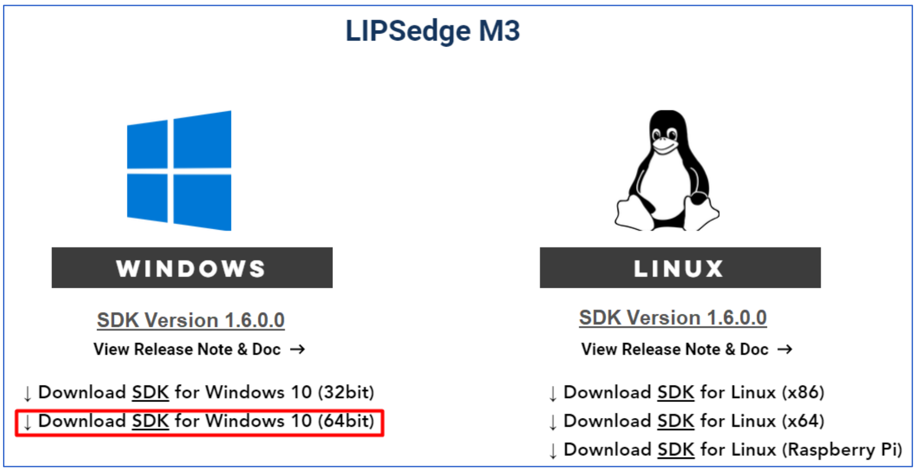
Windows

4. Installing LIPS SDK

Download and install the **LIPS SDK** on your host platform according to the operating system.

1. Go to our website: https://www.lips-hci.com/lipssdk.

2. Under **LIPSedge M3**, download the installation file according to your operating system.



LIPSedge M3

SDK Version 1.6.0.0
View Release Note & Doc →

↓ Download SDK for Windows 10 (32bit)
↓ Download SDK for Windows 10 (64bit)

SDK Version 1.6.0.0
View Release Note & Doc →

↓ Download SDK for Linux (x86)
↓ Download SDK for Linux (x64)
↓ Download SDK for Linux (Raspberry Pi)

Figure 4-1

Note: LIPSedge™ M3 supports Raspberry Pi 4 Model B on Linux system only. For details, refer to *12. Installing LIPS SDK, Linux*.

3. Download the SDK by the version of your choice.

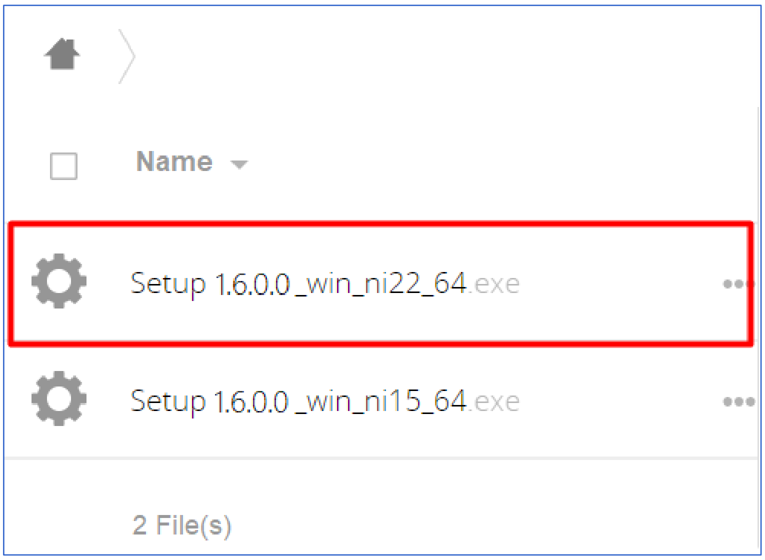
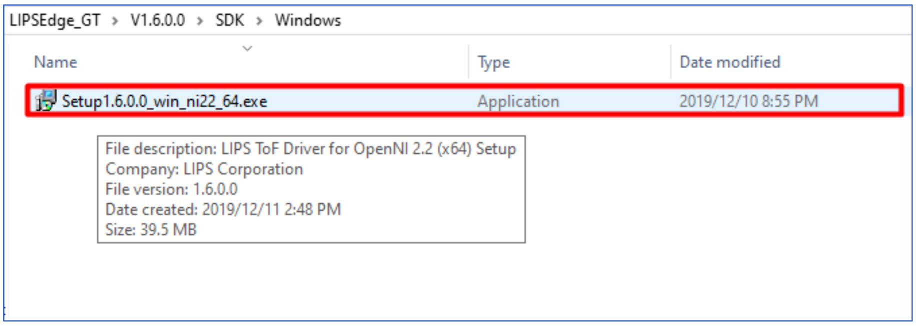

Name
Setup 1.6.0.0 _win_ni22_64.exe
Setup 1.6.0.0 _win_ni15_64.exe
2 File(s)

Figure 4-2

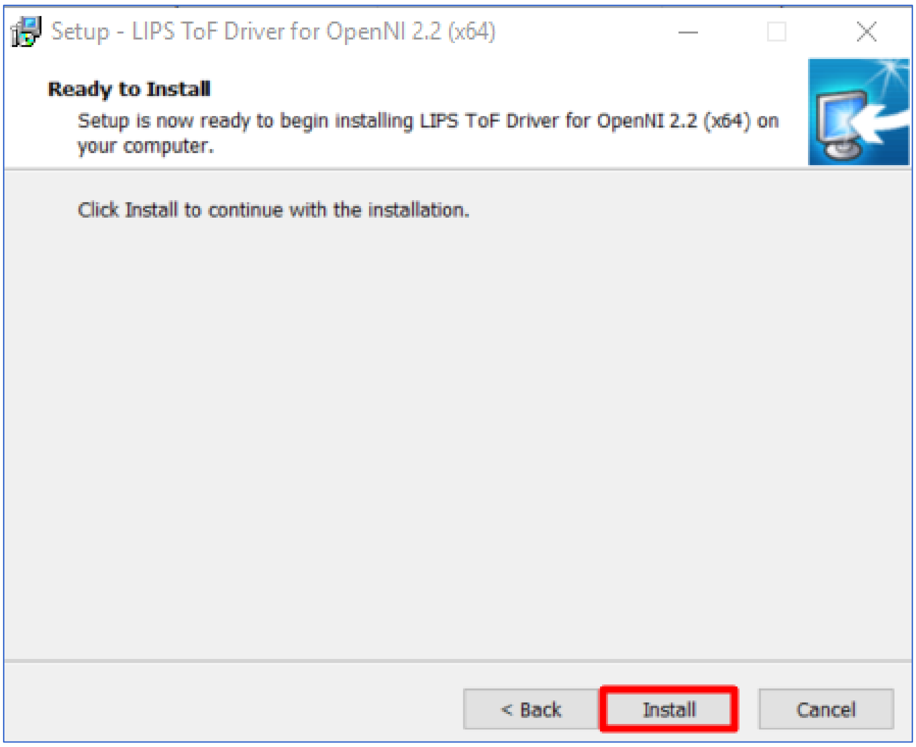
4. Unzip the downloaded file and double click the **Setup** program.


LIPSEdge_GT › V1.6.0.0 › SDK › Windows
Name
Type
Date modified
Setup1.6.0.0_win_ni22_64.exe
Application
2019/12/10 8:55 PM

File description: LIPS ToF Driver for OpenNI 2.2 (x64) Setup
Company: LIPS Corporation
File version: 1.6.0.0
Date created: 2019/12/11 2:48 PM
Size: 39.5 MB

Figure 4-3

5. Accept the **License Agreement**, click **Next** and click **Install**. The installation process starts.



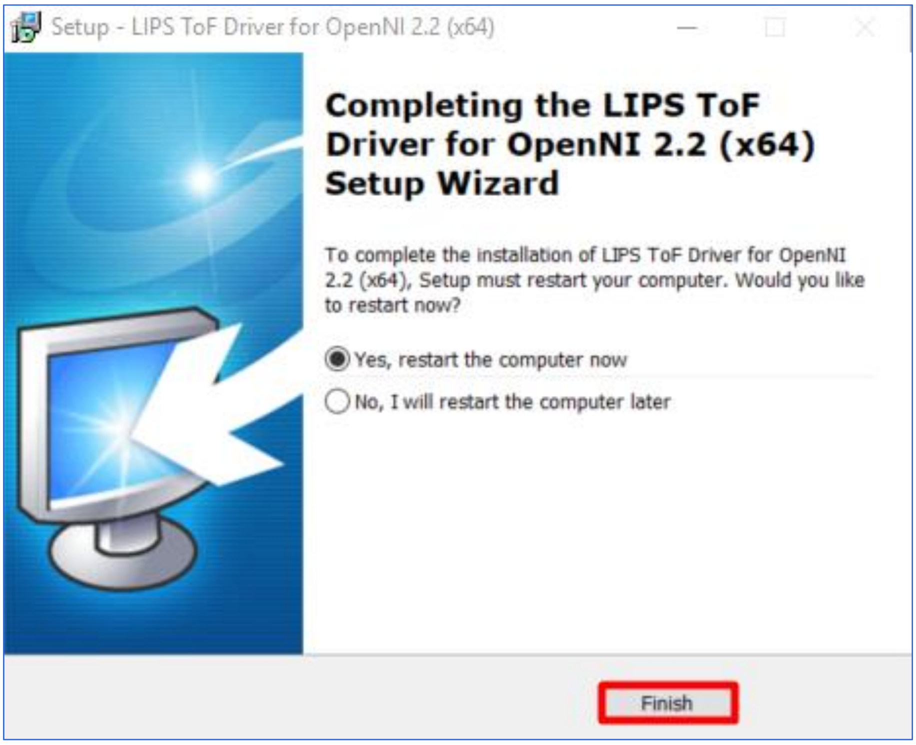
Ready to Install

Setup is now ready to begin installing LIPS ToF Driver for OpenNI 2.2 (x64) on your computer.

Click Install to continue with the installation.

Figure 4-4

6. Click **Finish** and restart your PC / Laptop.



Completing the LIPS ToF Driver for OpenNI 2.2 (x64) Setup Wizard

To complete the installation of LIPS ToF Driver for OpenNI 2.2 (x64), Setup must restart your computer. Would you like to restart now?

● Yes, restart the computer now

○ No, I will restart the computer later

Figure 4-5

5. Accessing Camera Image

Once the LIPS SDK is installed, a LIPSToFDemo folder containing the **NiViewer** program will be created. Through NiViewer, you can access the camera image and status. Note that your NiViewer is stored in different locations on your PC / laptop depending on your operating system.

1. On your desktop, click the **LIPSToFDemo** folder.

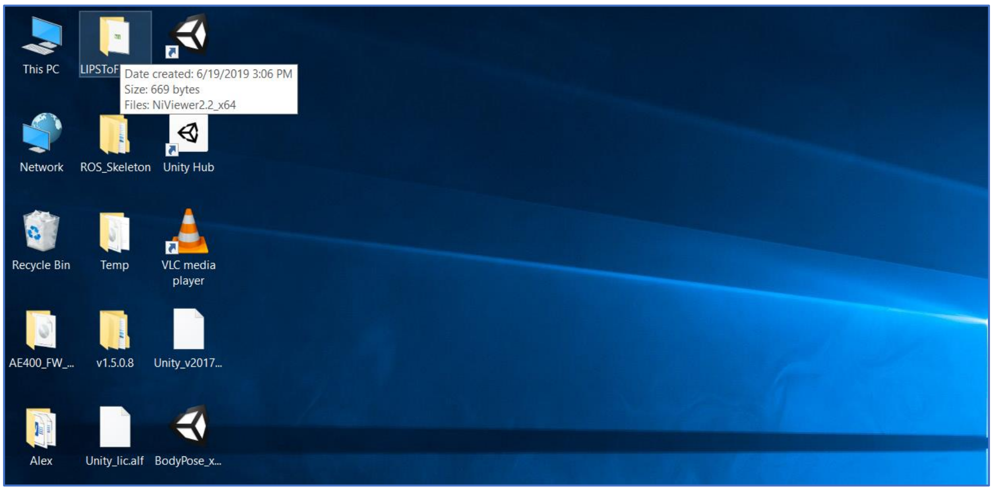
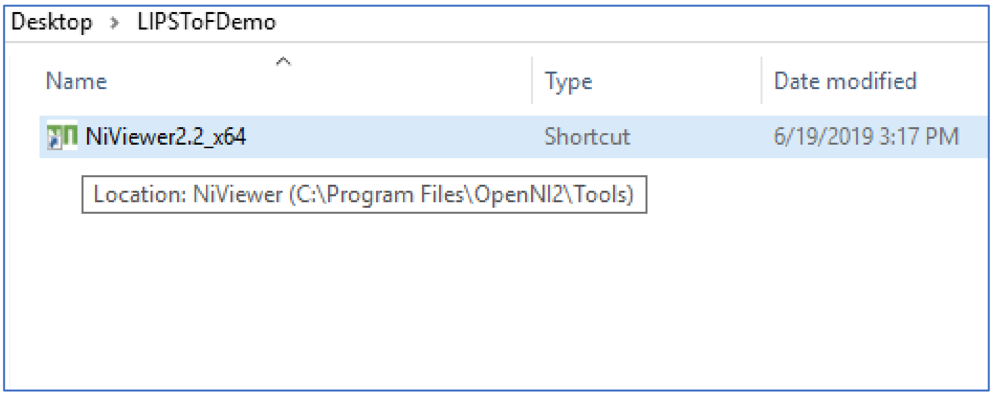


Figure 5-1

2. Open **NiViewer.exe**.



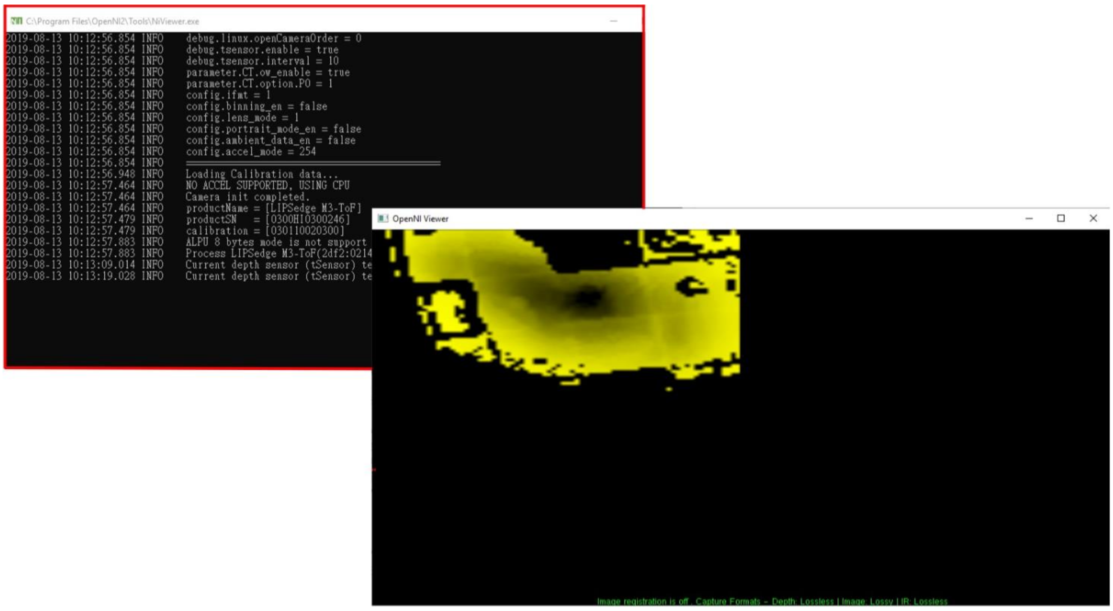
Desktop › LIPSToFDemo

Name	Type	Date modified
NiViewer2.2_x64	Shortcut	6/19/2019 3:17 PM

Location: NiViewer (C:\Program Files\OpenNI2\Tools)

Figure 5-2

3. Upon activation, a **Status Window** and a **Viewer Window** both pop up.

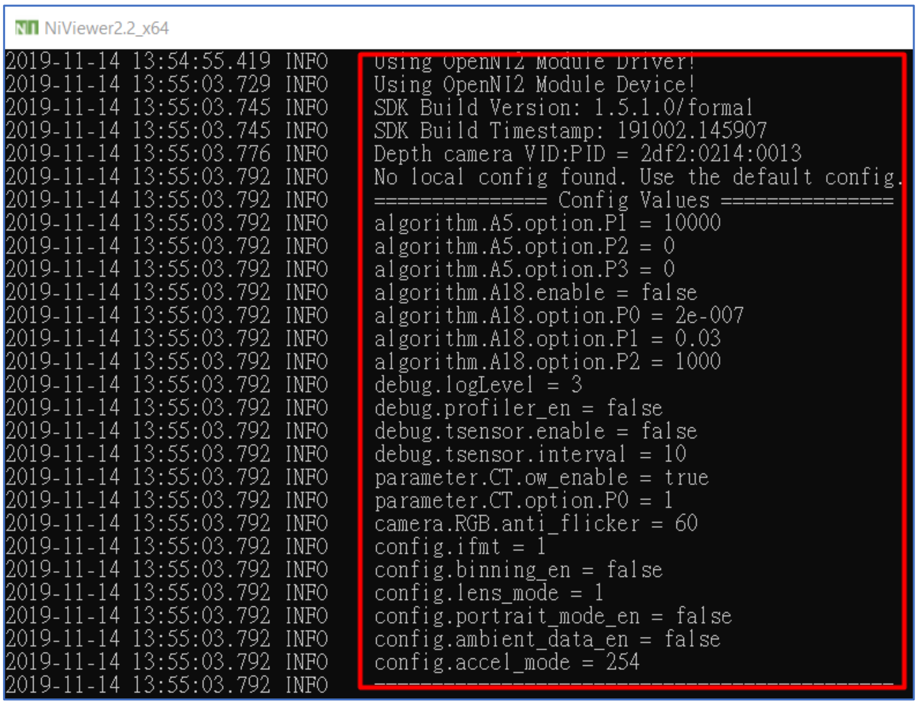


```
2019-08-13 10:12:56.854 INFO    debug.linux.openCameraOrder = 0
2019-08-13 10:12:56.854 INFO    debug.tsensor.enable = true
2019-08-13 10:12:56.854 INFO    debug.tsensor.interval = 10
2019-08-13 10:12:56.854 INFO    parameter.CT.ow_enable = true
2019-08-13 10:12:56.854 INFO    parameter.CT.option.P0 = 1
2019-08-13 10:12:56.854 INFO    config.ifmt = 1
2019-08-13 10:12:56.854 INFO    config.binning_en = false
2019-08-13 10:12:56.854 INFO    config.lens_mode = 1
2019-08-13 10:12:56.854 INFO    config.portrait_mode_en = false
2019-08-13 10:12:56.854 INFO    config.ambient_data_en = false
2019-08-13 10:12:56.854 INFO    config.accel_mode = 254
2019-08-13 10:12:56.854 INFO    ==========================================
2019-08-13 10:12:56.948 INFO    Loading Calibration data...
2019-08-13 10:12:57.464 INFO    NO ACCEL SUPPORTED, USING CPU
2019-08-13 10:12:57.464 INFO    Camera init completed.
2019-08-13 10:12:57.464 INFO    productName = [LIPSedge M3-ToF]
2019-08-13 10:12:57.479 INFO    productSN   = [0300HI0300246]
2019-08-13 10:12:57.479 INFO    calibration = [030110020300]
2019-08-13 10:12:57.883 INFO    ALPU 8 bytes mode is not support
2019-08-13 10:12:57.883 INFO    Process LIPSedge M3-ToF(2df2:0214
2019-08-13 10:13:09.014 INFO    Current depth sensor (tSensor) te
2019-08-13 10:13:19.028 INFO    Current depth sensor (tSensor) te
```

```
Image registration is off , Capture Formats - Depth: Lossless | Image: Lossy | IR: Lossless
```

Figure 5-3

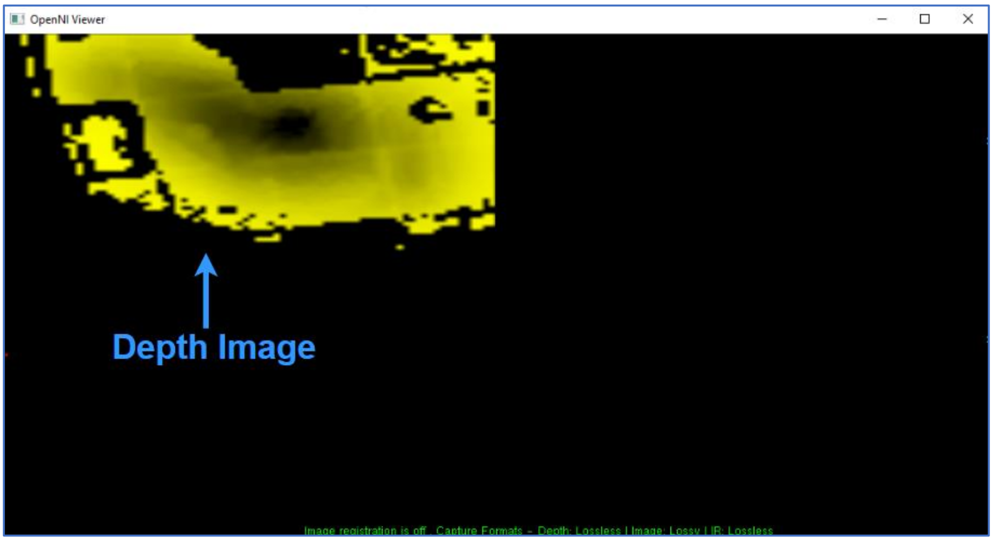
4. On the **Status Window**, you can view the camera information, such as SDK build version, SDK time stamp, camera ID, status.



```
2019-11-14 13:54:55.419 INFO    Using OpenNI2 Module Driver!
2019-11-14 13:55:03.729 INFO    Using OpenNI2 Module Device!
2019-11-14 13:55:03.745 INFO    SDK Build Version: 1.5.1.0/formal
2019-11-14 13:55:03.745 INFO    SDK Build Timestamp: 191002.145907
2019-11-14 13:55:03.776 INFO    Depth camera VID:PID = 2df2:0214:0013
2019-11-14 13:55:03.792 INFO    No local config found. Use the default config.
2019-11-14 13:55:03.792 INFO    =============== Config Values ===============
2019-11-14 13:55:03.792 INFO    algorithm.A5.option.P1 = 10000
2019-11-14 13:55:03.792 INFO    algorithm.A5.option.P2 = 0
2019-11-14 13:55:03.792 INFO    algorithm.A5.option.P3 = 0
2019-11-14 13:55:03.792 INFO    algorithm.A18.enable = false
2019-11-14 13:55:03.792 INFO    algorithm.A18.option.P0 = 2e-007
2019-11-14 13:55:03.792 INFO    algorithm.A18.option.P1 = 0.03
2019-11-14 13:55:03.792 INFO    algorithm.A18.option.P2 = 1000
2019-11-14 13:55:03.792 INFO    debug.logLevel = 3
2019-11-14 13:55:03.792 INFO    debug.profiler_en = false
2019-11-14 13:55:03.792 INFO    debug.tsensor.enable = false
2019-11-14 13:55:03.792 INFO    debug.tsensor.interval = 10
2019-11-14 13:55:03.792 INFO    parameter.CT.ow_enable = true
2019-11-14 13:55:03.792 INFO    parameter.CT.option.P0 = 1
2019-11-14 13:55:03.792 INFO    camera.RGB.anti_flicker = 60
2019-11-14 13:55:03.792 INFO    config.ifmt = 1
2019-11-14 13:55:03.792 INFO    config.binning_en = false
2019-11-14 13:55:03.792 INFO    config.lens_mode = 1
2019-11-14 13:55:03.792 INFO    config.portrait_mode_en = false
2019-11-14 13:55:03.792 INFO    config.ambient_data_en = false
2019-11-14 13:55:03.792 INFO    config.accel_mode = 254
2019-11-14 13:55:03.792 INFO    =============================================
```

Figure 5-4

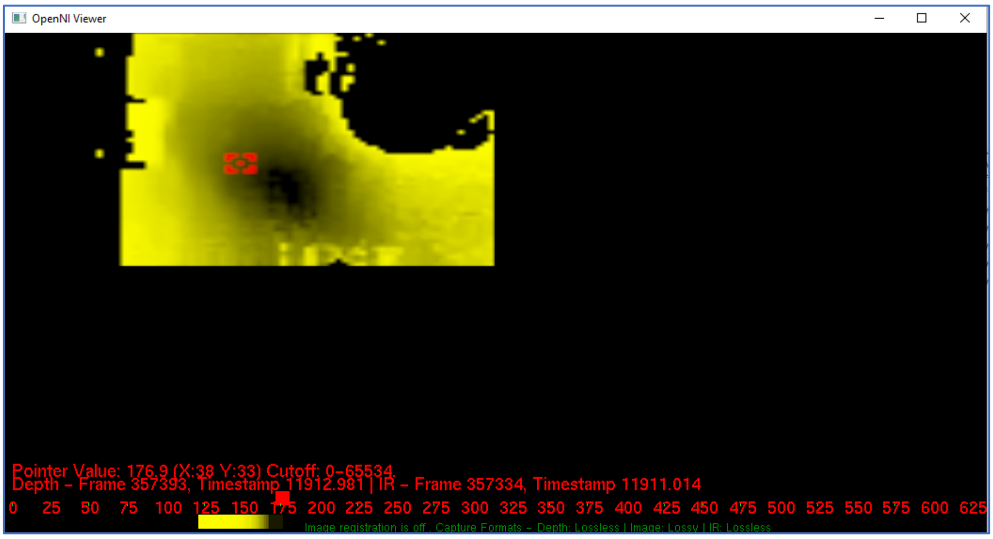
3. On the **Viewer Window**, the **Depth image** is displayed on screen



```
Image registration is off . Capture Formats - Depth: Lossless | Image: Lossy | IR: Lossless
```

Figure 5-5

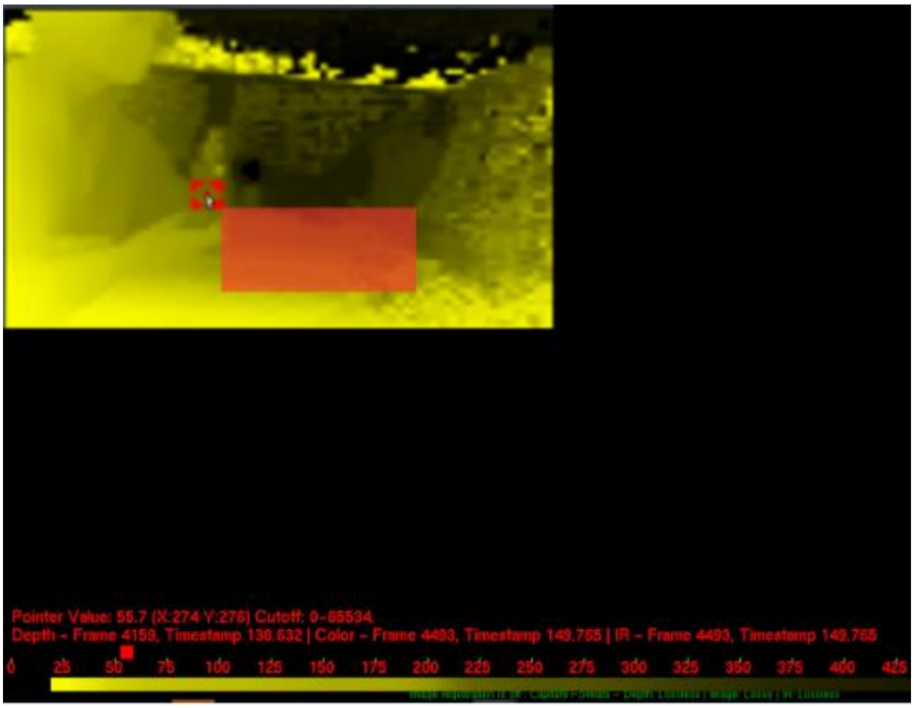
4. Press **p** to activate the **point mode**. The meter below shows the depth data of the given point marked by the indicator.



```
Pointer Value: 176.9 (X:38 Y:33) Cutoff: 0-65534.
Depth - Frame 357393, Timestamp 11912.981 | IR - Frame 357334, Timestamp 11911.014
0   25   50   75   100  125  150  175  200  225  250  275  300  325  350  375  400  425  450  475  500  525  550  575  600  625
Image registration is off . Capture Formats - Depth: Lossless | Image: Lossy | IR: Lossless
```

Figure 5-6

5. Optionally choose an area to display by dragging a cropping area with your cursor. The rest of the areas will be masked from displaying.

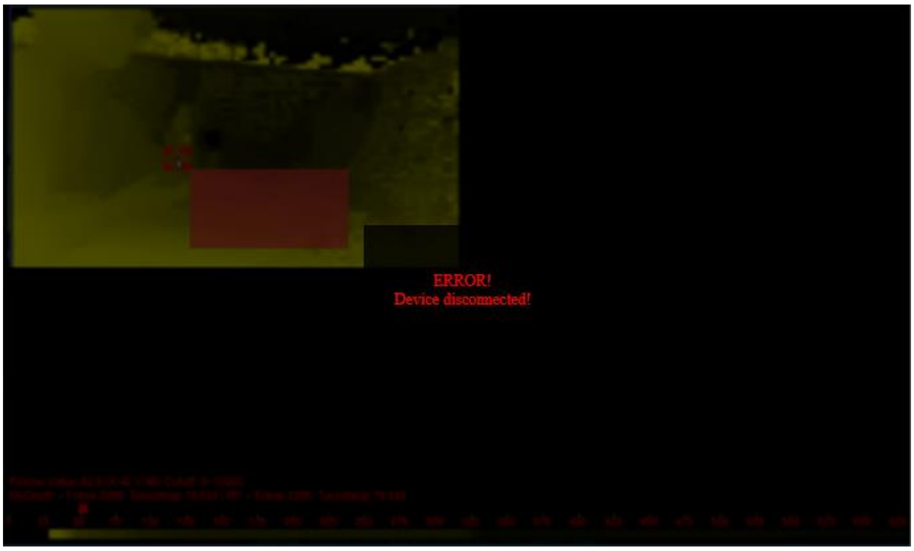


Pointer Value: 55.7 (X:274 Y:276) Cutoff: 0-65534
Depth - Frame 4159, Timestamp 138.632 | Color - Frame 4493, Timestamp 149.765 | IR - Frame 4493, Timestamp 149.765

Figure 5-7

6. Optionally press **F** to maximize / minimize the viewer’s window.

Note: If for any reason the USB cable is forcibly removed while NiViewer is functioning, an **ERROR! Device disconnected** message appears on the screen. To resume livestreaming, re-plug the USB cable.



ERROR!
Device disconnected!

NiViewer Settings

Right-click on the NiViewer window to access the following image settings.

Note: LIPSedge^{TM} M3 only supports depth / IR images and functions. IR images will be displayed when functions involving color streaming is selected.

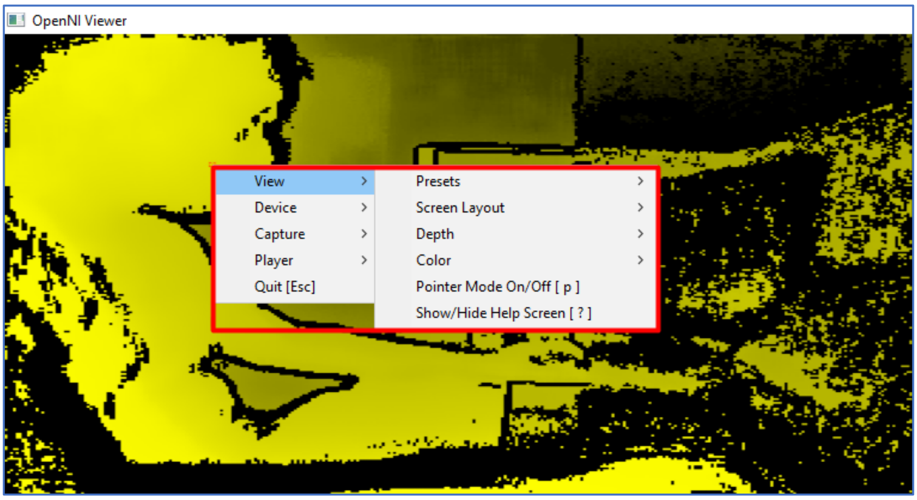


Figure 5-8

View

- **Presets**: Displays the depth / IR images in various styles. By default, depth / IR images are displayed **Side By Side**. Note this function is for evaluation purpose only.
- **Screen Layout**: Selects the arrangement for multiple camera images between **Side by Side** or **Overlay**. With **Side by Side** layout, depth / IR images are displayed side by side. With **Overlay**, depth / IR images are merged and displayed simultaneously.
- **Depth**: Displays the depth images in various styles or turns the depth image **Off**.
- **Color**: Select **Depth Masked Color** to display color images masked with depth grains or select **Normal** to display regular color images. Select **Off** to turns the depth image off.
- **Pointer Mode On / Off [p]**: Enables **Pointer Mode** to display depth value of a given point on camera images with a red dot.
- **Show / Hide Help Screen [?]**: Shows the **Help Screen** which contains the description of keyboard shortcuts with their functions.

Device

- **Streams**: Adjusts the image streaming settings of **depth** and **IR** images.
  - **Video Mode**: For **depth images**, select the grain size for each resolution. You can choose between **1 mm** and **100 µm**. Depth and IR images support the image resolution between **80 X 60 / 30FPS**. When the image resolution is changed, users can confirm the change in the Status Window message.
  - **Mirror**: Flips the streaming image horizontally.
  - **Reset Cropping**: Reset the cropping area previously assigned.
- **Registration**: Overlays the depth image onto the color image or turn the image overlap off.
- **Frame Sync [y]**: Synchronize the timing between depth / color images.
- **Mirror All [m]**: Flips the streaming image horizontally for every stream.

Capture

- **Depth Capturing**: Assign the image format for depth image stream when recording images.
- **Image Capturing**: Assign the image format for color image stream when recording images. Select **Lossless** to record the image at uncompressed quality or **Lossy** for compressed quality.
- **IR Capturing**: Assign the image format for IR image stream when recording images.
- **Browse**: Locate the recordings of camera images in your PC / laptop.
- **Start [s]**: Assign a path for saving the recording files and start recording images.
- **Start (5 sec delay) [d]**: Starts to record images 5 seconds upon clicking this function.
- **Restart**: Plays the recorded image again.
- **Stop [x]**: Stops recording camera image.

Player

- **Pause / Resume [Space]:** Pauses the playback of the recording or resumes playback.
- **Skip 1 / 10 frames forward / backward**: This function appears only when the playback is paused. Click to skip 1 / 10 frames forward / backward.
- **Toggle playback repeat [r]:** This function appears only when the playback is paused. Stops replaying the playback. By default, the playback will be replayed infinitely as the playback finished.
- **Increase / decrease playback speed:** This function appears only when the playback is paused. Adjust the playback speed.
- **Read one Frame [;]**: This function appears only when the playback is paused. Click to load the playback image of the next frame.

6. Test Applications

Besides the NiViewer program, LIPS Corp. also provide other testing tools for developers to access IMU data or the internal parameters of the camera.

To access the test applications:

1. On your desktop, click the **LIPSToFDemo** folder.

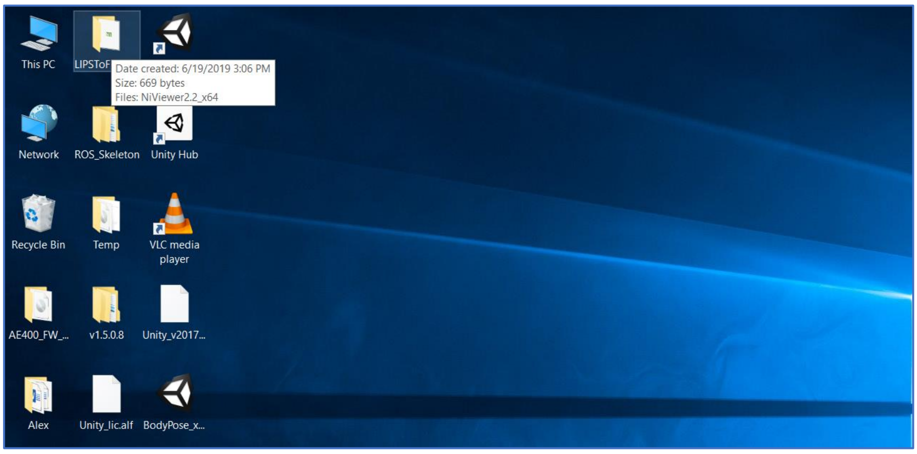


Figure 6-1

2. Right-click **NiViewer.exe** and select **Open File Location**.

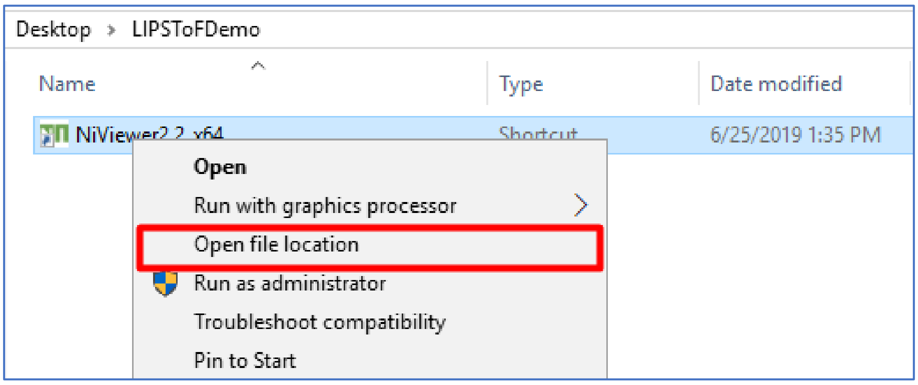
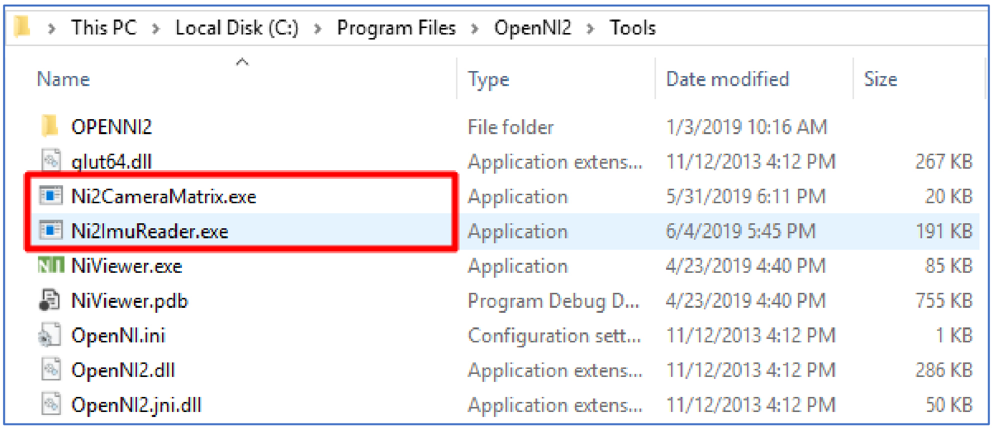


Figure 6-2

3. You can find other test applications in the destination.



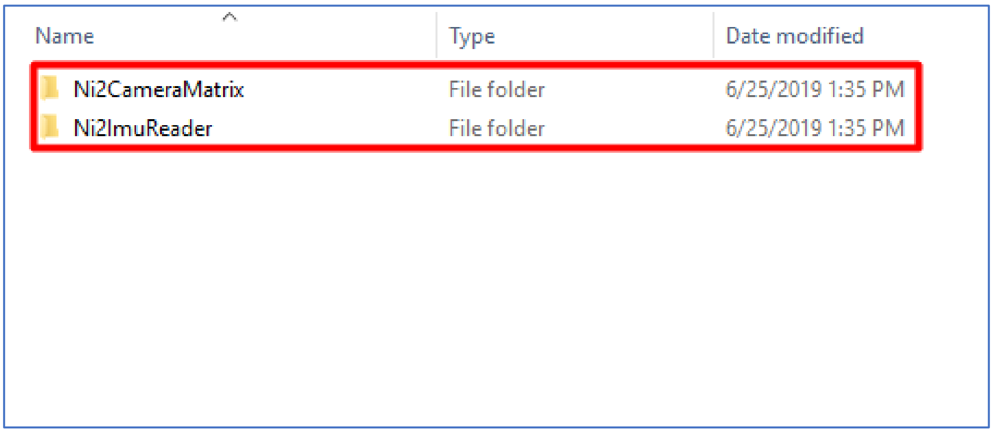
This PC > Local Disk (C:) > Program Files > OpenNI2 > Tools

Name	Type	Date modified	Size
OPENNI2	File folder	1/3/2019 10:16 AM	
glut64.dll	Application extens...	11/12/2013 4:12 PM	267 KB
Ni2CameraMatrix.exe	Application	5/31/2019 6:11 PM	20 KB
Ni2ImuReader.exe	Application	6/4/2019 5:45 PM	191 KB
NiViewer.exe	Application	4/23/2019 4:40 PM	85 KB
NiViewer.pdb	Program Debug D...	4/23/2019 4:40 PM	755 KB
OpenNI.ini	Configuration sett...	11/12/2013 4:12 PM	1 KB
OpenNI2.dll	Application extens...	11/12/2013 4:12 PM	286 KB
OpenNI2.jni.dll	Application extens...	11/12/2013 4:12 PM	50 KB

Figure 6-3

Note: You can also access the test applications directly on your local PC C:\Program Files\OpenNI2\Tools.

4. Optionally access the source code of the test applications at C:\Program Files\OpenNI2\LIPS_Sample



Name	Type	Date modified
Ni2CameraMatrix	File folder	6/25/2019 1:35 PM
Ni2ImuReader	File folder	6/25/2019 1:35 PM

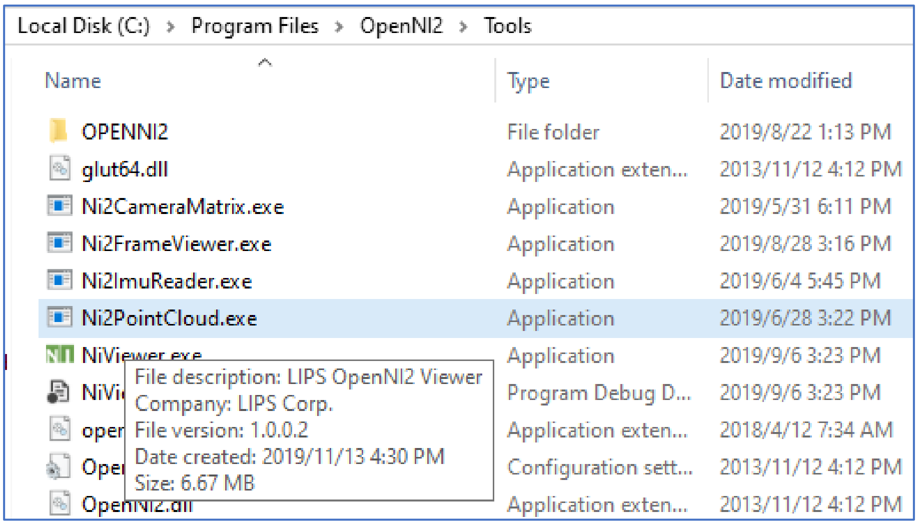
Figure 6-4

6.1 Ni2PointCloud

You can view point cloud images through **Ni2PointCloud.exe**. To access Ni2PointCloud, refer to *6. Test Applications*.

Note: Ni2PointCloud.exe requires **NVIDIA graphic cards**.

1. In **Tools**, click **Ni2PointCloud.exe**.



Local Disk (C:) › Program Files › OpenNI2 › Tools

Name	Type	Date modified
OPENNI2	File folder	2019/8/22 1:13 PM
glut64.dll	Application exten...	2013/11/12 4:12 PM
Ni2CameraMatrix.exe	Application	2019/5/31 6:11 PM
Ni2FrameViewer.exe	Application	2019/8/28 3:16 PM
Ni2ImuReader.exe	Application	2019/6/4 5:45 PM
Ni2PointCloud.exe	Application	2019/6/28 3:22 PM
NiViewer.exe	Application	2019/9/6 3:23 PM
NiVi	Program Debug D...	2019/9/6 3:23 PM
oper	Application exten...	2018/4/12 7:34 AM
Ope	Configuration sett...	2013/11/12 4:12 PM
OpenNI2.dll	Application exten...	2013/11/12 4:12 PM

File description: LIPS OpenNI2 Viewer
Company: LIPS Corp.
File version: 1.0.0.2
Date created: 2019/11/13 4:30 PM
Size: 6.67 MB

Figure 6-5

2. You can view point cloud images on live.

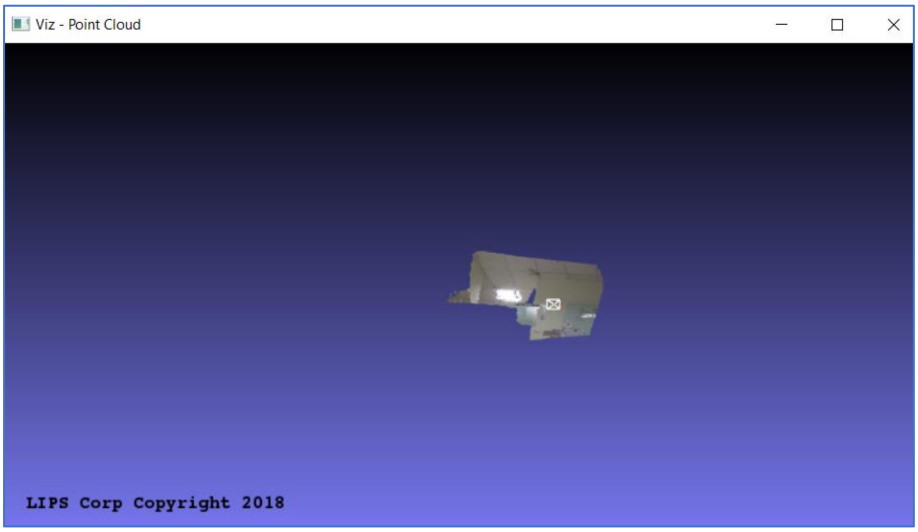
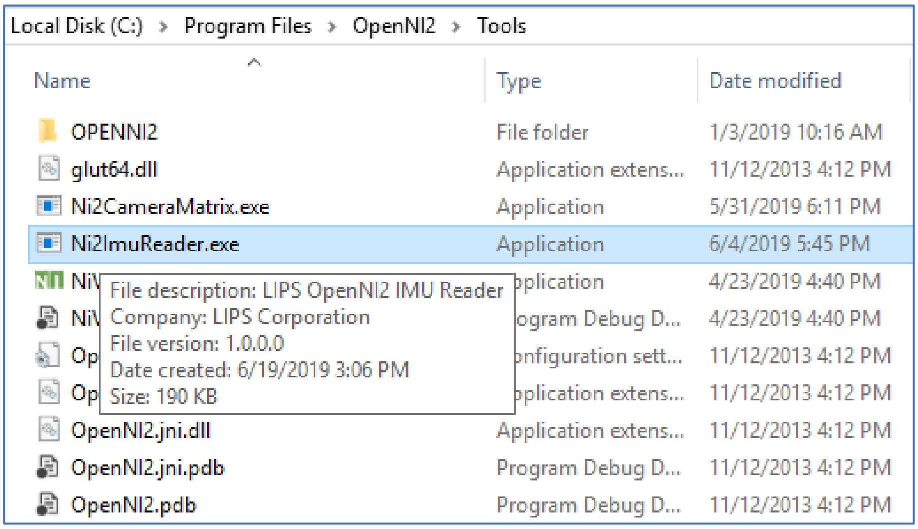


Figure 6-6

6.2 Ni2ImuReader

You can collect the camera’s IMU data through **Ni2ImuReader.exe** . To access Ni2ImuReader, refer to *6. Test Applications*.

1. In **Tools**, click **Ni2ImuReader.exe**.



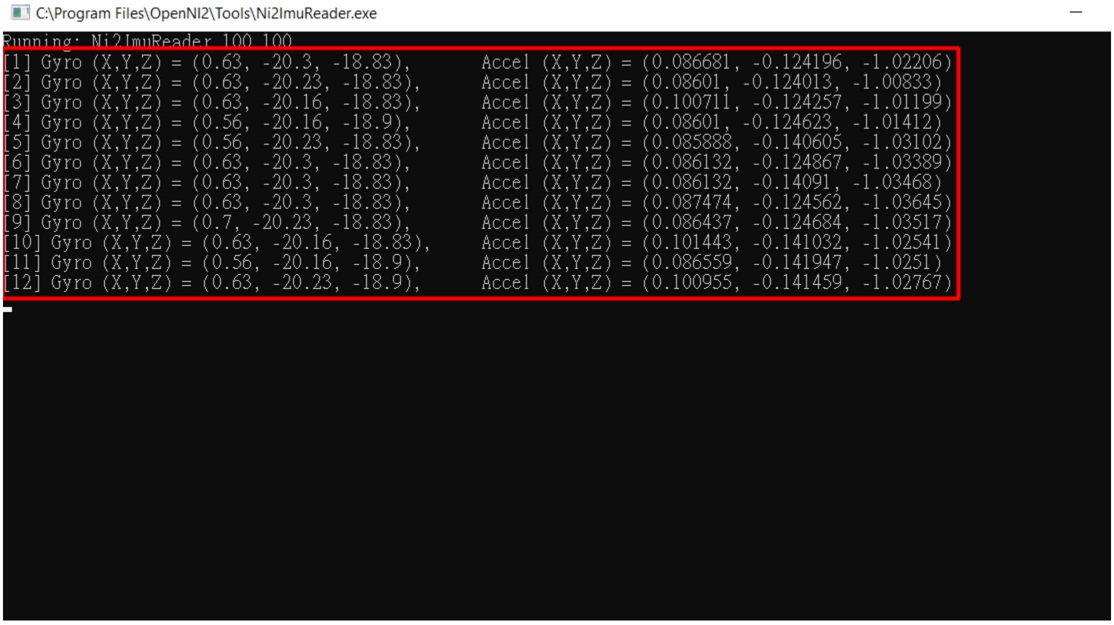
Local Disk (C:) › Program Files › OpenNI2 › Tools

Name	Type	Date modified
OPENNI2	File folder	1/3/2019 10:16 AM
glut64.dll	Application extens...	11/12/2013 4:12 PM
Ni2CameraMatrix.exe	Application	5/31/2019 6:11 PM
Ni2ImuReader.exe	Application	6/4/2019 5:45 PM
NiV	pplication	4/23/2019 4:40 PM
NiV	ogram Debug D...	4/23/2019 4:40 PM
Op	onfiguration sett...	11/12/2013 4:12 PM
Op	pplication extens...	11/12/2013 4:12 PM
OpenNI2.jni.dll	Application extens...	11/12/2013 4:12 PM
OpenNI2.jni.pdb	Program Debug D...	11/12/2013 4:12 PM
OpenNI2.pdb	Program Debug D...	11/12/2013 4:12 PM

File description: LIPS OpenNI2 IMU Reader
Company: LIPS Corporation
File version: 1.0.0.0
Date created: 6/19/2019 3:06 PM
Size: 190 KB

Figure 6-7

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



C:\Program Files\OpenNI2\Tools\Ni2ImuReader.exe

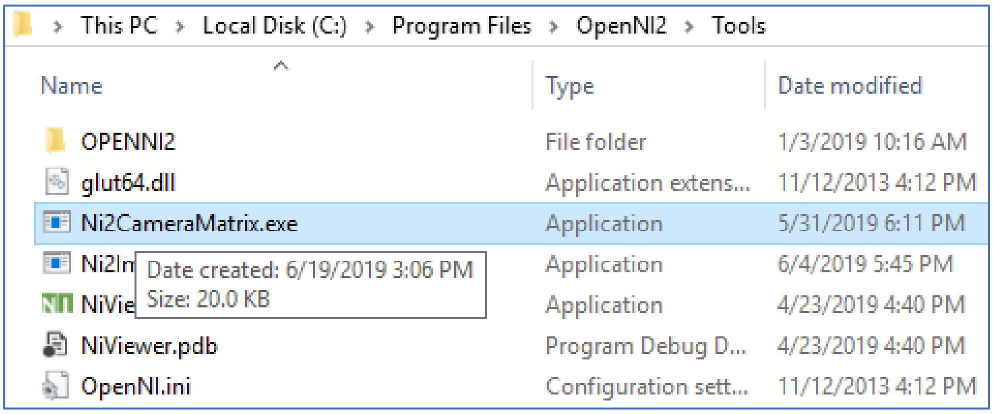
```
Running: Ni2ImuReader 100 100
[1] Gyro (X,Y,Z) = (0.63, -20.3, -18.83),       Accel (X,Y,Z) = (0.086681, -0.124196, -1.02206)
[2] Gyro (X,Y,Z) = (0.63, -20.23, -18.83),      Accel (X,Y,Z) = (0.08601, -0.124013, -1.00833)
[3] Gyro (X,Y,Z) = (0.63, -20.16, -18.83),      Accel (X,Y,Z) = (0.100711, -0.124257, -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)
```

Figure 6-8

6.3 Ni2CameraMatrix

You can access the camera's coordinates through **Ni2CameraMatrix.exe** for mapping color / depth images. To access Ni2CameraMatrix, refer to *6. Test Applications*.

1. In **Tools**, click **Ni2CameraMatrix.exe**.



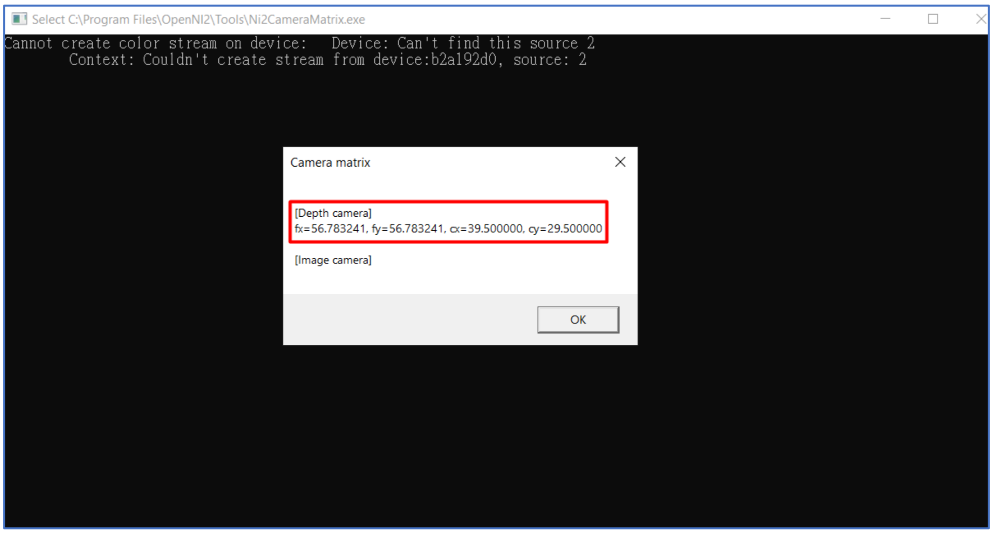
> This PC > Local Disk (C:) > Program Files > OpenNI2 > Tools

Name	Type	Date modified
OPENNI2	File folder	1/3/2019 10:16 AM
glut64.dll	Application extens...	11/12/2013 4:12 PM
Ni2CameraMatrix.exe	Application	5/31/2019 6:11 PM
Ni2In	Application	6/4/2019 5:45 PM
NiVie	Application	4/23/2019 4:40 PM
NiViewer.pdb	Program Debug D...	4/23/2019 4:40 PM
OpenNI.ini	Configuration sett...	11/12/2013 4:12 PM

Date created: 6/19/2019 3:06 PM
Size: 20.0 KB

Figure 6-9

2. A window containing the coordinates of depth images pops up.



Select C:\Program Files\OpenNI2\Tools\Ni2CameraMatrix.exe

```
Cannot create color stream on device:   Device: Can't find this source 2
        Context: Couldn't create stream from device:b2a192d0, source: 2
```

Camera matrix

[Depth camera]
fx=56.783241, fy=56.783241, cx=39.500000, cy=29.500000

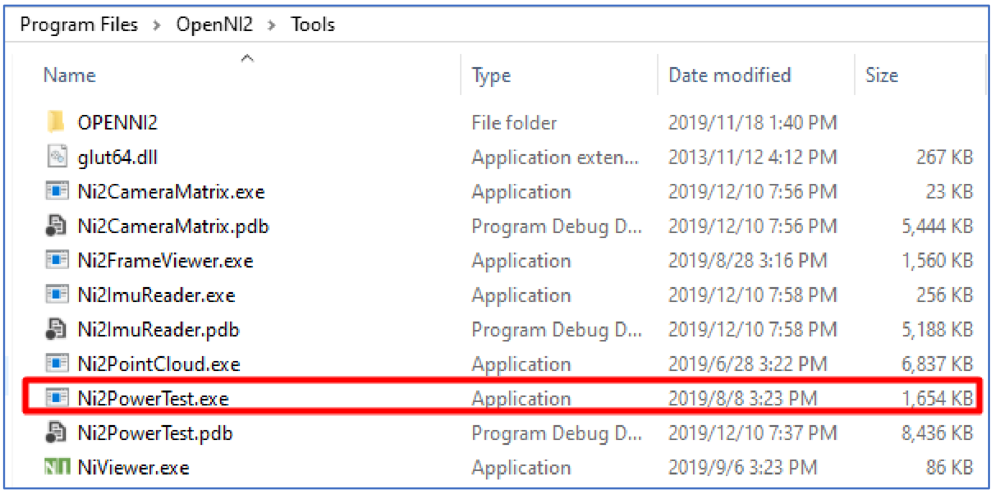
[Image camera]

Figure 6-10

6.3 Ni2PowerTest

LIPS SDK supports a Standby Mode (Low Power Mode) for which users can stop live streaming temporarily and resume live streaming at any time by sending a status code through **Ni2PowerTest**. To access Ni2PowerTest, refer to *6. Test Applications*.

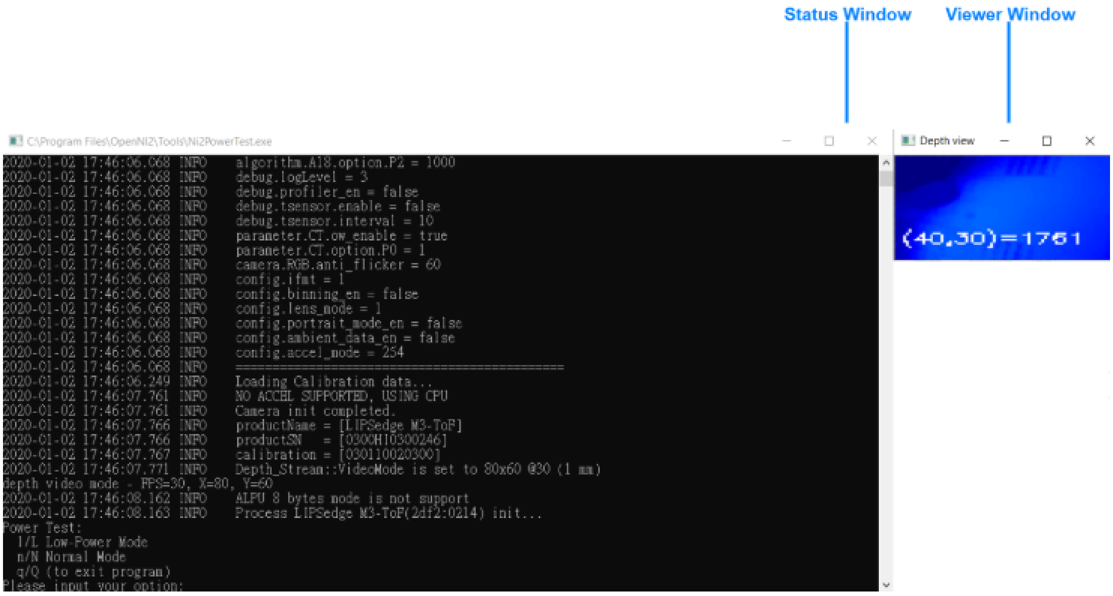
1. In **Tool**, click **Ni2PowerTest.exe.**



Name	Type	Date modified	Size
OPENNI2	File folder	2019/11/18 1:40 PM	
glut64.dll	Application exten...	2013/11/12 4:12 PM	267 KB
Ni2CameraMatrix.exe	Application	2019/12/10 7:56 PM	23 KB
Ni2CameraMatrix.pdb	Program Debug D...	2019/12/10 7:56 PM	5,444 KB
Ni2FrameViewer.exe	Application	2019/8/28 3:16 PM	1,560 KB
Ni2ImuReader.exe	Application	2019/12/10 7:58 PM	256 KB
Ni2ImuReader.pdb	Program Debug D...	2019/12/10 7:58 PM	5,188 KB
Ni2PointCloud.exe	Application	2019/6/28 3:22 PM	6,837 KB
Ni2PowerTest.exe	Application	2019/8/8 3:23 PM	1,654 KB
Ni2PowerTest.pdb	Program Debug D...	2019/12/10 7:37 PM	8,436 KB
NiViewer.exe	Application	2019/9/6 3:23 PM	86 KB

Figure 6-11

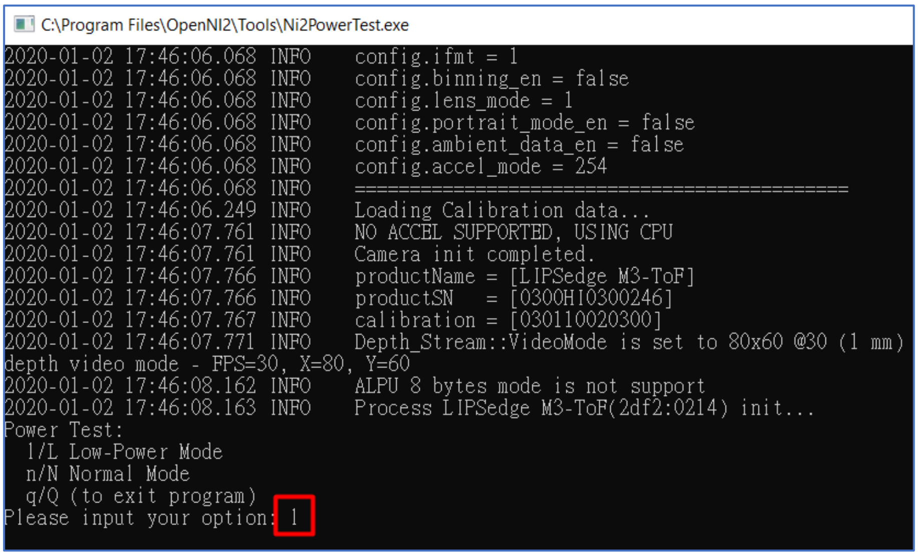
2. A **Status Window** and a **Viewer Window** pops up.



```
2020-01-02 17:46:06.068 INFO    algorithm.A18.option.P2 = 1000
2020-01-02 17:46:06.068 INFO    debug.logLevel = 3
2020-01-02 17:46:06.068 INFO    debug.profiler_en = false
2020-01-02 17:46:06.068 INFO    debug.tsensor.enable = false
2020-01-02 17:46:06.068 INFO    debug.tsensor.interval = 10
2020-01-02 17:46:06.068 INFO    parameter.CT.ow_enable = true
2020-01-02 17:46:06.068 INFO    parameter.CT.option.P0 = 1
2020-01-02 17:46:06.068 INFO    camera.RGB.anti_flicker = 60
2020-01-02 17:46:06.068 INFO    config.ifmt = 1
2020-01-02 17:46:06.068 INFO    config.binning_en = false
2020-01-02 17:46:06.068 INFO    config.lens_mode = 1
2020-01-02 17:46:06.068 INFO    config.portrait_mode_en = false
2020-01-02 17:46:06.068 INFO    config.ambient_data_en = false
2020-01-02 17:46:06.068 INFO    config.accel_mode = 254
2020-01-02 17:46:06.068 INFO    ============================================
2020-01-02 17:46:06.249 INFO    Loading Calibration data...
2020-01-02 17:46:07.761 INFO    NO ACCEL SUPPORTED, USING CPU
2020-01-02 17:46:07.761 INFO    Camera init completed.
2020-01-02 17:46:07.766 INFO    productName = [LIPSedge M3-ToF]
2020-01-02 17:46:07.766 INFO    productSN   = [0300H10300246]
2020-01-02 17:46:07.767 INFO    calibration = [030110020300]
2020-01-02 17:46:07.771 INFO    Depth_Stream::VideoMode is set to 80x60 @30 (1 mm)
depth video mode - FPS=30, X=80, Y=60
2020-01-02 17:46:08.162 INFO    ALPU 8 bytes mode is not support
2020-01-02 17:46:08.163 INFO    Process LIPSedge M3-ToF(2df2:0214) init...
Power Test:
  l/L Low-Power Mode
  n/N Normal Mode
  q/Q (to exit program)
Please input your option:
```

Figure 6-12

3. Type the following status code into the Status Window interface to enable / disable the Standby Mode.
   - **l**: Enable the Standby Mode. Under the Standby Mode, the live streaming stops and the camera's Status Indicator goes off.
   - **n**: Disable the Standby Mode.
   - **q**: Exists the program.

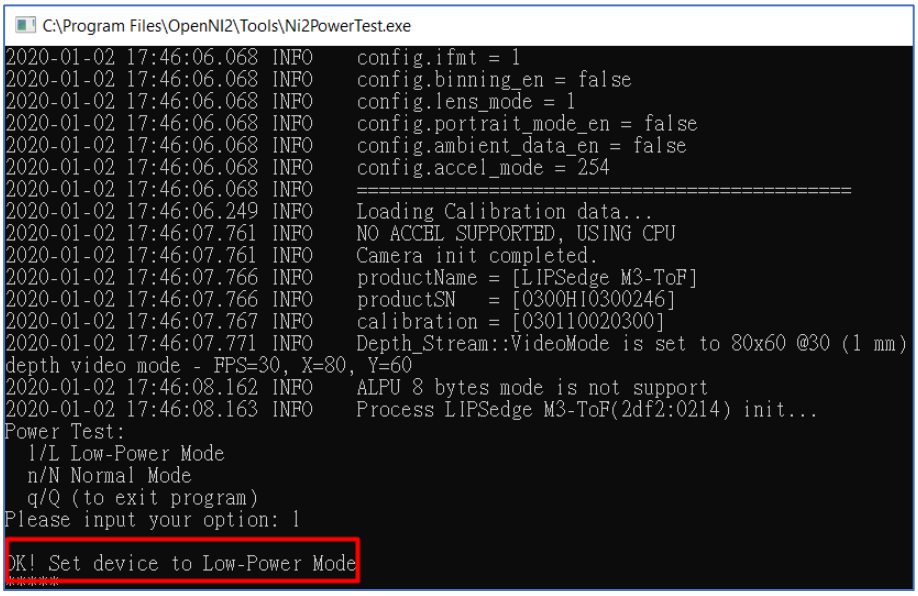


C:\Program Files\OpenNI2\Tools\Ni2PowerTest.exe

```
2020-01-02 17:46:06.068 INFO    config.ifmt = 1
2020-01-02 17:46:06.068 INFO    config.binning_en = false
2020-01-02 17:46:06.068 INFO    config.lens_mode = 1
2020-01-02 17:46:06.068 INFO    config.portrait_mode_en = false
2020-01-02 17:46:06.068 INFO    config.ambient_data_en = false
2020-01-02 17:46:06.068 INFO    config.accel_mode = 254
2020-01-02 17:46:06.068 INFO    =============================================
2020-01-02 17:46:06.249 INFO    Loading Calibration data...
2020-01-02 17:46:07.761 INFO    NO ACCEL SUPPORTED, USING CPU
2020-01-02 17:46:07.761 INFO    Camera init completed.
2020-01-02 17:46:07.766 INFO    productName = [LIPSedge M3-ToF]
2020-01-02 17:46:07.766 INFO    productSN   = [0300HI0300246]
2020-01-02 17:46:07.767 INFO    calibration = [030110020300]
2020-01-02 17:46:07.771 INFO    Depth_Stream::VideoMode is set to 80x60 @30 (1 mm)
depth video mode - FPS=30, X=80, Y=60
2020-01-02 17:46:08.162 INFO    ALPU 8 bytes mode is not support
2020-01-02 17:46:08.163 INFO    Process LIPSedge M3-ToF(2df2:0214) init...
Power Test:
  l/L Low-Power Mode
  n/N Normal Mode
  q/Q (to exit program)
Please input your option: l
```

Figure 6-13

4. Press **Enter** and the changes takes place.



C:\Program Files\OpenNI2\Tools\Ni2PowerTest.exe

```
2020-01-02 17:46:06.068 INFO    config.ifmt = 1
2020-01-02 17:46:06.068 INFO    config.binning_en = false
2020-01-02 17:46:06.068 INFO    config.lens_mode = 1
2020-01-02 17:46:06.068 INFO    config.portrait_mode_en = false
2020-01-02 17:46:06.068 INFO    config.ambient_data_en = false
2020-01-02 17:46:06.068 INFO    config.accel_mode = 254
2020-01-02 17:46:06.068 INFO    =============================================
2020-01-02 17:46:06.249 INFO    Loading Calibration data...
2020-01-02 17:46:07.761 INFO    NO ACCEL SUPPORTED, USING CPU
2020-01-02 17:46:07.761 INFO    Camera init completed.
2020-01-02 17:46:07.766 INFO    productName = [LIPSedge M3-ToF]
2020-01-02 17:46:07.766 INFO    productSN   = [0300HI0300246]
2020-01-02 17:46:07.767 INFO    calibration = [030110020300]
2020-01-02 17:46:07.771 INFO    Depth_Stream::VideoMode is set to 80x60 @30 (1 mm)
depth video mode - FPS=30, X=80, Y=60
2020-01-02 17:46:08.162 INFO    ALPU 8 bytes mode is not support
2020-01-02 17:46:08.163 INFO    Process LIPSedge M3-ToF(2df2:0214) init...
Power Test:
  l/L Low-Power Mode
  n/N Normal Mode
  q/Q (to exit program)
Please input your option: l

OK! Set device to Low-Power Mode
*****
```

Figure 6-14

6.3.1 Ni2PowerTest Core Functions

To modify Ni2PowerTest to work with your sample application, you can access Ni2PowerTest's source code through LIPS's Github page. For details on downloading the source code, refer to *8.1 Starting From Build Sample*.

In the source code, you can see the code segments that defines the power modes control in Ni2PowerTest. The `setProperty` function defines the Standby Mode:

```
Status VideoStream::setProperty(int propertyId, const
void* data, int dataSize)
```

Refer to the table below for the definition of each variables in the `setProperty` function:

No.	Variables	Functions
1.	`propertyId`	Assign the camera power modes with numerical ID `1` or `0`.
2.	`data`	Saves the power mode data to be written to `properId`.
3.	`dataSize`	Saves the size of `data`.

In Ni2PowerTest, the Standby Mode is coded under `propertyId 403(LIPS_DEPTH_SENSOR_LOW_POWER_EN)`. Pass ID `1` to `data`, for example:

```
  #define LIPS_DEPTH_SENSOR_LOW_POWER_EN 403


  VideoStream vsDepth;

  vsDepth.create( devDevice, SENSOR_DEPTH );

  vsDepth.start();


  int cmd = 1; //1=enable

  int cmdSize = sizeof(cmd);

  vsDepth.setProperty(LIPS_DEPTH_SENSOR_LOW_POWER_EN,
(void *)&cmd, cmdSize );
```

For the normal mode, likewise, pass `0` to `propertyId`:

```
  #define LIPS_DEPTH_SENSOR_LOW_POWER_EN 403


  VideoStream vsDepth;

  vsDepth.create( devDevice, SENSOR_DEPTH );

  vsDepth.start();


  int cmd = 0; //0=disable

  int cmdSize = sizeof(cmd);

  vsDepth.setProperty(LIPS_DEPTH_SENSOR_LOW_POWER_EN,
(void *)&cmd, sizeof(cmd) );
```

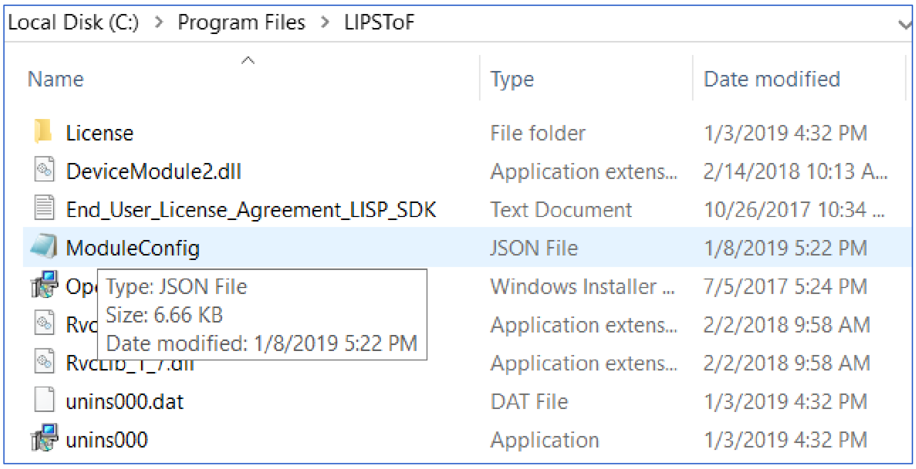
7. Advanced Configuration

In the **Program Files** folder of your PC / laptop, you can find **ModuleConfig.json** file with various SDK settings. Available SDK settings are written in key / value pairs. Change the value to modify the SDK settings.

The available settings for LIPS SDK, Windows and their configurations are identical to LIPS SDK, Linux. To find the ModuleConfig.json in Linux system, refer to *13. Configuring LIPS SDK, Linux*.

To find the configuration files:

1. Go to **Program Files > LIPSToF**, click **ModuleConfig.json**.



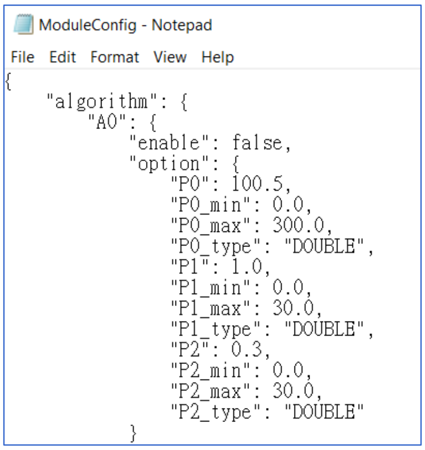
Local Disk (C:) > Program Files > LIPSToF

Name	Type	Date modified
License	File folder	1/3/2019 4:32 PM
DeviceModule2.dll	Application extens...	2/14/2018 10:13 A...
End_User_License_Agreement_LISP_SDK	Text Document	10/26/2017 10:34 ...
ModuleConfig	JSON File	1/8/2019 5:22 PM
Op	Windows Installer ...	7/5/2017 5:24 PM
Rvc	Application extens...	2/2/2018 9:58 AM
RvcLib_1_7.dll	Application extens...	2/2/2018 9:58 AM
unins000.dat	DAT File	1/3/2019 4:32 PM
unins000	Application	1/3/2019 4:32 PM

Type: JSON File
Size: 6.66 KB
Date modified: 1/8/2019 5:22 PM

Figure 7-1

2. Open **ModuleConfig.json** with administrator privilege. Find the functions you are changing and start editing.



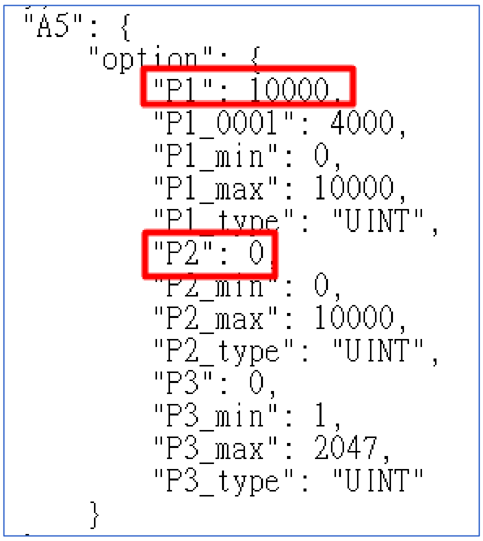
```
{
    "algorithm": {
        "A0": {
            "enable": false,
            "option": {
                "P0": 100.5,
                "P0_min": 0.0,
                "P0_max": 300.0,
                "P0_type": "DOUBLE",
                "P1": 1.0,
                "P1_min": 0.0,
                "P1_max": 30.0,
                "P1_type": "DOUBLE",
                "P2": 0.3,
                "P2_min": 0.0,
                "P2_max": 30.0,
                "P2_type": "DOUBLE"
            }
```

Figure 7-2

7.1 Cutting Range Settings

With the cutting range function, you can specify the minimum and maximum working range by filtering unwanted or out of range images.

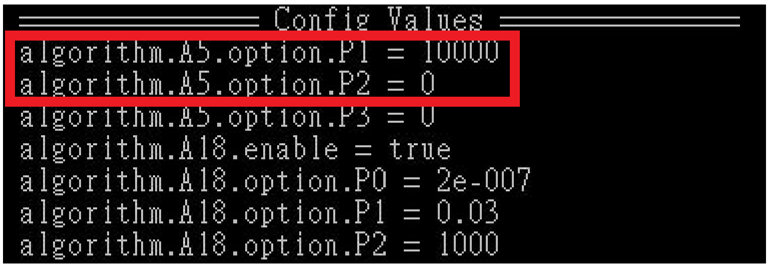
1. In the **ModuleConfig.json** file, find object **A5**.
2. Adjust the distance value. By default, the value for P1 is 10000, P2 is 0.
   - **P1** represents the **maximum distance**.
   - **P2** represents the **minimum distance**.
   - **1000** value represents **1 m** of physical distance.



```
"A5": {
    "option": {
        "P1": 10000,
        "P1_0001": 4000,
        "P1_min": 0,
        "P1_max": 10000,
        "P1_type": "UINT",
        "P2": 0,
        "P2_min": 0,
        "P2_max": 10000,
        "P2_type": "UINT",
        "P3": 0,
        "P3_min": 1,
        "P3_max": 2047,
        "P3_type": "UINT"
    }
```

Figure 7-3

3. Save the settings and launch your viewer to verify if the change is applied successfully.

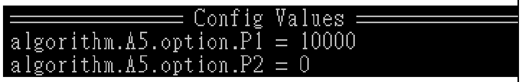
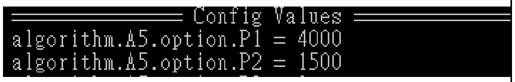


```
=============== Config Values ===============
algorithm.A5.option.P1 = 10000
algorithm.A5.option.P2 = 0
algorithm.A5.option.P3 = 0
algorithm.A18.enable = true
algorithm.A18.option.P0 = 2e-007
algorithm.A18.option.P1 = 0.03
algorithm.A18.option.P2 = 1000
```

Figure 7-4

4. Here’s a comparison between images with different working range.

Default	Maximum distance < 4 m
A5->P1: 10000 A5->P2: 0	A5->P1: 4000 (4 m) A5->P2: 1500 (1.5 m)

 ═══ Config Values ═══
algorithm.A5.option.P1 = 10000
algorithm.A5.option.P2 = 0
	 ═══ Config Values ═══
	algorithm.A5.option.P1 = 4000
	algorithm.A5.option.P2 = 1500

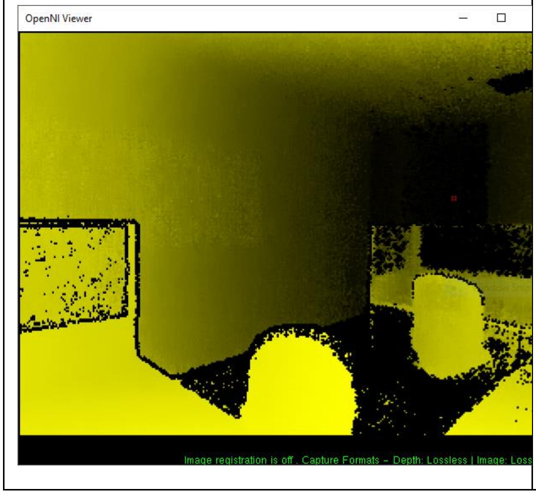
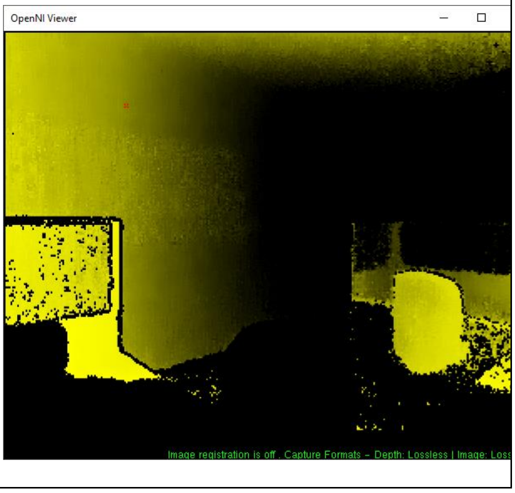
 Image registration is off , Capture Formats – Depth: Lossless | Image: Loss	 Image registration is off , Capture Formats – Depth: Lossless | Image: Loss

Figure 7-5

7.2 Flying Pixel Removal

The Flying Pixel Removal function filters noises resulting from the discrepancy between the reflected depth of the object and its background. By default, the Flying Pixel Removal function is enabled.

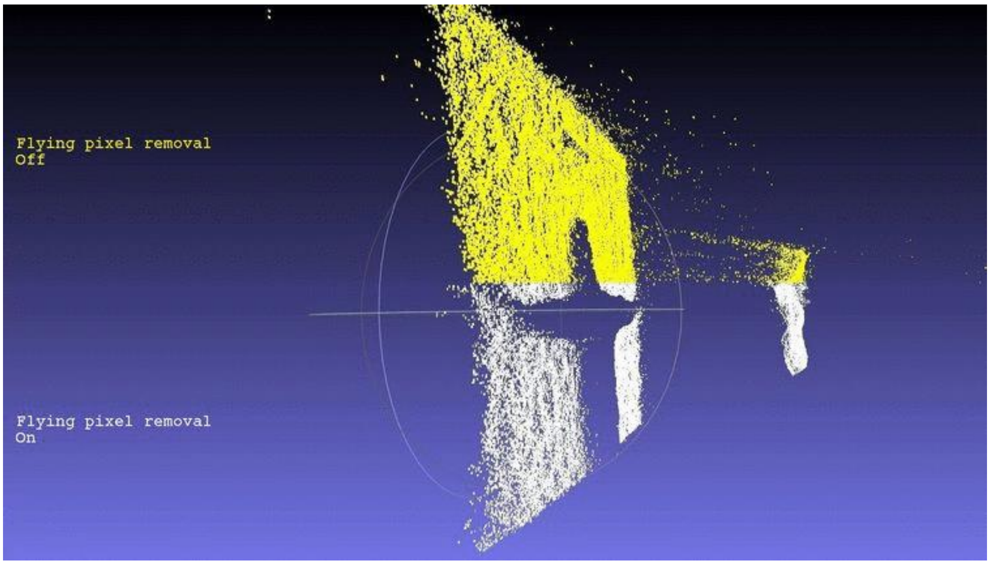
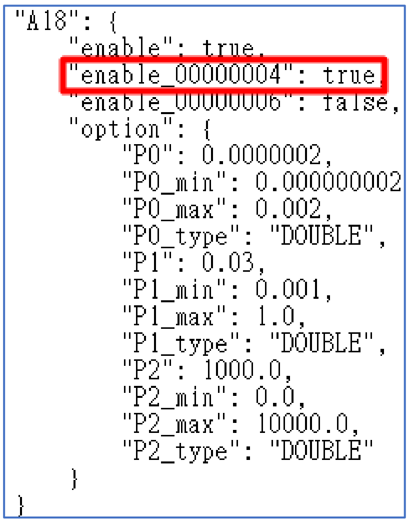


Figure 7-6

1. In the **ModuleConfig.json** file, find object **A18 > enable_00000004**.
2. Set the object's value as **true / false** to **enable / disable** the filter.

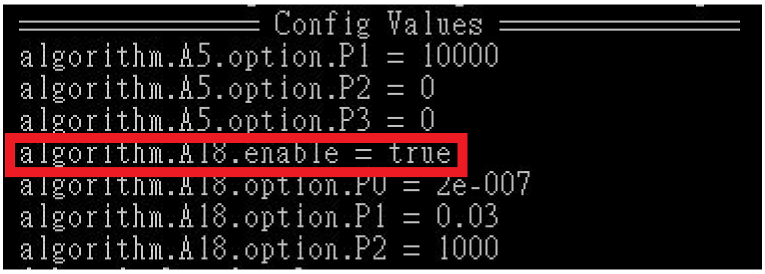


```
"A18": {
    "enable": true,
    "enable_00000004": true,
    "enable_00000006": false,
    "option": {
        "P0": 0.0000002,
        "P0_min": 0.000000002
        "P0_max": 0.002,
        "P0_type": "DOUBLE",
        "P1": 0.03,
        "P1_min": 0.001,
        "P1_max": 1.0,
        "P1_type": "DOUBLE",
        "P2": 1000.0,
        "P2_min": 0.0,
        "P2_max": 10000.0,
        "P2_type": "DOUBLE"
    }
}
```

Figure 7-7

Note: For LIPSedge™ M3, modify the value of enable_00000004.

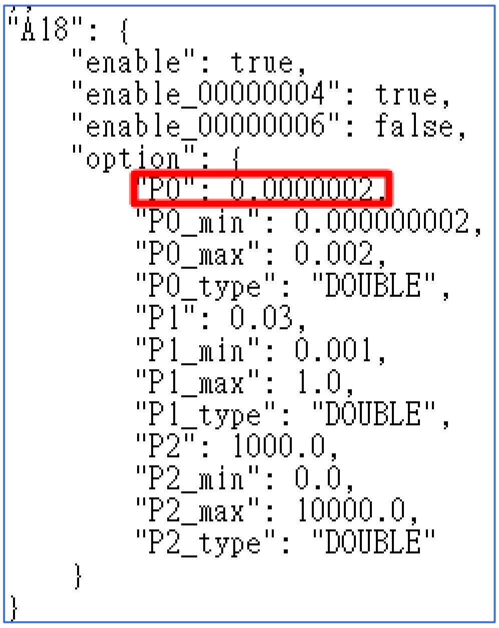
3. Save the settings and launch your viewer to verify if the change is applied successfully.



```
════════════ Config Values ════════════
algorithm.A5.option.P1 = 10000
algorithm.A5.option.P2 = 0
algorithm.A5.option.P3 = 0
algorithm.A18.enable = true
algorithm.A18.option.P0 = 2e-007
algorithm.A18.option.P1 = 0.03
algorithm.A18.option.P2 = 1000
```

Figure 7-8

4. Optionally, change the value of object **P0** for adjusting the filter strength. **0.000000002** represents the strongest filter, while **0.002** represents the weakest.



```
"A18": {
    "enable": true,
    "enable_00000004": true,
    "enable_00000006": false,
    "option": {
        "P0": 0.0000002,
        "P0_min": 0.000000002,
        "P0_max": 0.002,
        "P0_type": "DOUBLE",
        "P1": 0.03,
        "P1_min": 0.001,
        "P1_max": 1.0,
        "P1_type": "DOUBLE",
        "P2": 1000.0,
        "P2_min": 0.0,
        "P2_max": 10000.0,
        "P2_type": "DOUBLE"
    }
}
```

Figure 7-9

5. Here’s a comparison between images with different levels of filter.

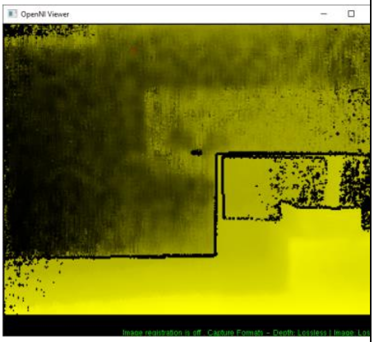
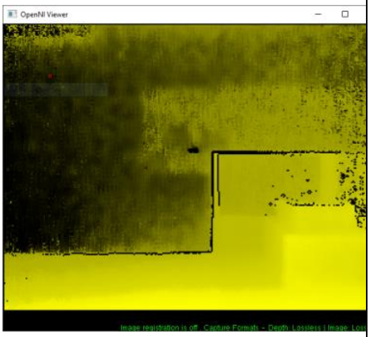
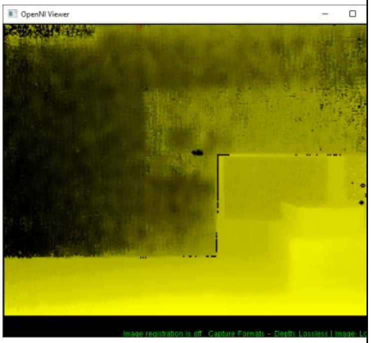
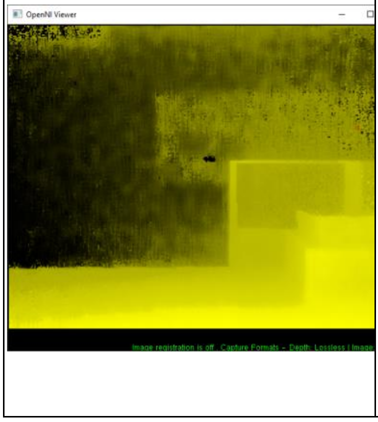
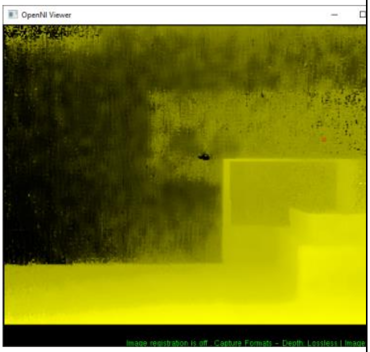
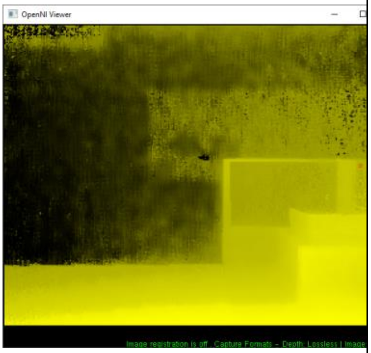
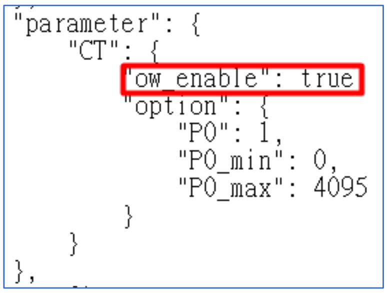
P0: 0.000002	P0: 0.000004	P0: 0.000008
 OpenNI Viewer Image registration is off . Capture Formats – Depth: Lossless | Image: Los	 OpenNI Viewer Image registration is off . Capture Formats – Depth: Lossless | Image: Los	 OpenNI Viewer Image registration is off . Capture Formats – Depth: Lossless | Image: Lo
P0: 0.000016	**P0: 0.000032**	**P0: 0.000064**
 OpenNI Viewer Image registration is off . Capture Formats – Depth: Lossless | Image	 OpenNI Viewer Image registration is off . Capture Formats – Depth: Lossless | Image	 OpenNI Viewer Image registration is off . Capture Formats – Depth: Lossless | Image

Figure 7-10

7.3 OWCT Setting

Overwrite Confidence Threshold (OWCT) allows users to minimize unfavorable pixels / depth information caused by diffusive refection, resulting in a smoother camera image.

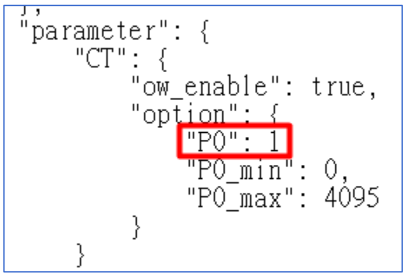
1. In the **ModuleConfig.json** file, find object **CT**.
2. Under CT, adjust the parameter of **ow_enable**. To **enable / disable** OWCT, type **true** / **false**.



```
"parameter": {
    "CT": {
        "ow_enable": true
        "option": {
            "P0": 1,
            "P0_min": 0,
            "P0_max": 4095
        }
    }
},
```

Figure 7-11

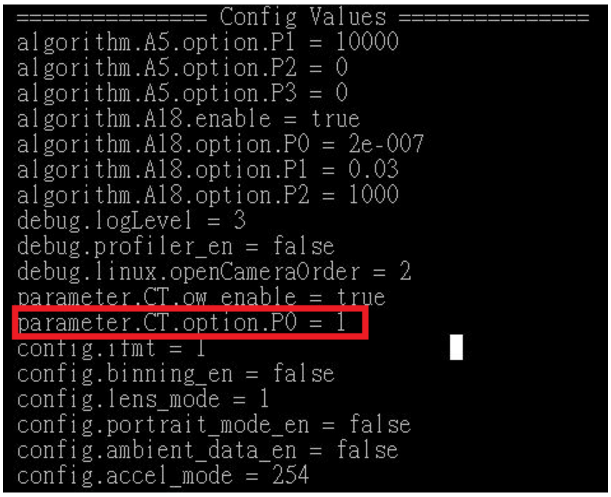
3. Optionally, change the value of object **P0** for adjusting the filter strength. **10** represents the weakest filter, while **10** represents the strongest. By default, the threshold value is 1.



```
"parameter": {
    "CT": {
        "ow_enable": true,
        "option": {
            "P0": 1
            "P0_min": 0,
            "P0_max": 4095
        }
    }
```

Figure 7-12

4. Save the settings and launch your viewer to verify if the change is applied successfully.



```
=============== Config Values ===============
algorithm.A5.option.P1 = 10000
algorithm.A5.option.P2 = 0
algorithm.A5.option.P3 = 0
algorithm.A18.enable = true
algorithm.A18.option.P0 = 2e-007
algorithm.A18.option.P1 = 0.03
algorithm.A18.option.P2 = 1000
debug.logLevel = 3
debug.profiler_en = false
debug.linux.openCameraOrder = 2
parameter.CT.ow_enable = true
parameter.CT.option.P0 = 1
config.ifmt = 1
config.binning_en = false
config.lens_mode = 1
config.portrait_mode_en = false
config.ambient_data_en = false
config.accel_mode = 254
```

Figure 7-13

6. Here’s a comparison between images with different confidence threshold level.

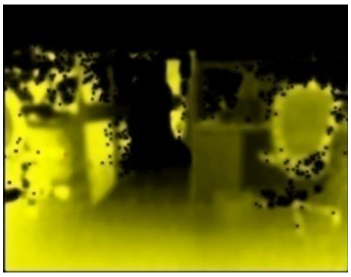
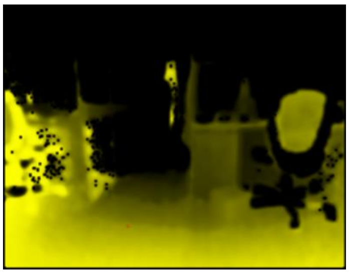
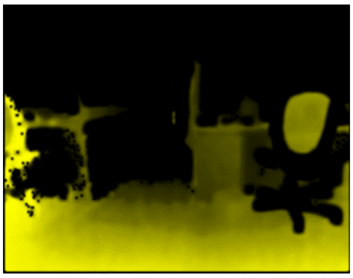
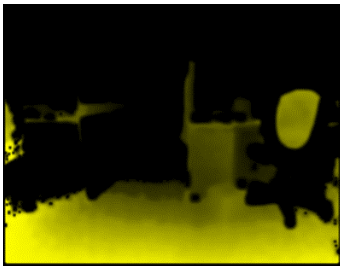
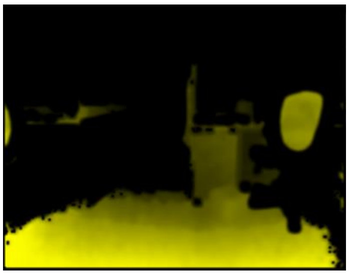
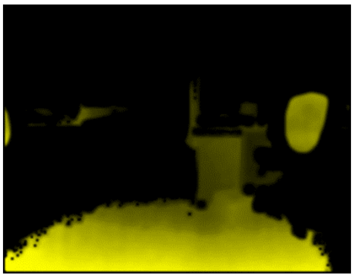
OWCT Level 1	OWCT Level 2	OWCT Level 3
		
OWCT Level 4	**OWCT Level 5**	**OWCT Level 6**
		

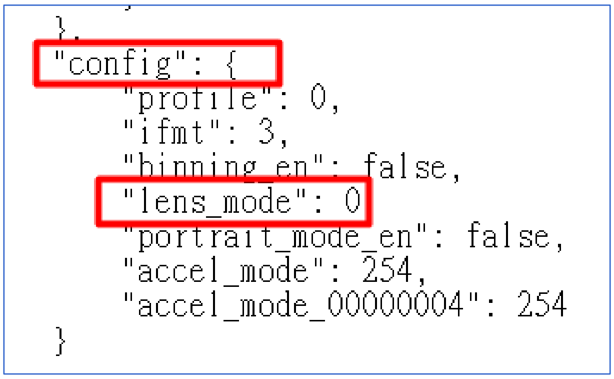
Figure 7-14

7.4 Working Range Setting

LIPS Camera supports two working range settings: **Normal Range** (1 ~ 4 m) and **Close Range** (0.2 ~ 1.2 m). You can adjust the working range settings depending on the estimated distance between the camera and the target. By default, the camera works on the Normal Range.

Note: Configuration process may vary from model to model.

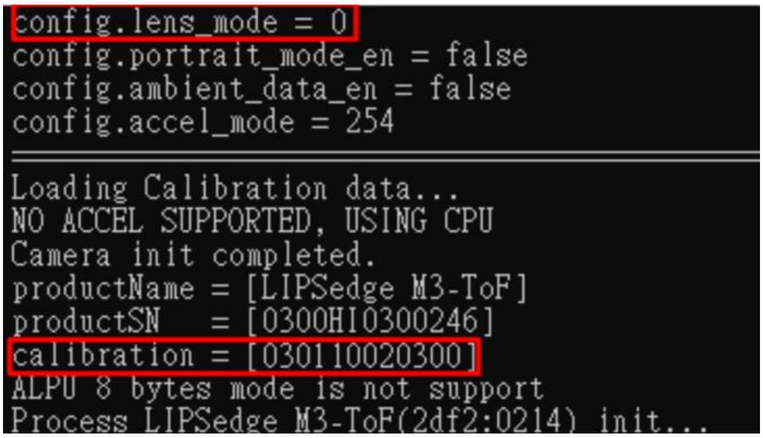
1. In the **ModuleConfig.json** file, find object **config**.
2. Under **config**, adjust the parameter of **lens_mode**. To enable **Normal Range**, type **1**. To enable **Close Range**, type **0**. By default, the value of lens_mode is 1.



```
    },
    "config": {
        "profile": 0,
        "ifmt": 3,
        "binning_en": false,
        "lens_mode": 0
        "portrait_mode_en": false,
        "accel_mode": 254,
        "accel_mode_00000004": 254
    }
```

Figure 7-15

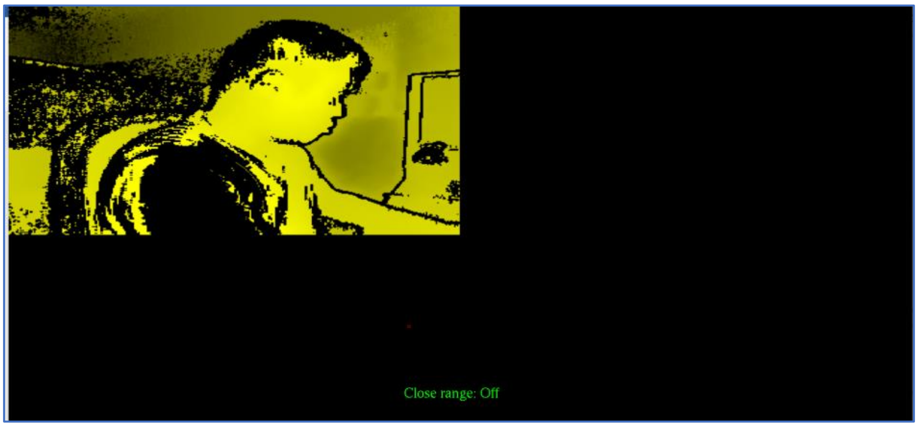
3. Save the settings and launch your viewer to verify if the change is applied successfully. On **Calibration** column, parameter beginning with **0301** represents **Normal Range**, and **0312** represents **Close Range** in LIPS SDK.



```
config.lens_mode = 0
config.portrait_mode_en = false
config.ambient_data_en = false
config.accel_mode = 254

Loading Calibration data...
NO ACCEL SUPPORTED, USING CPU
Camera init completed.
productName = [LIPSedge M3-ToF]
productSN   = [0300HI0300246]
calibration = [030110020300]
ALPU 8 bytes mode is not support
Process LIPSedge M3-ToF(2df2:0214) init...
```

Figure 7-16

4. You can also switch between Close and Normal Range instantly by pressing **x**.



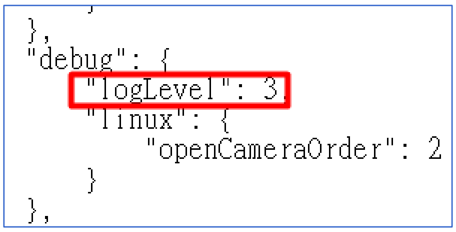
Close range: Off

Figure 7-17

7.5 Output Log Level

LIPS Camera keeps a system log for system activities, warnings and errors. You can turn the system log **ON** or **OFF** by typing Log Level Codes.

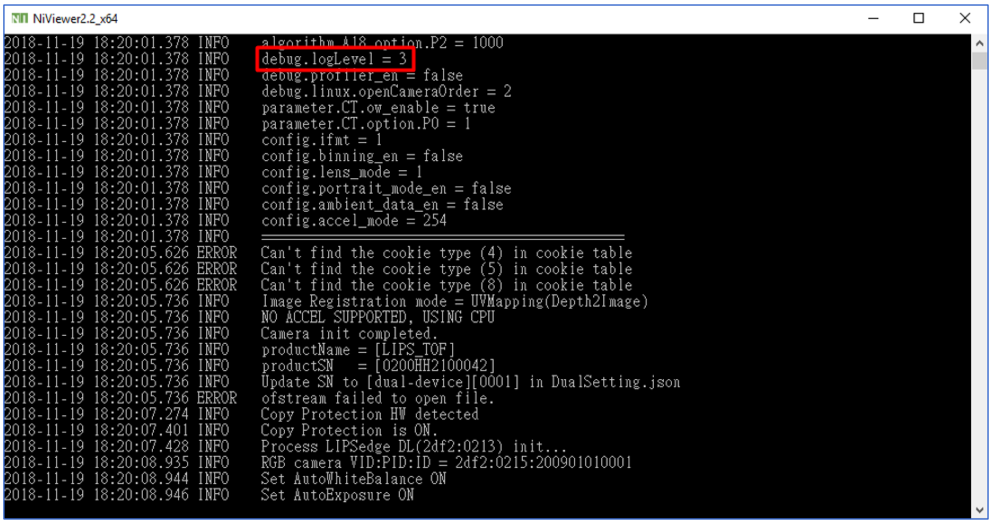
1. In **ModuleConfig.json**, find object **debug**.
2. Under debug, adjust the value of **logLevel**. 3 turns the system log **ON**, and 7 turns the system log **OFF**.



```
},
"debug": {
    "logLevel": 3,
    "linux": {
        "openCameraOrder": 2
    }
},
```

Figure 7-18

3. Save the settings and launch your viewer to verify if the change is applied successfully.



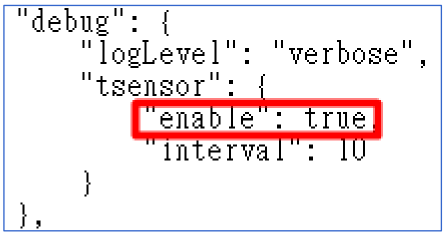
```
2018-11-19 18:20:01.378 INFO    algorithm.A18.option.P2 = 1000
2018-11-19 18:20:01.378 INFO    debug.logLevel = 3
2018-11-19 18:20:01.378 INFO    debug.profiler_en = false
2018-11-19 18:20:01.378 INFO    debug.linux.openCameraOrder = 2
2018-11-19 18:20:01.378 INFO    parameter.CT.ow_enable = true
2018-11-19 18:20:01.378 INFO    parameter.CT.option.P0 = 1
2018-11-19 18:20:01.378 INFO    config.ifmt = 1
2018-11-19 18:20:01.378 INFO    config.binning_en = false
2018-11-19 18:20:01.378 INFO    config.lens_mode = 1
2018-11-19 18:20:01.378 INFO    config.portrait_mode_en = false
2018-11-19 18:20:01.378 INFO    config.ambient_data_en = false
2018-11-19 18:20:01.378 INFO    config.accel_mode = 254
2018-11-19 18:20:01.378 INFO    ==============================================
2018-11-19 18:20:05.626 ERROR   Can't find the cookie type (4) in cookie table
2018-11-19 18:20:05.626 ERROR   Can't find the cookie type (5) in cookie table
2018-11-19 18:20:05.626 ERROR   Can't find the cookie type (8) in cookie table
2018-11-19 18:20:05.736 INFO    Image Registration mode = UVMapping(Depth2Image)
2018-11-19 18:20:05.736 INFO    NO ACCEL SUPPORTED, USING CPU
2018-11-19 18:20:05.736 INFO    Camera init completed.
2018-11-19 18:20:05.736 INFO    productName = [LIPS_TOF]
2018-11-19 18:20:05.736 INFO    productSN   = [0200HH2100042]
2018-11-19 18:20:05.736 INFO    Update SN to [dual-device][0001] in DualSetting.json
2018-11-19 18:20:05.736 ERROR   ofstream failed to open file.
2018-11-19 18:20:07.274 INFO    Copy Protection HW detected
2018-11-19 18:20:07.401 INFO    Copy Protection is ON.
2018-11-19 18:20:07.428 INFO    Process LIPSedge DL(2df2:0213) init...
2018-11-19 18:20:08.935 INFO    RGB camera VID:PID:ID = 2df2:0215:200901010001
2018-11-19 18:20:08.944 INFO    Set AutoWhiteBalance ON
2018-11-19 18:20:08.946 INFO    Set AutoExposure ON
```

Figure 7-19

7.6 Camera Temperature Display Settings

You can monitor the camera’s temperature on live upon the activation of NiViewer through the **Status Window**. The recorded temperature will be updated every 10 seconds in Celsius scale (° C).

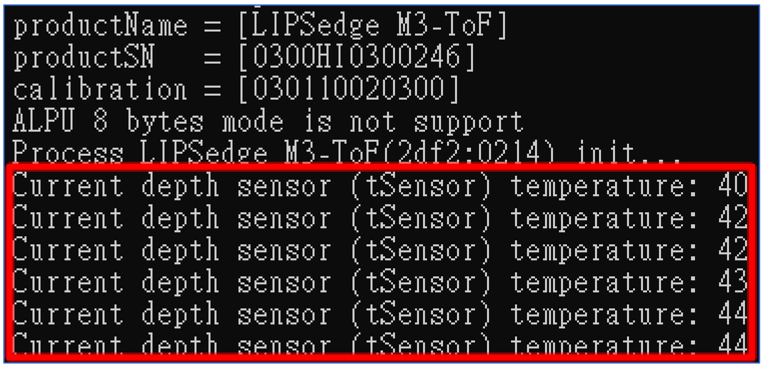
1. In **ModueConfig.json**, find object **debug**.
2. Under debug, adjust the value of **tsensor**. To **enable / disable** temperature display, type **true / false**.



```
"debug": {
    "logLevel": "verbose",
    "tsensor": {
        "enable": true,
        "interval": 10
    }
},
```

Figure 7-20

3. Save the settings and launch your viewer.
4. On the **Status Window**, verify if the change is applied successfully.



```
productName = [LIPSedge M3-ToF]
productSN   = [0300HI0300246]
calibration = [030110020300]
ALPU 8 bytes mode is not support
Process LIPSedge M3-ToF(2df2:0214) init...
Current depth sensor (tSensor) temperature: 40
Current depth sensor (tSensor) temperature: 42
Current depth sensor (tSensor) temperature: 42
Current depth sensor (tSensor) temperature: 43
Current depth sensor (tSensor) temperature: 44
Current depth sensor (tSensor) temperature: 44
```

Figure 7-21

8. Building Your Own Application

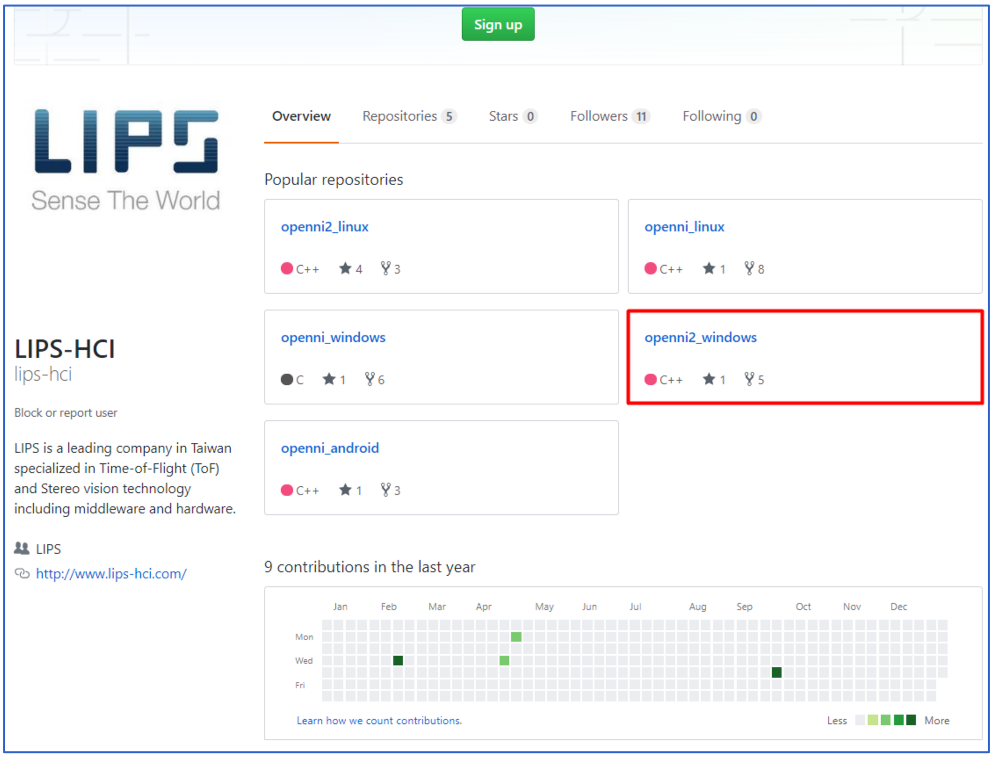
If you wish to develop your own application, or for some reason the installation failed to include the OpenNi platform properly, you can download the **Build Samples** from **LIPS's GitHub page** for your operating system.

Note:

1. Due to compatibility issues, we recommend using Microsoft Visual Studio 2015 as the standard for developing your application.
2. If you do not wish to start from our Build Sample, you can also start fresh by copying the IMU Sample Code to the project you created in your editor. For details, refer to *I. IMU Sample Code*, *Appendix, LIPSedge^{TM} M3 IMU User's Guide.*

8.1 Starting From Build Sample

1. Go to https://github.com/lips-hci. On LIPS's Github page, select the **Build Sample** according to the selected platform and OpenNi version. Here, we use **openni2_windows** as an example.

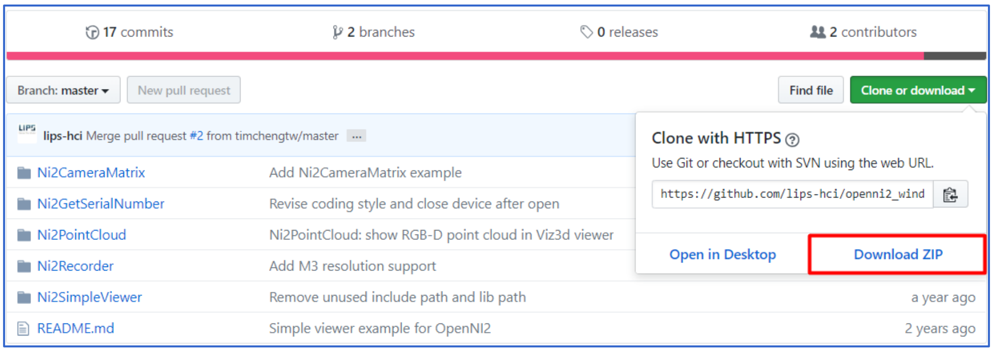


LIPS is a leading company in Taiwan specialized in Time-of-Flight (ToF) and Stereo vision technology including middleware and hardware.

9 contributions in the last year

Figure 8-1

2. Click **Clone or Download** and click **Download ZIP** to download the OpenNi files in a bundle.



17 commits · 2 branches · 0 releases · 2 contributors

Branch: master · New pull request · Find file · Clone or download

lips-hci Merge pull request #2 from timchengtw/master

Ni2CameraMatrix	Add Ni2CameraMatrix example	
Ni2GetSerialNumber	Revise coding style and close device after open	
Ni2PointCloud	Ni2PointCloud: show RGB-D point cloud in Viz3d viewer	
Ni2Recorder	Add M3 resolution support	
Ni2SimpleViewer	Remove unused include path and lib path	a year ago
README.md	Simple viewer example for OpenNI2	2 years ago

Clone with HTTPS

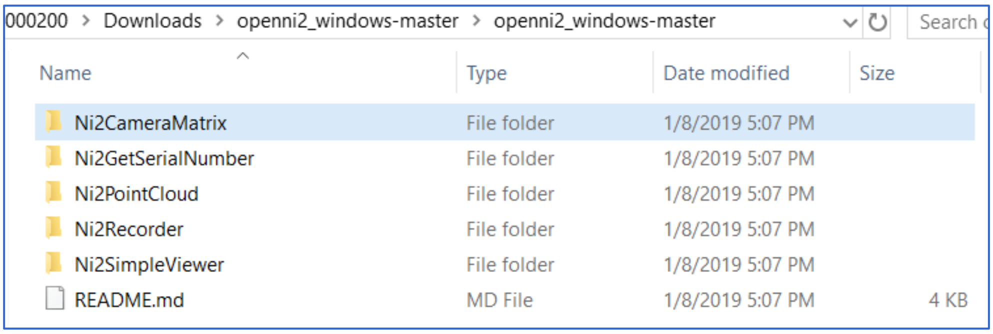
Use Git or checkout with SVN using the web URL.

`https://github.com/lips-hci/openni2_wind`

Open in Desktop · Download ZIP

Figure 8-2

3. Right-click and extract the downloaded file. The **Build Samples** are accessible in the **openni2_windows-master** folder.

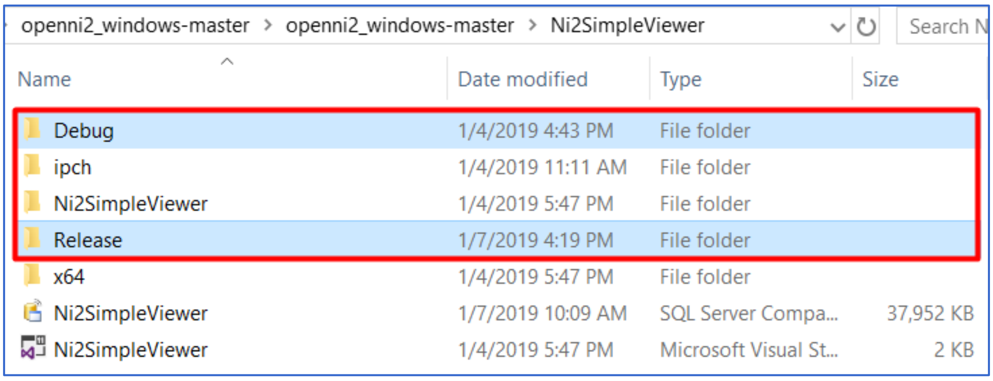


000200 › Downloads › openni2_windows-master › openni2_windows-master

Name	Type	Date modified	Size
Ni2CameraMatrix	File folder	1/8/2019 5:07 PM	
Ni2GetSerialNumber	File folder	1/8/2019 5:07 PM	
Ni2PointCloud	File folder	1/8/2019 5:07 PM	
Ni2Recorder	File folder	1/8/2019 5:07 PM	
Ni2SimpleViewer	File folder	1/8/2019 5:07 PM	
README.md	MD File	1/8/2019 5:07 PM	4 KB

Figure 8-3

4. Assign a directory in your PC / laptop to store the sample application. If you choose to start developing your application by using the Build Samples, the sample application you released will be stored in the **Debug / Release** folder under the original location of each Build Samples.



openni2_windows-master > openni2_windows-master > Ni2SimpleViewer

Name	Date modified	Type	Size
Debug	1/4/2019 4:43 PM	File folder	
ipch	1/4/2019 11:11 AM	File folder	
Ni2SimpleViewer	1/4/2019 5:47 PM	File folder	
Release	1/7/2019 4:19 PM	File folder	
x64	1/4/2019 5:47 PM	File folder	
Ni2SimpleViewer	1/7/2019 10:09 AM	SQL Server Compa...	37,952 KB
Ni2SimpleViewer	1/4/2019 5:47 PM	Microsoft Visual St...	2 KB

Figure 8-4

Note: Visual Studio requires users to complete the release procedure at least once to generate the storage directory for your sample application. You can skip the procedure by simply creating **Debug / Release** folders in the storage directory.

8.2 Installing OpenCV Libraries

LIPS Build Samples calls OpenCV functions and thus it is required to install **OpenCV Libraries** prior to application development process.

1. Download **OpenCV 3.4.1** from https://sourceforge.net/projects/opencvlibrary/files/opencv-win/3.4.1/opencv-3.4.1-vc14_vc15.exe

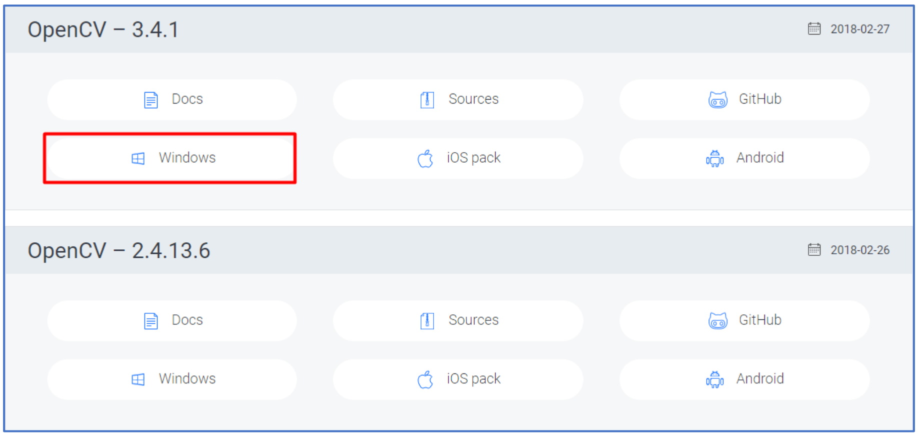
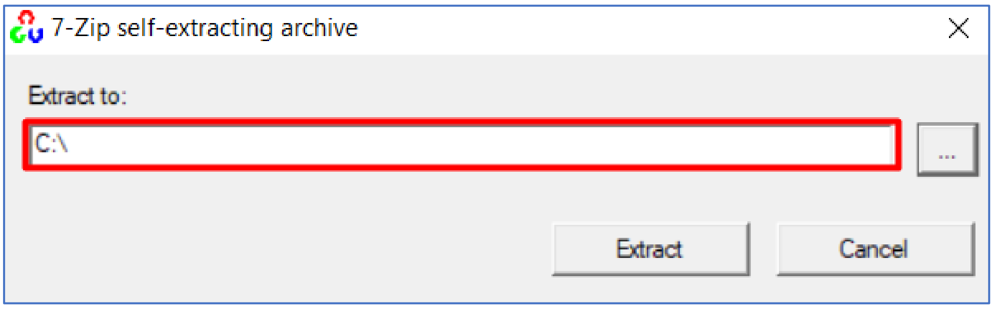


Figure 8-5

2. Click **opencv-3.4.1** and extract the file to the **root directory** on the C: drive of your local PC / laptop.



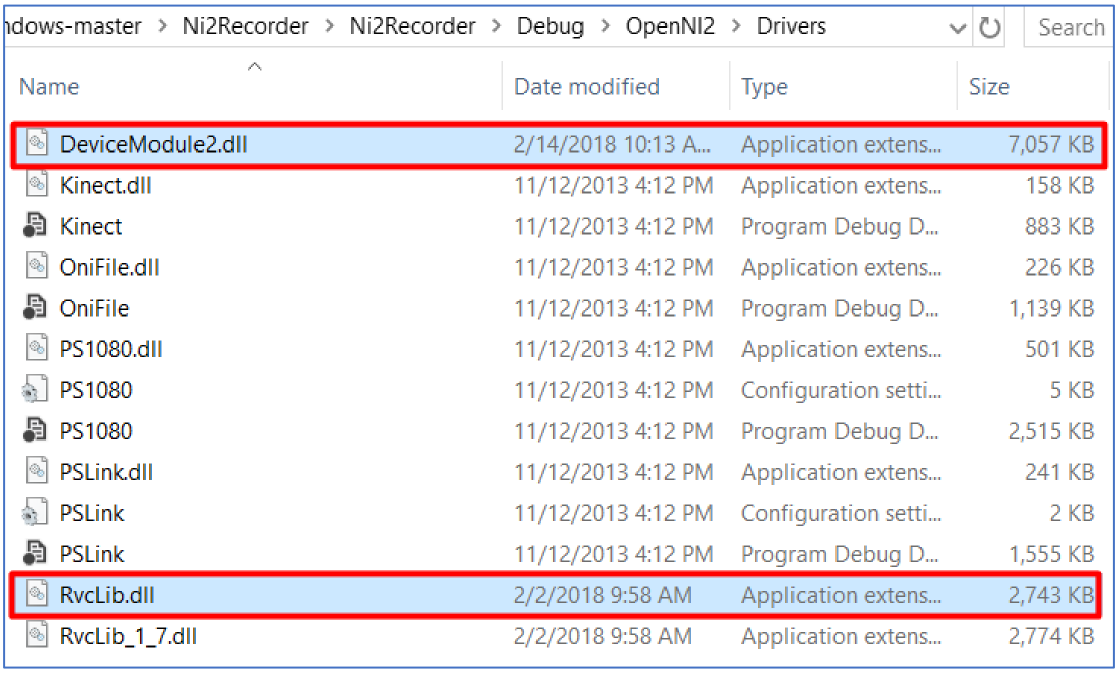
Extract to:
C:\

Figure 8-6

8.3 Moving OpenNi Libraries

Move **OpenNi libraries** to the directory as the Build Samples call OpenNi functions.

5. Go to **Program Files > OpenNI2 > Tools > OPENNI2 > Drivers**.
   Copy all the files in the **Drivers** folder (under Program Files) to **Debug / Release > OpenNI2 > Tools > OPENNI2 > Drivers**.

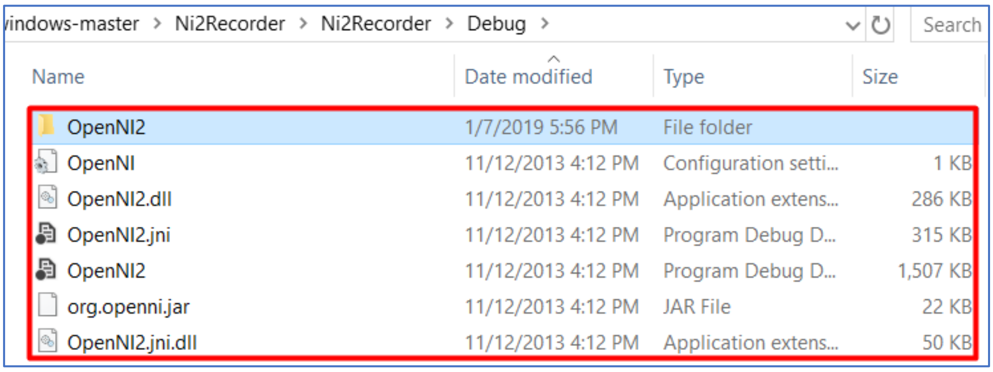


ndows-master > Ni2Recorder > Ni2Recorder > Debug > OpenNI2 > Drivers

Name	Date modified	Type	Size
DeviceModule2.dll	2/14/2018 10:13 A...	Application extens...	7,057 KB
Kinect.dll	11/12/2013 4:12 PM	Application extens...	158 KB
Kinect	11/12/2013 4:12 PM	Program Debug D...	883 KB
OniFile.dll	11/12/2013 4:12 PM	Application extens...	226 KB
OniFile	11/12/2013 4:12 PM	Program Debug D...	1,139 KB
PS1080.dll	11/12/2013 4:12 PM	Application extens...	501 KB
PS1080	11/12/2013 4:12 PM	Configuration setti...	5 KB
PS1080	11/12/2013 4:12 PM	Program Debug D...	2,515 KB
PSLink.dll	11/12/2013 4:12 PM	Application extens...	241 KB
PSLink	11/12/2013 4:12 PM	Configuration setti...	2 KB
PSLink	11/12/2013 4:12 PM	Program Debug D...	1,555 KB
RvcLib.dll	2/2/2018 9:58 AM	Application extens...	2,743 KB
RvcLib_1_7.dll	2/2/2018 9:58 AM	Application extens...	2,774 KB

Figure 8-7

2. Go to **Program Files > OpenNi2 > Redist**. Copy all the files in the Redist folder to the Debug / Release folder.



indows-master > Ni2Recorder > Ni2Recorder > Debug >

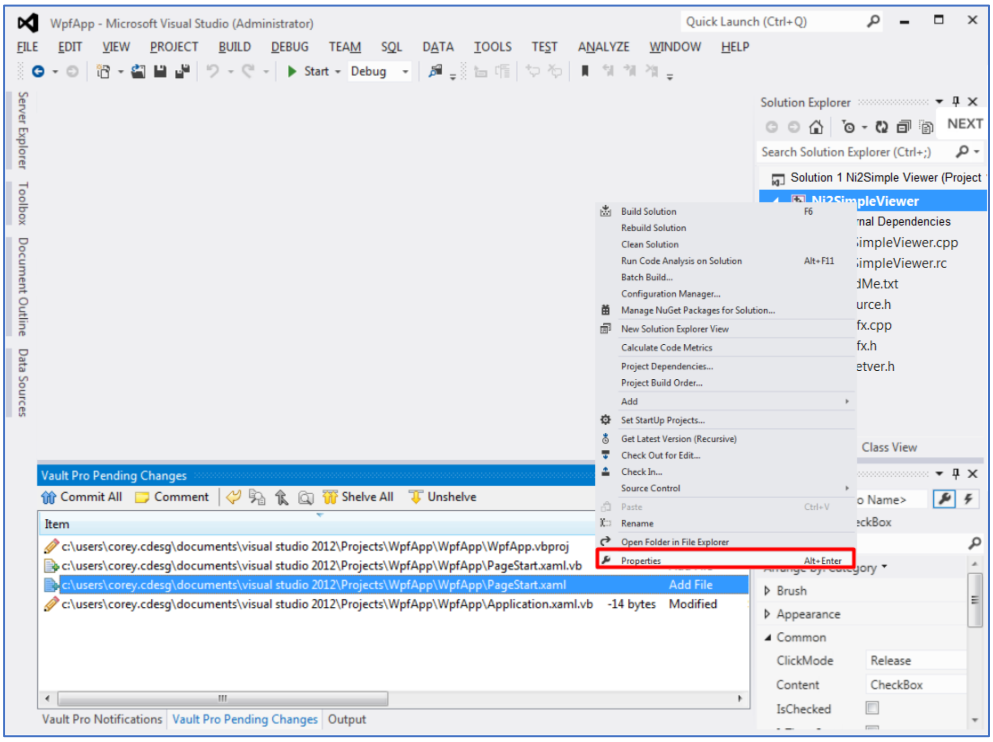
Name	Date modified	Type	Size
OpenNI2	1/7/2019 5:56 PM	File folder	
OpenNI	11/12/2013 4:12 PM	Configuration setti...	1 KB
OpenNI2.dll	11/12/2013 4:12 PM	Application extens...	286 KB
OpenNI2.jni	11/12/2013 4:12 PM	Program Debug D...	315 KB
OpenNI2	11/12/2013 4:12 PM	Program Debug D...	1,507 KB
org.openni.jar	11/12/2013 4:12 PM	JAR File	22 KB
OpenNI2.jni.dll	11/12/2013 4:12 PM	Application extens...	50 KB

Figure 8-8

8.4 Importing OpenNi / OpenCV Libraries

Import **OpenNi libraries** to the Build Sample project in your Visual Studio. Otherwise, errors occur during the process of generating applications.

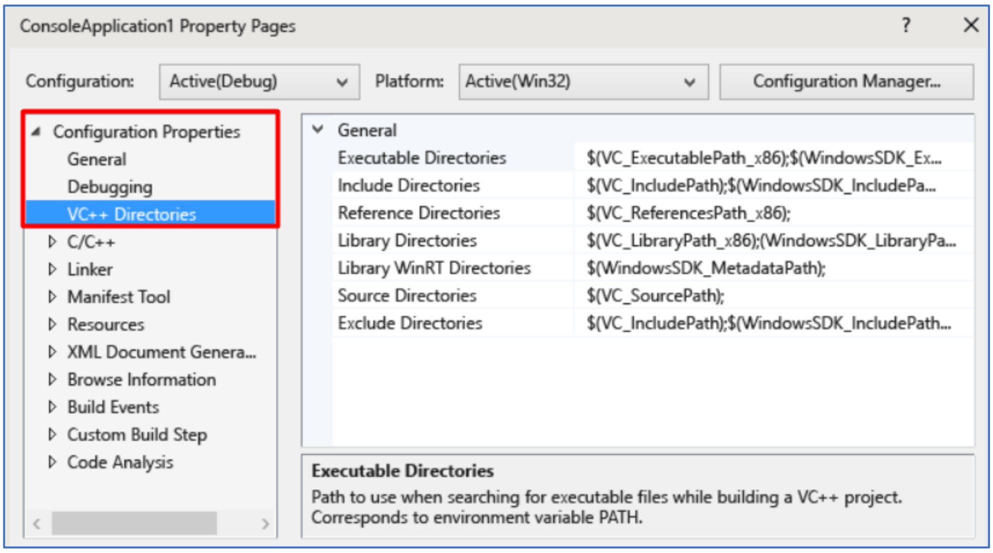
1. On your editor, right-click the Build Sample and select **Properties**.
   A window pops up.



```
c:\users\corey.cdesg\documents\visual studio 2012\Projects\WpfApp\WpfApp\WpfApp.vbproj
c:\users\corey.cdesg\documents\visual studio 2012\Projects\WpfApp\WpfApp\PageStart.xaml.vb
c:\users\corey.cdesg\documents\visual studio 2012\Projects\WpfApp\WpfApp\PageStart.xaml        Add File
c:\users\corey.cdesg\documents\visual studio 2012\Projects\WpfApp\WpfApp\Application.xaml.vb   -14 bytes   Modified
```

Figure 8-9

2. On the left menu, click **Configuring Properties**, and select **VC++ Directories**.



Configuration: Active(Debug)

Platform: Active(Win32)

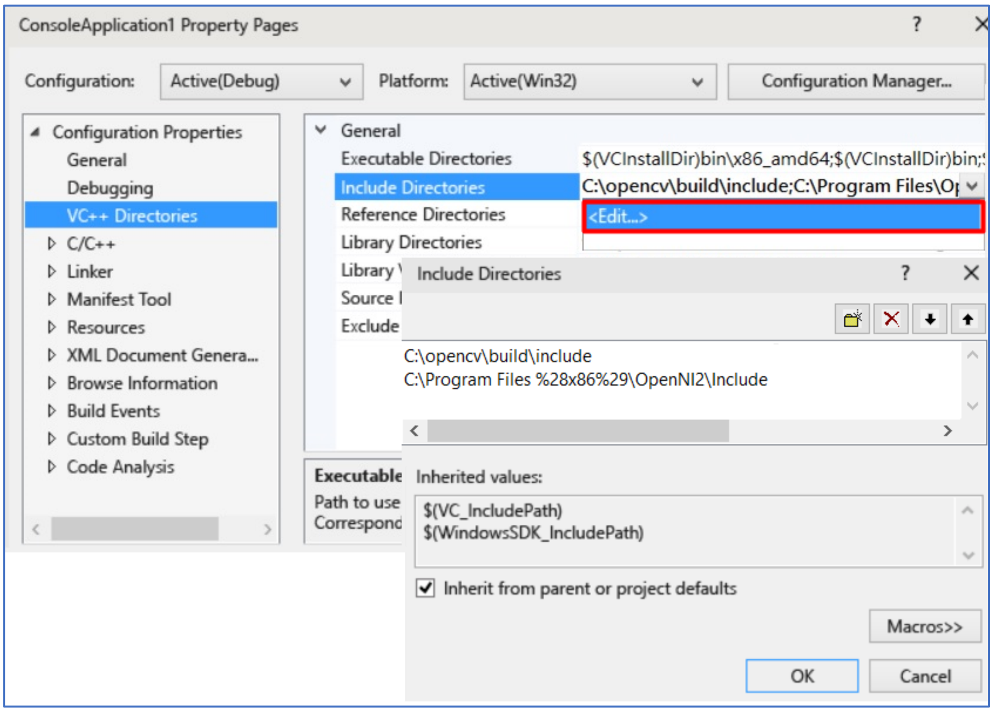
Executable Directories	$(VC_ExecutablePath_x86);$(WindowsSDK_Ex...
Include Directories	$(VC_IncludePath);$(WindowsSDK_IncludePa...
Reference Directories	$(VC_ReferencesPath_x86);
Library Directories	$(VC_LibraryPath_x86);(WindowsSDK_LibraryPa...
Library WinRT Directories	$(WindowsSDK_MetadataPath);
Source Directories	$(VC_SourcePath);
Exclude Directories	$(VC_IncludePath);$(WindowsSDK_IncludePath...

Executable Directories

Path to use when searching for executable files while building a VC++ project. Corresponds to environment variable PATH.

Figure 8-10

3. On **Include Directories**, click the ⌄ sign and select **Edit**. A window pops up.



Configuration: Active(Debug)

Platform: Active(Win32)

Executable Directories	$(VCInstallDir)bin\x86_amd64;$(VCInstallDir)bin;$
Include Directories	C:\opencv\build\include;C:\Program Files\Op

Include Directories:

C:\opencv\build\include
C:\Program Files %28x86%29\OpenNI2\Include

Inherited values:

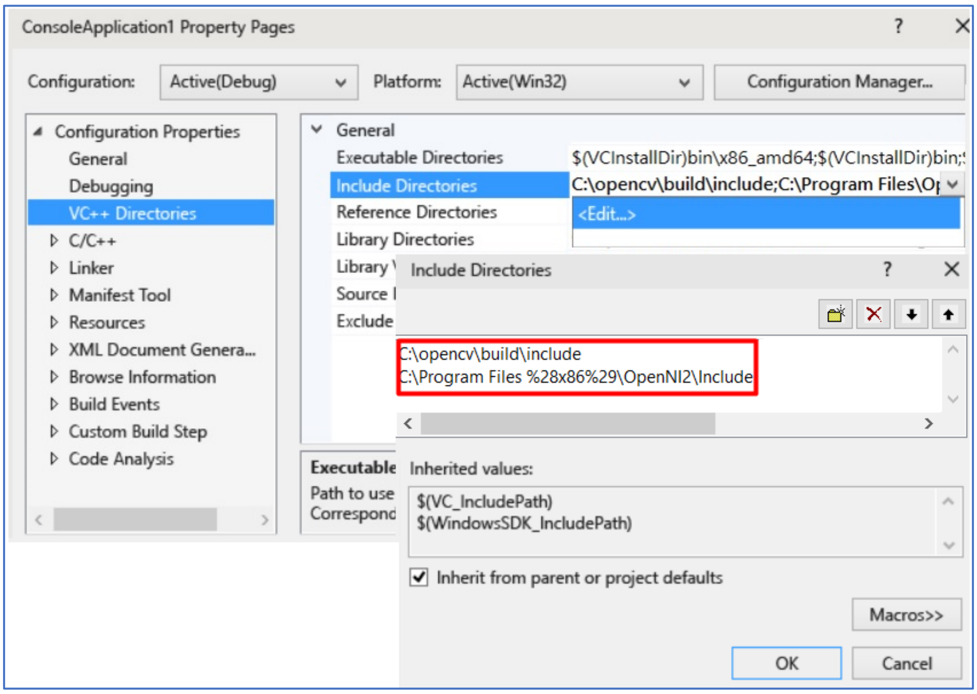
$(VC_IncludePath)
$(WindowsSDK_IncludePath)

☑ Inherit from parent or project defaults

Figure 8-11

4. Click 📁 to add the following library paths to the **Include Directories**. The default locations of the library paths are:

Libraries	**Default Locations**
OpenNi2	C:\Program Files\OpenNI2\Include
OpenCV	C:\opencv\build\include



ConsoleApplication1 Property Pages

Configuration: Active(Debug)　Platform: Active(Win32)

Include Directories: C:\opencv\build\include;C:\Program Files\Op

Include Directories

C:\opencv\build\include
C:\Program Files %28x86%29\OpenNI2\Include

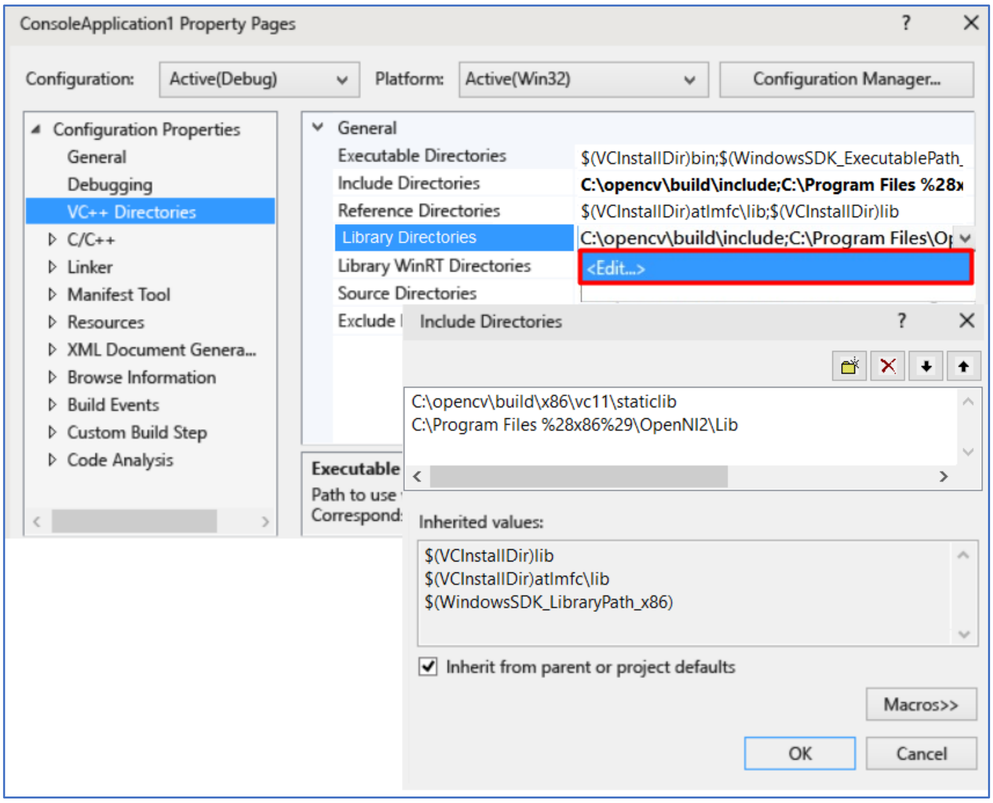
Inherited values:

$(VC_IncludePath)
$(WindowsSDK_IncludePath)

☑ Inherit from parent or project defaults

Figure 8-12

5. On **Library Directories**, click the ⌄ sign and select **Edit**. A window pops up.



ConsoleApplication1 Property Pages

Configuration: Active(Debug) Platform: Active(Win32) Configuration Manager...

- Configuration Properties
  - General
  - Debugging
  - VC++ Directories
  - C/C++
  - Linker
  - Manifest Tool
  - Resources
  - XML Document Genera...
  - Browse Information
  - Build Events
  - Custom Build Step
  - Code Analysis

General

Executable Directories: $(VCInstallDir)bin;$(WindowsSDK_ExecutablePath_

Include Directories: **C:\opencv\build\include;C:\Program Files %28x**

Reference Directories: $(VCInstallDir)atlmfc\lib;$(VCInstallDir)lib

Library Directories: C:\opencv\build\include;C:\Program Files\Op

<Edit...>

Library WinRT Directories

Source Directories

Exclude

Executable

Path to use

Correspond

Include Directories

```
C:\opencv\build\x86\vc11\staticlib
C:\Program Files %28x86%29\OpenNI2\Lib
```

Inherited values:

```
$(VCInstallDir)lib
$(VCInstallDir)atlmfc\lib
$(WindowsSDK_LibraryPath_x86)
```

☑ Inherit from parent or project defaults

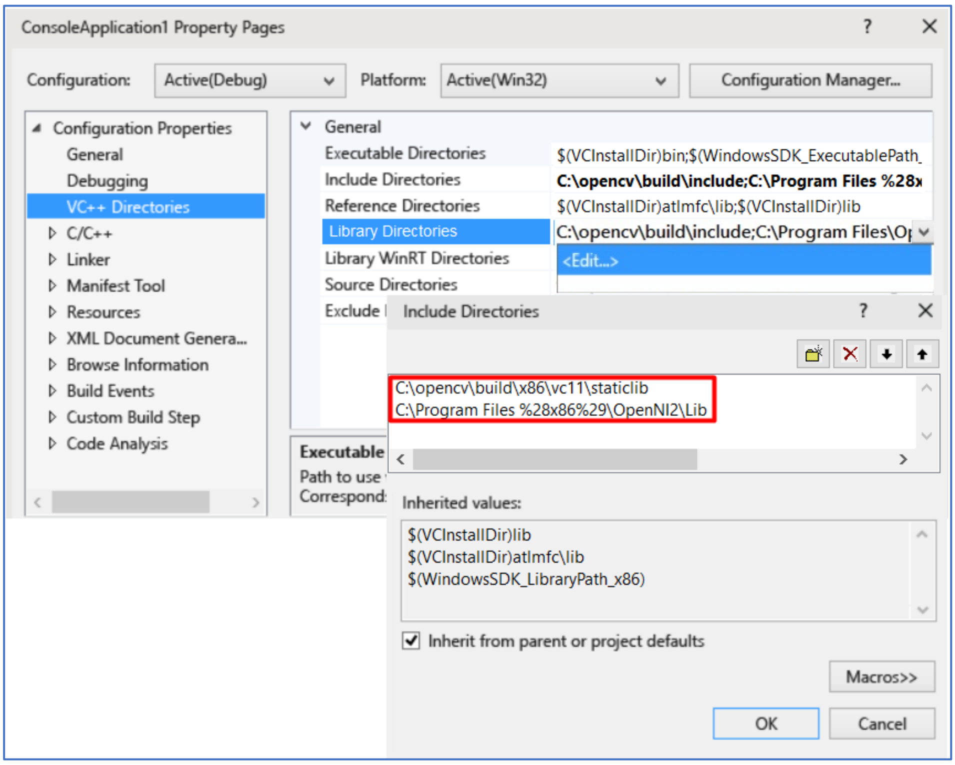
Macros>>

OK Cancel

Figure 8-13

6. Click 📁 to add the following library paths to the **Library Directories**. The default locations of the library paths are:

Libraries	Default Locations
OpenNi2	C:\Program Files\OpenNI2\Lib
OpenCV	C:\opencv\build\x64\vc11\staticlib



Configuration: Active(Debug)
Platform: Active(Win32)

Executable Directories: $(VCInstallDir)bin;$(WindowsSDK_ExecutablePath_
Include Directories: **C:\opencv\build\include;C:\Program Files %28x**
Reference Directories: $(VCInstallDir)atlmfc\lib;$(VCInstallDir)lib
Library Directories: C:\opencv\build\include;C:\Program Files\Op

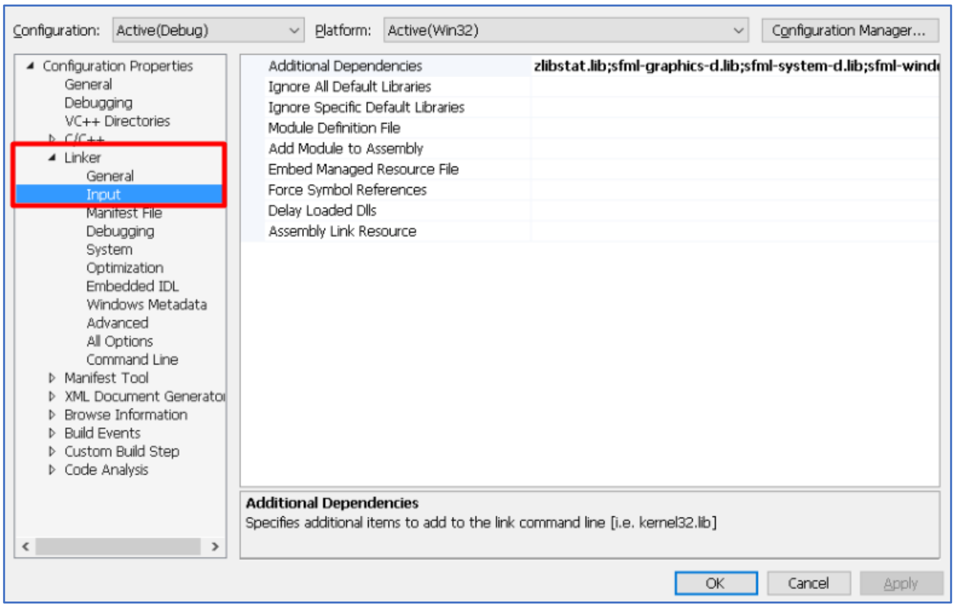
C:\opencv\build\x86\vc11\staticlib
C:\Program Files %28x86%29\OpenNI2\Lib

Inherited values:
$(VCInstallDir)lib
$(VCInstallDir)atlmfc\lib
$(WindowsSDK_LibraryPath_x86)

☑ Inherit from parent or project defaults

Figure 8-14

7. On the left menu, click **Linker**, and select **Input**.



Configuration: Active(Debug)

Platform: Active(Win32)

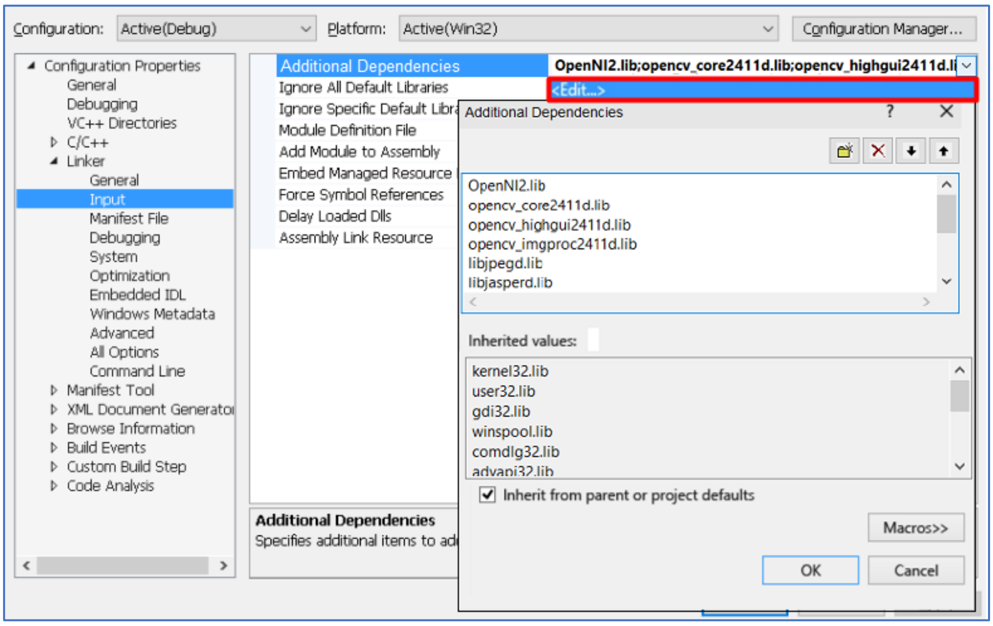
Additional Dependencies: zlibstat.lib;sfml-graphics-d.lib;sfml-system-d.lib;sfml-windo

Additional Dependencies

Specifies additional items to add to the link command line [i.e. kernel32.lib]

Figure 8-15

8. On **Additional Dependencies**, click the ⌄ sign and select **Edit**. A window pops up.



Configuration: Active(Debug)

Platform: Active(Win32)

Additional Dependencies: OpenNI2.lib;opencv_core2411d.lib;opencv_highgui2411d.li

Additional Dependencies:

OpenNI2.lib
opencv_core2411d.lib
opencv_highgui2411d.lib
opencv_imgproc2411d.lib
libjpegd.lib
libjasperd.lib

Inherited values:

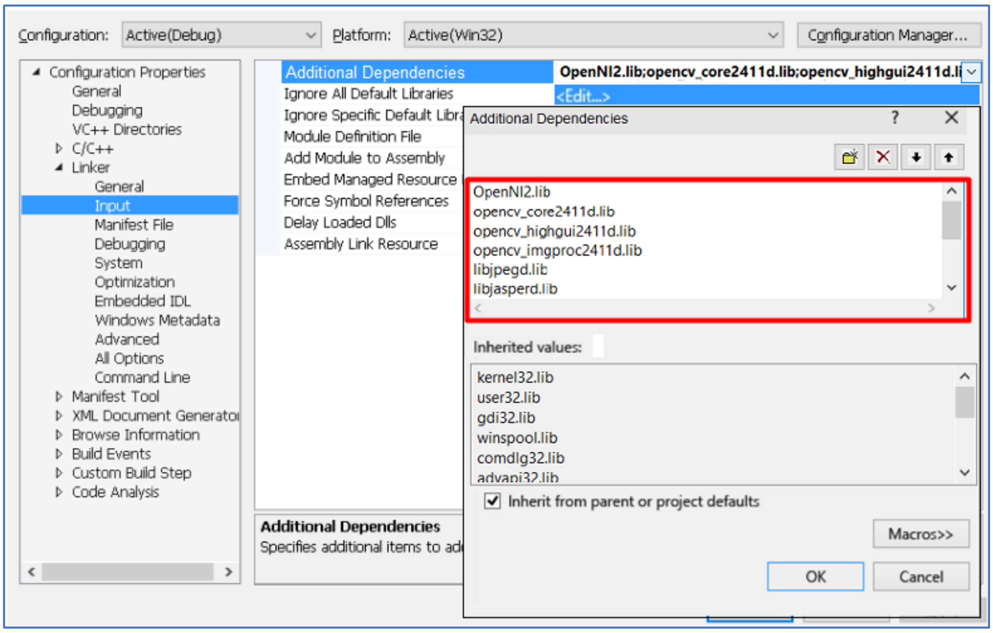
kernel32.lib
user32.lib
gdi32.lib
winspool.lib
comdlg32.lib
advapi32.lib

☑ Inherit from parent or project defaults

Figure 8-16

9. Click 📁 to add the following libraries to the **Additional Dependencies** folder. The default locations of the library files are:

Open NI2 Library Files	**Default Locations**
OpenNi2.lib	C:\Program Files\OpenNI2\Lib
OpenCV Library Files	**Default Locations**
opencv_core2411d.lib	C:\opencv\build\x64\vc11\lib
opencv_highgui2411d.lib	
opencv_imgproc2411d.lib	
zlibd.lib	C:\opencv\build\x64\vc11\staticlib
libjpegd.lib	
libjasperd.lib	
libpngd.lib	
libtiffd.lib	
IlmImfd.lib	



Configuration: Active(Debug)
Platform: Active(Win32)

Additional Dependencies: OpenNI2.lib;opencv_core2411d.lib;opencv_highgui2411d.li

Additional Dependencies

OpenNI2.lib
opencv_core2411d.lib
opencv_highgui2411d.lib
opencv_imgproc2411d.lib
libjpegd.lib
libjasperd.lib

Inherited values:

kernel32.lib
user32.lib
gdi32.lib
winspool.lib
comdlg32.lib
advapi32.lib

☑ Inherit from parent or project defaults

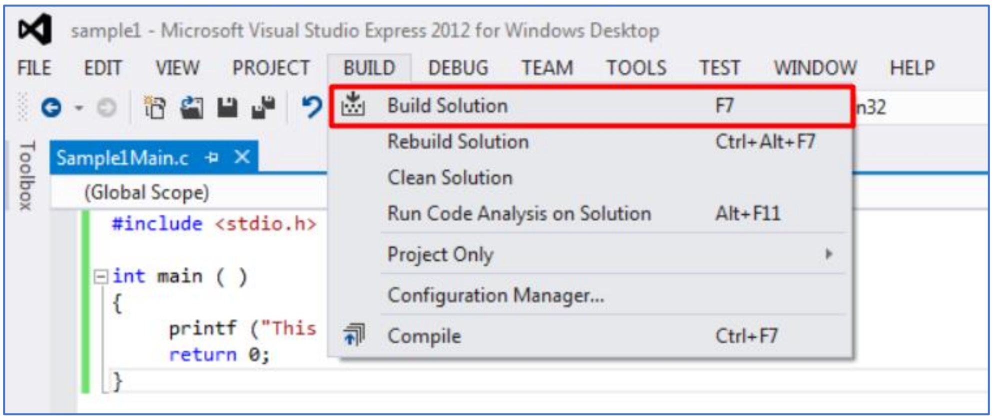
Additional Dependencies
Specifies additional items to ad

Figure 8-17

8.5 Building / Activating Your Sample Application

Once all the libraries are imported to the Build Sample, the development environment is ready for programming. Follow the instructions below to build a sample application.

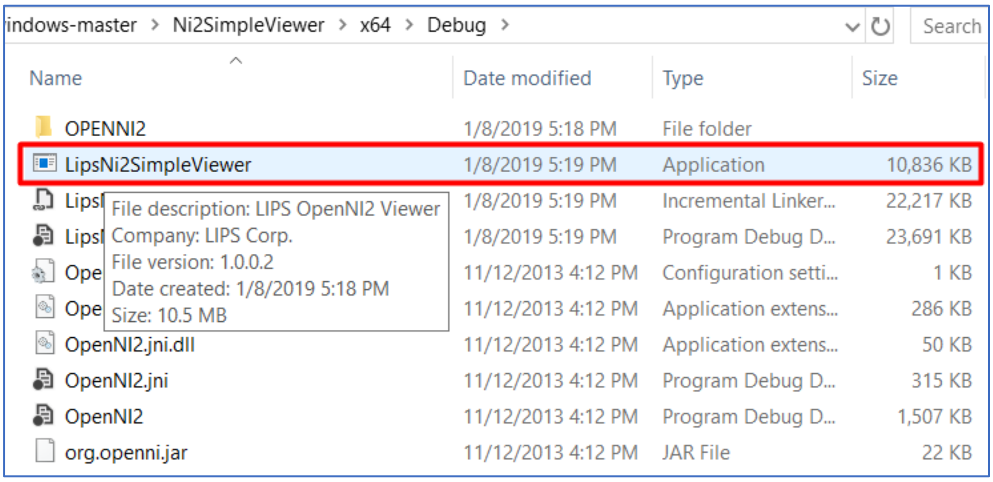
1. Start constructing codes and when the sample application is ready, select **Build** from the top bar and click **Build Solution**. Your sample application will be generated.


sample1 - Microsoft Visual Studio Express 2012 for Windows Desktop
FILE EDIT VIEW PROJECT BUILD DEBUG TEAM TOOLS TEST WINDOW HELP
Build Solution F7
Rebuild Solution Ctrl+Alt+F7
Clean Solution
Run Code Analysis on Solution Alt+F11
Project Only
Configuration Manager...
Compile Ctrl+F7
n32
Toolbox
Sample1Main.c
(Global Scope)

```
#include <stdio.h>

int main ( )
{
    printf ("This
    return 0;
}
```

Figure 8-18

2. Click the sample application. A command prompt pops up.

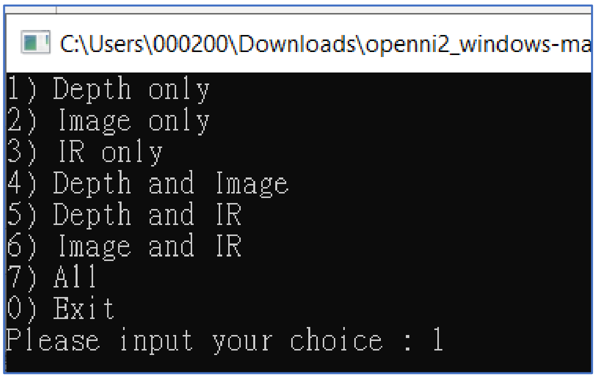


Name	Date modified	Type	Size
OPENNI2	1/8/2019 5:18 PM	File folder	
LipsNi2SimpleViewer	1/8/2019 5:19 PM	Application	10,836 KB
Lipsl	1/8/2019 5:19 PM	Incremental Linker...	22,217 KB
Lipsl	1/8/2019 5:19 PM	Program Debug D...	23,691 KB
Ope	11/12/2013 4:12 PM	Configuration setti...	1 KB
Ope	11/12/2013 4:12 PM	Application extens...	286 KB
OpenNI2.jni.dll	11/12/2013 4:12 PM	Application extens...	50 KB
OpenNI2.jni	11/12/2013 4:12 PM	Program Debug D...	315 KB
OpenNI2	11/12/2013 4:12 PM	Program Debug D...	1,507 KB
org.openni.jar	11/12/2013 4:12 PM	JAR File	22 KB

File description: LIPS OpenNI2 Viewer
Company: LIPS Corp.
File version: 1.0.0.2
Date created: 1/8/2019 5:18 PM
Size: 10.5 MB

Figure 8-19

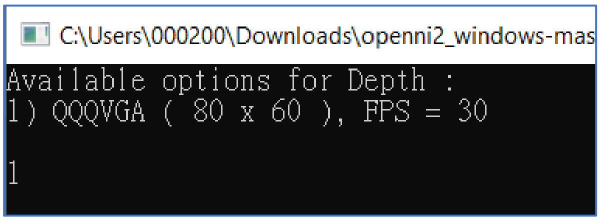
3. Press **1**.



```
1) Depth only
2) Image only
3) IR only
4) Depth and Image
5) Depth and IR
6) Image and IR
7) All
0) Exit
Please input your choice : 1
```

Figure 8 -20

4. Press **1** again.



```
Available options for Depth :
1) QQQVGA ( 80 x 60 ), FPS = 30

1
```

Figure 8-21

5. You can then view live motion data captured by the LIPS Camera.

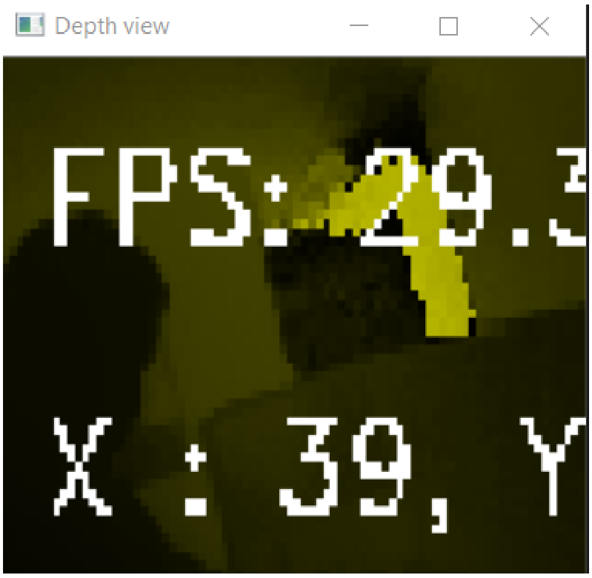


Figure 8-22

Linux

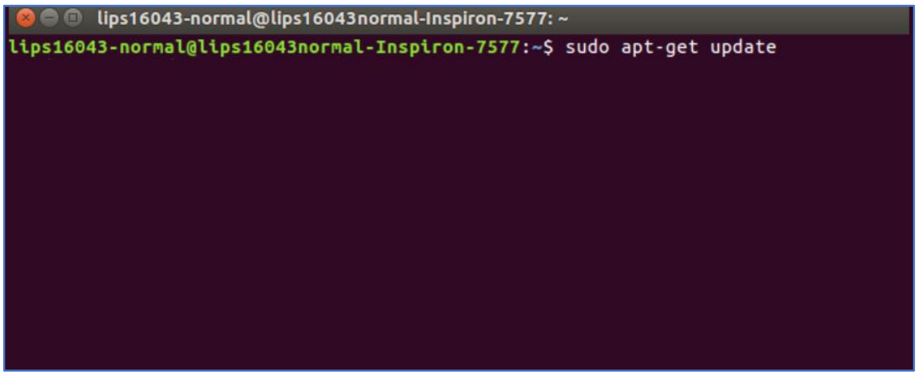
9. Updating / Upgrading Package Tools

Before installing LIPS SDK, make sure the index files and the software are upgraded to the latest version by using APT command lines.

Note: When performing system upgrade, do NOT upgrade Linux Kernel. LIPS SDK does NOT work on Linux Kernel 4.15 or above.

---

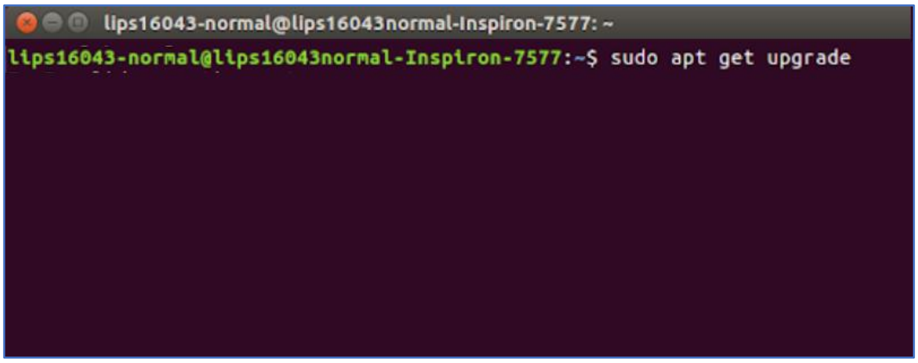
1. Press **Ctrl + Alt + T** on your keyboard. On the **Terminal**, run **sudo apt-get update**. Linux automatically updates the index files.



```
lips16043-normal@lips16043normal-Inspiron-7577:~$ sudo apt-get update
```

Figure 9-1

2. After the update completes, run **sudo apt-get upgrade** on the Terminal. Linux automatically upgrades system software.



```
lips16043-normal@lips16043normal-Inspiron-7577:~$ sudo apt get upgrade
```

Figure 9-2

10. Installing OpenCV Libraries

LIPS SDK calls OpenCV functions and thus it is required to install **OpenCV Libraries** prior to application development process.

1. On the **Terminal**, type **sudo apt-get install cmake pkg-config libgtk2.0-dev**.

2. Download **OpenCV Libraries** from https://github.com/opencv/opencv/archive/3.4.1.zip

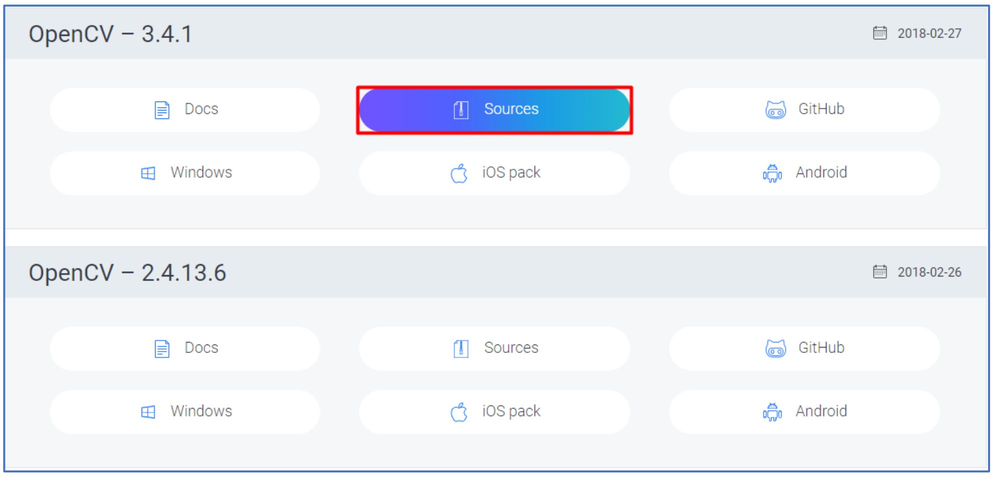


Figure 10-1

3. In the **Home** directory of your Linux distribution, create a folder to store OpenCV Libraries

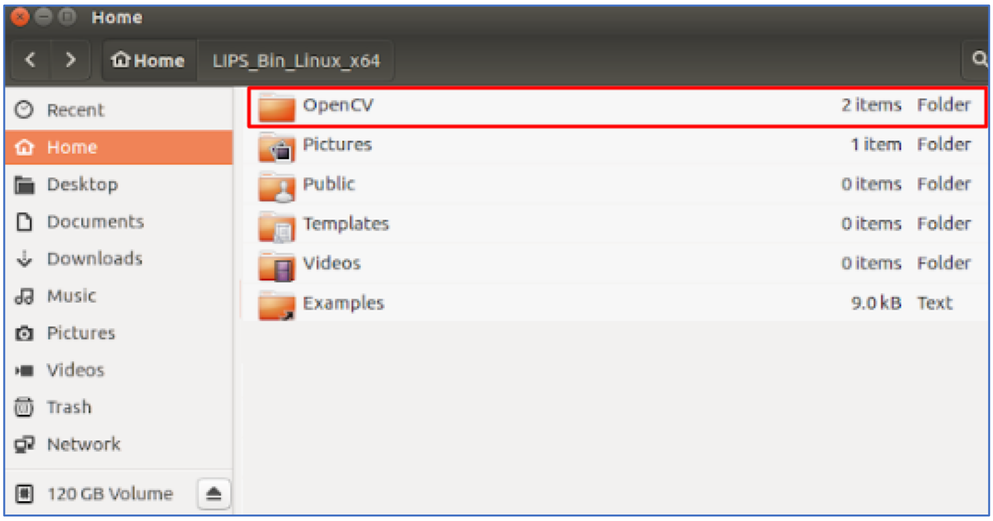


Figure 10-2

4. Click **opencv** and extract the file on your local PC / laptop.

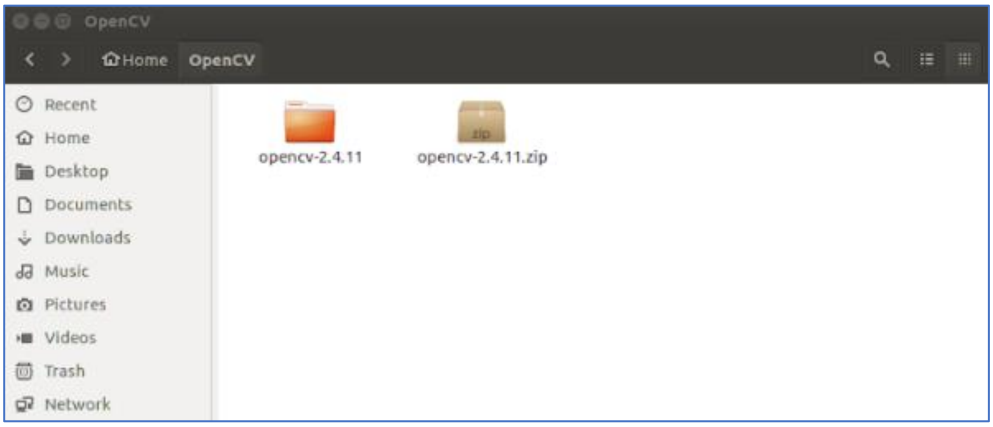


Figure 10-3

5. Under the **opencv** folder, create a **build** folder for **cmake**, the build management system for Linux.

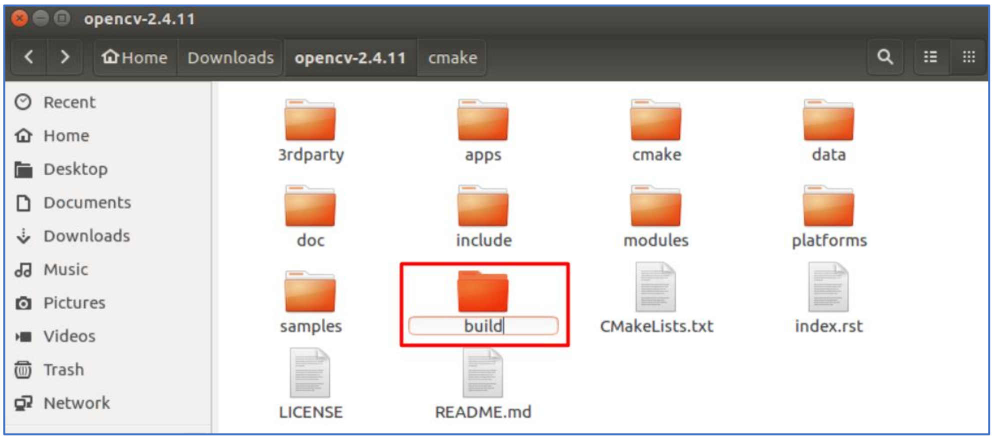
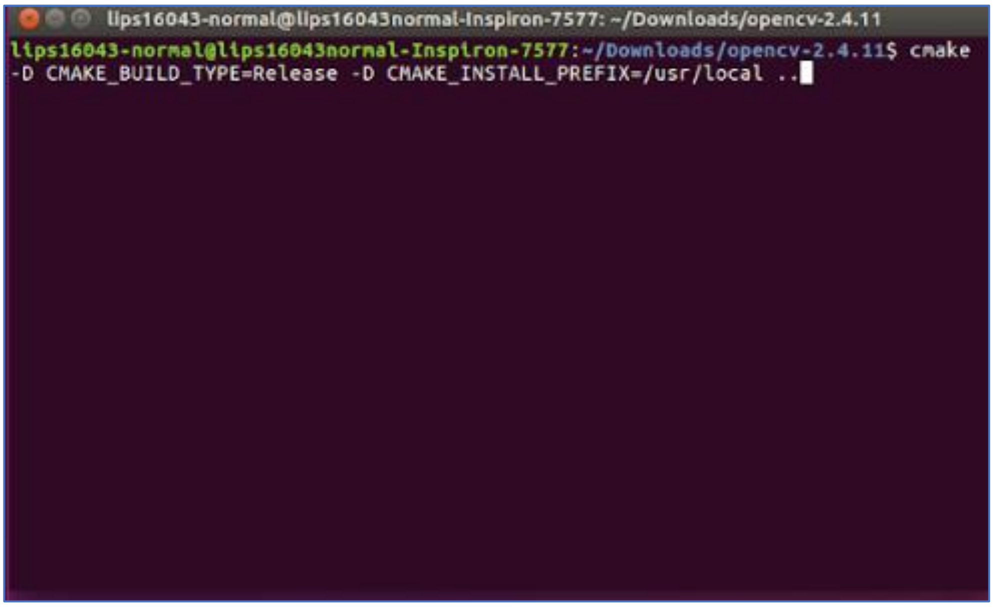


Figure 10-4

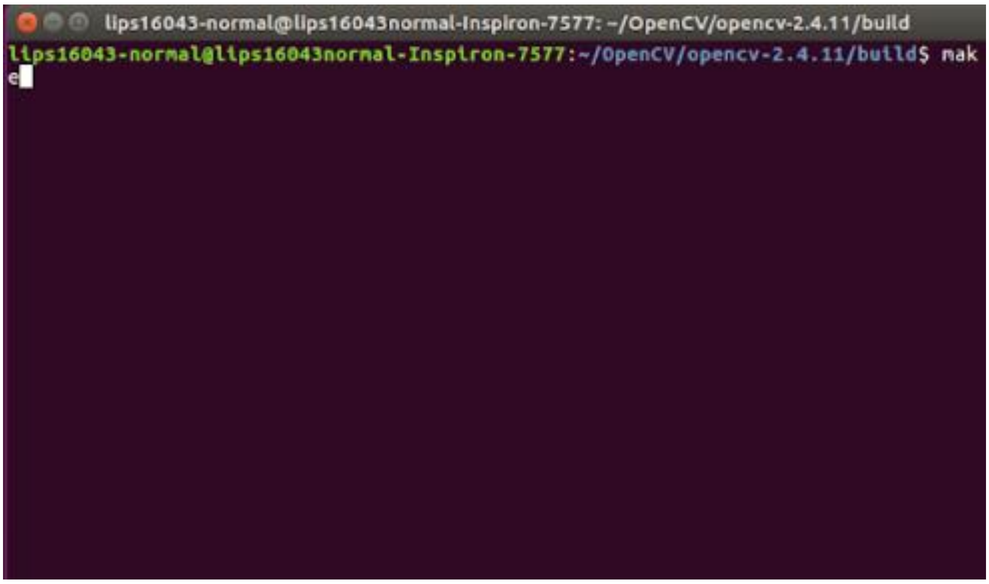
6. Under the build folder, type **cmake -D CMAKE_BUILD_TYPE=Release -D CMAKE_INSTALL_PREFIX=/usr/local ..** on the Terminal**.**



```
lips16043-normal@lips16043normal-Inspiron-7577: ~/Downloads/opencv-2.4.11
lips16043-normal@lips16043normal-Inspiron-7577:~/Downloads/opencv-2.4.11$ cmake
-D CMAKE_BUILD_TYPE=Release -D CMAKE_INSTALL_PREFIX=/usr/local ..
```

Figure 10-5

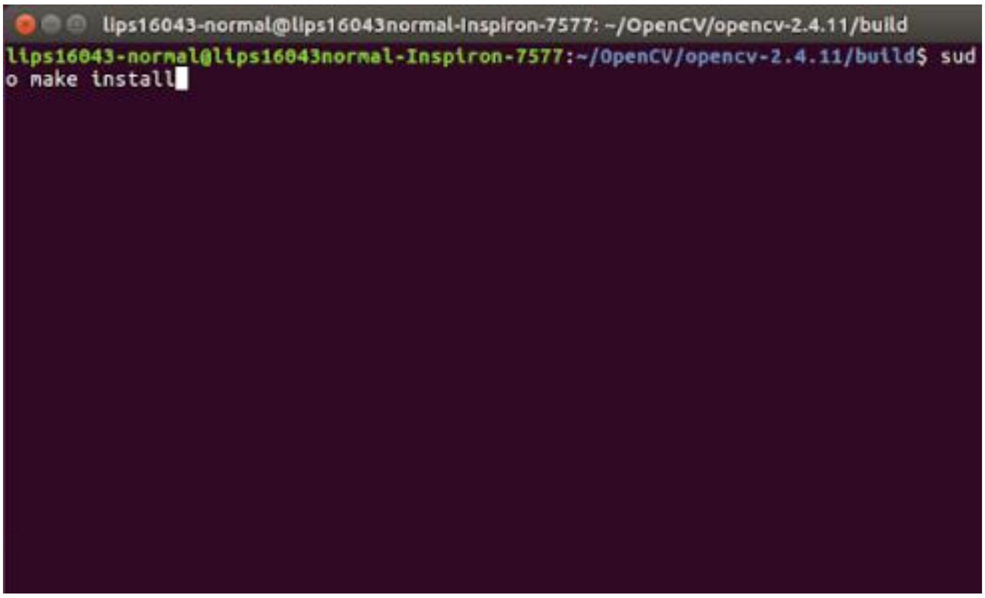
7. When the cmake system is generated, type **make** on the Terminal.



```
lips16043-normal@lips16043normal-Inspiron-7577: ~/OpenCV/opencv-2.4.11/build
lips16043-normal@lips16043normal-Inspiron-7577:~/OpenCV/opencv-2.4.11/build$ mak
e
```

Figure 10-6

8. On the Terminal, type **sudo make install**. OpenCV libraries will be automatically installed.



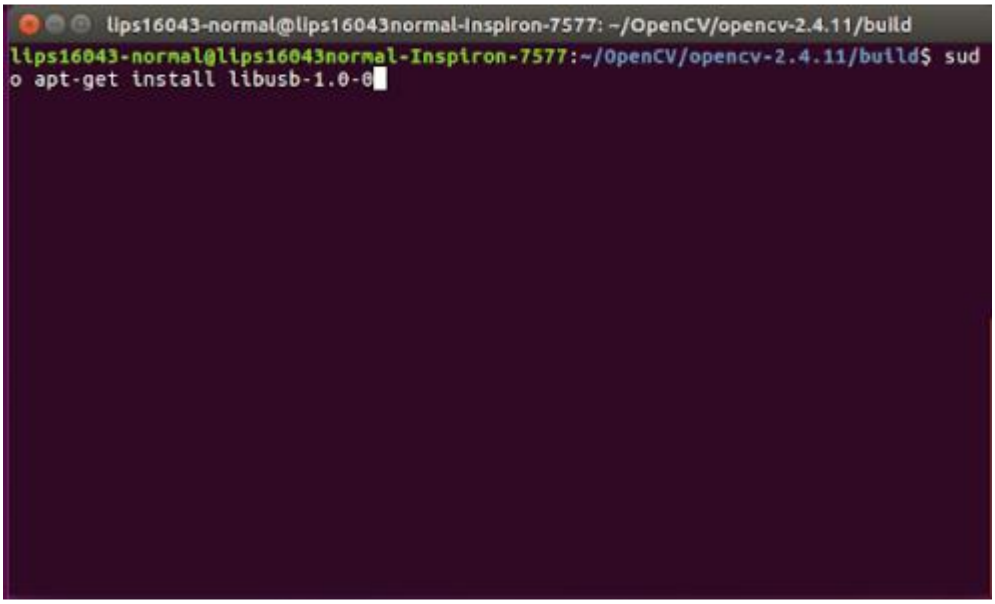
```
lips16043-normal@lips16043normal-Inspiron-7577: ~/OpenCV/opencv-2.4.11/build
lips16043-normal@lips16043normal-Inspiron-7577:~/OpenCV/opencv-2.4.11/build$ sud
o make install
```

Figure 10-7

11. Installing USB Libraries

After installing OpenCV Libraries, install USB Libraries to allow USB device connection.

1. On the **Terminal**, type **sudo apt-get install libusb-1.0-0**. The USB libraries will be automatically installed.



```
lips16043-normal@lips16043normal-Inspiron-7577: ~/OpenCV/opencv-2.4.11/build
lips16043-normal@lips16043normal-Inspiron-7577:~/OpenCV/opencv-2.4.11/build$ sud
o apt-get install libusb-1.0-0
```

Figure 11-1

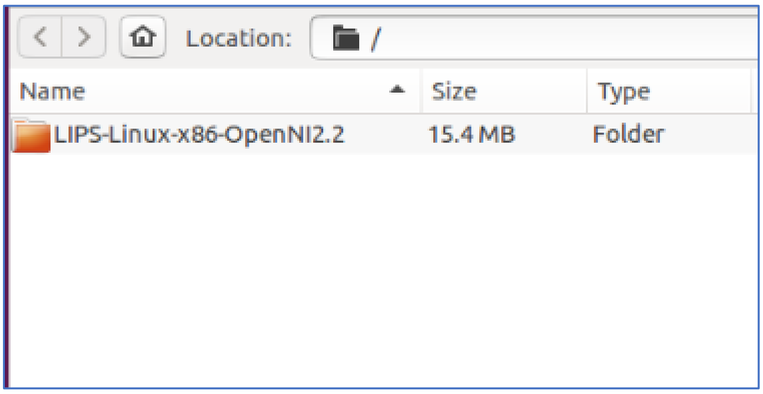
12. Installing LIPS SDK

To download the **LIPS SDK for Linux System** from our website, refer to similar steps for Windows. The following instructions use **v1.5.1.0 - Linux (Ubuntu 18.04+OpenCV 3.4.1) 64bit / OpenNI 2.2** as an example.

Note: Raspberry Pi 4 Model B is only supported by Linux system compatible with **ARM architecture**. Make sure your PC / laptop is equipped with the CPU of ARM architecture for your operating system when downloading LIPS SDK.

---

1. After the download completes, unzip the **LIPS-Linux-x86-OpenNI2.2** folder.



Location: /

Name	Size	Type
LIPS-Linux-x86-OpenNI2.2	15.4 MB	Folder

Figure 12-1

2. Double click **Samples**.

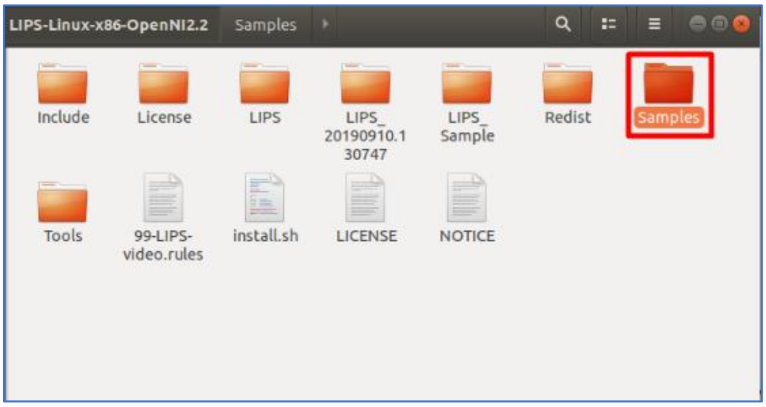
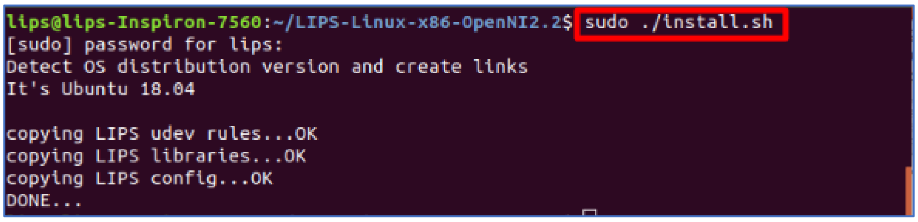


Figure 12-2

3. On the Terminal, type **sudo./install.sh**. LIPS SDK will be automatically installed.



```
lips@lips-Inspiron-7560:~/LIPS-Linux-x86-OpenNI2.2$ sudo ./install.sh
[sudo] password for lips:
Detect OS distribution version and create links
It's Ubuntu 18.04

copying LIPS udev rules...OK
copying LIPS libraries...OK
copying LIPS config...OK
DONE...
```

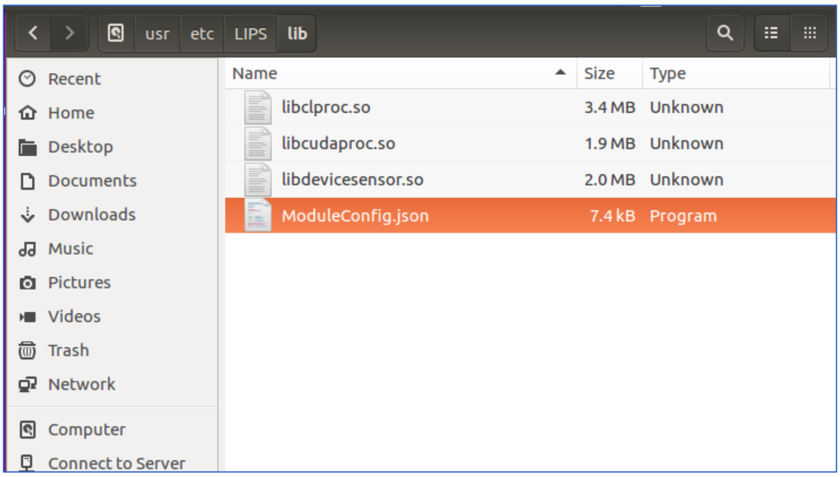
Figure 12-3

13. Configuring LIPS SDK

Once LIPS SDK is properly set up, you can find **ModuleConfig.json**, its configuration file, on your local PC / laptop. The settings for specific SDK functions are saved as values in .json format, which can be edited simply as a text file to make changes.

To find the configuration files:

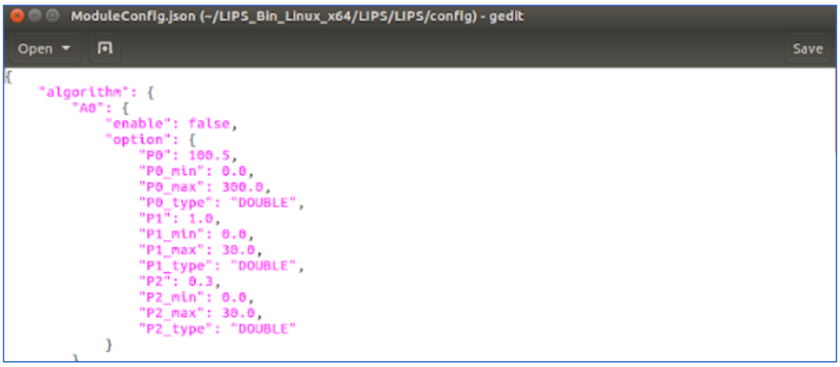
1. Go to **Computer > usr > etc > LIPS > lib**, click **ModuleConfig.json**.



Name	Size	Type
libclproc.so	3.4 MB	Unknown
libcudaproc.so	1.9 MB	Unknown
libdevicesensor.so	2.0 MB	Unknown
ModuleConfig.json	7.4 kB	Program

Figure 13-1

2. Open **ModuleConfig.json**. Find the functions you are changing and start editing.


ModuleConfig.json (~/LIPS_Bin_Linux_x64/LIPS/LIPS/config) - gedit
Open
Save

```
{
    "algorithm": {
        "A0": {
            "enable": false,
            "option": {
                "P0": 100.5,
                "P0_min": 0.0,
                "P0_max": 300.0,
                "P0_type": "DOUBLE",
                "P1": 1.0,
                "P1_min": 0.0,
                "P1_max": 30.0,
                "P1_type": "DOUBLE",
                "P2": 0.3,
                "P2_min": 0.0,
                "P2_max": 30.0,
                "P2_type": "DOUBLE"
            }
        }
```

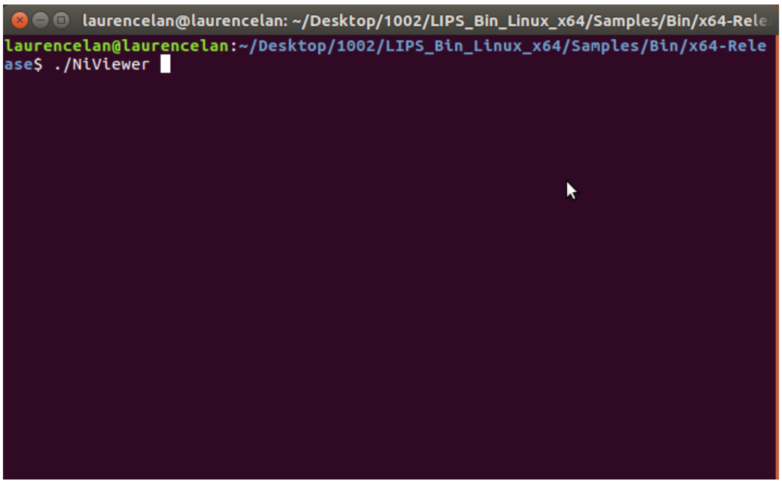
Figure 13-2

The available settings for LIPS SDK, Linux and their configurations are identical to LIPS SDK, Windows. To learn about the configuration of a specific functions, refer to similar settings in *7. Advanced Configuration, Windows*.

14. Accessing Camera Image

Once the LIPS SDK is installed, you can access the camera image and status through NiViewer. Note that your NiViewer is stored in different locations on your PC / laptop depending on your operating system.

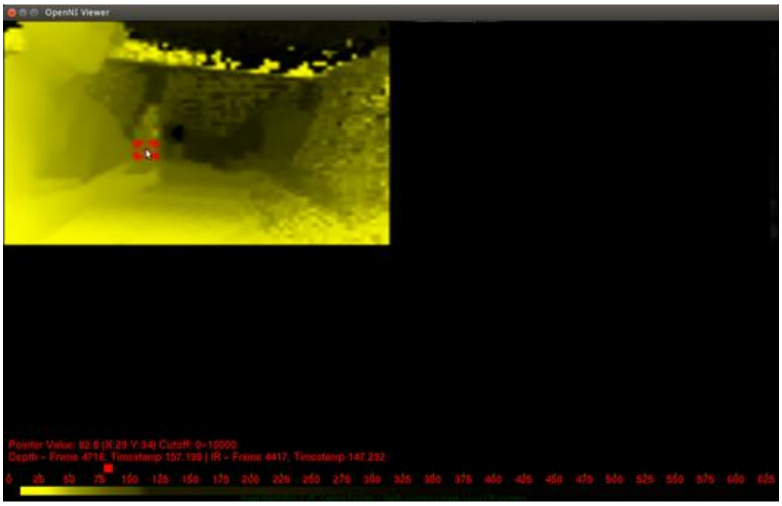
1. In the Terminal, type **./NiViewer**, then press **Enter**.



```
laurencelan@laurencelan: ~/Desktop/1002/LIPS_Bin_Linux_x64/Samples/Bin/x64-Rele
laurencelan@laurencelan:~/Desktop/1002/LIPS_Bin_Linux_x64/Samples/Bin/x64-Rele
ase$ ./NiViewer
```

Figure 14-1

2. Upon successful activation, the **Depth image** will be displayed on screen.



```
Pointer Value: 82.0 (X:29 Y:34) Cutoff: 0-10000
Depth - Frame 4716, Timestamp 157.199 | IR - Frame 4417, Timestamp 147.232
```

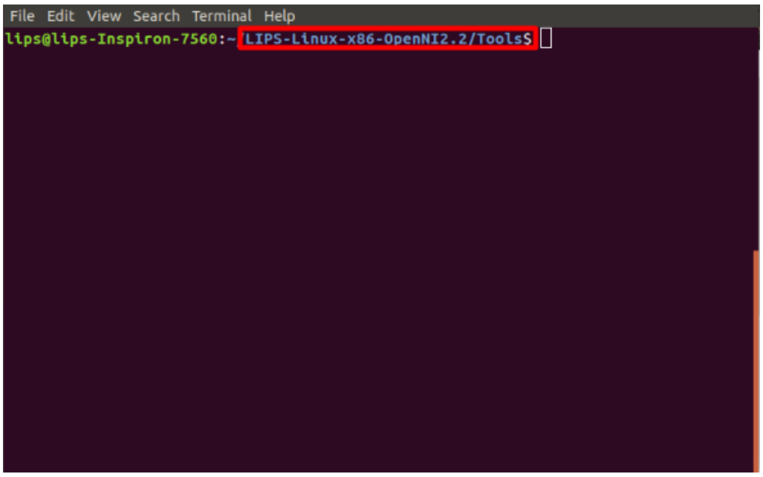
Figure 14-2

15. Test Applications

LIPS Corp. provide other testing tools for developers to access IMU data or the internal parameters of the camera. The test applications work similarly with the test applications for LIPS SDK, Windows. For the specific functions of each test application, refer to *6. Test Applications, Windows*.

Follow the instructions to start LIPS test applications on Windows. Here, we use **Ni2ImuReader** as an example.

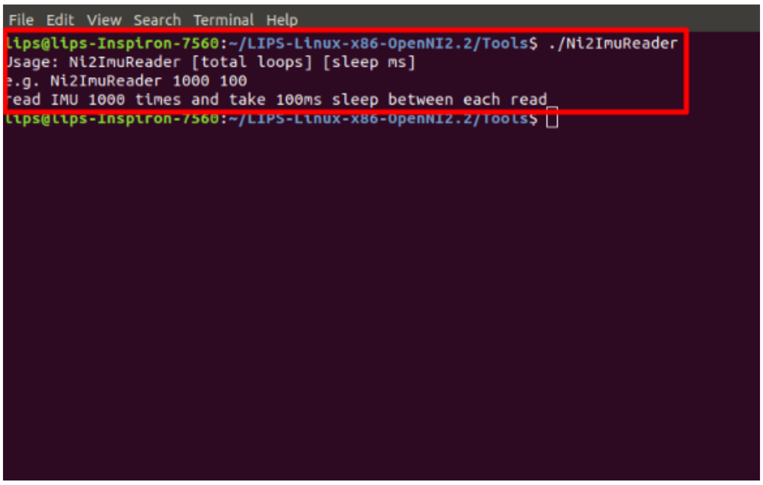
1. Go to **LIPS SDK** > **Tools**.



```
lips@lips-Inspiron-7560:~/LIPS-Linux-x86-OpenNI2.2/Tools$
```

Figure 15-1

2. Type **./[Test Application Name]** to access the test application desired. The application will be displayed in the **Viewer Window**, **Status Window**, or **both**.



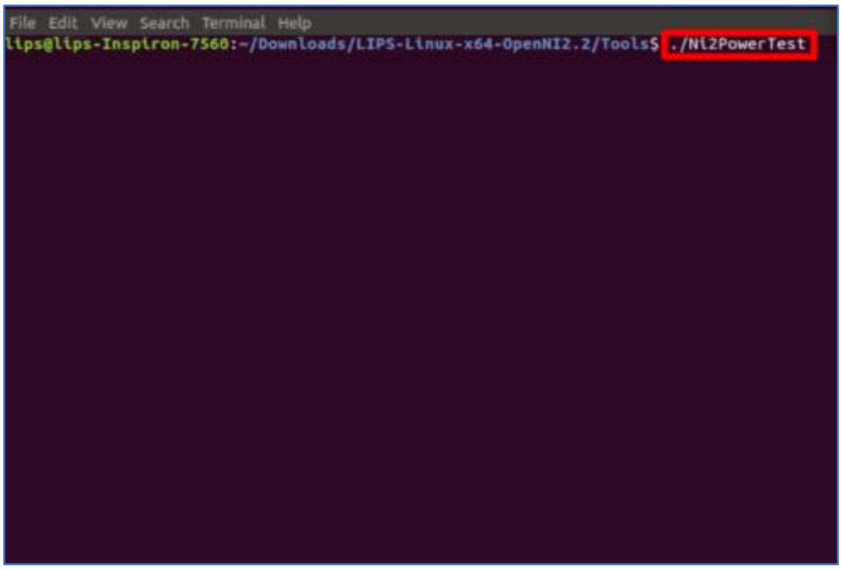
```
lips@lips-Inspiron-7560:~/LIPS-Linux-x86-OpenNI2.2/Tools$ ./Ni2ImuReader
Usage: Ni2ImuReader [total loops] [sleep ms]
e.g. Ni2ImuReader 1000 100
read IMU 1000 times and take 100ms sleep between each read
lips@lips-Inspiron-7560:~/LIPS-Linux-x86-OpenNI2.2/Tools$
```

Figure 15-2

15.1 Ni2PowerTest

LIPS SDK supports a Standby Mode (Low Power Mode) for which users can stop live streaming temporarily and resume live streaming at any time by sending a status code through **Ni2PowerTest**.

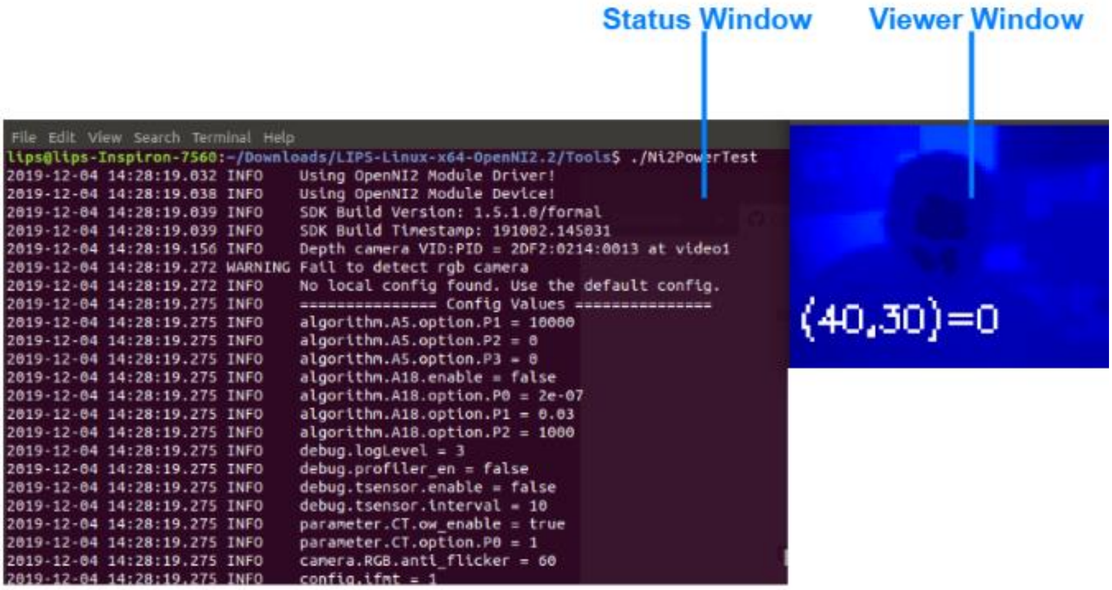
5. Go to **LIPS SDK > Tools**. Type **./Ni2PowerTest** to start the application.



```
lips@lips-Inspiron-7560:~/Downloads/LIPS-Linux-x64-OpenNI2.2/Tools$ ./Ni2PowerTest
```

Figure 15-3

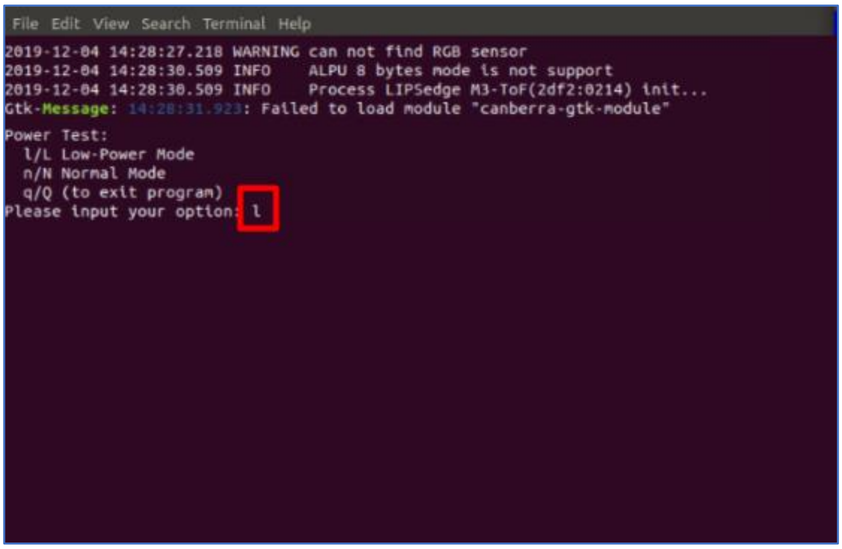
6. A **Status Window** and a **Viewer Window** pops up.



```
lips@lips-Inspiron-7560:~/Downloads/LIPS-Linux-x64-OpenNI2.2/Tools$ ./Ni2PowerTest
2019-12-04 14:28:19.032 INFO    Using OpenNI2 Module Driver!
2019-12-04 14:28:19.038 INFO    Using OpenNI2 Module Device!
2019-12-04 14:28:19.039 INFO    SDK Build Version: 1.5.1.0/formal
2019-12-04 14:28:19.039 INFO    SDK Build Timestamp: 191002.145031
2019-12-04 14:28:19.156 INFO    Depth camera VID:PID = 2DF2:0214:0013 at video1
2019-12-04 14:28:19.272 WARNING Fail to detect rgb camera
2019-12-04 14:28:19.272 INFO    No local config found. Use the default config.
2019-12-04 14:28:19.275 INFO    =============== Config Values ===============
2019-12-04 14:28:19.275 INFO    algorithm.A5.option.P1 = 10000
2019-12-04 14:28:19.275 INFO    algorithm.A5.option.P2 = 0
2019-12-04 14:28:19.275 INFO    algorithm.A5.option.P3 = 0
2019-12-04 14:28:19.275 INFO    algorithm.A18.enable = false
2019-12-04 14:28:19.275 INFO    algorithm.A18.option.P0 = 2e-07
2019-12-04 14:28:19.275 INFO    algorithm.A18.option.P1 = 0.03
2019-12-04 14:28:19.275 INFO    algorithm.A18.option.P2 = 1000
2019-12-04 14:28:19.275 INFO    debug.logLevel = 3
2019-12-04 14:28:19.275 INFO    debug.profiler_en = false
2019-12-04 14:28:19.275 INFO    debug.tsensor.enable = false
2019-12-04 14:28:19.275 INFO    debug.tsensor.interval = 10
2019-12-04 14:28:19.275 INFO    parameter.CT.ow_enable = true
2019-12-04 14:28:19.275 INFO    parameter.CT.option.P0 = 1
2019-12-04 14:28:19.275 INFO    camera.RGB.anti_flicker = 60
2019-12-04 14:28:19.275 INFO    config.ifmt = 1
```

Figure 15-4

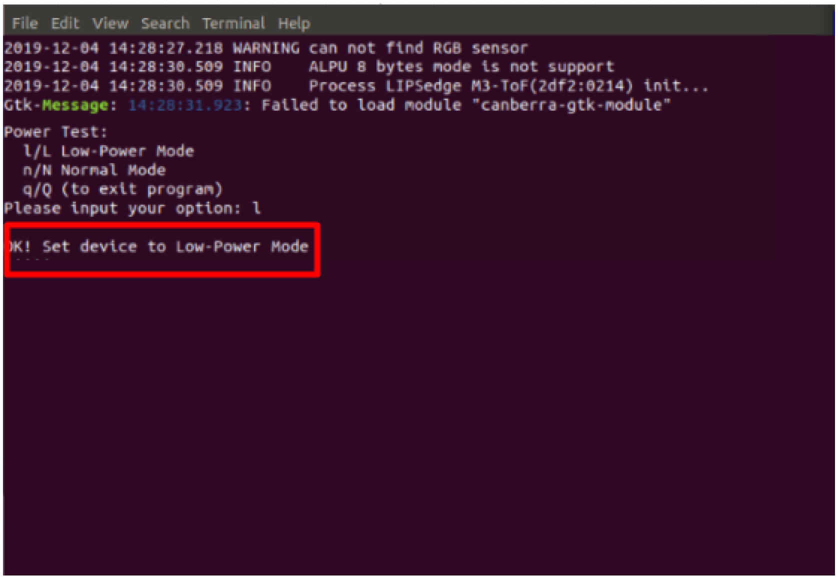
7. Type the following status code into the Status Window interface to enable / disable the Standby Mode.
   - **l**: Enable the Standby Mode. Under the Standby Mode, the live streaming stops and the camera’s Status Indicator goes off.
   - **n**: Disable the Standby Mode.
   - **q**: Exists the program.



```
2019-12-04 14:28:27.218 WARNING can not find RGB sensor
2019-12-04 14:28:30.509 INFO    ALPU 8 bytes mode is not support
2019-12-04 14:28:30.509 INFO    Process LIPSedge M3-ToF(2df2:0214) init...
Gtk-Message: 14:28:31.923: Failed to load module "canberra-gtk-module"
Power Test:
  l/L Low-Power Mode
  n/N Normal Mode
  q/Q (to exit program)
Please input your option: l
```

Figure 15-5

8. Press **Enter** and the changes takes place.



```
2019-12-04 14:28:27.218 WARNING can not find RGB sensor
2019-12-04 14:28:30.509 INFO    ALPU 8 bytes mode is not support
2019-12-04 14:28:30.509 INFO    Process LIPSedge M3-ToF(2df2:0214) init...
Gtk-Message: 14:28:31.923: Failed to load module "canberra-gtk-module"
Power Test:
  l/L Low-Power Mode
  n/N Normal Mode
  q/Q (to exit program)
Please input your option: l

OK! Set device to Low-Power Mode
```

Figure 15-6

15.1.1 Ni2PowerTest Core Functions

To modify Ni2PowerTest to work with your sample application, you can access Ni2PowerTest's source code through LIPS's Github page. For details on downloading the source code, refer to *15.1 Starting From Build Sample*.

In the source code, you can see the code segments that defines the power modes control in Ni2PowerTest. The `setProperty` function defines the Standby Mode:

```
Status VideoStream::setProperty(int propertyId, const
void* data, int dataSize)
```

Refer to the table below for the definition of each variables in the `setProperty` function:

No.	Variables	Functions
4.	`propertyId`	Assign the camera power modes with numerical ID `1` or `0`.
5.	`data`	Saves the power mode data to be written to `properId`.
6.	`dataSize`	Saves the size of `data`.

In Ni2PowerTest, the Standby Mode is coded under `propertyId 403(LIPS_DEPTH_SENSOR_LOW_POWER_EN)`. Pass ID `1` to `data`, for example:

```
  #define LIPS_DEPTH_SENSOR_LOW_POWER_EN 403


  VideoStream vsDepth;

  vsDepth.create( devDevice, SENSOR_DEPTH );

  vsDepth.start();


  int cmd = 1; //1=enable

  int cmdSize = sizeof(cmd);

  vsDepth.setProperty(LIPS_DEPTH_SENSOR_LOW_POWER_EN,
 (void *)&cmd, cmdSize );
```

For the normal mode, likewise, pass `0` to `propertyId`:

```
  #define LIPS_DEPTH_SENSOR_LOW_POWER_EN 403


  VideoStream vsDepth;

  vsDepth.create( devDevice, SENSOR_DEPTH );

  vsDepth.start();


  int cmd = 0; //0=disable

  int cmdSize = sizeof(cmd);

  vsDepth.setProperty(LIPS_DEPTH_SENSOR_LOW_POWER_EN,
 (void *)&cmd, sizeof(cmd) );
```

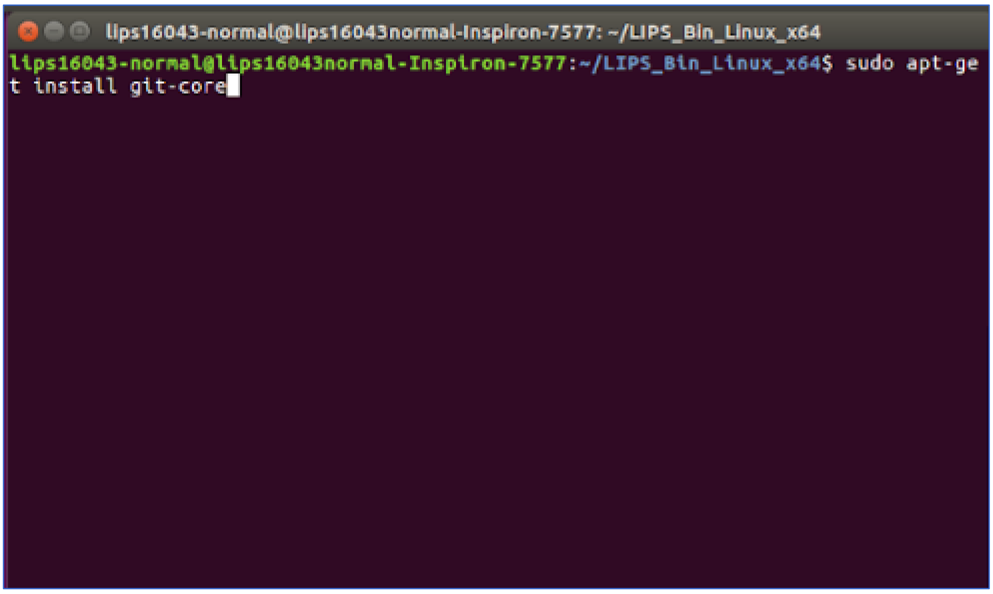
16. Building Your Own Application

If you wish to develop your own application, you can download the **Build Samples** from **LIPS's GitHub page** for your operating system.

Note: If you do not wish to start from our Build Sample, you can also start fresh from the IMU Sample Code we provide. For details, refer to *I. IMU Sample Code*, *Appendix, LIPSedge*^{TM} *M3 IMU User's Guide.*

16.1 Starting from Build Sample

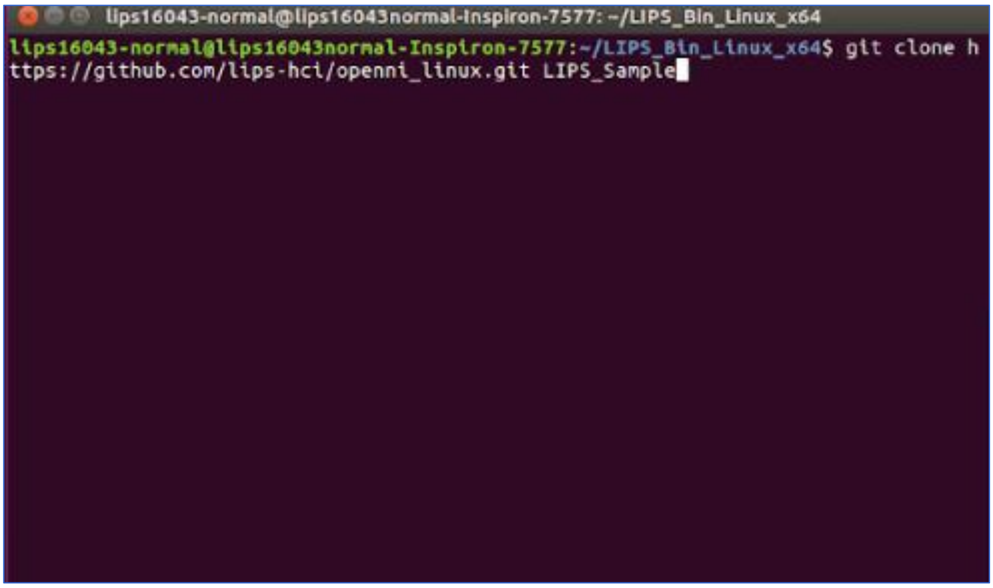
1. On the **Terminal**, type **sudo apt-get install git-core**.



```
lips16043-normal@lips16043normal-Inspiron-7577: ~/LIPS_Bin_Linux_x64
lips16043-normal@lips16043normal-Inspiron-7577:~/LIPS_Bin_Linux_x64$ sudo apt-ge
t install git-core
```

Figure 16-1

2. Type **git clone https://github.com/lips-hci/openni_linux.git LIPS_Sample.** The Build Sample will be imported to your LIPS SDK.

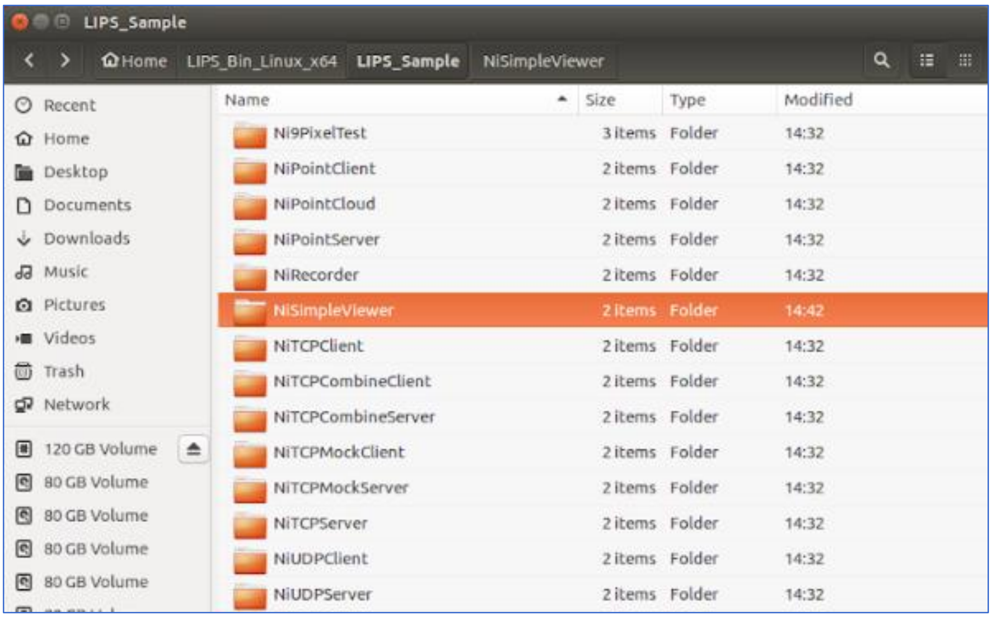


```
lips16043-normal@lips16043normal-Inspiron-7577: ~/LIPS_Bin_Linux_x64
lips16043-normal@lips16043normal-Inspiron-7577:~/LIPS_Bin_Linux_x64$ git clone h
ttps://github.com/lips-hci/openni_linux.git LIPS_Sample
```

Figure 16-2

16.2 Building / Activating Your Sample Application

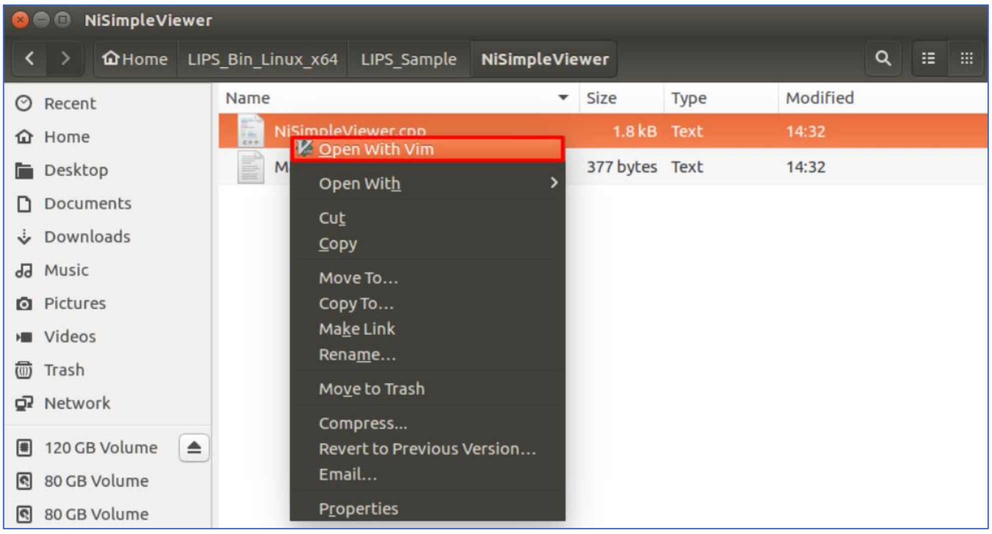
1. Go to the **LIPSedge M3 SDK > LIPS_Sample** folder after importing the Build Samples. Here, we use **NiSimpleViewer** as an example.



Name	Size	Type	Modified
Ni9PixelTest	3 items	Folder	14:32
NiPointClient	2 items	Folder	14:32
NiPointCloud	2 items	Folder	14:32
NiPointServer	2 items	Folder	14:32
NiRecorder	2 items	Folder	14:32
NiSimpleViewer	2 items	Folder	14:42
NiTCPClient	2 items	Folder	14:32
NiTCPCombineClient	2 items	Folder	14:32
NiTCPCombineServer	2 items	Folder	14:32
NiTCPMockClient	2 items	Folder	14:32
NiTCPMockServer	2 items	Folder	14:32
NiTCPServer	2 items	Folder	14:32
NiUDPClient	2 items	Folder	14:32
NiUDPServer	2 items	Folder	14:32

Figure 16-3

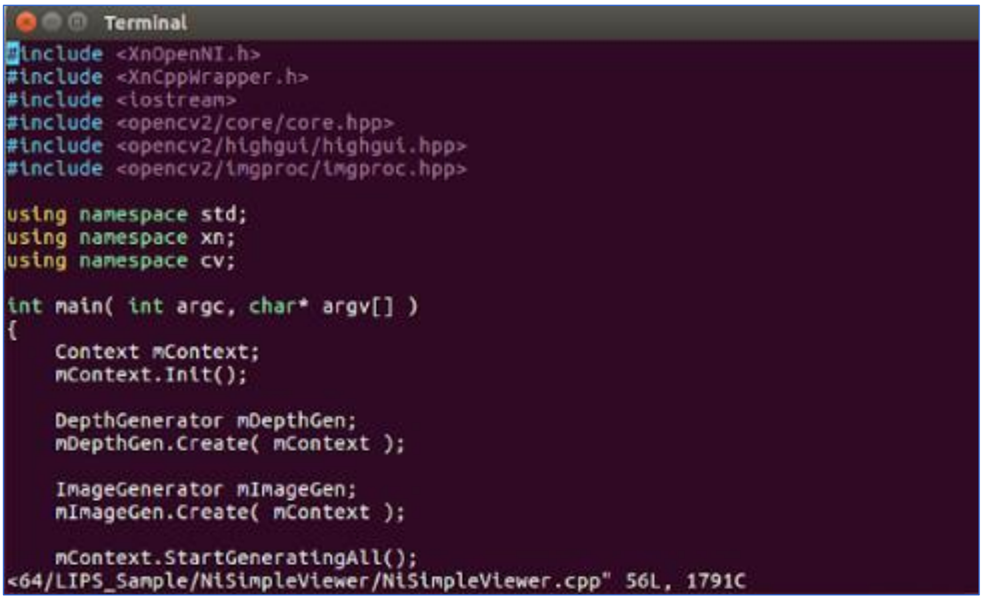
2. In the **NiSimpleViewer** folder, right-click to run **NiSimpleViewer.cpp** with the editor of your choice. Here, we use Vim as an example.



Name	Size	Type	Modified
NiSimpleViewer.cpp	1.8 kB	Text	14:32
M	377 bytes	Text	14:32

Figure 16-4

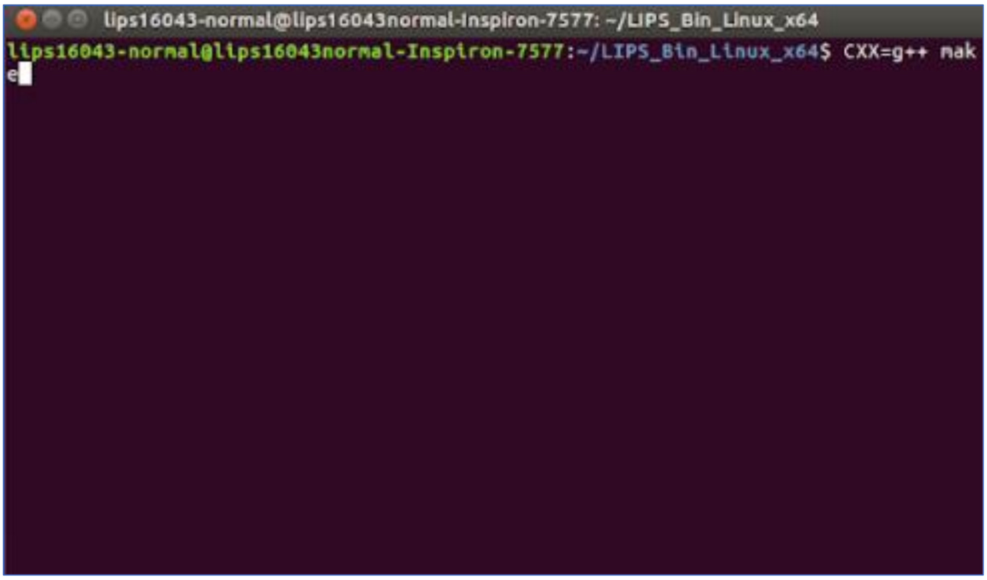
3. Start constructing codes and save the changes when you are finished.



```
#include <XnOpenNI.h>
#include <XnCppWrapper.h>
#include <iostream>
#include <opencv2/core/core.hpp>
#include <opencv2/highgui/highgui.hpp>
#include <opencv2/imgproc/imgproc.hpp>

using namespace std;
using namespace xn;
using namespace cv;

int main( int argc, char* argv[] )
{
    Context mContext;
    mContext.Init();

    DepthGenerator mDepthGen;
    mDepthGen.Create( mContext );

    ImageGenerator mImageGen;
    mImageGen.Create( mContext );

    mContext.StartGeneratingAll();
<64/LIPS_Sample/NiSimpleViewer/NiSimpleViewer.cpp" 56L, 1791C
```

Figure 16-5

4. When the sample application is ready, go to the Terminal and type **CXX=g++ make**. A **NiSimpleViewer** application will be generated.


lips16043-normal@lips16043normal-Inspiron-7577: ~/LIPS_Bin_Linux_x64

```
lips16043-normal@lips16043normal-Inspiron-7577:~/LIPS_Bin_Linux_x64$ CXX=g++ mak
e
```

Figure 16-6

3. Click **NiSimpleViewer**.

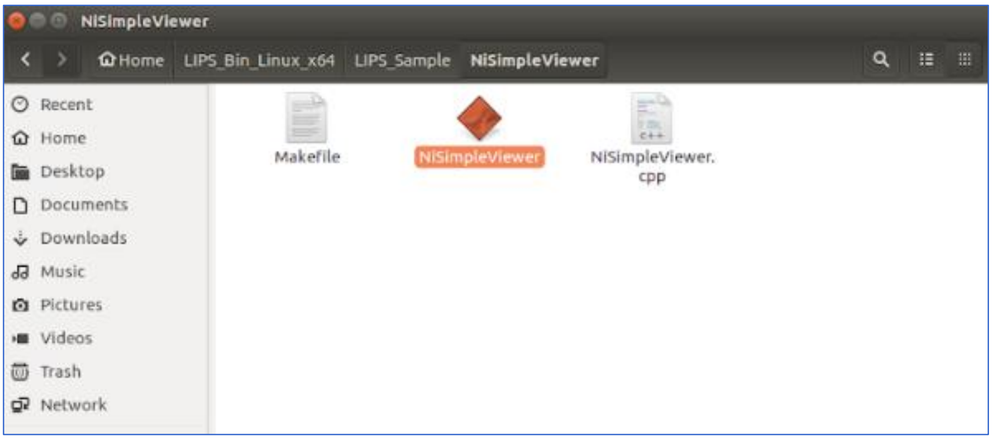


Figure 16-7

4. You can then view live motion data captured by the LIPS Camera.

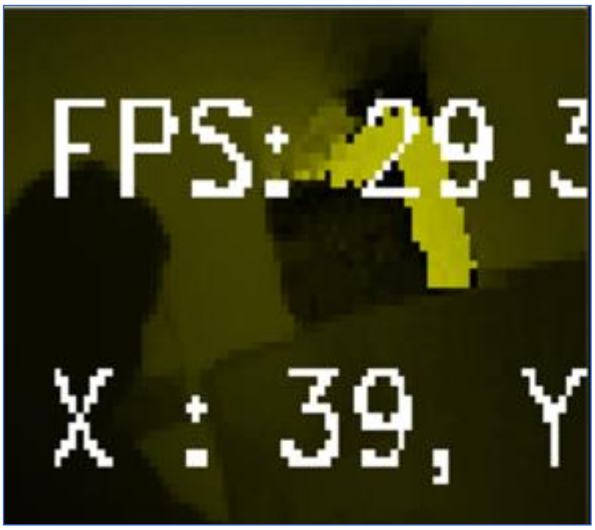


Figure 16-8

LIPS

Sense The World

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