

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

## Introduction

The UI in Tarina is design so that all settings is made visible and quickly accessible at all times and this is implemented with as few keys as possible.

Key pattern is as following.

(view) (up) (record)  
(left) (enter) (right)  
(remove) (down) (retake)

With keys up and down you change a specific setting for example shutter speed. With keys left and right you change what settings to change. With view, you can view the last shot or if you have a specific scene highlighted the camera would automatically glue all shots together and play that scene for you, same goes for film. With remove you can remove a specific take, shot, scene or film. With the retake button you retake a bad take, this is how the camera keeps track of your good takes. As of now the last take is always chosen.



Figure 2: Tarina UI

## 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.

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

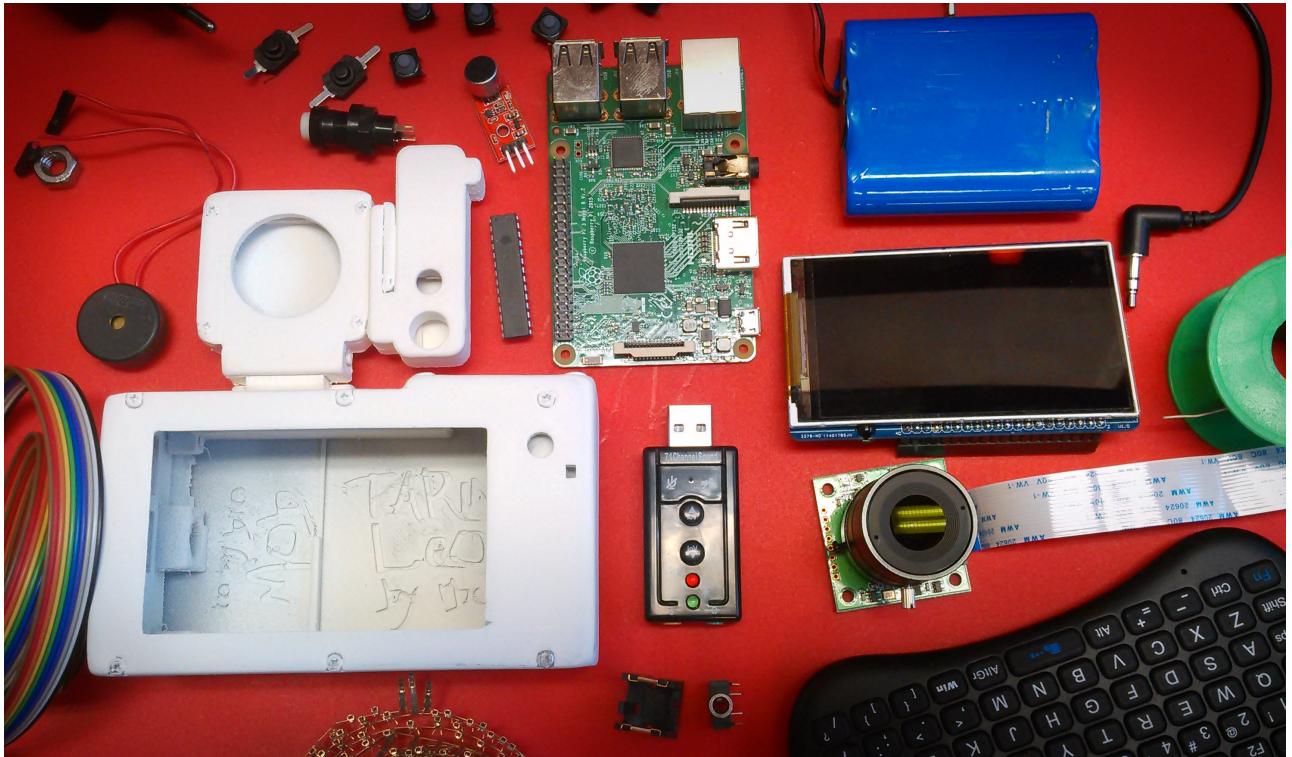


Figure 3: Tarina parts layed out

- 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 surprisingly 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 hardware 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 some 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

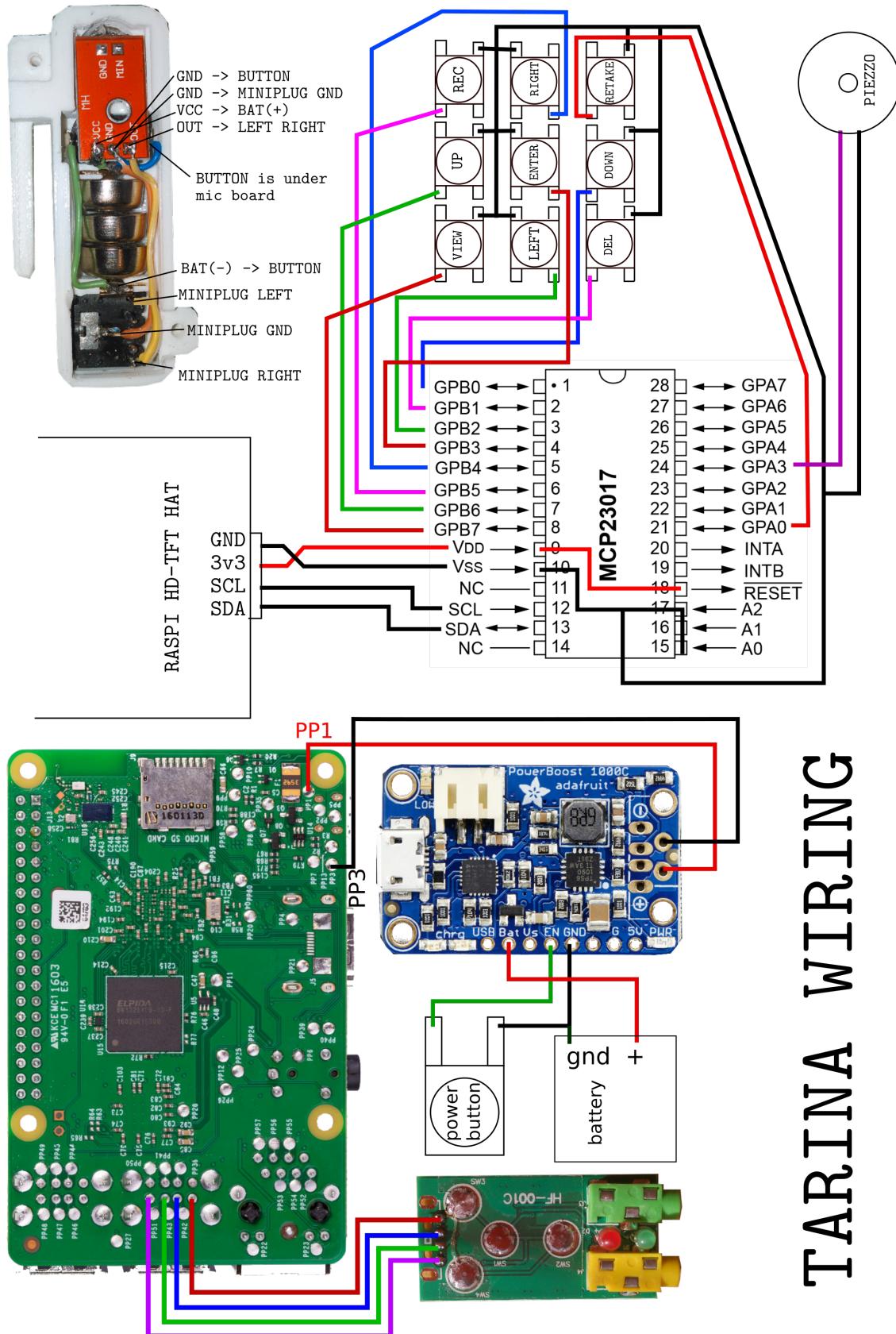
## Post processing

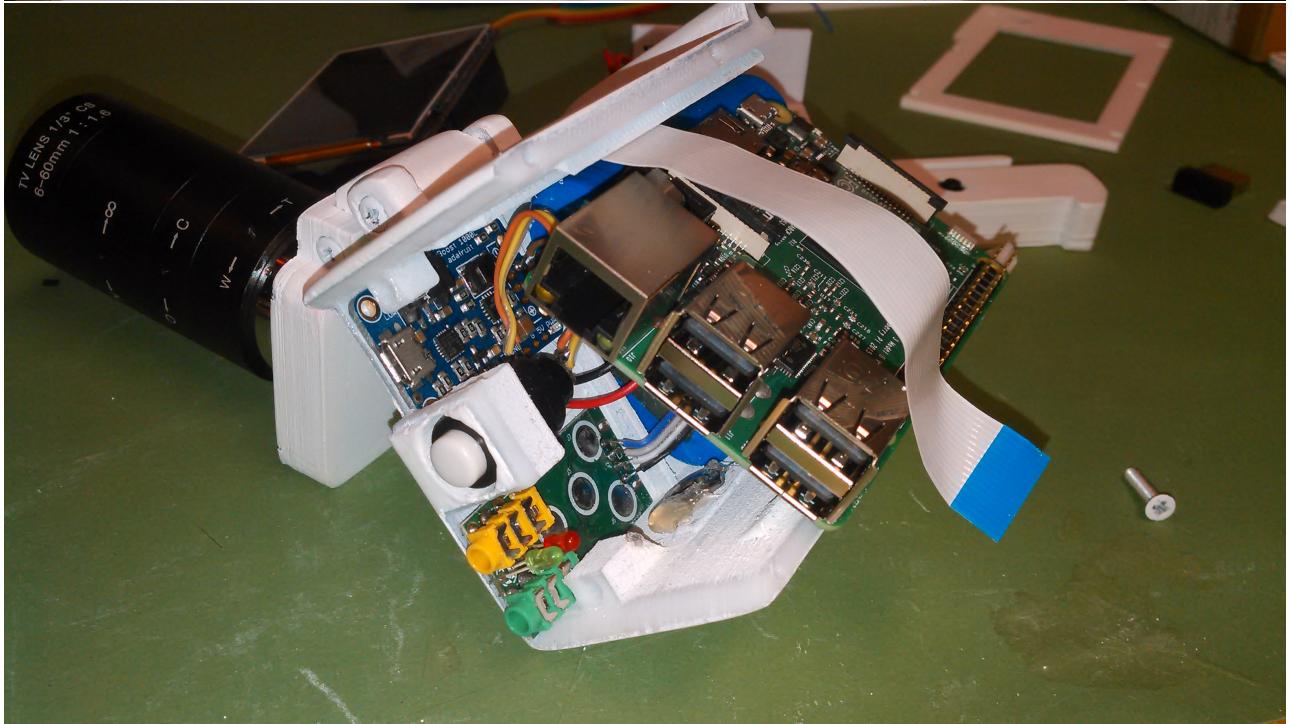
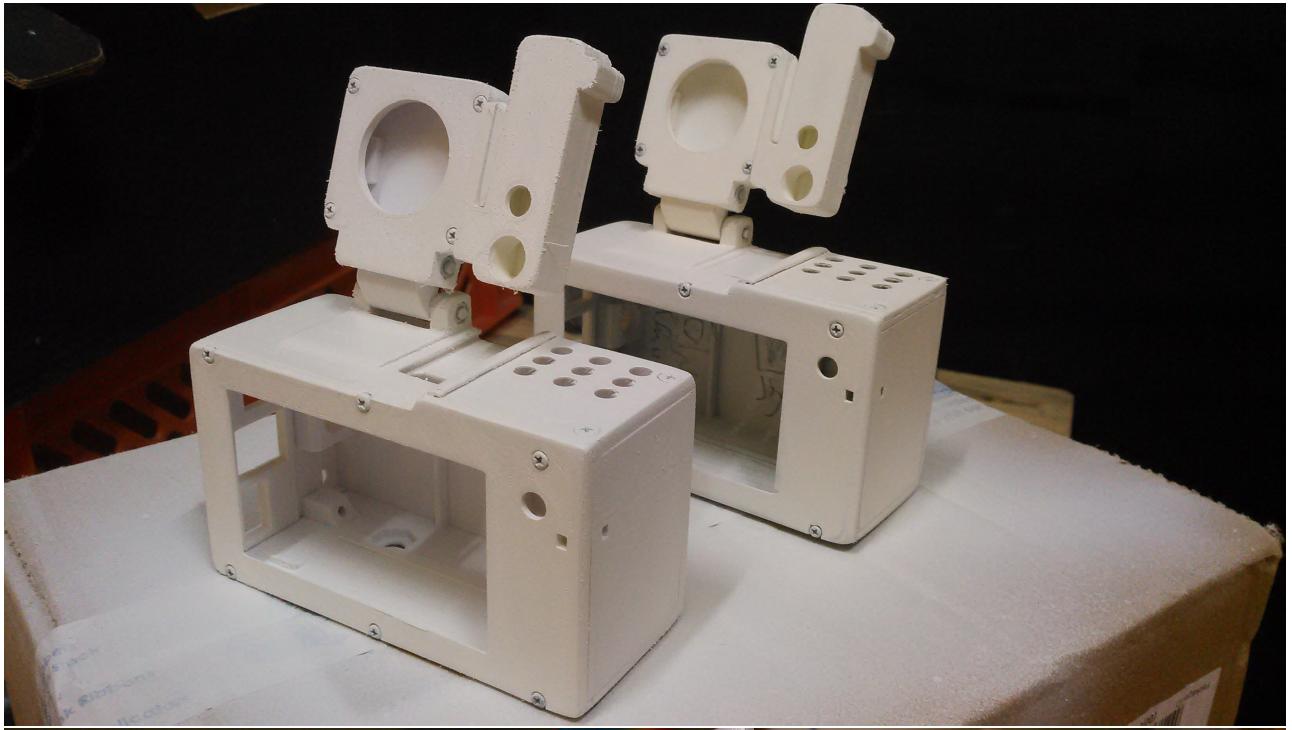
This is still a work in progress...

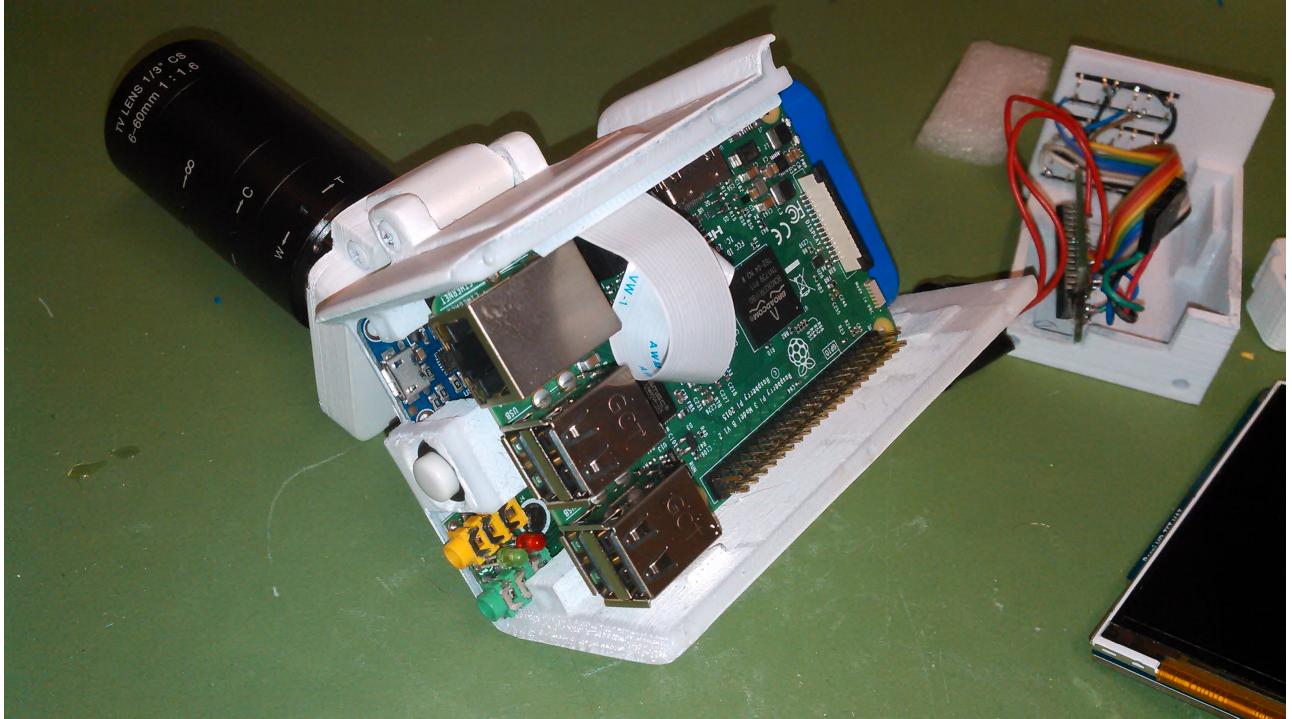
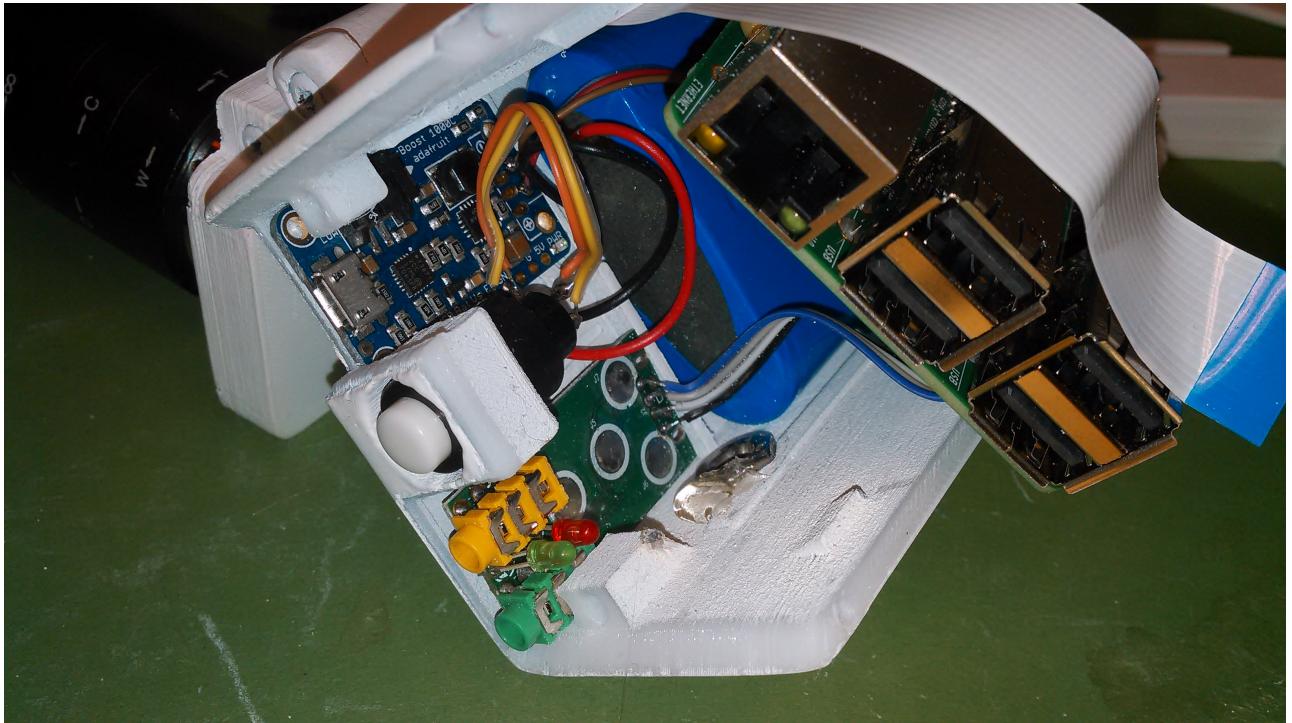
So far I've come to this conclusion:

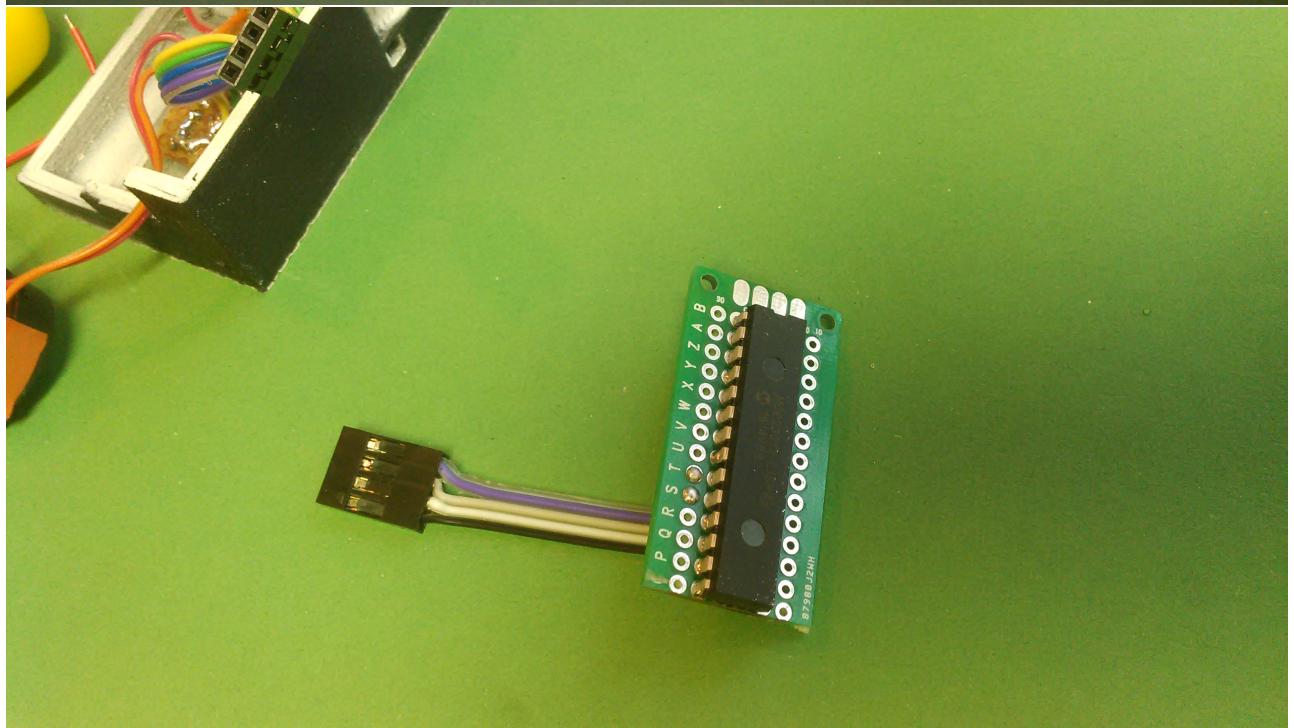
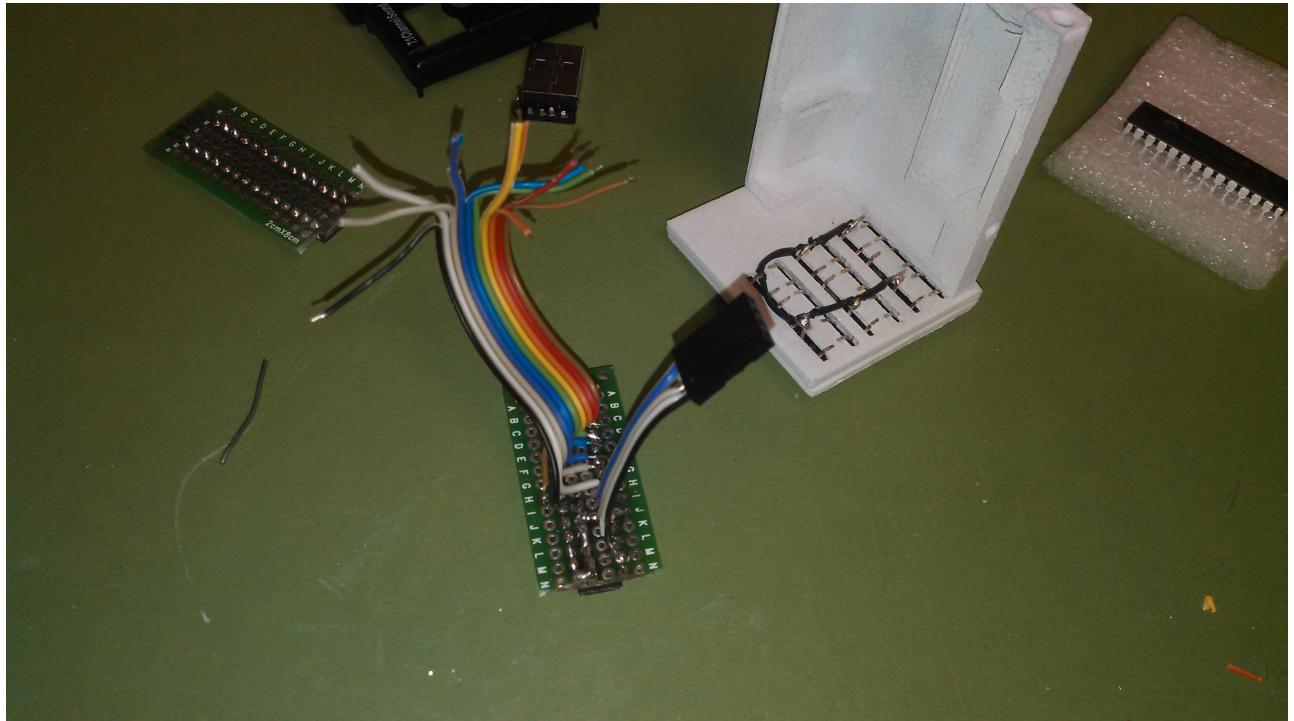
- Put 3d printed parts together with screws.
- Sand with sandpaper from rough to finest (from 120 to 400). I like to sand down all corners making them round.
- Dust off.
- Paint.
- Wait til dry.
- Paint again.
- Wait til dry. I like to wait for atleast a day to make it really dry.
- Sand again.
- Paint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

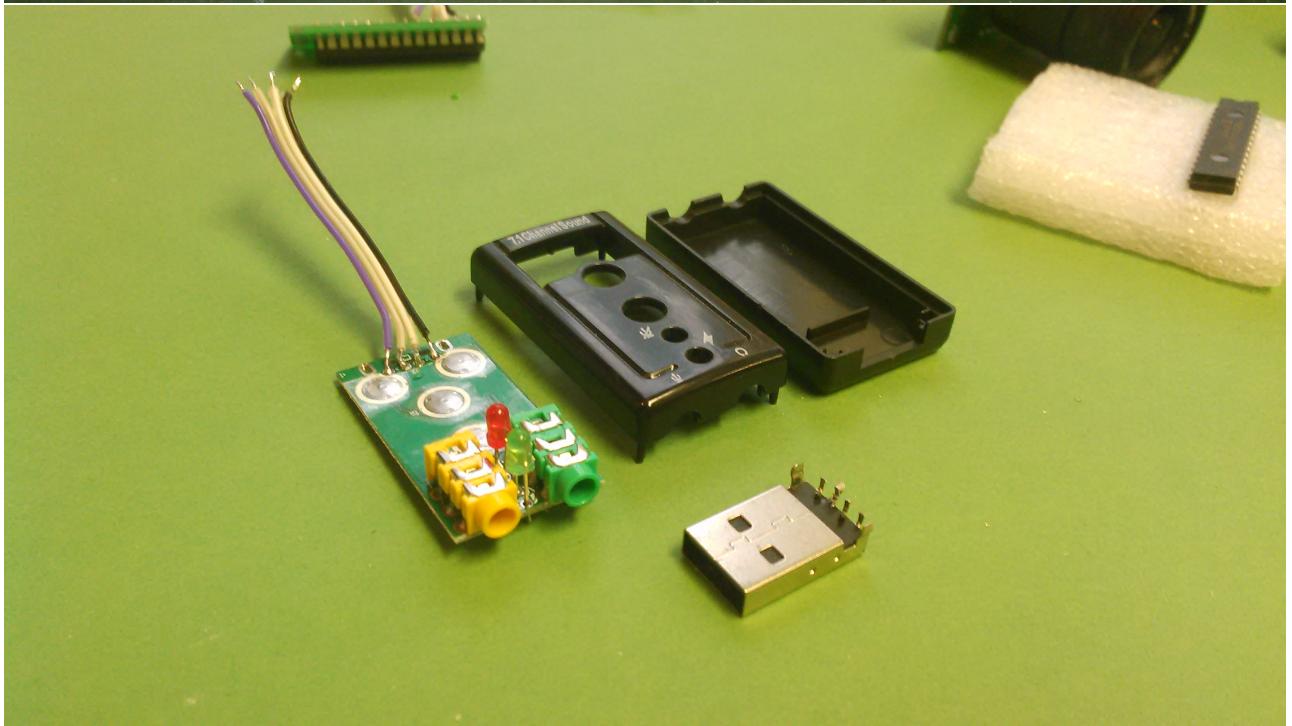
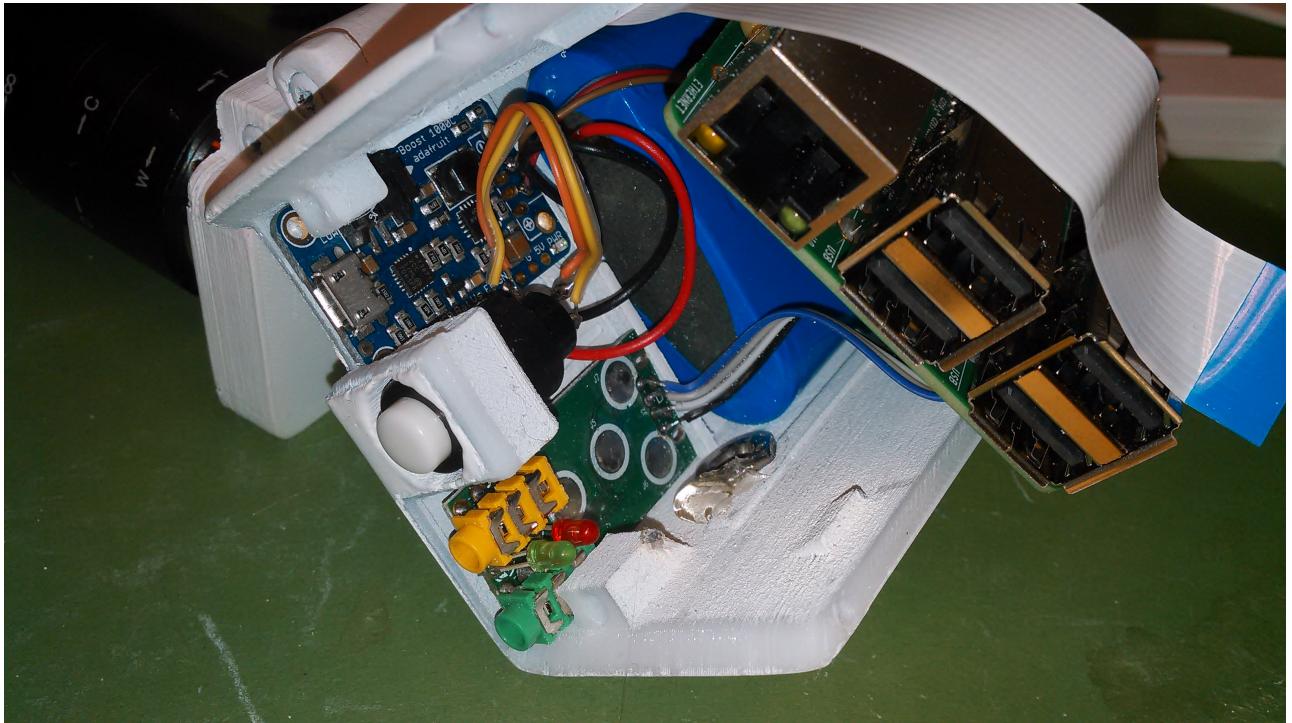
## Wiring











## Putting it together

Documentation on its way, if you're in a hurry feel free to drop a message in `#tarina:bennysmatrixchat.ddns.net`

## 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 4: 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