

Astra Series FAQ

Table of Contents

1. Introduction	2
2. Scope and Tools	2
3. FAQ	2
3.1 How to save and view depth map, color map, and IR map?	2
3.2 How to view IR map through NiViewer?	4
3.3 Astra Pro's color map cannot be seen through NiViewer.	5
3.4 Color setting - blurred screen in 1280x960 resolution.....	5
3.5 How to record oni video and ensure the same frame number of Depth and Color?	5
3.6 Depth map has misalignment while setting depth map to 1280x1024.....	6
3.7 There is no depth data in some situation.....	6
3.8 There is black shadow around measured object.....	7
3.9 Cannot show IR map in QVGA format.....	7
3.10 Warning: USB events thread...when starting in Linux.....	7
3.11 Astra cannot view depth map	7
3.12 RGB exposure cannot be adjusted.	8
3.13 Binning and Skipping mode	8
3.14 USB power supply problem.....	9
3.15 USB connection problem.....	9
3.16 USB compatibility issue	10
3.17 Linux UDEV.....	10

1. Introduction

Astra Series Camera is becoming an important sensor utilized in entertainment, robot, measurement, 3D Modeling, etc. This document is to solve some issues while using the Astra products.

2. Scope and Tools

Device: Astra Series Camera, including Astra, Astra Pro, Astra Mini, etc.

Platform: Windows 7 and above; Ubuntu 14.04 and above.

The following questions and answers mainly focus on two tools:

NiViewer - Comes with OpenNI2

OBNiViewer – NiViewer with enhanced function by Orbbec

3. FAQ

3.1 How to save and view depth map, color map, and IR map?

1. Saving depth and color map

Open OBNiViewer, use shortcut “c”. The depth map and color map will be saved to CapturedFrame directory where OBNiViewer.exe saved. The format of color map is bmp, and the format of depth map is ppm.

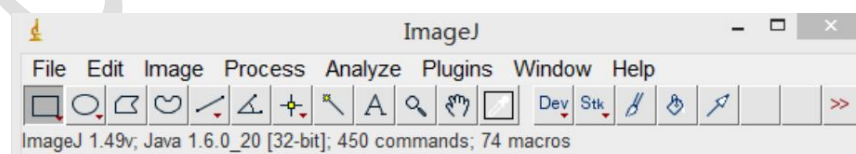
2. Saving depth and IR map

Under the limitation of OpenNI2, IR and RGB data cannot be opened together. Open OBNiViewer, use shortcut “>” to switch RGB/IR display. Using shortcut “c” while displaying depth and IR map. The depth map and IR map will be saved to CapturedFrame directory where OBNiViewer.exe saved. The format of IR map is bmp, and the format of depth map is ppm.

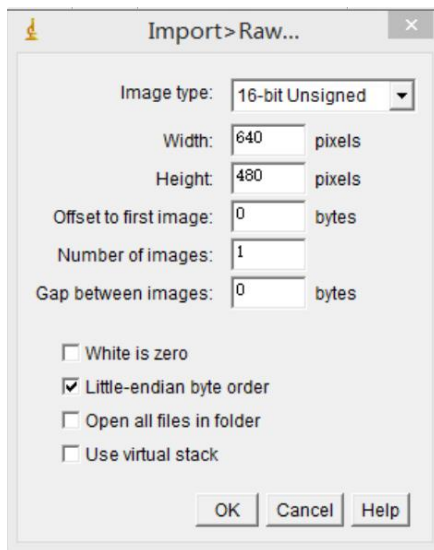
3. Viewing depth map

The saved depth map stores the depth data of the frame. The depth value of each point is stored in a length of 2 bytes. To display the depth map, the frame data needs to be histogramd. It is recommended to use ImageJ to view (<https://imagej.nih.gov/ij/download.html>).

1) Open ImageJ



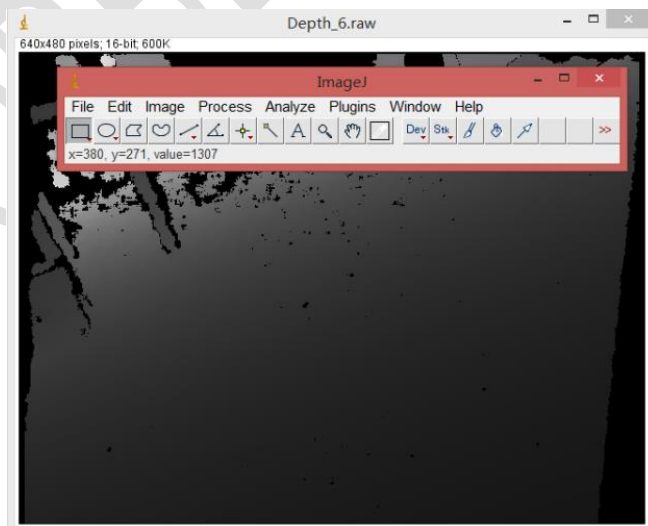
2) Drag saved depth map (the file name start with Depth) in CapturedFrames directory to. Filling in the pop-up window according to the figure below.



3) Click OK to view depth map.



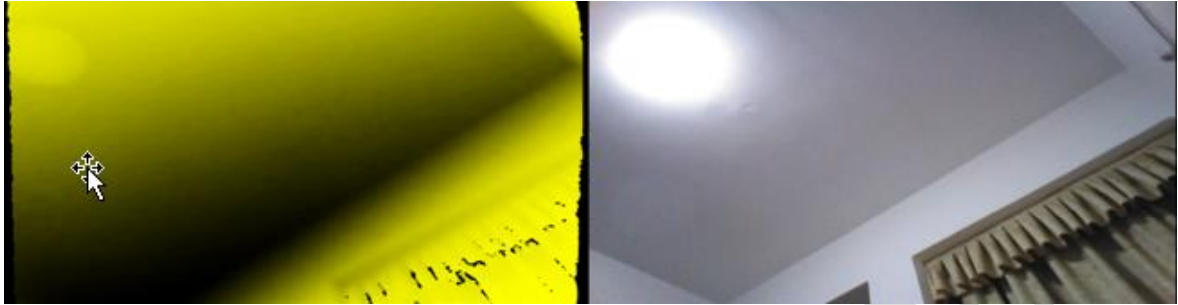
4) Put mouse on depth map to view current depth value. Check the reference image below(x, y are coordinate, and value is depth value, the unit is mm)



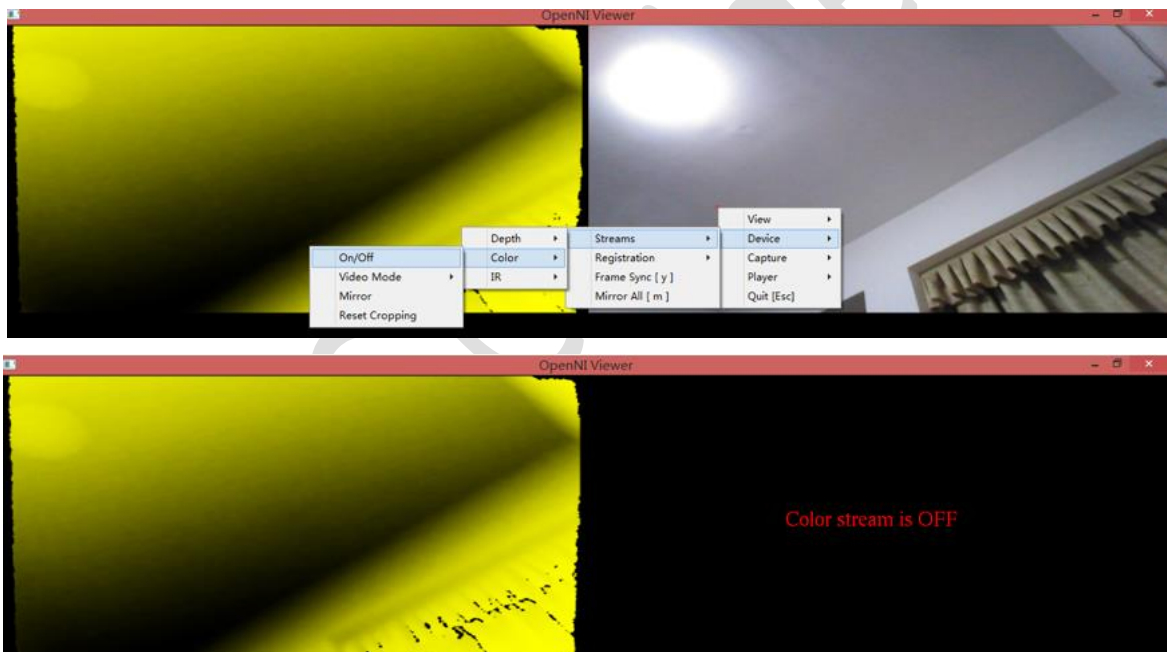
3.2 How to view IR map through NiViewer?

Under the limitation of OpenNI2, IR and RGB data cannot be opened together. RGB Stream need to be closed before viewing IR stream

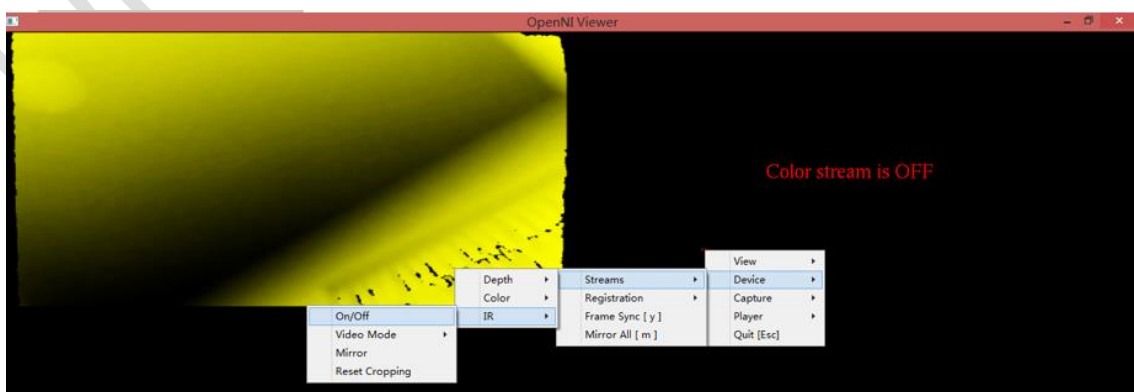
- 1) Open NiViewer. The default shows Depth and RGB stream.

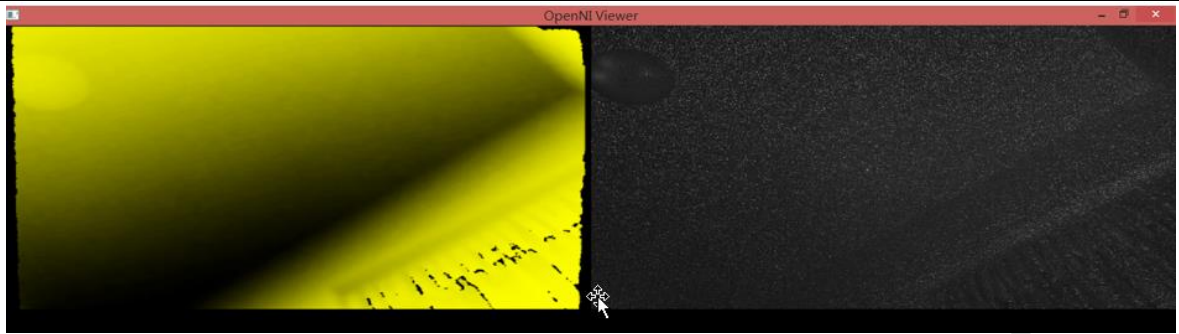


- 2) Right click to turn off RGB (Please use “F” to exit full screen mode if there is no action).
Device→Streams→Color→On/Off



- 3) Turn on IR: Device→Streams→IR→On/Off



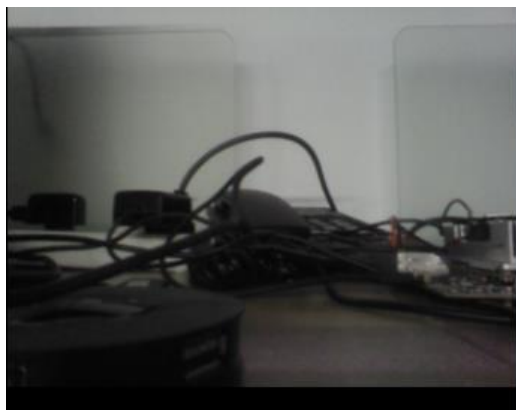


3.3 Astra Pro's color map cannot be seen through NiViewer.

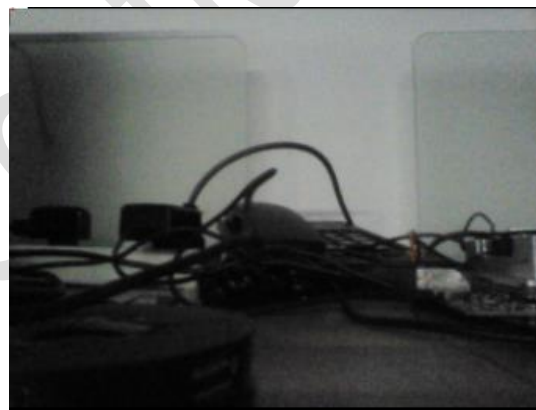
Astra Pro's Color Camera using UVC camera. The data does not transfer by OpenNI2. Please use other UVC camera viewing tool to view color data such as AMCAP. For more information, please check document 《AstraProUVC》.

3.4 Color setting - blurred screen in 1280x960 resolution.

1280x960 of Astra is output through OpenNI. Resolution parameter needs to be to 1280x1024. There will be 64 rows of invalid data in the bottom of 1280x1024 resolution image.

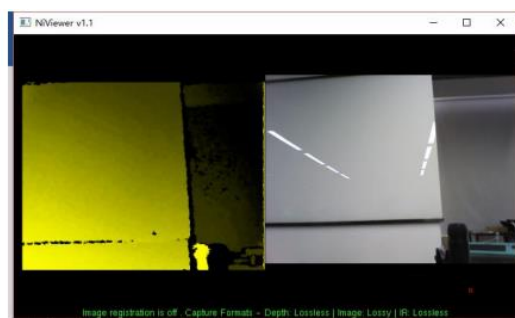


1280x1024



640x480

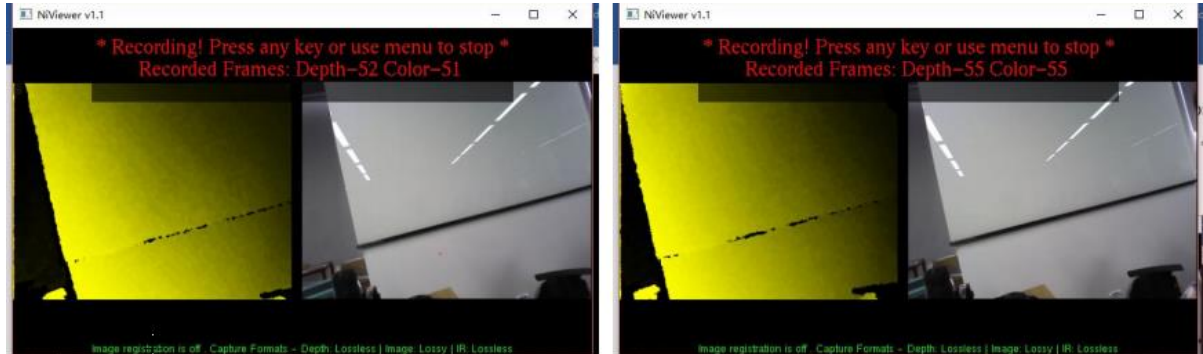
The figure below shows 1280x960 and 1280x1024 resolution under NiViewer.



3.5 How to record oni video and ensure the same frame number of Depth and Color?

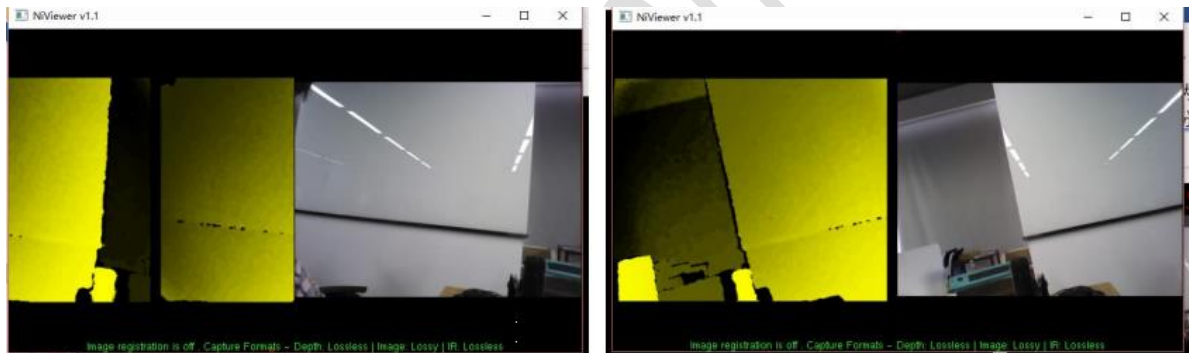
OBNiViewer provides function of recording oni video. The video can reflect color/depth data of current

scenario, and can be used to record depth stream for data package. Shortcut “S” to start recording on file. Shortcut “X” to stop. Frame synchronization between Depth and Color is default by “off” in order to have the compatibility of using with color and using without color. Shortcut “y” can be used to turn on/off the frame synchronization. (Check figure below: left is on and right is off)



3.6 Depth map has misalignment while setting depth map to 1280x1024.

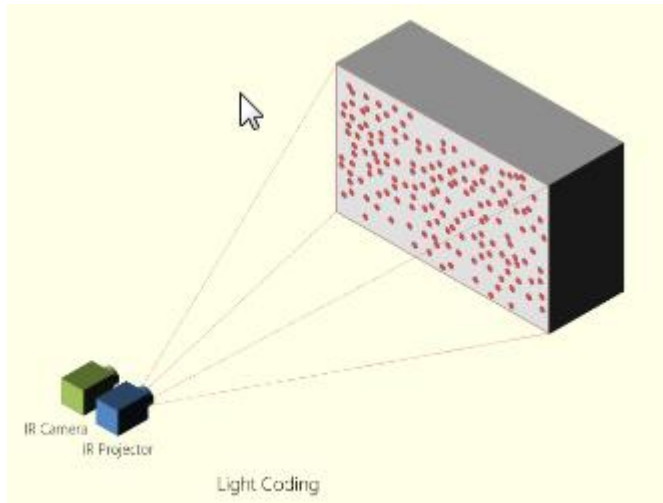
This is a BUG in NiViewer and it will be modified later. Outputting through non-mirrored mode in 1280x1024 mode does not have misalignment problem. Please use shortcut “m” to turn on/off the mirror mode. (Check the figure below: Left figure has misalignment, right figure is normal)



3.7 There is no depth data in some situation.

The Astra series uses the principle of active structured light. As shown in the figure below, the coded information projected to the surface of the object must be returned to the camera, so that the depth information of the object can be calculated. However, due to the limitations of object Material, some of them cannot reflect, such as black light-absorbing materials, glass (transparent). In these situation, the camera cannot receive the information, and it will result in no depth data. Here are some common situations where you can't get the depth information of an object.

- 1) Transparent material object
- 2) Mirroring material object
- 3) Measured object is covered
- 4) Light-absorbing object or material.



3.8 There is black shadow around measured object.

As shown in the figure below, In some cases, especially when the camera is close to the object, and there are other objects which have capable of forming depth data after the measured object, a black shadow will appear around the measured object. Because the measured object covers some other objects behind, those objects cannot reflect enough information, and cause a shadow.



3.9 Cannot show IR map in QVGA format.

Due to resource and customer feedback considerations, the Astra series does not output an IR image in the 320x240 format. Please consider sampling down from the IR image in VGA format to get that format.

3.10 Warning: USB events thread...when starting in Linux

By default setting, USB thread scheduling policy is SCHED_RR. This setting requires administrator permission. Please ignore the warning if required priority is not high. The system will automatically use the time-sharing scheduling policy. If the USB thread priority is high, please consider running the camera under ROOT permissions. The warning will disappear.

3.11 Astra cannot view depth map

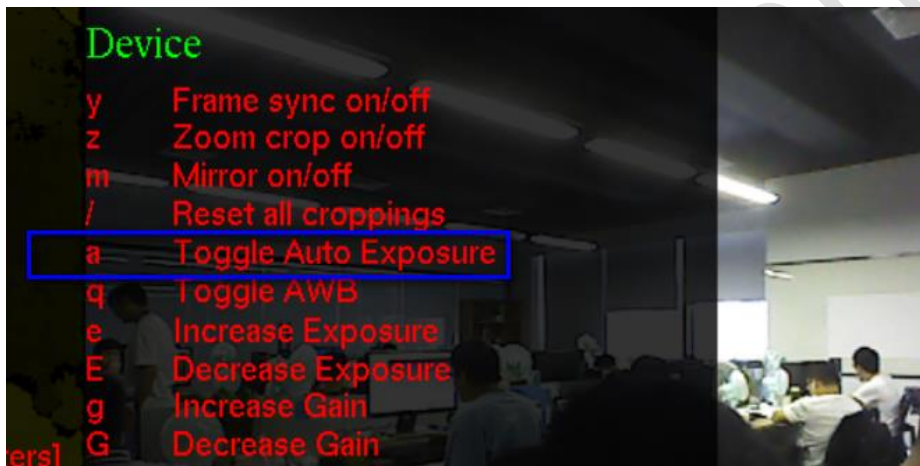
If the driver is installed properly and color map can be seen successfully, the problem may be caused by the operation of the LDP module. As shown in the figure below, there is an LDP module next to the emitter module of Astra/Astra Pro. LDP is used for detecting the distance. The main function is to turn off the laser

emission module when the person is too close to the camera. If the LDP module is covered or there are many cameras facing to each other. Laser will turn off because LDP believes something is too close to the camera. Thus, there will be no depth map.



3.12 RGB exposure cannot be adjusted.

For camera not using UVC such as Astra and Mini Series, OpenNI2 provides the interface to modify RGB exposure and white balance. It can be implemented in NiViewer. Auto Exposure should be turned off before direct call.



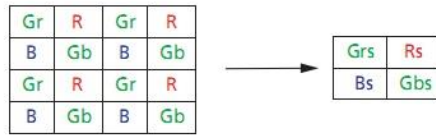
3.13 Binning and Skipping mode

In some older firmware versions, turning on Binning mode of RGB camera will cause low frame rate in RGBD sync. The Skipping mode is used to collect the desired data and throw the rest of the data.

As shown below, column skip 2 row skip 2, the black pixels are discarded.

R	G	R	G	R	G	R	G	R	G
G	B	G	B	G	B	G	B	G	B
R	G	R	G	R	G	R	G	R	G
G	B	G	B	G	B	G	B	G	B
R	G	R	G	R	G	R	G	R	G
G	B	G	B	G	B	G	B	G	B
R	G	R	G	R	G	R	G	R	G
G	B	G	B	G	B	G	B	G	B
R	G	R	G	R	G	R	G	R	G
G	B	G	B	G	B	G	B	G	B

Binning mode can merge the adjacent pixels into one pixel and then output. As shown in the figure below, it's 2 bin to 1, all pixels are take part in to form new pixels.



Binning mode will cause edge deformation (Figure below).



3.14 USB power supply problem

Astra is standard USB2.0 device, working current<500mA. Peak may reach 1A at the moment of plugging in. If the USB does not strictly follow the USB standard for surge protection measures, the USB port voltage will be less than 4.7v, and Astra device cannot be started normally.

- 1) Add surge protection measures.
- 2) Improve supply current of USB interface (current>1A).
- 3) Use a hub for the device to take power from the outside.

There are also other cases. The USB connection can be enumerated to the device, but the depth map and color map cannot be displayed. The Log print will drop frames. These problem can also be solved by using a hub with electric.

3.15 USB connection problem

Check if the connection is normal by measuring D+ and D-.

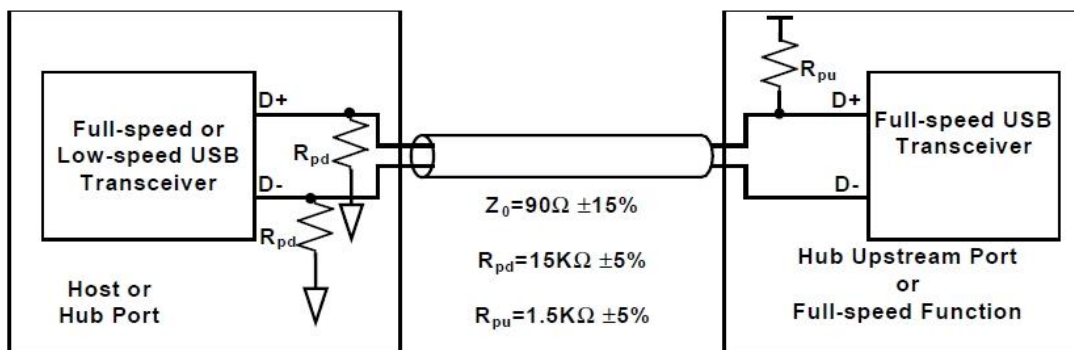


Figure 7-20. Full-speed Device Cable and Resistor Connections

When a high-speed device is connected to the USB host, the signal during the enumeration process is divided into the following stages:

- 1: After the device is connected, D+ receives the signal. Host or roothub/hub reports the port connection signal.
- 2: Host sending out a reset signal and set D+D- to SE0 state for a period of time ($t > 2.5\mu s$)
- 3: Device detects the SE0 states for over $2.5\mu s$ and sends the Chrip K signal to the bus ($1ms < t < 7ms$)
- 4: When the Chrip K is stopped, if host supports HS, within $< 100\mu s$, a series Chrip K/J signal pairs will be posted. Chrip K/J signal width $40\mu s < d < 60\mu s$. And $< 2.5\mu s$ between Chrip K and J.
- 5: When device receives three pairs of Chrip K/J signals, the D+ pull up resistor will be disconnected within $500\mu s$ and ground D+D-. Thus enters high speed data transfer mode and stops enumeration process.

3.16 USB compatibility issue

- 1) The theoretical bandwidth of USB2.0 is 480Mbit /s, which more than enough for transferring RGB and depth data stream both at VGA resolution. For some low-powered platform, the controller may not have enough processing power to process the data stream and causes the viewer to show no video output or at a very low framerate. Lowering the resolution may results in a better performance.
- 2) For sensors equipped with MX6000 ASIC chip, comparing with the MX400, there is no special treatment to make sure the last packet during each USB data transfer to be at 512 byte. For some systems with MTK processor, the results may be categorized as invalid due to the above description. The current solution is to complete transfer with 512 byte data at the controller side to prevent this.

3.17 Linux UDEV

Linux platform uses udev to manage pnp devices. If the VID/PID is not logged in udev, the sensor may not be recognized without root permission.

- 1) Please add the rules as shown below to /etc/udev/rules.d directory:

```
orbbec@ubuntu:/etc/udev/rules.d$ ls
56-orbbec-usb.rules  99-vmware-scsi-udev.rules
orbbec@ubuntu:/etc/udev/rules.d$
```

- 2) The configuration file should contain the PID of the sensor connected to the computer. If the PID is not included, please add it manually.

```
orbbec@ubuntu:/etc/udev/rules.d$ cat 56-orbbec-usb.rules
SUBSYSTEM=="usb", ATTR{idProduct}=="0401", ATTR{idVendor}=="2bc5", MODE=="0666", OWNER=="root", GROUP=="video", SYMLINK+="astra"
SUBSYSTEM=="usb", ATTR{idProduct}=="0402", ATTR{idVendor}=="2bc5", MODE=="0666", OWNER=="root", GROUP=="video", SYMLINK+="astra_s"
SUBSYSTEM=="usb", ATTR{idProduct}=="0403", ATTR{idVendor}=="2bc5", MODE=="0666", OWNER=="root", GROUP=="video", SYMLINK+="astra_pro"
SUBSYSTEM=="usb", ATTR{idProduct}=="0404", ATTR{idVendor}=="2bc5", MODE=="0666", OWNER=="root", GROUP=="video", SYMLINK+="astra_mini"
SUBSYSTEM=="usb", ATTR{idProduct}=="0407", ATTR{idVendor}=="2bc5", MODE=="0666", OWNER=="root", GROUP=="video", SYMLINK+="astra_mini_s"
SUBSYSTEM=="usb", ATTR{idProduct}=="0501", ATTR{idVendor}=="2bc5", MODE=="0666", OWNER=="root", GROUP=="video", SYMLINK+="astrauvc"
SUBSYSTEM=="usb", ATTR{idProduct}=="6712", ATTR{idVendor}=="0c45", MODE=="0666", OWNER=="root", GROUP=="video", SYMLINK+="astrauvc"
SUBSYSTEM=="usb", ATTR{idProduct}=="0502", ATTR{idVendor}=="2bc5", MODE=="0666", OWNER=="root", GROUP=="video", SYMLINK+="astrauvc"
SUBSYSTEM=="usb", ATTR{idProduct}=="0608", ATTR{idVendor}=="2bc5", MODE=="0666", OWNER=="root", GROUP=="video", SYMLINK+="astrauvc"
SUBSYSTEM=="usb", ATTR{idProduct}=="0508", ATTR{idVendor}=="2bc5", MODE=="0666", OWNER=="root", GROUP=="video", SYMLINK+="astrauvc"
```

- 3) The PID/VID can be obtain with lsusb command.