

Using MIPI camera

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The Raspberry Pi 5 combines the previous CSI and DSI interfaces into two dual-purpose CSI/DSI (MIPI) ports.

Configure camera

When using a Raspberry Pi camera or a third-party camera, you can modify the camera configuration according to the following table:

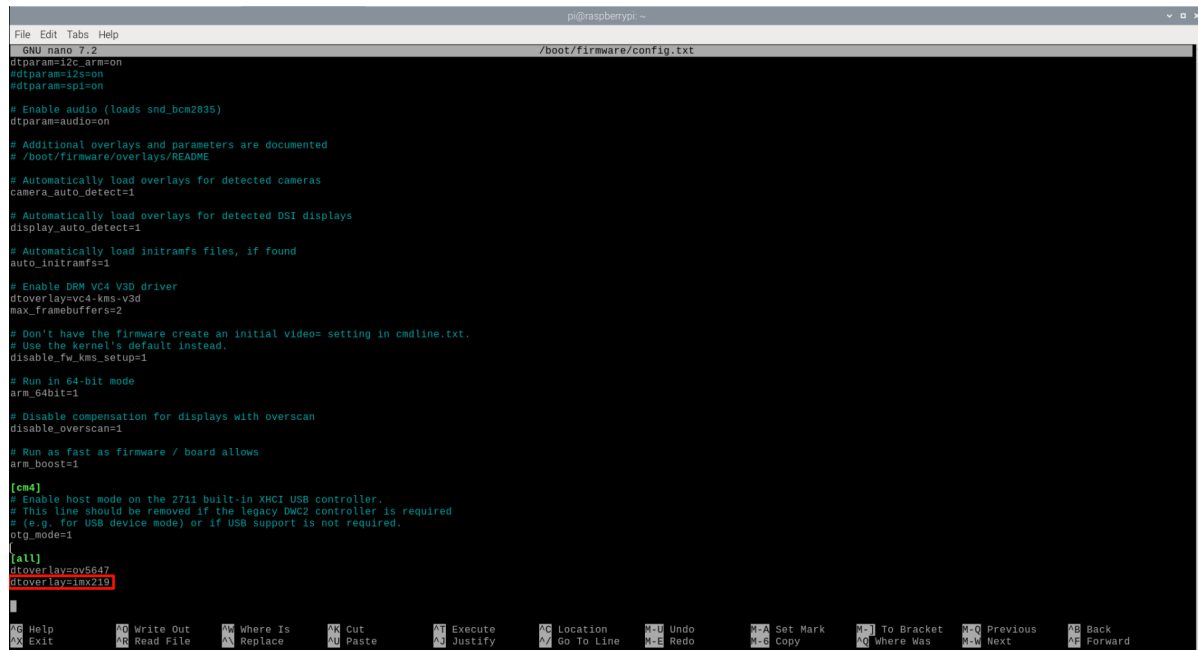
Camera module	File located at: /boot/firmware/config.txt
V1 Camera (OV5647)	dtoverlay=ov5647
V2 camera (IMX219)	dtoverlay=imx219
HQ Camera (IMX477)	dtoverlay=imx477
GS camera (IMX296)	dtoverlay=imx296
Camera module 3 (IMX708)	dtoverlay=imx708
IMX290 and IMX327	dtoverlay=imx290,clock-frequency=74250000 or (both modules share the IMX290 kernel driver; for the correct frequency, see the module vendor's instructions) dtoverlay=imx290,clock-frequency=37125000
IMX378 type	dtoverlay=imx378
OV9281 series	dtoverlay=ov9281

If you are not using the official Raspberry Pi camera, you can modify the config.txt file as shown in the table and add the dtoverlay content to the /boot/firmware/config.txt file.

```
sudo nano /boot/firmware/config.txt
```

```
pi@raspberrypi:~ $ sudo nano /boot/firmware/config.txt
```

For example: Raspberry Pi uses IMX219 camera, connect the camera to the Raspberry Pi J4 interface, and then modify the `/boot/firmware/config.txt` file:



```
File Edit Tabs Help
GNU nano 2.2 /boot/firmware/config.txt
dtparam=i2c_arm=on
dtparam=i2s=on
dtparam=spi=on

# Enable audio (loads snd_bcm2835)
dtparam=audio=on

# Additional overlays and parameters are documented
# /boot/firmware/overlays/README

# Automatically load overlays for detected cameras
camera_auto_detect=1

# Automatically load overlays for detected DSI displays
display_auto_detect=1

# Automatically load initramfs files, if found
auto_initramfs=1

# Enable DRM VC4 V3D driver
dtoverlay=vc4-kms-v3d
max_framebuffers=2

# Don't have the firmware create an initial video= setting in cmdline.txt.
# Use the kernel's default instead.
disable_fw_kms_setup=1

# Run in 64-bit mode
arm_64bit=1

# Disable compensation for displays with overscan
disable_overscan=1

# Run as fast as firmware / board allows
arm_boost=1

[cmd]
# Enable host mode on the 2711 built-in XHCI USB controller.
# This line should be removed if the legacy DWC2 controller is required
# (e.g. for USB device mode) or if USB support is not required.
otg_mode=1

[all]
dtoverlay=ov5647
dtoverlay=imx219
```

To use the IMX219 camera, it needs to be connected to the J4 interface of Raspberry Pi 5 for recognition!

Modify the configuration file and restart to take effect!

Use camera

Preview camera

- `rplicam-hello`

Entering this command in the terminal will display the preview window for about 5 seconds.

- `rplicam-hello -t 0`

Running this command in the terminal will always display the preview window. You can use the window close button and `Ctrl+C` to exit!

Photograph

- `rplicam-jpeg -o test.jpg`

Display a preview for 5 seconds, then capture the image and save it as a `test.jpg` file

- `rplicam-jpeg -o test.jpg -t 2000 --width 640 --height 480`

Show a preview for 2 seconds, then capture and save the image as a `test.jpg` file, with the image having a width of 640 pixels and a height of 480 pixels.

rplicam-still

This command can be used to save files in different formats:

```
rpicam-still -e png -o test.png
rpicam-still -e bmp -o test.bmp
rpicam-still -e rgb -o test.data
rpicam-still -e yuv420 -o test.data
```

- Raw image capture

```
rpicam-still -r -o test.jpg
```

- Time-lapse shooting

Capture images continuously at intervals of 2 seconds for a total capture duration of 30 seconds, and save each image as a file name similar to image0001.jpg:

```
rpicam-still -t 30000 --timelapse 2000 -o image%04d.jpg
```

Video

rpicam-vid

Commands for video recording using the camera module on the Raspberry Pi.

Example: Record 10 seconds of video and write to test.h264 file

```
rpicam-vid -t 10000 -o test.h264
```

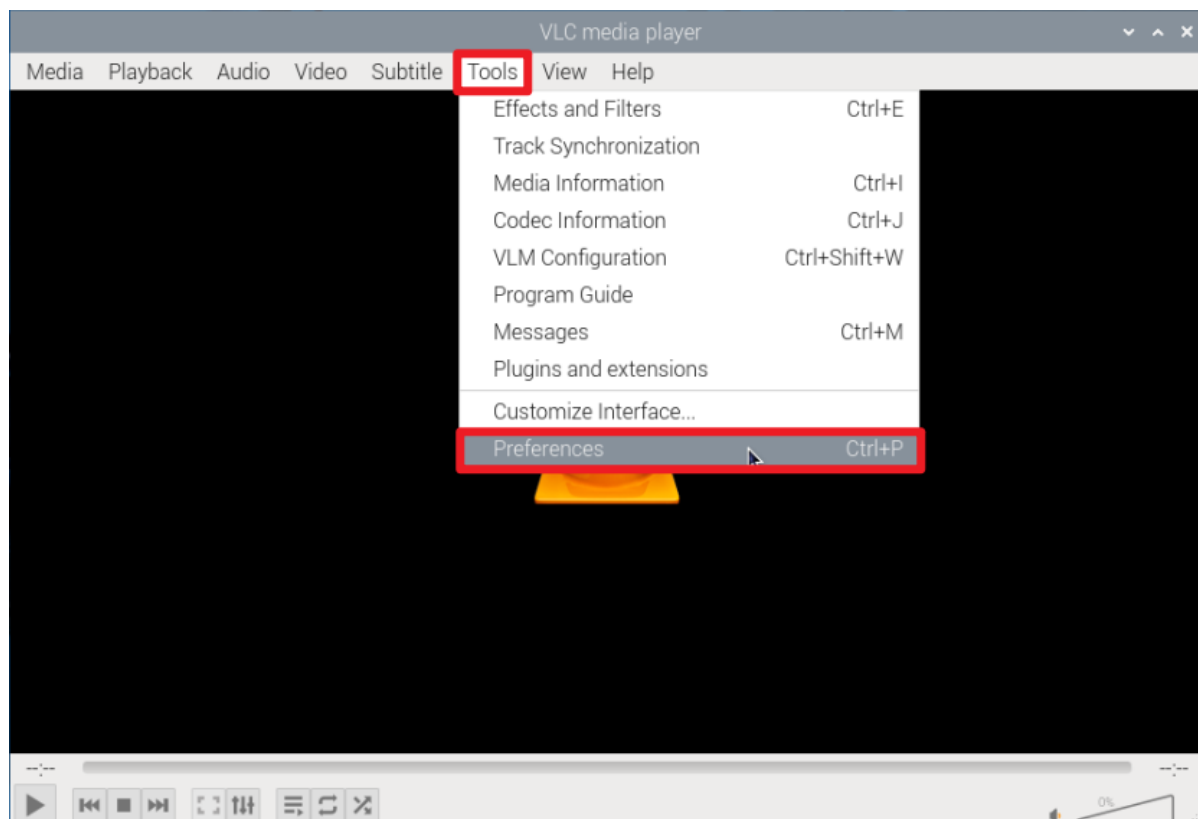
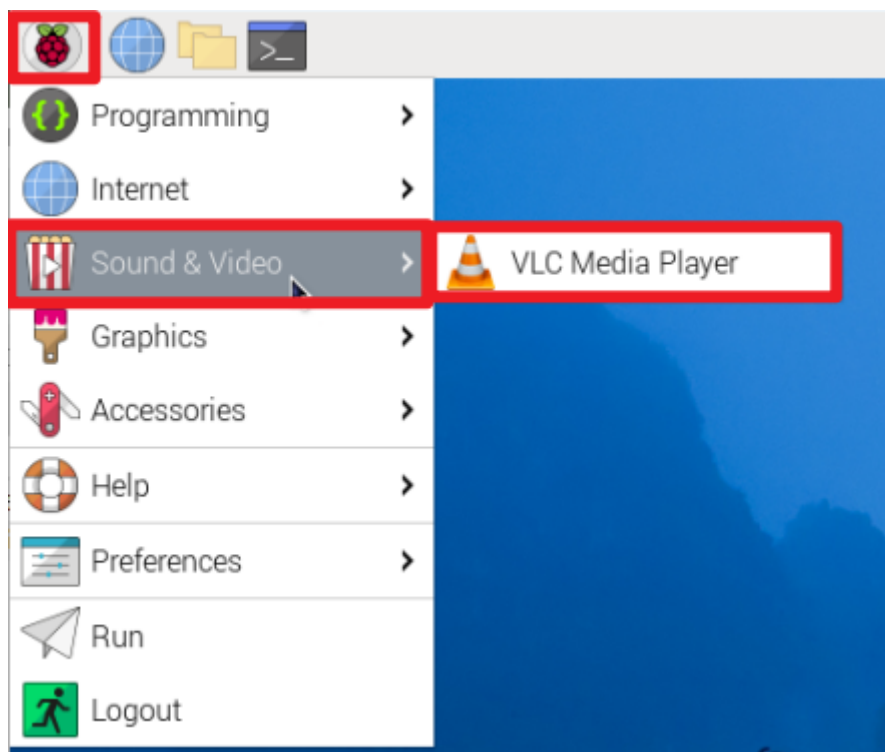
play video

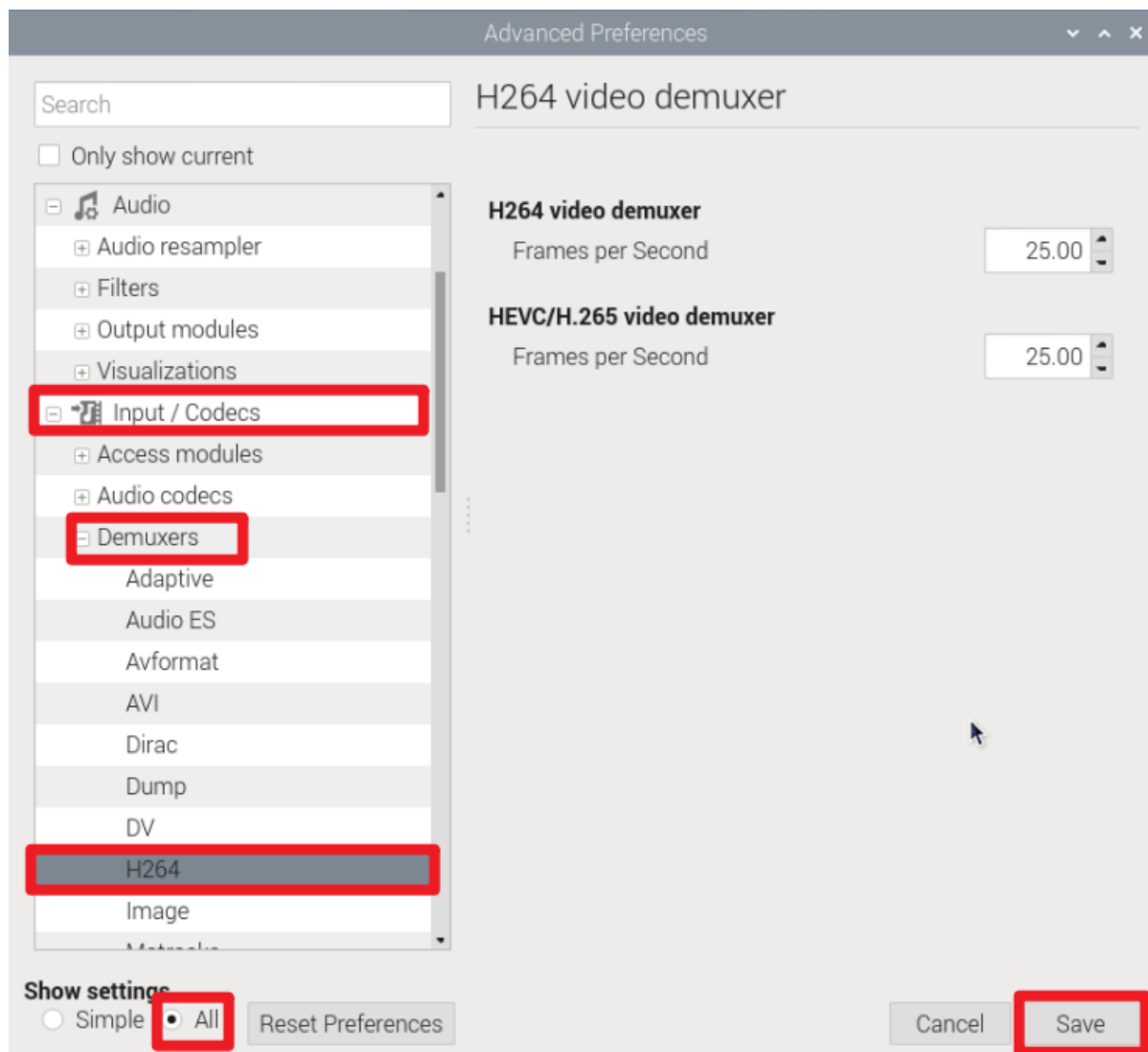
```
vlc test.h264
```

Note: If the test.h264 file cannot be played and an error occurs, please try the following method to solve it.

Error resolution

Modify the frame rate of H264 playback per second





Web page preview camera

Use Python script files to preview camera images on web pages.

Run script

Code path:/home/pi/Camera_Web_Preview/

```
cd /home/pi/Camera_web_Preview/  
python3 mjpeg_server.py
```

```
pi@raspberrypi: ~/Camera_Web_Preview
File Edit Tabs Help
pi@raspberrypi:~$ cd /home/pi/Camera_Web_Preview/
pi@raspberrypi:~/Camera_Web_Preview$ python3 mjpeg_server.py
[0:13:12.445517358] [3588] INFO Camera camera_manager.cpp:284 libcamera v0.1.0+118-563cd78e
[0:13:12.459206377] [3591] INFO RPI pisp.cpp:653 libpisp version v1.0.2 fa44a258644a22-11-2023 (21:59:22)
[0:13:12.469037988] [3591] INFO RPI pisp.cpp:1112 Registered camera /base/axi/pcie@120000/rp1/i2c@800000/imx219@10 to CFE device /dev/media1 and ISP device /dev/media2 using PiSP variant BCM2712_C0
[0:13:12.470301488] [3588] INFO Camera camera_manager.cpp:284 libcamera v0.1.0+118-563cd78e
[0:13:12.487091229] [3594] INFO RPI pisp.cpp:653 libpisp version v1.0.2 fa44a258644a22-11-2023 (21:59:22)
[0:13:12.500835229] [3594] INFO RPI pisp.cpp:1112 Registered camera /base/axi/pcie@120000/rp1/i2c@800000/imx219@10 to CFE device /dev/media1 and ISP device /dev/media2 using PiSP variant BCM2712_C0
[0:13:12.504465507] [3588] WARN V4L2 v4l2_pixelformat.cpp:338 Unsupported V4L2 pixel format Y16
[0:13:12.504733895] [3588] WARN V4L2 v4l2_pixelformat.cpp:338 Unsupported V4L2 pixel format RGB6
[0:13:12.504799969] [3588] WARN V4L2 v4l2_pixelformat.cpp:338 Unsupported V4L2 pixel format BGR6
[0:13:12.504823321] [3588] WARN V4L2 v4l2_pixelformat.cpp:338 Unsupported V4L2 pixel format PC1M
[0:13:12.507865229] [3588] INFO Camera camera.cpp:1183 configuring streams: (0) 640x480-XBGR8888 (1) 640x480-BGGR16_PISP_COMP1
[0:13:12.508480395] [3594] INFO RPI pisp.cpp:1396 Sensor: /base/axi/pcie@120000/rp1/i2c@800000/imx219@10 - Selected sensor format: 640x480-SBGGR10_1X10 - Selected CFE format: 640x480-PC1B
```

Web access

Devices under the same LAN can enter :8000 through the browser to view the real-time camera view!

Example:

Raspberry Pi IP: 10.42.0.1

Web access: 10.42.0.1:8000

Picamera2 MJPEG Streaming Demo



If you want to set up auto-start at boot, you can search for information online and set the script file to auto-start at boot!