V4L2

Install

Install v4l utilities first.

```
sudo apt install v4l-utils
```

Measure actual frame rate

Set video format, and start streaming to `/dev/null`

```
v4l2-ctl --device /dev/video1 -p 30
v4l2-ctl --device /dev/video1 --set-fmt-video=width=1920,height=1080,pixelformat=H264
```

Start capturing and calculating

```
v4l2-ctl --device /dev/video1 --stream-mmap=3 --stream-count=1000 --stream-to=/dev/null
```

Output from last command

```
<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 30.00 fps
<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 30.04 fps
<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 30.03 fps
<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 30.00 fps
<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 30.00 fps
<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 30.00 fps
```

Get supported video formats

/dev/video1 supports h.264 video stream

```
v4l2-ctl --device /dev/video1 --list-formats
```

```
ioctl: VIDIOC_ENUM_FMT
        Index       : 0
        Type        : Video Capture
        Pixel Format: 'H264' (compressed)
```

```
        Name        : H.264
```

/dev/video0 support MJPG and YUYV streams

```
v4l2-ctl --device /dev/video0 --list-formats
```

```
ioctl: VIDIOC_ENUM_FMT
        Index       : 0
        Type        : Video Capture
        Pixel Format: 'MJPG' (compressed)
        Name        : Motion-JPEG

        Index       : 1
        Type        : Video Capture
        Pixel Format: 'YUYV'
        Name        : YUYV 4:2:2
```

Get UVC control list

```
v4l2-ctl -d /dev/video0 --list-ctrls
```

```
                     brightness 0x00980900 (int)    : min=-64 max=64 step=1 default=0
value=0
                       contrast 0x00980901 (int)    : min=0 max=64 step=1 default=32
value=32
                     saturation 0x00980902 (int)    : min=0 max=128 step=1 default=64
value=64
                            hue 0x00980903 (int)    : min=-40 max=40 step=1 default=0 value=0
 white_balance_temperature_auto 0x0098090c (bool)   : default=1
value=1
                          gamma 0x00980910 (int)    : min=72 max=500 step=1 default=100
value=100
                           gain 0x00980913 (int)    : min=0 max=63 step=1 default=0
value=0
           power_line_frequency 0x00980918 (menu)   : min=0 max=2 default=1 value=1
      white_balance_temperature 0x0098091a (int)    : min=2800 max=10000 step=1 default=4600
value=4600 flags=inactive
                      sharpness 0x0098091b (int)    : min=0 max=6 step=1 default=3
value=3
         backlight_compensation 0x0098091c (int)    : min=0 max=2 step=1 default=1
```

```
value=1
                  exposure_auto 0x009a0901 (menu)   : min=0 max=3 default=3
value=3
               exposure_absolute 0x009a0902 (int)    : min=1 max=10000 step=1 default=156
value=156 flags=inactive
         exposure_auto_priority 0x009a0903 (bool)   : default=0 value=0
```

Set white ballance

```
v4l2-ctl -d /dev/video0 -c white_balance_temperature_auto=0
v4l2-ctl -d /dev/video0 -c white_balance_temperature=3000
```

Get supported video formats

```
v4l2-ctl -d /dev/video0 --list-formats-ext
```

```
ioctl: VIDIOC_ENUM_FMT
        Index       : 0
        Type        : Video Capture
        Pixel Format: 'MJPG' (compressed)
        Name        : Motion-JPEG
                Size: Discrete 1920x1080
                        Interval: Discrete 0.033s (30.000 fps)
                        Interval: Discrete 0.040s (25.000 fps)
                        Interval: Discrete 0.050s (20.000 fps)
                        Interval: Discrete 0.067s (15.000 fps)
                Size: Discrete 1280x1024
                        Interval: Discrete 0.033s (30.000 fps)
                        Interval: Discrete 0.040s (25.000 fps)
                        Interval: Discrete 0.050s (20.000 fps)
                        Interval: Discrete 0.067s (15.000 fps)
                Size: Discrete 1280x720
                        Interval: Discrete 0.033s (30.000 fps)
                        Interval: Discrete 0.040s (25.000 fps)
                        Interval: Discrete 0.050s (20.000 fps)
                        Interval: Discrete 0.067s (15.000 fps)
                Size: Discrete 720x576
                        Interval: Discrete 0.033s (30.000 fps)
                        Interval: Discrete 0.040s (25.000 fps)
                        Interval: Discrete 0.050s (20.000 fps)
```

```
                Interval: Discrete 0.067s (15.000 fps)
                Interval: Discrete 0.100s (10.000 fps)
                Interval: Discrete 0.200s (5.000 fps)
        Size: Discrete 720x480
                Interval: Discrete 0.033s (30.000 fps)
                Interval: Discrete 0.040s (25.000 fps)
                Interval: Discrete 0.050s (20.000 fps)
                Interval: Discrete 0.067s (15.000 fps)
                Interval: Discrete 0.100s (10.000 fps)
                Interval: Discrete 0.200s (5.000 fps)
        Size: Discrete 640x480
                Interval: Discrete 0.033s (30.000 fps)
                Interval: Discrete 0.040s (25.000 fps)
                Interval: Discrete 0.050s (20.000 fps)
                Interval: Discrete 0.067s (15.000 fps)
        Size: Discrete 1920x1080
                Interval: Discrete 0.033s (30.000 fps)
                Interval: Discrete 0.040s (25.000 fps)
                Interval: Discrete 0.050s (20.000 fps)
                Interval: Discrete 0.067s (15.000 fps)

Index       : 1
Type        : Video Capture
Pixel Format: 'YUYV'
Name        : YUYV 4:2:2
        Size: Discrete 1920x1080
                Interval: Discrete 0.200s (5.000 fps)
        Size: Discrete 1280x1024
                Interval: Discrete 0.200s (5.000 fps)
        Size: Discrete 1280x720
                Interval: Discrete 0.100s (10.000 fps)
                Interval: Discrete 0.200s (5.000 fps)
        Size: Discrete 800x600
                Interval: Discrete 0.100s (10.000 fps)
                Interval: Discrete 0.200s (5.000 fps)
        Size: Discrete 720x576
                Interval: Discrete 0.100s (10.000 fps)
                Interval: Discrete 0.200s (5.000 fps)
        Size: Discrete 720x480
                Interval: Discrete 0.050s (20.000 fps)
```

```
                        Interval: Discrete 0.067s (15.000 fps)
                        Interval: Discrete 0.100s (10.000 fps)
                        Interval: Discrete 0.200s (5.000 fps)
                Size: Discrete 640x480
                        Interval: Discrete 0.033s (30.000 fps)
                        Interval: Discrete 0.040s (25.000 fps)
                        Interval: Discrete 0.050s (20.000 fps)
                        Interval: Discrete 0.067s (15.000 fps)
                        Interval: Discrete 0.100s (10.000 fps)
                        Interval: Discrete 0.200s (5.000 fps)
                Size: Discrete 1920x1080
                        Interval: Discrete 0.200s (5.000 fps)
```

Tell everything about camera

```
v4l2-ctl --all
```

```
Driver Info:
        Driver name      : uvcvideo
        Card type        : C2: C2 RVN-3Q4WH
        Bus info         : usb-0000:00:14.0-1.1.2
        Driver version   : 5.11.21
        Capabilities     : 0x84a00001
                Video Capture
                Metadata Capture
                Streaming
                Extended Pix Format
                Device Capabilities
        Device Caps      : 0x04200001
                Video Capture
                Streaming
                Extended Pix Format
Priority: 2
Video input : 0 (Camera 1: ok)
Format Video Capture:
        Width/Height      : 1920/1080
        Pixel Format      : 'MJPG' (Motion-JPEG)
        Field             : None
        Bytes per Line    : 0
        Size Image        : 4147789
```

```
        Colorspace       : Default
        Transfer Function : Default (maps to Rec. 709)
        YCbCr/HSV Encoding: Default (maps to ITU-R 601)
        Quantization     : Default (maps to Full Range)
        Flags            :
Crop Capability Video Capture:
        Bounds      : Left 0, Top 0, Width 1920, Height 1080
        Default     : Left 0, Top 0, Width 1920, Height 1080
        Pixel Aspect: 1/1
Selection Video Capture: crop_default, Left 0, Top 0, Width 1920, Height 1080, Flags:
Selection Video Capture: crop_bounds, Left 0, Top 0, Width 1920, Height 1080, Flags:
Streaming Parameters Video Capture:
        Capabilities     : timeperframe
        Frames per second: 10000000.000 (10000000/1)
        Read buffers     : 0
                     brightness 0x00980900 (int)    : min=-64 max=64 step=1 default=0
value=0
                       contrast 0x00980901 (int)    : min=0 max=64 step=1 default=32
value=32
                     saturation 0x00980902 (int)    : min=0 max=128 step=1 default=64
value=64
                            hue 0x00980903 (int)    : min=-40 max=40 step=1 default=0 value=0
 white_balance_temperature_auto 0x0098090c (bool)   : default=1
value=1
                          gamma 0x00980910 (int)    : min=72 max=500 step=1 default=100
value=100
                           gain 0x00980913 (int)    : min=0 max=48 step=1 default=0
value=0
           power_line_frequency 0x00980918 (menu)   : min=0 max=2 default=2
value=2
                                0: Disabled
                                1: 50 Hz
                                2: 60 Hz
      white_balance_temperature 0x0098091a (int)    : min=2800 max=9300 step=1 default=4600
value=4600 flags=inactive
                      sharpness 0x0098091b (int)    : min=0 max=6 step=1 default=3
value=3
         backlight_compensation 0x0098091c (int)    : min=0 max=2 step=1 default=1
value=1
                  exposure_auto 0x009a0901 (menu)   : min=0 max=3 default=3
value=3
```

```
                                1: Manual Mode
                                3: Aperture Priority Mode
             exposure_absolute 0x009a0902 (int)    : min=1 max=5000 step=1 default=156
value=156 flags=inactive
         exposure_auto_priority 0x009a0903 (bool)   : default=0 value=0
```

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