

Raspberry Pi camera tutorial



Introducing the Raspberry Pi Cameras

All Raspberry Pi cameras are capable of taking high-resolution photographs, along with full HD 1080p video, and can be fully controlled programmatically.

Once installed, there are various ways the cameras can be used. The simplest option is to use one of the provided camera applications, such as [libcamera-still](#) or [raspistill](#). This article describes how to use [raspistill](#).

Reasons to using the raspistill:

- It may perform better on Raspberry Pi 2 and Raspberry Pi Zero devices, as it offloads more to the GPU and is less dependent on the ARM cores.

- libcamera is still missing certain features, most notably Python bindings. Whilst this work is in progress, users who need a Python interface (such as Picamera) will have to stay with the legacy stack for the time being.

If you want to use libcamera or want to know more about raspistill, please refer to the official documentation: <https://www.raspberrypi.com/documentation/accessories/camera.html>

Getting started with the Camera Module

The Python Picamera module is currently not, by default, compatible with the latest version of Raspberry Pi OS (called Bullseye).

To use the Picamera module, you will need to enable legacy support for the camera

Open a terminal window and type the following command:

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

Add following content and **Ctrl+O ->Enter ->Ctrl+X**

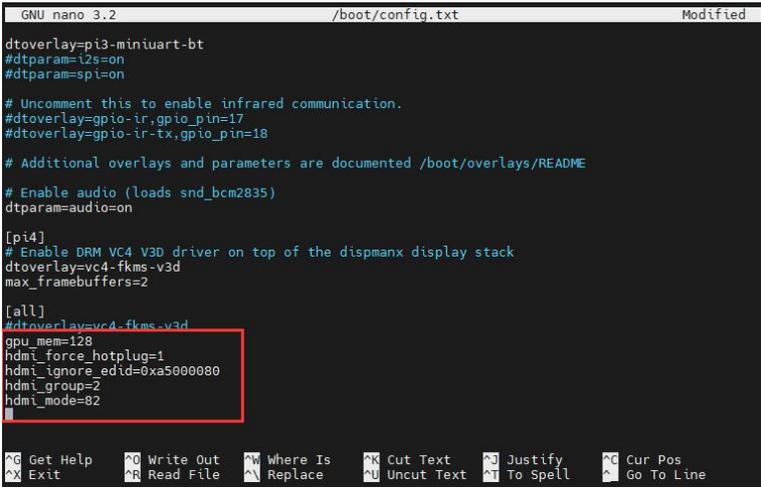
```
gpu_mem=128
```

```
hdmi_force_hotplug=1
```

```
hdmi_ignore_edid=0xa5000080
```

```
hdmi_group=2
```

```
hdmi_mode=82
```



```
GNU nano 3.2 /boot/config.txt Modified
dtoverlay=pi3-miniuart-bt
#dtparam=i2s=on
#dtparam=spi=on
# Uncomment this to enable infrared communication.
#dtoverlay=gpio-ir,gpio_pin=17
#dtoverlay=gpio-ir-tx,gpio_pin=18
# Additional overlays and parameters are documented /boot/overlays/README
# Enable audio (loads snd_bcm2835)
dtparam=audio=on
[pi4]
# Enable DRM VC4 V3D driver on top of the dispmanx display stack
dtoverlay=vc4-fkms-v3d
max_framebuffers=2
[all]
#dtoverlay=vc4-fkms-v3d
gpu_mem=128
hdmi_force_hotplug=1
hdmi_ignore_edid=0xa5000080
hdmi_group=2
hdmi_mode=82
^G Get Help  ^O Write Out  ^W Where Is   ^K Cut Text   ^J Justify    ^C Cur Pos
^X Exit      ^R Read File  ^_ Replace    ^U Uncut Text ^T To Spell  ^_ Go To Line
```

Enter at the command line: **sudo raspi-config**

Use the cursor keys to scroll down to **3 Interface Options** and press the 'Enter' key.

```
Raspberry Pi 3 Model B Rev 1.2

Raspberry Pi Software Configuration Tool (raspi-config)

1 System Options      Configure system settings
2 Display Options     Configure display settings
3 Interface Options   Configure connections to peripherals
4 Performance Options Configure performance settings
5 Localisation Options Configure language and regional settings
6 Advanced Options    Configure advanced settings
8 Update              Update this tool to the latest version
9 About raspi-config  Information about this configuration tool

<Select>                <Finish>
```

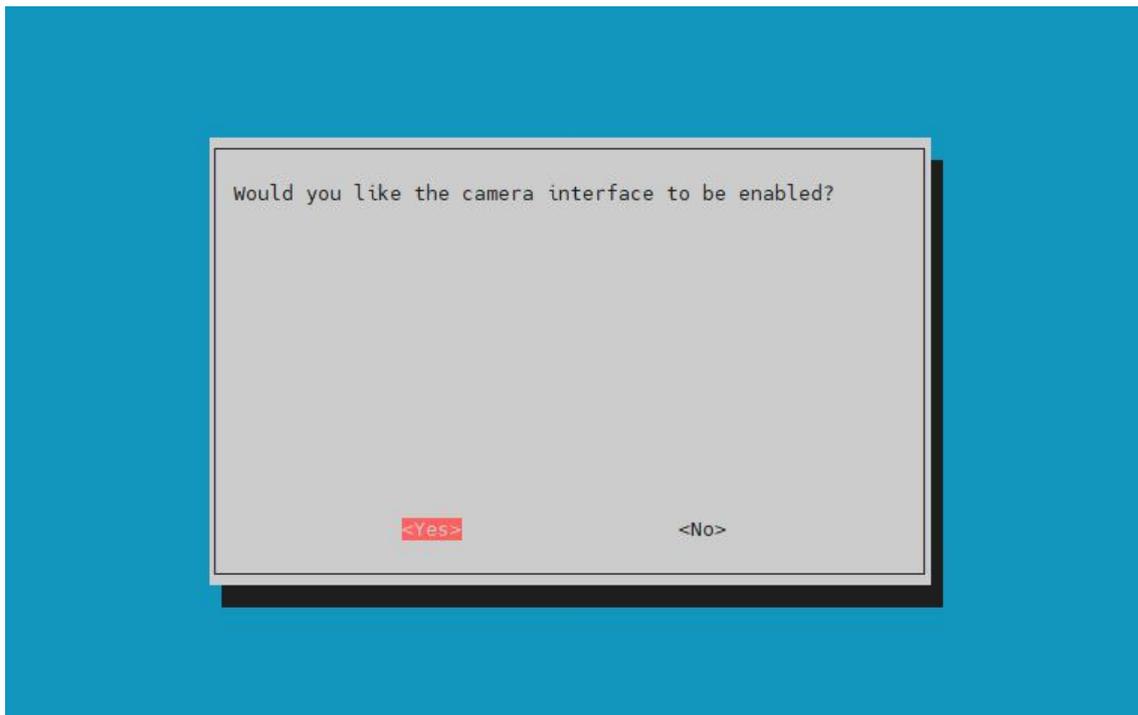
Make sure 'P1 camera' is selected and press the 'Enter' key.

```
Raspberry Pi Software Configuration Tool (raspi-config)

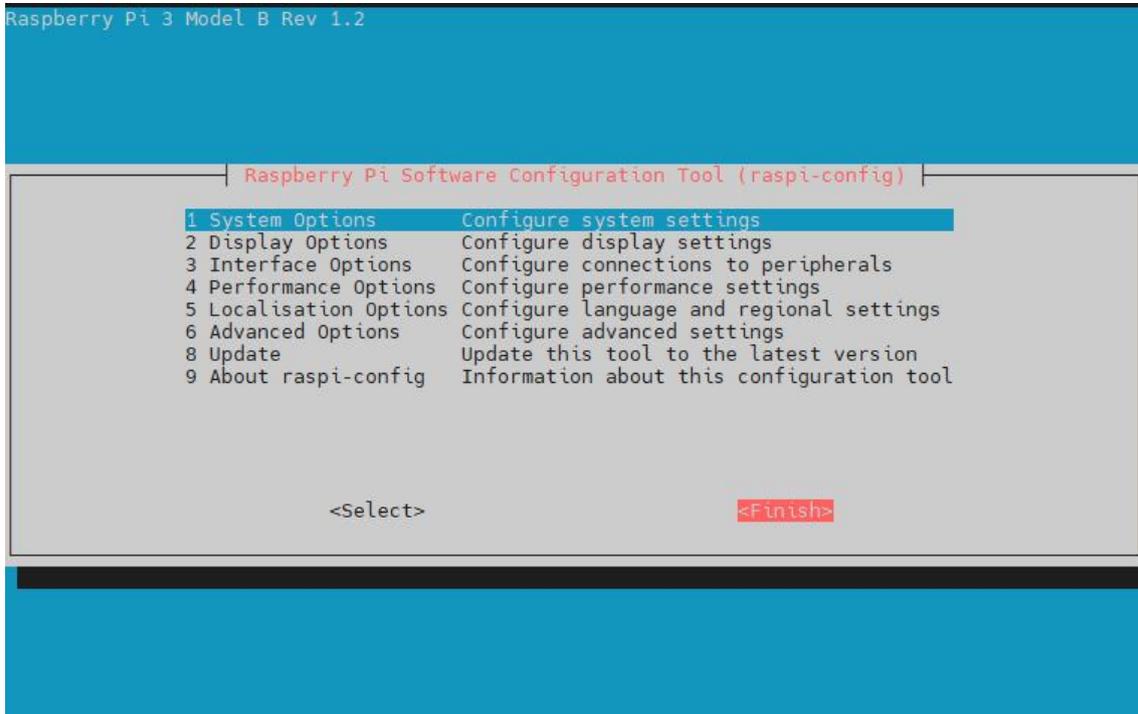
P1 Camera  Enable/disable connection to the Raspberry Pi Camera
P2 SSH     Enable/disable remote command line access using SSH
P3 VNC     Enable/disable graphical remote access using RealVNC
P4 SPI     Enable/disable automatic loading of SPI kernel module
P5 I2C     Enable/disable automatic loading of I2C kernel module
P6 Serial Port Enable/disable shell messages on the serial connection
P7 1-Wire  Enable/disable one-wire interface
P8 Remote GPIO Enable/disable remote access to GPIO pins

<Select>                <Back>
```

Use the cursor keys to select **<Yes>** and press the 'Enter' key Press 'Enter' again to confirm.



Use the cursor keys to select **<Finish>**.



Press 'Enter' to reboot.

How to control the Camera Module

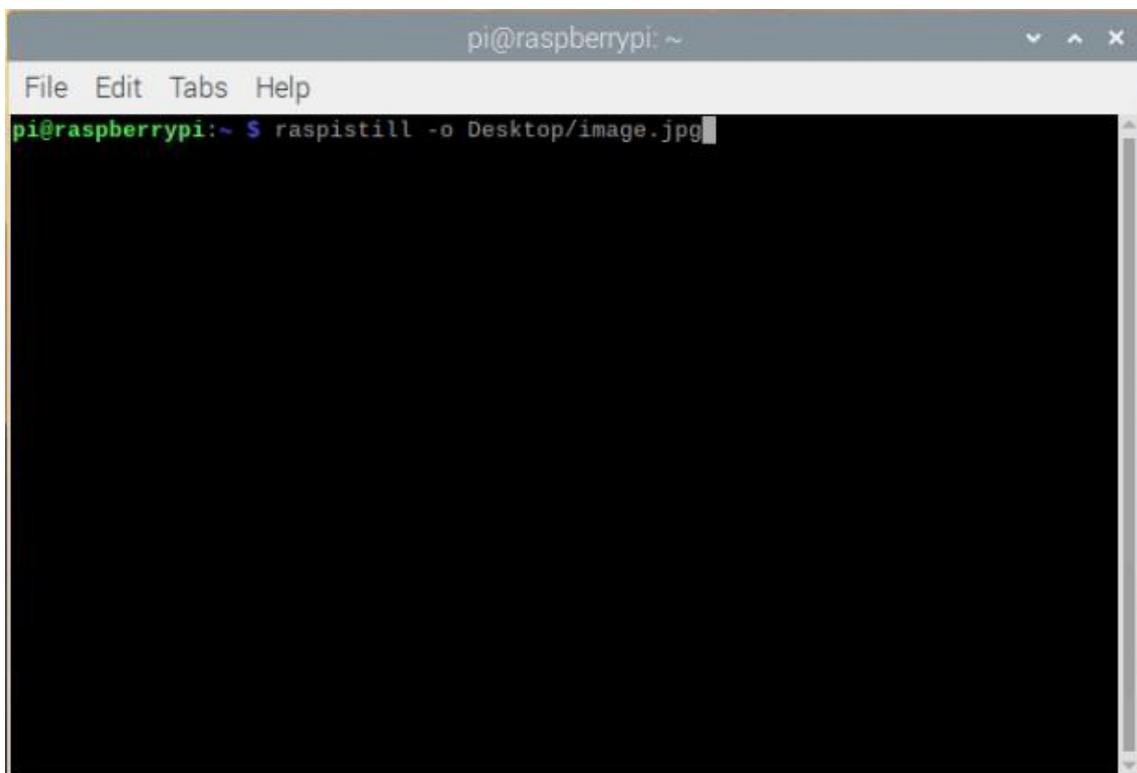
Now your Camera Module is connected and the software is enabled, try out the command line tools.

raspistill

raspistill is the command line tool for capturing still photographs with a Raspberry Pi camera module.

- Open a terminal window by clicking the black monitor icon in the taskbar.
- Type in the following command to take a still picture and save it to the Desktop:

```
raspistill -o Desktop/image.jpg
```

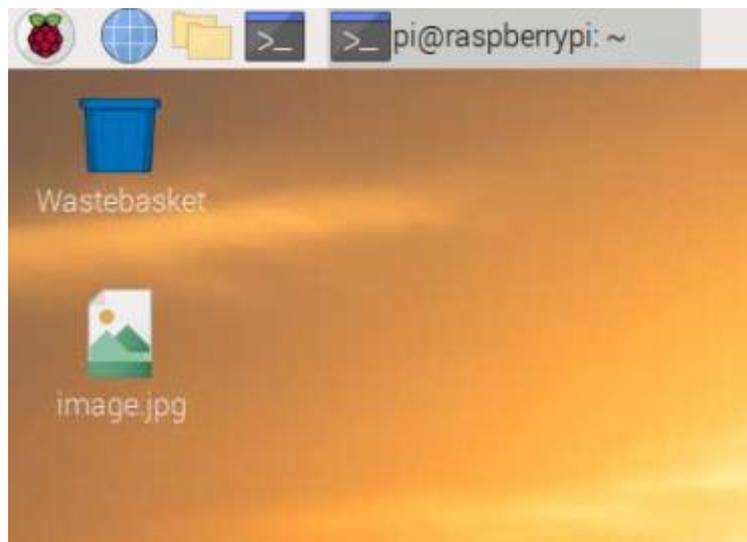


- Press Enter to run the command.

When the command runs, you can see the camera preview open for five seconds before a still picture is taken.

Note: the camera preview only works when a monitor is connected to your Raspberry Pi. If you are using remote access (such as SSH or VNC), you won't see the camera preview.

- Look for the picture file icon on the Desktop, and double-click the file icon to open the picture.



By adding different options, you can set the size and look of the image the raspistill command takes.

- For example, add -h and -w to change the height and width of the image:

```
raspistill -o Desktop/image-small.jpg -w 640 -h 480
```

raspivid

raspivid is the command line tool for capturing video with a Raspberry Pi camera module.

- Now record a video with the Camera Module by using the following raspivid command:

```
raspivid -o Desktop/video.h264
```

- In order to play the video file, double-click the video.h264 file icon on the Desktop to open it in VLC Media Player.

For more information and other options you can use with these commands, read the documentation for raspistill:

<https://www.raspberrypi.org/documentation/usage/camera/raspicam/raspistill.md>

And the documentation for raspivid :

<https://www.raspberrypi.org/documentation/usage/camera/raspicam/raspivid.md>