

# Raspberry Pi Camera

There is now a new, higher-resolution camera from the Raspberry Pi Foundation that has the same video resolutions, geometry, electrical connections, and base price of \$25 as the original so the following notes apply to it as well as to the older version which will eventually become unavailable.

The older version of the camera could do 2592x1944 stills while the new version can do 3280x2464 stills. Both have the same video modes of 1920x1080x30 fps, 1280x720x60 fps, 640x480x60 fps, and 640x480x90 fps. Each has two versions, one for normal use that includes a filter to remove unwanted infra-red radiation (called simply PiCamera mounted on a green PC board) and a second without that filter (called PiNoIR mounted on a black PC board) that is sensitive to near infra-red and can be used with an IR floodlight for night observations.

Additional technical specifications can be found at

<https://www.raspberrypi.org/documentation/hardware/camera/README.md>

PiCamera and PiNoIR both have small lenses that give sharp resolution from 1 m distance to infinity. The lens may be loosened (with some effort and great care) to allow focus as close as about 2 cm, but with a greatly restricted depth of focus.

If the lens is completely removed, the camera CCD can then be mounted at the focus of a microscope or telescope in place of the optical eyepiece. Take great care to keep the CCD surface dust-free and to mount it with an adapter that keeps stray light out. See <http://yosemitefoothills.com/PiCameraModifications.html> for more about doing this.

The camera may be run directly from programs called `raspistill` and `raspivid` which are usually installed by default with the operating system. How to use these programs is shown by doing `raspistill --help` and `raspivid --help`, respectively. A normal phone camera has the same capabilities, but is not programmable. Being able to run your camera under program control opens up many additional uses.

There is also an extensive, object-oriented Python library for controlling the camera called `picamera`. See <https://readthedocs.org/projects/picamera/downloads/pdf/release-1.10/> for the latest (as of June 20, 2015) documentation for it. (A shorter version is at <https://www.raspberrypi.org/learning/python-picamera-setup/worksheet.md> .)

**Caution:** In section 2.1.1 of the long version, the font used on my Ubuntu system was too large and cut off the end of the following line:

```
$ sudo apt-get install --reinstall libraspberrypi0 libraspberrypi-{bin,dev,doc} raspberrypi-bootloader
```

The line simply ended with `raspberrypi-boot` when it should have ended with `raspberrypi-bootloader`.

I followed the suggestion in that section on all my RaspberryPi's and no longer use `sudo rpi-update`.

There is great interest in making stereoscopic pictures with the Pi, but the Pi has only one camera interface. There is, however, a compute module that is a bare bones pi with two camera interfaces. A compute module development kit ( <https://www.raspberrypi.org/products/compute-module-development-kit/> ) is available for about \$100, but I have not bought one yet. The Raspberry Pi Foundation camera forum has the following interesting note about using it to make stereo pictures: <https://www.raspberrypi.org/forums/viewtopic.php?f=43&t=85012> .