Tutorial

Creating a console —
David & John

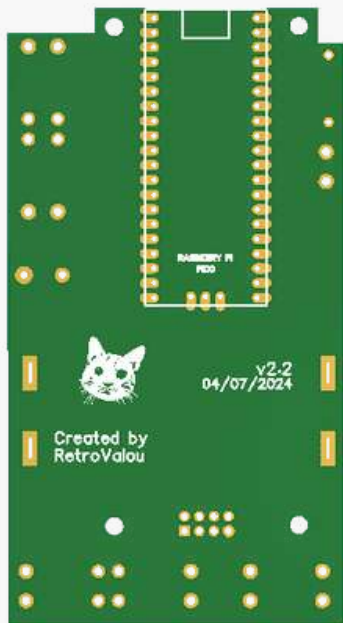by RetroValou

Tools and materials

/01

Materials

E-Paper Weaxie WeAct Studio
2.9 - Black-White
(Link Aliexpress)

Raspberry Pi Pico
Standard, without pin
(Link kubii)

PCB *David&John*
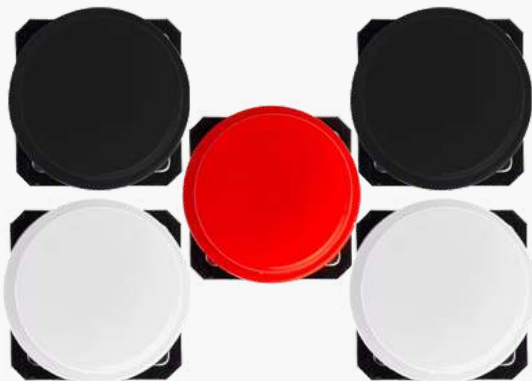(file Gerber available)
(to be ordered from
JLCPCB for example)

Button Power
3Pin L-type black
(Link Aliexpress)

Schottky Diode
1N5817
(Link Aliexpress)

Batterie shrapnel
2 Pairs
(Link Aliexpress)

Push buttons
5 buttons
(Link Aliexpress)

Passive buzzer
(Link Aliexpress)

Insert Nut
4 nuts
M3 (OD4.5mm) Length 5mm
(Link Aliexpress)

Carbon Screw
4 Screws
ISO7380 M3 6mm
(Link Aliexpress)

Tools

Soldering iron

Tin

3D printer
Tested on an Elegoo
Neptune 3 Pro

PLA
less than
100g

Micro USB cable
WARNING !
not type C!

Screwdriver

Configurations for PCB and 3D printing

/02

PCB

Complete configurations (under JLCPCB)

David&John PCB can be ordered from a custom PCB creation service/site

Result tested with the JLCPCB site

The available Gerber file contains the necessary information for creating the PCB

Important PCB Configurations:
thickness: 0.8mm
- **Layers: 2 (1 should be OK)**
- **Via Covering : Untented**

Gerber file:	PCB David V2.1_PCB_PCB David V2.1__20240717102034.zip_Y7	Build Time:	2 days
Base Material:	FR-4	Layers:	2
Dimension:	58.2 mm* 106.3 mm ~~58.17mm* 106.3mm~~	PCB Qty:	10
Product Type:	Industrial/Consumer electronics	Different Design:	1
Delivery Format:	Single PCB	PCB Thickness:	0.8
Impedance Control:	no	Layer Sequence:	
PCB Color:	Green	Silkscreen:	White
Material Type:	FR4-Standard TG 135-140	Via Covering:	Untented
Surface Finish:	HASL(with lead)	Deburring/Edge rounding:	No
Outer Copper Weight:	1 oz	Gold Fingers:	No
Flying Probe Test:	Fully Test	Castellated Holes:	no
Edge Plating:	No	Mark on PCB	Order Number
4-Wire Kelvin Test:	No	Paper between PCBs:	No
Appearance Quality:	IPC Class 2 Standard	Confirm Production file:	No
Silkscreen Technology:	Ink-jet/Screen Printing Silkscreen	Package Box:	With JLCPCB logo
Board Outline Tolerance:	±0.2mm(Regular)		

Configurations for PCB and 3D printing

3D printing

Basic configuration used in Cura 5.6.0 under an Elegoo Neptune 3 Pro (check that the settings are activated in Cura!)

Quality
Layer height: 0.12 mm
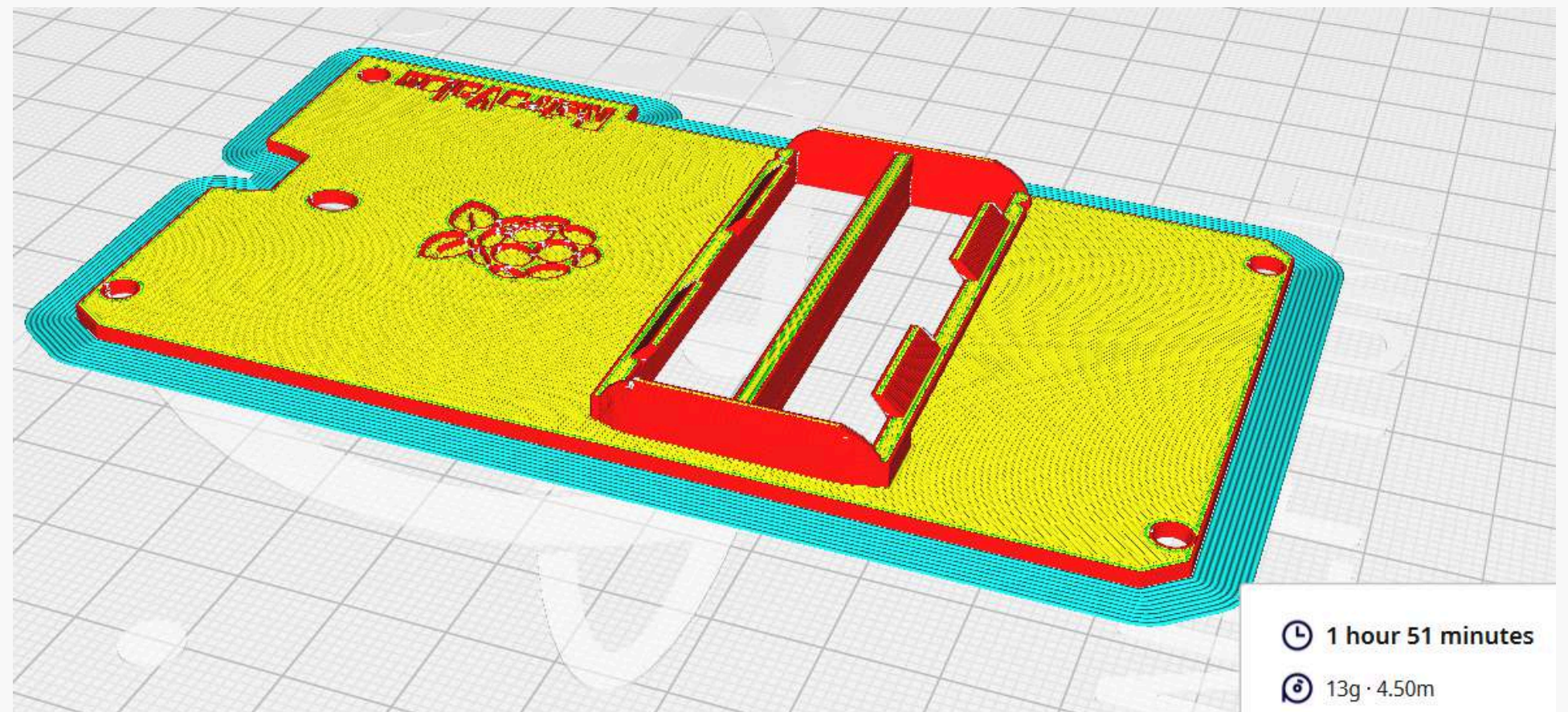*Line width: 0.4 mm*
Flow Percentage: 105%

Speed
Print Speed: 50 mm/s

Back case configuration
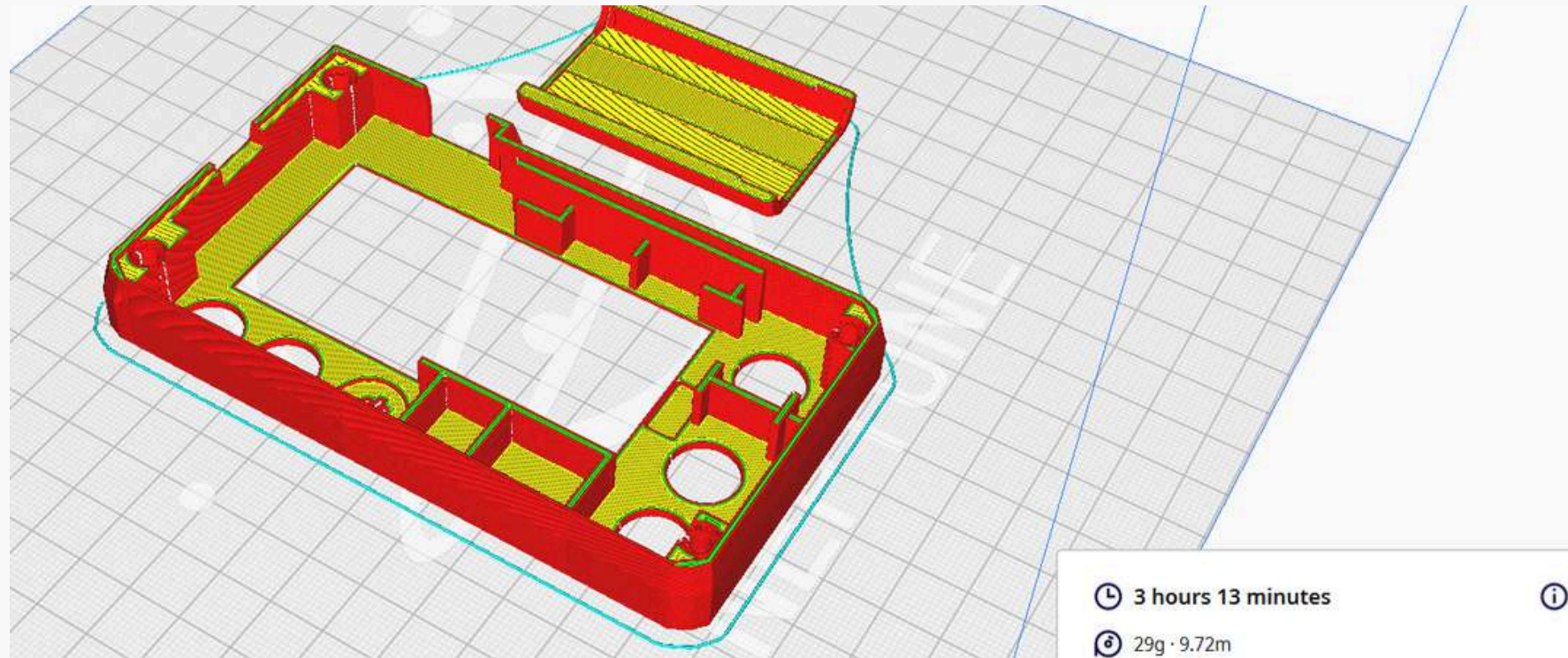
Adhesion of the plate
Plate adhesion type: Edge

Up down
Activate stretching Stretch flow: 15%

🕐 1 hour 51 minutes
⏱ 13g · 4.50m

3D printing

Front case and battery cover configuration

Adhesion of the plate
Type of grip of the deck: Skirt

WARNING ! I advise you to use a little glue for better adhesion to the tray

3 hours 13 minutes
29g · 9.72m

Configuration maintains screen and PCB

Adhesion of the plate
Plate adhesion type: Edge

Supports
Generate supports

1 hour 6 minutes
9g · 2.88m

Configurations for PCB and 3D printing
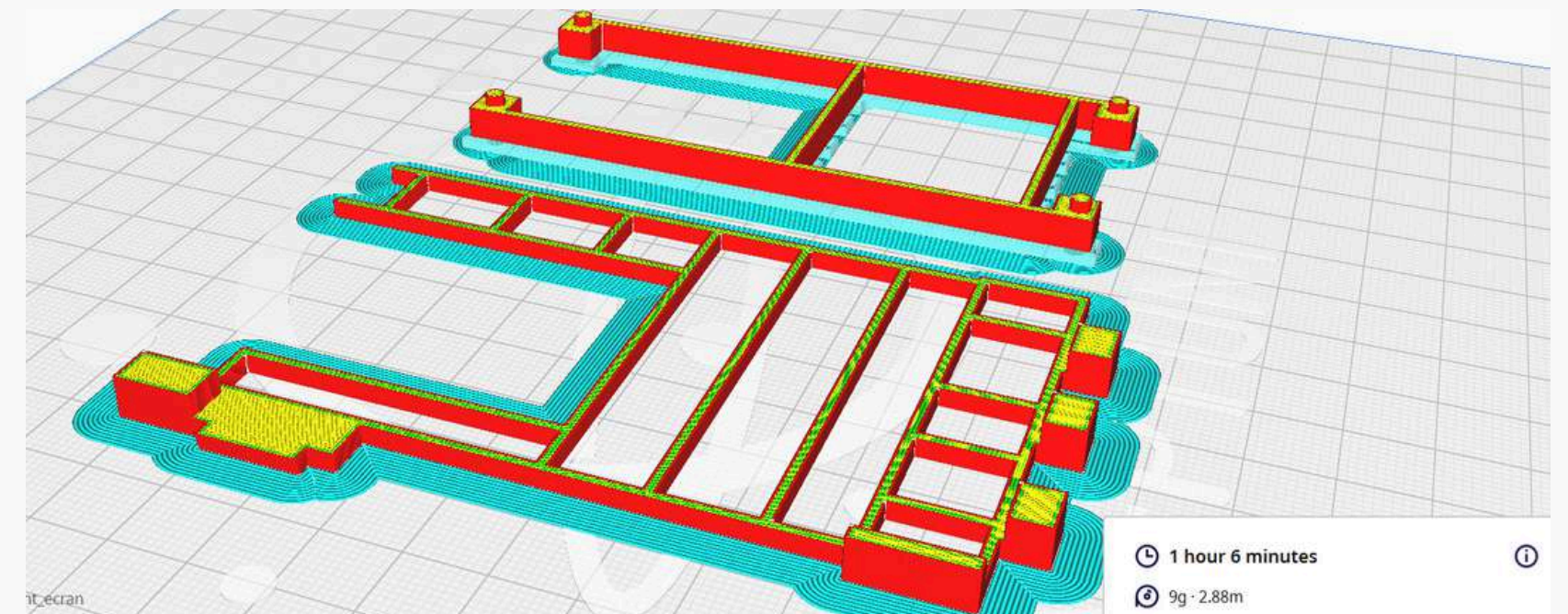
Soldering the PCB
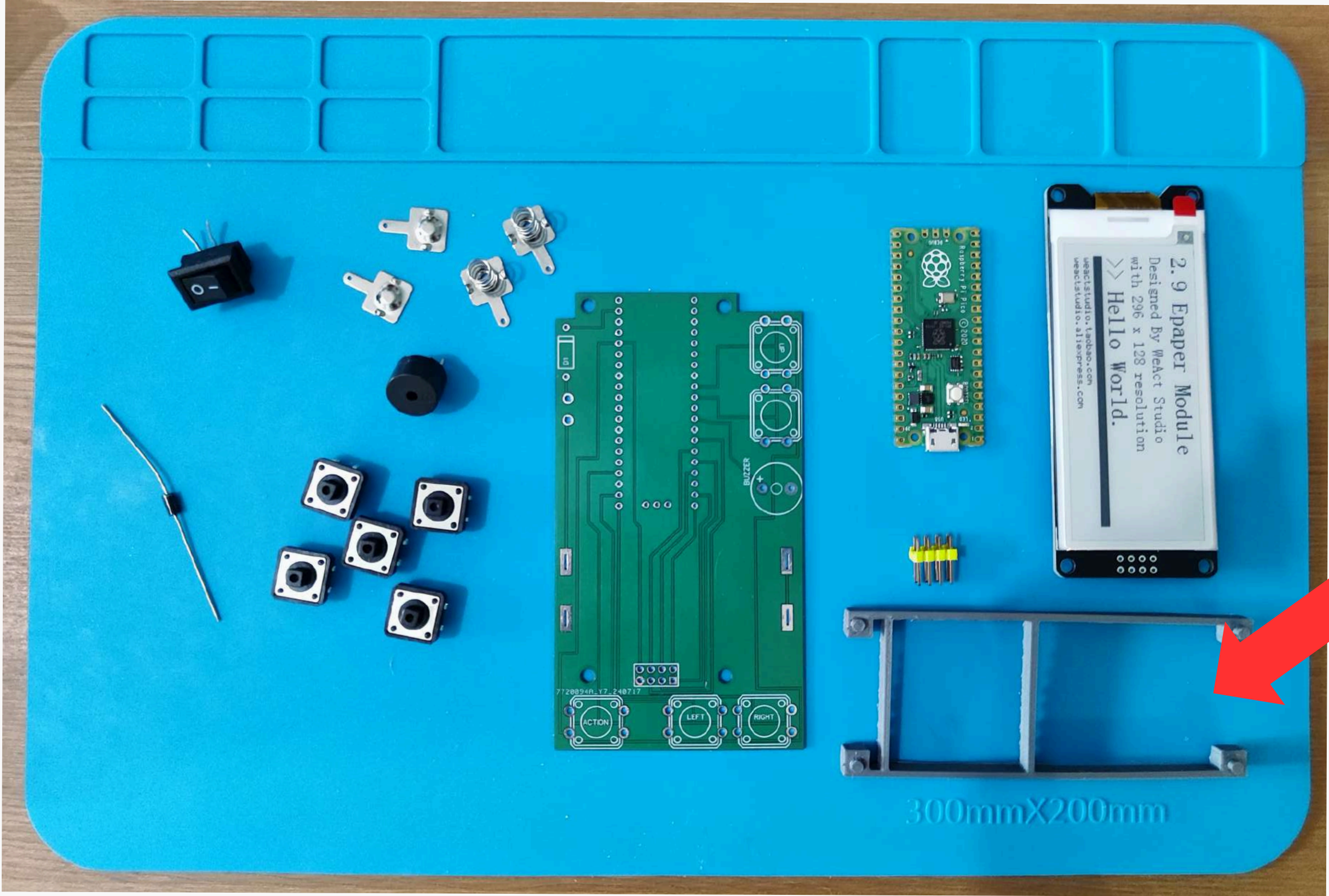
Materials

You need to print this part before you start soldering!
(Part Maintains Screen)

Materials
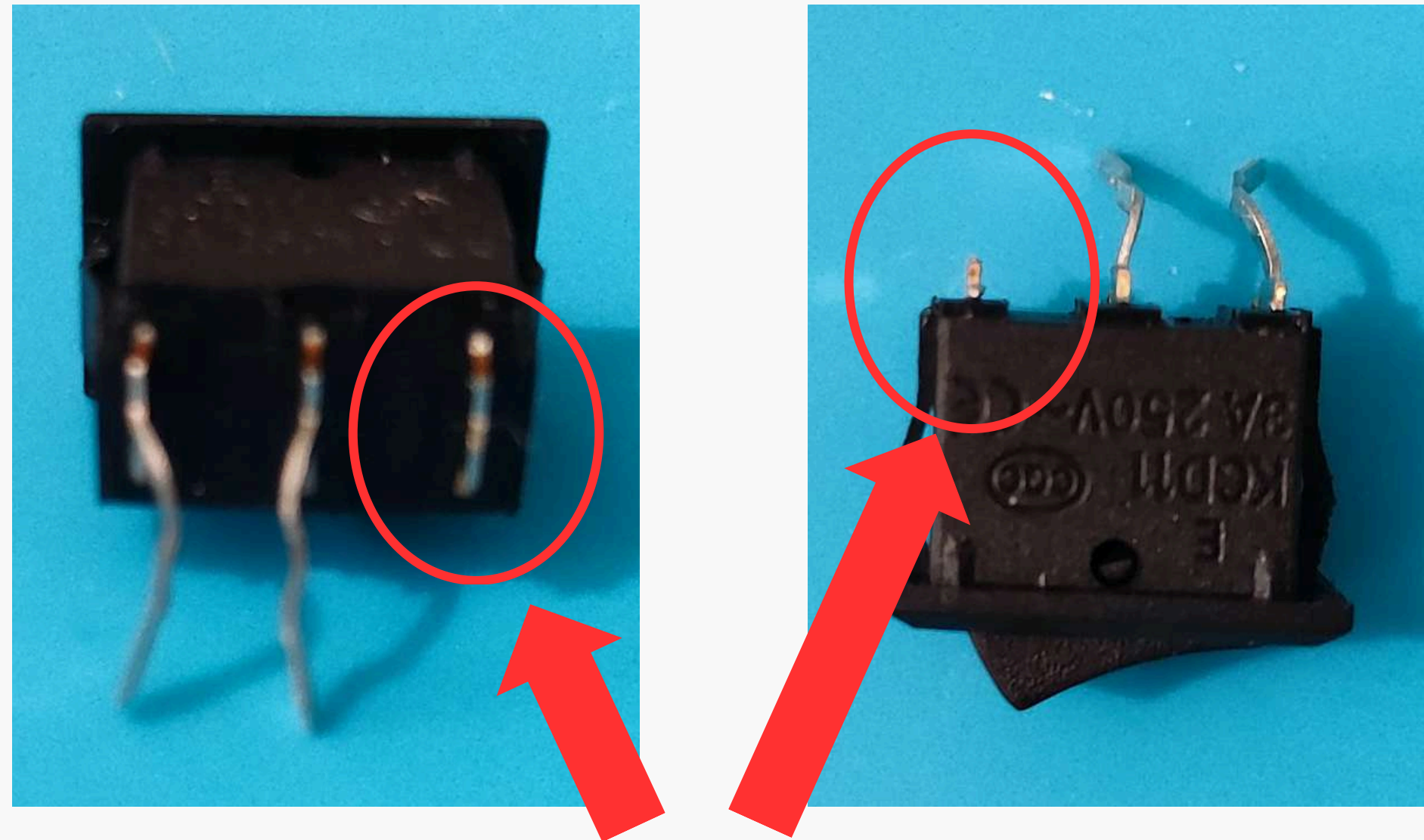
You must also cut one of the pins present
on the power button
(pin most at the edge and on the same side
as the "|" logo)
(WARNING! the button available with the 2
pins on Aliexpress is reversed!)

Soldering the screen

There is no specific order for the steps to follow for welding. You can start by soldering the buttons, the Raspberry pi or the screen.
However, the order defined here is the one that makes it easier to weld

The first step is to solder the screen pins
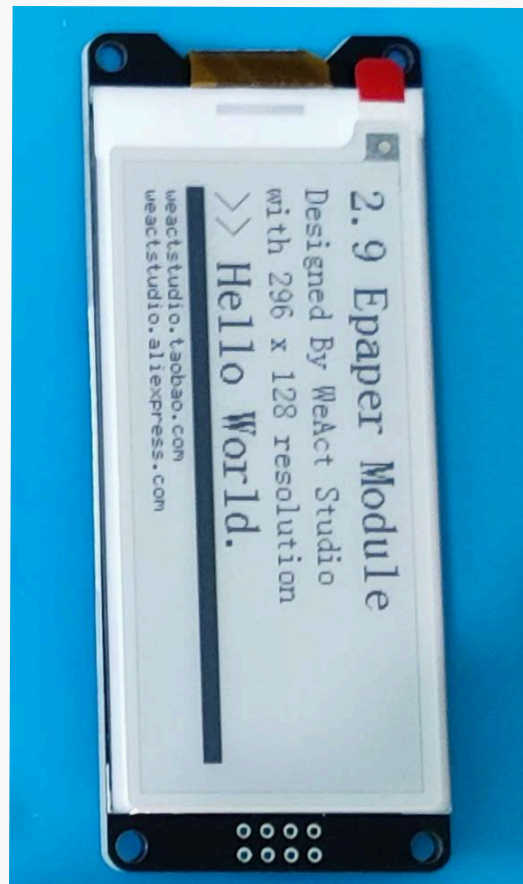
Included with the purchase of the screen
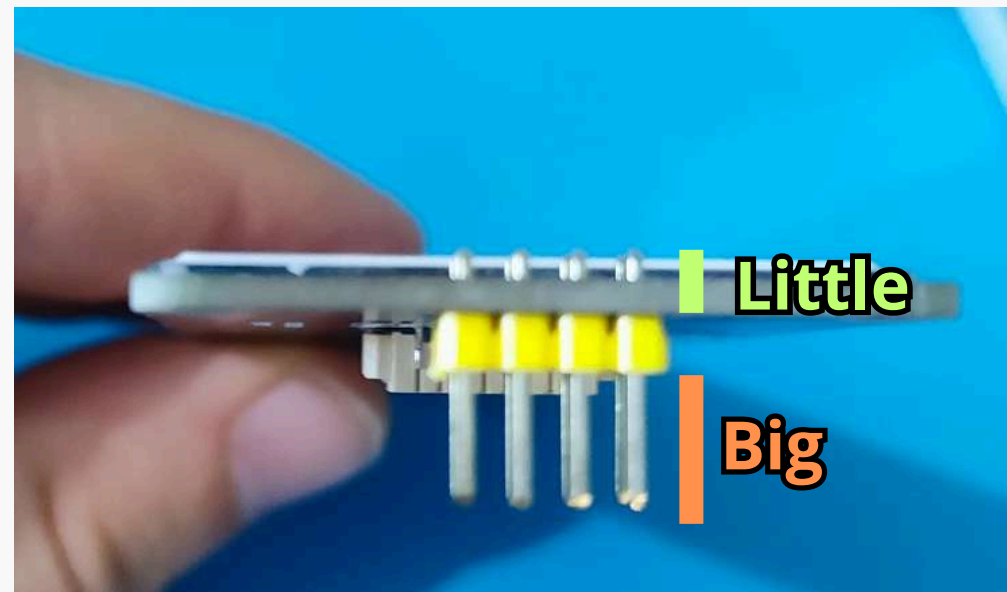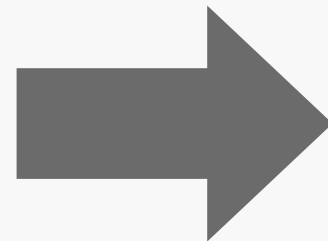
Position the pins so that the smallest part is the one that fits into the screen (yellow part on the back of the screen!)
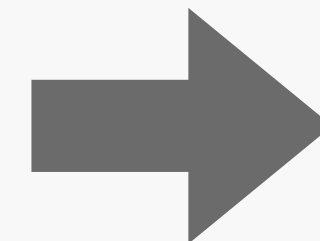
Solder the 8 Pins
Be careful that none of the pins are connected together

Soldering the screen

Position the printed "screen hold" part on the PCB like this.
It is used to have the right distance between the screen and the PCB The rods must fit into the holes of the PCB

Position the screen on the support the rods must fit into the holes of the screen
The pins of the screen must fit into the 8 vias (holes) of the PCB

at the end, the screen, PCB and printed part should be like this

Soldering the screen

Side with the Cat!
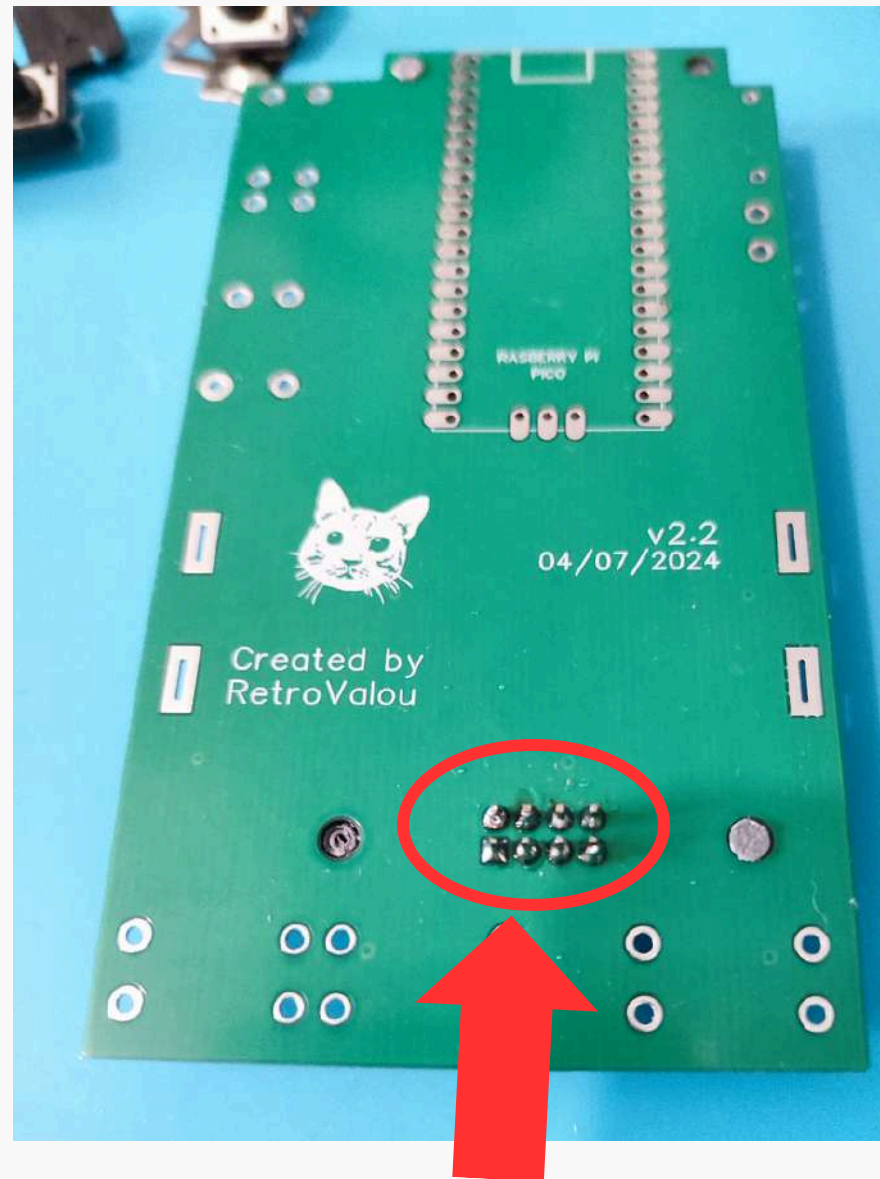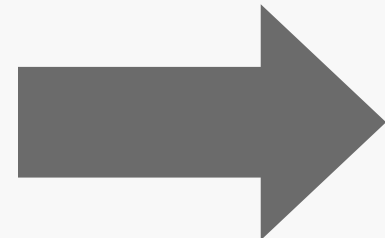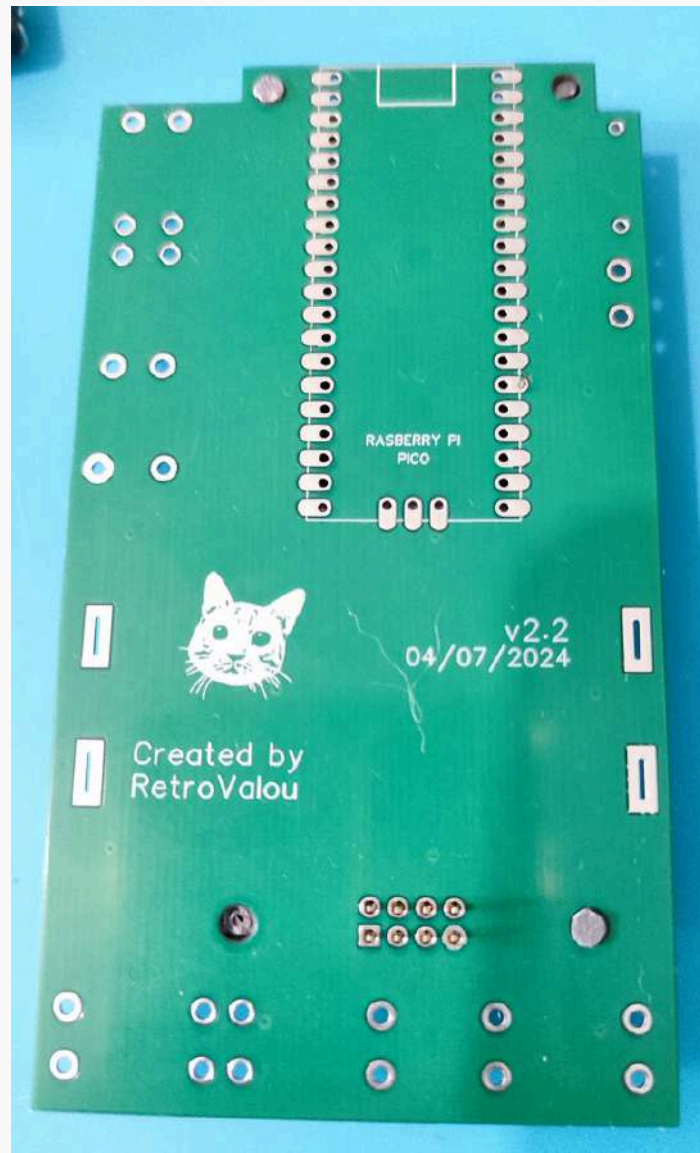
The screen is welded!

Flip the screen and PCB over. Be careful that the screen, the PCB and the printed part remain fitted!

Solder the 8 Pins Be careful that none of the pins are connected together

Soldering the PCB

Soldering the Raspberry PI Pico

Side with the Cat!
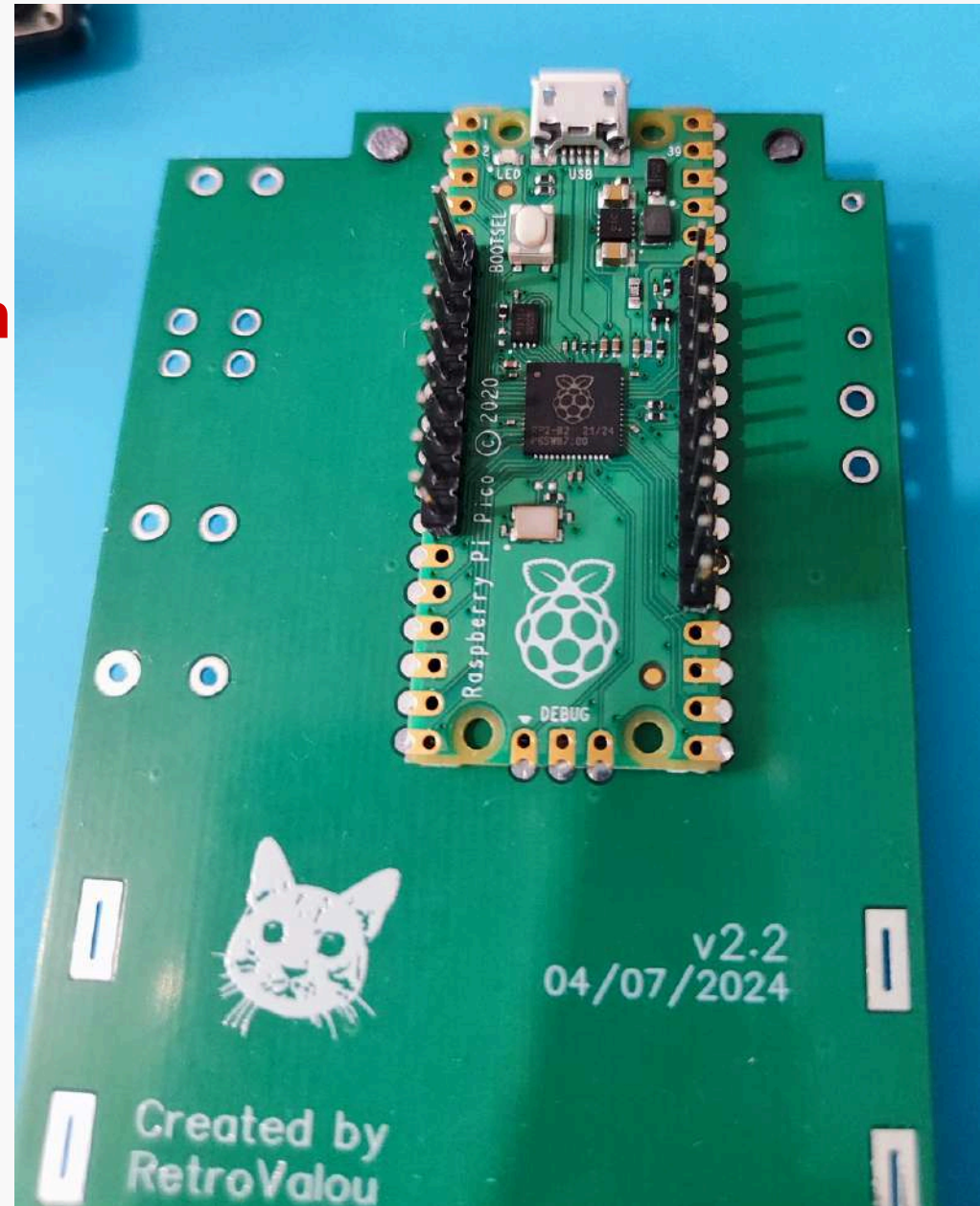
For this step, the easiest way to position and hold the Raspberry Pi during soldering is to use a row of standard pins found for example with the PI
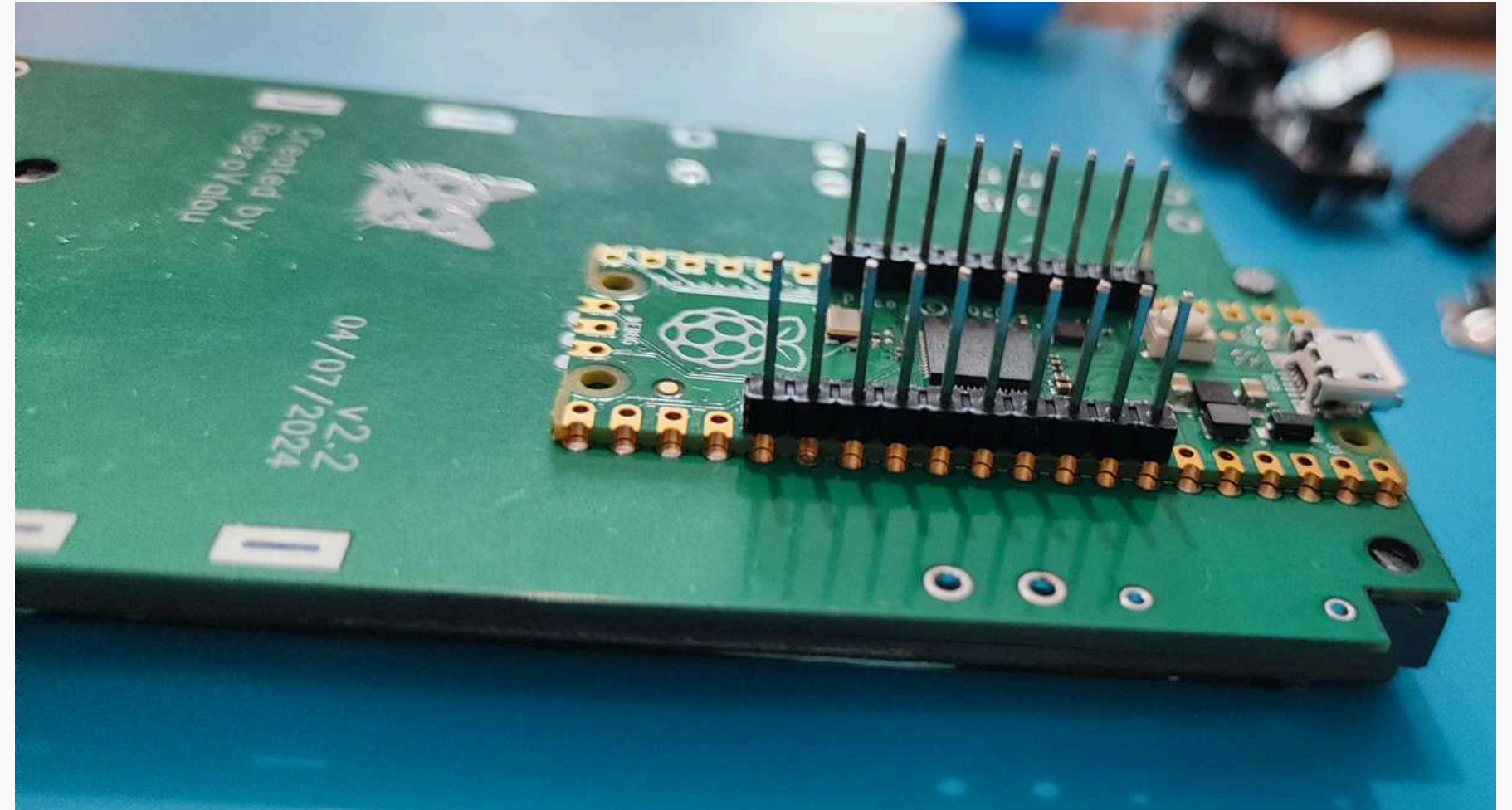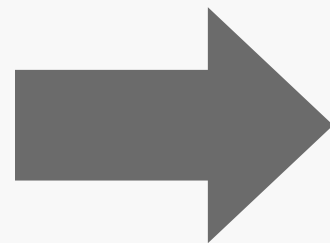

Use the shortest part of the pins to prevent them from touching the soldered screen.
WARNING ! we are not going to solder the pins, they are only used to hold them during soldering. They are not obligatory but strongly recommended
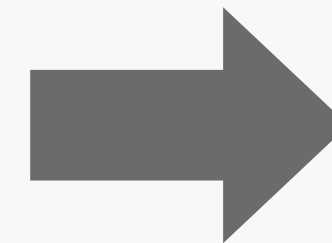
Soldering the Raspberry PI Pico
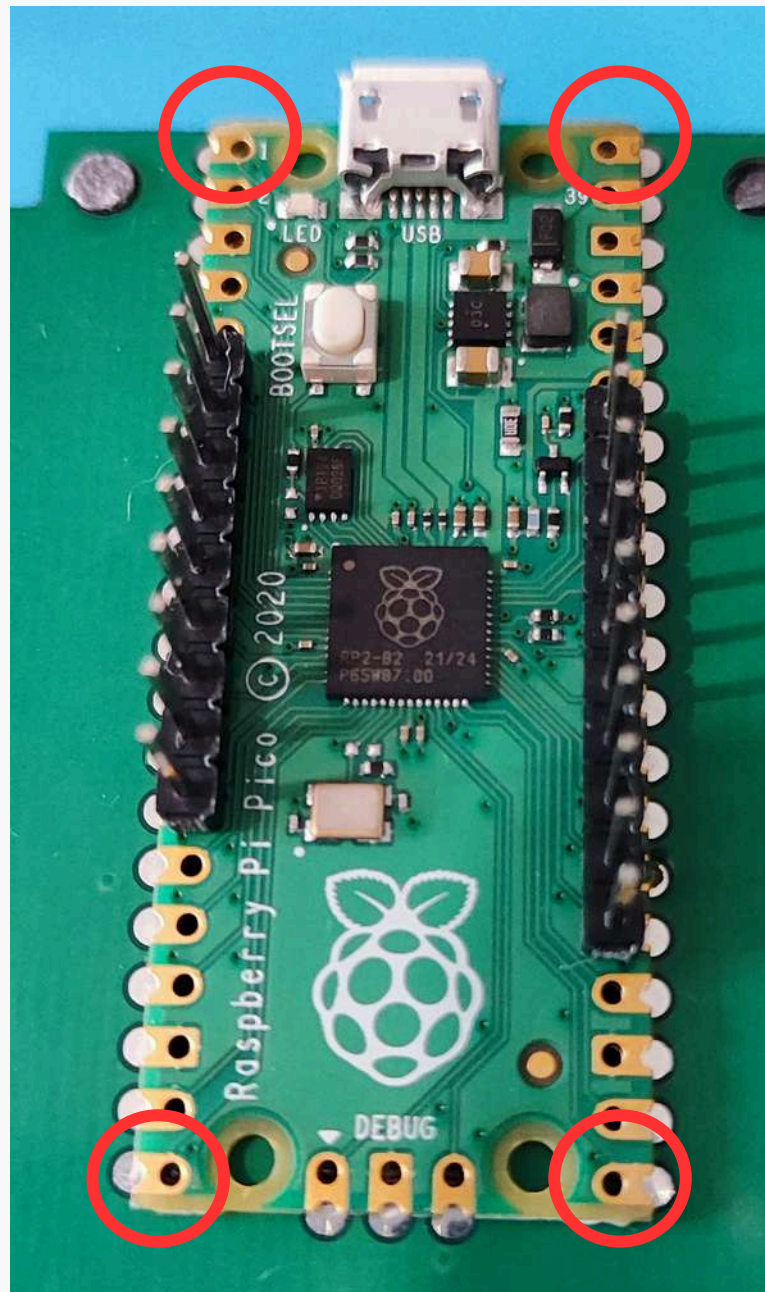
First solder the 4 pins in the corners so that the Raspberry pi is held by the PCB
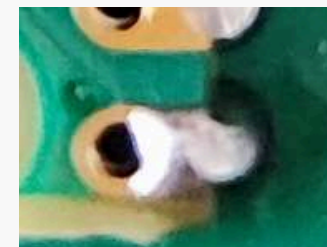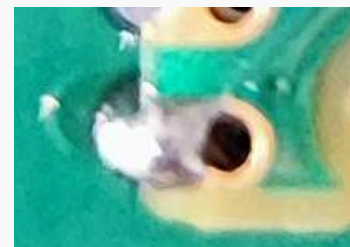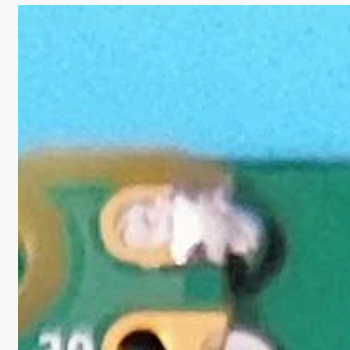
The tin must be present on the side of the Raspberry PI and in contact with the copper part which protrudes from the PCB
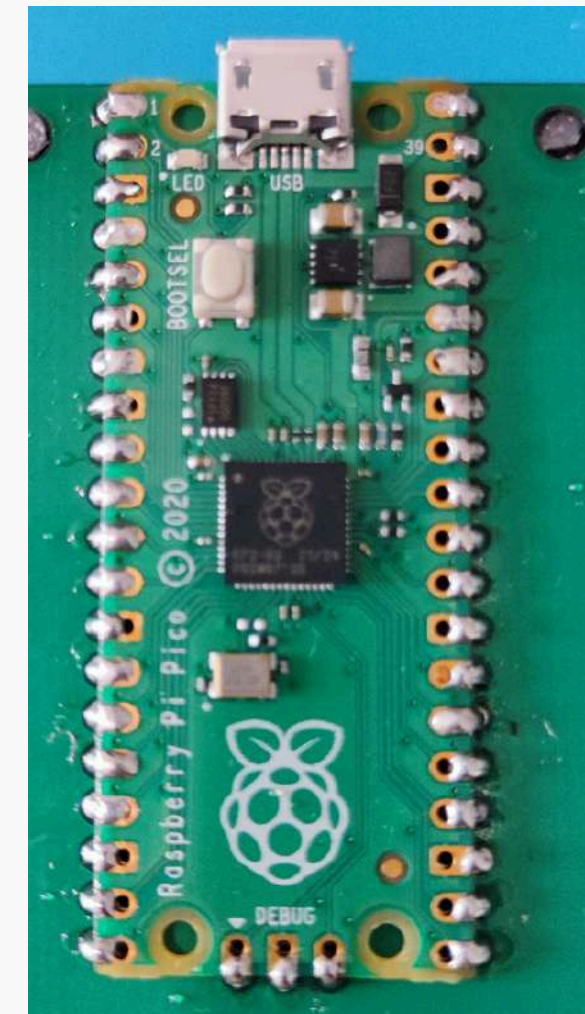
You can remove the rows of pines serving as aids.
Solder the rest of the pins to the PCB. Technically, not all pins are necessary but it's better to solder them all for strength!
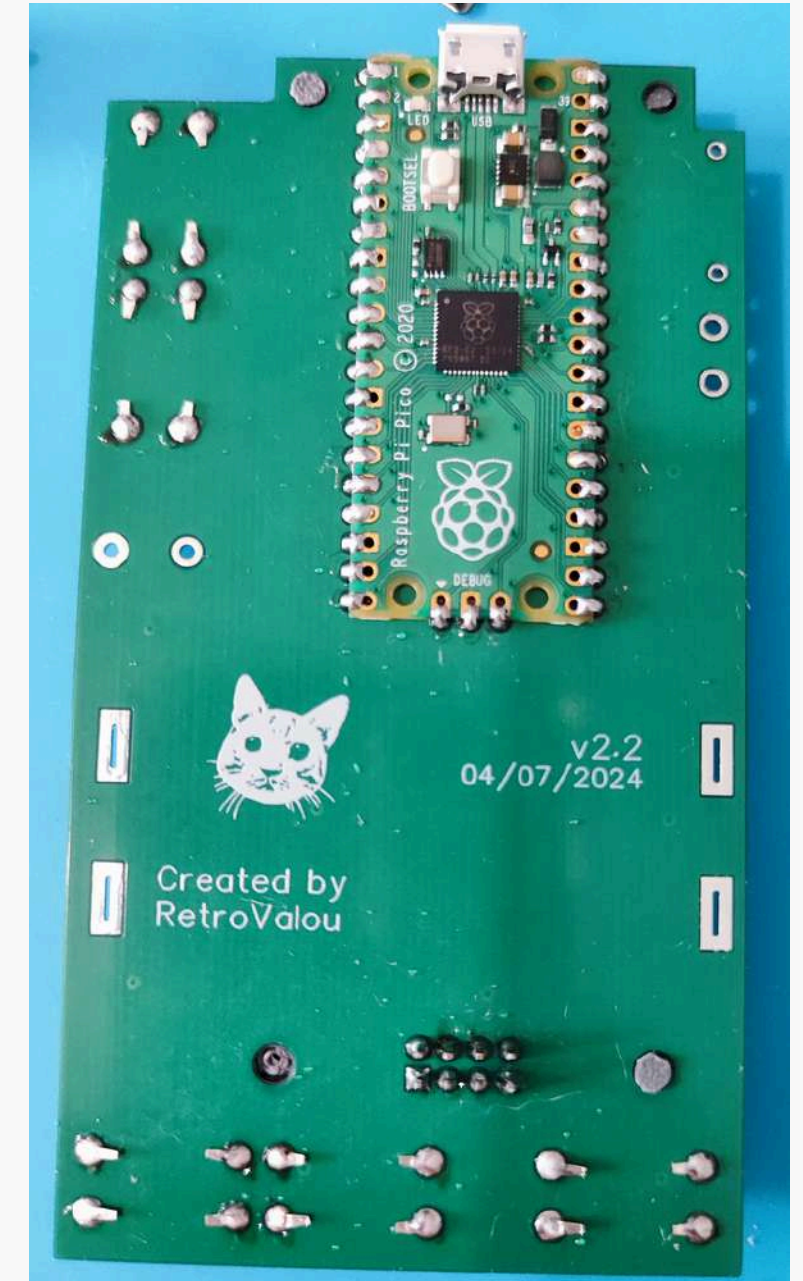
Soldering the buttons

Side without the Cat!

Position the 5 buttons on the PCB like this. The direction of the buttons does not matter

Side with the Cat!

To make soldering easier, I advise you to slightly bend the button pins.
This allows the buttons to fit on the PCB without soldering!

Solder the 5 buttons

Buzzer soldering

Position the buzzer on the PCB like this.

Side without the Cat!
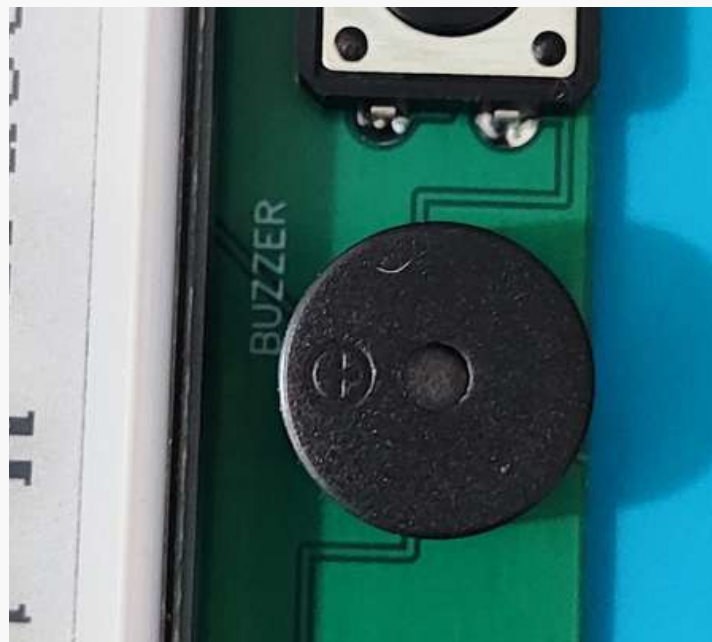
The (+) present on the buzzer must be on the screen side

Side with the Cat!

To make soldering easier, I advise you to slightly bend the buzzer pins.
WARNING ! They must be folded downwards otherwise they risk getting in the way during assembly.
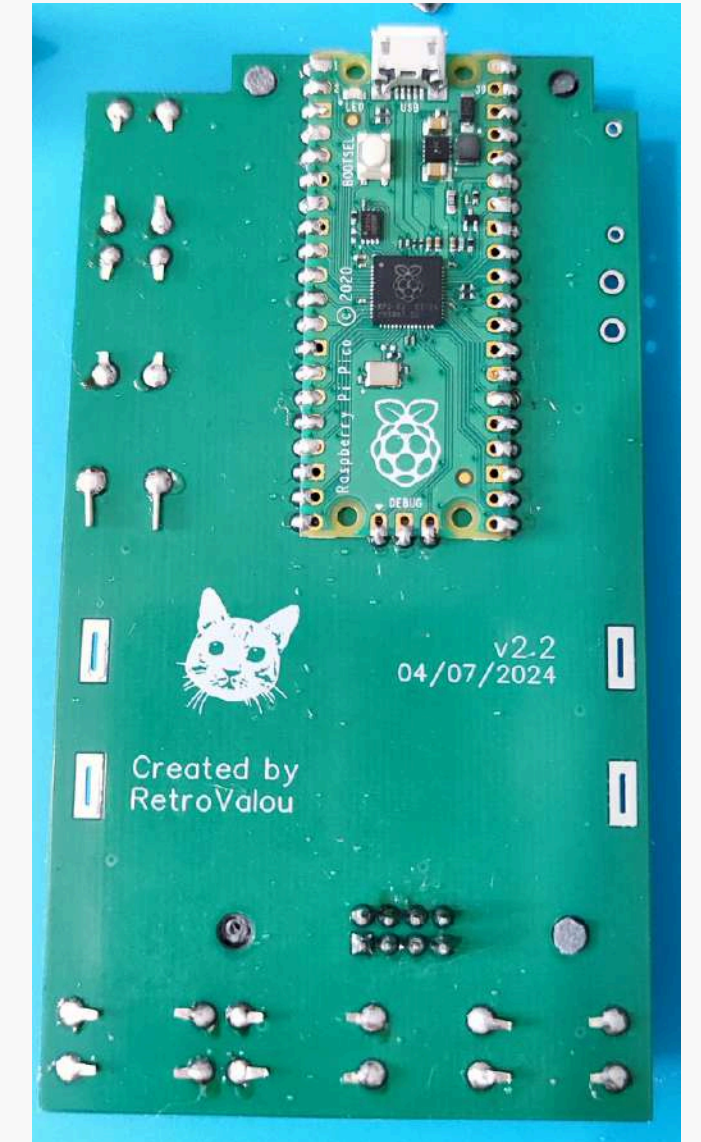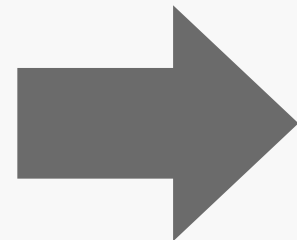

Solder the buzzer

Soldering the Power button

Side without the Cat!
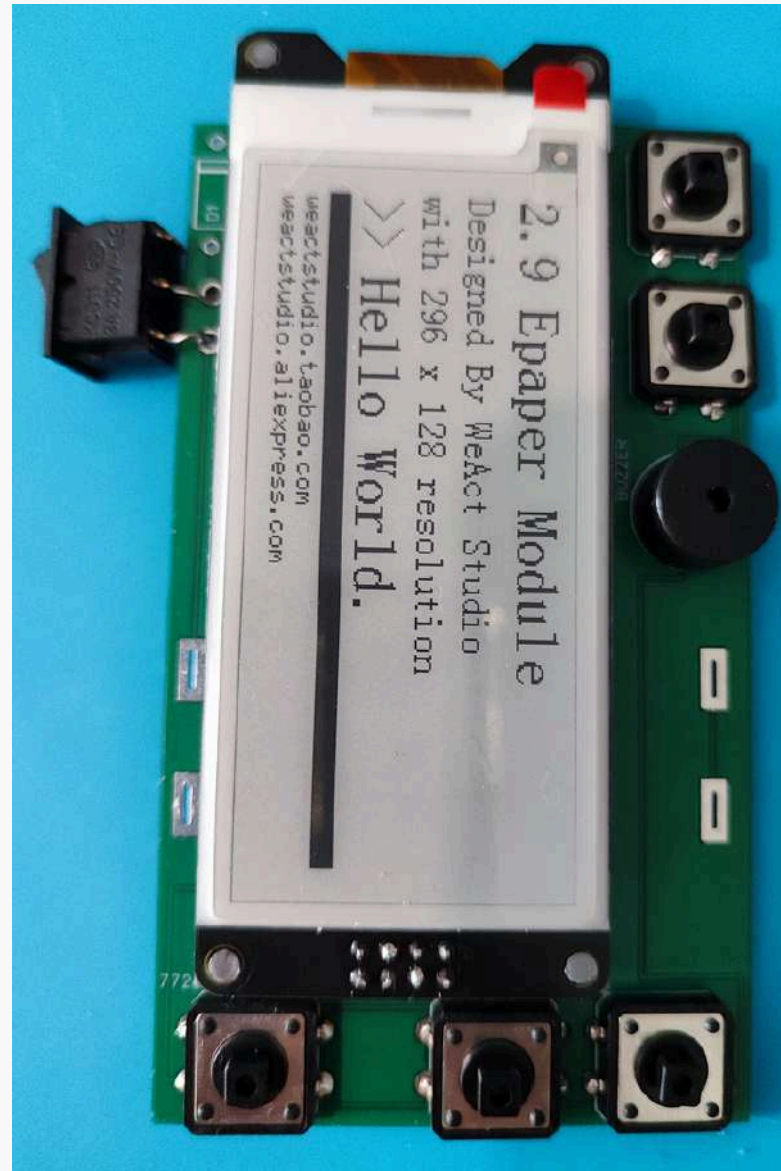
Side with the Cat!

Position the Power Button like this
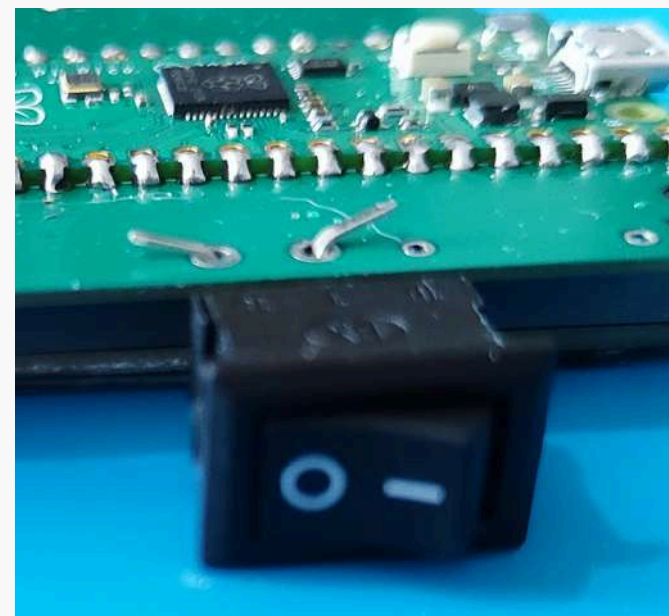
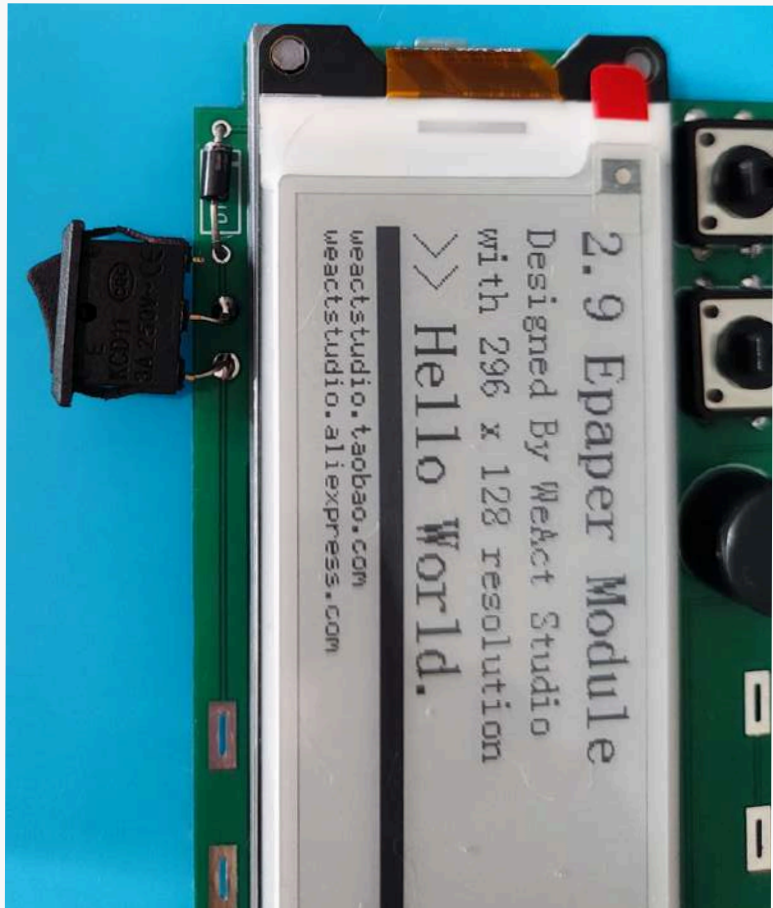Make the button flush with the cat side PCB
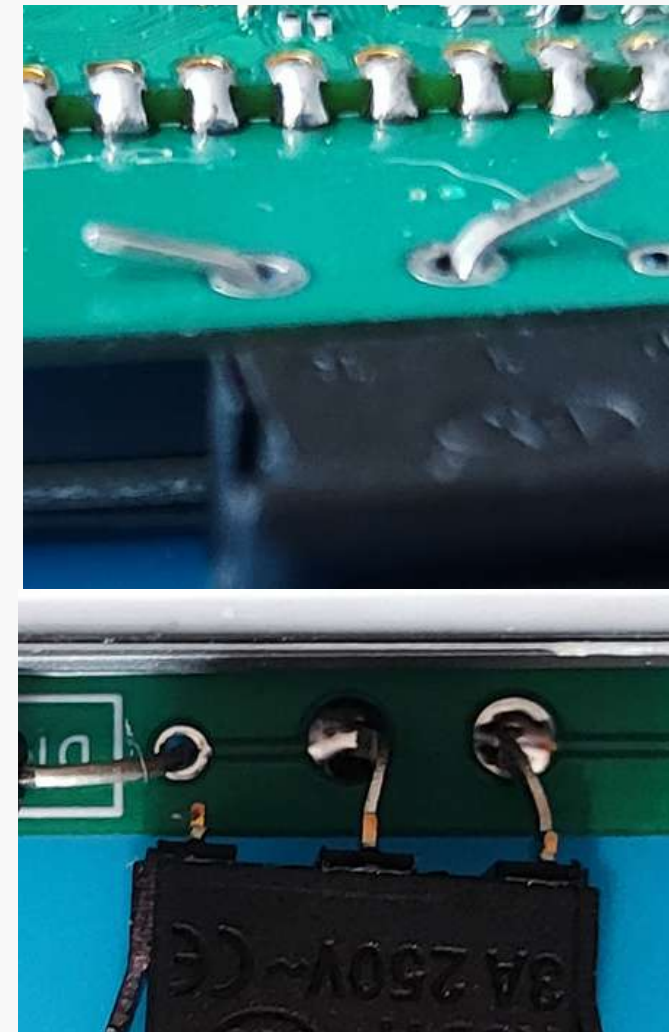
To make soldering easier, I advise you to slightly bend the pins of the power buttons on both sides of the PCB
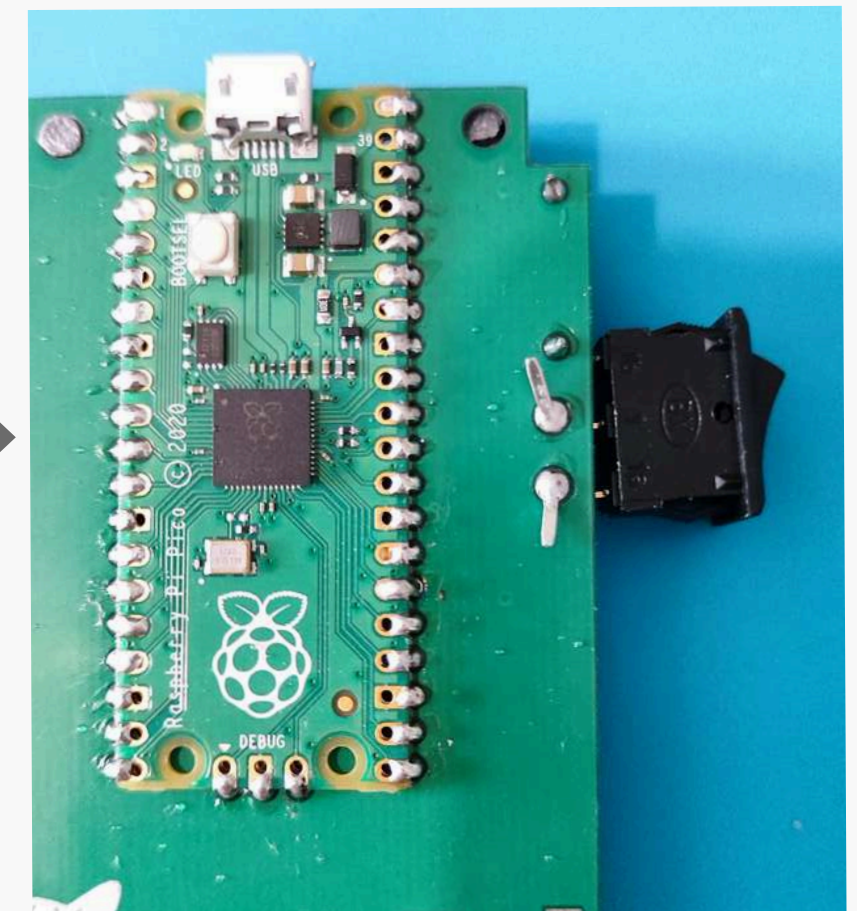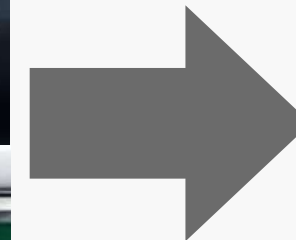
Solder the Power button

Diode soldering

Position the diode like this
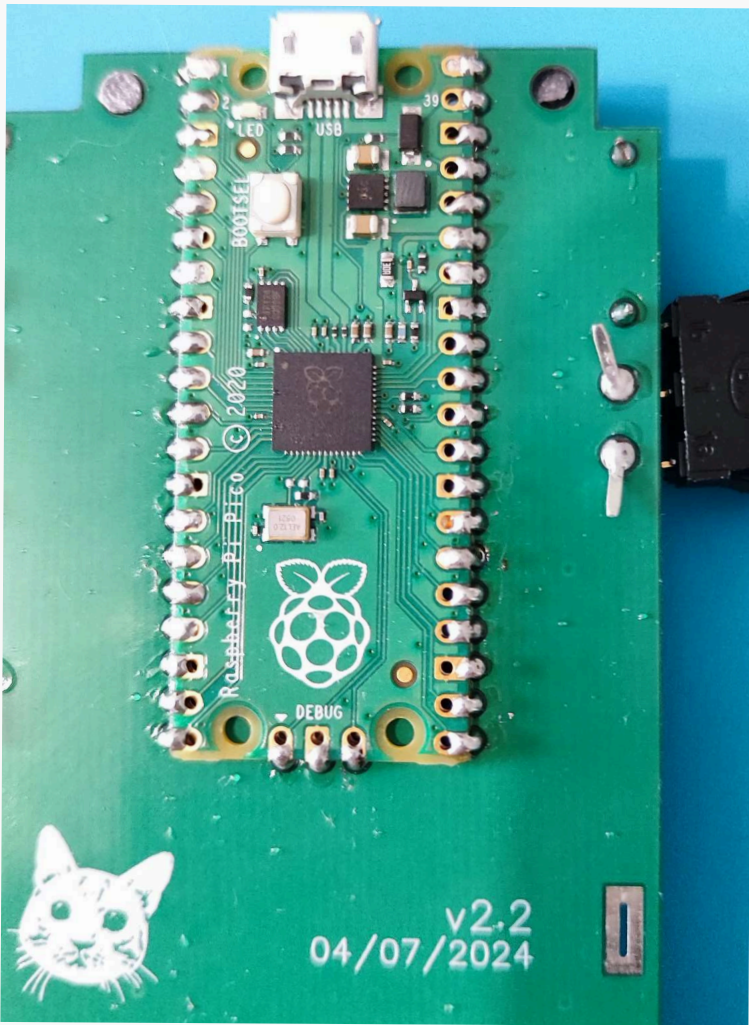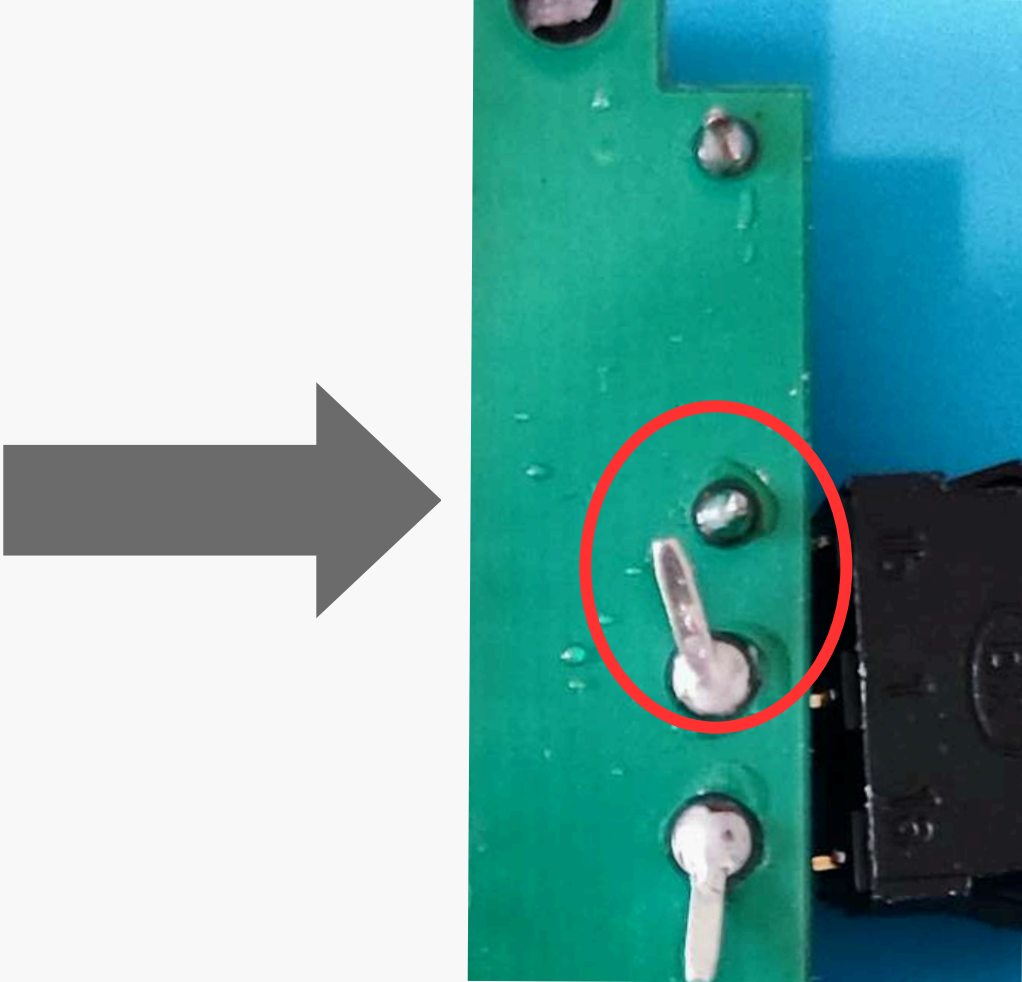
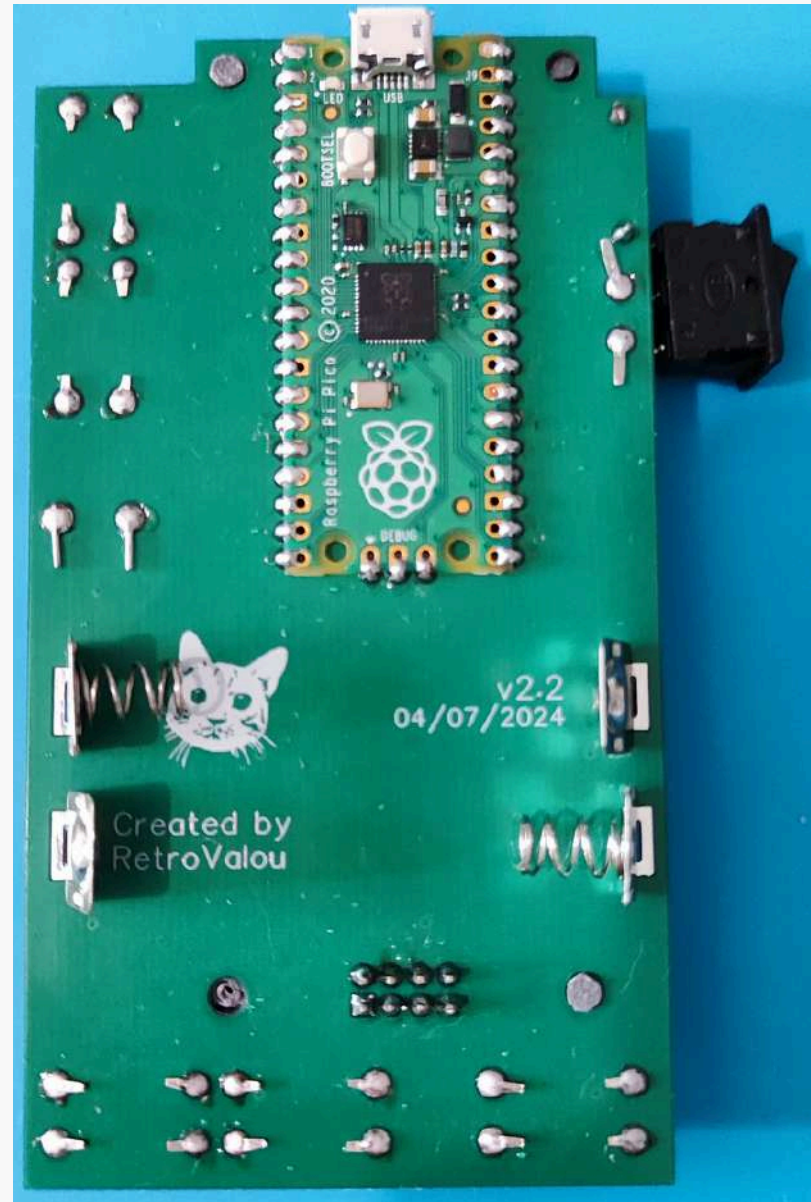The gray line of the diode must be upwards (opposite the Power button)

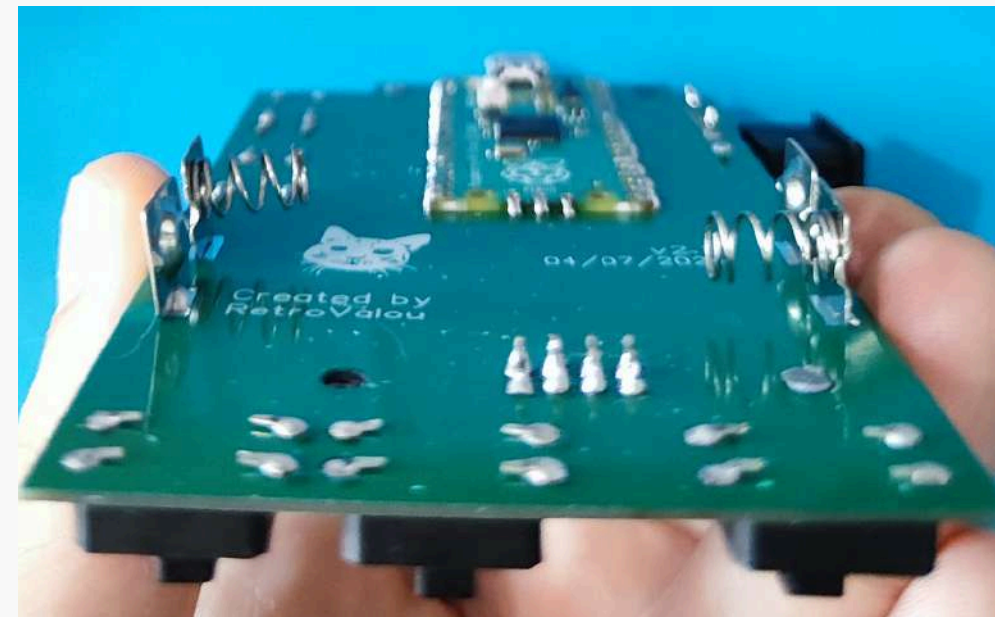Solder the diode and cut the pins to shorten them

Normally, there is no risk if the pin of the diode and the power button are in contact here (the pins are already connected by the PCB!)

Soldering the PCB

/03

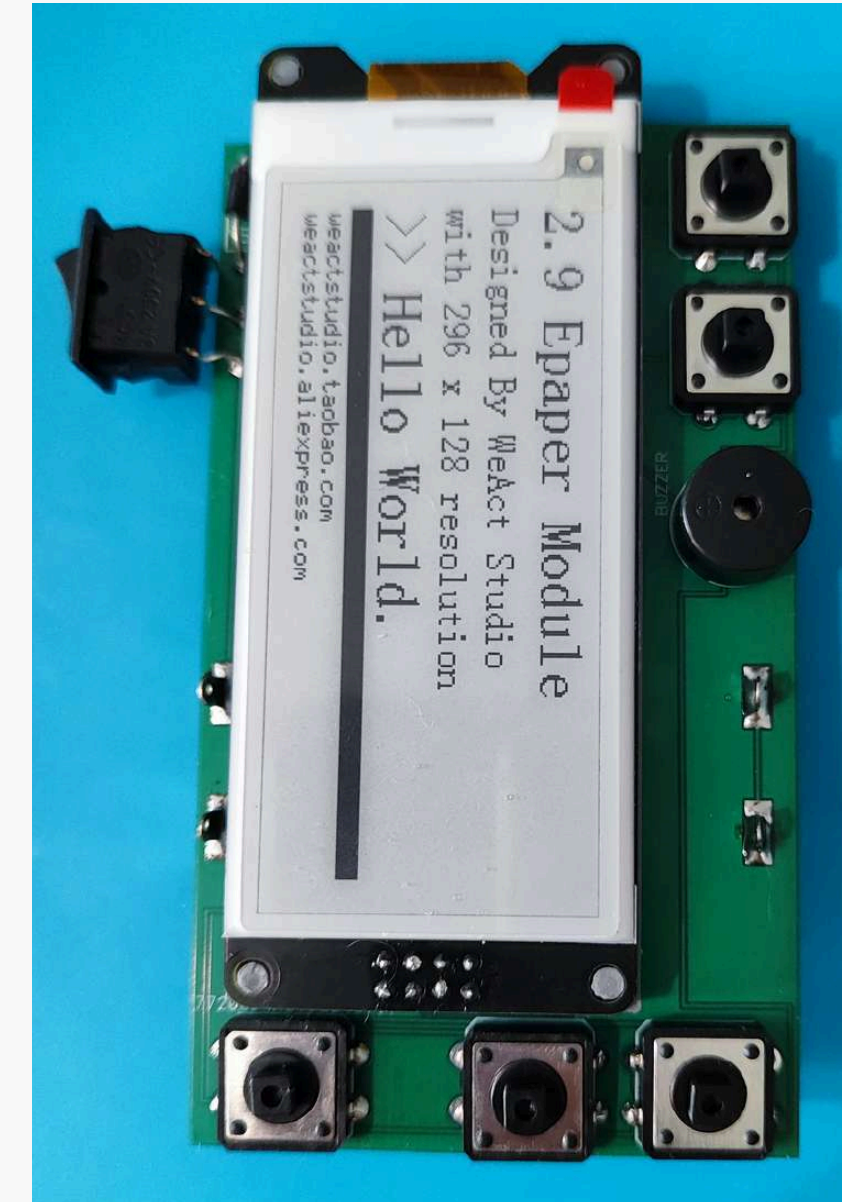# Soldering contacts for batteries

Side with the Cat!

The contacts must be as straight as possible

the battery contacts should be positioned like this
WARNING ! Respect the spring and non-spring contacts
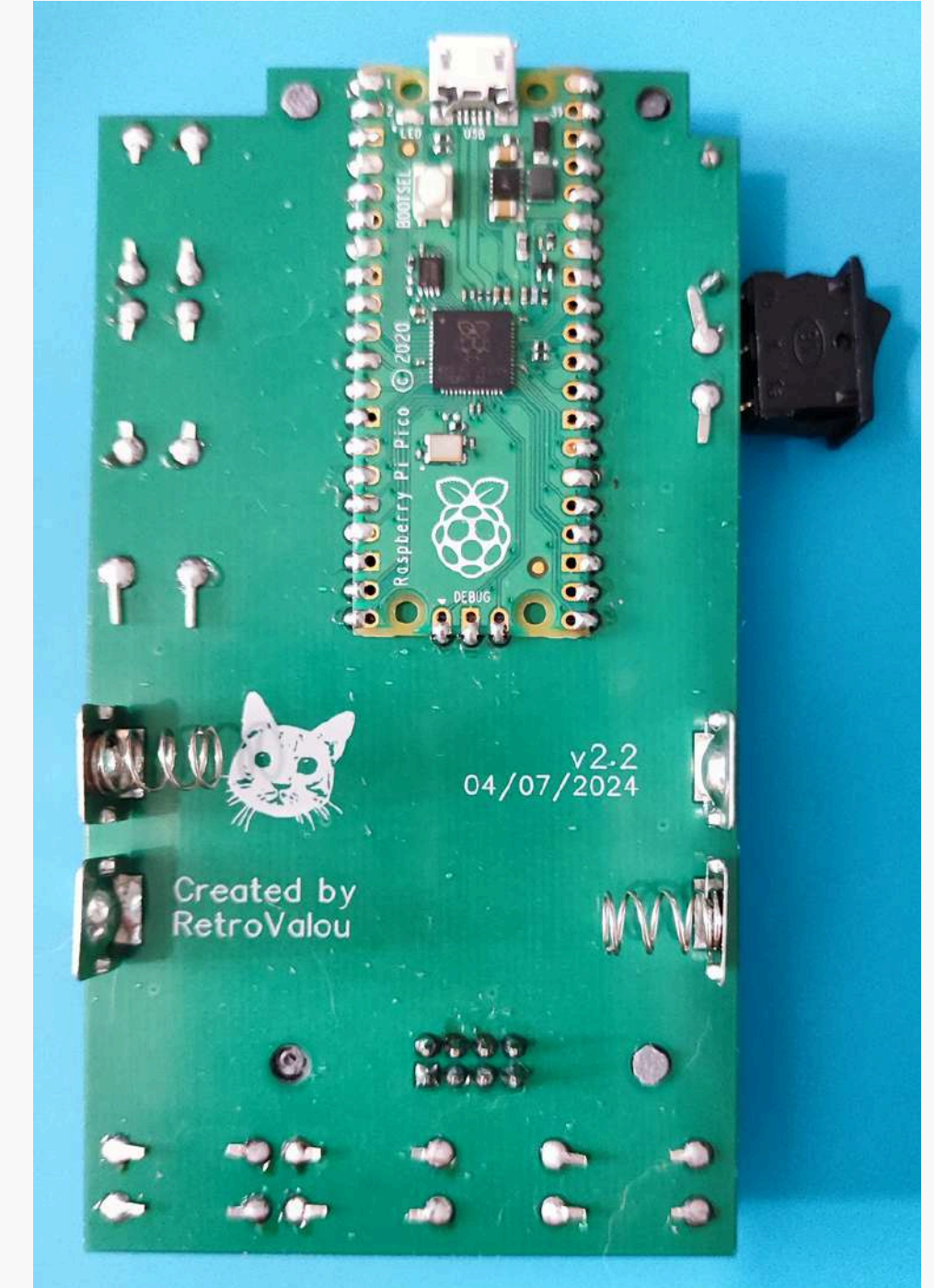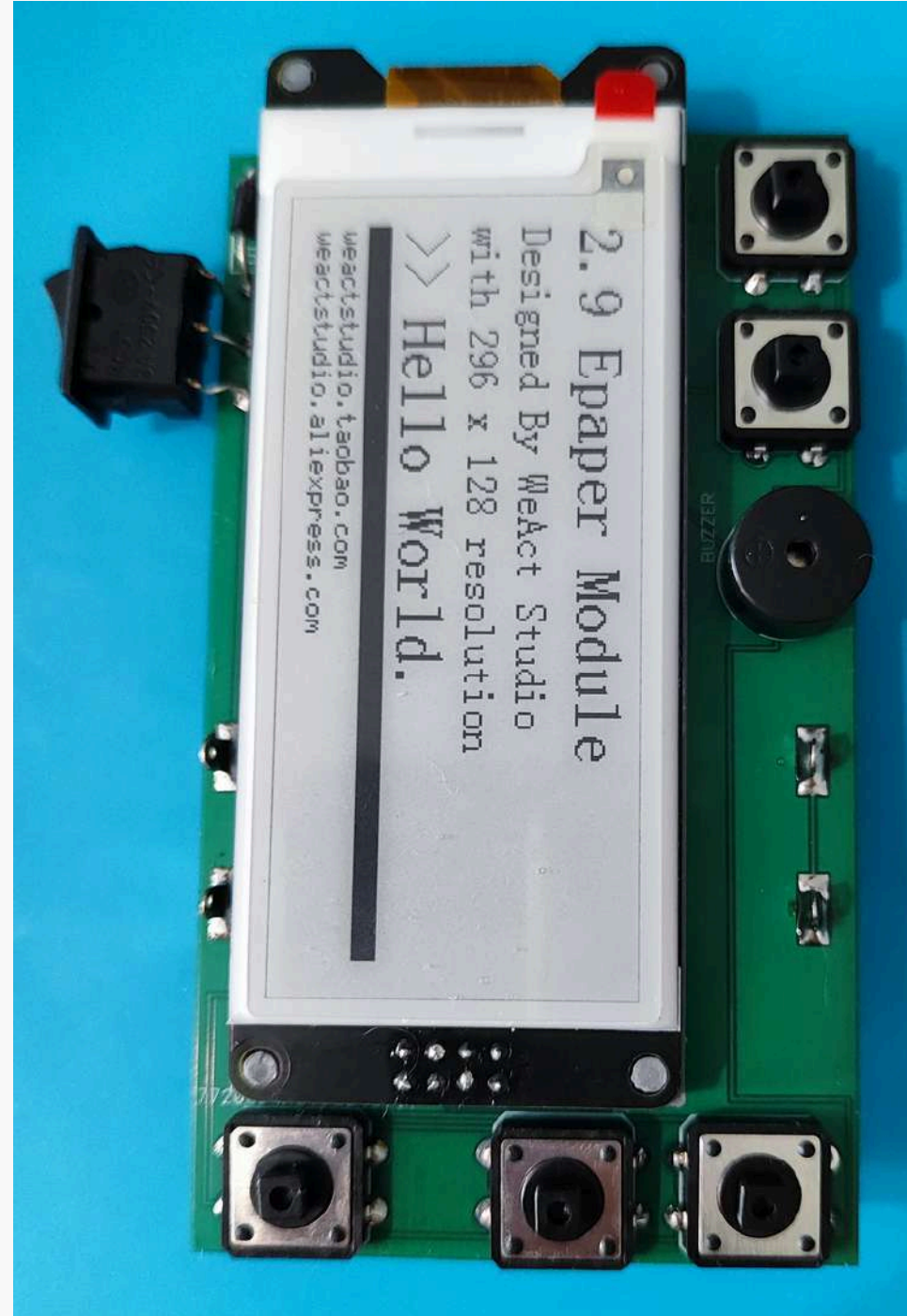

Side without the Cat!

Solder the contacts on the catless side.
This part is the hardest. Unfortunately I don't have much advice to give =(
You can lightly solder on the other side if that makes it easier for you to solder on the screen side

Soldering the PCB

Finish!

**Bravo !
you have finished
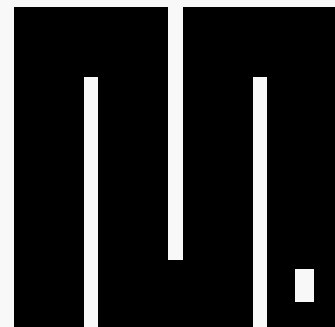soldering the David &
John console PCB!**

Loading the software

Prerequisites

Micro USB cable to connect to the Raspberry PI Pico

Software allowing you to read a Raspberry PI Pico under Micro-Python Software I use: Thonny (does not require installation)
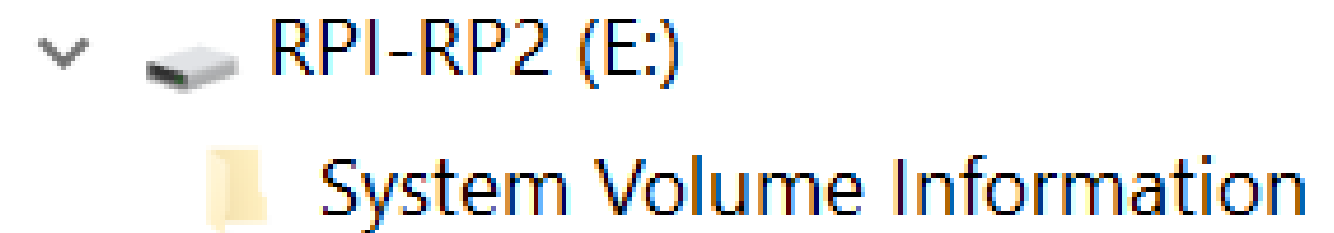
Micro Python Software for Rasberry PI Pico Available in the given files or on the official Micro Python website

Loading the software

Loading Micro Python
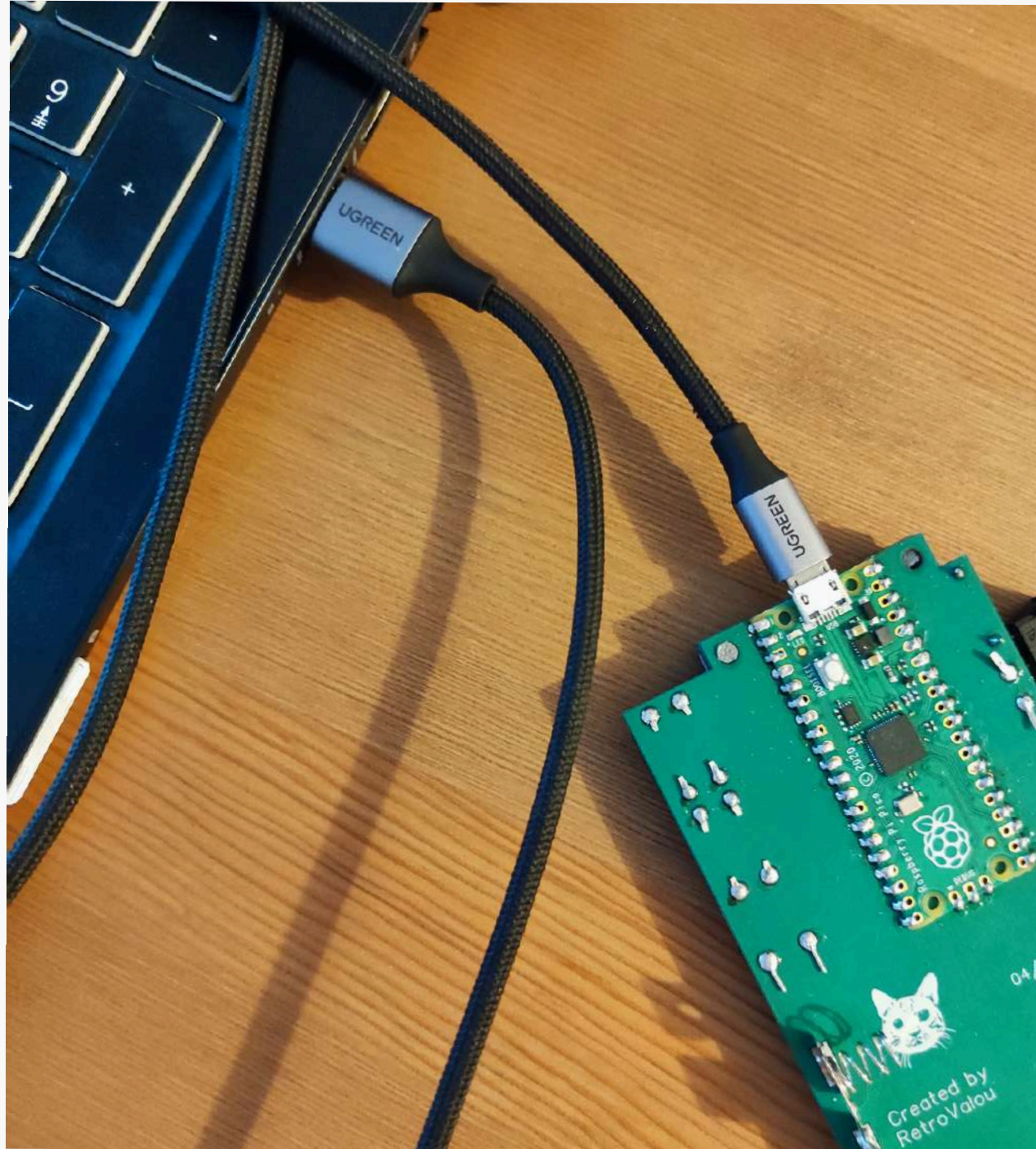
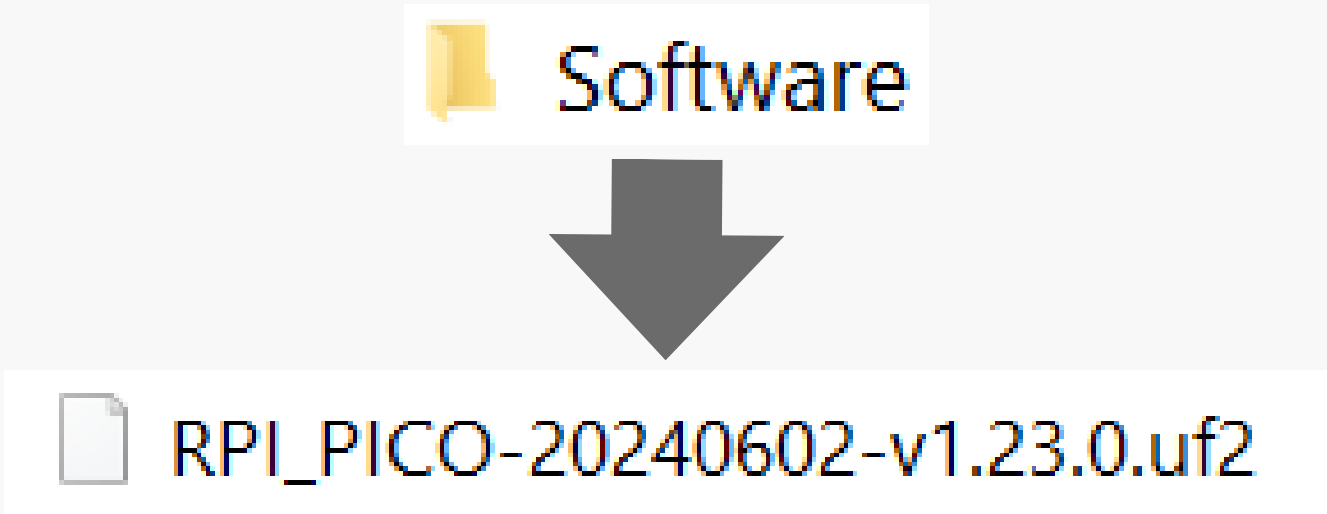The tutorial is carried out under Windows with Tonny

Connect the console to your computer using the MicroUSB cable on the Raspberry PI Pico port

The Raspberry PI should appear as
a new drive

Loading Micro Python

In the Software folder attached to this tutorial or on the Micro Python official website, you will find the following file
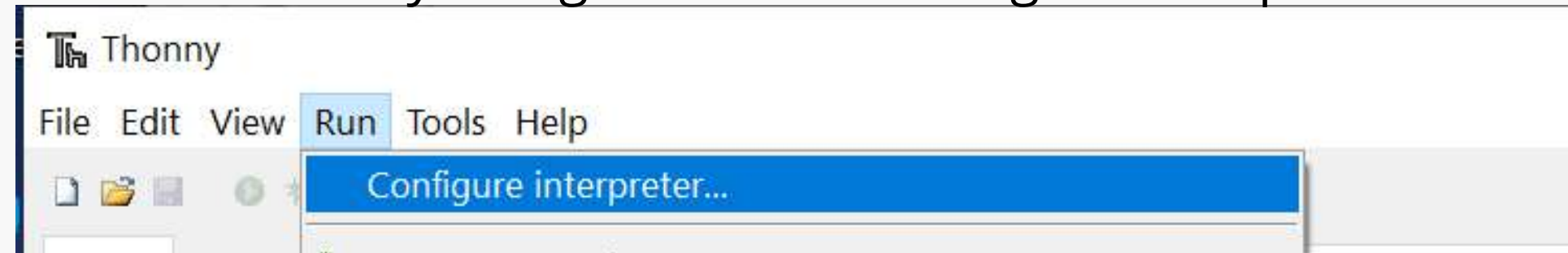

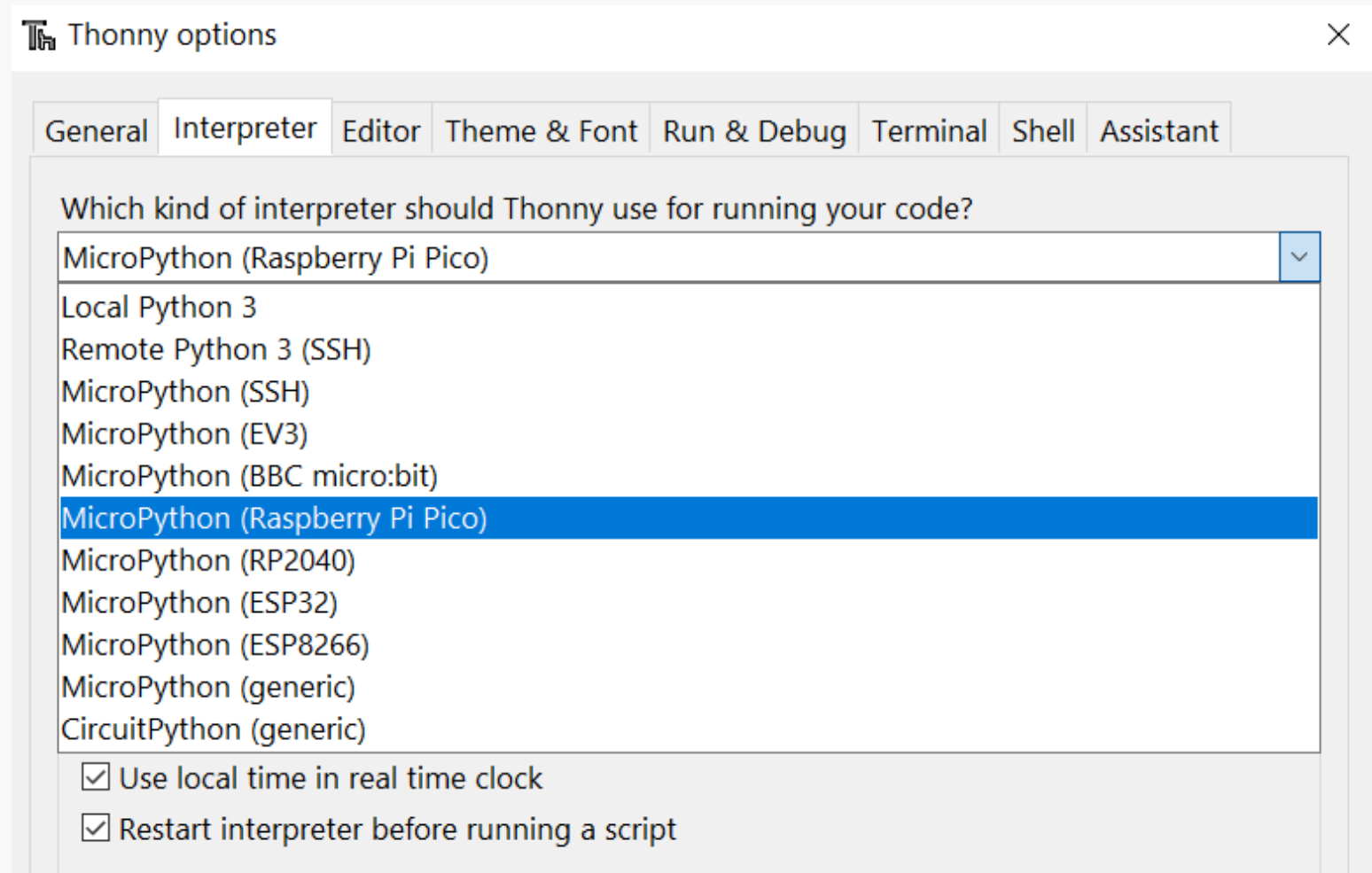Copy it to the Root of the Raspberry PI Pico

The reader should screw up and disappear from readers
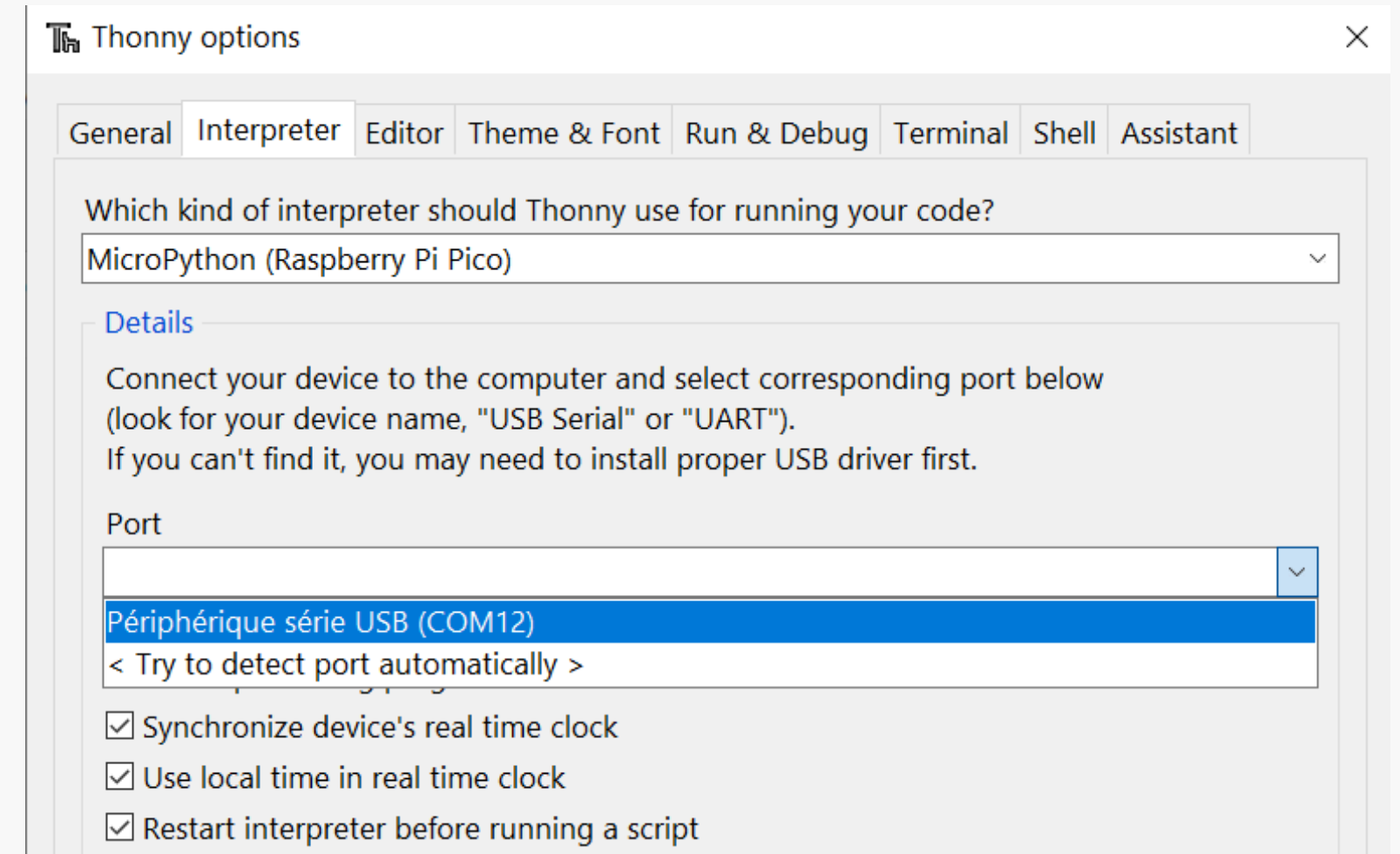
Loading the Software

Launch Tonny and go to Run -> Configure interpreter
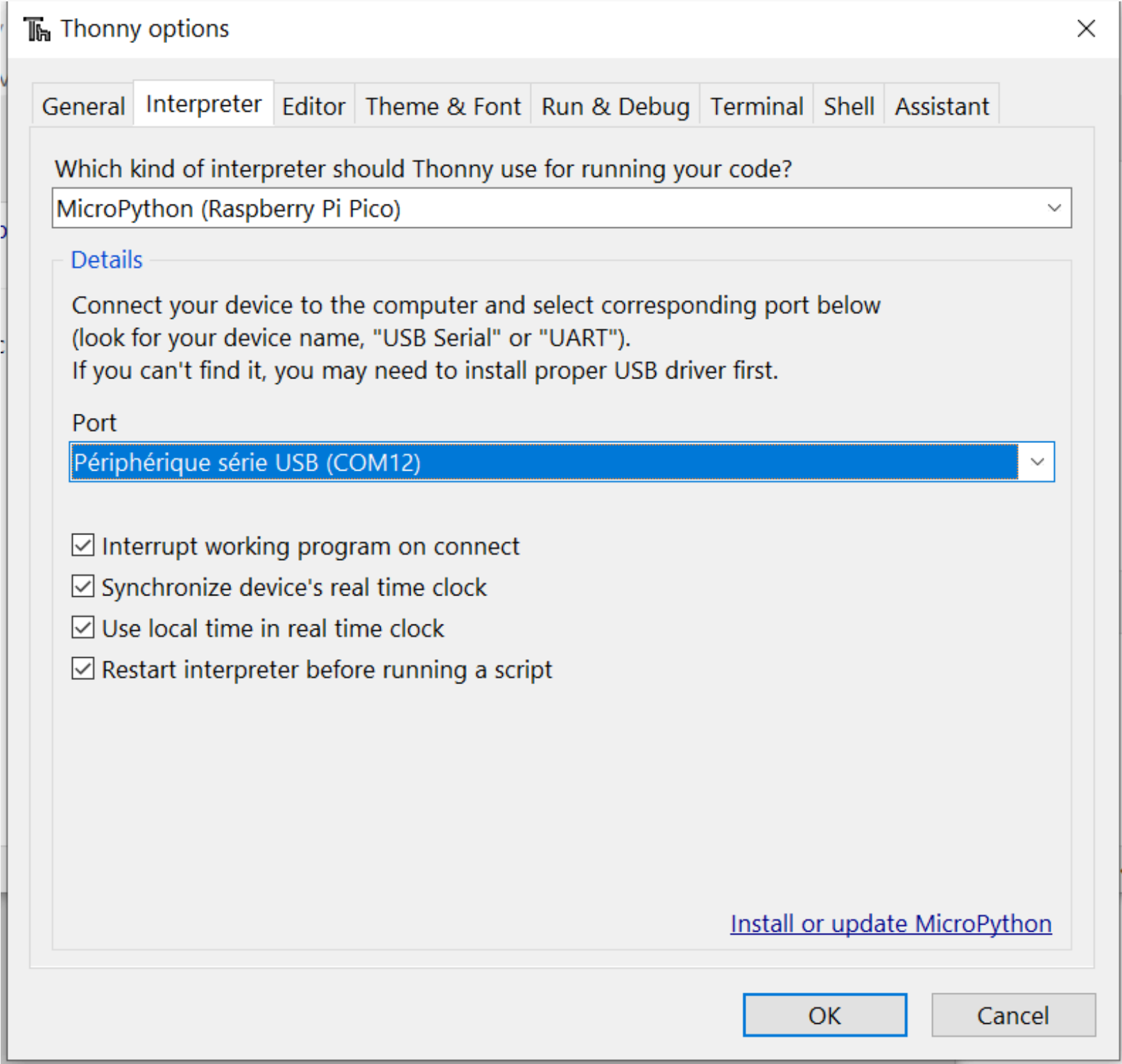

A window appears

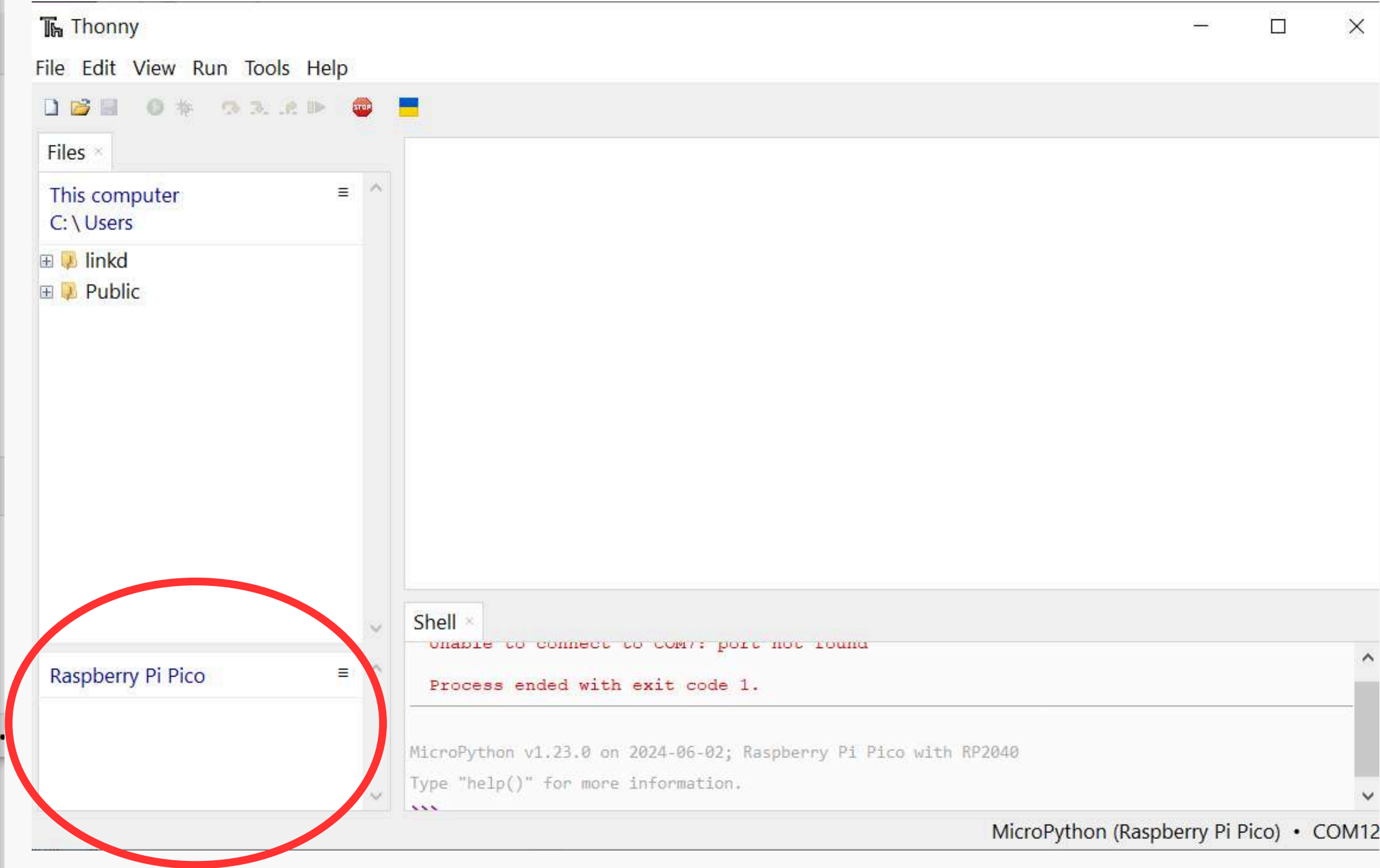select in the first box MicroPython (Rasberry PI Pico)

select in the second box your USB device corresponding to the Rasberry PI
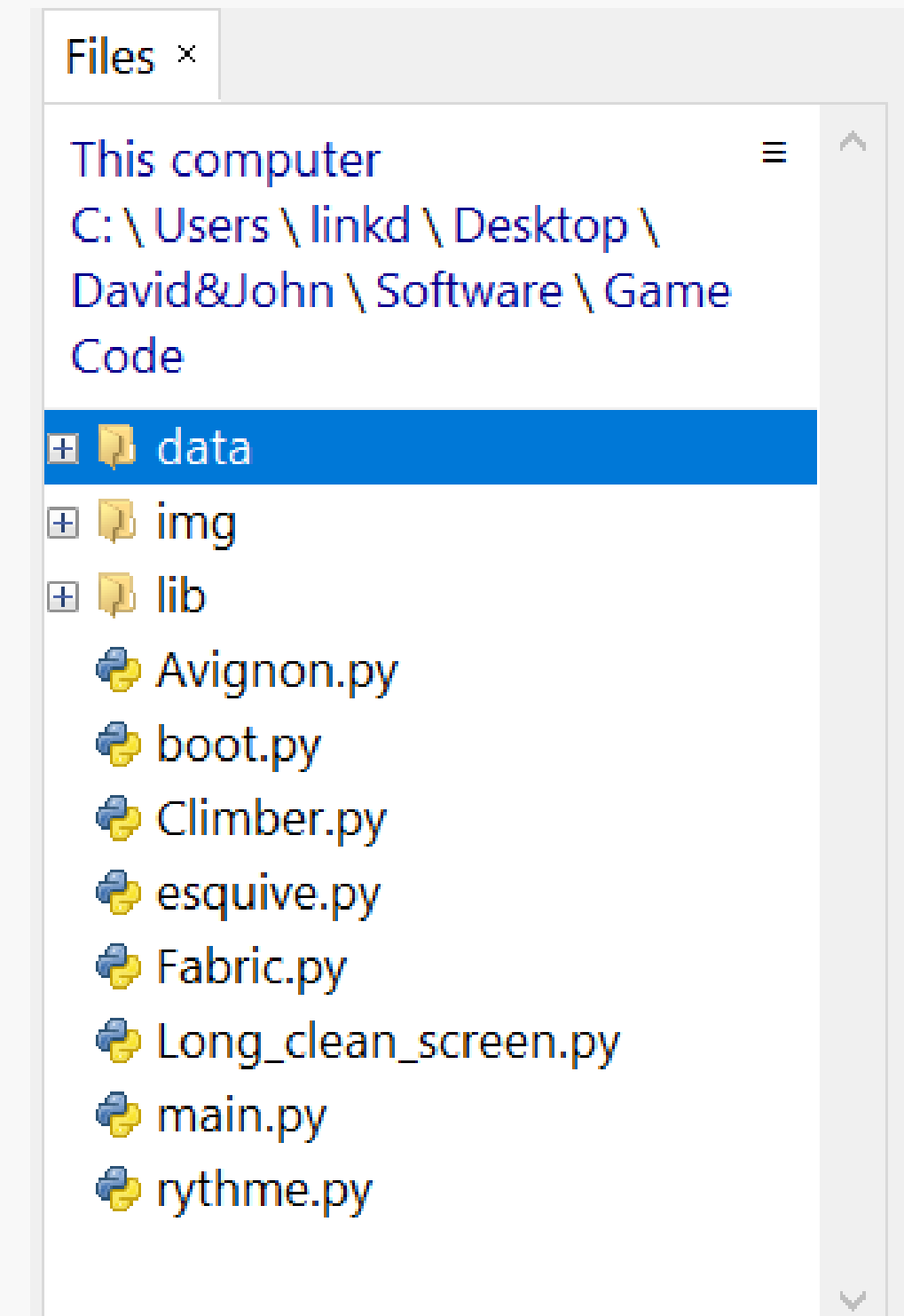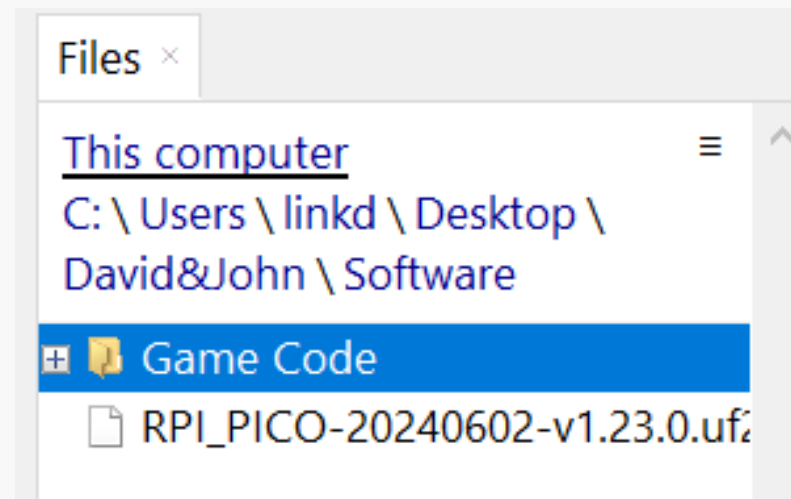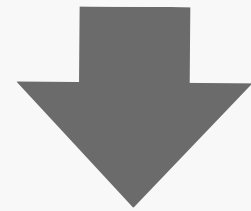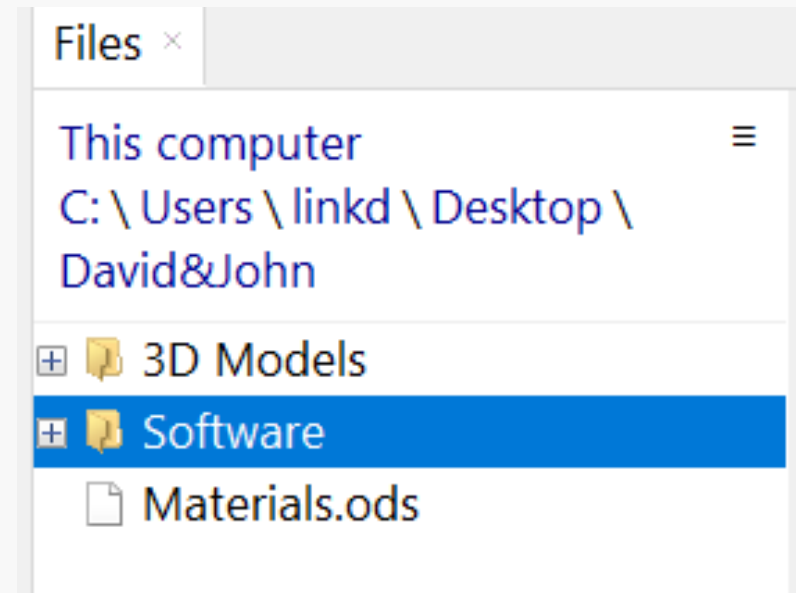
Loading the Software

Click OK
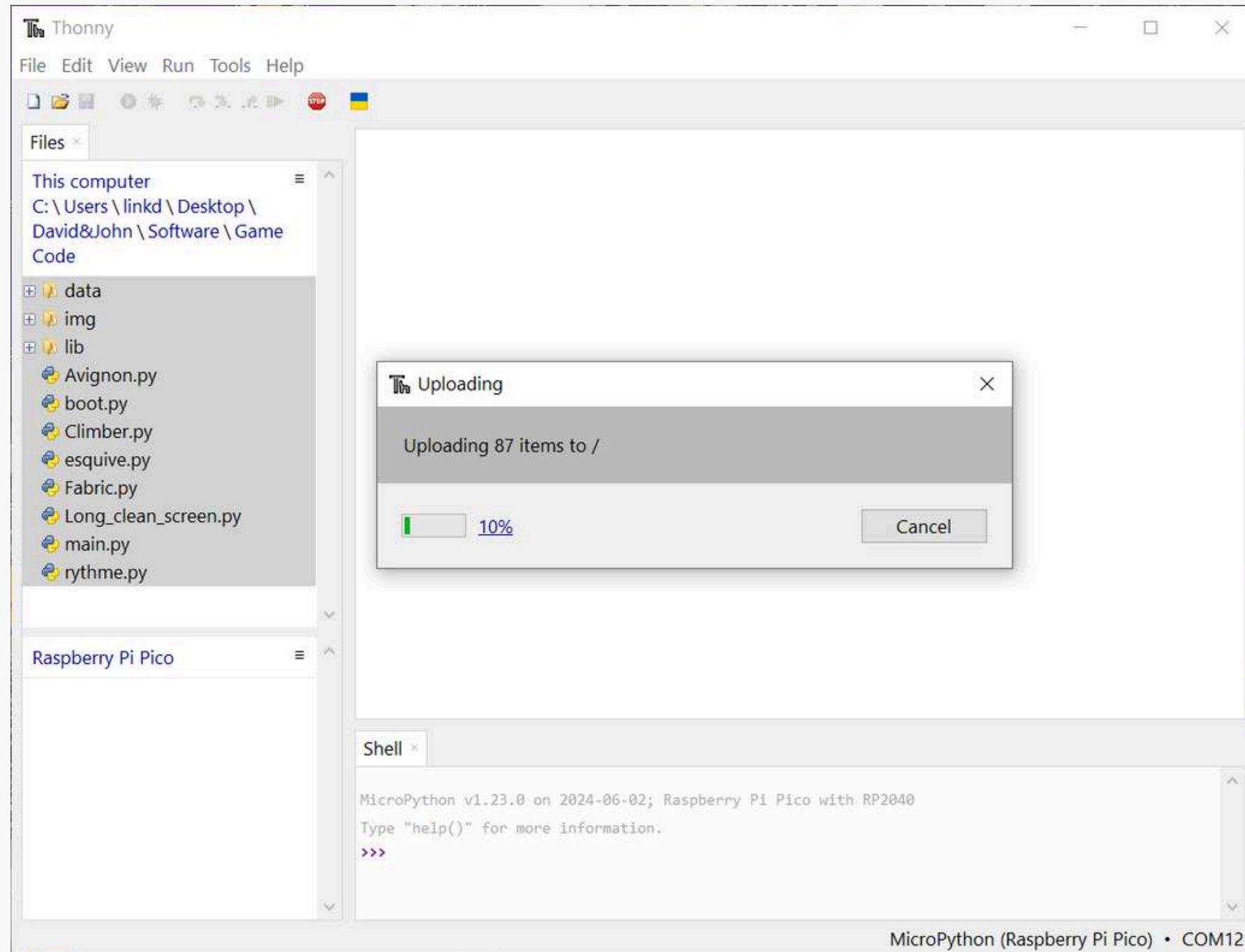
The Rasberry PI Pico should appear

Loading the Software
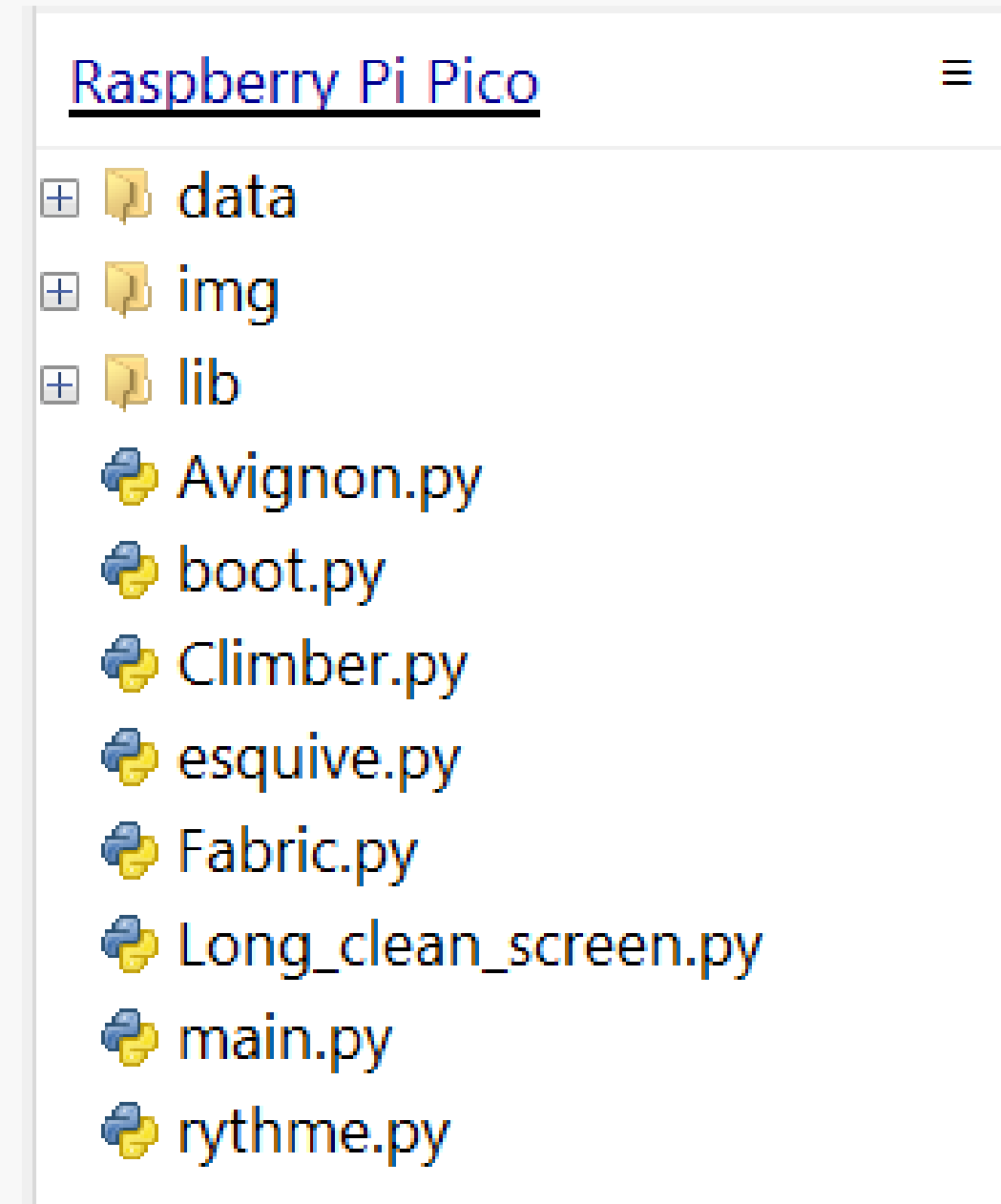
In the File window go to Software -> Game Code

Loading the Software

Select all files, right click and select "Update to /"

The files are completely copied to the Raspberry PI PICO!
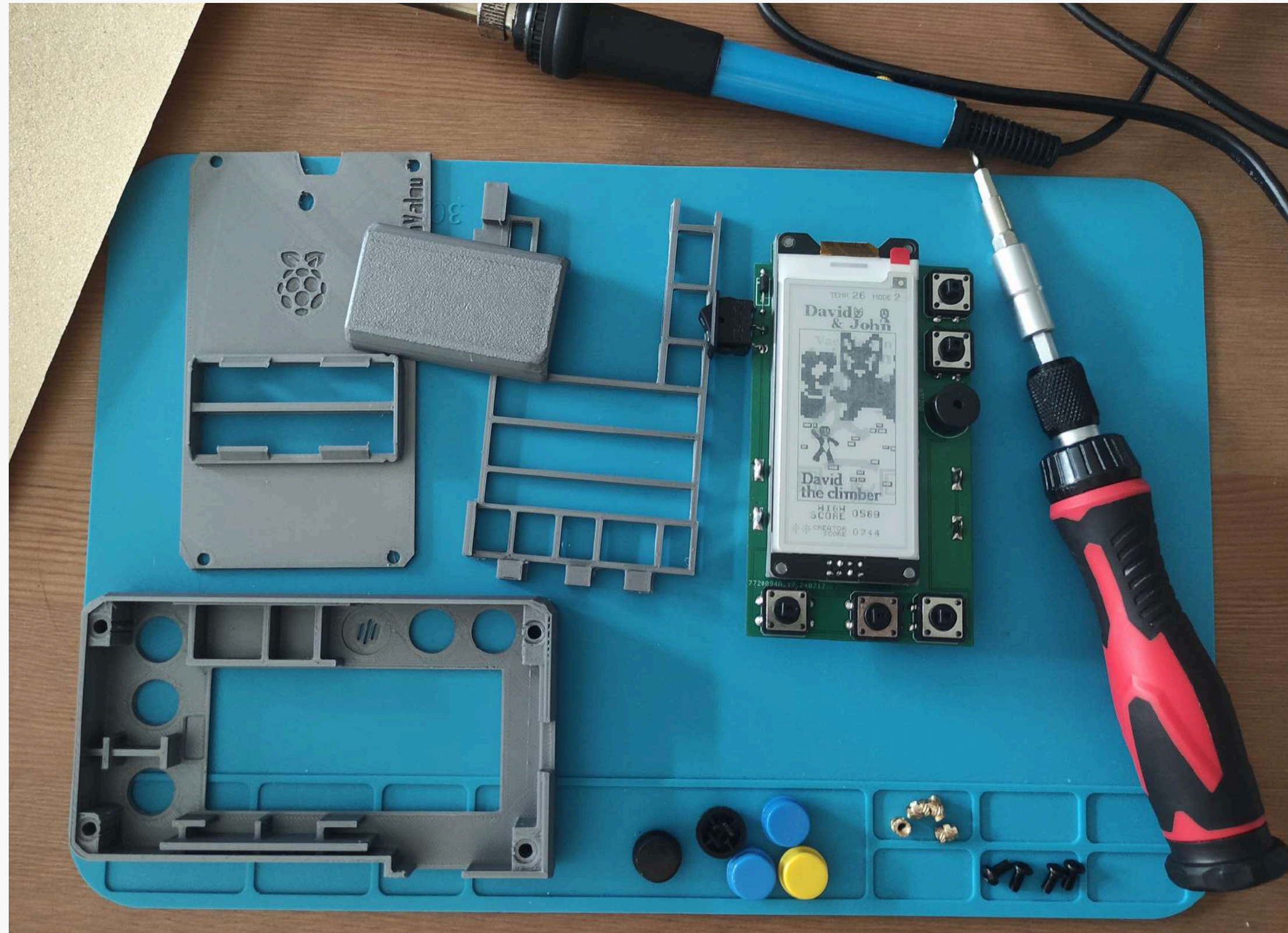
Loading the Software

Exit Tonny, unplug and plug back in the Raspberry Pi Pico. The console should start!

WARNING ! Test if all the components work correctly (the sound, the 5 buttons, the batteries) and repair / resolder / change the components if one of them is defective
(for example, in this tutorial the buzzer was defective!)
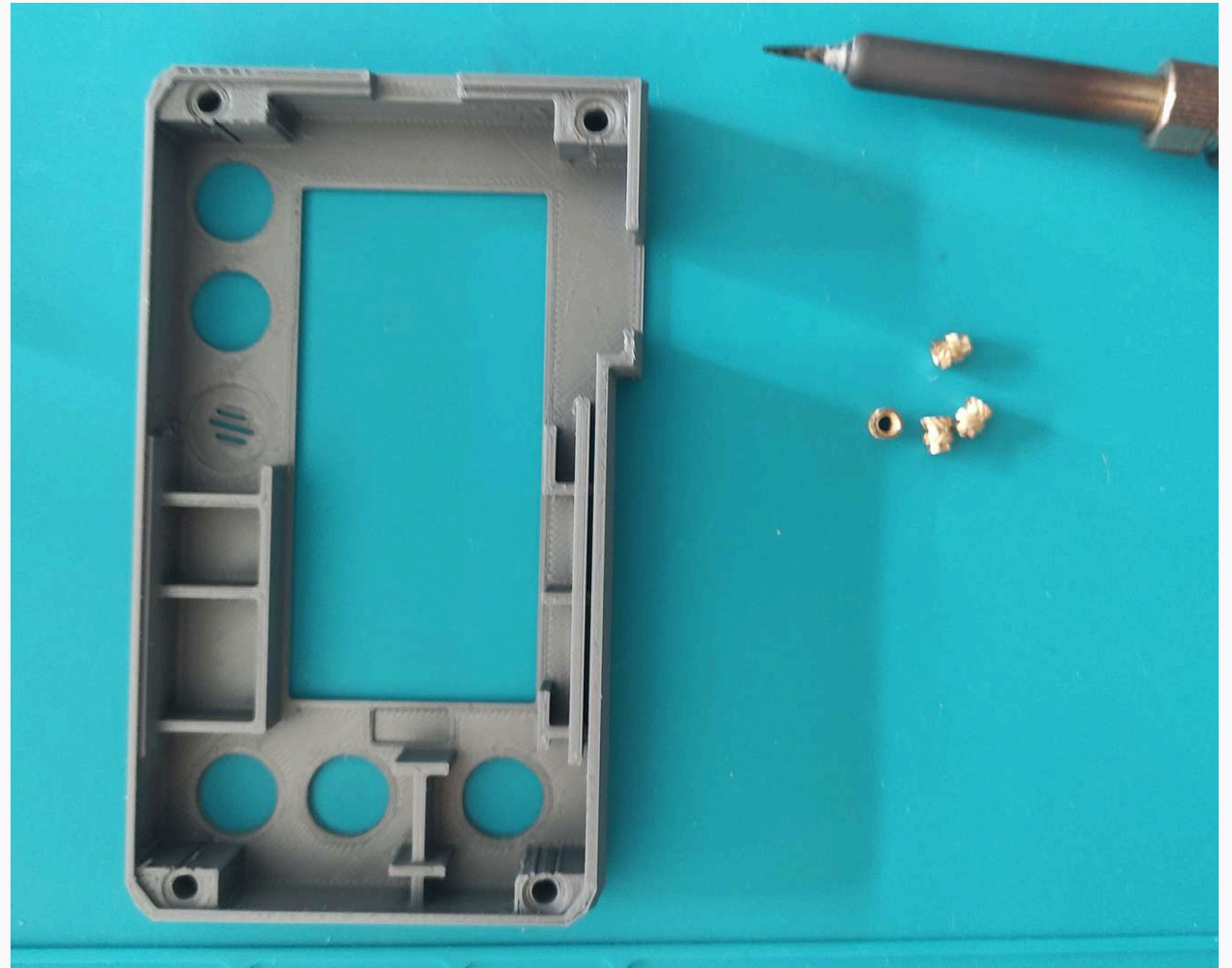
Case assembly

Materials

Preparing the front case

I advise you to lightly sand the button holes so that they can fit perfectly.

First, we will place the inserts in the 4 holes of the front case

Preparing the front case

Place the insert like this on the tip of the hot soldering iron

Push it into one of the holes in the front case.
Do this until the edge is at the edge of the plastic (To prevent the insert from falling during the operation, hold the shell on its side)

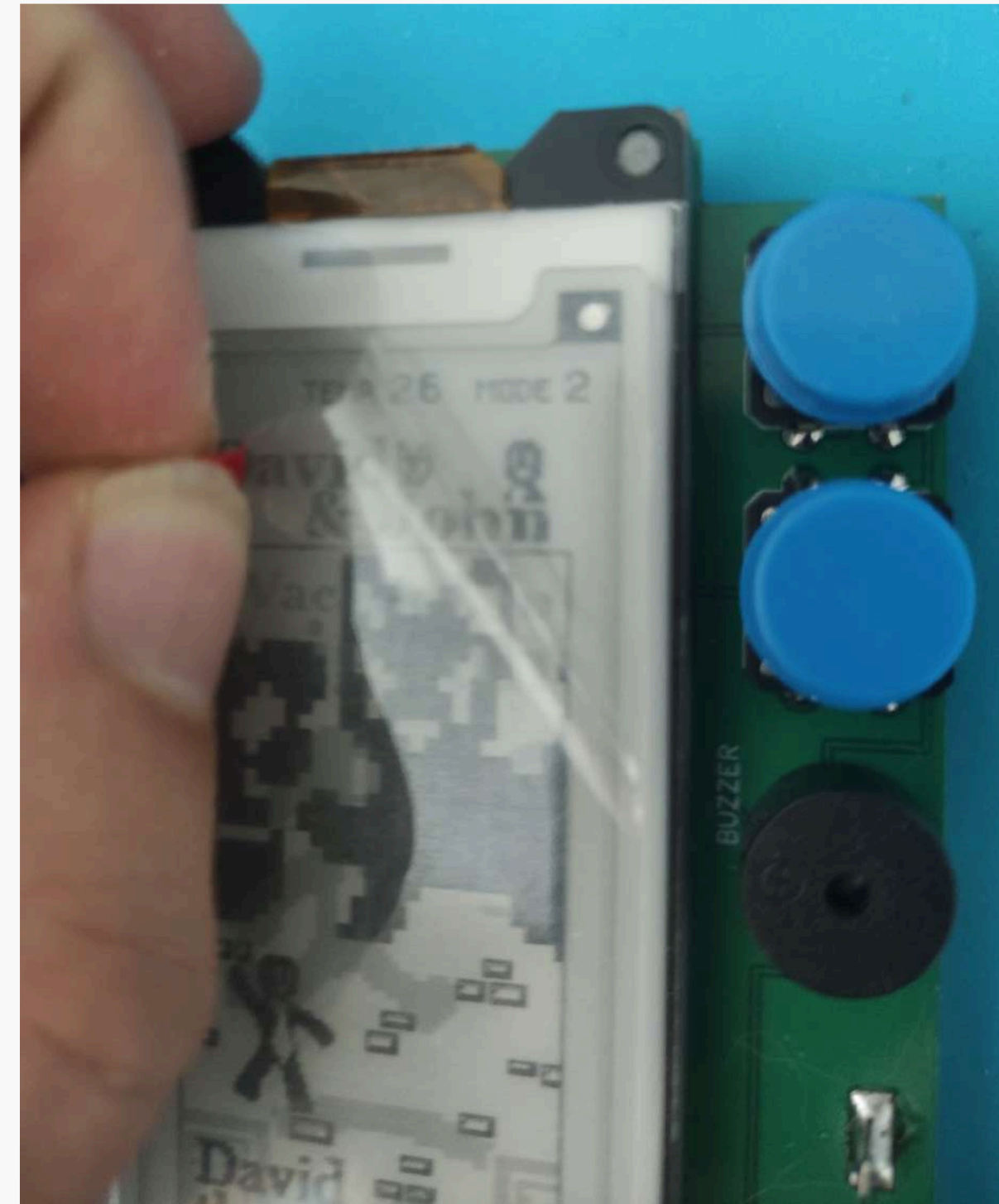# Preparing the front case

Repeat the action for the
other holes
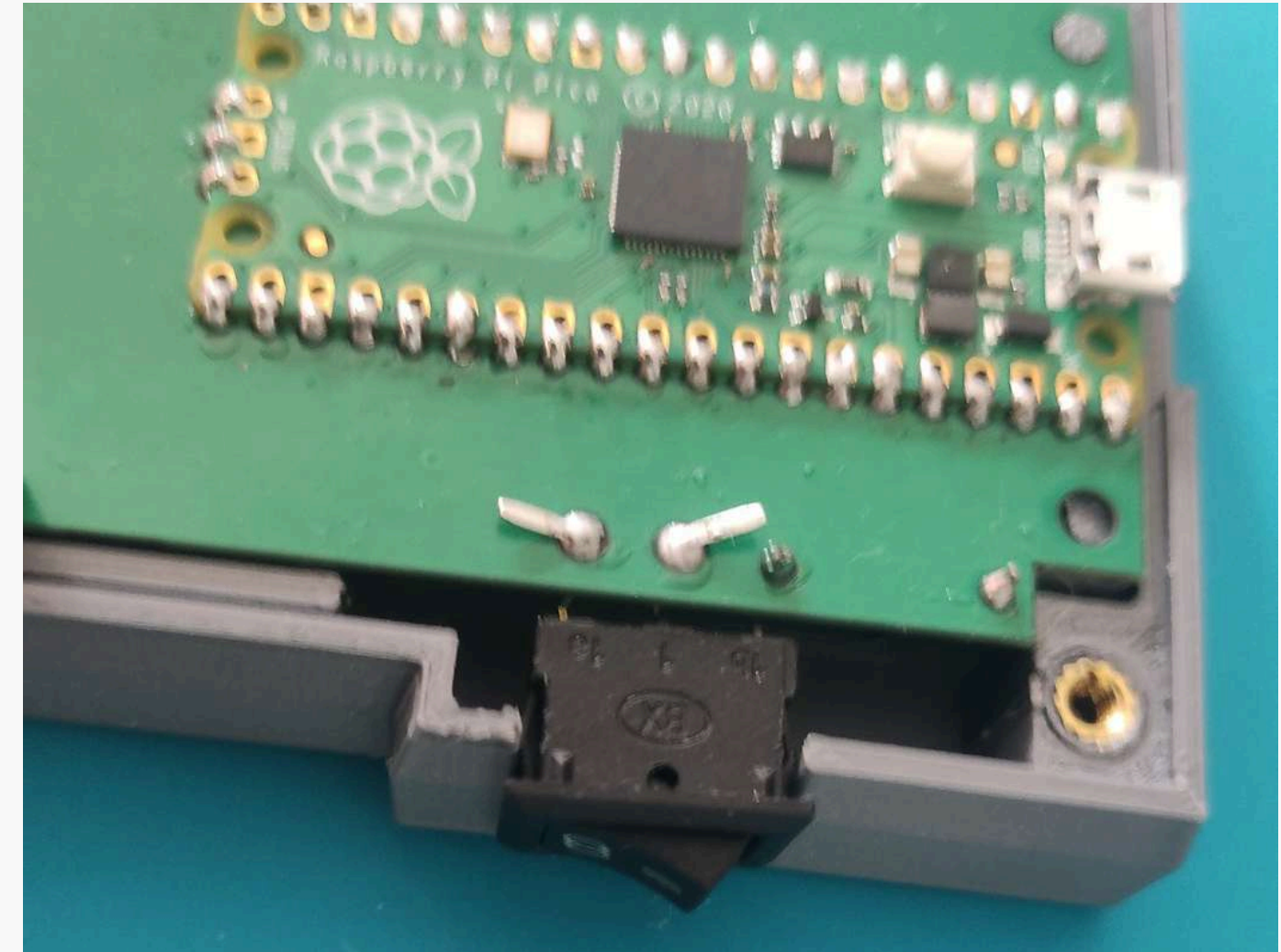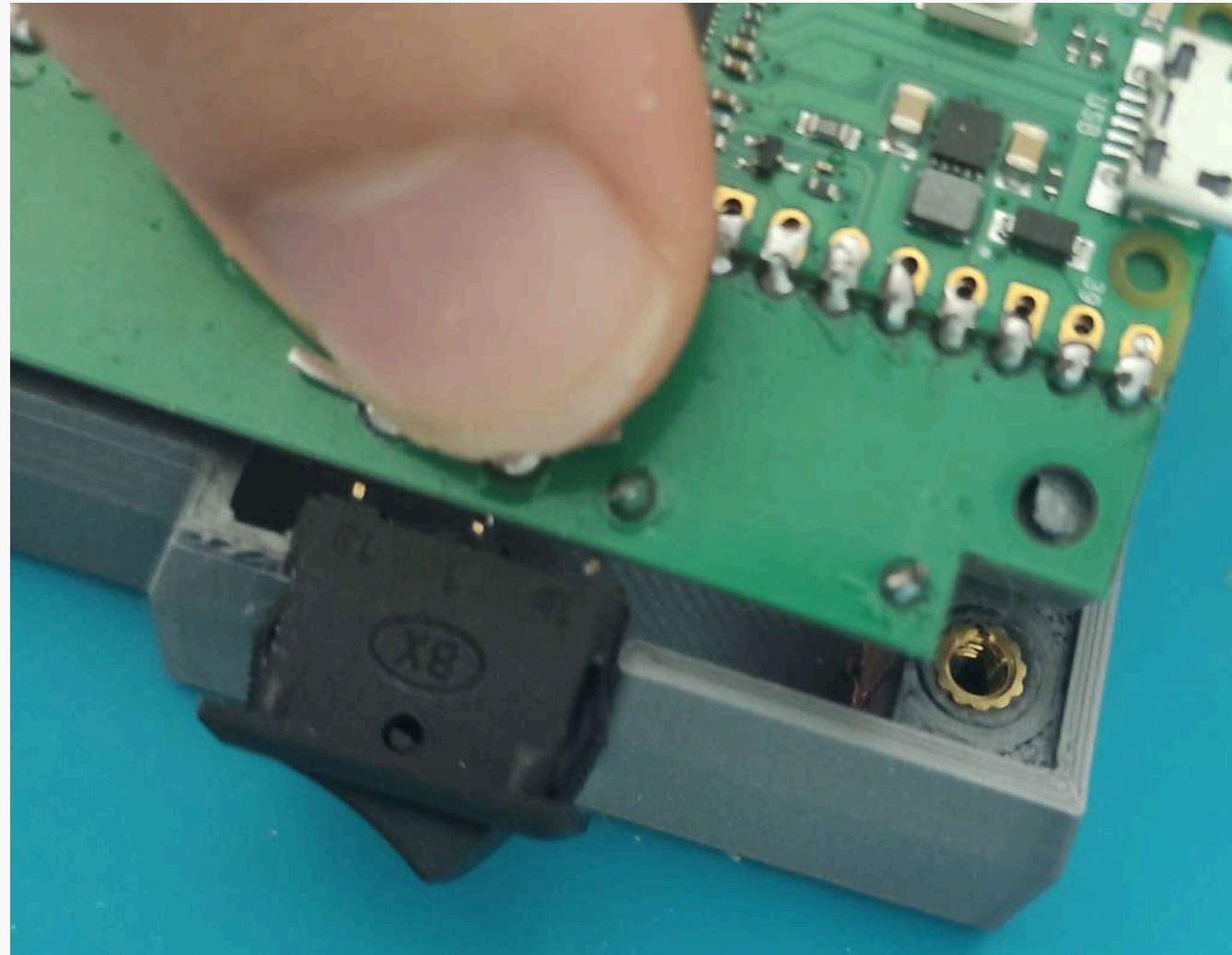
Inserting the PCB into the case

Place the button caps

Remove the film from the screen

Inserting the PCB into the case

To insert the PCB, start by inserting the power button from the
outside of the case

Inserting the PCB into the case

Insert the rest of the card until it is completely seated in the front case

Inserting the PCB into the case

Insert the rest of the card until it is completely seated in the front cover

Check that the buttons click correctly.
If not, remove the PCB and sand button's holes

Assembly of the rest of the case
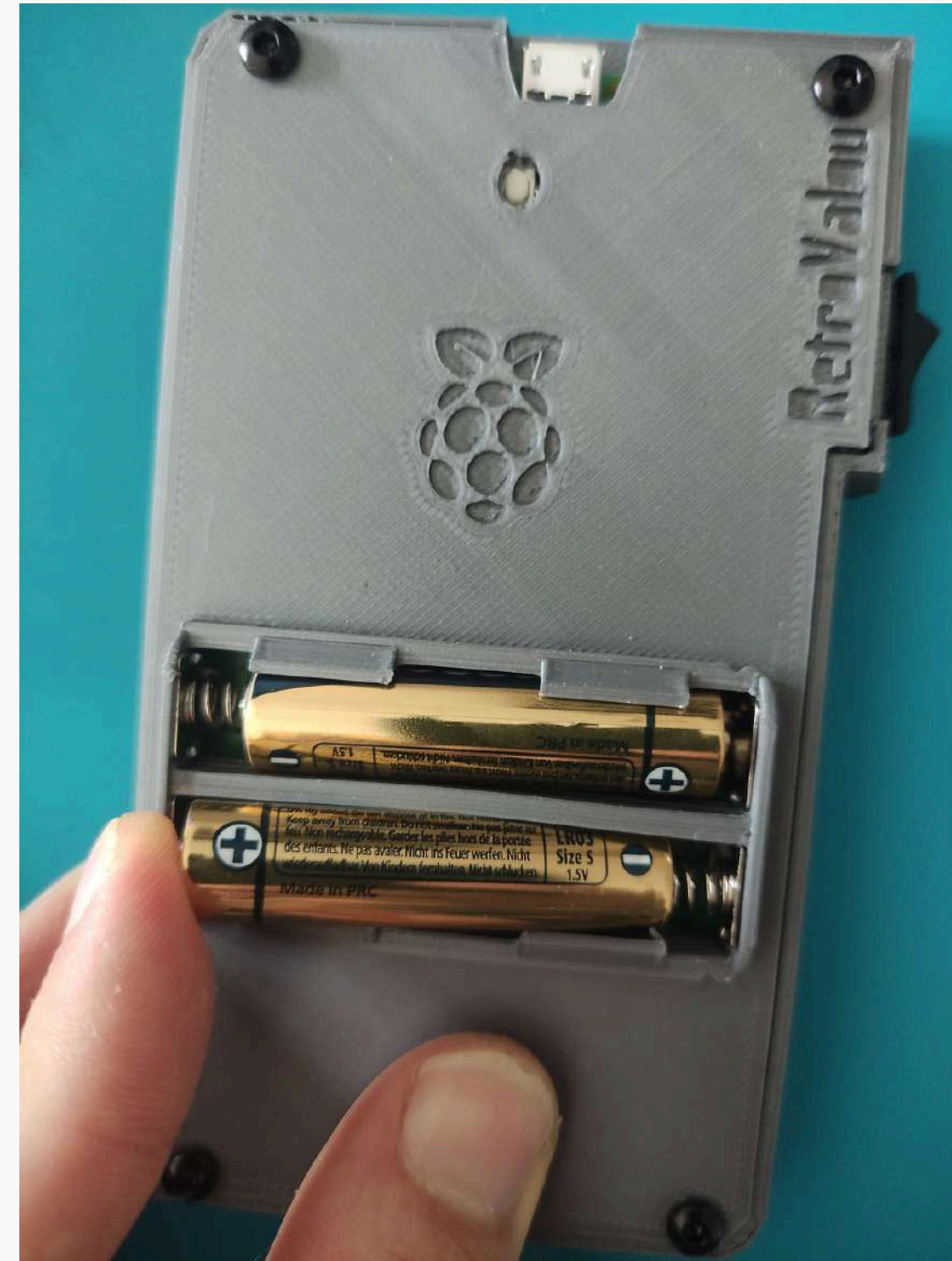

Insert the PCB holder

Then fit the rear case

Assembly of the rest of the case

Screw in the remaining 3 screws

Insert the batteries

Assembly of the rest of the case

Slide the battery cover into place

END

The console is completely finished!

THANK YOU !
and good game!

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