# How to Set Up a USB Camera on ROS 2 (Logitech Brio 100)

This guide will help you install and run a USB camera (like the Logitech Brio 100) using ROS 2 and Ubuntu. We’ll use two nodes: one to publish raw camera frames (`/image\_raw`) and another to publish compressed video (`/image\_raw/compressed`).

## Step 1: Plug in the USB Camera

Connect your USB camera (e.g., Logitech Brio 100) to the Raspberry Pi or your PC using a USB port.

You can check if it’s connected by running:

ls /dev/video\*

If you see `/dev/video0`, the camera is detected.

## Step 2: Install ROS 2 Camera Packages

Make sure these packages are installed:

sudo apt update

sudo apt install ros-humble-image-tools ros-humble-v4l2-camera

## Step 3: Launch the Raw Image Publisher

Use the v4l2\_camera node to start publishing camera frames to `/image\_raw`:

ros2 run v4l2\_camera v4l2\_camera\_node

By default, it will start broadcasting frames to `/image\_raw`.

## Step 4: Check the Topic

To verify if the camera is streaming, run:

ros2 topic list

You should see `/image\_raw` in the list.

## Step 5: Launch the Compressed Image Publisher

Use this command to publish compressed video to `/image\_raw/compressed`:

ros2 run image\_transport republish raw in:=/image\_raw compressed:=/image\_raw/compressed

## Step 6: Verify Output

To check if both raw and compressed image streams are working, use:

ros2 topic echo /image\_raw

ros2 topic echo /image\_raw/compressed

## Step 7: View the Camera Feed

You can visualize the live camera feed in RViz2 by adding an `Image` display:

1. Open RViz2:

rviz2

2. Click `Add` and choose `Image`.

3. Set the topic to `/image\_raw` or `/image\_raw/compressed`.

4. Set the fixed frame to `camera\_link` (or whichever TF frame is being used).

## Step 8: Fixing Missing RViz2 or Errors

If `rviz2` isn’t installed, install it using:

sudo apt install ros-humble-rviz2

If you get device or permission errors, make sure `/dev/video0` has the right permissions:

sudo chmod 777 /dev/video0

## Step 9: Common Errors and Fixes

Here are some common errors you might run into and how to fix them:

Error: `rviz2: command not found`

Fix: Install RViz2 using this command:

sudo apt install ros-humble-rviz2

Error: `Cannot open '/dev/video0'` or `Permission denied`

Fix: Give proper access to the camera device:

sudo chmod 777 /dev/video0

Error: `No image received on topic /image\_raw`

Fixes:

- Make sure the camera is properly connected.

- Ensure the camera node is running (`ros2 run v4l2\_camera v4l2\_camera\_node`).

- Check if `/image\_raw` topic exists: `ros2 topic list`.

- Use: `ros2 topic echo /image\_raw` to see live data.

## Step 10: View Camera Feed in RViz2

To visualize the live video from your USB camera in RViz2:

1. Launch RViz2:

rviz2

2. In RViz2:

- Click the `Add` button in the bottom left.

- Choose `Image` from the list.

3. In the Image settings:

- Set the topic to:

/image\_raw (or /image\_raw/compressed if using compression)

Now you should see your camera stream inside RViz2!