

TARINA BUILD INSTRUCTIONS

Step by step build instructions for a 3D printable Raspberry Pi video camera. Now, this is still a work in progress and documentation is on its way, if you're in a hurry feel free to drop a message in #tarina:bennysmatrixchat.ddns.net



Figure 1: Tarina and Leon

Contents

1. Get the parts
2. 3d printing
3. Post processing
4. Wiring
5. Putting it together
6. Installing software
7. Tested lenses

Get the parts

Here is a list of parts that will work, there are other parts that probably will work but this is what I recommend.

Raspberry pi 3 B

Price ~30 eur

The heart of Tarina. Why Raspberry pi you ask? There are several reasons:

- Huge support.
- The great Debian based os Raspbian (beeing a debian nerd myself).
- Low price.
- Picamera.

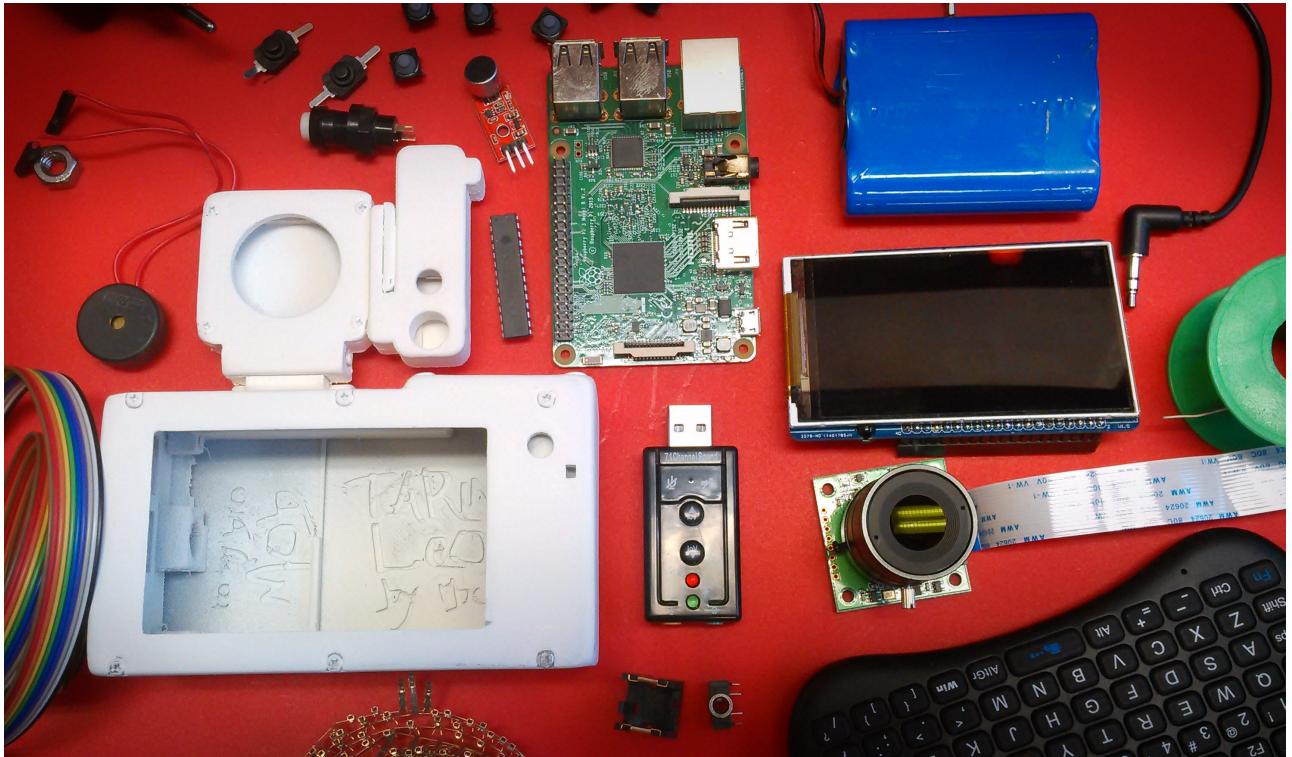


Figure 2: Tarina parts layed out

The 3B+ is too powerhungry for the Powerbooster 1000C thats why I went with 3B

[Links](#) Raspberry pi site [Buy](#) Aliexpress

Arducam 5 MP OV5647 camera module with CS lens

Price ~30 eur

This module and lens gives good hd video quality with the ability to manually focus and replace lenses. See tested lenses down below.

[Links](#) Arducam [Buy](#) ebay

Ugeek 3.5 inch 800x480 TFT Screen

Price ~35 eur

Best 3.5 inch screen that I could find. Features worth mentioning:

- 800x480 pixels
- Very responsible 11 ms.
- High contrast.
- Sunlight readable.
- I2C Master.

This is not a touchscreen but I dont think touchscreens are good for cameras anyway.

[Links](#) Raspberrypiwiki [Buy](#) Aliexpress

USB via vt1620a sound card

Price ~1 eur

Really cheap usb soundcard. It has been working suprisingly well. Have not tested other cards yet.

Buy Aliexpress

3.7v 7800mAh li-ion Battery

Price ~17 eur

I have tried several batteries, the adafruit 6800mAh is also fine.

Buy Aliexpress

Adafruit Powerboost 1000C

Price ~23 eur

This is the only power board that I could find with the feature to run the camera and charge it at the same time.

Links Adafruit **Buy** Ebay

8x8x5MM DIP-4 Silicone Switch Mute Silent button

Price ~2 eur/20 pcs

You can only buy a pack of 20 pcs but these buttons are good and silent! Not necessary if you want to control with keyboard like Rii mini 8+

Buy Ebay

MCP23017-E/SP DIP-28 16 bit I / O expander I2C

Price ~1 eur

This will be connected to the screen I2C port. This is not necessary if you intend to control the camera with a keyboard like the Rii mini i8+

Buy Aliexpress

2x8cm double side copper prototype pcb

Price ~0.20 eur/pcs

PCB board to solder all connections on the MCP23017-E/SP

Buy Aliexpress

Piezo electronic buzzer

Price ~1 eur

Very useful for timing shots!

Buy Aliexpress

Latching push button switch mini

Price ~1 eur/10 pcs

This serves as the microphone and screen on/off button

Buy Aliexpress

Latching push button switch 10mm

Price ~5 eur/24 pcs

I use this as the powerbutton. I have tried different versions of safe shutdown buttons for the Raspberry pi but they have not worked as I wanted (they draw power even when Pi is powered off, this is not good). I have solved the problem with a menu button to safely shut down the camera.

Buy Aliexpress

Nut 1/4 -20 UNC 304 A2

Price ~2 eur/10 pcs

This is the standard camera stand nuts. If you never use a stand then you dont need this.

Buy Ebay

MAX9812 Microphone amplifier

Price ~2 eur

This makes suprisingly good sounding sound!

Buy Aliexpress

3.5mm Female stereo headset interior PCB mount

Price ~1 eur/10 pcs

Microphone input.

Buy Ebay

LR44 Batteries

Price ~2 eur/10 pcs

Microphone batteries

Buy Aliexpress

Screws M3x12mm

Price ~2 eur/25 pcs

These hold the camera together.

Buy Your local harware store Motonet (store in Finland)

Screws 2.2x9.5mm

Price ~1 eur/20 pcs

These hold the camera/mic together.

Buy Your local hardware store Hobbycenter (store in Finland)

LR44 Button cell socket holder

Price ~1 eur/pcs

We only need the metal parts from these, if you have som thin metal you could cut these yourself.

Buy Aliexpress

3.5mm Jack to jack aux cable

Price ~1 eur

From microphone to mic-in.

Buy Aliexpress

Rii mini i8+ mini keyboard

Price ~17 eur

Wireless control over camera. You will also need this for wifi settings etc. (Recommended) This is one of the best mini keyboards I've tried.

Buy Aliexpress

Parts grand total ~200 eur

3d printing

While waiting for ordered parts lets 3d print the rest of the parts. I recommend printing with a solid 90% infill. Now it is pretty crucial that you have a good calibrated printer so that you don't over/under print. Some parts need to be very precise to work.

You'll find all the 3d parts in the 3d folder.

- body
- button-plate-bottom
- button-plate-upper
- hdmi-cap
- left-side
- mic-body
- mic-lid
- picamera-body
- picamera-body-lid
- picamera-bridge
- right-side
- screen-lid

Post processing

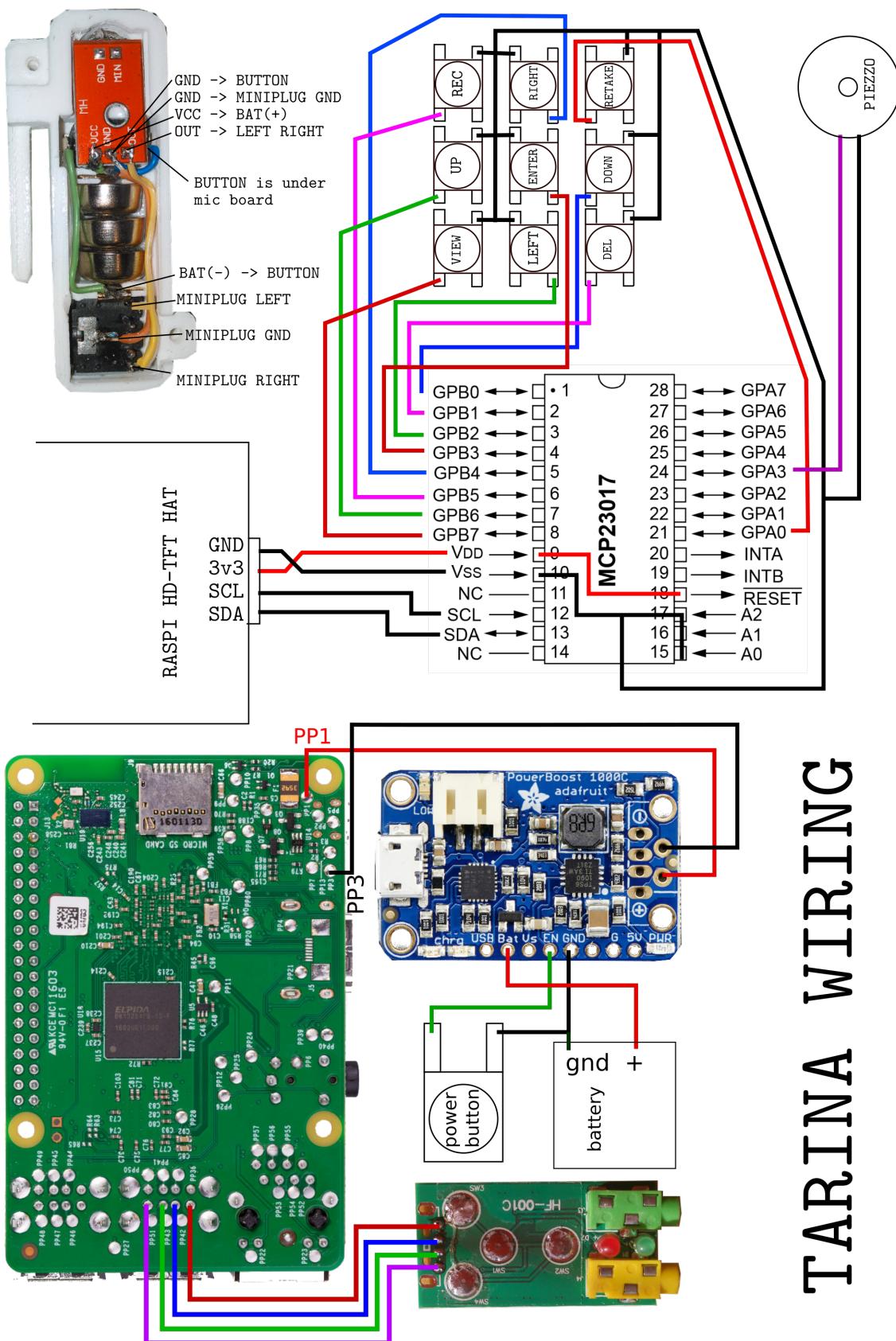
This is still a work in progress...

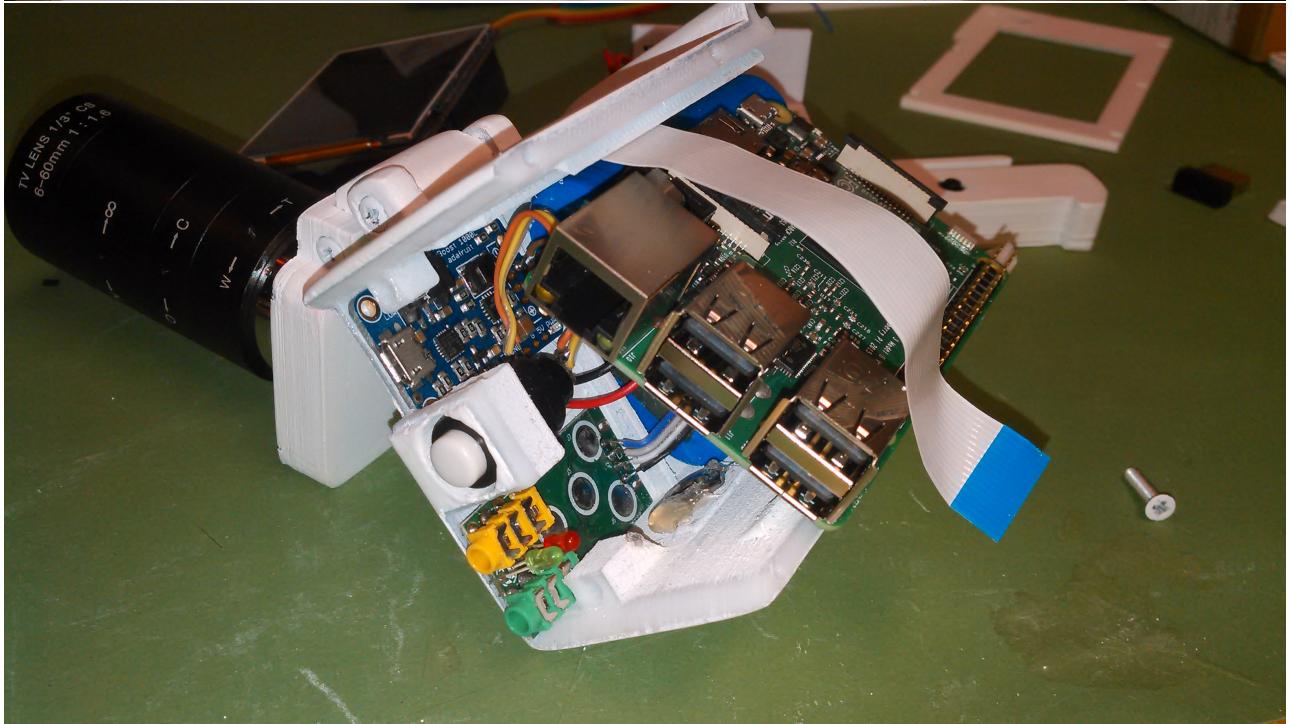
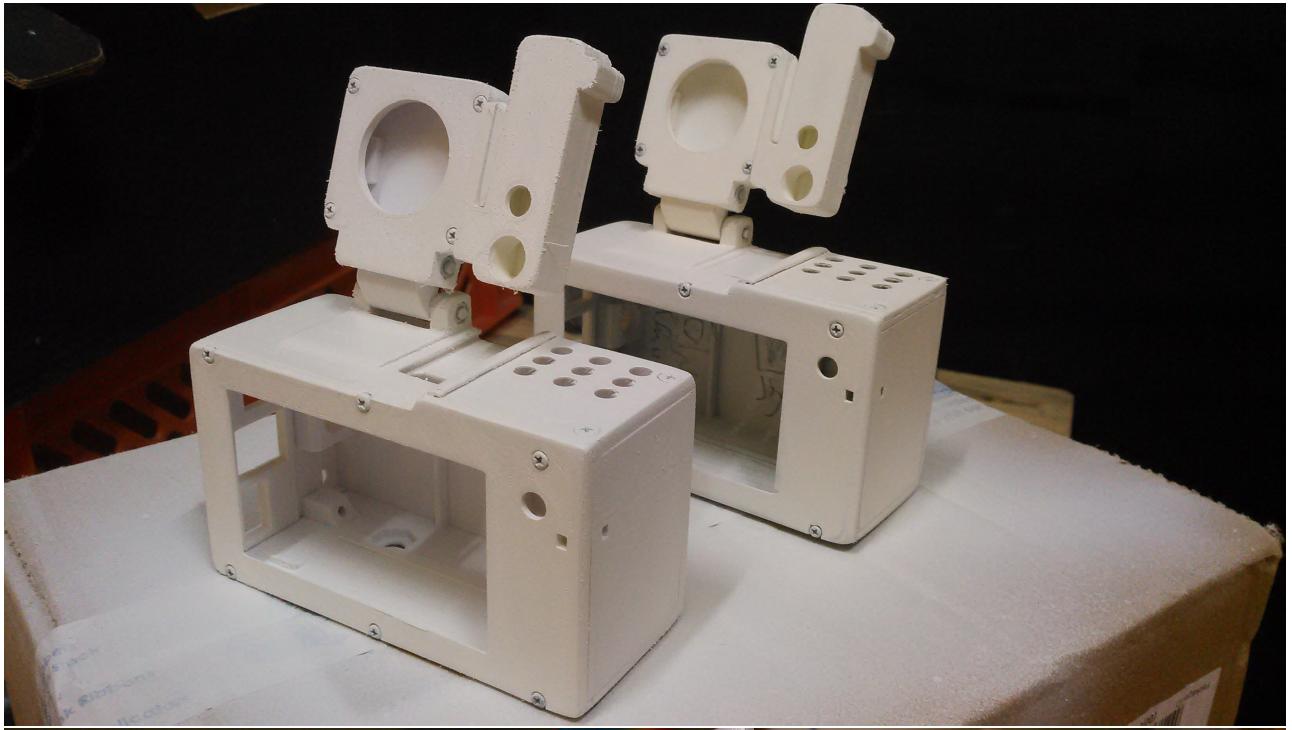
So far I've come to this conclusion:

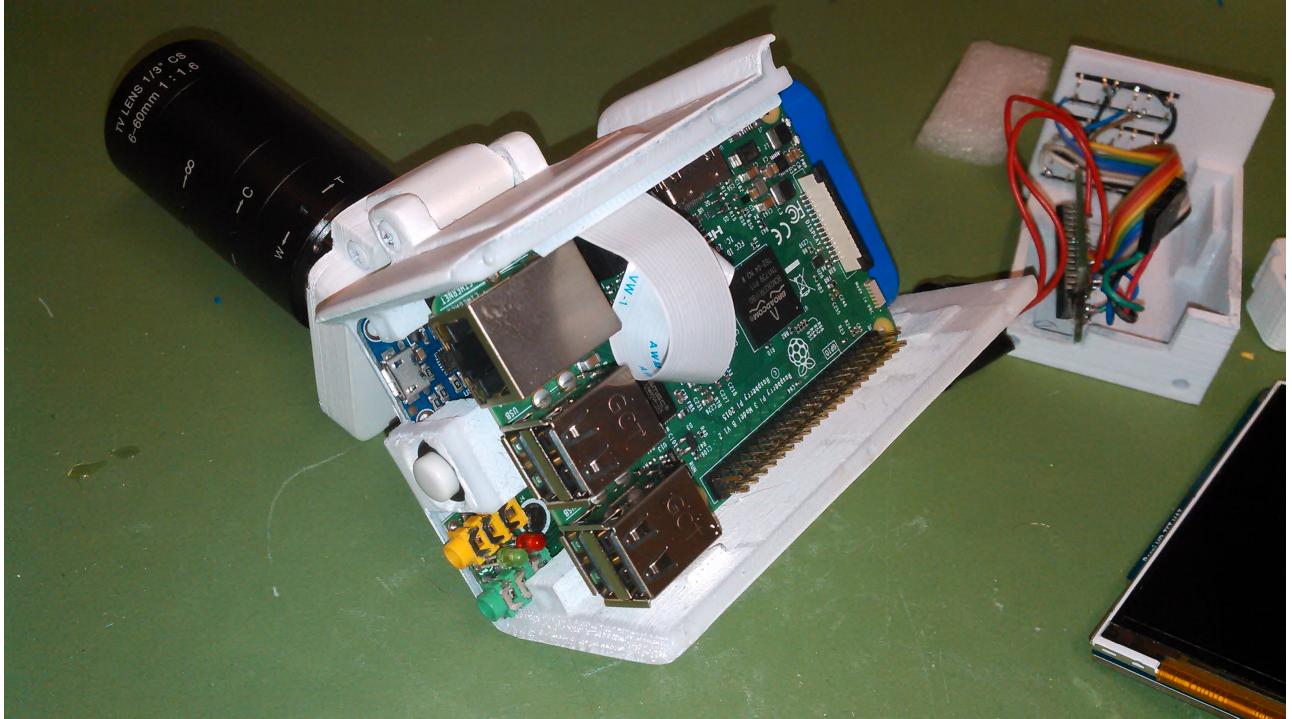
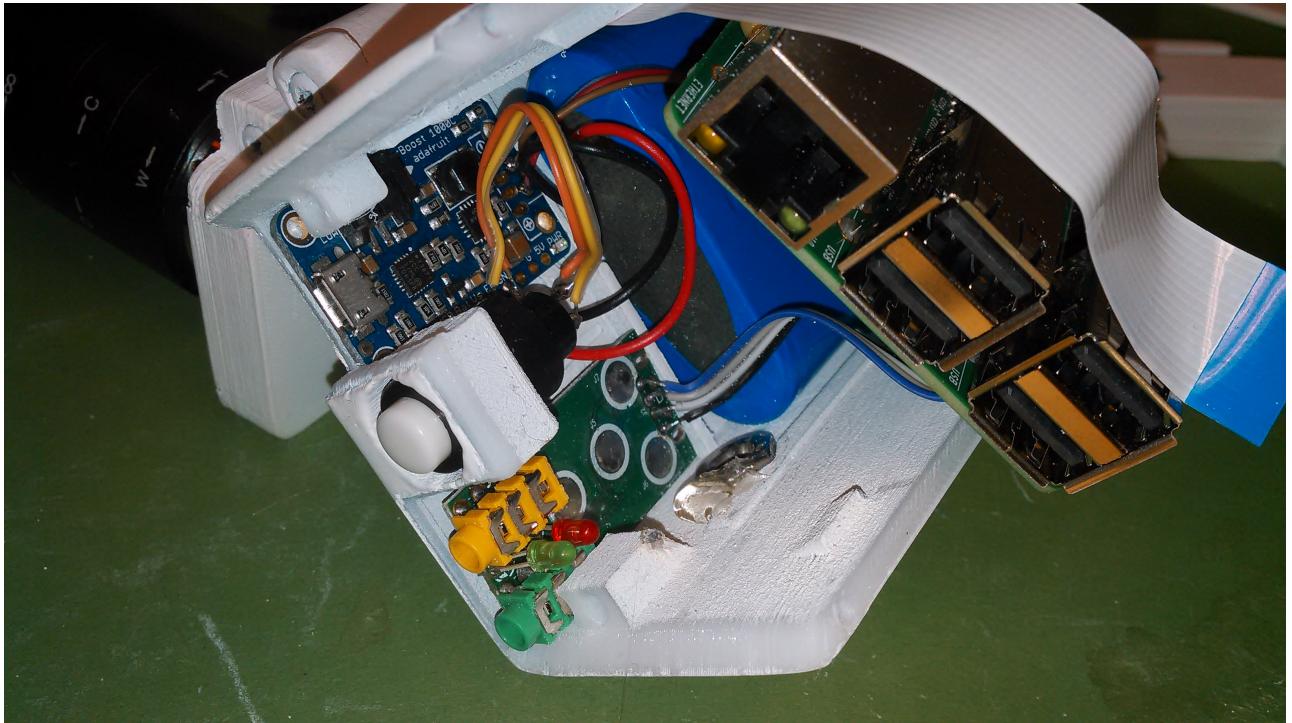
- Put 3d printed parts together with screws.
- Sand with sandpaper from rough to finest (from 120 to 400). I like to sand down all corners making them round.
- Dust off.
- Paint.
- Wait til dry.
- Paint again.

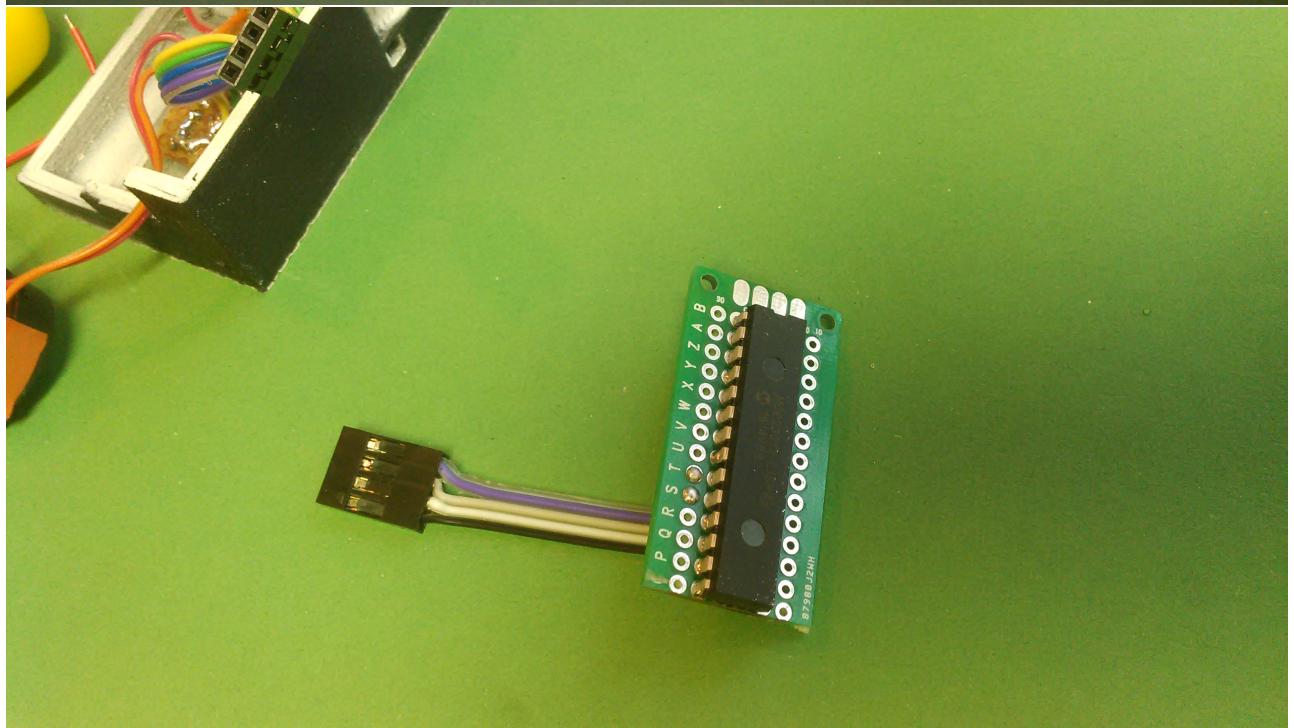
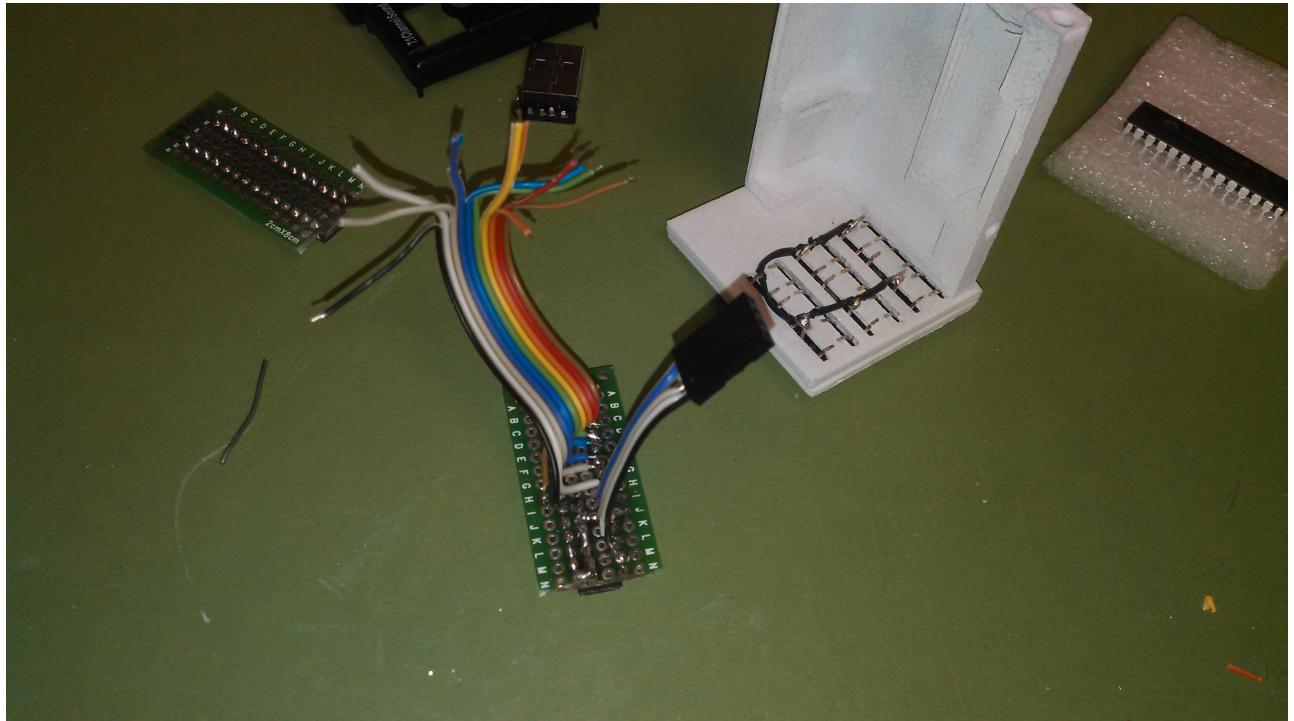
- Wait til dry. I like to wait for atleast a day to make it really dry.
- Sand again.
- Paint and wait again.
- Continue like this til you are satisfied with the feel, now I like to have a good grip so I finnish with sanding with 400 grit paper and leave it like that.

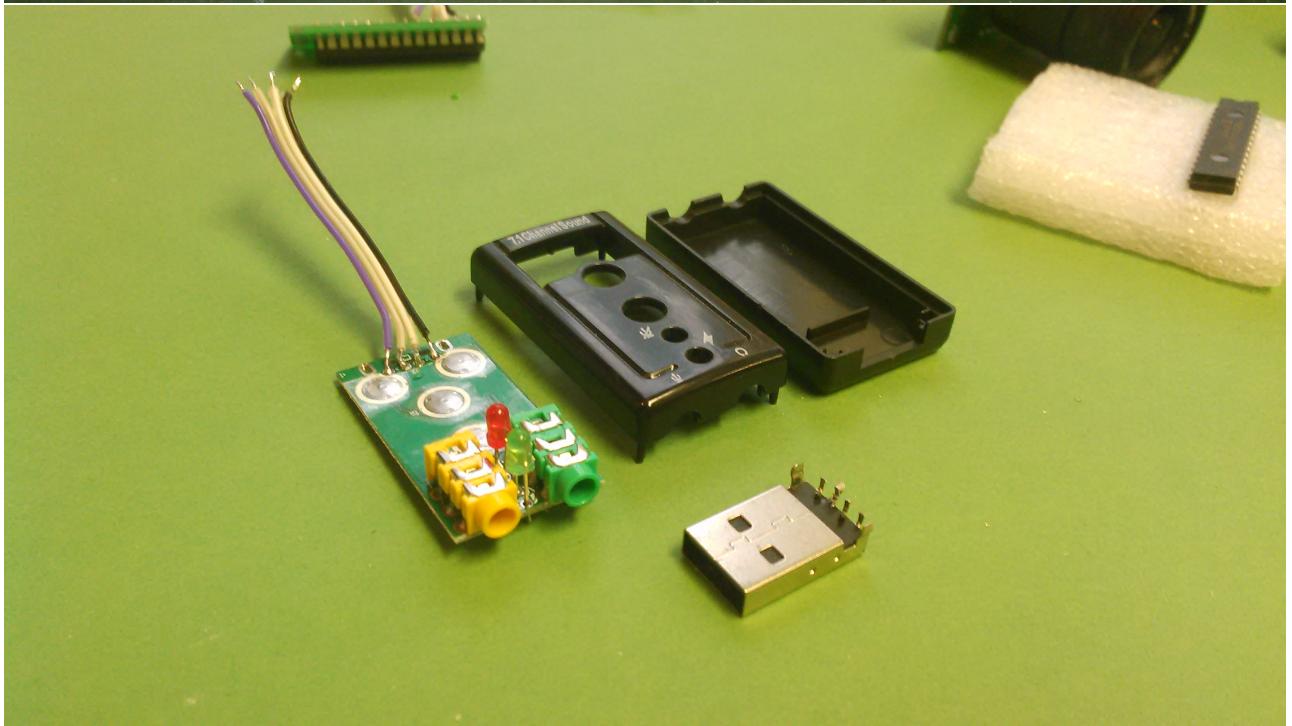
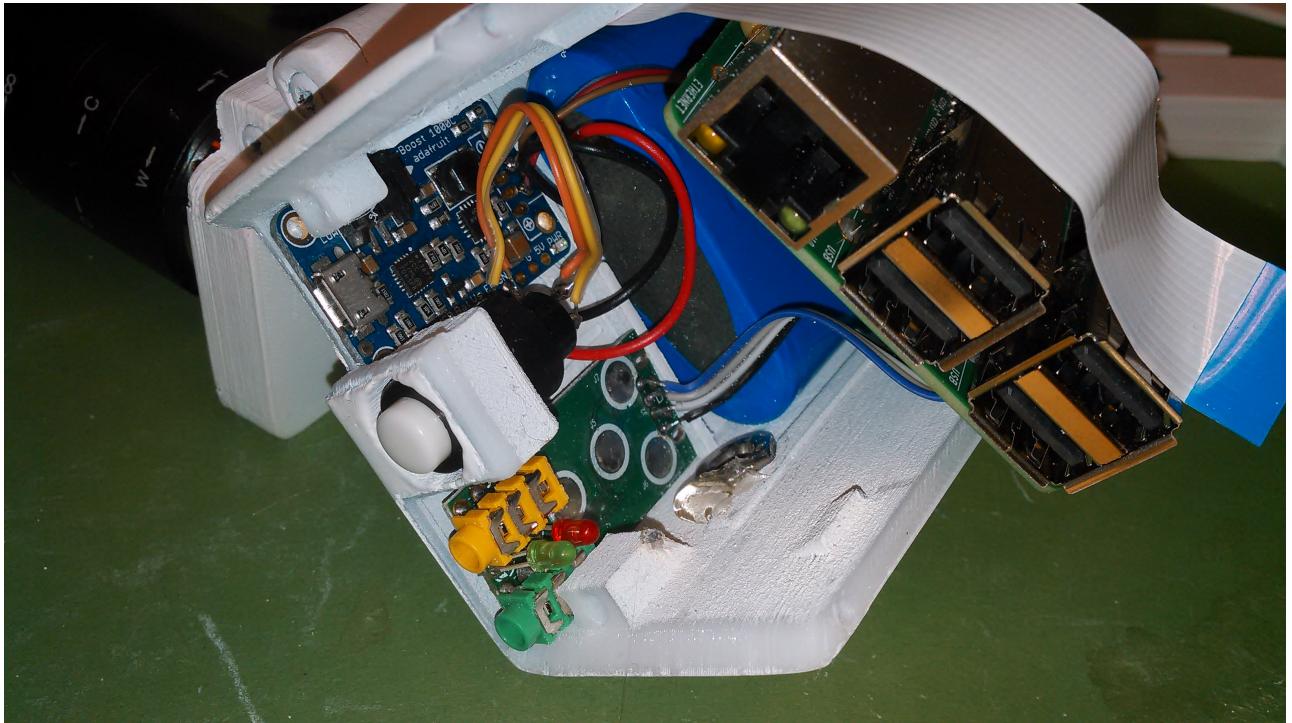
Wiring











Putting it together

Documentation on its way, if you're in a hurry feel free to drop a message in telegram

Installing software

Download latest Raspbian and follow install instructions. Ssh into Raspberry Pi and run:

```
sudo raspi-config
```

Expand file system, enable camera and then reboot. Run this to install git:

```
sudo apt-get install git
```

Git clone tarina and then run install script with sudo:

```
git clone https://github.com/rbckman/tarina.git  
cd tarina  
sudo ./install.sh
```

You're ready to rumble:

```
python tarina.py
```

Happy filming!



Figure 3: Should be looking like this once finished

Tested lenses

Here is what I'm testing right now.

Yumiki 6-60mm 1/3" CS Lens CCTV Lens IR F1.6 Manual Zoom Manual Iris

Aliexpress

Camera Lens 2.8-12mm Varifocal

This lens is good. Will write a longer review once I have more filming hours.

Aliexpress