

YDLIDAR HP60C USER MANUAL



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1 OPERATION UNDER WINDOWS

1.1 Device Connection

When HP60C is evaluated and developed under windows, HP60C and PC need to be interconnected. The specific process is as follows:

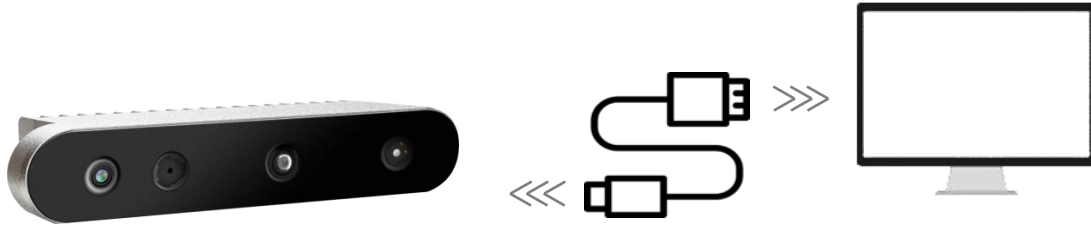


FIG 1 YDLIDAR HP60C DEVICE CONNECTION

1.2 How to Use EAIViewer

YDLIDAR provides EAIViewer, a visualization software for HP60C real-time scanning. Users can use this software to visually observe the HP60C scanning map. Visualization software download link: <https://www.ydlidar.com/dowfile.html?cid=29&type=5>

1.2.1 Data Display

After opening the software, RGB and Depth data will be displayed automatically, and the Depth information of the mouse position will be displayed in the lower left corner of the Depth window, as shown in the figure below:

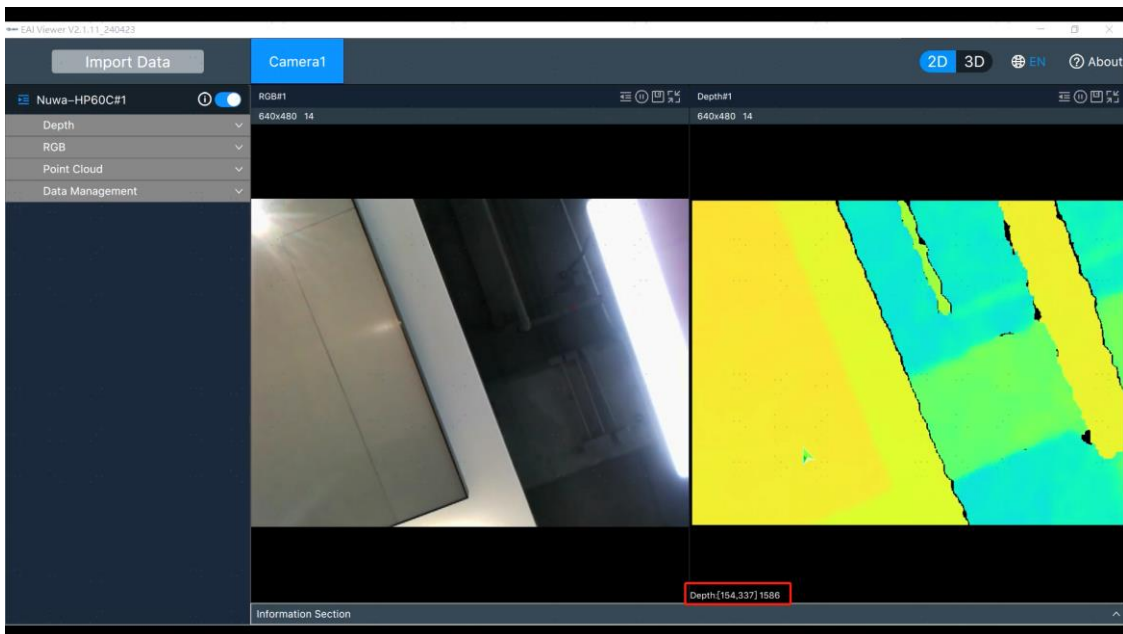


FIG 2 SOFTWARE INTERFACE

1.2.2 Data Management - Change The Save Address

Set the address to save the data.

By default, the data was stored in the same directory folder named "Nuwa - HP60C".

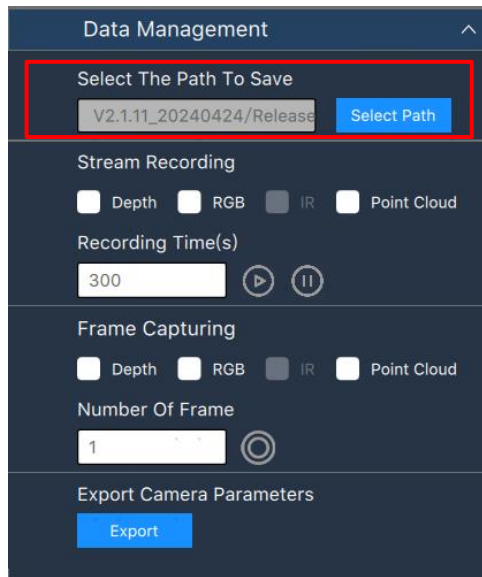


FIG 3 CHANGE THE DATA SAVE ADDRESS

1.2.3 Record Data

Users can record Depth, RGB, Point Cloud data, and save it in the peer directory by default. Save address Change refers to Data Management – Change the saved address.

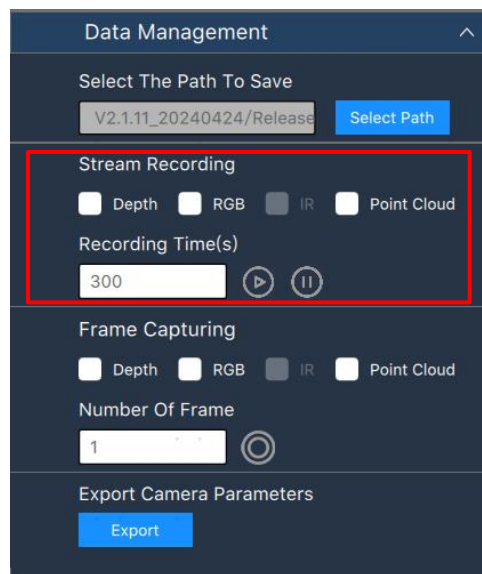


FIG 4 DISPLAY MEAN AND STANDARD DEVIATION

1.2.4 Save Image

Depth, RGB, and Point Cloud data can be saved in the peer directory by default; Save address Change refers to Data Management - Change the saved address.

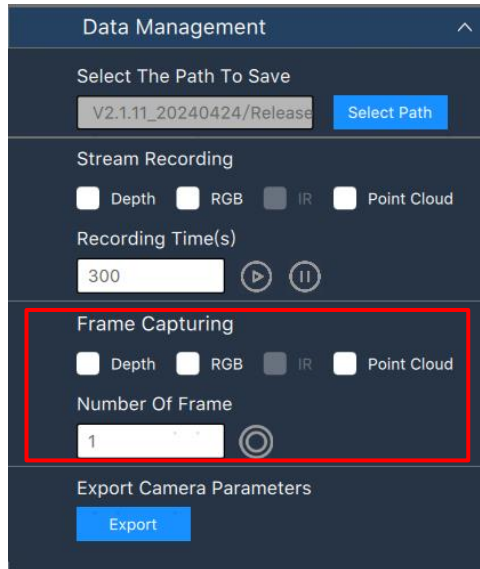


FIG 5 SAVE IMAGE

1.2.5 Save Camera Parameters

Camera parameters are saved in text format.

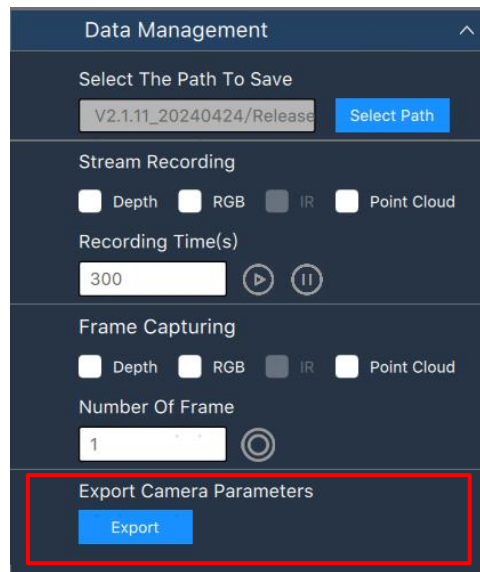


FIG 6 SAVE CAMERA PARAMETERS

2 LINUX ROS OPERATION

2.1 Run Ubuntu (Linux) System Example Program

Go to the sample/linux directory, where build.sh is the compile script and run_ascamera.sh is the script to run the sample program. root permissions are required to execute the program, which is run in sudo mode in the script.

Compile:

```
$ ./build.sh
```

Start node:

```
$ ./run_ascamera.sh
```

2.2 Run ROS System Sample Program

Go to the sample/ros directory, where build.sh is the compile script and run_ascamera.sh is the script for starting the node. Starting a node requires root permission, which is run in sudo mode in the script.

Compile:

```
$ ./build.sh
```

Start node:

```
$ ./run_ascamera.sh
```

2.3 Run ROS2 System Sample Program

Go to the sample/ros2 directory, where build.sh is the compile script and run_ascamera.sh is the script for starting the node. Starting a node requires root permission, which is run in sudo mode in the script.

Compile:

```
$ ./build.sh
```

Start node:

```
$ ./run_ascamera.sh
```

2.4 RVIZ Image Checking

When the node is started, open rviz to receive and view the image. The steps are as follows:

1) Start the rviz node with the following command:

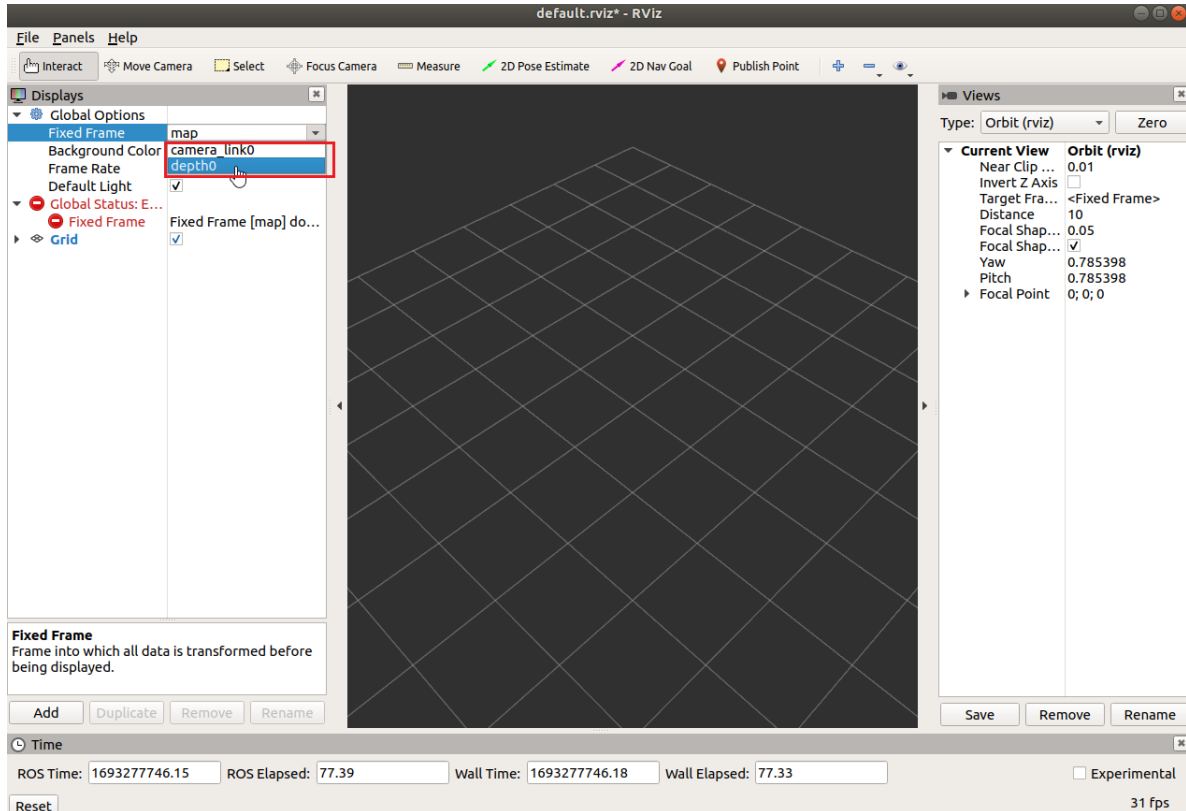
ROS1:

```
$ rosruncv rviz rviz
```

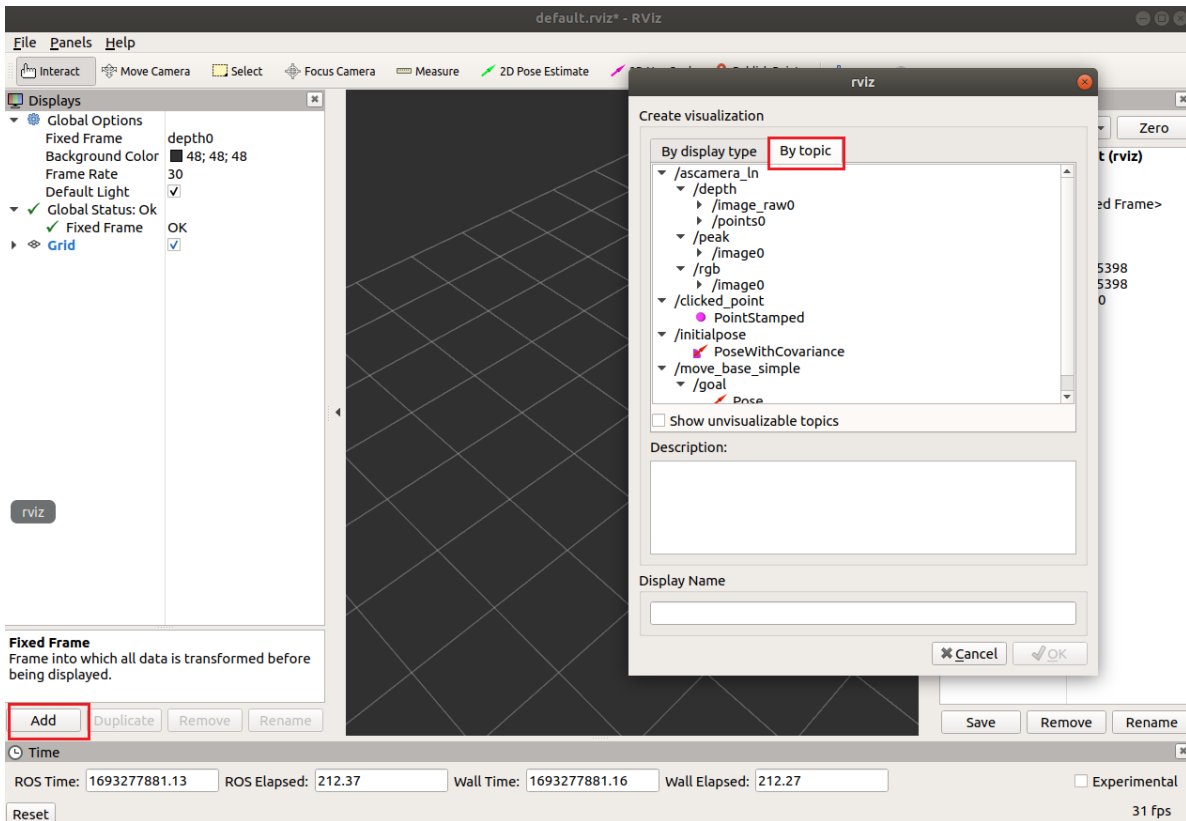
ROS2:

```
$ ros2 run rviz2 rviz2
```

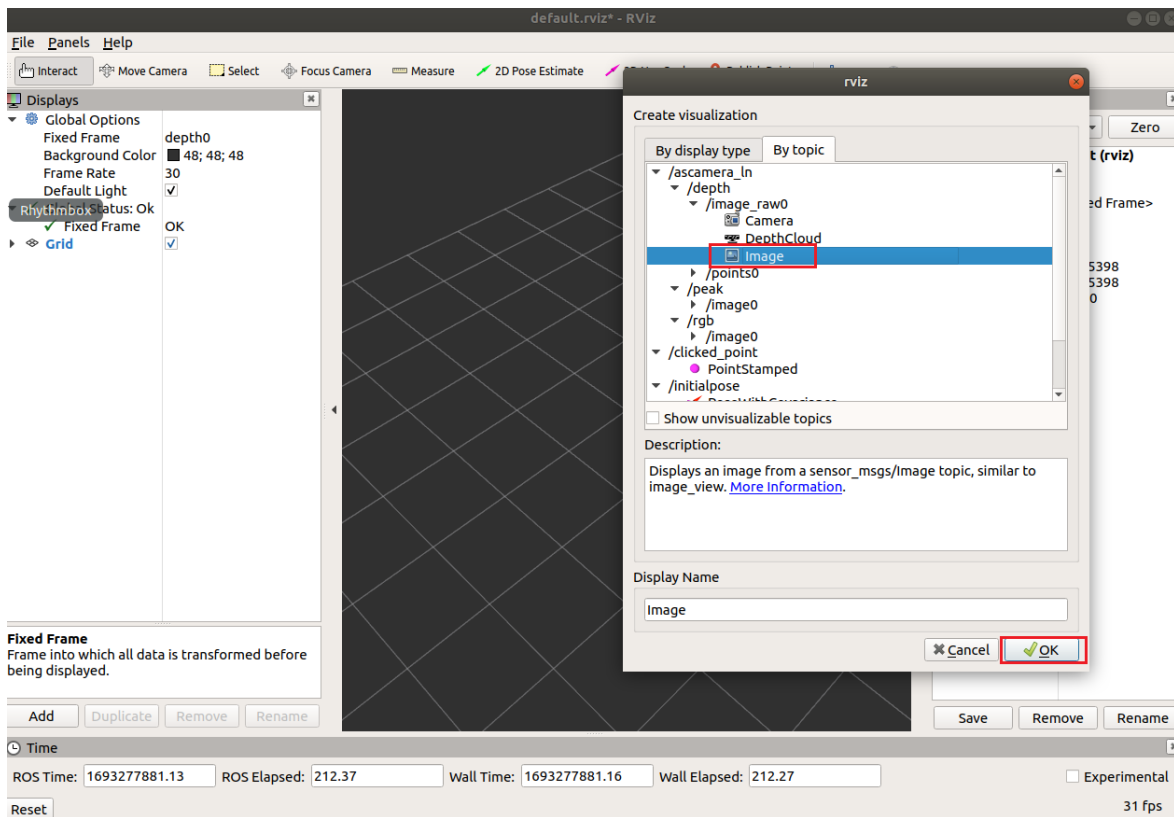
- 2) Select the Fixed Frame the Users want in the Global Options of displays in RVIZ after startup, as shown below.



- 3) To Add display options, click [Add] in the lower left corner of RVIZ and select [By topic] in the pop-up window to add the topic Users want to display.



- 4) To view depth as an example, select Image under /xxx/depth/image_raw0 and click [OK] to add the topic to the display window.



3 FAQ

3.1 How To Run ROS Nodes Without Root Permissions

In Linux, the root permission is required to access the device. For programs that operate the device node in the /dev directory, one way to change the device node permission is to run the chmod command, but this is only temporary. For programs that do not operate the device node in the /dev directory, the root permission is required. Permissions cannot be changed by chmod. In this case, users can use Linux udev and rules to manage device permissions.

For Linux system using HP60C phase module, the sample can be performed through/linux_ros/ros/SRC/ascamera create_udev_rules/scripts directory. Sh scripts, can operate by ordinary jurisdiction ros node access HP60C camera. Modify the run_ascamera_node.sh script in the sample/linux_ros/ros/ directory to check and apply for the comment of the root permission. As shown below:

```
18
19 CUR_DIR="$(dirname "$(realpath "${BASH_SOURCE[0]}")")"
20 # check for whitespace in $CUR_DIR and exit for safety reasons
21 grep -q "[[:space:]]" <<<"${CUR_DIR}" && { echo "\${CUR_DIR}\" contains whitespace. Not supported. Aborting." >&2 ; exit 1 ; }
22
23 # if [ $EUID -ne 0 ]; then
24 #     echo -e "${RED}---This script requires root privileges, trying to use sudo${NORMAL}"
25 #     sudo "${CUR_DIR}/run_ascamera_node.sh" "$@"
26 #     exit $?
27 # fi
28
29 if [ -f /opt/ros/melodic/setup.bash ]; then
30     source /opt/ros/melodic/setup.bash
31 elif [ -f /opt/ros/kinetic/setup.bash ]; then
32     source /opt/ros/kinetic/setup.bash
33 elif [ -f /opt/ros/noetic/setup.bash ]; then
34     source /opt/ros/noetic/setup.bash
35 else
36     echo -e "Error,Can't not found ros in /opt/"
37 fi
38
39 if [ "$(ps -aux | grep rosmaster | grep -v grep | wc -l)" -eq "0" ]; then
40     roscore &
41     sleep 3
42 fi
```

3.2 How to Run The Ros2 Node Without Root Permissions

In Linux, the root permissions is required to access the device. For programs that operate the device node in the /dev directory, one way to change the device node permission is to run the chmod command, but this is only temporary. For programs that do not operate the device node in the /dev directory, the root permission is required. Permissions cannot be changed by chmod. In this case, users can use Linux udev and rules rules to manage device permissions.

For Linux system using HP60C phase module, by holding the sample/linux_ros/ros2 / SRC/ascamera create_udev_rules/scripts directory. Sh scripts, The HP60C camera can be accessed by running the ROS2 node with normal permissions.

3.3 Executing Script Errors Provided By SDK

Execute errors such as script: Bad substitution or Syntax error: redirection unexpected provided by the SDK. This is because the shell script provided by the SDK is the bash shell, and the default

shell parser for ubuntu is dash. Bash is more powerful than Dash, and some Bash syntax may not be parsed by dash. Users can change the default shell of ubuntu to bash by following these steps.

The terminal execution `sudo DPKG` to reconfigure the dash, select [NO] in a pop-up window.

3.4 Compilation Error On Ubuntu 20.04/22.04 ROS

ROS (Noetic or later) in Ubuntu 20.04/22.04 reported the following error. As a result of our node example program under the ROS is based on ubuntu18.04 melodic development version of ROS, when transplanted into ROS - Noetic, Ros can be/SRC/ascamera/CMakeLists. TXT file - STD = c ++ 11 changes to - STD == 14 c ++ or - STD == c ++ 17.

```

        from /opt/ros/noetic/include/ros/time.h:58,
        from /opt/ros/noetic/include/ros/ros.h:38,
        from /home/boocax/roswork/src/as_nuwacam/src/as_nuwacam_node.cpp:29:
/usr/include/boost/mpl/aux_/preprocessed/gcc/minus.hpp:68:8: note:   'boost::mpl::minus'
68 | struct minus
    | ^~~~~
In file included from /usr/include/pcl-1.10/pcl/point_types.h:44,
        from /usr/include/pcl-1.10/pcl/common/impl/copy_point.hpp:41,
        from /usr/include/pcl-1.10/pcl/common/copy_point.h:58,
        from /usr/include/pcl-1.10/pcl/common/impl/io.hpp:45,
        from /usr/include/pcl-1.10/pcl/common/io.h:586,
        from /usr/include/pcl-1.10/pcl/io/file_io.h:41,
        from /usr/include/pcl-1.10/pcl/io/pcd_io.h:44,
        from /opt/ros/noetic/include/pcl_conversions/pcl_conversions.h:70,
        from /home/boocax/roswork/src/as_nuwacam/src/as_nuwacam_node.cpp:38:
/usr/include/pcl-1.10/pcl/point_types.h:698:1: error: 'minus' is not a member of 'pcl::traits'
698 | POINT_CLOUD_REGISTER_POINT_STRUCT (pcl::_PointDEM,
    | ^~~~~~
/usr/include/pcl-1.10/pcl/point_types.h:698:1: note: suggested alternatives:
In file included from /usr/include/c++/9/string:48,
        from /usr/include/c++/9/bits/locale_classes.h:40,
        from /usr/include/c++/9/bits/ios_base.h:41,
        from /usr/include/c++/9/ios:42,
        from /usr/include/c++/9/ostream:38,
        from /usr/include/c++/9/iostream:39,
        from /home/boocax/roswork/src/as_nuwacam/src/as_nuwacam_node.cpp:21:
/usr/include/c++/9/bits/stl_function.h:177:12: note:   'std::minus'
177 |     struct minus : public binary_function<_Tp, _Tp, _Tp>
    |            ^~~~~

```

```

sample > ros > src > ascamera > CMakeLists.txt

1  cmake_minimum_required(VERSION 3.0.2)
2  project(ascamera)
3
4  ## Compile as C++11, supported in ROS Kinetic and newer
5  add_compile_options(-std=c++11)
6  add_definitions(-std=c++11)
7  # get gcc -v target

```

3.5 Using RVIZ2 On ROS2 Did Not Find The Posted Topic

Cause: When method 3.2 is not executed, the script will run the application with root permission, resulting in ubuntu22.04 or some versions of rviz2 without root permission will not be able to subscribe to the application published topics.

Solution: to perform the above 3.2.

3.6 Depth Camera Matching Exception Problem In Virtual Machine

Since HP60C camera is combined by two USB device for a camera (1 USB communication equipment + 1 UVC equipment), so users need to match; When running on a virtual machine, USB devices cannot be correctly paired because the device topology of the virtual machine may be incorrect. Therefore, when running a program on a virtual machine, only one HP60C camera can be connected. If more than one camera is used, the matching may fail due to the above reasons.

3.7 Multiple Cameras Run Abnormal Flow

One possible reason for this issue is that the system kernel parameter `usbfs_memory_mb` is set too small. `usbfs_memory_mb` is a kernel parameter used to specify the memory size used by the USB file system (USBFS). USBFS is a virtual file system used to transfer USB device data between user space and the kernel. This parameter specifies the memory size, in MB, allocated by `usbfs` to the USB device communication buffer. By default, this value is 16 MB. By increasing or decreasing this value, you can adjust the memory size of the USB device communication buffer.

Temporary modification method (will fail after system restart): Increase this kernel parameter to 64/128/512 or higher.

Command: `echo "64" | sudo tee - a/sys/module/usbcore/parameters/usbfs_memory_mb`

The permanent modification method can be set by customers according to the system they are using.

4 Revise

Date	Version	Content
2024-06-05	1.0	The 1st release