

**Date: 2024-11-19**

## What is needed:

- Raspberry Pi 4 model b (with a microSD card preloaded with Raspberry Pi OS)
- Raspberry Pi Camera. The one I got for this project is this:



The image shows the product page for the Raspberry Pi Camera Module V2-8 Megapixel, 1080p (RPI-CAM-V2) on Amazon. The product is a green circuit board with a black lens and a white ribbon cable. The page includes a 4.4-star rating from 3,293 reviews, a price of \$24.99 (22% off the original price of \$32.00), and a list of specifications: Brand: Raspberry Pi, Model name: RPI 8MP CAMERA BOARD, Memory storage capacity: 12 GB, Connectivity technology: CSI, Operating system: Operating, CPU manufacturer: Sony, and Wireless communication: Infrared. The 'About this item' section lists features such as being a second-generation module with a fixed focus lens, using a Sony Exmor IMX219 sensor, and having a maximum of 1080p30 and 8MP stills. The page also shows delivery options, a 'Quantity: 1' selector, and buttons for 'Add to Cart' and 'Buy Now'.

**Raspberry Pi Camera Module V2-8 Megapixel, 1080p (RPI-CAM-V2)**  
Brand: Raspberry Pi  
4.4 ★★★★★ 3,293 ratings  
50+ bought in past month

**-22%** \$24<sup>99</sup>  
Was: \$32.00

**Brand** Raspberry Pi  
**Model name** RPI 8MP CAMERA BOARD  
**Memory storage capacity** 12 GB  
**Connectivity technology** CSI  
**Operating system** Operating  
**CPU manufacturer** Sony  
**Wireless communication** Infrared  
✓ See more

**About this item**

- Second Generation Raspberry Pi Camera Module with Fixed Focus Lens
- Sony Exmor IMX219 Sensor Capable of 4K30 1080P60 720P180 8MP Still
- 3280 (H) x 2464 (V) Active Pixel Count
- Maximum of 1080P30 and 8MP Stills in Raspberry Pi Board
- 2A Power Supply Highly Recommended

Report an issue with this product

**Delivery** Collection

**\$24<sup>99</sup>**

**FREE delivery Thursday, November 28** on your first order. Order within 7 hrs 16 mins

Or fastest delivery **Wednesday, November 27**

Delivering to Montreal H2V – Update location


**In Stock**

Quantity: 1

**Add to Cart** **Buy Now**

Payment: Secure transaction  
Ships from: Amazon  
Sold by: Seller\_King  
Returns: Returnable until 31 Jan 2025  
Support: Product support included

- PIR Motion Sensor which should have three pins: VCC, GND, and OUT



The image shows the product page for the Stemedu 5PCS HC-SR501 PIR Motion Sensor on Amazon. The product is a green circuit board with a white dome-shaped sensor. The page includes a 4.3-star rating from 311 reviews, a price of \$17.49, and a list of specifications: Brand: Stemedu, Colour: White, Power source: Electric, Item weight: 60 Grams, Maximum range: 21 Feet, Mounting type: Wall Mount, and Compatible devices: Arduino, Raspberry Pi. The 'About this item' section lists features such as being a high-tech product suitable for various applications, having a DC 4.5-20V operating voltage, and a quiescent current of <50uA. The page also shows delivery options, a 'Quantity: 1' selector, and buttons for 'Add to Cart' and 'Buy Now'.

**Stemedu 5PCS HC-SR501 PIR Motion Sensor Infrared Human Body Distance Detectors Module for Arduino for Raspberry Pi**  
Visit the Stemedu Store  
4.3 ★★★★★ 311 ratings

**\$17<sup>49</sup>**

**Brand** Stemedu  
**Colour** White  
**Power source** Electric  
**Item weight** 60 Grams  
**Maximum range** 21 Feet  
**Mounting type** Wall Mount  
**Compatible devices** Arduino, Raspberry Pi  
✓ See more

**About this item**

- This HC-SR501 PIR motion sensor can turn on devices by detected motion. Automatically and quickly open various types of incandescent, fluorescent lamps, buzzer, automatic doors, electric fans, automatic washing machine and dryer Machines and other devices.
- Reference links: <https://www.mysensors.org/build/motion>
- Using Potentiometer 10S, output timing is from 0.5S to 200S. Operating voltage range: DC 4.5-20V, Quiescent Current: <50uA Trigger: L can not be repeated trigger/H can be repeated trigger(Default repeated trigger)
- Usage: HC-SR501 can use as a hightech products. Suitable for companies, hotels, shopping malls, warehouses and family aisles, corridors. Or use for the security zone automatic lighting, lighting and alarm systems

**Delivery** Collection

**\$17<sup>49</sup>**

**FREE delivery Thursday, November 28** on your first order. Order within 7 hrs 9 mins

Or fastest delivery **Wednesday, November 27**

Delivering to Montreal H2V – Update location

**Only 5 left in stock.**

Quantity: 1

**Add to Cart** **Buy Now**

Payment: Secure transaction  
Ships from: Amazon  
Sold by: Stemedu  
Returns: Returnable until 31 Jan 2025  
Support: Product support included

☐ Add gift options

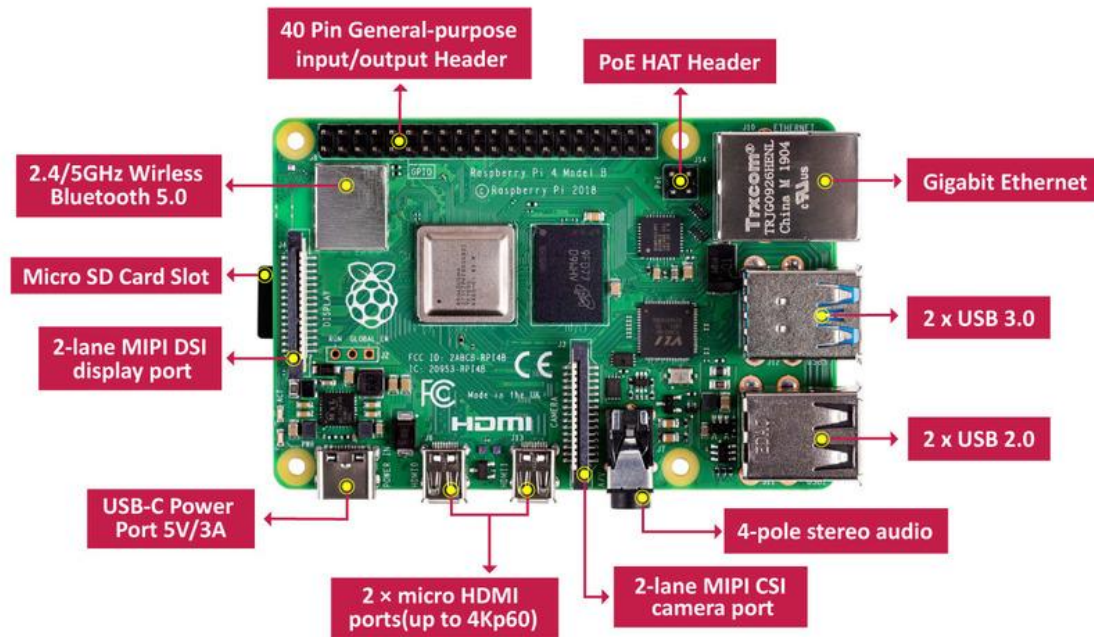
**Add to Wish List**

- Jumper wires to connect the PIR sensor to the Raspberry Pi GPIO pins (female to female wire is recommended)

**Date: 2024-11-20**

**Plugging the camera to the model (Shaheryar did this part):**

- Make sure the Raspberry Pi is turned off.
- Find the 2-lane MIPI CSI camera port. (image bellow helps you locate it)



- Lift the plastic latch of the CSI upward.
- Attach the ribbon cable to the camera port and make sure the metal connectors on the ribbon cable are facing the HDMI port.
- Push the latch back down to secure.

**Date: 2024-11-20**

**Making sure the camera is properly connected (Shaheryar did this part):**

- Turn on the raspberry pi
- Connect the raspberry pi model to the laptop using usb-c to usb-c cable.
- Open terminal and type "ssh <username>@<ip address of the raspberry pi>"
- Update the system by typing the following in the terminal:

sudo apt update

sudo apt upgrade -y

- Open the Raspberry Pi configuration tool by typing:

```
sudo raspi-config
```

Then go to Interface Options -> I2C and enable it.

- Reboot the raspberry pi by typing:

```
sudo reboot
```

- Use RealVNC Viewer to see the Raspberry pi OS

**Date: 2024-11-20**

### **Testing the camera (Shaheryar did this part):**

- Install the libcamera tools by typing:

```
sudo apt update
```

```
sudo apt install -y libcamera-apps
```

- Now to test the camera we type:

```
Libcamera-jpeg -o test.jpg
```

- This should save an image in the home directory

For the last 3 steps this video can be used as visual step by step:

<https://youtu.be/yhM1NhD-kGs?si=GXFxC2PB8wAONrHW>

**Date: 2024-11-21**

### **Installing the Python library (Amir did this):**

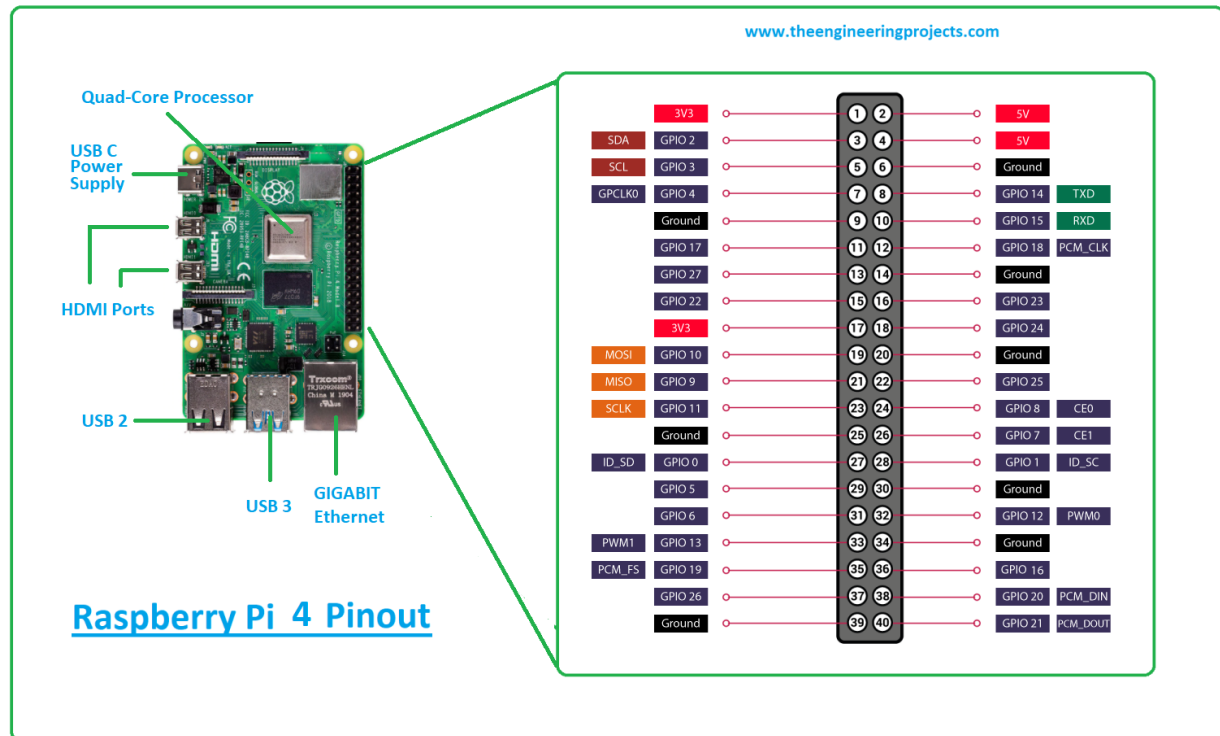
- Install the python library by typing:

```
sudo apt-get install python3-picamera
```

**Date: 2024-11-22**

### **Connecting the PIR Motion Sensor and Camera (Shaheryar did this part):**

use these pictures for this step:



- Connect the VCC to 5V (Pin 2) on the Raspberry Pi via jumper wires
- Connect GND to GND (Pin 6) on the Raspberry Pi
- Connect OUT to GPIO23 (Pin 16)

**Date: 2024-11-22**

**Creating a new file to include the script (Amir did this):**

- Create a new file

sudo nano project.py

- Include the following code:

```
import RPi.GPIO as GPIO
import time
import picamera
import os

# Pin to which the motion sensor is connected
SENSOR_PIN = 23

# Folder to save pictures
SAVE_FOLDER = "/home/pi/motion_pics"

# Create the folder if it doesn't exist
if not os.path.exists(SAVE_FOLDER):
    os.makedirs(SAVE_FOLDER)

# Initialize the camera
camera = picamera.PiCamera()

# Set up GPIO mode
GPIO.setmode(GPIO.BCM)
GPIO.setup(SENSOR_PIN, GPIO.IN)

# Callback function to take a picture when motion is detected
def my_callback(channel):
    timestamp = time.strftime("%Y%m%d-%H%M%S")
    picture_filename = os.path.join(SAVE_FOLDER, f"motion_{timestamp}.jpg")
    camera.capture(picture_filename) # Capture and save the picture
    print(f'Motion detected! Picture saved: {picture_filename}')

try:
    # Detect motion and trigger the callback
    GPIO.add_event_detect(SENSOR_PIN, GPIO.RISING, callback=my_callback)

    # Keep the program running
    while True:
        time.sleep(100)

except KeyboardInterrupt:
    print("Exiting program...")
finally:
    GPIO.cleanup() # Clean up GPIO resources when done
```

- Run the script to make sure it works by typing:

Python3 project.py

- Image should be saved at /home/pi/motion\_pics

For step 5 and 6, use this website: [Connect and control Raspberry Pi motion detector PIR](#)

Took the main idea from the website script code but asked the AI to add so that it takes picture when motion is detected.

**Date: 2024-11-23**

### **Transfer from Raspberry pi to laptop using SSH (Amir did this):**

- Ensure the SSH is enabled on raspberry pi by using

sudo raspi-config

- Then navigate to Interface options -> SSH and enabling it if not enabled.
- Use the following command to get raspberry pi IP:

hostname -i

- Use the following command to transfer image to the laptop:

Scp <username>@<ip address>:/home/pi/<image name>.jpg ~/Downloads

- Verify the file is appearing in your laptop

Link to GitHub repo: <https://github.com/Shehryyy/UnixProject.git>