

# 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 telegram

Get the parts

3d printing

Post processing

Wiring

Putting it together

Installing software

Tested lenses



Figure 1: Tarina parts layed out

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## 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.

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### 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

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### **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

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### **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

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### **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

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### **3.7v 7800mAh li-ion Battery**

Price ~17 eur

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

**Buy** Aliexpress

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### **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

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## **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](#)

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## **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](#)

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## **2x8cm double side copper prototype pcb**

Price ~0.20 eur/pcs

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

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## **Piezo electronic buzzer**

Price ~1 eur

Very useful for timing shots!

**Buy** [Aliexpress](#)

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## **Latching push button switch mini**

Price ~1 eur/10 pcs

This serves as the microphone and screen on/off button

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## **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](#)

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## **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

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## **MAX9812 Microphone amplifier**

Price ~2 eur

This makes surprisingly good sounding sound!

**Buy** Aliexpress

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## **3.5mm Female stereo headset interior PCB mount**

Price ~1 eur/10 pcs

Microphone input.

**Buy** Ebay

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## **LR44 Batteries**

Price ~2 eur/10 pcs

Microphone batteries

**Buy** Aliexpress

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## **Screws M3x12mm**

Price ~2 eur/25 pcs

These hold the camera together.

**Buy** Your local hardware store Motonet (store in Finland)

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## **Screws 2.2x9.5mm**

Price ~1 eur/20 pcs

These hold the camera/mic together.

**Buy** Your local hardware store Hobbycenter (store in Finland)

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## **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

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## **3.5mm Jack to jack aux cable**

Price ~1 eur

From microphone to mic-in.

**Buy** Aliexpress

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## **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

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Parts grand total ~200 eur

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## **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.
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## Wiring

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## Putting it together

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

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## 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'r ready to rumble:

```
python tarina.py
```

Happy filming!

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## Tested lenses

Here is what I'm testing right now.

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

Aliexpress

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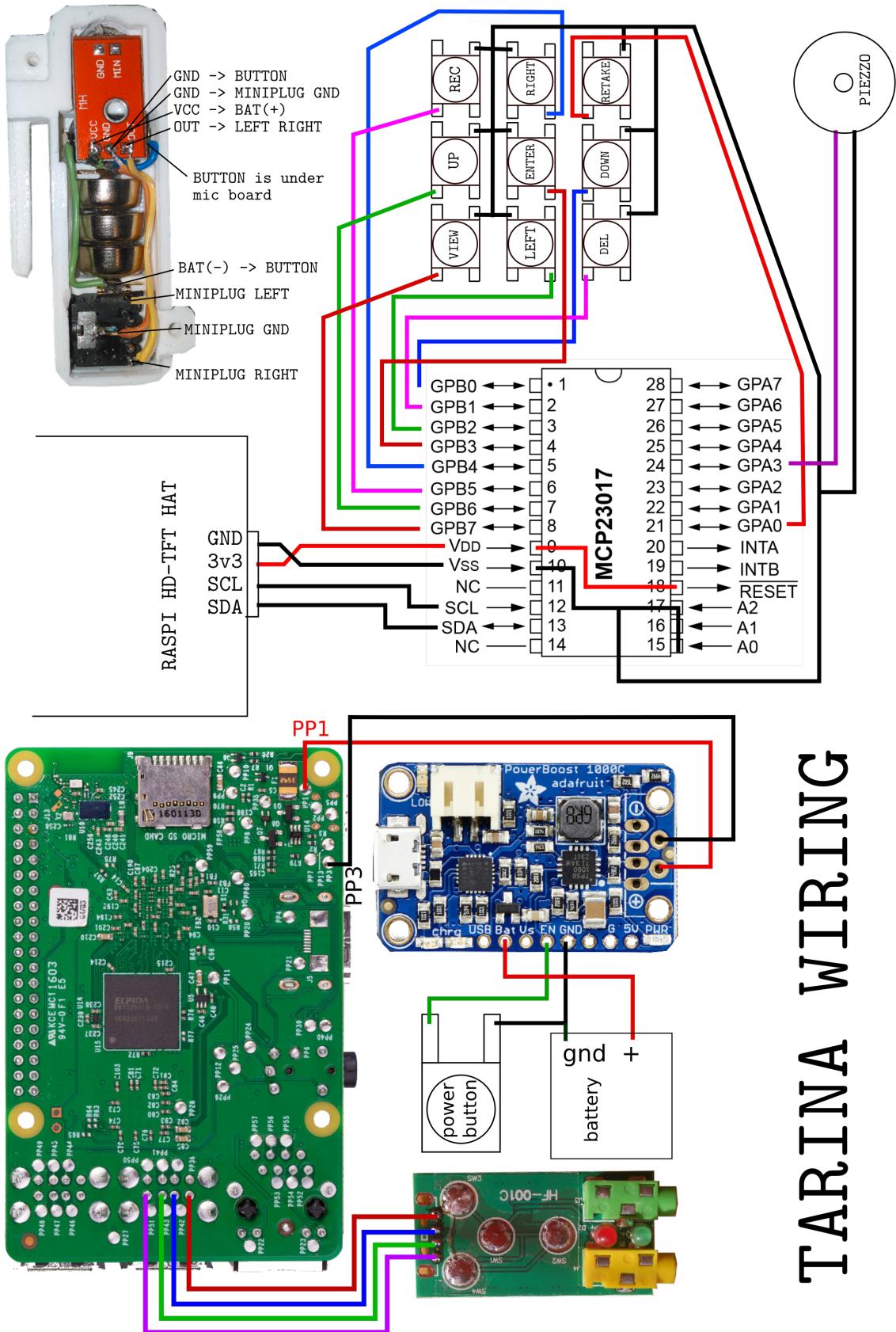


Figure 2: Tarina wiring diagram



Figure 3: Should be looking like this once finnished

### Camera Lens 2.8-12mm Varifocal

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

Aliexpress

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