PICADE 3D

ASSEMBLY MANUAL

TABLE OF CONTENTS

1 BOM – BILL OF MATERIAL

Electronics:

1x Raspberry Pi (3B+/4B 4GB)

1x MicroSD Card (at least 64GB)

1x USB-C/Micro-USB PowerSupply (Official Raspberry Pi recommended)

1x Official Raspberry Pi 7" Touch

1x Picade X Hat (Pimoroni) or DIY

1x Arcade Parts Kit (Pimoroni)

or 1x Retro Joystick + 10X Arcade Buttons (2xBlue/2xYellow/2xRed/4xBlack)

1x Set of Cables (eq Pimoroni Wiring Loom) or DIY

1x On/Off Button (with or without integrated LED)

1x 3" Speaker 4Ω (5W)

1x 30x30x10 Fan 5V

1x Raspberry Pi Camera Cable – 30cm (for the Display)

Optional Parts:

1x Micro-HDMI to HDMI Cable (For External Display)

x Bluetooth Gamepads (8BitDo tested)

Some Bolts,Nuts and Stuff:

28x M3 Threaded Inserts (M3x5/M3x6)

36x M3 Allen Bolts SocketCap (M3x6/M3x8)

4x M3 Allen Bolts SocketCap (M3x20)

12x M3 Washers

8x M3 Nuts

4x RubberFeet

Fancy Lights:

LED-Strip or Neopixel Bars to Put behind the FrameBar for Cool Effects

Filament:

1-1,5 Kg for the Complete Build (depends on Print Settings)

Recommended Print Settings:

0.2mm Layer Height

20% – 30% Infill

2 Perimeter or more

Supports needed for some Parts

PLA Filament works fine

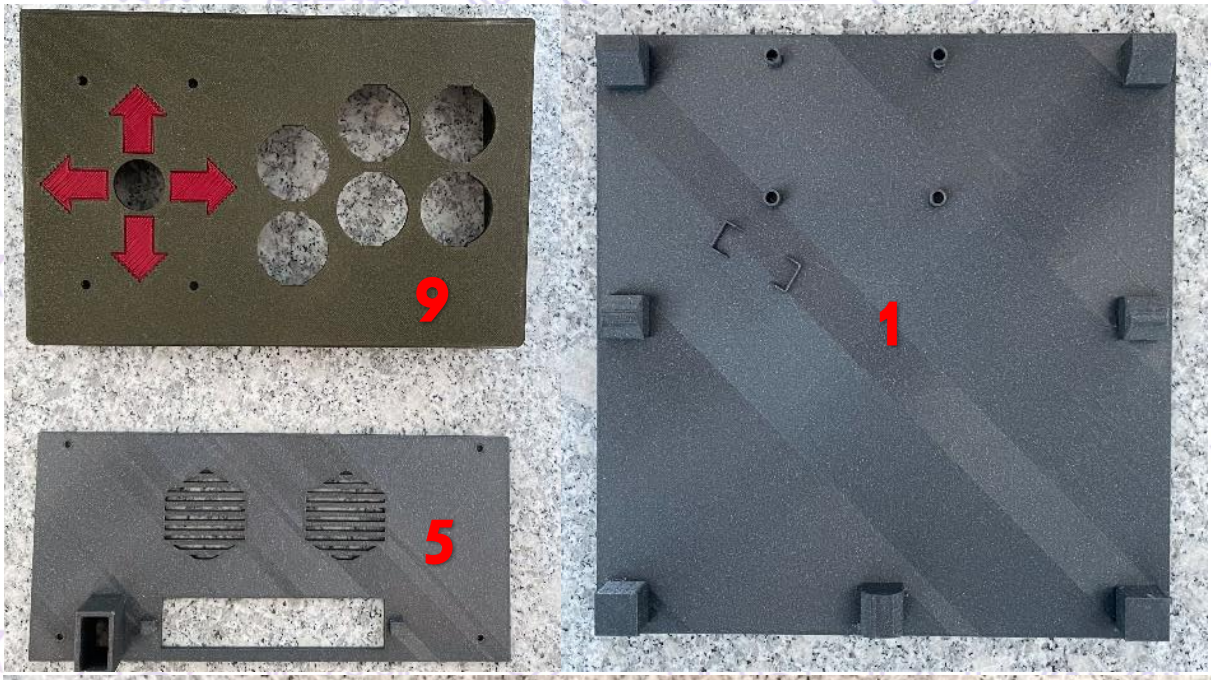
2 PREFLIGHT CHECK

Before you begin, please check of all Parts and Tools needed are in Front of you.

Printed Parts:

1 Baseplate [ ]	6 Cover_Backpanel [ ]	Light_Tunnel* [ ]
2 LeftPanel [ ]	7 Display_Frame [ ]	
3 RightPanel [ ]	8 Display_Top [ ]	
4 FrontPanel [ ]	9 Joystick_Button [ ]	
5 Backpanel* [ ]	10 LightSign [ ]	

*Backpanel_noHDMI or Backpanel_HDMI | Light_Tunnel Recommended if using Lightstrips to eliminate LightBleeding through Case.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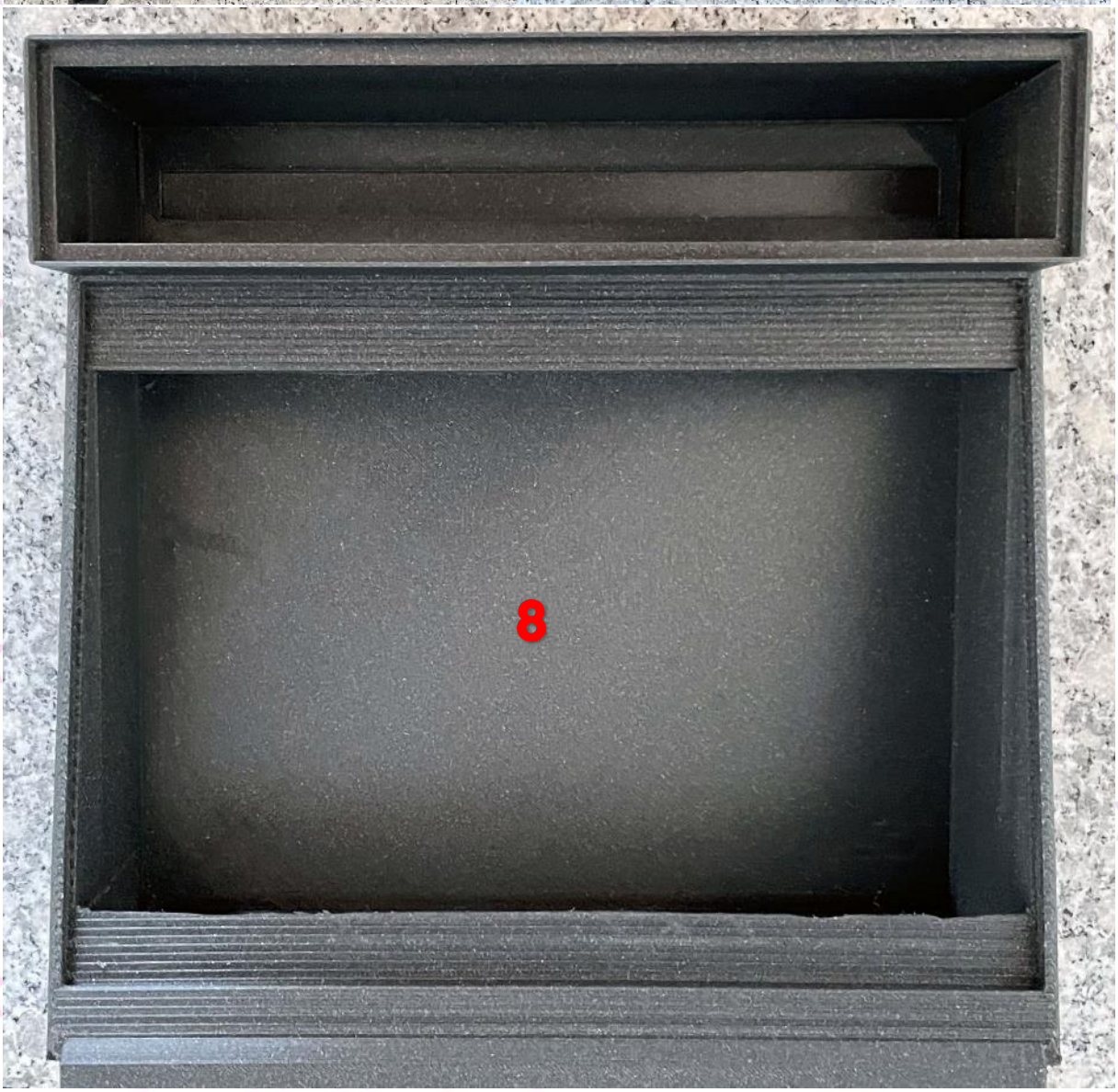
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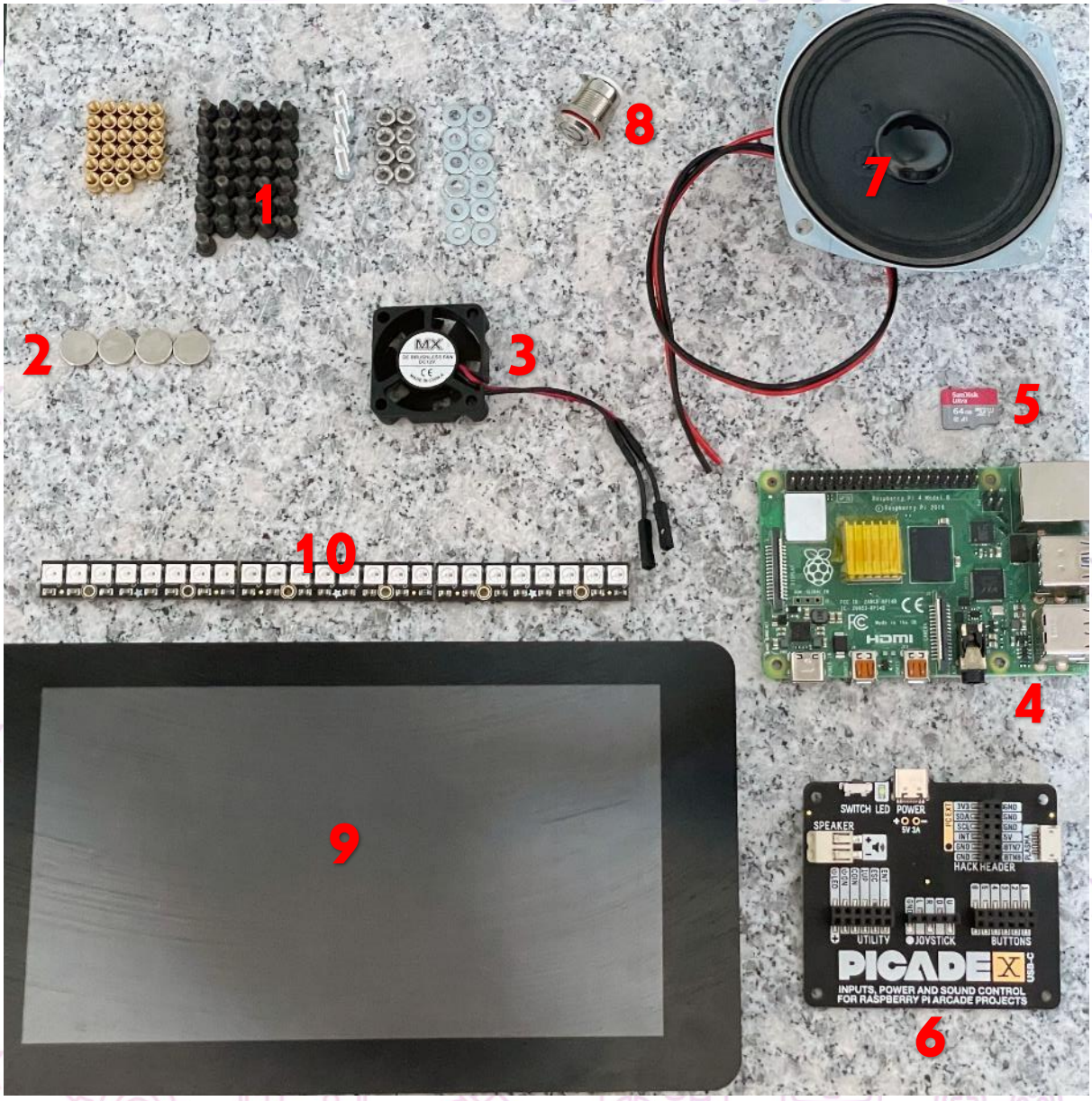
Electronic Parts:

1 Nuts,Bolts etc.	[ ]	6 Picade X Hat	[ ]	11 Joystick	[ ]
2 Magnets	[ ]	7 Speaker	[ ]	12 Buttons	[ ]
3 Fan	[ ]	8 On/Off Button	[ ]	13 Wires	[ ]
4 Raspberry Pi	[ ]	9 7"Touch Display	[ ]	14 Controller*	[ ]
5 Micro SD Card	[ ]	10 LightStrip/NeoPixel*	[ ]	15 MicroHDMI-HDMI*	[ ]

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8Bitdo
8Bitdo
SELECT
START
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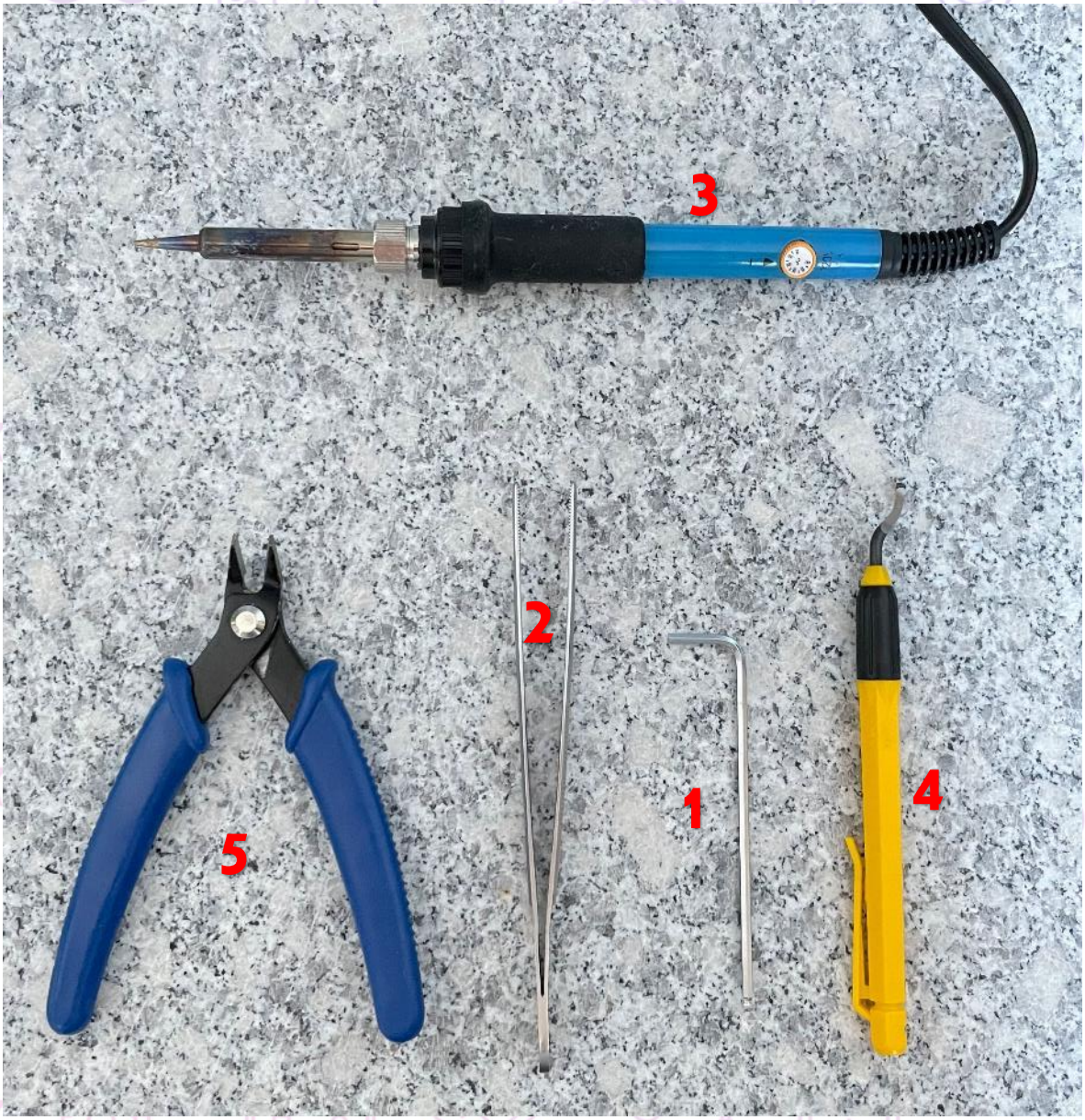
Tools you will need:

1 Allen Key	[ ]	Superglue	[ ]
2 Tweezer	[ ]	Wires or Jumper Wires	[ ]
3 Solder Iron	[ ]		
4 Deburring Tool	[ ]		
5 Side Cutter	[ ]		

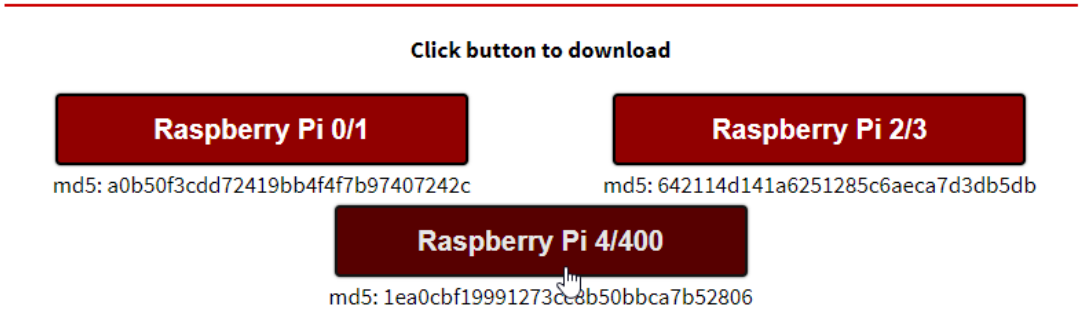


3 PREPARATIONS

SD-Card Preparation

Before we start to assemble our Case, we need to prepare our SD Card with Retropie and Configure Wifi and SSH.

First download the appropriate Image from https://retropie.org.uk/download/ in my Case for the Pi4



Now Download your favourite Program to write the Image tot he Micro-SD Card.

For Windows: Raspberry Pi Imager, Etcher, or Win32DiskImager

Win32DiskImager requires an .img file extracted from the .img.gz image downloaded. You can use a program like 7zip to do this.

For macOS: Raspberry Pi Imager, Etcher, Apple Pi Baker, or the dd command

For Linux: Raspberry Pi Imager, Etcher, or the dd command

MacOS/Linux users can optionally extract the .img image from the downloaded .img.gz by using gunzip (macOS users can also simply double-click it)

Create a file called wpa_supplicant.conf in the boot partition using the following template. (This will be moved at boot to the /etc/wpa_supplicant directory). Replace the Country with yours.

```
country=US
ctrl_interface=DIR=/var/run/wpa_supplicant GROUP=netdev
update_config=1
# RETROPIE CONFIG START
network={
    ssid="your_real_wifi_ssid"
    psk="your_real_password"
}
# RETROPIE CONFIG END
```

Make sure to include the RETROPIE CONFIG lines as shown in the Template to ensure that the RetroPie-Setup wifi configuration module will be able to cleanly edit/delete your configuration if you wish to change it later.

Hint:

Wifi will not start up if you have an hard wired ethernet connection. After disconnecting the ethernet cable you'll need to reboot to get Wifi started.

If you want to enable ssh by default as well, you can create a blank file called ssh in the boot partition too. This is a 'flag' file and will be deleted during boot after ssh is enabled.

When everything is finished, you can unload the Micro-SD Card from your Computer and put it into your Raspberry Pi.

4 ASSEMBLY

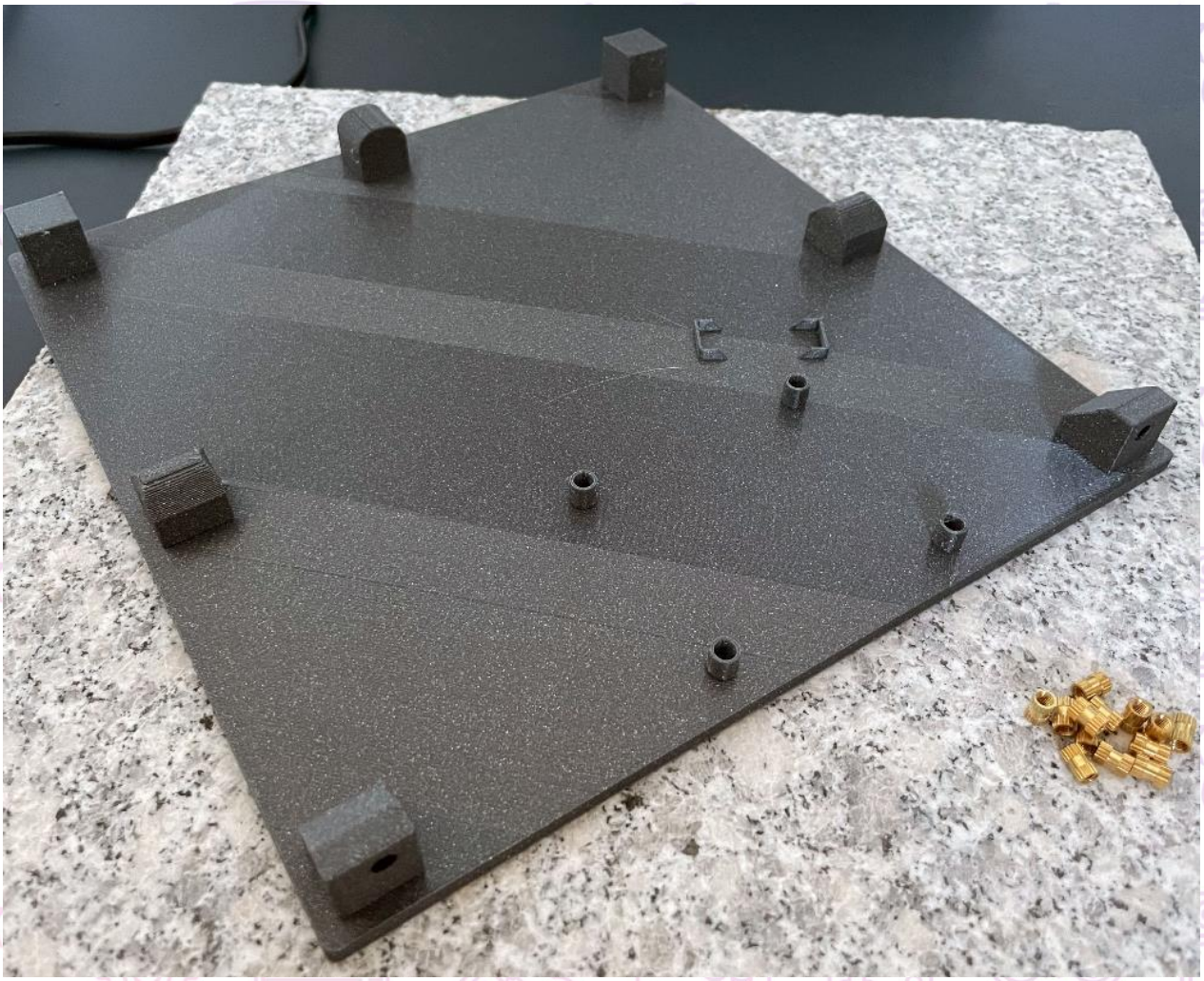
Part 1 - Preparing the Printed Parts with Threaded Inserts

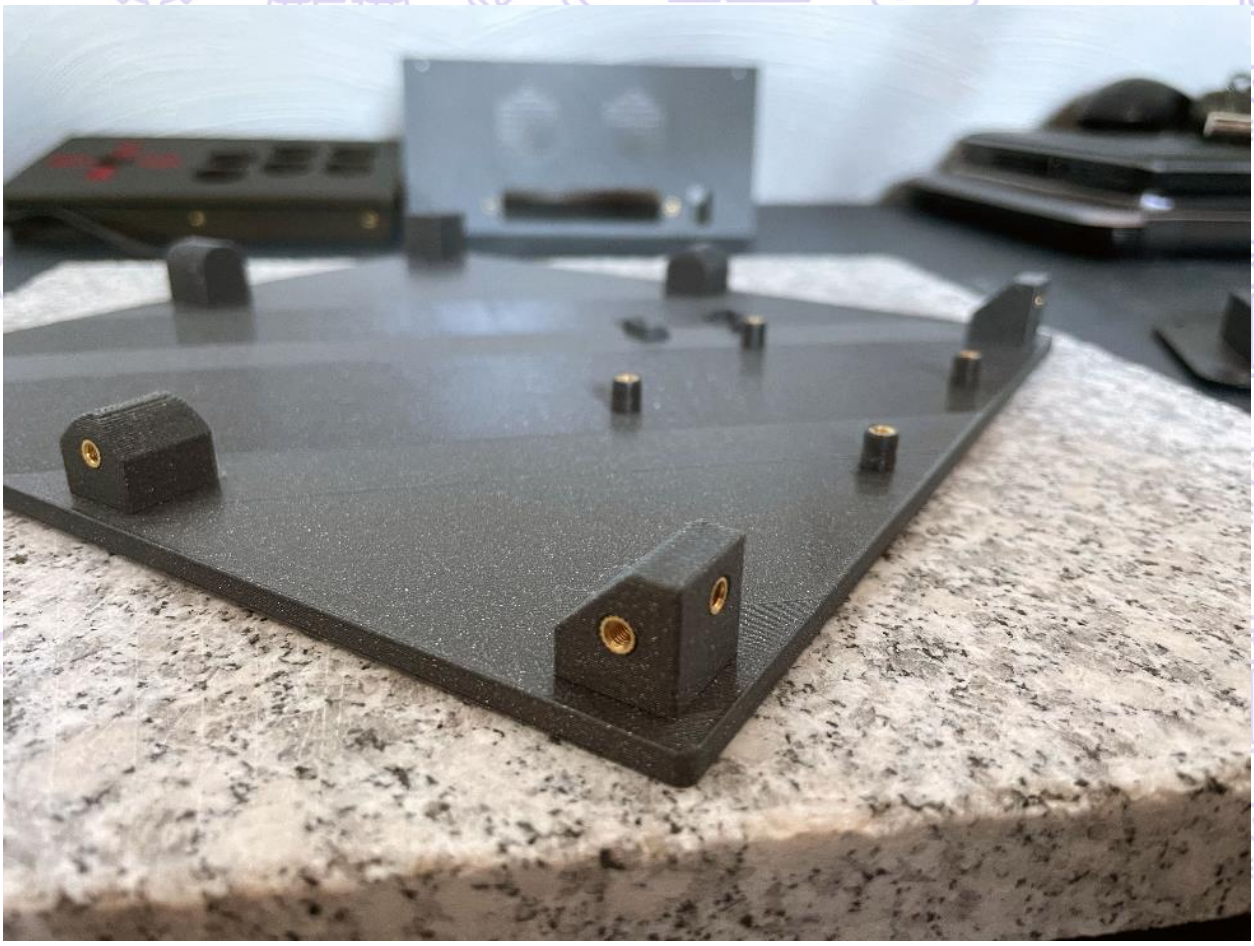
Before we start with the Assembly its neccessary to prepare our Printed Parts with the threaded inserts. So its time to fire up your solder iron and get those Inserts melted in.

We need the following Parts:

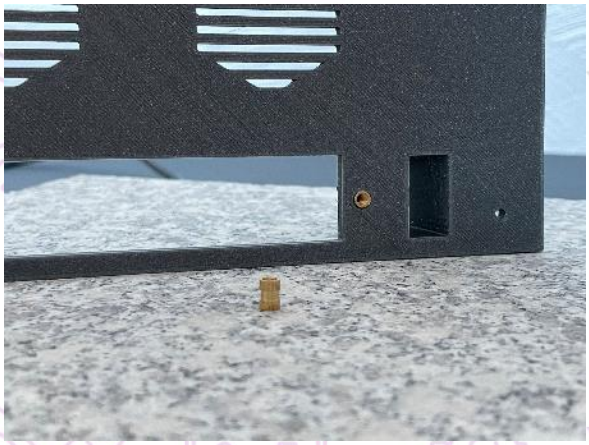
- Baseplate
- Back-Panel
- Joystick_Button
- Display_Top

First start with the Build Plate with a total of 15 inserts.



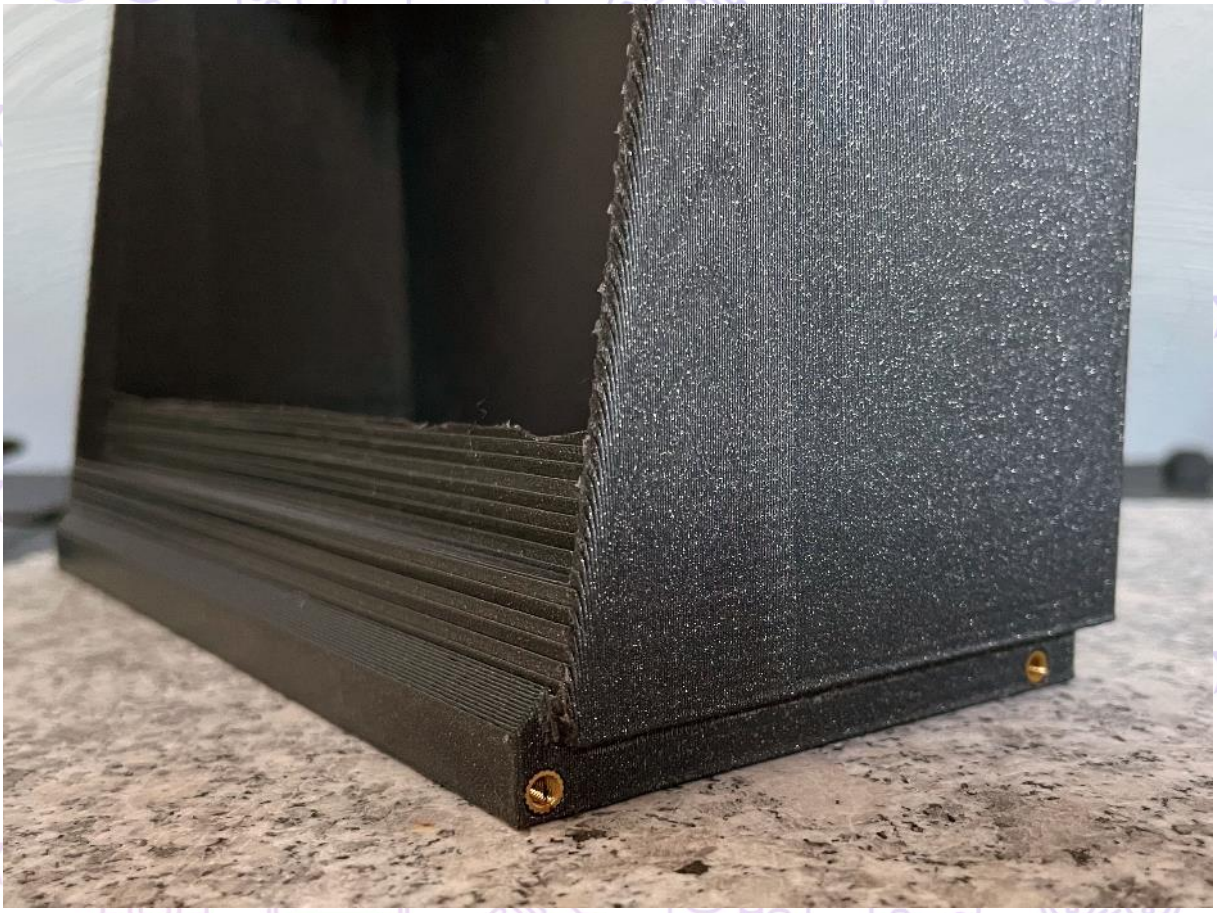


Go on with the Back-Panel with two Inserts for the Cover



The Joystick_Button Part gets a total of 5 Inserts

The Last Part Display_Top takes another 6 Inserts. 2 on each side



Attention:

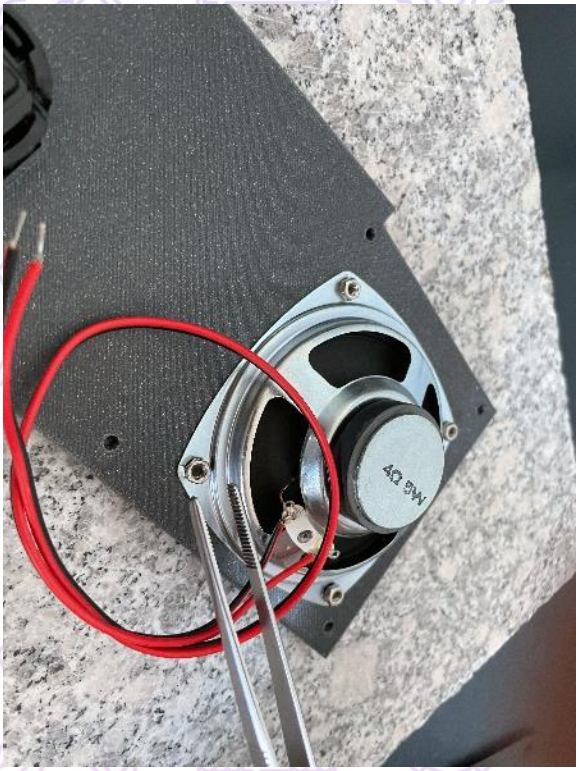
Do not hurry on these steps, as the Tolerances are very tight and you get in Trouble if the Inserts are not Lined Up correctly.

Part 2 – We need Buttons…. And Speaker….and the Joystick…..and POWERbutton :)

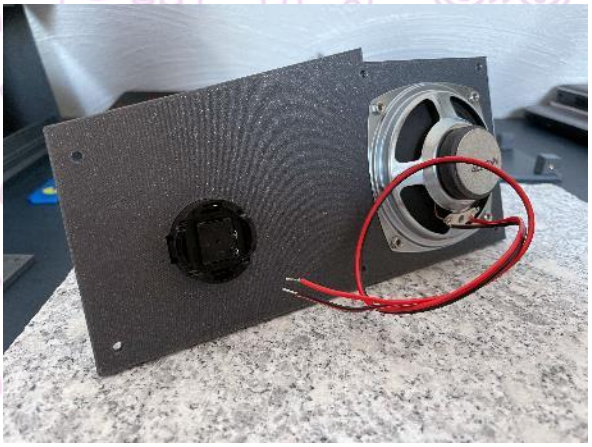
For this Step we need all the Panels (If you chose the HDMI Backplate, we prepare this as well) and the Button_Joystick Part. The Buttons have a tight fit and do not clip in fully, in Case you wonder. The Tight fit is enough to hold them in place.

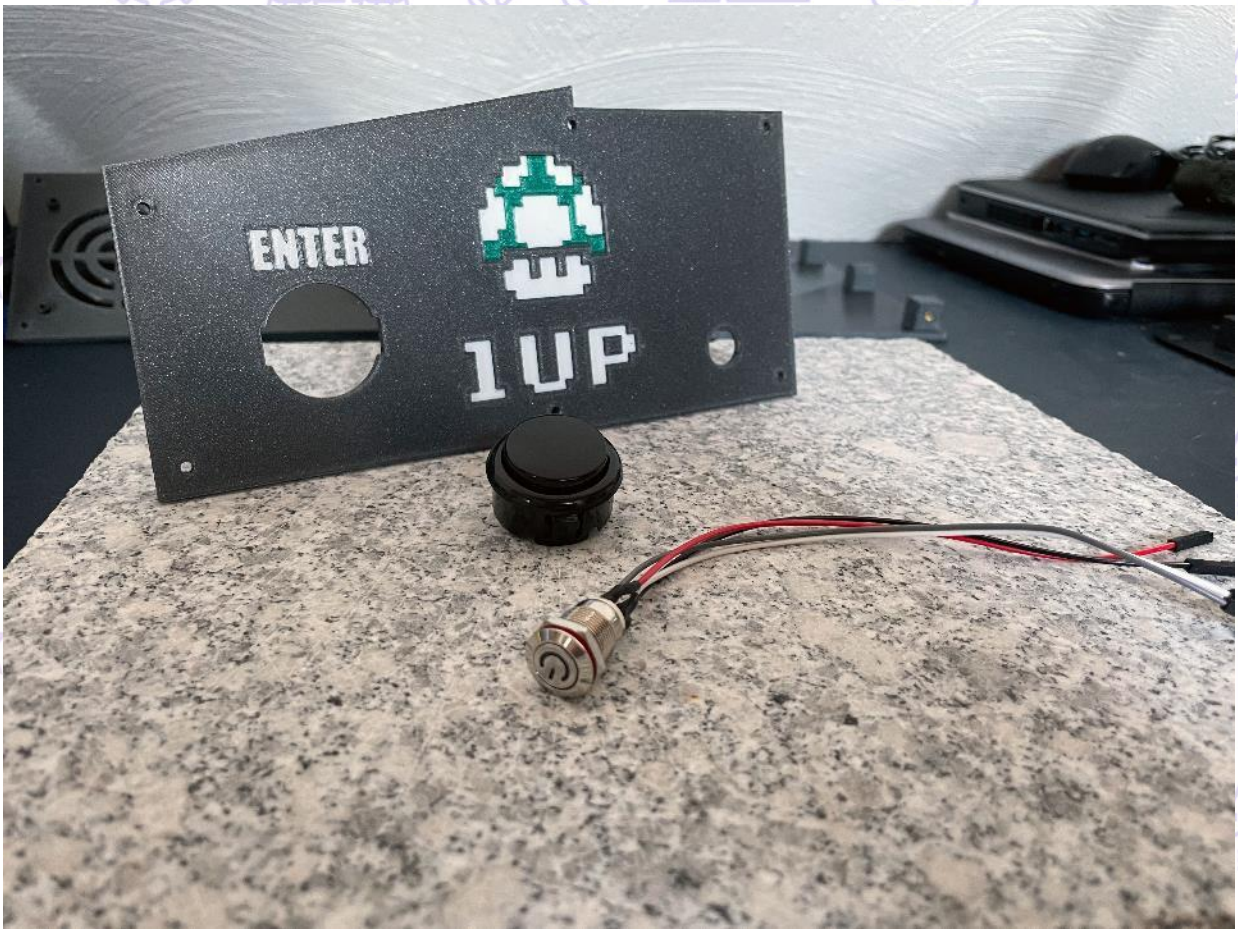
The Speaker Side needs 4 M3 Bolts, Washer and Nuts

Screw in the M3 Bolts for the Speaker and turn over the part



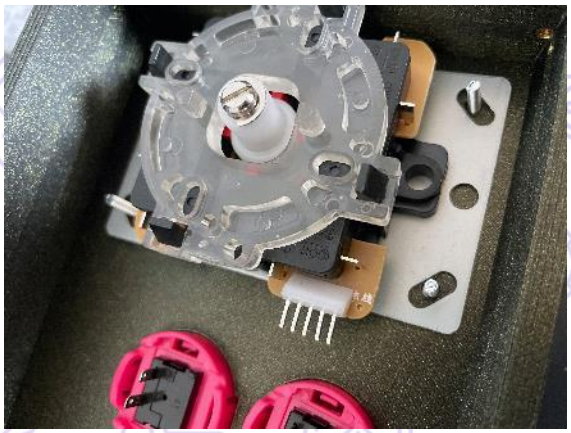
Arrange the Speaker on the Bolts and put on the Washers if your Screws are long enough, otherwise screw on the nuts with the help of a tweezer to tighten them.





The Left-Panel is holding our Power Button. Prepare it with the Wires before and screw it on tight. Wiring depends on the Type of Button.

For the Joystick Part we need all the leftover Buttons and the Joystick. Clip in the Buttons like on the other Parts and take the M3x20 screws, Washers and Nuts



Put in the Screws and Flip over the Part to align the Joystick part with the connector near to the Buttons. Pro Tip: Take some Tape to hold the Screws in Place and to Prevent Falling off when Flippin' over.

Put on the Washers and Nuts but not tighten them full. Flip over and adjust the Joystick to be centered in the Hole. After that, tighten the screws.

Now put on the DustCover and Screw on the Big Joystick Ball.

So lets start with the fun Part and bring it all together.

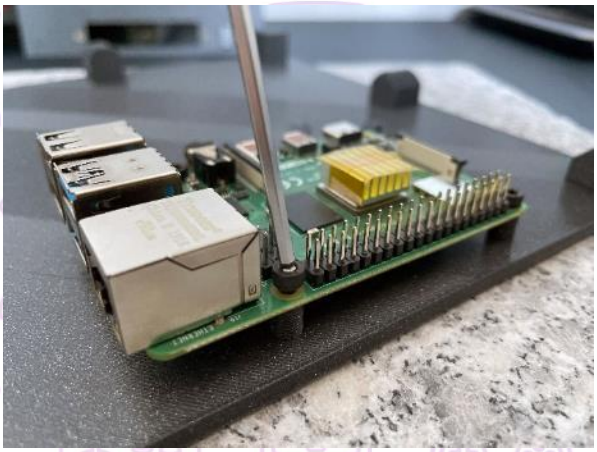
Part 2.5 – Optional Backplate with HDMI

If you printed out the HDMI Backplate you have to prepare the micro HDMI to HDMI Cable First. Take some sandpaper and sand down the sides if they are too tight. Just a small amount on both sides.



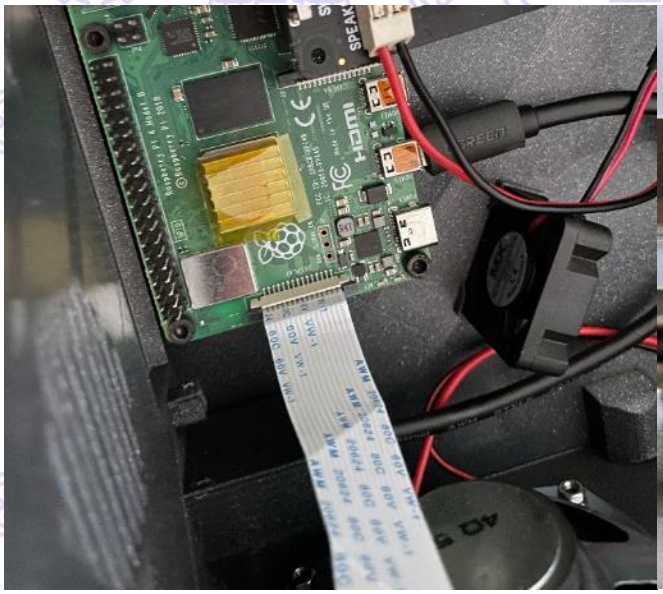
Part 3 – We need some Raspberry Pi's here

In this Step we are going to bring our Raspberry and the Picade Hat X in Place. Dont forget the Fan to cool down the Pi. This is essential because the Pi is getting really hot when emulate 3D Games. So lets go...

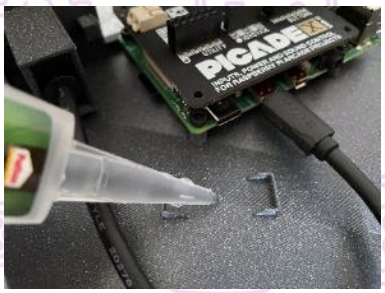
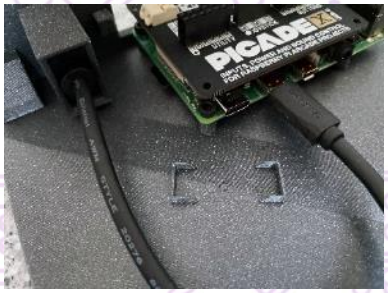
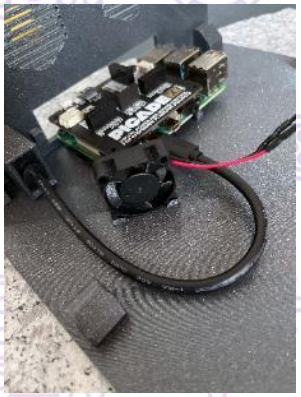



Before screwing the Pi onto the Baseplate, gently screw those M3 screws through the Pi Holes. The Pi comes with M2.5 screws, so we have to widen them to fit M3 screws.

Be very careful in this step as it can Damage your Raspberry Pi!



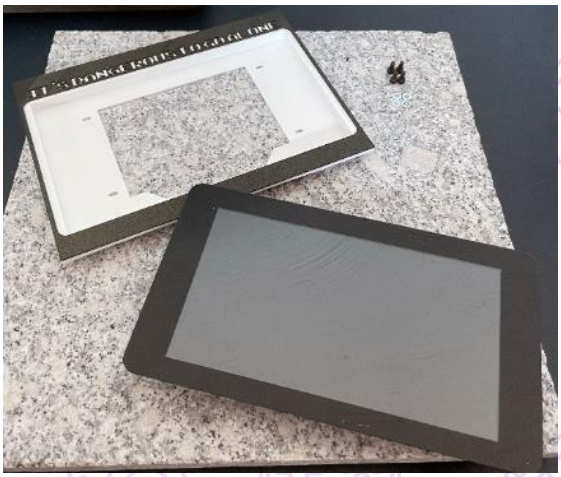

After the Raspberry Pi was tight-fit in place we Plug-In the Display Cable. After this step we can Put on our Picade X Hat. If you Have some Heatsinks on the Pi (Recommended) dont push the HAT to much on the GPIO Panel as the Board may collide with the Heatsink which can produce a short. Leave a 1mm gap between those. Kapton or Isolation Tape is also Recommended. Check if you have inserted the Micro-SD Card.

When everything is in Place, we can Clip in our Fan. To prevent it from Falling off, we support it with a drop of SuperGlue. Check the AirFlow before placing the Fan on the Drop of SuperGlue 😊

Part 4 – Display Preparation

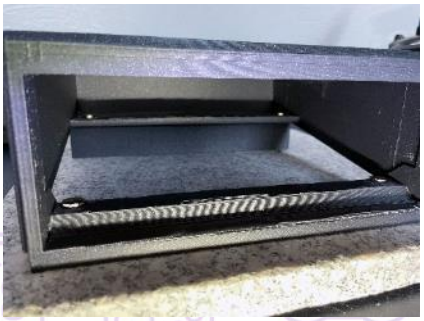
To Prepare our Display, we need 4x M3 Screws and 4 Washers. Optionally 8 Neodym Magnets if you want to hold the Display in the Case when its not tight fit.



Put in the Display so the USB port is looking to the Right.

Screw in the Screws with some washers. Add more Washers if your Screws are longer, so you don't damage the screen. Don't tighten them fully. Adjust the Display so it fits and then tighten one screw after the other.

If you need the Magnets, just glue them into the holes. Watch out for the right direction



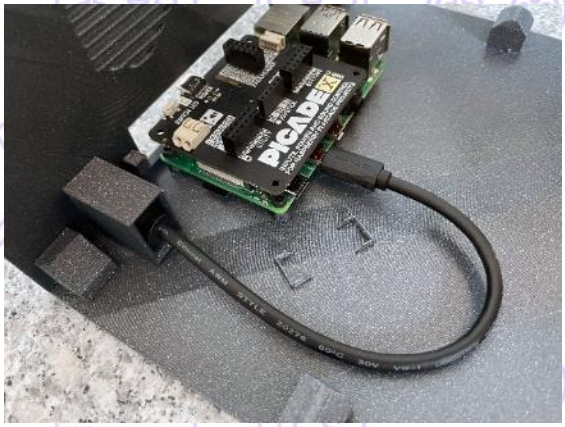
After that it should look like this:

Part 5 – Put it all together

After we prepared all our Parts needed, its time to assemble everything.

First we start with the Backplate and the Side Panels. Screw in all the Bottom Screws.

Do not overtighten.

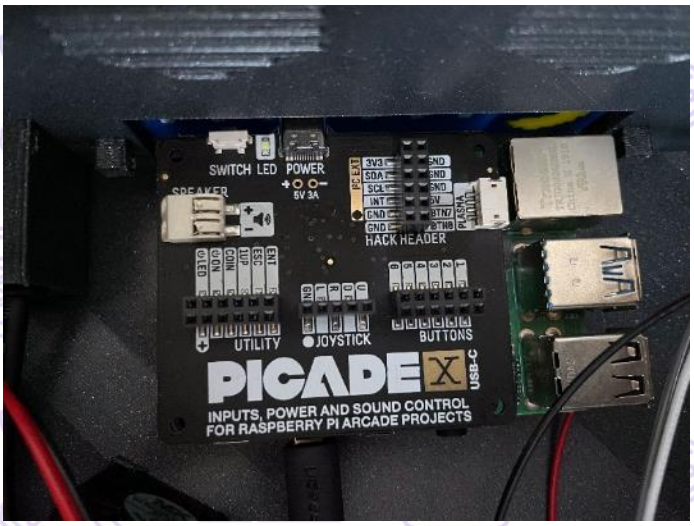


Plug in the micro-hdmi cable into port 0 (HDMI0) if you choosed to use the HDMI Out.

Then go on with the other Side-Panels.

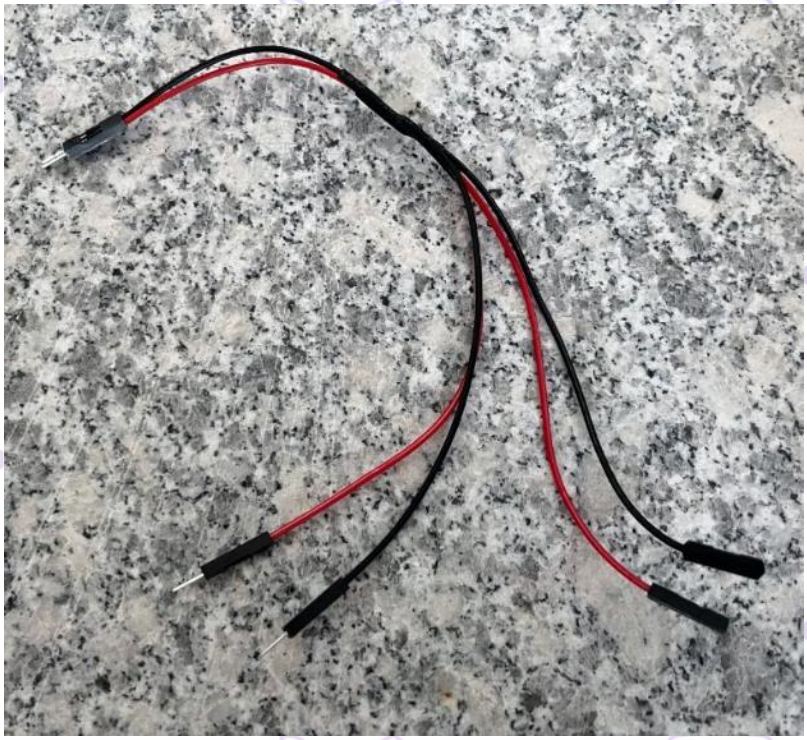
Before we place our other parts, we should connect the Buttons to the Picade X Hat.

Take the 4x Pair Cable from the Wiring Loom Kit and connect the Buttons to the correct Plugs on the Picade (Utility Header).

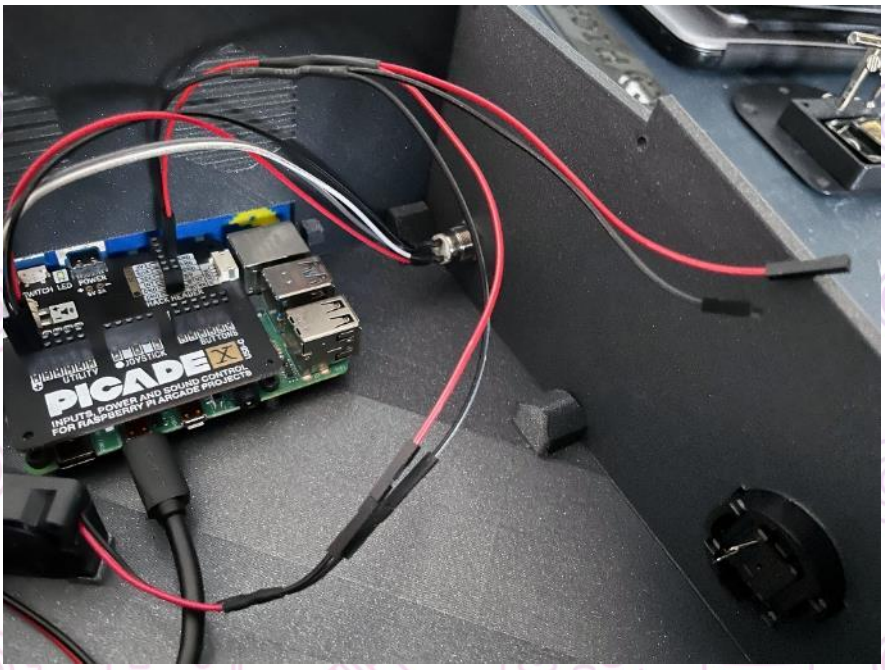


Also Plug in the Power-Button. Be aware to the Polarity of the LED if you have a button with built in LED.

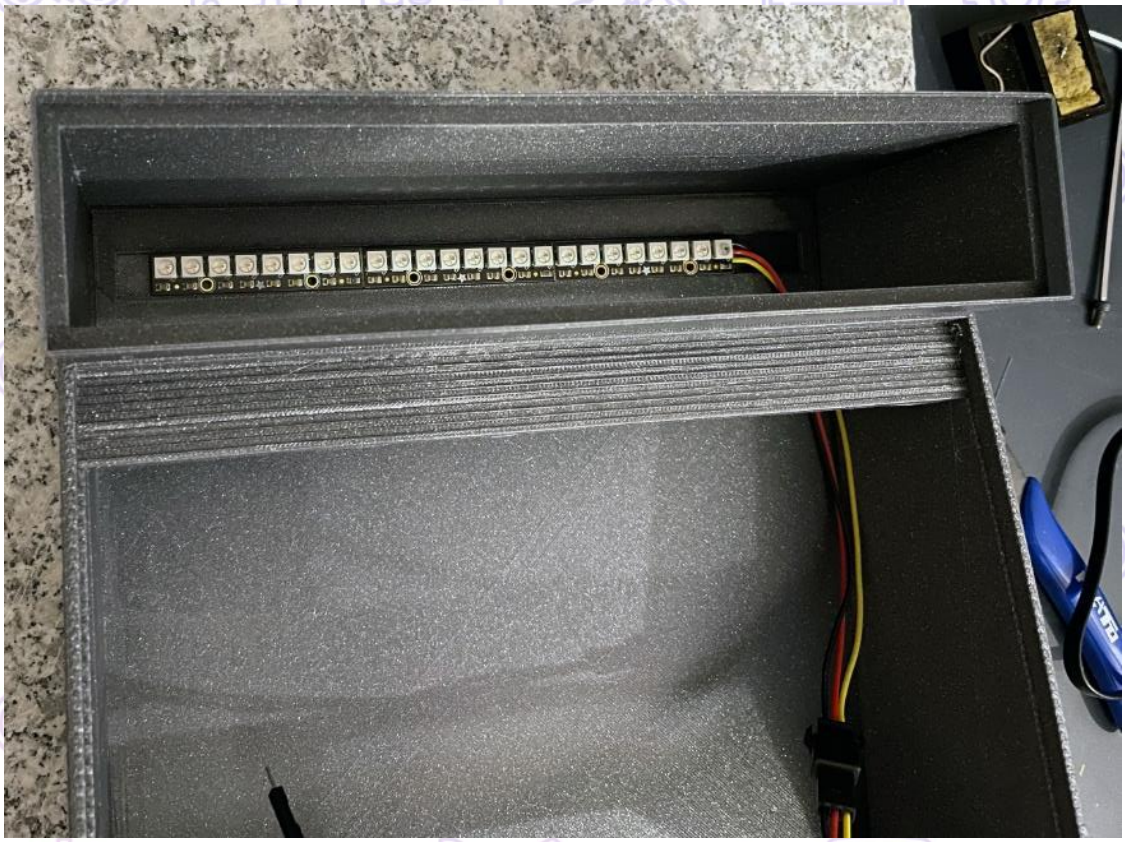
As we need to Power the Fan and our Display. (If you are Planning to run the Lighting of the Sign from the Pi, add a additional Cable to Power your Light Strip)
Its Recommended to build a Y-Cable for this. Take some Jumper Wires and solder them together like this:



The Male Wires go into the Picade Hat and connects tot he Fan. The Female connects to the Display Board (if you want a direct connect, leave this Female Cable longer)



Now its time to Put on the Display_Top Part. If you want some Lights for the Sign (you WANT that!! 😊) its time to prepare it with your favorite LED Strip or LED-Bar...



Attach the Strip with some 3M Tape or Double-Sided Tape. Leave the Cable long enough and put some JST-Connectors on it for clean cabling.

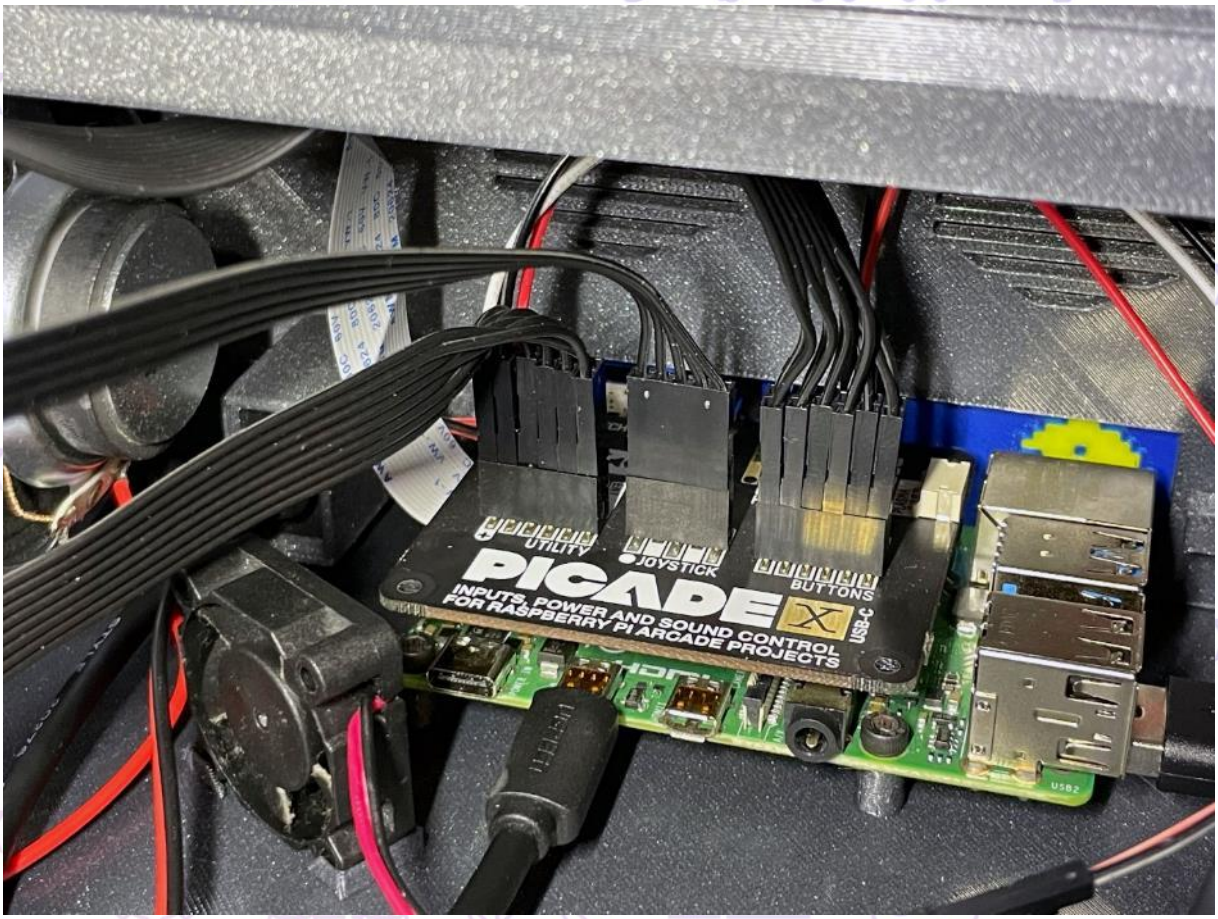
At the Moment of this Manual, i used some ATTiny USB to power the Lights. Feel free to use any MicroController you want or Connect your Strip through the Hack-Header on the Picade X Hat. If youre Planning this, you need a Y-Cable with an additional Cable (1 IN 3 OUT)

When the LEDs are in Place its time to marry the Part with our Prebuild Base.

Screw in the 6xM3 Screws to stabilize. Tight the Screws when all are in Place so you can adjust a little bit. Its important that the insert nuts are placed very well.

Halfway done. Grab the Joystick and Button Part an lay it upside down, so you can connect the cables easily. First connect the Joystick Cable and mark the GND Cable. (its the nearest one to the joystick).Then Connect the Buttons one after the other. Build yourself some ordering (not recommended for the mapping, but its better to be clean 😊)

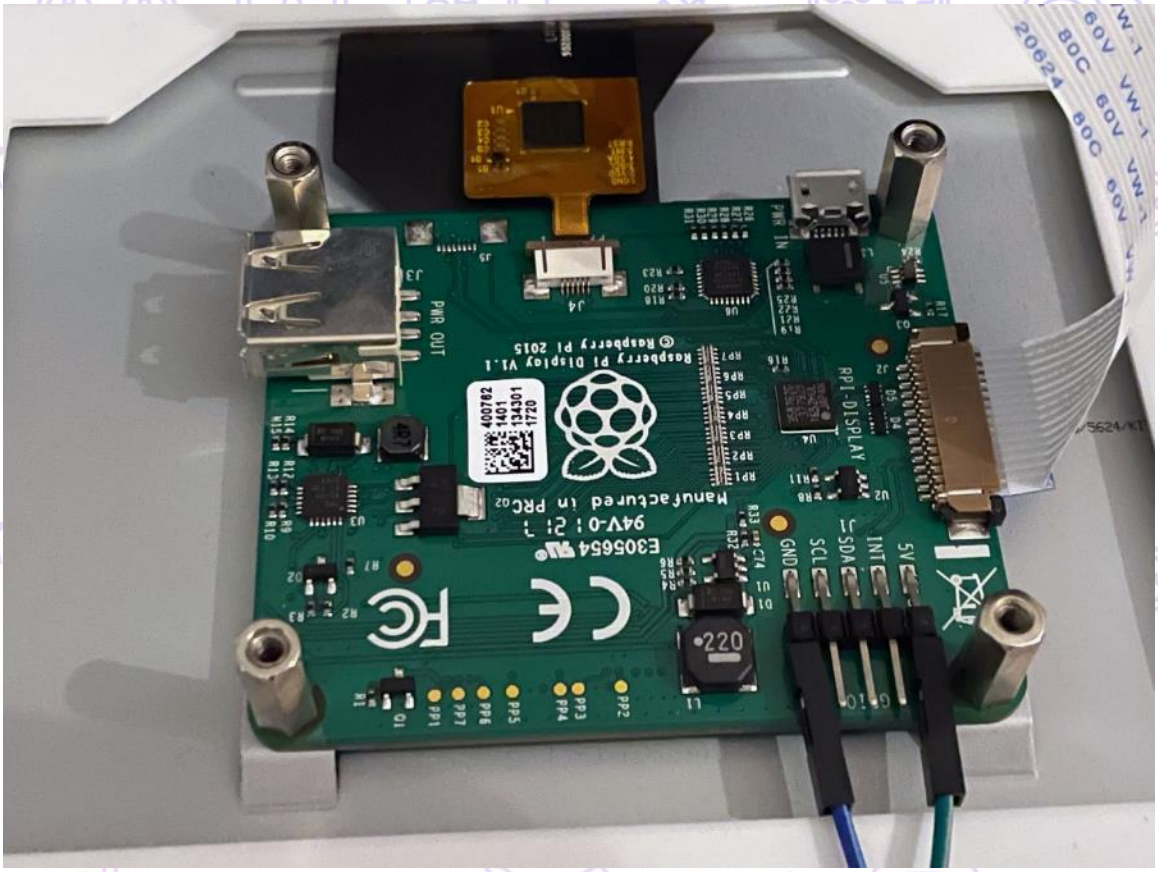
Now we have to connect the cables to our Picade HAT. If its too difficult to plug them into the headers, take off the Display_Top Part. Connect the Cables like its printed on the Picade Hat. Be sure to Check the GND Pin on the Joystick Cable.



Put back on the Top Part in case you removed it.

Grab the display cable and the power cable through the Hole for the Display. Attach the Joystick_Button part. Leave the screws aside, in Case you have to change the Pin Order of the Cables.

Take the Display Part and connect the Flat-Cable to the Display. The Contacts should be facing to you. Connect the Power Cable to the Pin-Header (GND and 5v)



Now push in the Display to the Case. Start on the Top and take care of the cables not to slip in between. Then push fit on the bottom. If its too lose use the neodymium magnets to hold the Display in Place.

Now it should look something like this:

To finish this Step, just push in the Light-Sign and we are Ready to go. If you see some Light shining through the Case from your LED Strip, slide in the „Light-Tunnel“ Part (Printed in Black Filament) to Prevent Light Bleeding.

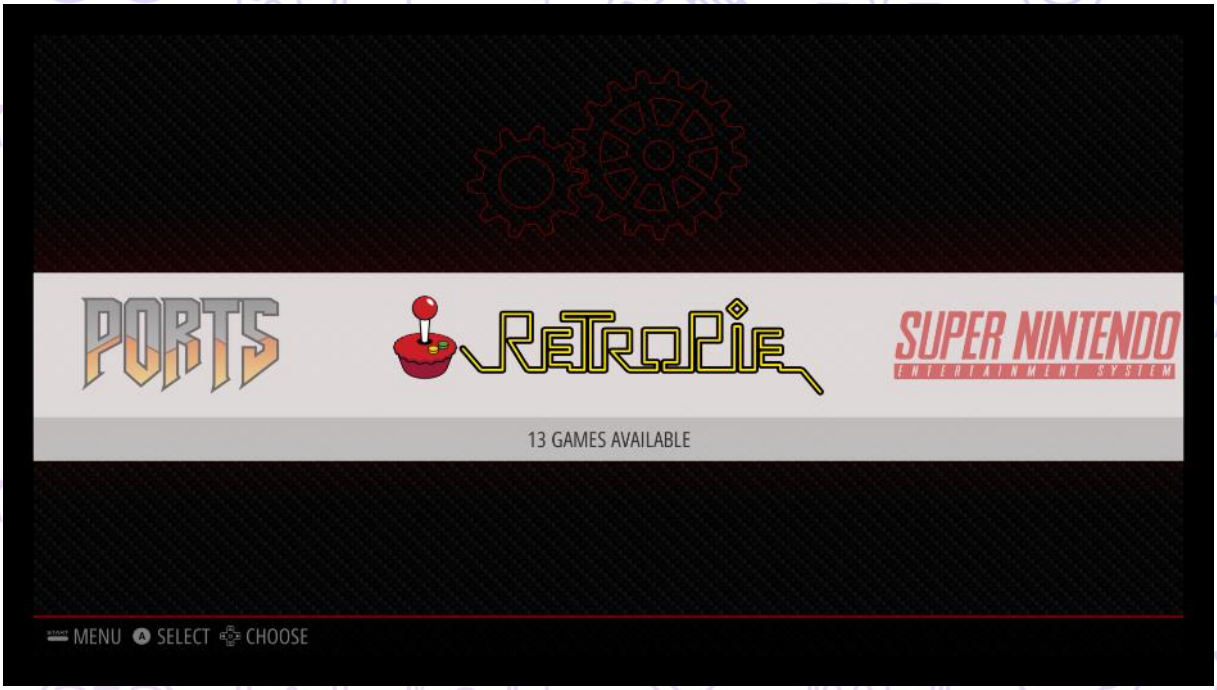
If the LED_SignPart is too loose. Take some drops of SuperGlue (not much in case you have to detach it.)

In the Last step, screw on the Cover for the Backplate

Part 6 – Power!!!

Plug in the Power cable and press the Power Knob. If something‘ not working (Display/Pi/etc.) Please Check your Wiring.

If you see something on the Screen:



Congratulations! You made it!

To calibrate the Buttons and Configure Retropie

Head over to:

https://retropie.org.uk/docs/

To Configure the Picade X Hat refer to:

https://github.com/pimoroni/picade-hat

For more Information about Retropie visit:

https://retropie.org.uk/

Donations:

https://www.paypal.me/andre1289

Questions or Feedback Welcome:

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