

GO - Thermocam Project Manual

COMPONENT LIST, ASSEMBLY
INSTRUCTIONS, TIPS AND HINTS



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1.0Disclaimer

The following instructions are intended as possible assembly instructions for assembling the GO - Thermocam product yourself. GO - Thermocam is not liable for any damage caused to the additional hardware. GO - Thermocam is not liable for damage to objects or persons caused by incorrect assembly. The additional hardware to be ordered from third parties serves only as a guideline or recommendation. The links, where the additional hardware is to be acquired, serves likewise only as guideline and/or recommendation. GO - Thermocam is not liable for any damage to objects where the GO - Thermocam system has been installed. The files available for download in the download area serve only as a guideline or recommendation, they are without guarantee. By purchasing the GO - Thermocam transceiver you automatically accept GO - Thermocam's policies and privacy policy on <https://go-thermocam.com>. GO - Thermocam is not liable for any damage to your "Seek Thermal Compact XR".

2.0 Introduction

ATTENTION: In order to use the "GO - Thermocam" described in the present document - project successfully by yourself, basic knowledge in the field of electronics/electrical engineering and a certain degree of skill are strictly recommended. Please proceed step by step and read this document carefully to avoid any mistakes. If you have any questions, please feel free to contact our support: gothermocam@gmx.at.

Thank you for choosing the DIY product GO-Thermocam. GO - Thermocam is compatible with the "Seek Thermal Compact Thermal Camera for Android" with Micro-USB connection. It is a transceiver that receives, processes and sends thermal images to your smartphone via wireless connection. At the heart of **GO - Thermocam** is a **Raspberry Pi Zero W board** with **Go-Thermocam transceiver software** flashed on a 16GB Sandisk SD card. Furthermore, there is an **iOs app available for download** in iTunes (not Pro version free). On our store <https://go-thermocam.com/> you can find downloadable 3D - stl files, which can be 3D printed directly. On request by mail, we can also print the required parts, but the delivery time can be several weeks, because our production - capacity is rather small. The required hardware must be purchased from third party stores like **Amazon** or **Aliexpress** to use Go-Thermocam as described in this manual. In the following document you will find the component list, assembly instructions, application and other useful tips and hints to assemble the DIY Go-Thermocam yourself.



The heart that receives the thermal images from the Seek thermal camera is a Raspberry Pi Zero W.



In combination with the Go Thermocam iOs app, it is possible to send thermal images wirelessly via WLAN protocol to an iOs capable device. Download the iOs app from the **iTunes Store**.



In the Go-Thermocam download section you can download various 3D stl files that can be printed directly with a 3D printer. We are specialized in dji drones (dji Mavic Air2, Mini2, Mavic Pro...). There are various mounts for different dji drones in the download section, but there are also 3D files of camera mounts that you can download from our site. You can find more information in our store. Of course you can also design your own mounts for different projects and use them with GO-Thermocam.

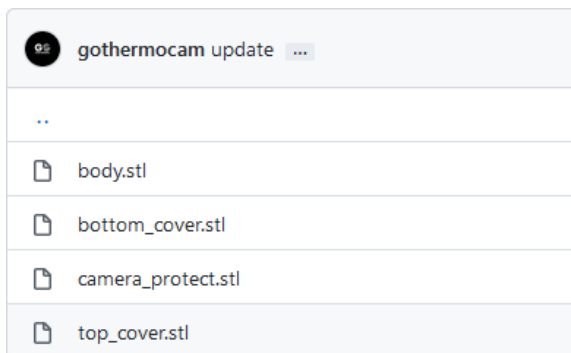
<https://go-thermocam.com/>

2.0 Components list

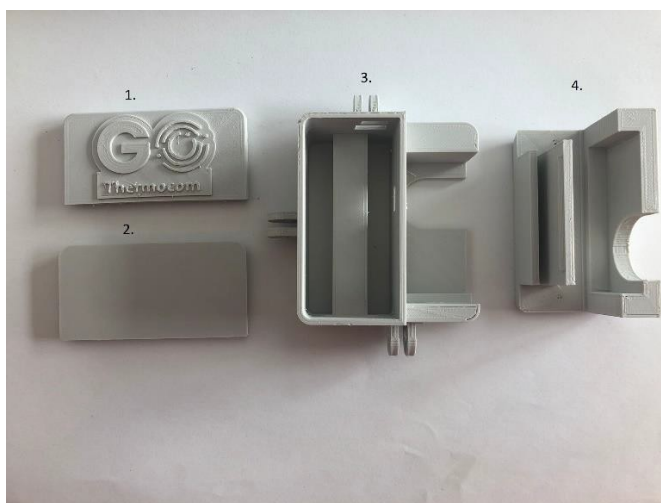
The following section explains which parts/components you need to assemble GO-Thermocam.

2.1 3D Files/Housing

In the Github download area of Go-Thermocam you can download all needed 3d stl files. Go to **3D Files->GOThermocam_body** and download all stl files in the folder.



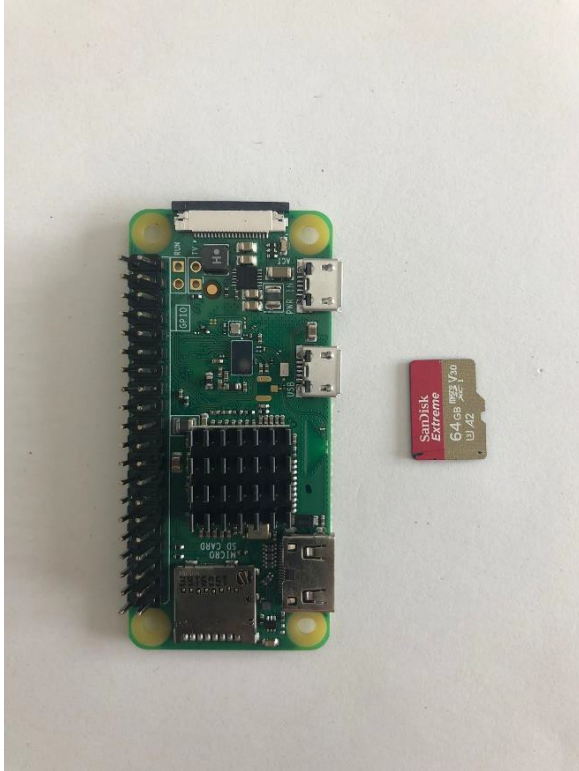
Once the files have been downloaded, you can slice the models directly in a slicer program (e.g. Cura) and print them in the 3D printer. For your information, our models were printed with the Anycubic Mega S. After successful 3D printing you should have the following parts available:



1: top_cover, 2: bottom_cover, 3: body, 4: camera_protect

2.2 Transceiver hardware with flashed Go-Thermocam transceiver software on 16GB SD card

The transceiver hardware required is a Raspberry Pi Zero W and an SD card with at least 16GB storage capacity (one with 64GB storage capacity was used here).



Important: This hardware must be purchased from the Go-Thermocam Shop in order to be compatible with the GO-Thermocam iOs App, as the transceiver software is flashed directly to the target Raspberry Pi by our GO-Thermocam team. The GO-Thermocam iOs App is only compatible with the GO-Thermocam transceiver hardware. The SD card is bound to the Raspberry Pi after flashing the GO-Thermocam transceiver software and cannot be used in another Raspberry Pi. You can purchase the flashed Raspberry Pi in our store.

<https://go-thermocam.com/>

Cost: approx 200€ / piece

2.3 Helpful tools and miscellaneous

It is solder, cable with 0.5mm² cross-section, double-sided tape, soldering iron and a voltmeter (recommended) needed and also possibly a hot glue gun, slot - screwdriver, scissors, sandpaper. (Tip: can be found on **Amazon**)

2.4 Battery and charging cable

For power supply a battery, DC-DC converter, charging cable and an electronic switch to turn the Raspberry Pi on and off is needed.



Info: The battery, should be a LIPO battery and have at least 1200mAh capacity. Supply voltage should be 3.7 volts. The battery and its charging cable can be purchased on **Amazon** or **Aliexpress**.

IMPORTANT: Be careful when charging the battery. LIPO batteries should never be charged without supervision. The plugs should have the following dimensions to fit perfectly into the Go-Thermocam body:



Link battery + charging cable:

3.7V, 1400mAh Lipo battery:

https://www.aliexpress.com/item/32846312884.html?spm=a2g0o.productlist.0.0.6bff1de2svLd0Q&algo_pvid=4ecdf4e2-129a-4b13-9a49-3bfea675d68d&algo_exp_id=4ecdf4e2-129a-4b13-9a49-3bfea675d68d-11&pdp_ext_f=%7B%22sku_id%22%3A%2265178714035%22%7D

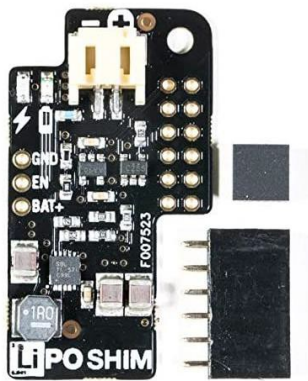
USB Charger:

https://www.aliexpress.com/item/32862187063.html?spm=a2g0o.productlist.0.0.42b83162OISJp0&algo_pvid=55857eb6-b612-402e-a30f-31a8ee51fef2&algo_exp_id=55857eb6-b612-402e-a30f-31a8ee51fef2-1&pdp_ext_f=%7B%22sku_id%22%3A%2265361110821%22%7D

Cost: approx 15€ / piece

2.5 LiPo/Lilon power supply module:

To ensure a constant supply voltage for the Raspberry Pi and to prevent an undervoltage discharge of the LiPo battery, it is recommended to use a LiPo/Lilon power supply module. We use the module "**LiPo Shim**" from Pimorini. This is specially designed for the Raspberry Pi Zero and available e.g. at Amazon.



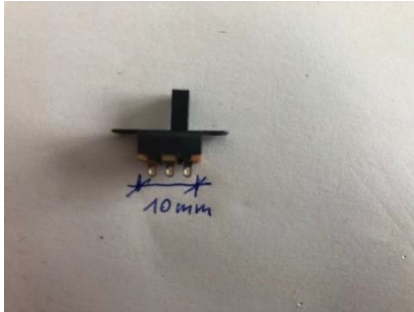
Amazon link:

https://www.amazon.de/Pimoroni-PIM181-Zero-LiPo/dp/B01JO2UK3Q/ref=sr_1_2?mk_de_DE=%C3%85M%C3%85%C5%BD%C3%95%C3%91&crd=MJX9CBAUPXJI&keywords=lipo+shim&qid=1640163190&srefix=lipo+shim%2Caps%2C189&sr=8-2

Cost: about 20€ / piece

2.6 On-off switch:

To decouple the battery from the electronics, an on - off switch is needed. We have ordered one on Amazon with the following dimensions, so that this later fits perfectly in the Go-Thermocam body:



Amazon link:

https://www.amazon.de/Lezed-Horizontal-Schiebeschalter-Mini-Panel-Mini-format/dp/B07LBPDB6S/ref=sr_1_3?keywords=switches+electronics&qid=1639832474&sr=8-3

Cost: about 0,05€/piece

2.7 Seek Thermal Compact XR:

In order for Go-Thermocam to process thermal images, the so-called Seek Thermal Compact XR - inexpensive thermal imaging camera with extended range of view, Micro USB connection and waterproof protective housing. Compatible with Android smartphones - is required. The resolution can also be changed/adjusted directly while rotating the lens. For this, please read the Seek Thermal - manual, which you should get with the purchase of this camera module (e.g. purchase at Amazon).



Important: It must be the version with Micro-USB so that it can be connected to the Raspberry Pi Zero W. You can buy it on Amazon or Aliexpress for about 270€ (no guarantee).

Amazon link:

<https://www.amazon.de/Seek-Thermal-Compact-W%C3%A4rmebildkamera-Waterproof/dp/B00Y2QO79I>

Cost: approx 270€ / piece

2.8 GO Pro Thumbscrews

To attach Go-Thermocam to drone mounts or other mounts it is recommended to get Go Pro thumbscrews(long) e.g. at **Amazon**.



Amazon link:

https://www.amazon.de/Daumenschrauben-Daumenschraube-Session-Kameras-Black/dp/B074K9ZFG2/ref=sr_1_1_sspa?mk_de_DE=%C3%85M%C3%85%C5%BD%C3%95%C3%91&keywords=gopro+schraube&qid=1639832122&sr=8-1-spons&pssc=1&smid=A35TDC9L128M3G&spLa=ZW5jcnlwdGVkUXVhbGlmaWVyPUFYNIldPSTIaRzIGVVUmZW5jcnlwdGVkSWQ9QTEwMzkxNzQzN0JYWjcxNDkyUFZBJmVuY3J5cHRIZEFkSWQ9QTAwMjExODIzQkE1NFBHNDNBNSjlaJndpZGdldE5hbWU9c3BfYXRmJmFjdGlvb11jbGlja1JlZGlyZWNOJmRvTm90TG9nQ2xpY2s9dHJ1ZQ==

Cost: about 3€ / piece

2.9 Total cost component list

1. The cost of the **GO-Thermocam transceiver** **without** "Seek Thermal Compact XR":

~238,05€

2. The cost of the **GO-Thermocam transceiver** **with** "Seek Thermal Compact XR":

~508,05€

3. + **~ 5€** for the **Go-Thermocam iOS App** Pro version.

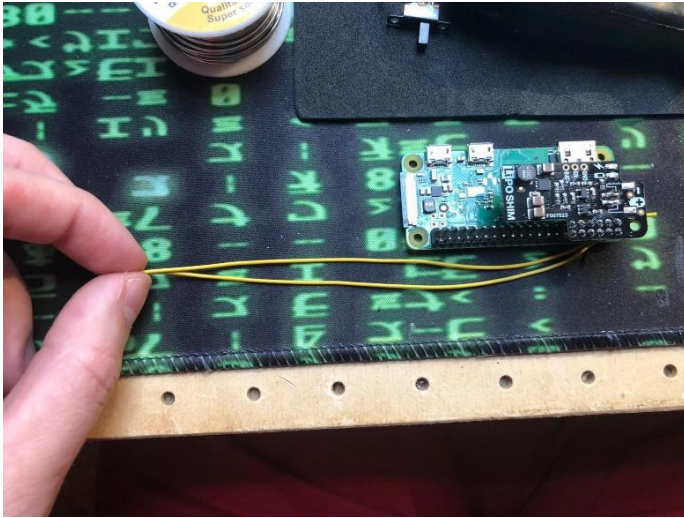
3.0 GO - Thermocam Transceiver Assembly

This section will explain step by step how to assemble the **GO-Thermocam transceiver**. I assume that you have downloaded the GO-Thermocam 3D files in the download area, the parts are printed and have been reworked with e.g. sandpaper. Furthermore you also need the **Raspberry Pi Zero W flashed with the GO-Thermocam software** to receive thermal images later. Here again the link to the GO-Thermocam Shop. Here you can also find the download files in the Github - Repository:

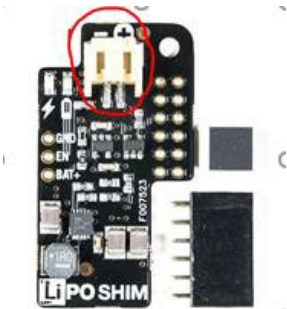
<https://go-thermocam.com/>

You should allow about 1 hour to assemble the transceiver.

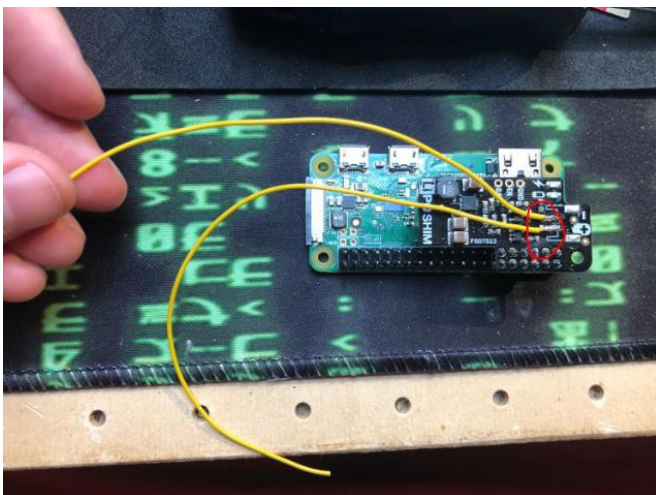
1. Cut 2x cables that are about 2x the size of the Raspberry Pi Zero W board.



2. Take the **LiPo Shim** module here. Tip, if you remove the plastic socket of the connector on the LiPo Shim, this will save space in the 3D printed body of your GO-Thermocam transceiver later.



Now solder the two previously measured cables to the "LiPo Shim" module. Tip remember which cable is + and which -. Best you take the color black for **negative pole** and red for **positive pole**. I had here unfortunately only two yellow cables.

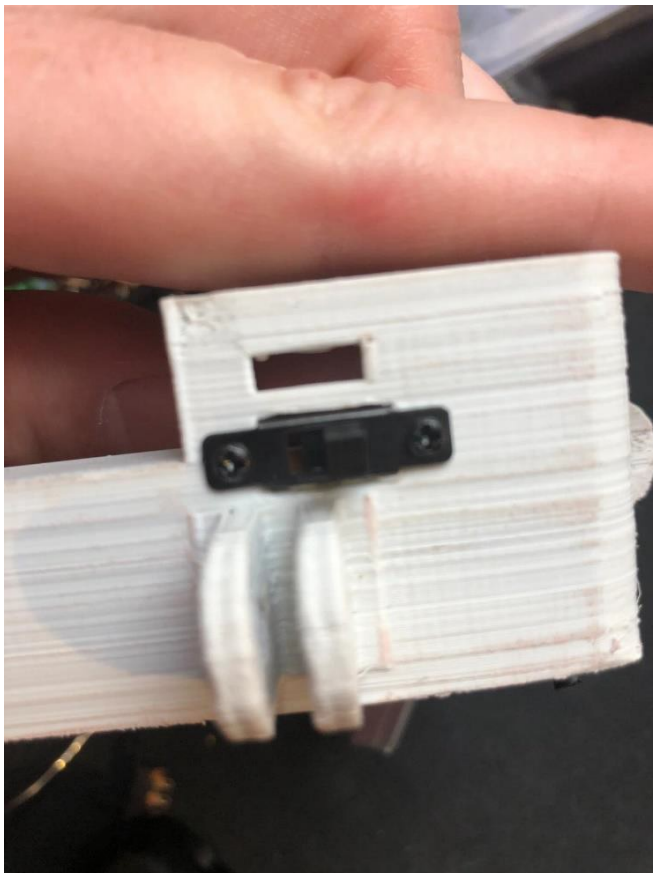


Info: Here the LiPo Shim module has already been plugged into the Raspberry Pi Zero W (The "How To" for this should also be described in the **LiPo Shim** - Shields manual).

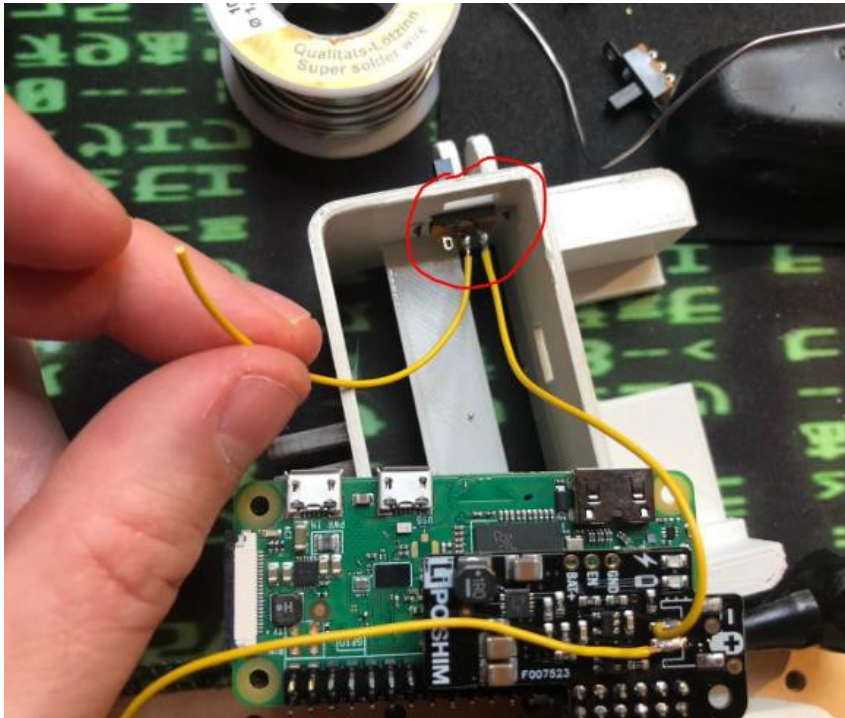


3. Of course, it must also be possible to turn GO-Thermocam on and off. For this, you take the on/off switch and insert it into the 3D printed body of your GO-Thermocam. After you have placed the switch, you can fix it with 2 Phillips screws. The best way to do this is to order a Phillips screw set from Amazon:

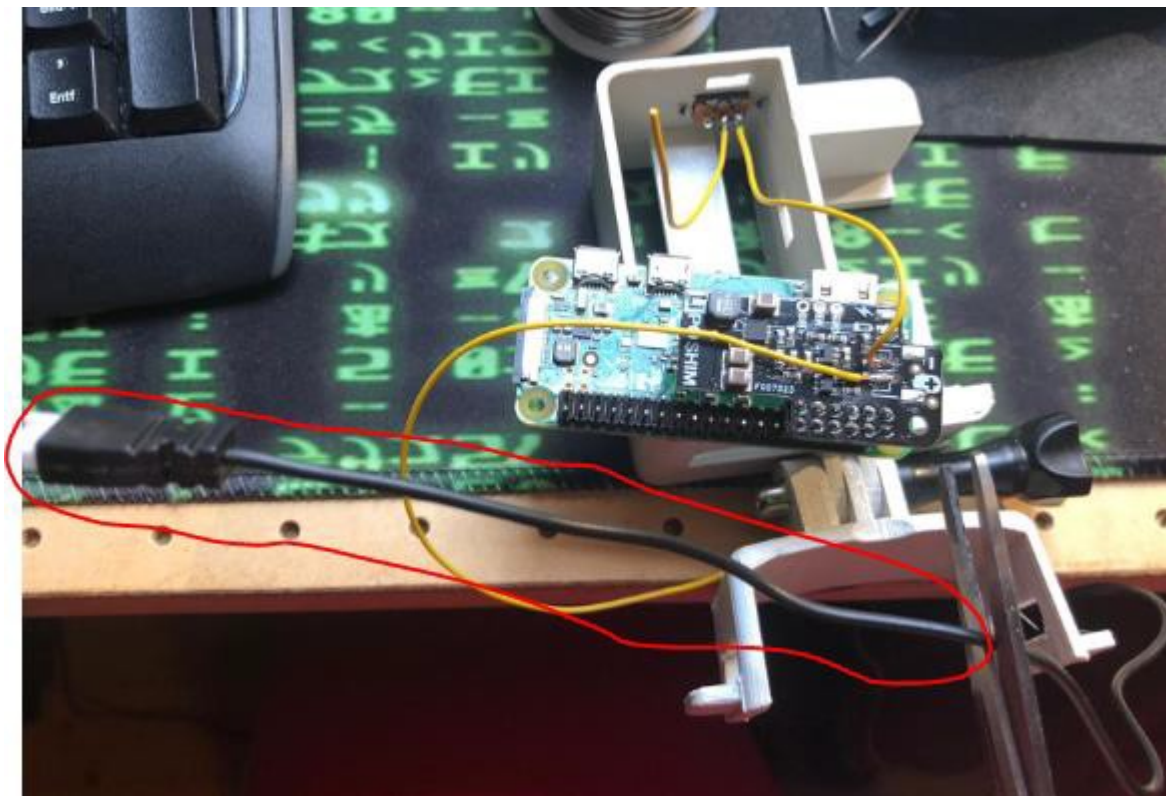
https://www.amazon.de/Winfred-Micro-Schrauben-Kohlenstoffstahl-Aufbewahrung-repairglasses/dp/B08TWVYH8W/ref=sr_1_11?mk_en_DE=%C3%85M%C3%85%C5%BD%C3%95%C3%91&crid=198F3OUX1Q85S&keywords=phillips+schrauben&qid=1640165515&srefix=phillipsscrauben%2Caps%2C139&sr=8-11



We switch with ground potential. For this you can solder the previously cut cable pieces (negative pole) to the switch as follows.



4. Next you have to take the charging cable for the LiPo battery. This must now be cut. Take about twice the length of the Raspberry Pi Zero W board.

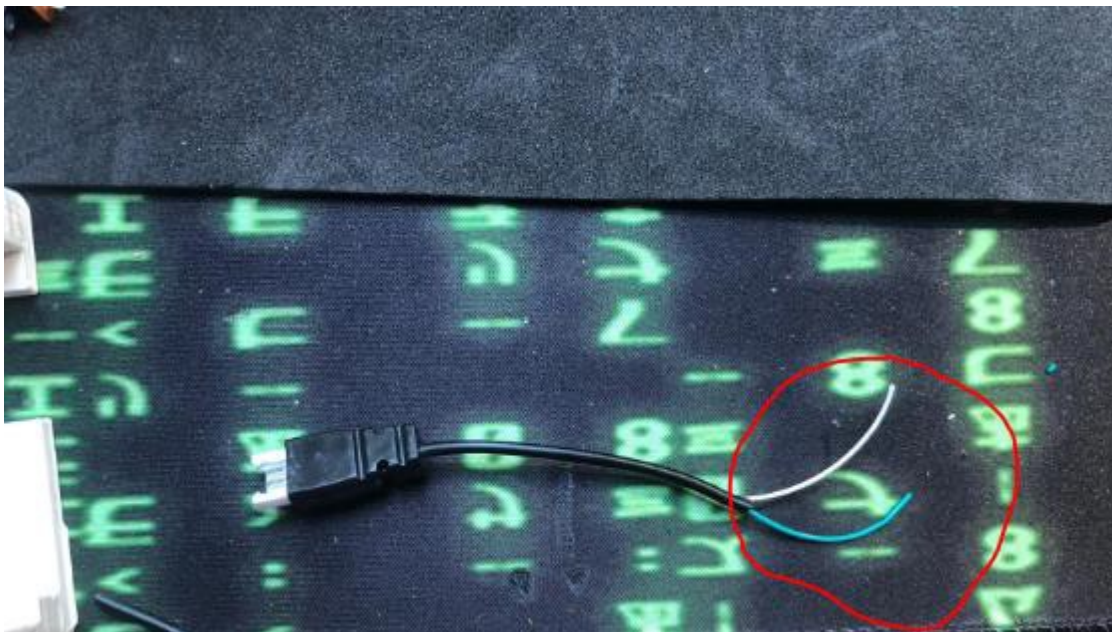


The battery connector must also be disconnected from the LiPo battery.

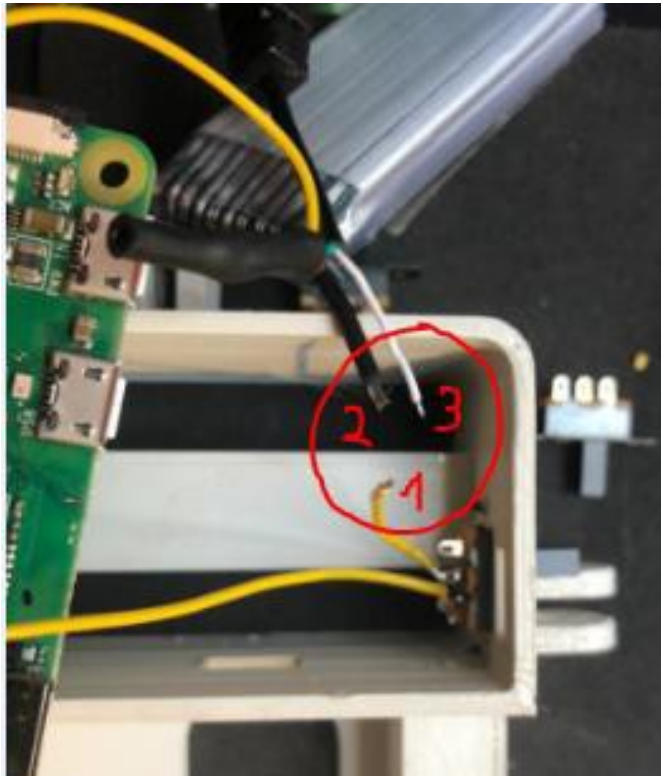
ATTENTION: It is essential to cut off the poles individually to avoid causing a short circuit. First cut off the positive pole of the battery (cut 1) and then the negative pole (cut 2).



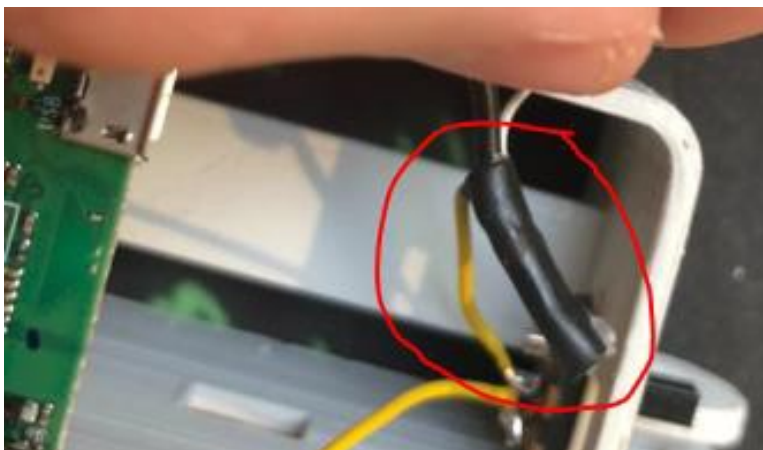
Now take the cut charging cable and cut off the black jacket insulation as follows.



5. Next, connect the ground of the on/off switch (1) with the negative terminal of the LiPo battery (2) and the negative terminal of the charging cable (3).

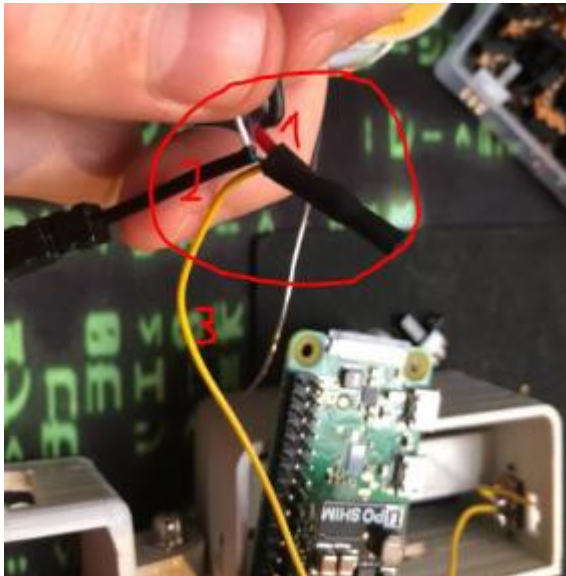


ATTENTION: Be sure to insulate the soldered cables with heat shrink tubing to avoid possible short circuits. Do this really carefully.

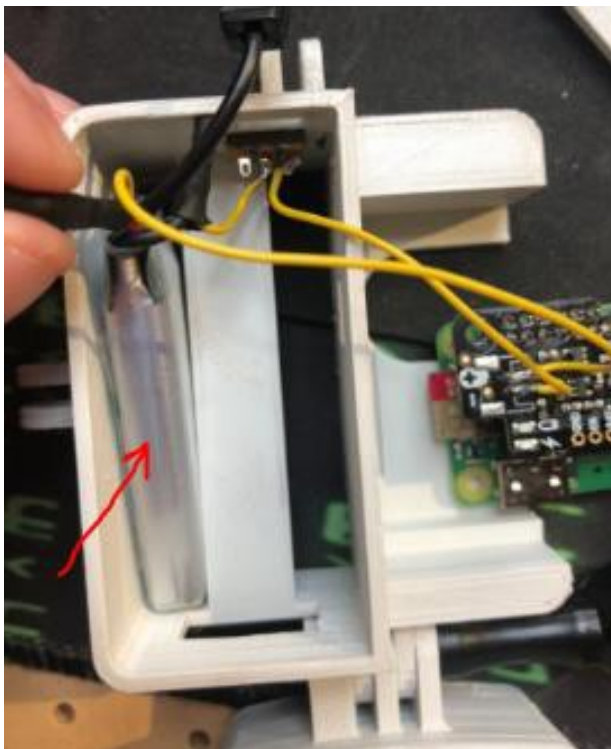


6. Do the same with the positive poles. Solder the positive pole of the LiPo battery (1), the positive pole of the battery charging cable (2) and the positive pole of the LiPo shim module (3) together.

ATTENTION: Insulate the soldered cables with a heat shrink tubing to avoid possible short circuits. Do this really carefully.



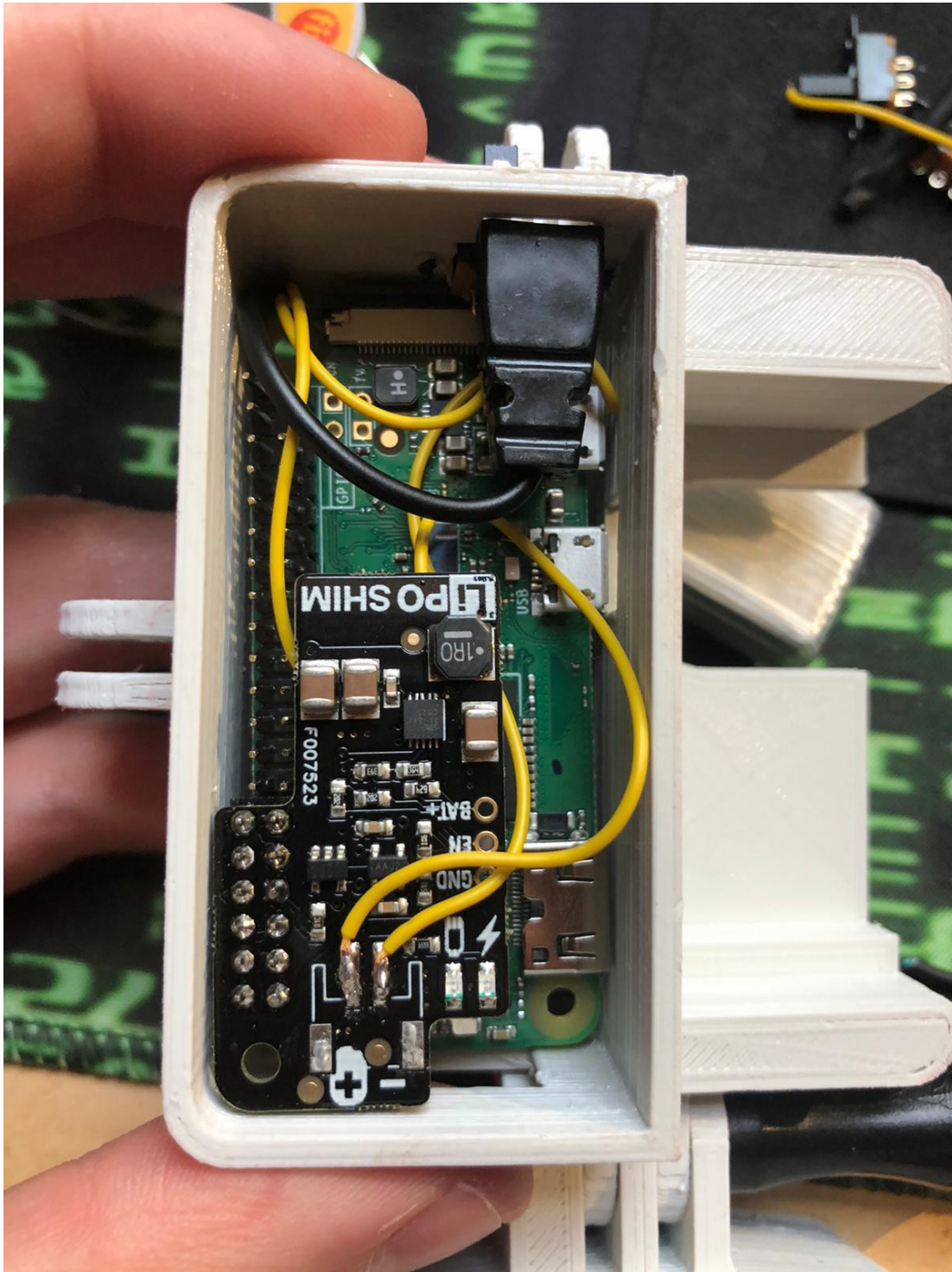
7. Now a little skill is required. Now thread the LiPo battery through the slot on the side of the GO Thermocam body. Be careful not to damage the battery.



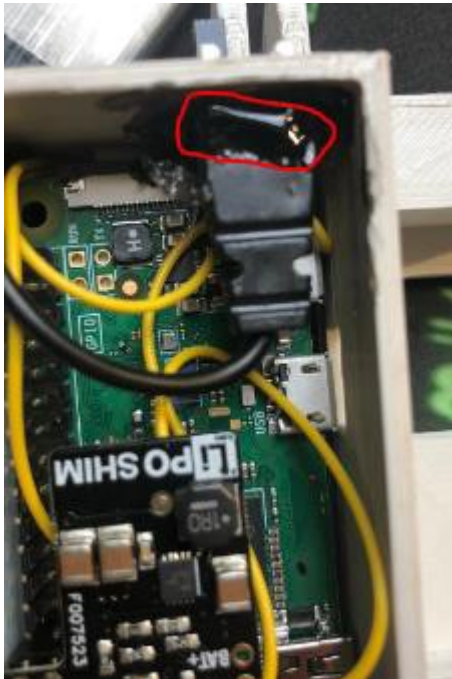
8. Now you can apply double-sided adhesive tape to the back of the battery and the Raspberry Pi board so that your components are well fixed in the case. Carefully glue the components to the center beam of the body.



9. Now glue the Raspberry Pi board and the battery into the GO-Thermocam body. The "female" piece of the charging cable can now also be placed in the opening provided in the body. It should look like this.



The charging plug should be fixed with hot glue. Make sure that you do not use too much glue, otherwise the top cover will no longer fit into the GO-Thermocam body.



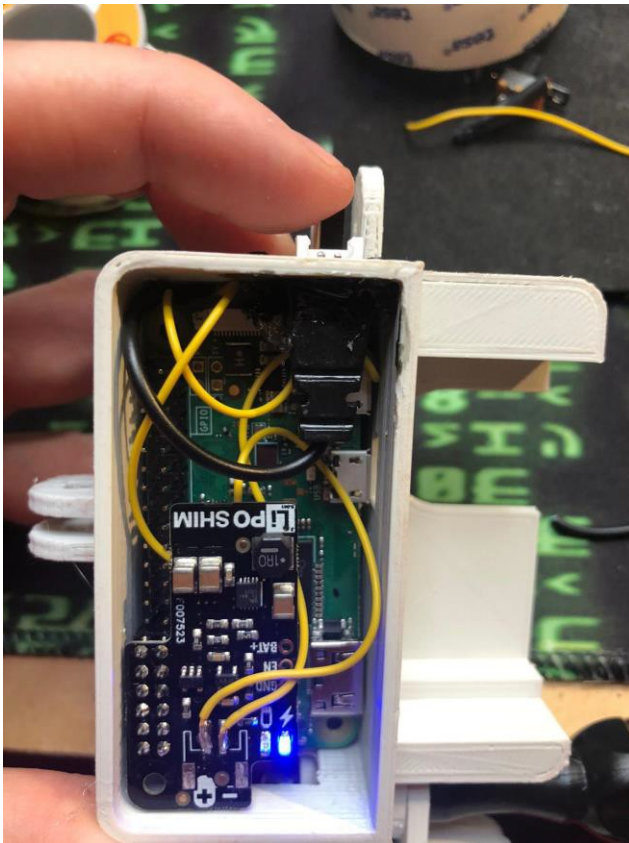
Back side should now look like this.



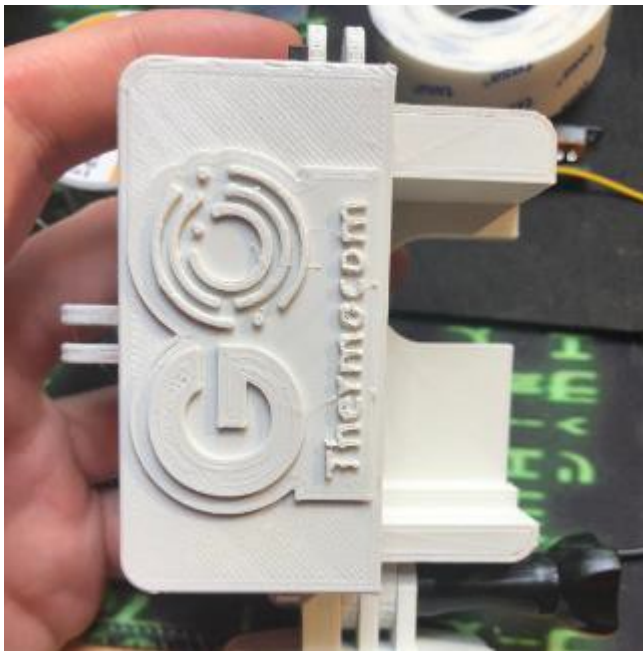
10. Now you can insert the GO-Thermocam bottom cover. Tip: It may be that the bottom cover is a little difficult to fit into the frame. If it does not fit, you could sand it a little with sandpaper so that it slips more easily into the body frame.



The GO - Thermocam transceiver can now be switched on. There should be a blue light on the LiPo Shim module. If not, please check if everything was assembled correctly as described above.



Now the top cover can also be used.



11. Turn off your GO Thermocam transceiver again. Now insert the SD card into your Raspberry Pi, if not already done. Now you can connect the "Seek Thermal Compact XR" to the micro USB of your Raspberry Pi Zero W. This should look like this.

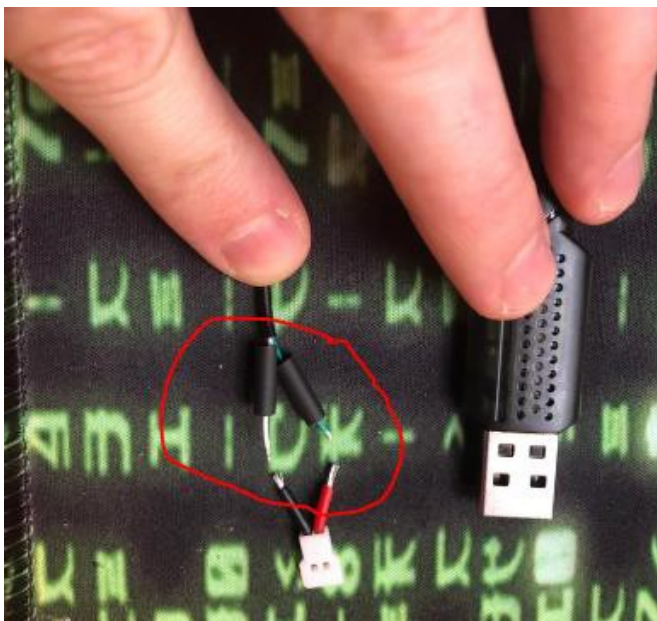


12. The camera would now be ready for use. To protect your "Seek Thermal Compact XR" you can download the file camera_protect.stl. This must then be fixed with a Phillips screw on the back of the body for proper hold.



13. Last but not least you have to solder the charging cable for your GO-Thermocam transceiver. To do this, take the cut USB charging cable and the cut battery cable with you.
"Male" connector and solder positive pole to positive pole and negative pole to negative pole.

ATTENTION: Insulate the solder joints with 2 heat shrink tubes.



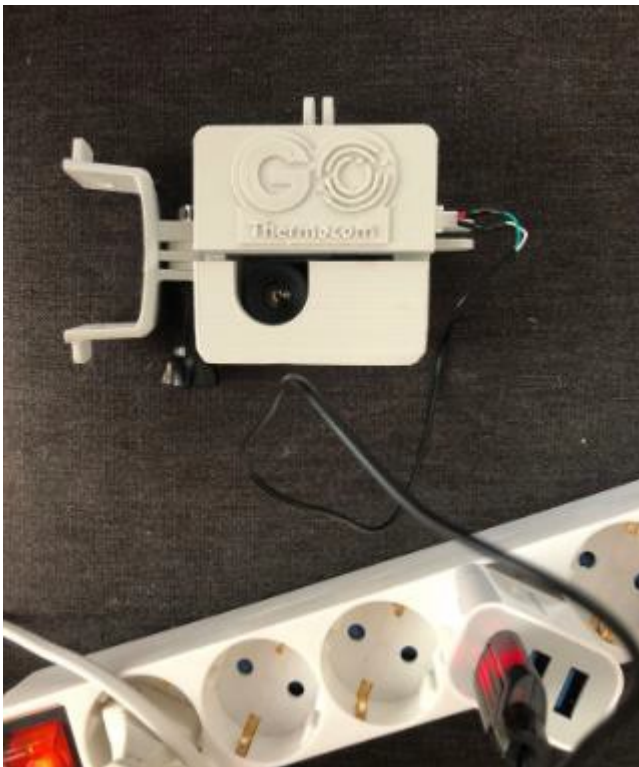
Congratulations your **GO-Thermocam transceiver** is now fully assembled and should look like this. The mount chosen here is the mount for the DJI Mavic Air2.





The GO - Thermocam system can be charged via a USB power supply.

CAUTION: Since this is charging a LiPo battery, it is imperative that it is charged only under supervision.

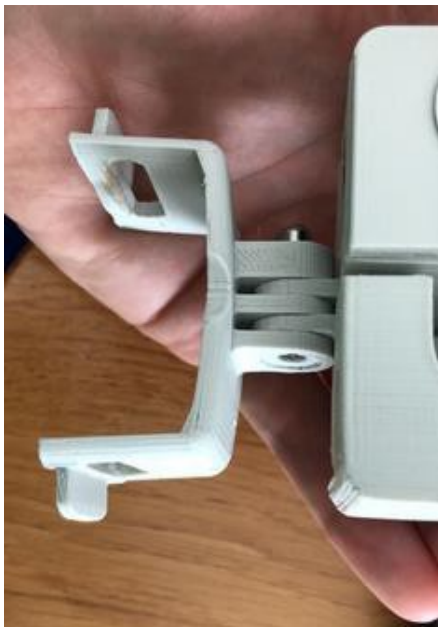


4.0 DJI MAVIC Air2 Mount

This chapter will describe how to attach your GO-Thermocam system to your dji Mavic Air2 drone. GO-Thermocam is compatible with GO PRO mounts. To attach it to the DJI MAVIC Air2 drone, take the GO PRO thumbscrews (2) and insert the nut screw (1) into the side of the mount.



Then you can attach the mount to one of the 3 GO PRO brackets on the GO - Thermocam body and screw in the thumbscrew.



TIP: It might be that the mounts are a bit more difficult to attach. This depends on the 3D print quality. This can be remedied by lightly grinding the connectors.

Now the GO -Thermocam system can be attached to the DJI MAVIC Air2 drone. It is recommended to attach GO - Thermocam with a certain pitch angle α , so that the thermal imaging camera can also capture images from the ground in flight.



ATTENTION: Due to the additional weight (~130g) of GO - Thermocam on the drone, the flight characteristics of your drone are worse. Therefore, it is strictly recommended to take care of it and perform careful flight maneuvers. Please also pay attention to the drone flight laws in your country.

5.0 Hand Tripod Mount

Among the 3D files, there is also a mount for a handheld tripod. This should be attached as follows. The nut screw is inserted on the left, then GO - Thermocam is put on and fastened with the thumbscrew. This should look like this.



TIP: It might be that the mounts are a bit more difficult to attach. This depends on the 3D print quality. This can be remedied by lightly grinding the connectors.

6.0 iOs app and connection with smartphone

GO - Thermocam sends thermal images to your Apple smartphone. For this to work, you need to download Go thermocam from the Apple Store.

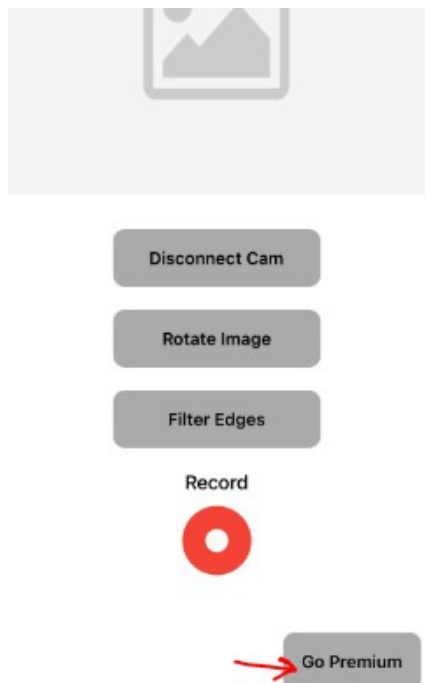


After the app has been successfully downloaded and installed, it is possible to use the app for free, but some features such as image rotation, edge filtering and video recording are not available. For this, there is the PRO version of the Thermocam app.

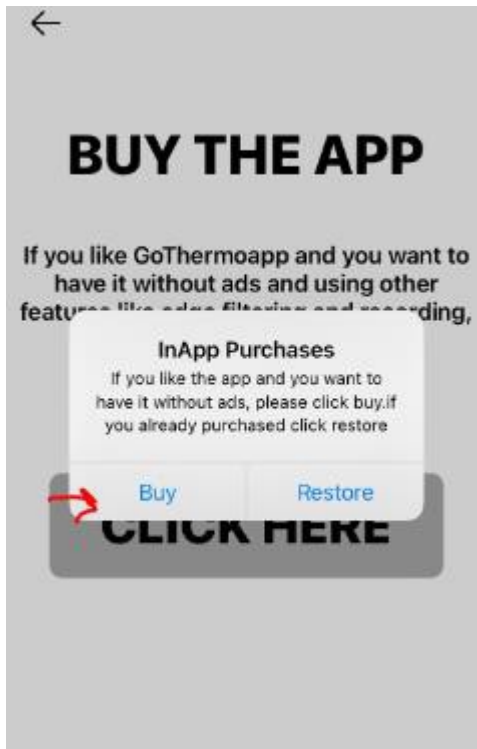
6.1 PRO Version Thermocam App

To use the **PRO version of the app** follow these steps:

1. Open the app, you need internet access
2. Click GO Premium



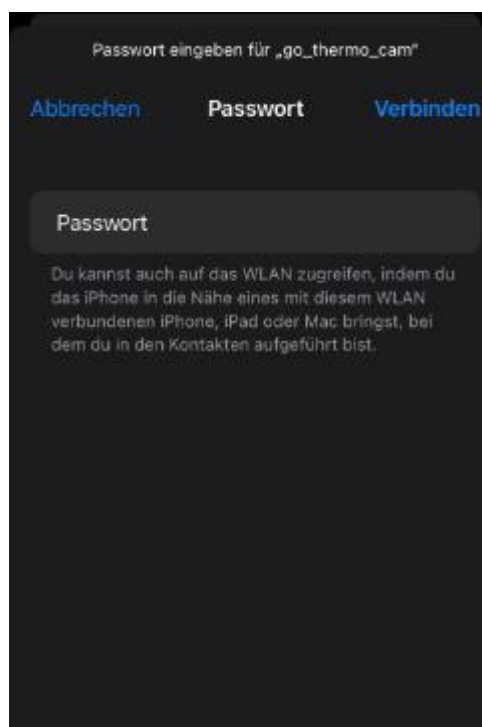
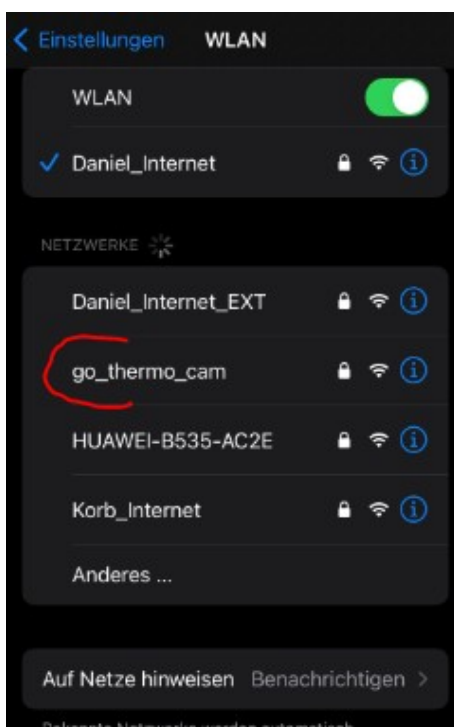
3. button "CLICK HERE", then a popup should open.
4. Here you have to click on "BUY". The price of the PRO version is **4.99€**.



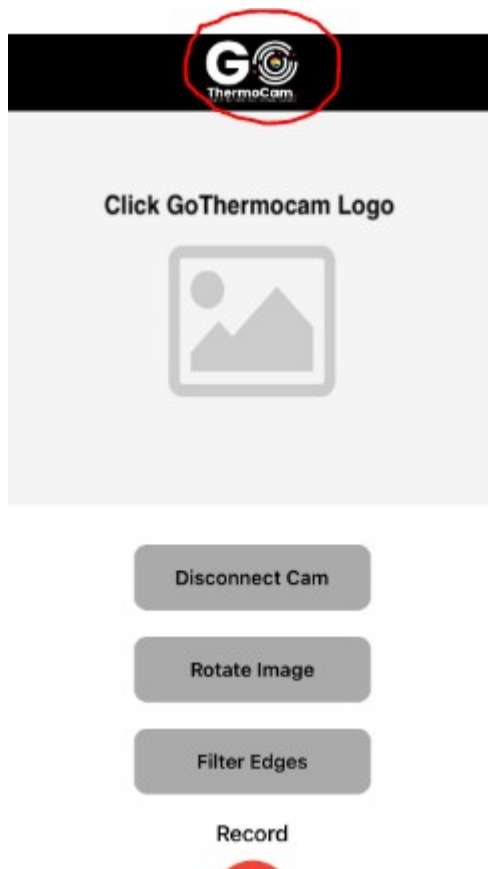
5. After successful purchase the feature **rotate, edge filter and save video** can be used. **INFO: When saving the videos, they are saved in several chunks of about 10 seconds on the phone. This has performance reasons. With editing programs these chunks can be merged to a video.**

6.2 Connection of GO - Thermocam with the iOS App

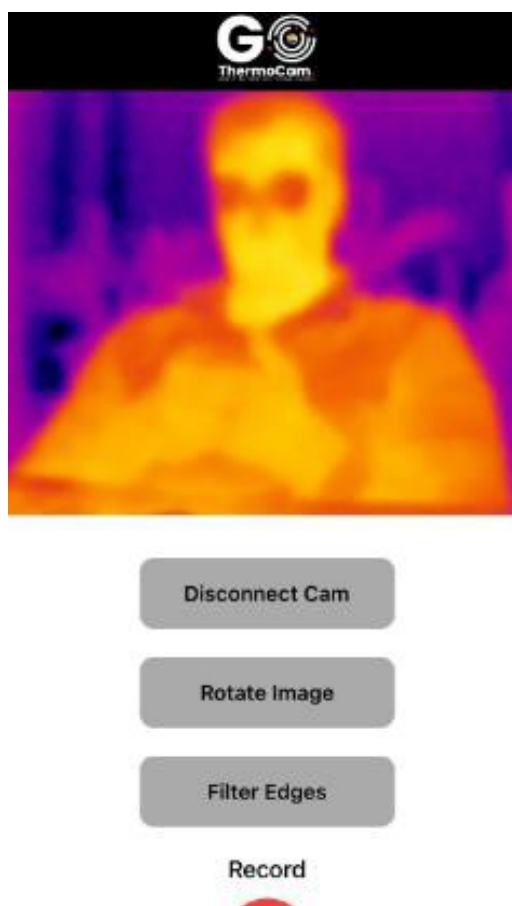
First you have to switch on your GO - Thermocam. After about 30 seconds you will hear a click your "Seek Thermal Compact XR". This crackling is normal. The reason is that your Seek calibrates itself every second to always get a sharp thermal image. After about 1 minute, the network "go_thermo_cam" should appear on your smartphone under WLAN. Click on it.



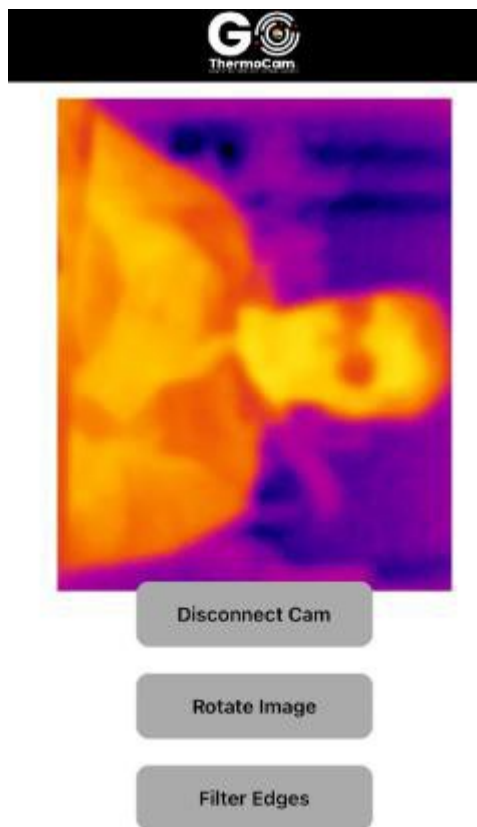
Password for the go_thermo_cam network is "**12345678**". After successful connection with go_thermo_cam, the app can now be opened.



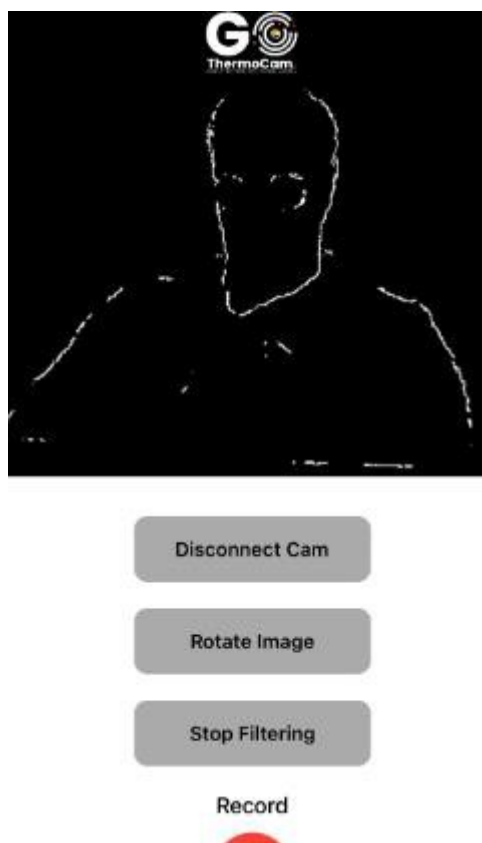
When the logo is clicked, the live thermal image is loaded into the app and should look something like this.



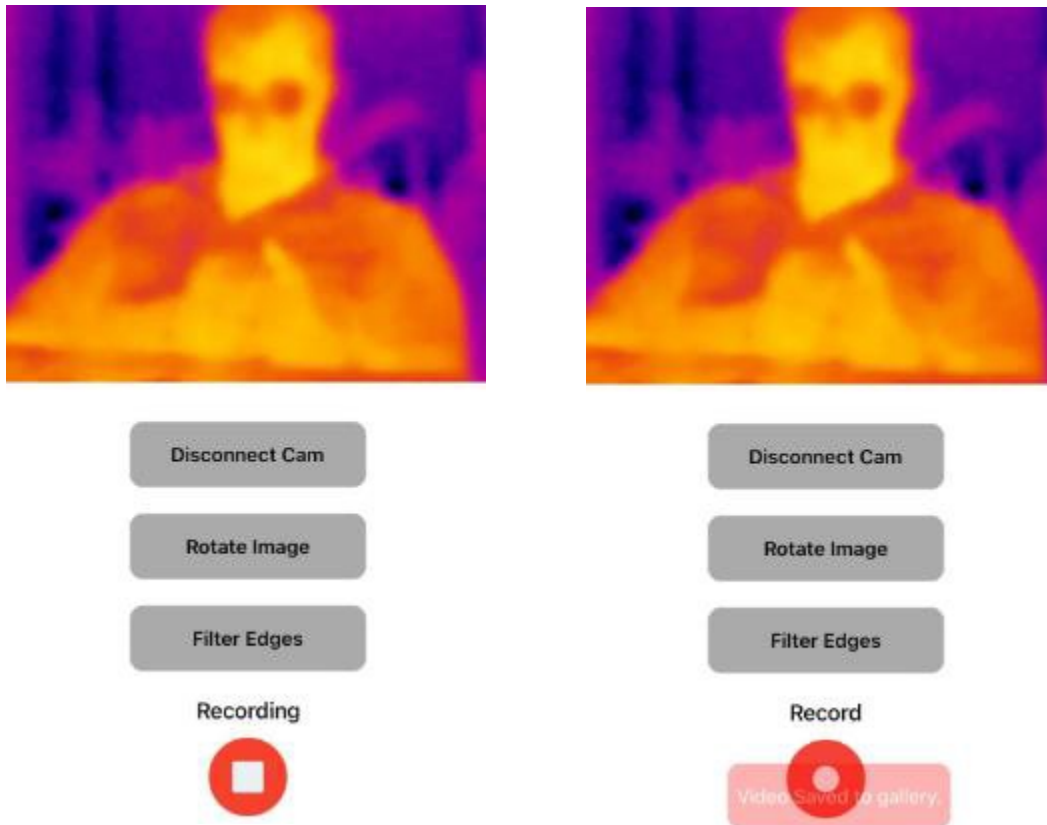
Click on "Rotate Image" to rotate the live image by 90°.



Click on "Filter Edges" to filter the live thermal image.



Click on "Record" to record the live thermal image and save it in chunks in the smartphone memory.



Do you have any questions regarding the iOS Go-Thermocam app? Then write to us at gothermocam@gmx.at.