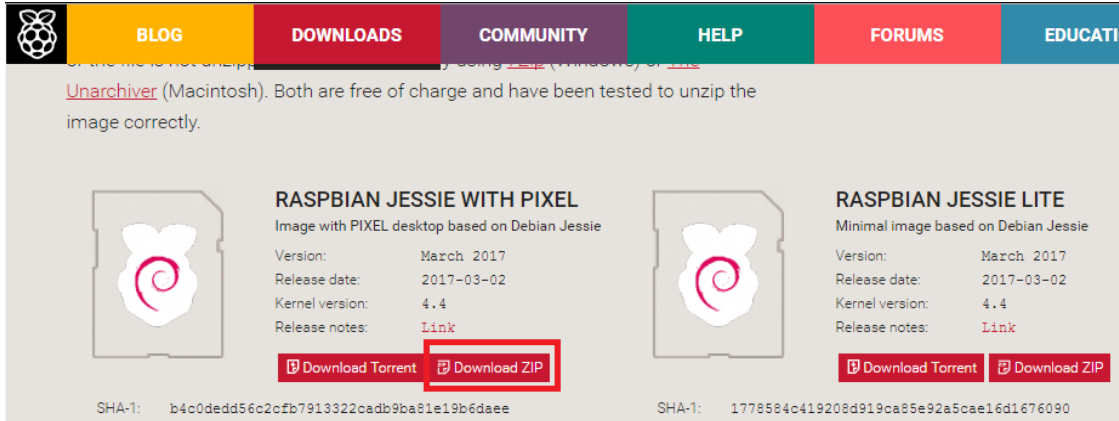


Berry Pi TIS camera installation teaching

1. Download Berry Pi software

<https://www.raspberrypi.org/downloads/raspbian/>



2. Download Win32 Disk Imager Berry Pi's img file burned

into the SD card

<https://sourceforge.net/projects/win32diskimager/files/Archive/>



3. Dependencies

```
# Build dependencies
```

0. sudo apt-get update
- I. sudo apt-get install git g++ cmake pkg-config libudev-dev libudev1 libtinyxml-dev libgstreamer1.0-dev libgstreamer-plugins-base1.0-dev libglib2.0-dev libgirepository1.0-dev libusb-1.0-0-dev libzip-dev uvcdynctrl

```
pi@raspberrypi:~$ sudo apt-get install git g++ cmake pkg-config libudev-dev libudev1 libtinyxml-dev libgstreamer1.0-dev libgstreamer-plugins-base1.0-dev libglib2.0-dev libgirepository1.0-dev libusb-1.0-0-dev libzip-dev uvcdynctrl
```

```
# Runtime dependencies
```

- II. sudo apt-get install gstreamer1.0-tools gstreamer1.0-x gstreamer1.0-plugins-base gstreamer1.0-plugins-good gstreamer1.0-plugins-bad gstreamer1.0-plugins-ugly

```
pi@raspberrypi:~$ sudo apt-get install gstreamer1.0-tools gstreamer1.0-x gstreamer1.0-plugins-base gstreamer1.0-plugins-good gstreamer1.0-plugins-bad gstreamer1.0-plugins-ugly
Reading package lists... Done
```

4. Install tiscamera

- I. git clone <https://github.com/TheImagingSource/tiscamera.git>
- II. cd tiscamera
- III. mkdir build
- IV. cd build
- V. cmake -DBUILD_ARAVIS=OFF -DBUILD_GST_1_0=ON -DBUILD_TOOLS=ON -DBUILD_V4L2=ON -DCMAKE_INSTALL_PREFIX=/usr ..

```
pi@raspberrypi:~$ git clone https://github.com/TheImagingSource/tiscamera.git
Cloning into 'tiscamera'...
remote: Counting objects: 7940, done.
remote: Compressing objects: 100% (12/12), done.
remote: Total 7940 (delta 1), reused 0 (delta 0), pack-reused 7928
Receiving objects: 100% (7940/7940), 1.97 MiB | 926.00 KiB/s, done.
Resolving deltas: 100% (5454/5454), done.
Checking connectivity... done.
pi@raspberrypi:~$ cd tiscamera
pi@raspberrypi:~/tiscamera$ mkdir build
pi@raspberrypi:~/tiscamera$ cd build
pi@raspberrypi:~/tiscamera/build$ cmake -DBUILD_ARAVIS=OFF -DBUILD_GST_1_0=ON -DBUILD_TOOLS=ON -DBUILD_V4L2=ON -DCMAKE_INSTALL_PREFIX=/usr ..
```

VI. make

```
pi@raspberrypi:~/tiscamera/build $ make
Scanning dependencies of target tcam-dfk73
[ 1%] Building C object src/CMakeFiles/tcam-dfk73.dir/dfk73.c.o
[ 2%] Linking C shared library libtcam-dfk73.so
[ 2%] Built target tcam-dfk73
Scanning dependencies of target tcam-v4l2
[ 3%] Building CXX object src/CMakeFiles/tcam-v4l2.dir/format.cpp.o
:
[ 98%] Linking CXX executable firmware-update
[ 98%] Built target firmware-update
Scanning dependencies of target dfk73udev
[ 99%] Building C object tools/dfk73udev/CMakeFiles/dfk73udev.dir/dfk73udev.c.o
[100%] Linking C executable dfk73udev
[100%] Built target dfk73udev
pi@raspberrypi:~/tiscamera/build $
```

VII. sudo make install

```
pi@raspberrypi:~/tiscamera/build $ sudo make install
[ 2%] Built target tcam-dfk73
[ 16%] Built target tcam-v4l2
[ 37%] Built target tcam
[ 39%] Built target tcamprop
[ 41%] Built target create_gobject
[ 46%] Built target tcam-algorithms
[ 48%] Built target gsttcamsrc
[ 50%] Built target gsttcamwhitebalance
[ 52%] Built target gsttcamautofocus
[ 54%] Built target gsttcambin
[ 55%] Built target gsttcamautoexposure
[ 60%] Built target tcam-ctrl
[ 89%] Built target 33update
[ 98%] Built target firmware-update
[100%] Built target dfk73udev
Install the project...
-- Install configuration: ""
-- Installing: /usr/lib/tcam-0/libtcam-v4l2.so.0.8.0
```

OURCE
ON STANDARDS

5. tiscamera tools

I. `tcam-ctrl -l`

Check the connected camera serial number

II. `tcam-ctrl -c <serial>`

Confirm the FPS of the camera with the output format and resolution

```
pi@raspberrypi:~$ tcam-ctrl -c 11619902
Available gstreamer-1.0 caps:
video/x-bayer, format=(string)rggb, width=2592, height=1944, fps={ 8.000000 7.000000 6.000000 5.000000
0 4.000000 3.000000 }
video/x-bayer, format=(string)rggb, width=2560, height=1920, fps={ 8.000000 7.000000 6.000000 5.000000
0 4.000000 3.000000 }
video/x-bayer, format=(string)rggb, width=1920, height=1080, fps={ 20.000000 10.000000 7.000000 5.000000
000 }
video/x-bayer, format=(string)rggb, width=1280, height=960, fps={ 30.000000 20.000000 15.000000 10.000000
0000 }
video/x-bayer, format=(string)rggb, width=1280, height=720, fps={ 40.000000 30.000000 20.000000 10.000000
0000 }
video/x-bayer, format=(string)rggb, width=1024, height=768, fps={ 40.000000 30.000000 20.000000 10.000000
0000 }
video/x-bayer, format=(string)rggb, width=640, height=480, fps={ 120.000000 90.000000 60.000000 30.000000
0000 15.000000 10.000000 }
```

RGB

```
gst-launch-1.0 tcambin serial=123456! video/x-raw,format=RGBx,width=1600,height=1200,framerate=15/1 ! videoconvert ! ximagesink
```

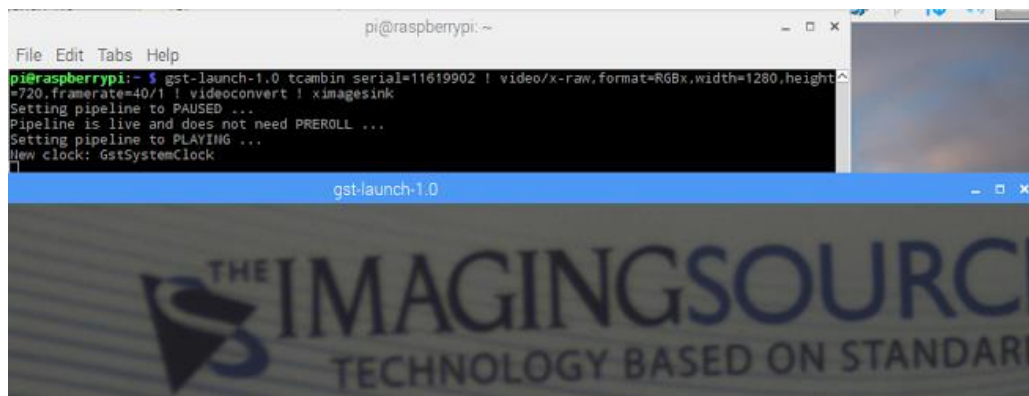
GRAY 8

```
gst-launch-1.0 tcambin serial=123456! video/x-raw,format=GRAY8,width=1600,height=1200,framerate=15/1 ! videoconvert ! ximagesink
```

GRAY 16

```
gst-launch-1.0 tcambin serial=123456! video/x-raw,format=GRAY16_LE,width=1600,height=1200,framerate=15/1 ! videoconvert ! ximagesink
```

Result:



6. Property setting

I. `tcam-ctrl -p <serial>`

```
pi@raspberrypi:~ $ tcam-ctrl -p 11619902
Found 15 propert(y/ies)
Brightness                (int) min=0 max=4095 step=1 default=-8193 value=168
Gain                      (int) min=4 max=63 step=1 default=57343 value=4
Exposure                  (int) min=50 max=30000000 step=1 default=33333 value=25000
Gain (dB/100)             (int) min=0 max=1197 step=1 default=0 value=0
Trigger Mode              (bool) default=true value=false
Software Trigger          (button)
Trigger Delay (us)        (int) min=0 max=10000000 step=10 default=0 value=4400
Strobe Enable             (bool) default=false value=false
Strobe Polarity           (bool) default=false value=false
Strobe Exposure           (bool) default=false value=false
GPOut                     (int) min=0 max=1 step=1 default=0 value=0
GPIO                     (int) min=0 max=1 step=1 default=0 value=0
Offset X                  (int) min=0 max=2336 step=2 default=0 value=16
Offset Y                  (int) min=0 max=1940 step=2 default=0 value=12
Offset Auto Center        (bool) default=true value=true
```

II. `tcam-ctrl -s <Property> <serial>`

```
pi@raspberrypi:~ $ tcam-ctrl -s Exposure=200 11619902
Found property!
```

Found property Indicates that the setting was successful



7. V4L2 Property Setting

I. V4l2-ctl - list-devices

Confirm the connected camera

```
pi@raspberrypi:~ $ v4l2-ctl --list-devices
DFM 27UP006-ML (usb-3f980000.usb-1.2):
    /dev/video1

DMx 72AUC02 (usb-3f980000.usb-1.3):
    /dev/video0
```

II. V4l2-ctl - d /dev/videoX

Specify the connected camera

III. V4l2-ctl - all

Check the camera information and property

IV. V4l2-ctl - d /dev/videoX -c <property name=value>

```
pi@raspberrypi:~ $ v4l2-ctl -d /dev/video1
pi@raspberrypi:~ $ v4l2-ctl --all
Driver Info (not using libv4l2):
  Driver name   : uvcvideo
  Card type     : DMx 72AUC02
  Bus info      : usb-3f980000.usb-1.3
  Driver version: 4.4.50
  Capabilities : 0x84200001
    Video Capture
    Streaming
    Extended Pix Format
    Device Capabilities
  Device Caps  : 0x04200001
    Video Capture
    Streaming
    Extended Pix Format
Priority: 2
Video input : 0 (Camera 1: ok)
Format Video Capture:
  Width/Height : 2592/1944
  Pixel Format  : 'GREY'
  Field        : None
  Bytes per Line: 2592
  Size Image   : 5038848
  Colospace    : Unknown (00000000)
  Flags        :
Crop Capability Video Capture:
  Bounds       : Left 0, Top 0, Width 2592, Height 1944
  Default      : Left 0, Top 0, Width 2592, Height 1944
  Pixel Aspect : 1/1
Selection: crop_default, Left 0, Top 0, Width 2592, Height 1944
Selection: crop_bounds, Left 0, Top 0, Width 2592, Height 1944
Streaming Parameters Video Capture:
  Capabilities : timeperframe
  Frames per second: 7,500 (15/2)
  Read buffers  : 0
  brightness (int) : min=0 max=255 step=1 default=-8193 value=12
  gain (int)       : min=4 max=63 step=1 default=57343 value=36
trigger_global_reset_shutter (bool) : default=0 value=0
  exposure_absolute (int) : min=1 max=300000 step=1 default=127 value=127
  focus_absolute (int)   : min=0 max=1000 step=1 default=57343 value=0
  privacy (bool)         : default=0 value=0
  trigger (bool)        : default=0 value=0
  software_trigger (button) :
  gainr (int)           : min=164 max=79 step=1 default=129 value=36
  gain (int)            : min=164 max=79 step=1 default=129 value=36
  gainb (int)           : min=164 max=79 step=1 default=129 value=36
  binning (int)         : min=127 max=79 step=1 default=129 value=1
  x_offset (int)        : min=0 max=1794 step=2 default=12287 value=0
  y_offset (int)        : min=0 max=1464 step=2 default=12287 value=0
  skipping (bool)       : default=0 value=0
  brightness (int)     : min=0 max=255 step=1 default=-8193 value=12
  gain (int)           : min=4 max=63 step=1 default=57343 value=36
pi@raspberrypi:~ $ v4l2-ctl -d /dev/video1 -c exposure_absolute=10
```

Note:

If you need to re-irrigation SD card, please refer to the following video connection

<https://www.youtube.com/watch?v=gtmwViQvS2U>

2. Open the command

3. Enter: diskpart

```
Microsoft Windows [版本 6.2.9200]
(c) 2012 Microsoft Corporation. 著作權所有，並保留一切權利。
C:\Users\Prs>diskpart
```

4. Enter : list disk

```
DISKPART> list disk

磁碟編號  ###  狀態          大小    可用    Dyn  Gpt
-----  -  -  -  -  -  -  -
磁碟編號  0  連線          238 GB   0 B
磁碟編號  1  連線          465 GB  1024 KB
磁碟編號  2  連線          61 GB   60 GB  *
```

5. Enter : select disk x (Choose your SD card field)

6. Enter : Clean

7. Go to Device Manager -> Disk Management -> Add a simple volume



8. After the completion of the SD card on the complete merger