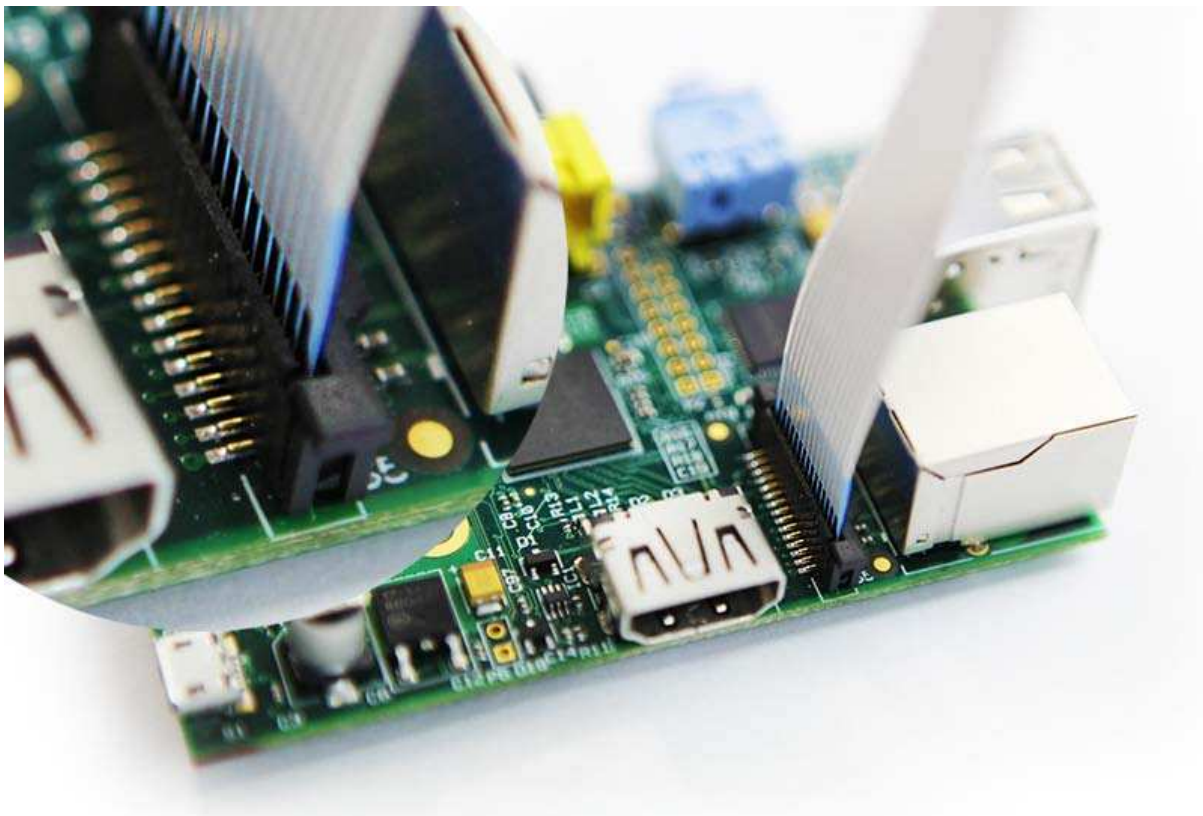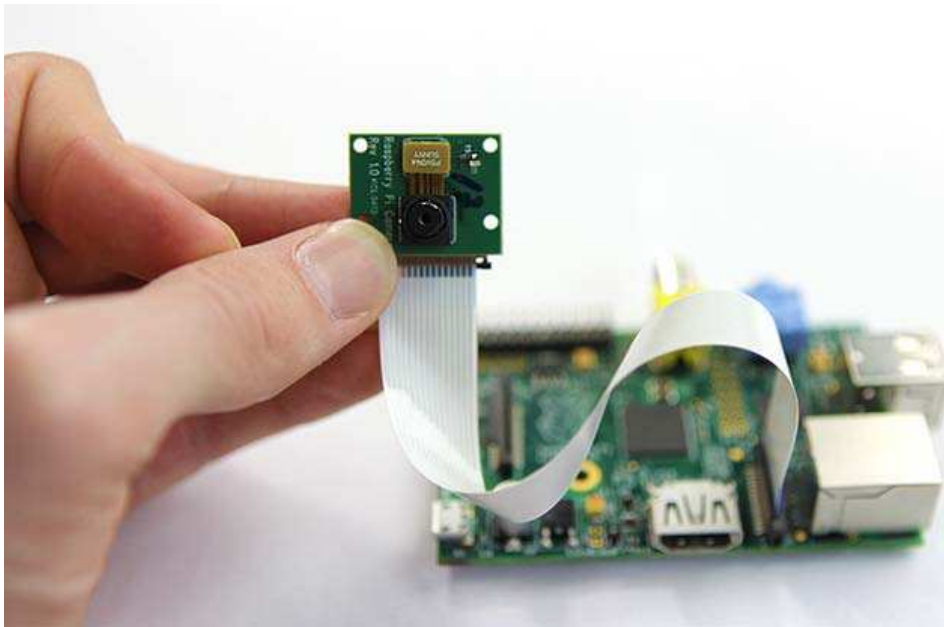# Unofficial guide to getting up and running with the Raspberry Pi Camera

Andy Laing is a committed Raspberry Pi *pi-oneer* at element14 and these notes are intended to help users get the Raspberry Pi camera working on any Model A or Model B Raspberry Pi computer.

First, please download the latest Raspbian image (2013-02-09-wheezy-raspbian.img) and install it onto your SD card. Please ensure that your SD card is at least 4 GB in size.
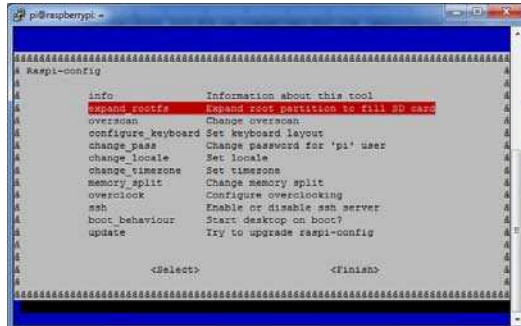
Then, connect the Camera module to the CSI port on the Raspberry Pi computer.
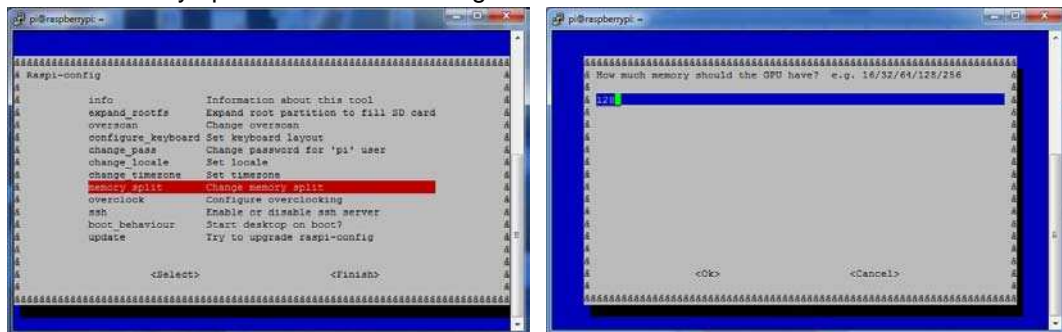
**Configure the Raspberry Pi computer**

On first boot, you will be presented with the 'raspi-config' menu. There are two options we need to set before we start installing the camera software:
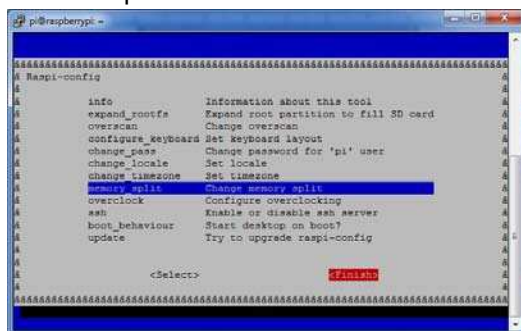
1. Expand the filesystem to fill the SD card



2. Set the memory split to allocate 128 Meg to the GPU



3. Once complete select **Finish** and then select **Yes** to reboot the Raspberry Pi computer
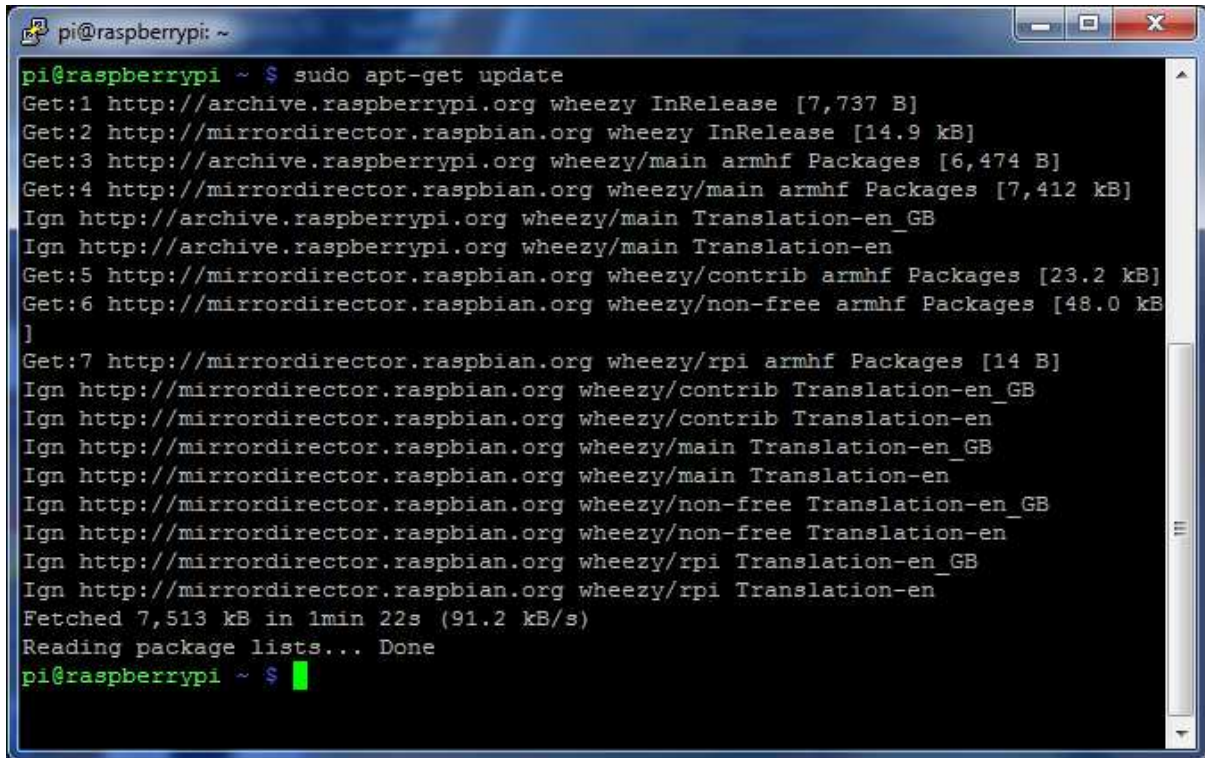


Once rebooted you can login to your Raspberry Pi using the following credentials

Username: pi

Password: raspberry
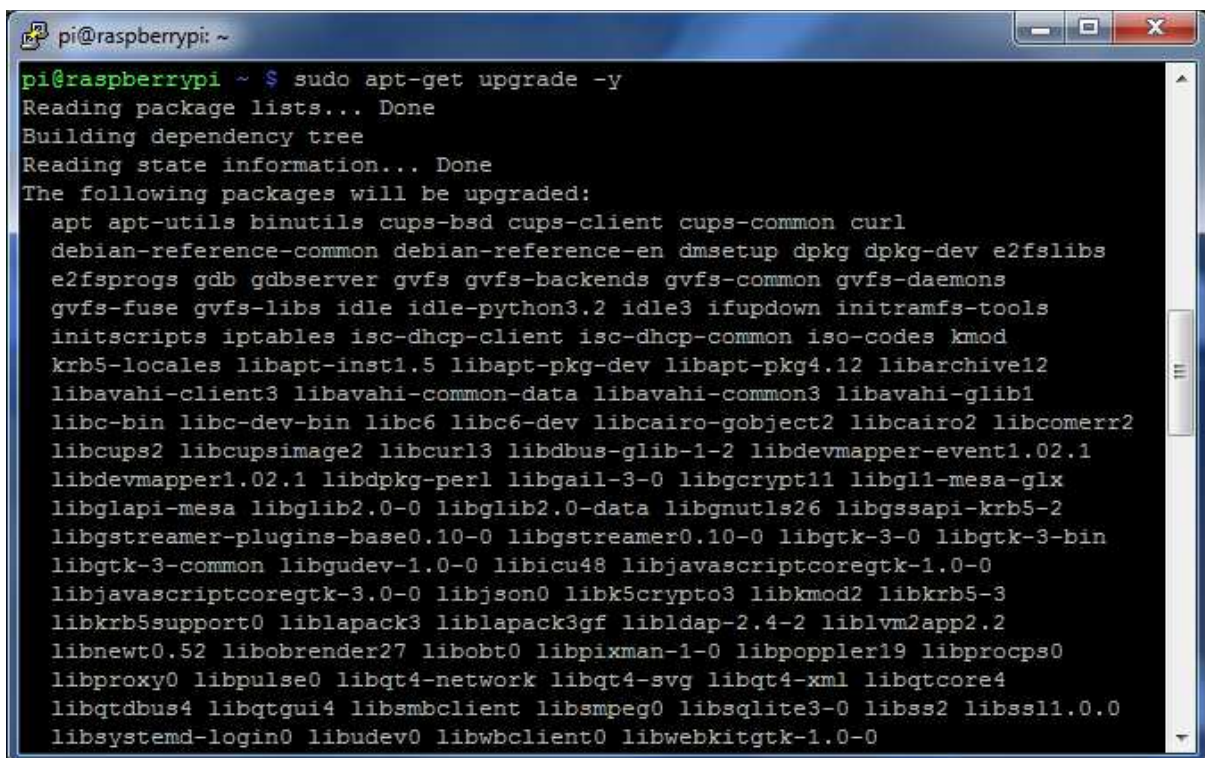
**Update the Operating System to the latest version**

pi@raspberrypi ~ $ sudo apt-get update

```
pi@raspberrypi ~ $ sudo apt-get update
Get:1 http://archive.raspberrypi.org wheezy InRelease [7,737 B]
Get:2 http://mirrordirector.raspbian.org wheezy InRelease [14.9 kB]
Get:3 http://archive.raspberrypi.org wheezy/main armhf Packages [6,474 B]
Get:4 http://mirrordirector.raspbian.org wheezy/main armhf Packages [7,412 kB]
Ign http://archive.raspberrypi.org wheezy/main Translation-en_GB
Ign http://archive.raspberrypi.org wheezy/main Translation-en
Get:5 http://mirrordirector.raspbian.org wheezy/contrib armhf Packages [23.2 kB]
Get:6 http://mirrordirector.raspbian.org wheezy/non-free armhf Packages [48.0 kB
]
Get:7 http://mirrordirector.raspbian.org wheezy/rpi armhf Packages [14 B]
Ign http://mirrordirector.raspbian.org wheezy/contrib Translation-en_GB
Ign http://mirrordirector.raspbian.org wheezy/contrib Translation-en
Ign http://mirrordirector.raspbian.org wheezy/main Translation-en_GB
Ign http://mirrordirector.raspbian.org wheezy/main Translation-en
Ign http://mirrordirector.raspbian.org wheezy/non-free Translation-en_GB
Ign http://mirrordirector.raspbian.org wheezy/non-free Translation-en
Ign http://mirrordirector.raspbian.org wheezy/rpi Translation-en_GB
Ign http://mirrordirector.raspbian.org wheezy/rpi Translation-en
Fetched 7,513 kB in 1min 22s (91.2 kB/s)
Reading package lists... Done
pi@raspberrypi ~ $
```

pi@raspberrypi ~ $ sudo apt-get upgrade -y
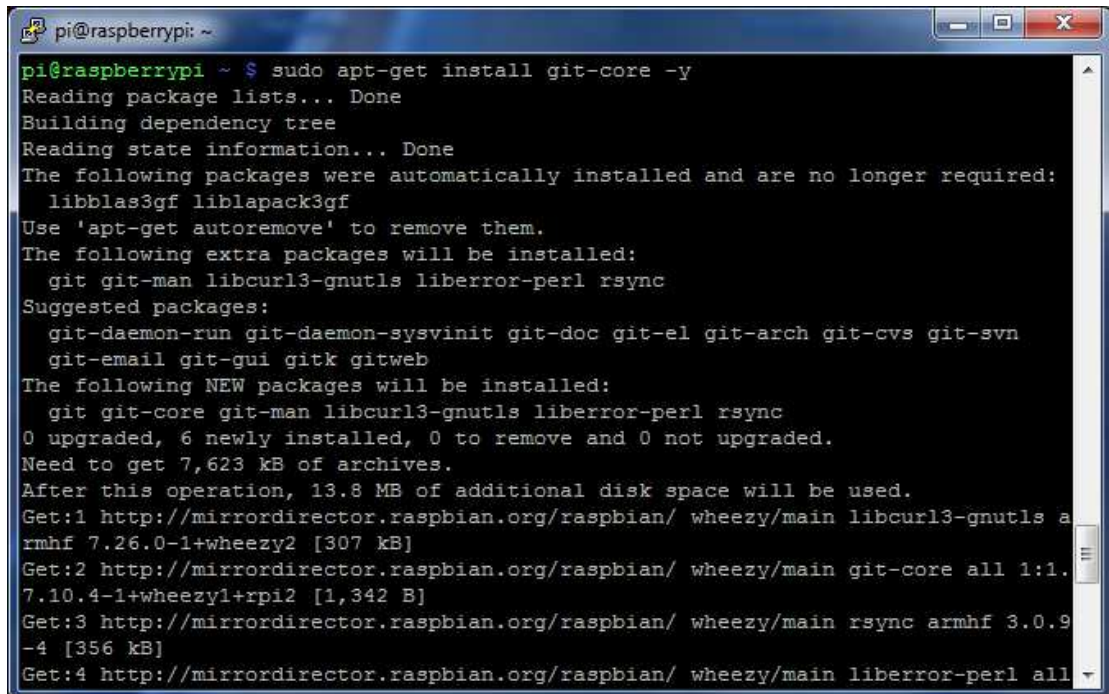(This update will take several minutes to complete)

```
pi@raspberrypi ~ $ sudo apt-get upgrade -y
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages will be upgraded:
  apt apt-utils binutils cups-bsd cups-client cups-common curl
  debian-reference-common debian-reference-en dmsetup dpkg dpkg-dev e2fslibs
  e2fsprogs gdb gdbserver gvfs gvfs-backends gvfs-common gvfs-daemons
  gvfs-fuse gvfs-libs idle idle-python3.2 idle3 ifupdown initramfs-tools
  initscripts iptables isc-dhcp-client isc-dhcp-common iso-codes kmod
  krb5-locales libapt-inst1.5 libapt-pkg-dev libapt-pkg4.12 libarchive12
  libavahi-client3 libavahi-common-data libavahi-common3 libavahi-glib1
  libc-bin libc-dev-bin libc6 libc6-dev libcairo-gobject2 libcairo2 libcomerr2
  libcups2 libcupsimage2 libcurl3 libdbus-glib-1-2 libdevmapper-event1.02.1
  libdevmapper1.02.1 libdpkg-perl libgail-3-0 libgcrypt11 libgl1-mesa-glx
  libglapi-mesa libglib2.0-0 libglib2.0-data libgnutls26 libgssapi-krb5-2
  libgstreamer-plugins-base0.10-0 libgstreamer0.10-0 libgtk-3-0 libgtk-3-bin
  libgtk-3-common libgudev-1.0-0 libicu48 libjavascriptcoregtk-1.0-0
  libjavascriptcoregtk-3.0-0 libjson0 libk5crypto3 libkmod2 libkrb5-3
  libkrb5support0 liblapack3 liblapack3gf libldap-2.4-2 liblvm2app2.2
  libnewt0.52 libobrender27 libobt0 libpixman-1-0 libpoppler19 libprocps0
  libproxy0 libpulse0 libqt4-network libqt4-svg libqt4-xml libqtcore4
  libqtdbus4 libqtgui4 libsmbclient libsmpeg0 libsqlite3-0 libss2 libssl1.0.0
  libsystemd-login0 libudev0 libwbclient0 libwebkitgtk-1.0-0
```

**Updating the firmware on the Raspberry Pi**

Updating the firmware on your Raspberry Pi computer will install all of the drivers necessary to run the camera module.

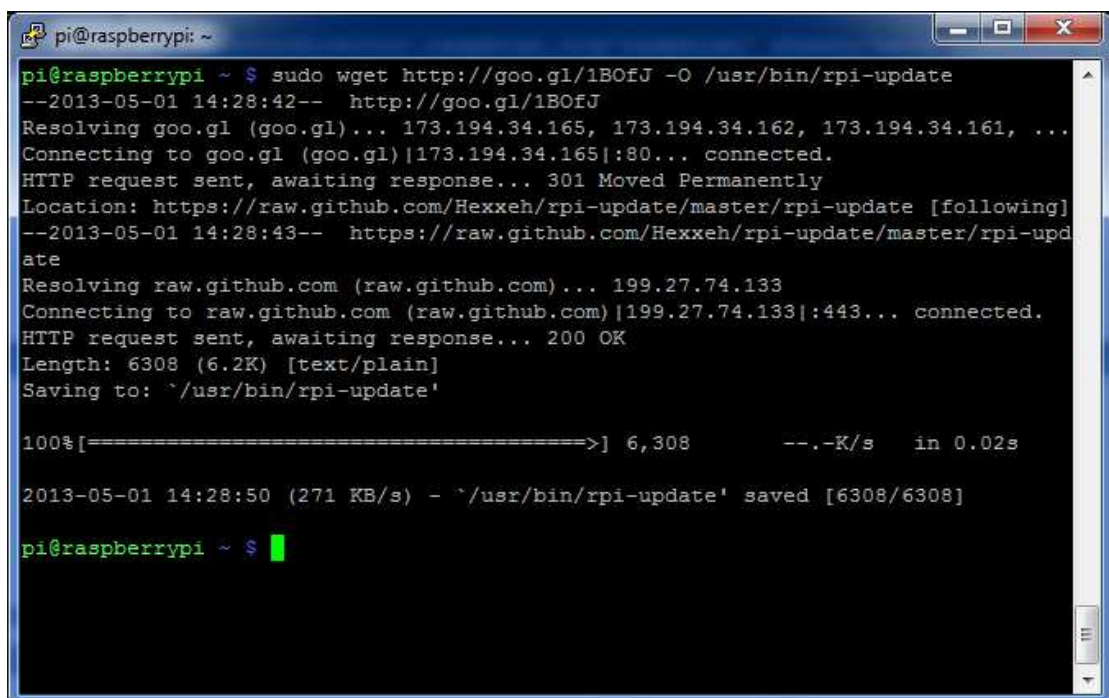1. Installing the git-core package
   pi@raspberrypi ~ $ sudo apt-get install git-core -y

```
pi@raspberrypi: ~
pi@raspberrypi ~ $ sudo apt-get install git-core -y
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libblas3gf liblapack3gf
Use 'apt-get autoremove' to remove them.
The following extra packages will be installed:
  git git-man libcurl3-gnutls liberror-perl rsync
Suggested packages:
  git-daemon-run git-daemon-sysvinit git-doc git-el git-arch git-cvs git-svn
  git-email git-gui gitk gitweb
The following NEW packages will be installed:
  git git-core git-man libcurl3-gnutls liberror-perl rsync
0 upgraded, 6 newly installed, 0 to remove and 0 not upgraded.
Need to get 7,623 kB of archives.
After this operation, 13.8 MB of additional disk space will be used.
Get:1 http://mirrordirector.raspbian.org/raspbian/ wheezy/main libcurl3-gnutls a
rmhf 7.26.0-1+wheezy2 [307 kB]
Get:2 http://mirrordirector.raspbian.org/raspbian/ wheezy/main git-core all 1:1.
7.10.4-1+wheezy1+rpi2 [1,342 B]
Get:3 http://mirrordirector.raspbian.org/raspbian/ wheezy/main rsync armhf 3.0.9
-4 [356 kB]
Get:4 http://mirrordirector.raspbian.org/raspbian/ wheezy/main liberror-perl all
```

2. Download the 'rpi-update' script
   pi@raspberrypi ~ $ sudo wget http://goo.gl/1BOfJ -O /usr/bin/rpi-update
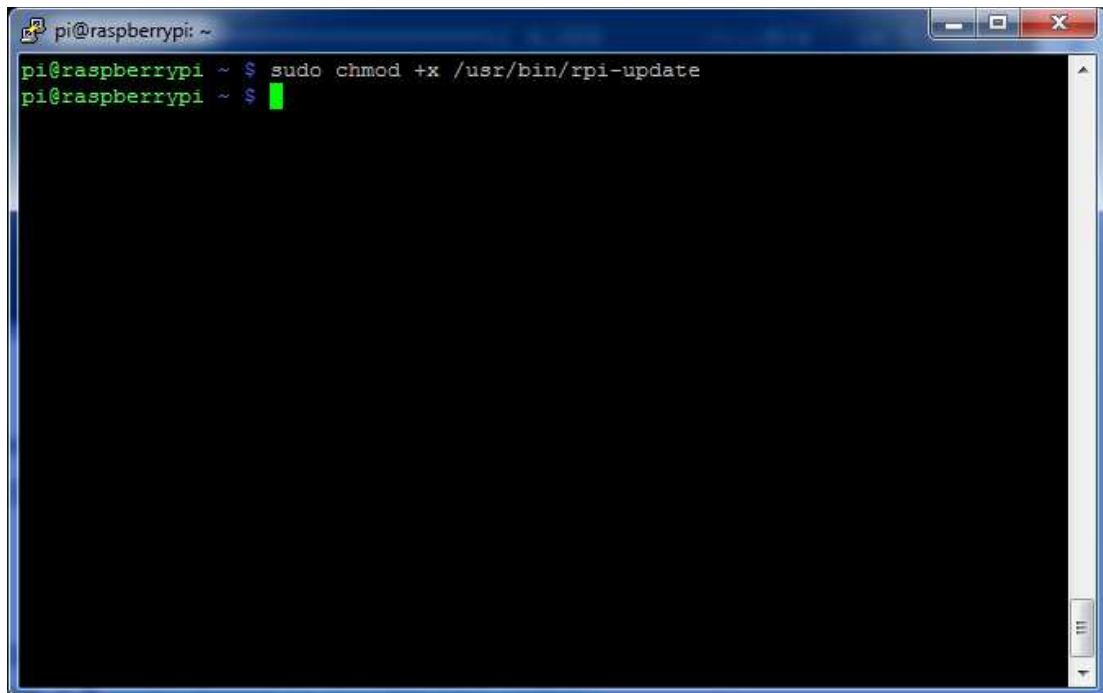
```
pi@raspberrypi: ~
pi@raspberrypi ~ $ sudo wget http://goo.gl/1BOfJ -O /usr/bin/rpi-update
--2013-05-01 14:28:42--  http://goo.gl/1BOfJ
Resolving goo.gl (goo.gl)... 173.194.34.165, 173.194.34.162, 173.194.34.161, ...
Connecting to goo.gl (goo.gl)|173.194.34.165|:80... connected.
HTTP request sent, awaiting response... 301 Moved Permanently
Location: https://raw.github.com/Hexxeh/rpi-update/master/rpi-update [following]
--2013-05-01 14:28:43--  https://raw.github.com/Hexxeh/rpi-update/master/rpi-upd
ate
Resolving raw.github.com (raw.github.com)... 199.27.74.133
Connecting to raw.github.com (raw.github.com)|199.27.74.133|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 6308 (6.2K) [text/plain]
Saving to: `/usr/bin/rpi-update'

100%[====================================>] 6,308       --.-K/s   in 0.02s

2013-05-01 14:28:50 (271 KB/s) - `/usr/bin/rpi-update' saved [6308/6308]

pi@raspberrypi ~ $
```
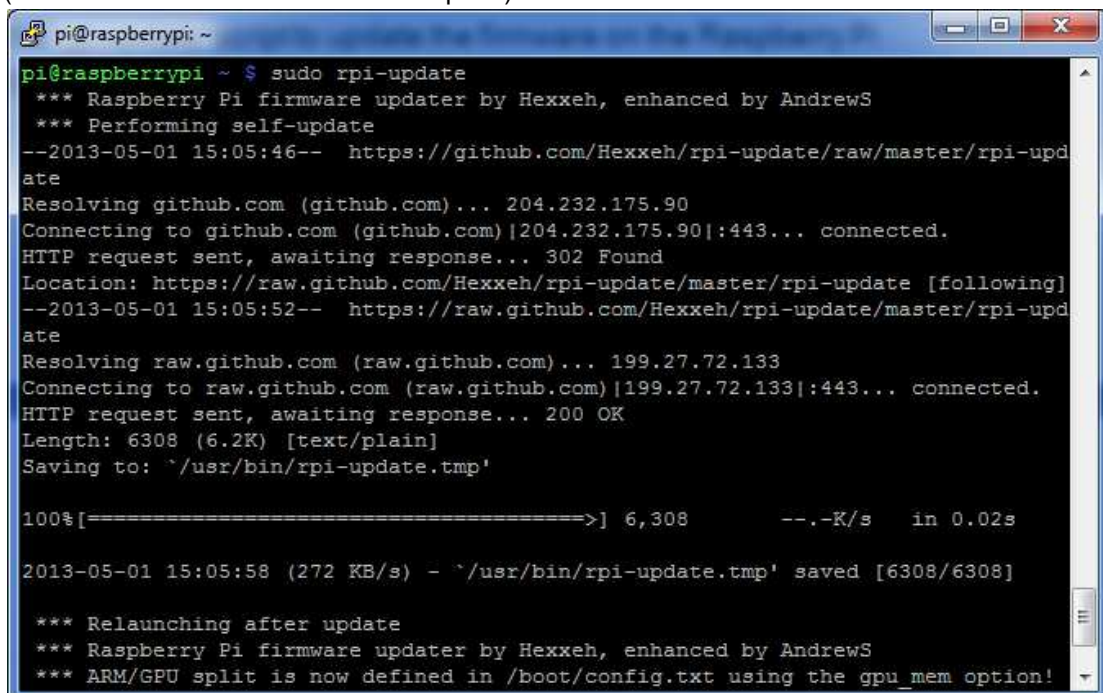
3. Change the permissions in the 'rpi-update' script so we can run it
   pi@raspberrypi ~ $ sudo chmod +x /usr/bin/rpi-update



4. Execute the 'rpi-update' script to update the firmware on the Raspberry Pi
   pi@raspberrypi ~ $ sudo rpi-update
   (This will take several minutes to complete)

**Update the boot configuration file**

Edit the /boot/config.txt boot file to add in the following two lines at the bottom of the file:

start_file=start_x.elf
fixup_file=fixup_x.dat

Also make sure that the following line is present within the file (This line was added when the GPU memory allocation was set to 128 meg). If it is not then add the following line at the bottom of the file:
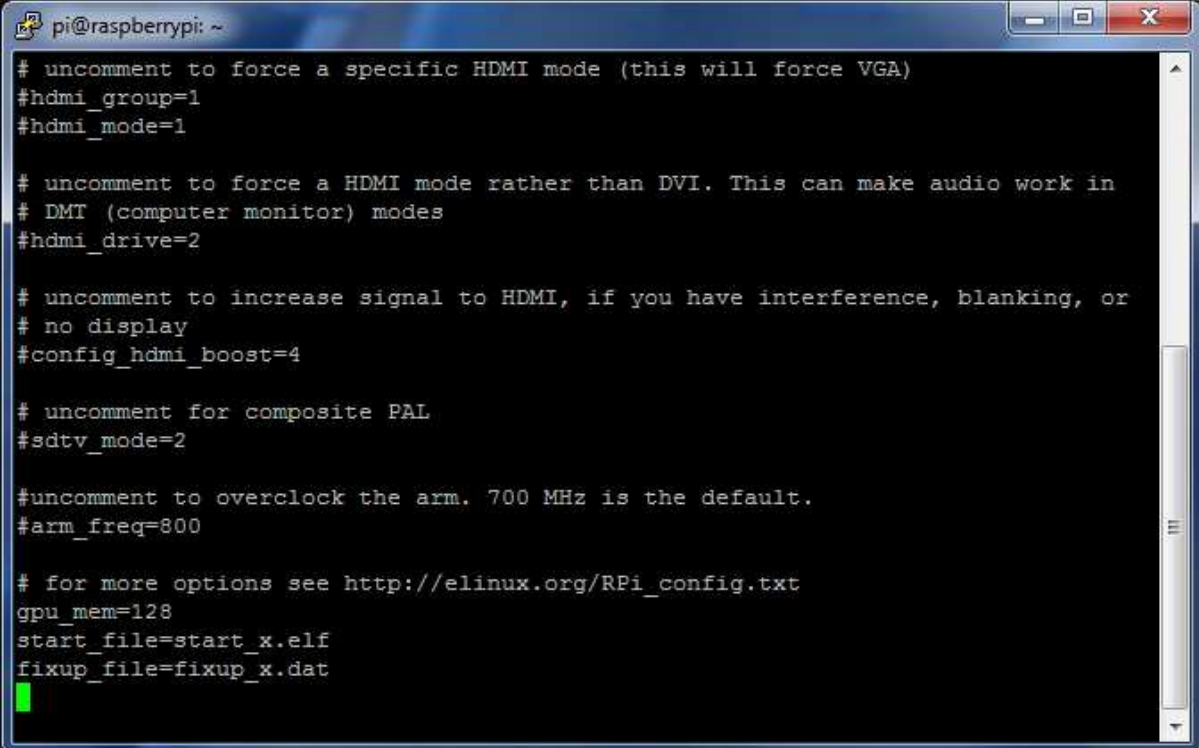
gpu_mem=128

You can edit this file on the Raspberry Pi using one of the following commands:

pi@raspberrypi ~ $ sudo vi /boot.config.txt

or

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



Setup for the camera software should now be complete. You can reboot your Raspberry Pi computer using:

pi@raspberrypi ~ $ sudo reboot

**Using the camera software**

Once your Raspberry Pi computer has rebooted, you can login again and run the camera software to take photographs or record video.

1. Online help (gives you all of the command-line options available)
   pi@raspberrypi ~ $ /opt/vc/bin/raspicam

2. Taking a simple photograph
   pi@raspberrypi ~ $ /opt/vc/bin/raspicam –o file.jpg

3. Recording a simple video
   pi@raspberrypi ~ $ /opt/vc/bin/raspivid –o file.h264

   **Please note that when recording video the camera module will not record any sound – this unit will only capture HD video images only.**

4. Taking some time lapsed images (in this case the images are 30ms apart)
   pi@raspberrypi ~ $ /opt/vc/bin/raspicam –tl 30 –o file%d.jpg
   Note the filename – the %d will be replaced with an integer (creating file1.jpg, file2.jpg etc).
   This software will continue taking images until you press 'CTRL-C' to terminate the program.

5. Using the image effects when taking photographs or capturing video
   This command will take a picture in 'negative'
   pi@raspberrypi ~ $ /opt/vc/bin/raspicam –ifx negative –o negative_image.jpg

   For a full list of image effects when taking photographs type:
   pi@raspberrypi ~ $ /opt/vc/bin/raspicam
   To read the help screen and all available command line options.

   For a full list of image effects when recording video type:
   pi@raspberrypi ~ $ /opt/vc/bin/raspivid
   To read the help screen and all available command line options.