

Raspberry Pi Power Considerations

The Raspberry Pi is powered through a micro USB connector from a 5 V power adapter. If the power adapter cannot supply adequate current, there will be performance problems. (Usually indicated by a small, mysterious colored square appearing in the upper-right corner of the desktop.) How much is adequate depends on many factors including

Overclocking beyond the nominal speed will use proportionately more power.

Plugging power-hungry USB devices into the USB ports increase the power load. This can be avoided by using a USB hub **that has an external source of power**.

Any external USB hard disk must have its own power.

USB storage sticks seem ok.

My tiny Rii mini WiFi keyboard/touchpad uses very little USB power since it has its own rechargeable battery with an external charger.

On the other hand, my large medium-sized Anker wireless keyboard and mouse combination uses a significant amount of USB power.

The Raspberry Pi B+ uses more efficient power circuits that allowed the addition of two more USB ports.

The Raspberry Pi 2 with its quad core CPU running 13% faster requires more power.
The Camera when running requires significantly more power (I think about 200 mA).

The Raspberry Pi 3 build-in Bluetooth and WiFi increase the power needs so a 2.5 A power supply is strongly recommended for it.

Drawing power from the GPIO pins will also increase the power requirement.

The latest recommendation is that one should have a power unit that supplies at least 1.5 A and up to 2.5 A.

When using a Raspberry Pi 2 with a Ralink Technology, Corp. RT5372 USB Wireless Adapter, I have seen the WiFi adapter fail to perform and the system gives a default (zero config) address to the wlan interface.

The least power is when running a Raspberry Pi A+ via a remote SSH connection. A Raspberry Pi 3 A+ version is expected to become available which will be ideal for remote use as in critter cams.

Heat sinks should not be necessary unless one wants them just for looks. They are supplied with the Raspberry Pi 3 Complete Starter Kit – 32 GB.

Alex Eames has a useful discussion at

<http://raspi.tv/2015/raspberry-pi2-power-and-performance-measurement>

A conservative summary of his results puts the basic processor power usage at

A: 350 mA

A+: 250 mA

B: 500 mA

B+: 350
2B: 400 (1 core active)
2B: 550 mA (4 cores active)

The command

`lsusb -v`

can provide information about individual USB devices that includes a “MaxPower” entry.

Panda wireless adapter: 450 mA

Edimax wireless adapter: 500 mA

Anker wireless keyboard/mouse: 100 mA

Rii mini wireless miniature keyboard/touchpad: 100 mA

I have 4 power adapters: a 1 A, three 2 A units, and two 2.5 A units.

There is a nice discussion of the Pi hardware (not including Pi 2, however) that includes interesting points about power usage and protection. It is at:

http://elinux.org/RPi_Hardware

There is a link in that page to an explanation about polyfuses:

http://elinux.org/Polyfuses_explained

A very interesting discussion of methods to reduce power consumption is at

<https://www.raspberrypi.org/forums/viewtopic.php?f=29&t=152692>

Another interesting discussion on power usage is at

<http://raspi.tv/2016/how-much-power-does-raspberry-pi3b-use-how-fast-is-it-compared-to-pi2b>