MilKris‘ TEDAC (v2) for the DCS AH-64D Apache

DISCLAIMER: I’m not a professional maker! It’s not perfect, but it works and I’m fine with the result. Here and there, some filing, drilling, and gluing might be necessary...

This is the successor to my old 7-inch TEDAC. This time I slapped the same 8" panel into the **TDU (TEDAC Display Unit)** that I’m using for my MPDs. For **VR users**, an actual LCD screen doesn’t make much sense - that’s why I’ve included a extra STL file for 3D printing

The whole thing is part of my CP/G front panel for my modular cockpit setup. The CP/G panel, including the **EUFD** and **Armament Panel**, will drop as its own project soon (two weeks™).

Anyway, back to the TEDAC. Originally I designed the TDU for Hannibal’s TEDAC grips. Then my brain went “nah, we’re going deeper” and I ended up **designing my own grips as well. They’re 1:1 scale to the real Apache grips with similar ergonomics**, and yes, **just like the real deal they rotate/adjust**. That makes the TEDAC extreme flexible - throw it in a cockpit, or just park it on your desk. I made a bunch of mounts/stands for different setups.

For the grips I also designed my own integrated trigger setup, plus **custom 4-way HAT switches**

I also made a **standalone version of the grips that works without my TEDAC**. Same bolt pattern as Hannibal’s grips, so you can drop them into existing projects without having an aneurysm.

Build difficulty: extremely low-tier. You don’t need to code, and you don’t need EE knowledge. A 3D printer (or print service) + a soldering iron = done.

For the electronics I went with **Leo Bodnar board**s because they “just work”. The boards are automatically recognized by **Windows as USB game devices**, and the **buttons can simply be assigned in DCS**. If you prefer Arduino, that’s also an option.

Labeling was done with a diode laser. All laser files are included. If you can’t laser, I also included STL variants with raised text - just hit the letters with a white paint marker and maybe clear coat it so it survives your sweaty gamer hands.

The total cost for the version with a screen an the Leo Bodnar Boards is around €230 If you’re using an Arduino and marching through the Valley of Tears wiring everything up with shift registers, you’ll end up saving like €100 in parts — and gaining +5 to electrical PTSD.

Build steps will mostly be shown with pictures because 1) reading is for nerds and 2) pictures explain it way faster.

Here's a time-lapse video that shows it all together very clearly. **Nevertheless - RTFM!**

#Update: added **Pro Tip: George AI** on the last Pages
#Update: Tips for the **Joysticks**
#Update: More details on the construction of the **4-way HAT switch**
#Update: Added **M2x16mm** screws to **part list**
#Update: Added tips **3d printing**
#Update: added **Joystick orientation**
#Update: added Information about the heat inserts used

PSA from Command:

If this thing blew your mind and made your simpit jealous, maybe drop a little “thanks” in the jar. Projects like this don’t grow on trees; they’re handcrafted in basements powered by caffeine, copium, and pure autism.

https://www.paypal.com/donate/?hosted_button_id=XG6RA9RWPM84Y

I'm looking forward to your feedback — and of course, feel free to share pictures of your own TEDAC!

Yours,
MilKris

Follow me
Reddit
YouTube
Thingiverse
cults3d

Additional Apache projects such as the KDU, MPDs, IHADSS and others are available on my GitHub.

Part list:

1x Wisecoco 8 Zoll LCD 1024 x 768 IPS HDMI Screen

1x 40 Pin FFC/FPC Cable Extention | 40 Pin, spacing 0.5 mm socket, 200mm long

2x FJ06K-S joystick

2x linear rotary Potentiometer RV097NS 6mm

1x RS16 16mm rotary switch 2 Pole 3 Postion

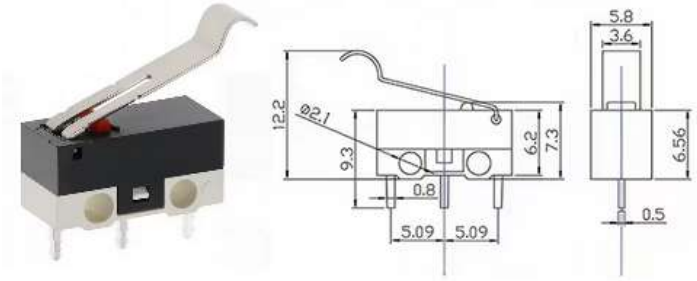
4x Toggle Switch ON-OFF-ON R Springreturn | 11.7mm long Flat Lever

The toggle switches should look like this.

3x Toggle Switch ON-OFF-ON | 11.7mm long Flat Lever

12x 12mm withe momentary pushbutton

43x Tactile Switch 6x6x4,3mm



2x Microswitch | Limit switch

heat-set insert M3x5x6mm

heat-set insert M3x4x4,5mm

M3x16mm Socket head cap screw

M3x25mm Socket head cap screw

M3x12mm Pan head screw

M2x16mm Pan head screw

1x BBI-64 Button Box Interface

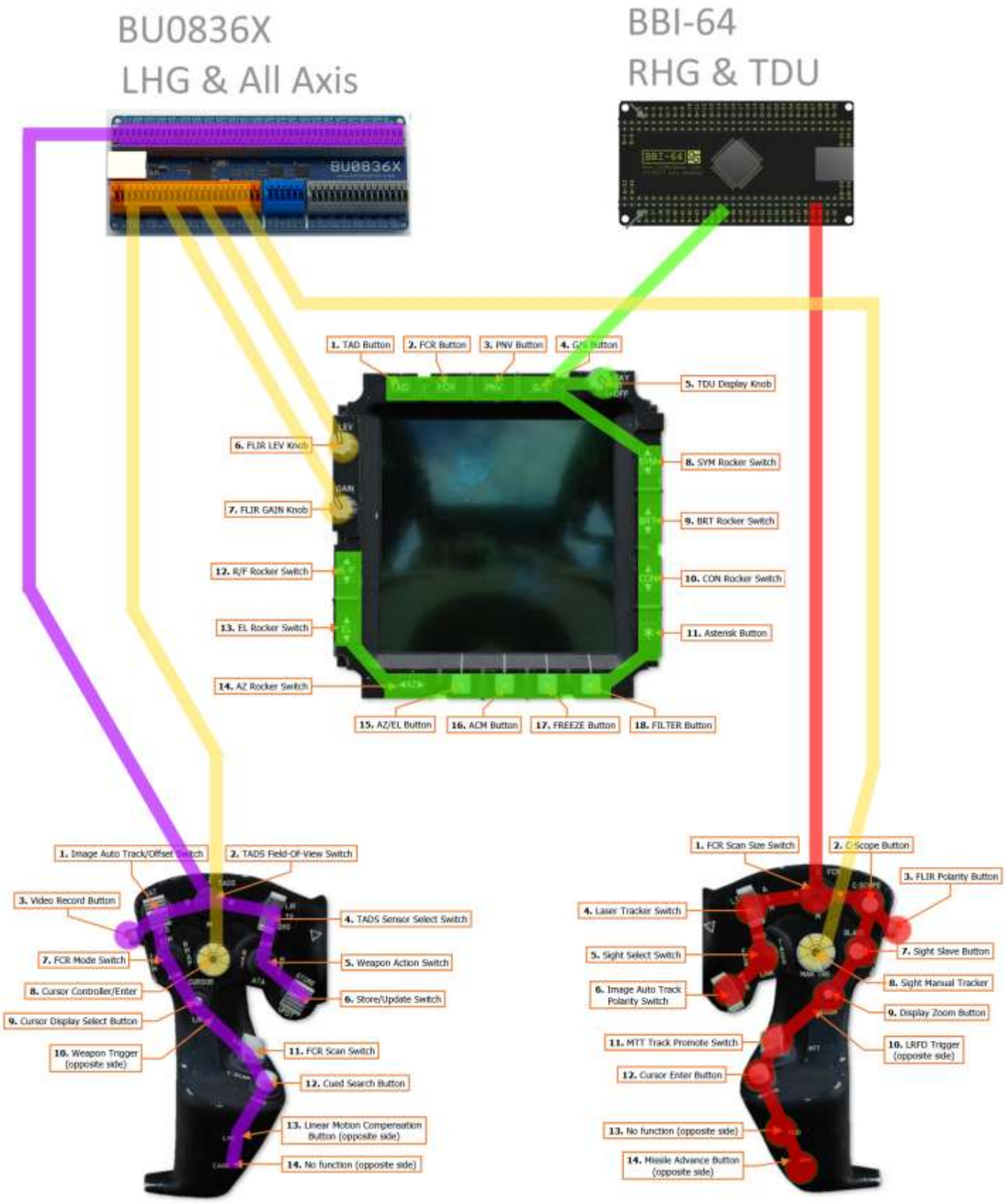
1x BU0836X Joystick Interface

2x springs 0.6mm 20x6mm

19x 3x12mm woodscrews

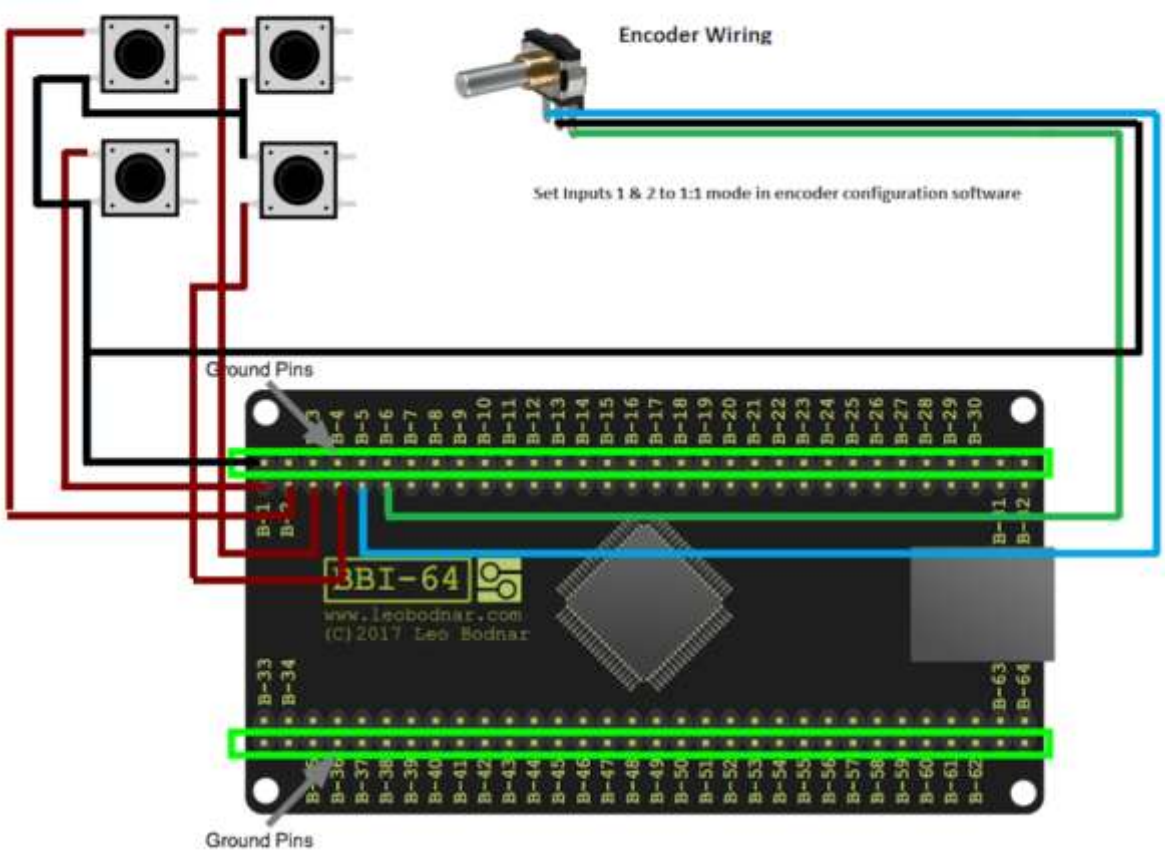
Also: Meter by meter 0,14 mm² copper wire, some Dupont connectors 2.54mm (female)

Wiring overview



All joystick and LEV/GAIN (potentiometers) are connected to the BU0836X. All switches and buttons on the Left Hand Grip (LHG) are also connected to the BU0836X.
The buttons and switches on the TDU and Right Hand Grip (RHG) are connected to the BBI-64.

The Leobodnar BBI-64 and BU0836X



For the Leobodnar boards, you don't need much prior knowledge. Simply solder the wires to the switches and connect them to the board.

WARNING! Windows only registers 32 buttons! But don’t worry — DCS recognizes all 64 buttons of the BBI-64!

Tip: It's sufficient for a single ground wire to run from the Leobodnar board, with the switches connected in series.

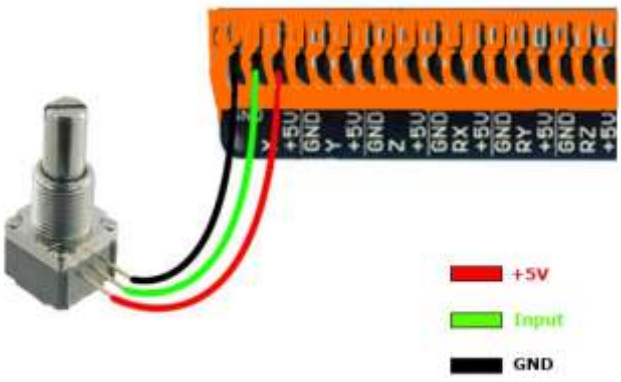
Rotary encoders are essentially digital rotary switches with **one ground pin and two input pins**. I've created a small diagram to illustrate this.

When using a **rotary encoder**, you need to define one or more **input pin pairs** in the **BBI-64 Config Tool** (available on the Leobodnar website) where the encoder is connected.

BU0836X Board: Joystick / potentiometer wiring

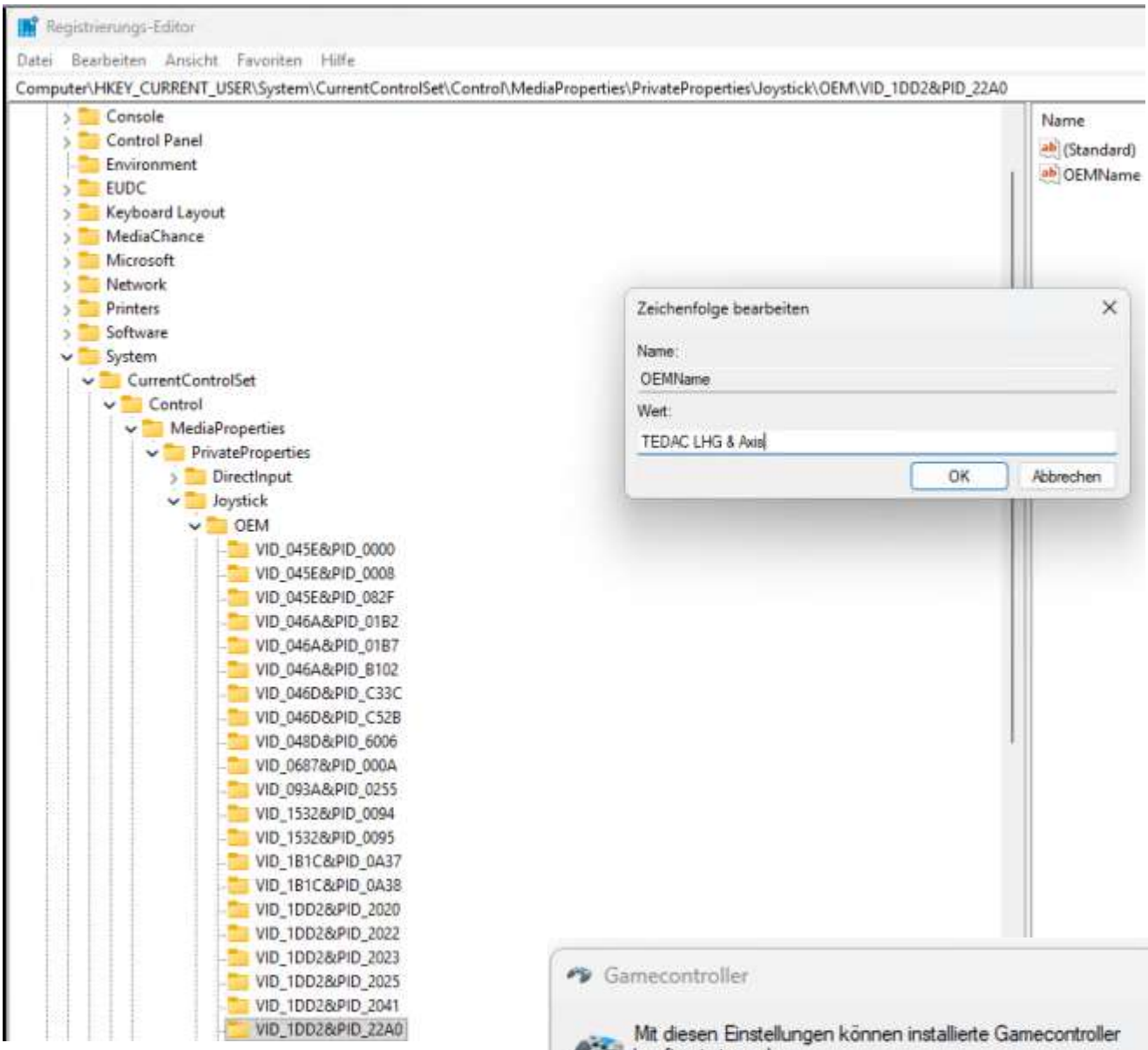
You must only connect potentiometers with the USB cable unplugged from the device.

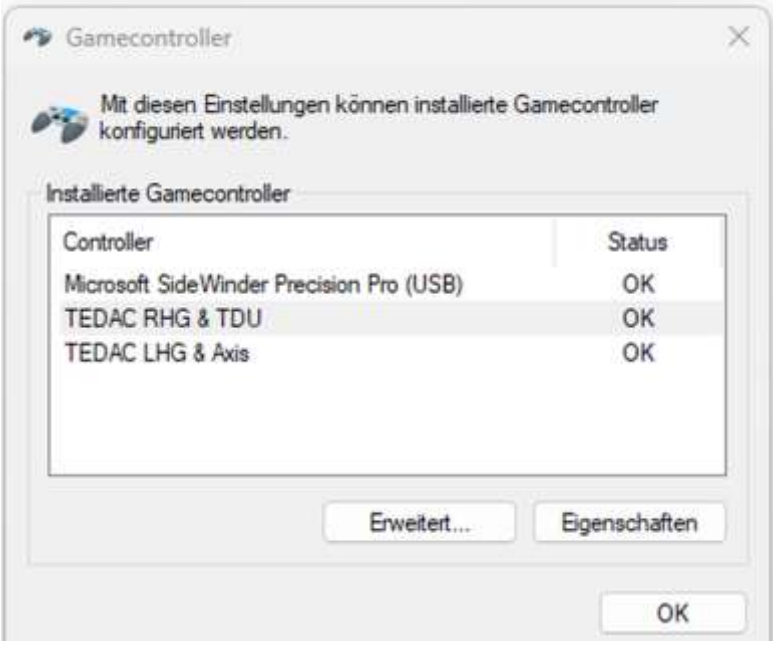
The axes (especially the **FJ06K joystick)** must be **calibrated** in Windows and the USB Game Devices!



If you're **using multiple BBI-64 or BU0836X boards** (e.g. if you also built my MPDs using BBI-64 instead of Arduinos, etc.) you'll need to flash a different firmware onto each board using the **HidFlasher** tool (available on the Leobodnar website). Without this step, Windows won't be able to tell the devices apart. Leobodnar provides 10 unique firmware versions specifically for this purpose.

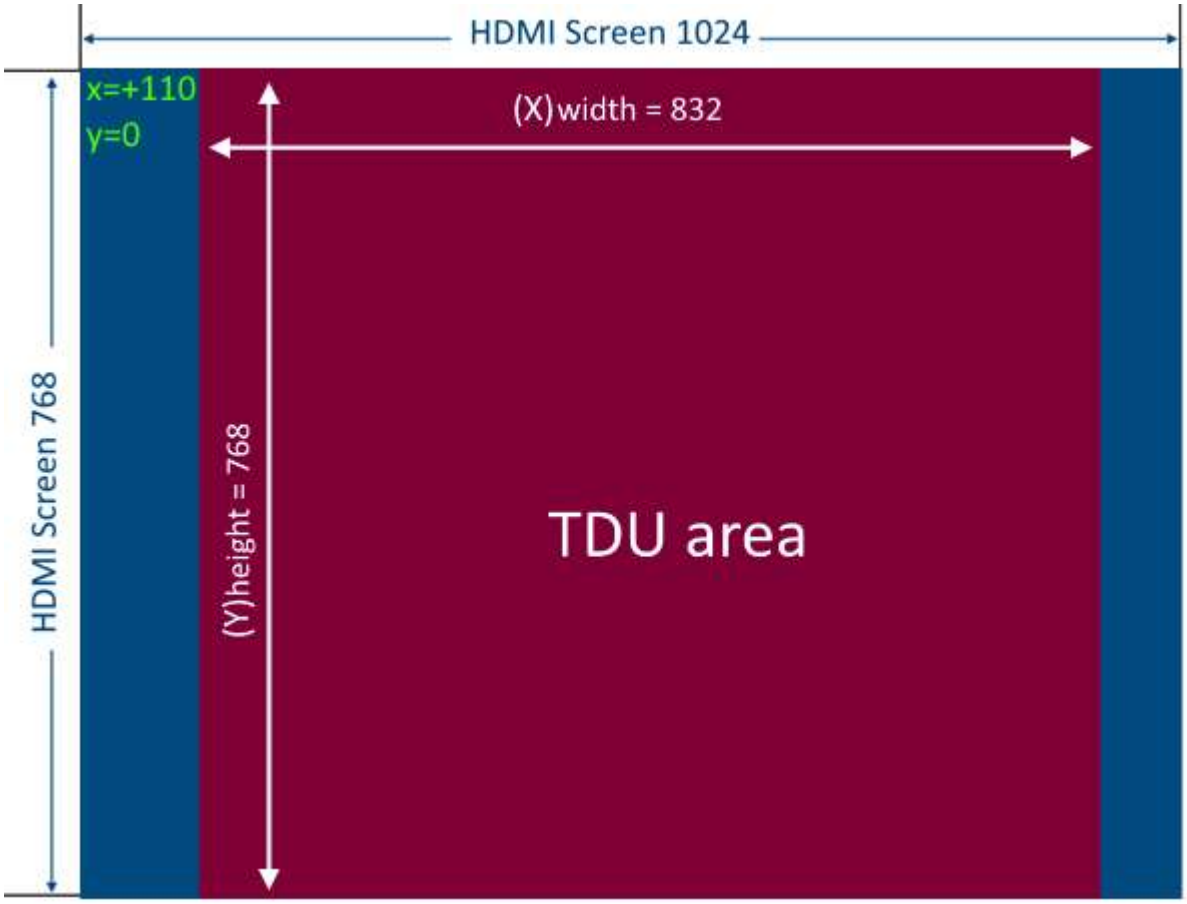
🔧 **Tip:** You can rename the devices in the Windows Registry.
For example, instead of showing up as "BBI64" and "BU0836X", they could appear as "**TEDAC RHG & TDU**" and "**TEDAC AXIS & LHG**" — much easier to manage in DCS controller setup!





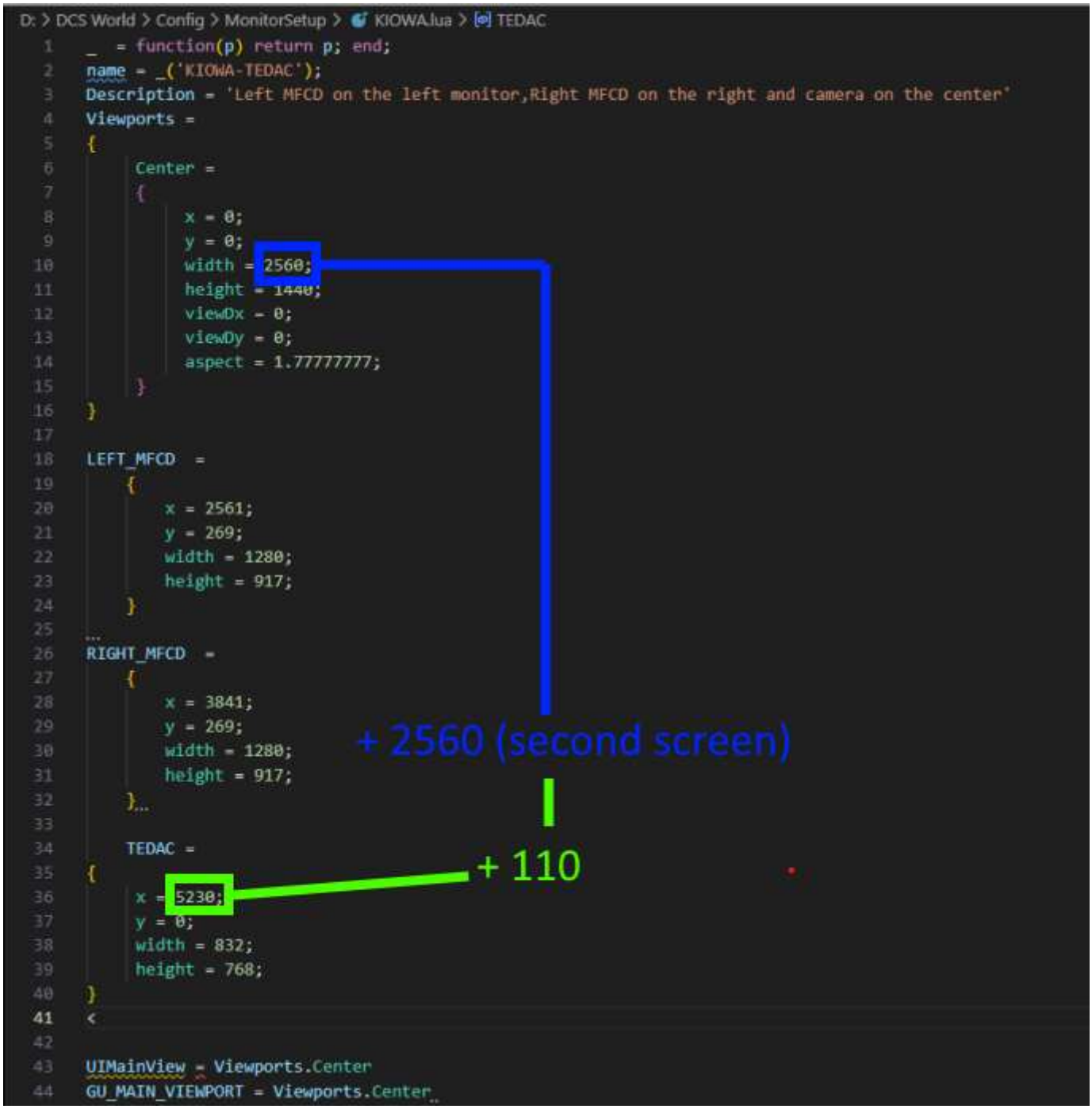
Setting up the Display

We use the viewport export method to display the TDU on the HDMI screen. To do this, simply adjust your MonitorSetup.lua accordingly. You'll find all the details on how to configure external displays in DCS here: https://wiki.hoggitworld.com/view/Exporting_MFCD_Displays



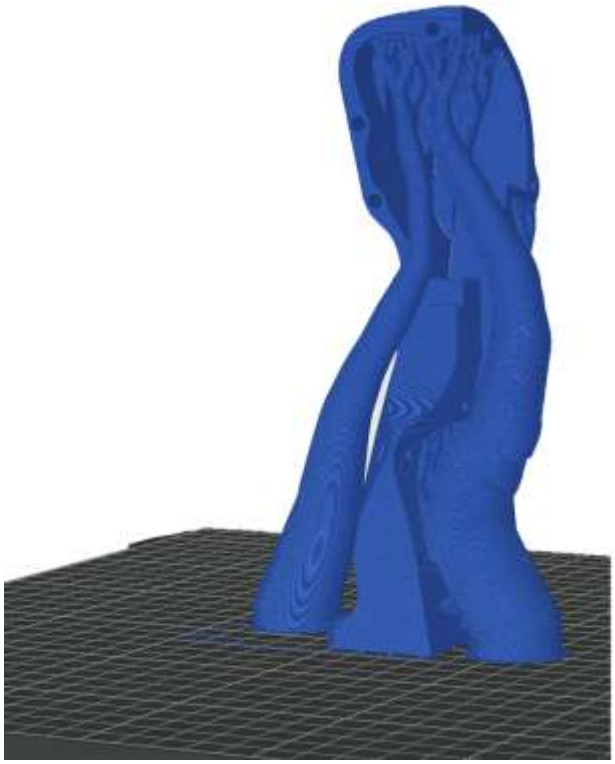
Below is an example of my monitor setup LUA from my test system. This setup uses two displays at 2560×1440 each, plus the TDU screen at 1024×768.
This gives us a total resolution of **6144×1440**.

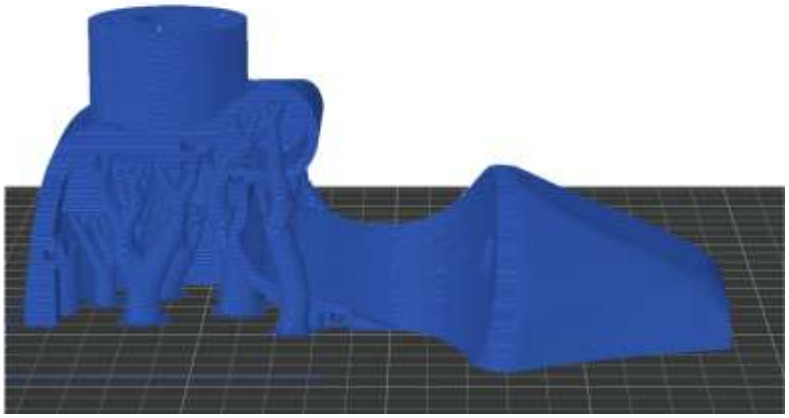
DCS runs on the main monitor, the two MPDs are exported to the second display, and the 8-inch screen is used for the TDU viewport export.



Tip to save display outputs:
I'm installing the TEDAC together with my MPDs (which also uses the Wisecoco 8-inch screen) and the EUFD (with a 800x480 screen) into a my CP/G frontpanel that can be mounted into my modular cockpit. Using the StarTech.com USB 3.0 to Quad HDMI Adapter – USB to 4x HDMI Monitor Converter, I can connect all displays to the PC using just a single USB port.

3d printing





The **grips** should of course be **printed with higher strength**: use 4 perimeter walls and 50% infill. For the best print results and sufficient strength, you should print **Shell_Part_2** of the grips vertically and **Shell_Part_1** horizontally. It's best to use tree supports in general.

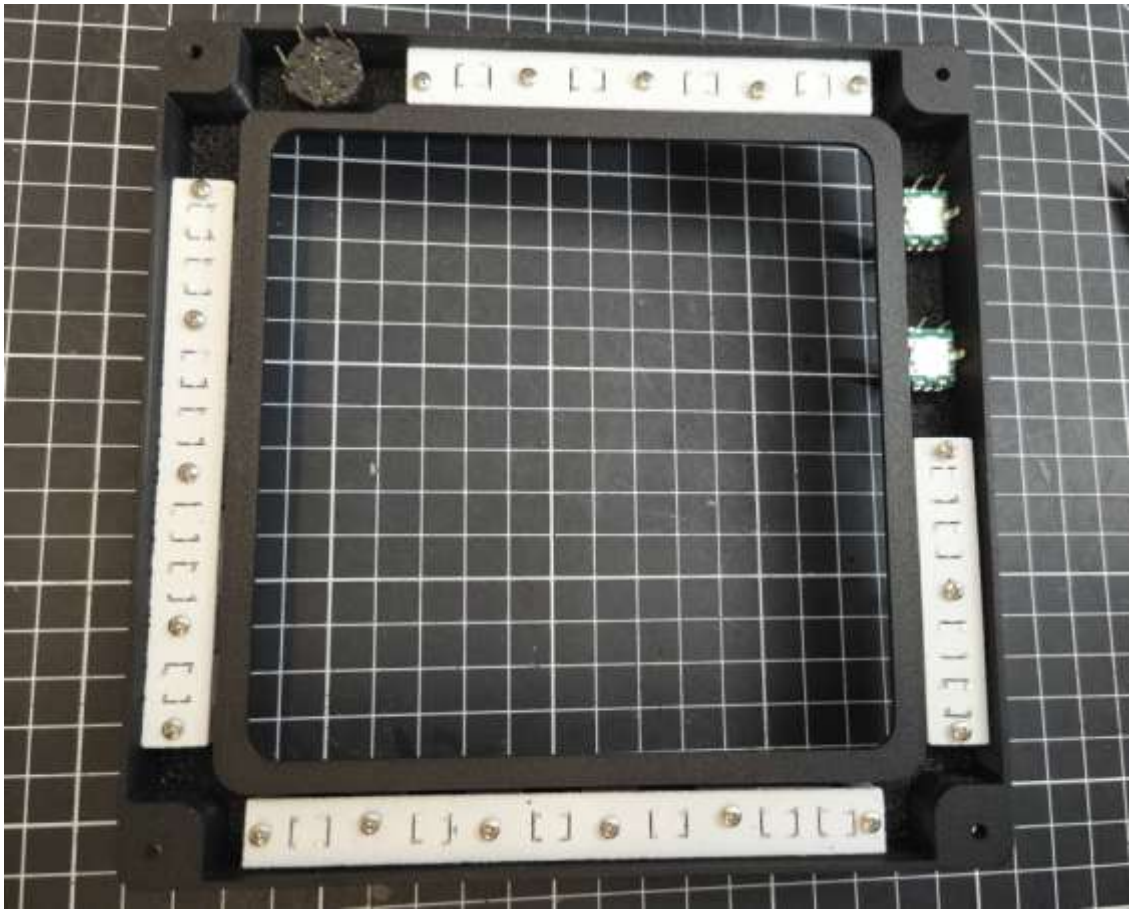
The **TEDAC_Grip_Housing** should also be printed with increased strength. I used 3 perimeter walls and 40% infill for mine.

Parts for the **4 way HAT switches** should be printed with 100% infil.

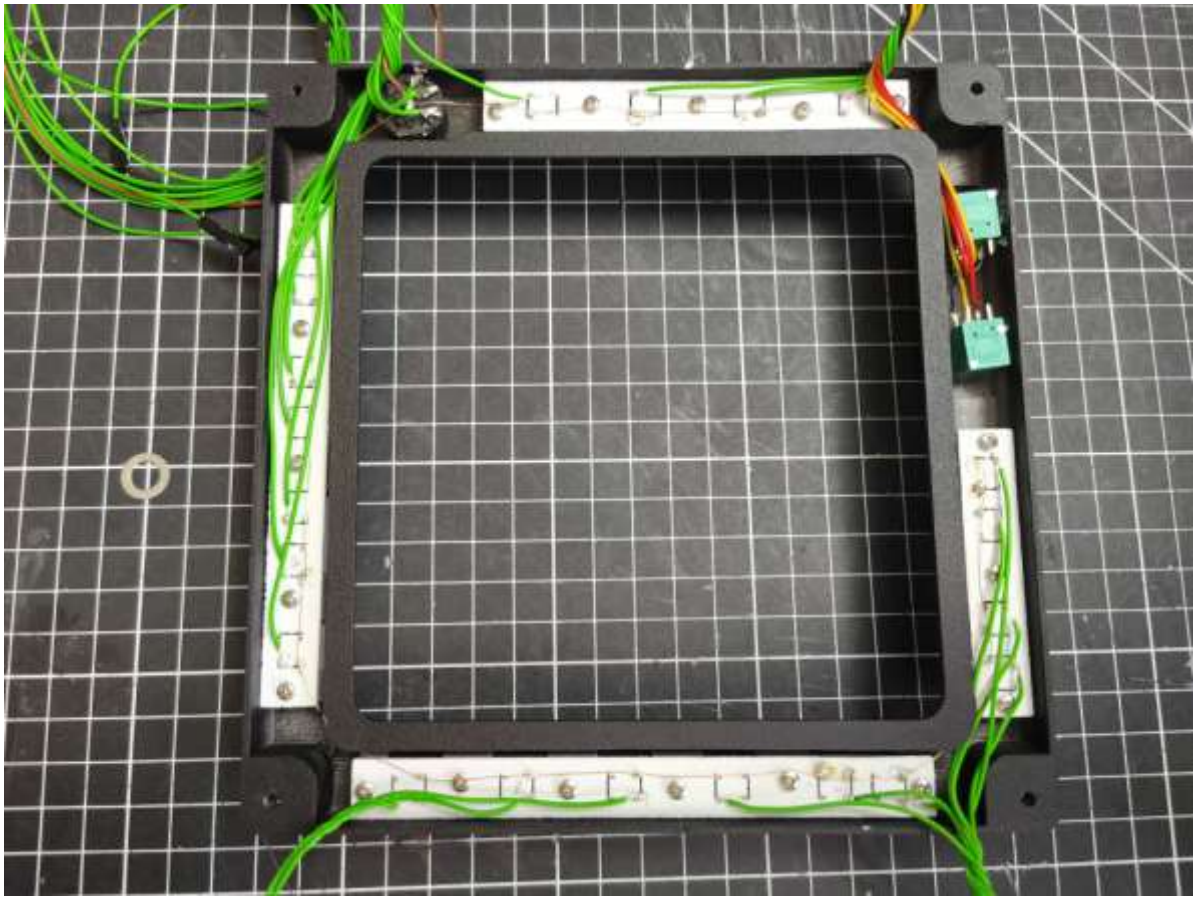
Now have fun building!

Buidling the TDU

Insert the tactile switches into the matrix boards.

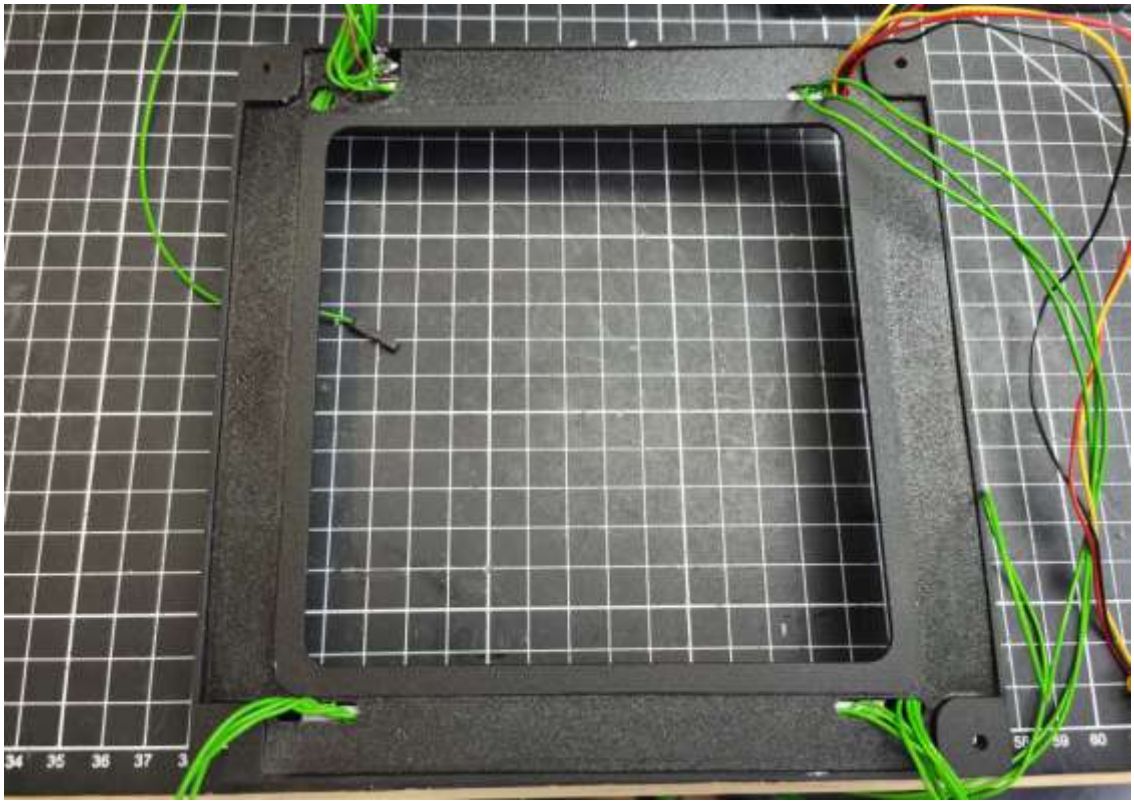


Insert the TDU buttons, then fasten the matrix PCBs directly to the TDU frame using 3×12 mm wood screws. Test the buttons for proper operation. Depending on the desired haptic feel, tighten the screws more or less. Install the two pots and the 3-way switch as well. They're secured with hot glue (design limitations… don't judge me).



As shown in the image, solder a ground wire (you can use a stripped wire from a regular cable) in a loop to all inner pins of the push buttons, as well as to the GND pin of the 3-way switch. Then connect the whole setup to a GND. The input cables and the cables for the potentiometers should be approximately 45 cm in length. This makes assembly easier.

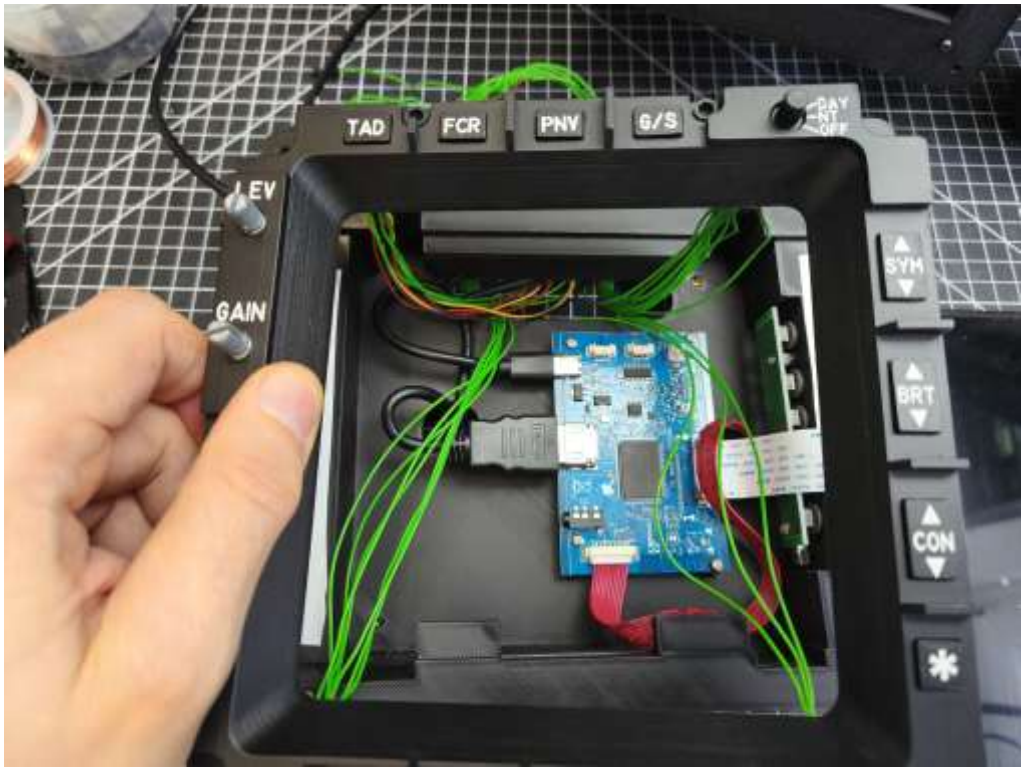
Tip: Use Dupont connectors for easy wiring ! (Only the cables that are connected to the BBI-64 board)



Now route the cables through the openings of the cable cover as shown in the picture, and place the cable cover properly.

Insert M3x5x6 heat-inserts into the front and rear sides of the TDU housing.
Next, install the display driver board and the board for the display control buttons.
Route the HDMI and USB power cables as shown in the picture.
Connect the LCD display using the FFC extension cable — pay attention to the orientation of the extension board — and test the display to ensure it works correctly!

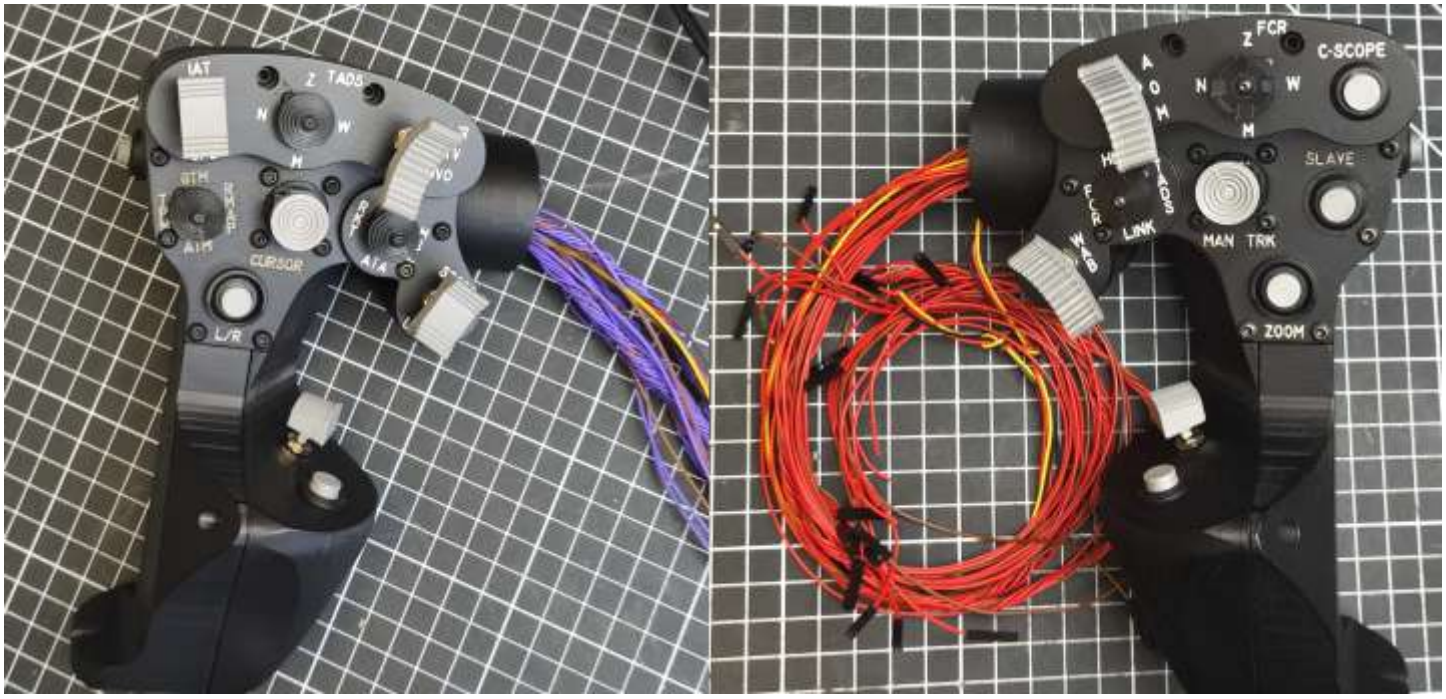
After that, apply some double-sided tape to the left and right sides of the TDU housing (as shown in the picture).

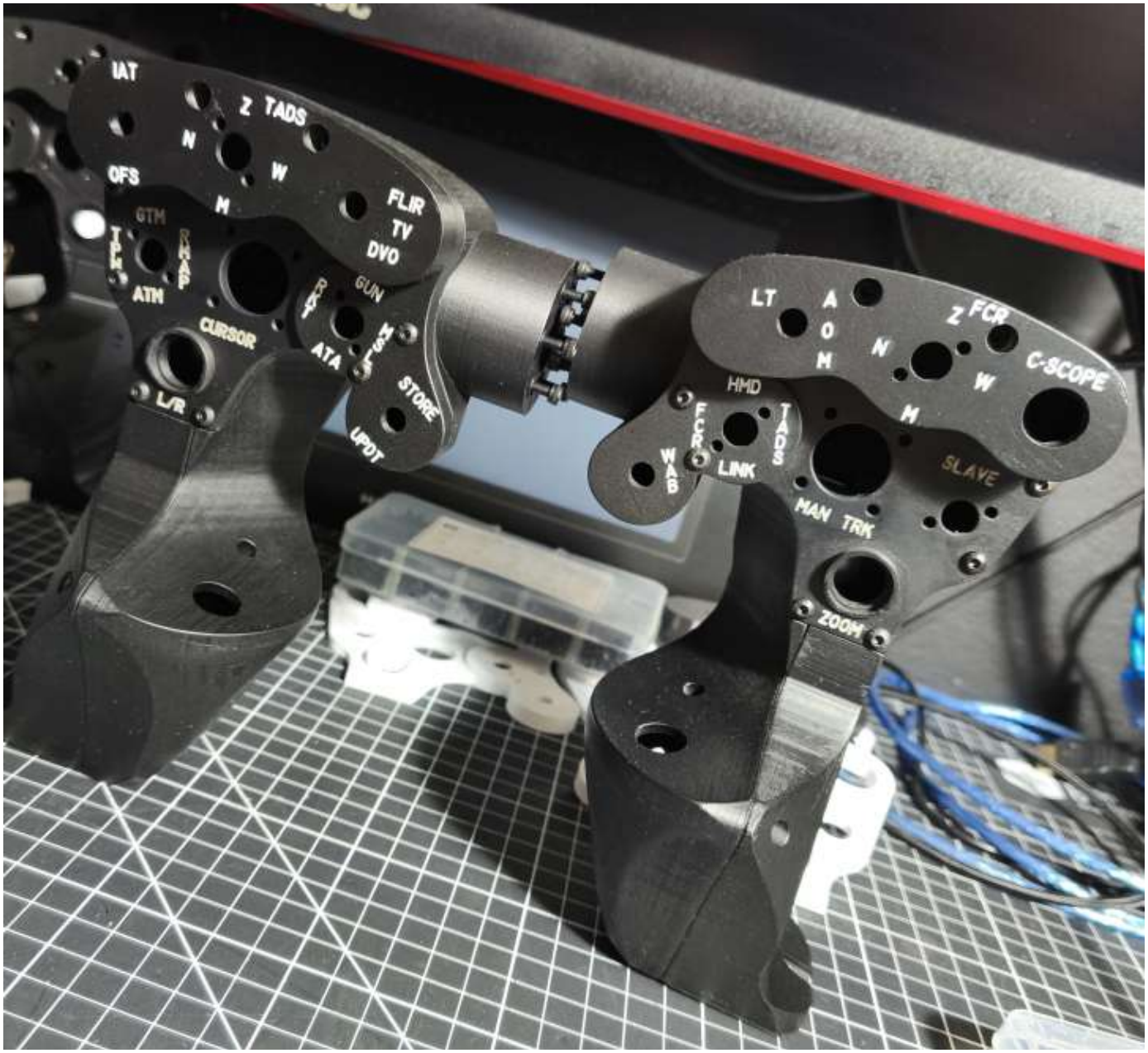


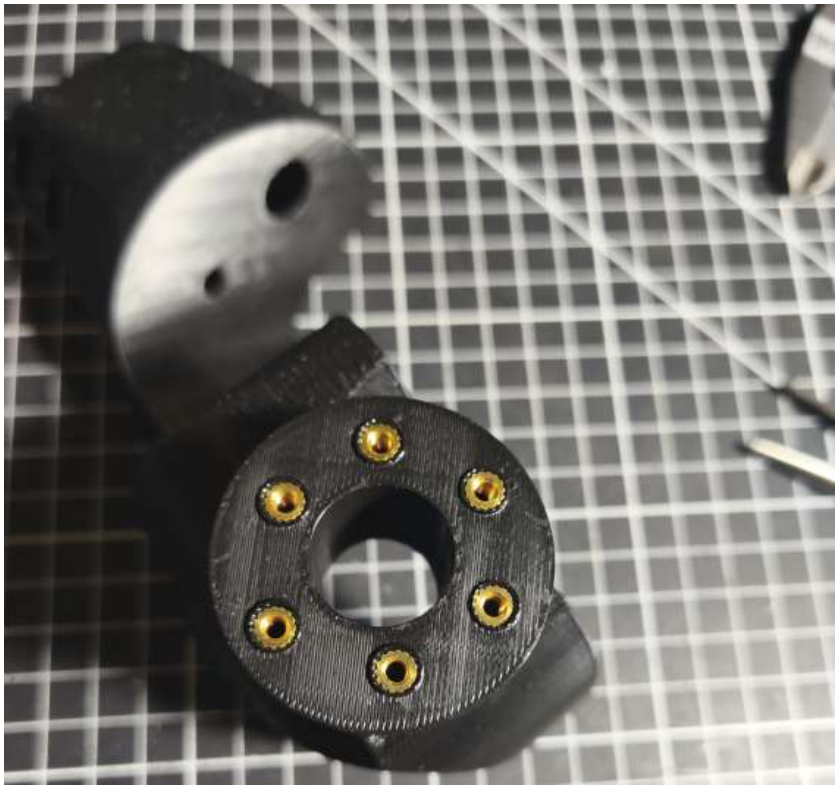
Now place the assembled TDU frame over the TDU housing. Route the cables through the openings exactly as shown in the picture, and carefully insert the display.

Now screw down the TDU frame. Use use M3×16 mm socket head screws. Boom - the TDU unit is done! ***It's best to place the knob caps onto the potentiometers and the 3-position switch before fastening the TDU frame***.

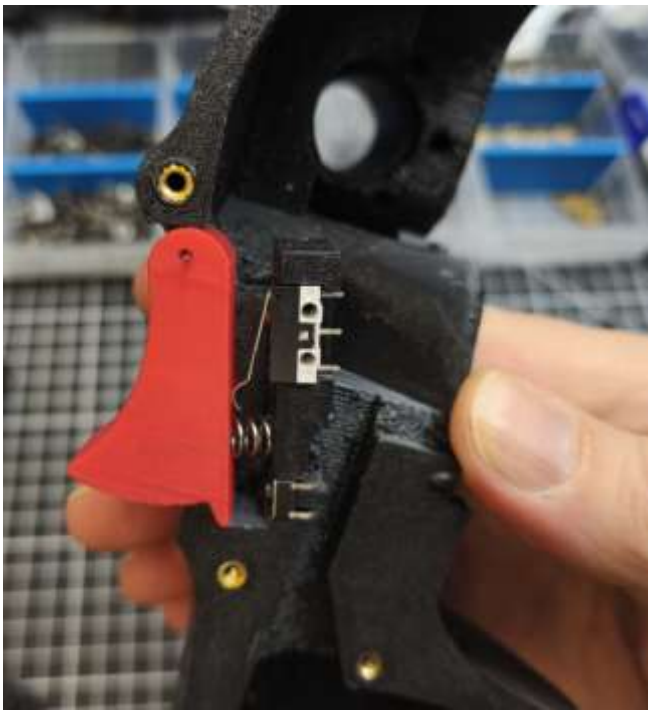
Building the TEDAC hand Grips



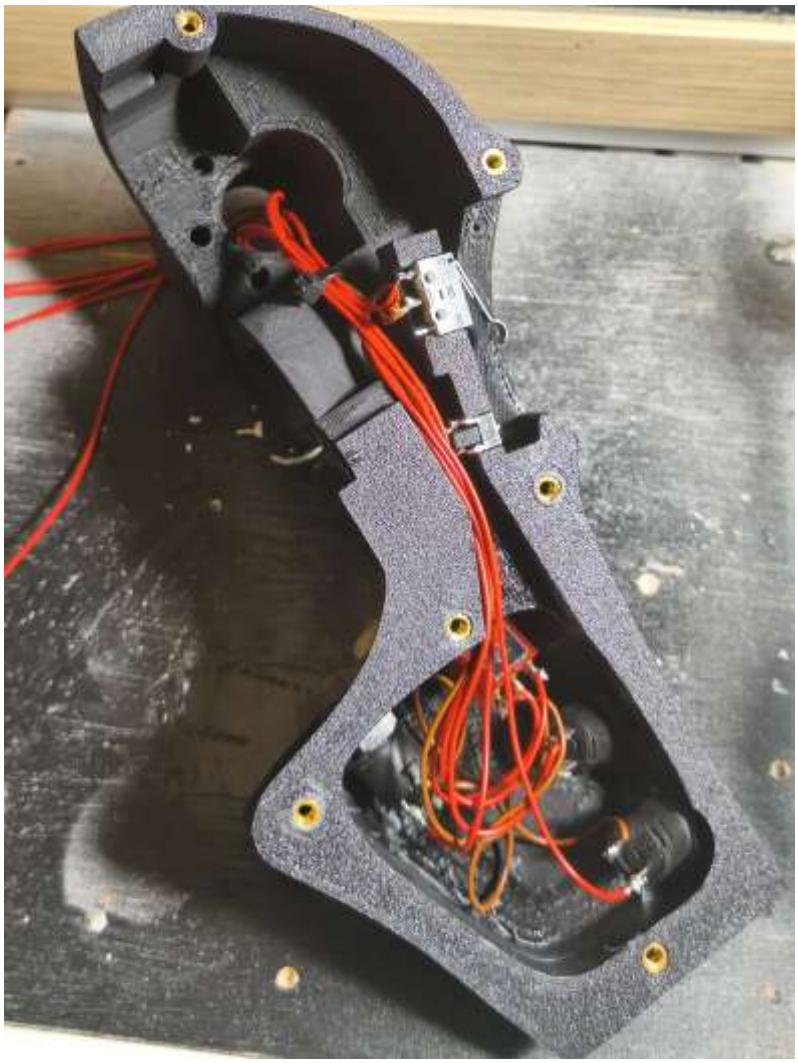

IAT
Z TADS
N
OFS
W
M
FLIR
TV
DVO
GTM
TPL
MAP
ATM
GUN
CURSOR
ATA
L/R
STORE
UPDT
LT
A
O
M
Z FCR
N
W
C-SCOPE
M
HMD
FCR
TADS
WAB
LINK
SLAVE
MAN TRK
ZOOM



Insert the heat-inserts as shown in the pictures. The grips use M3x4x4,5 heat inserts. Except for the flange: here, M3x5x6 inserts are used.



For the trigger, you should use a spring with a 5–6 mm diameter and a length of approximately 20–25 mm.
I used a relatively stiff spring (0.6 mm wire, 20 mm length, 6 mm diameter).
Use a 20 mm piece of wire as the trigger axle.



Install the corresponding buttons and switches and wire them cleanly. The cables should be at least 45 cm long.

Assemble the two grip halves and use M3×16 mm socket head screws.

Building the 4 Way HAT swtich

I created a video specifically to show the detailed assembly of the 4-way HAT switches: **https://youtu.be/cr8Qt5lnP8I**

However, here are a few important notes:

Print all parts with 100% infill!

One pair of pins needs to be clipped off each of the tactile switches.

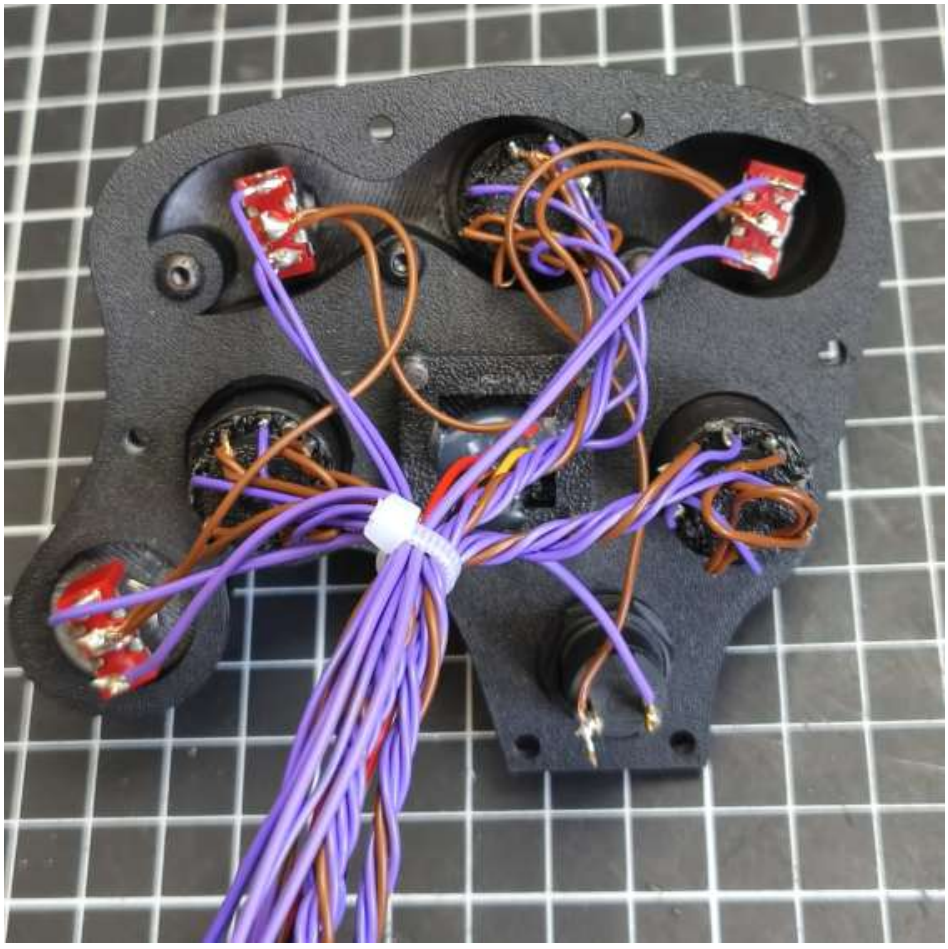
The square hole in the base may need to be enlarged slightly so that the shaft doesn't fit too tightly. It should be able to move freely in all four directions (without the tactile switches installed).

You might need to scale the shaft in the X and Y axes – depending on the tolerances of your 3D printer. In the end, the HAT switches should feel really crisp and tactile.

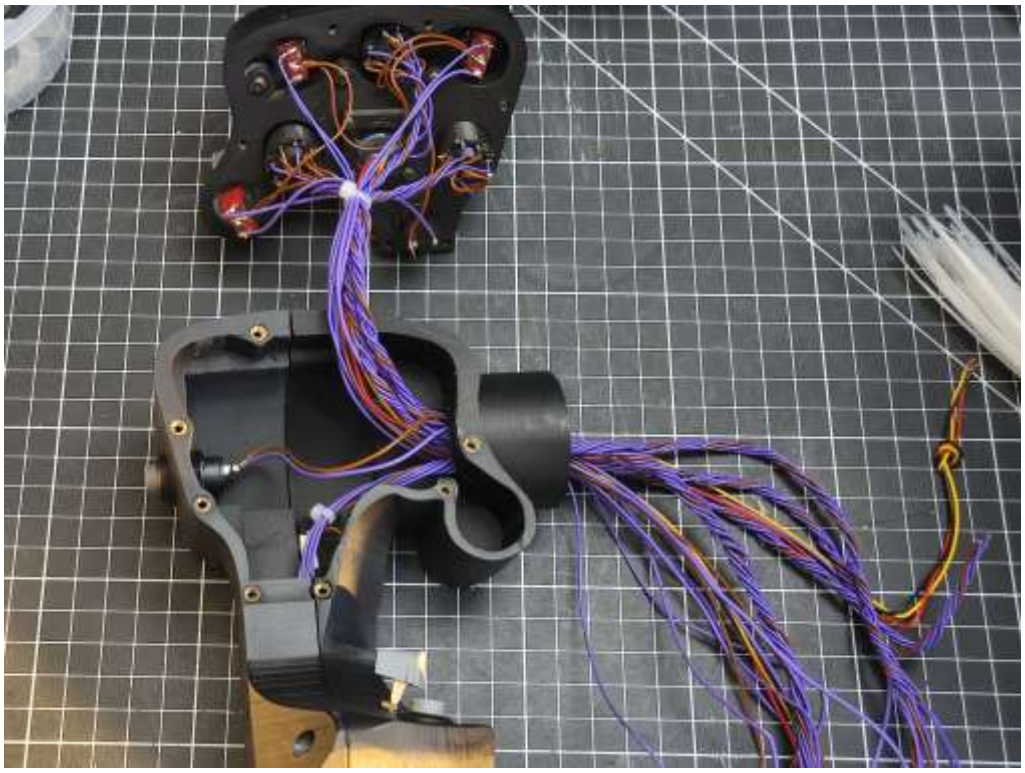
Use M2x16 pan head screws for assembly.

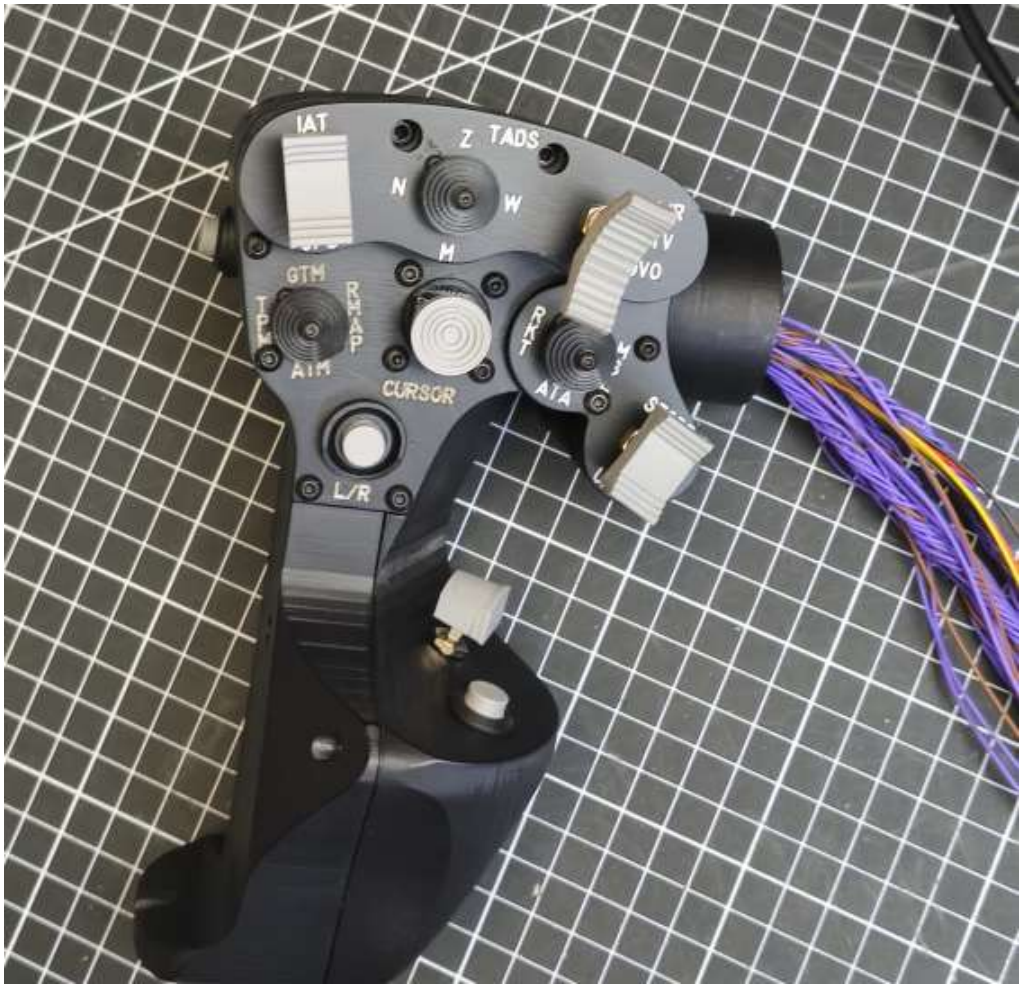
Cut off the marked pins from the FJ06K joystick. Solder the wires to the FJ06K joystick and install it into the joystick bracket. The joystick bracket is screwed in place using M3x12 pan head screws without threaded inserts.

Pay attention to the orientation when installing the joysticks - see picture! This is the only way to ensure enough clearance above when the stick is moved.

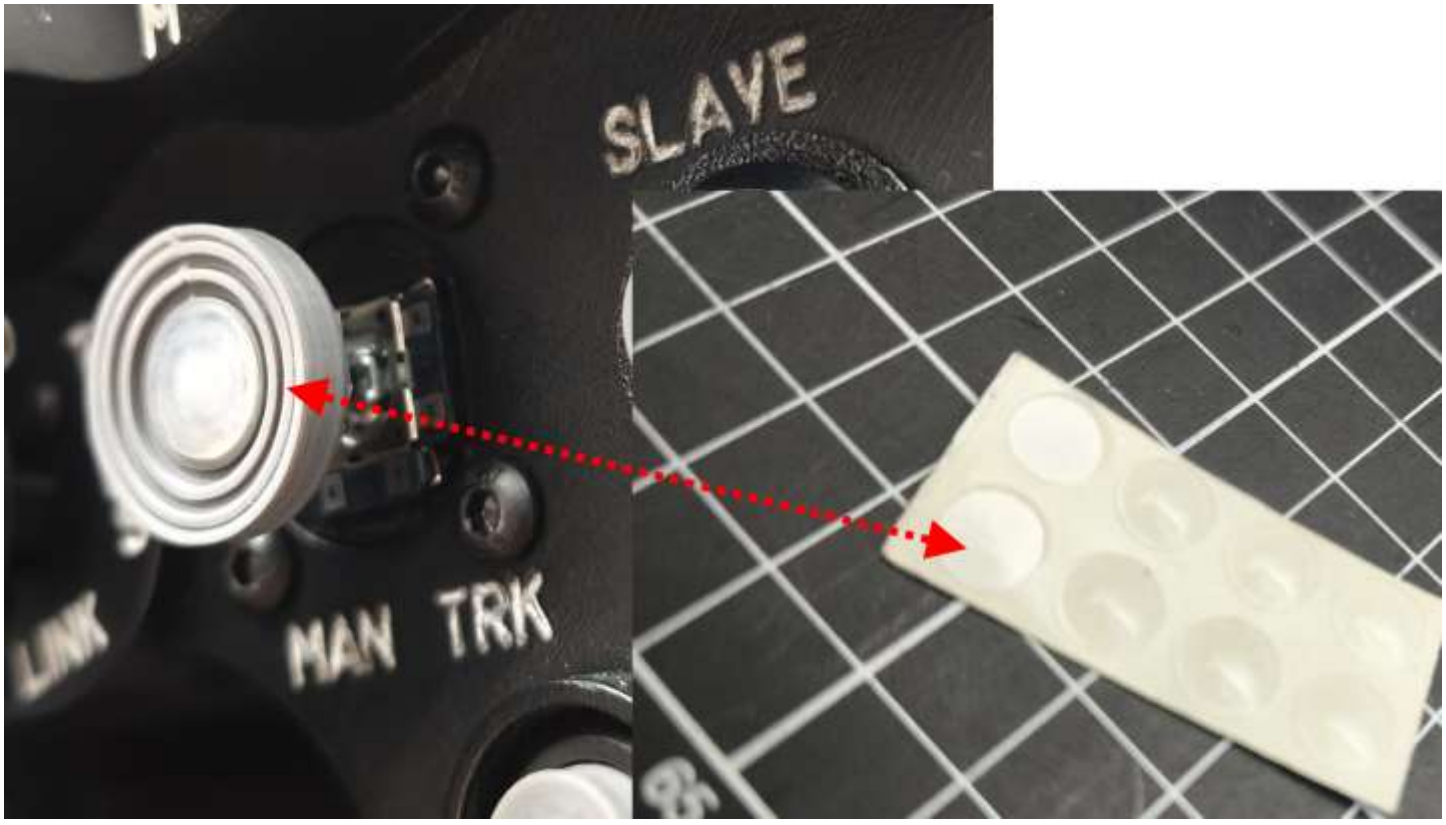


Then, depending on the grip version, install all switches and the 4-way HAT switches. Now solder all cables and bundle them into a clean wire harness





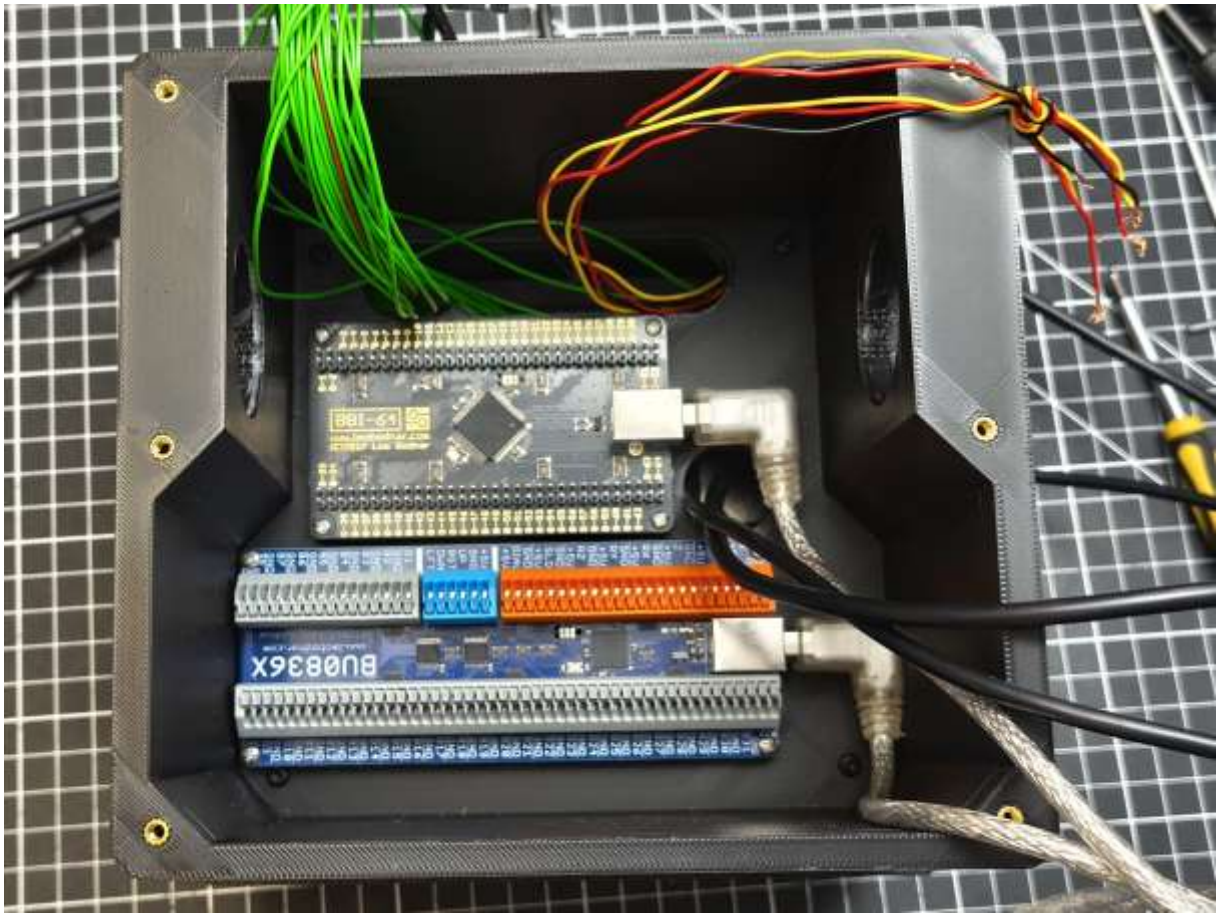
Feed all cables through the openings as shown in the picture and fasten the top part with M3×12 mm pan head screws. For the two upper screws, M3×16 mm socket head screws are recommended.



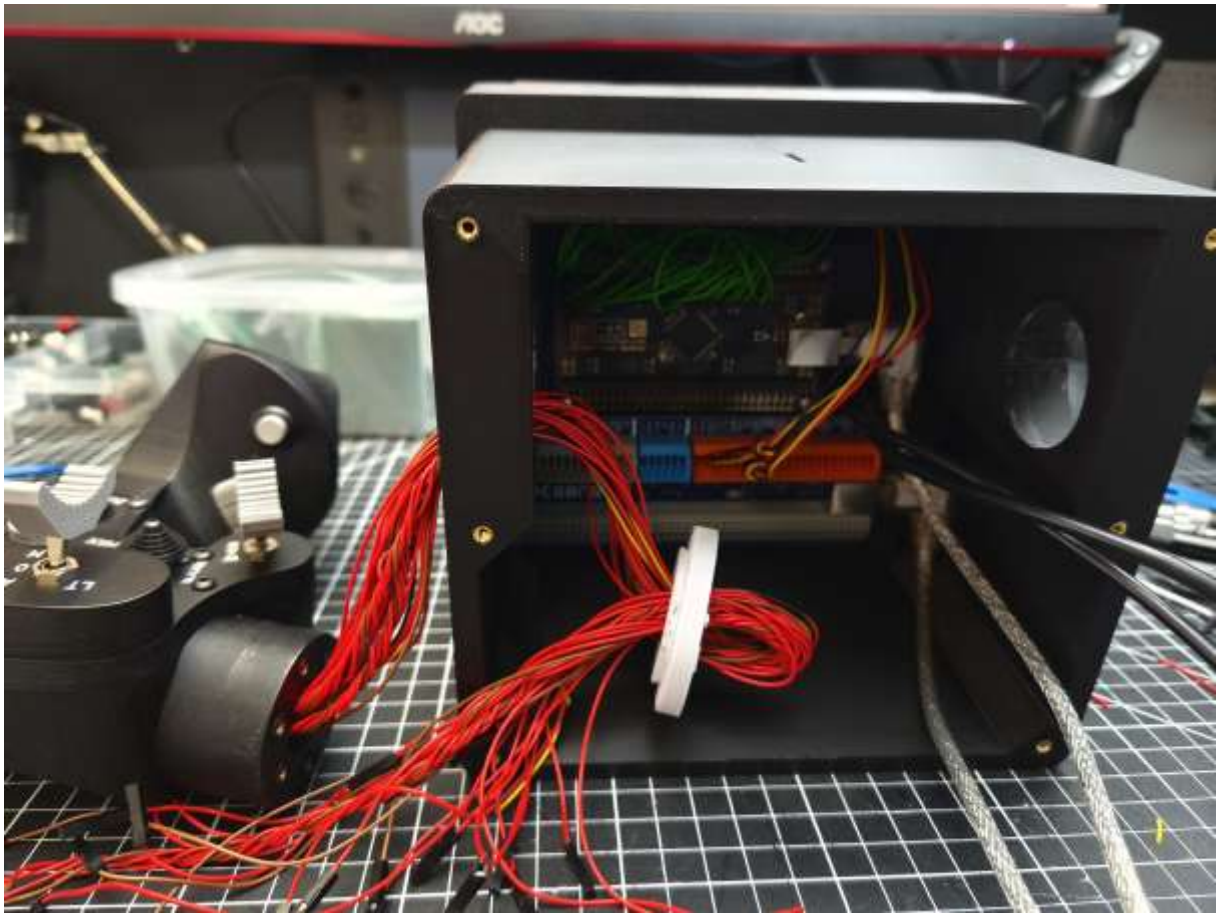
To improve the joystick's usability, I glued on some small rubber thingis. On top of that, I also created an alternative HAT cap STL file for the joystick.

As an alternative, I designed and printed some caps in grey for the 12mm push buttons.

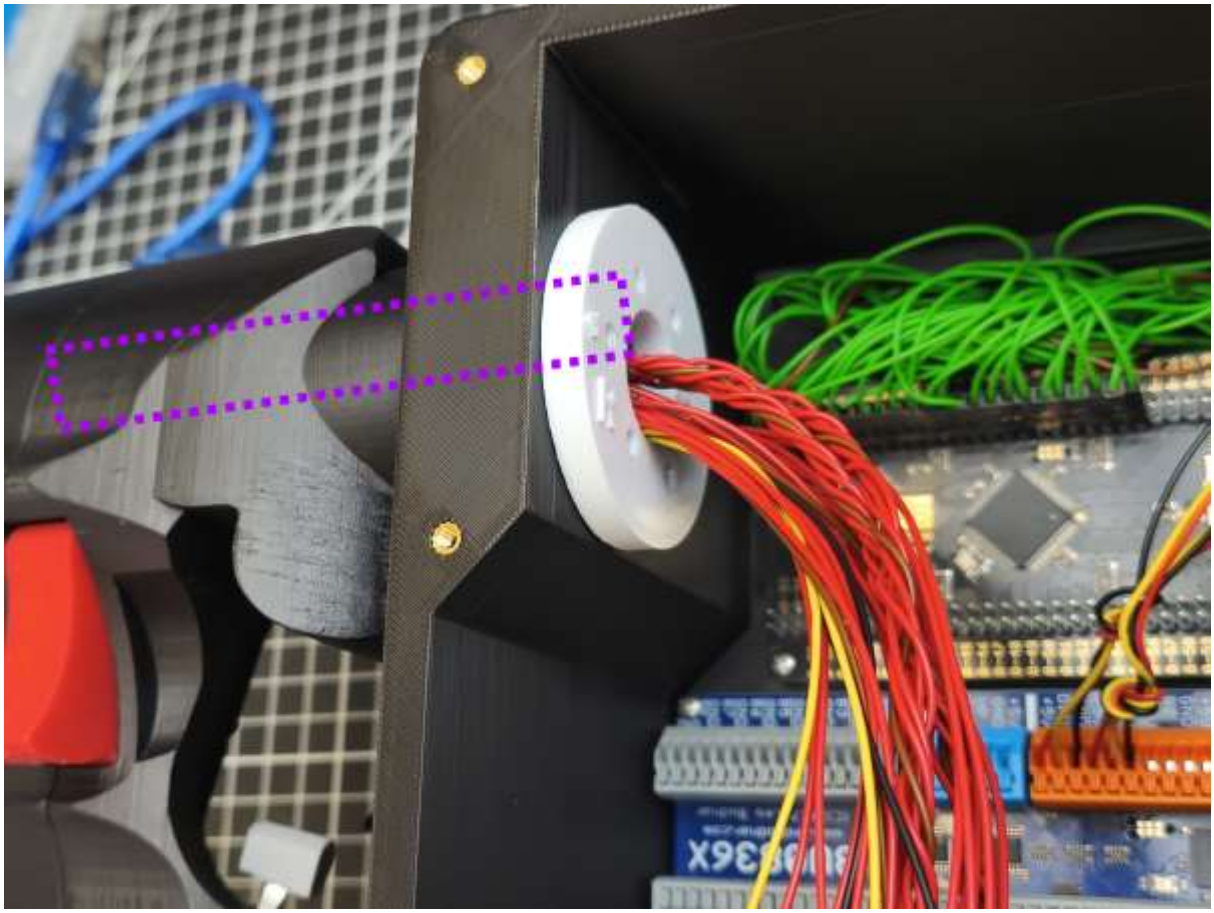
Final assembly steps



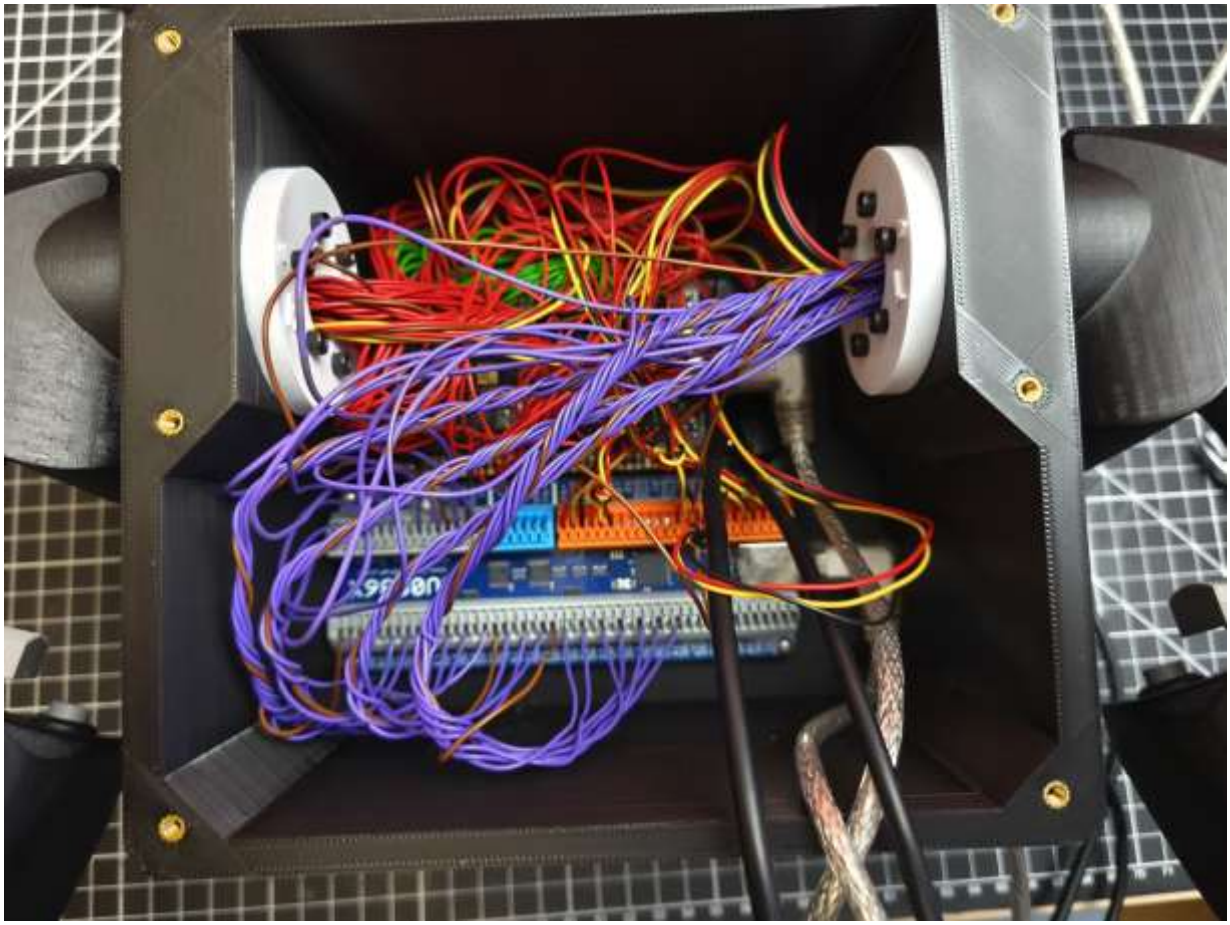
Install the Leo Bodnar boards. Before doing so, connect the angled USB cables to the boards.



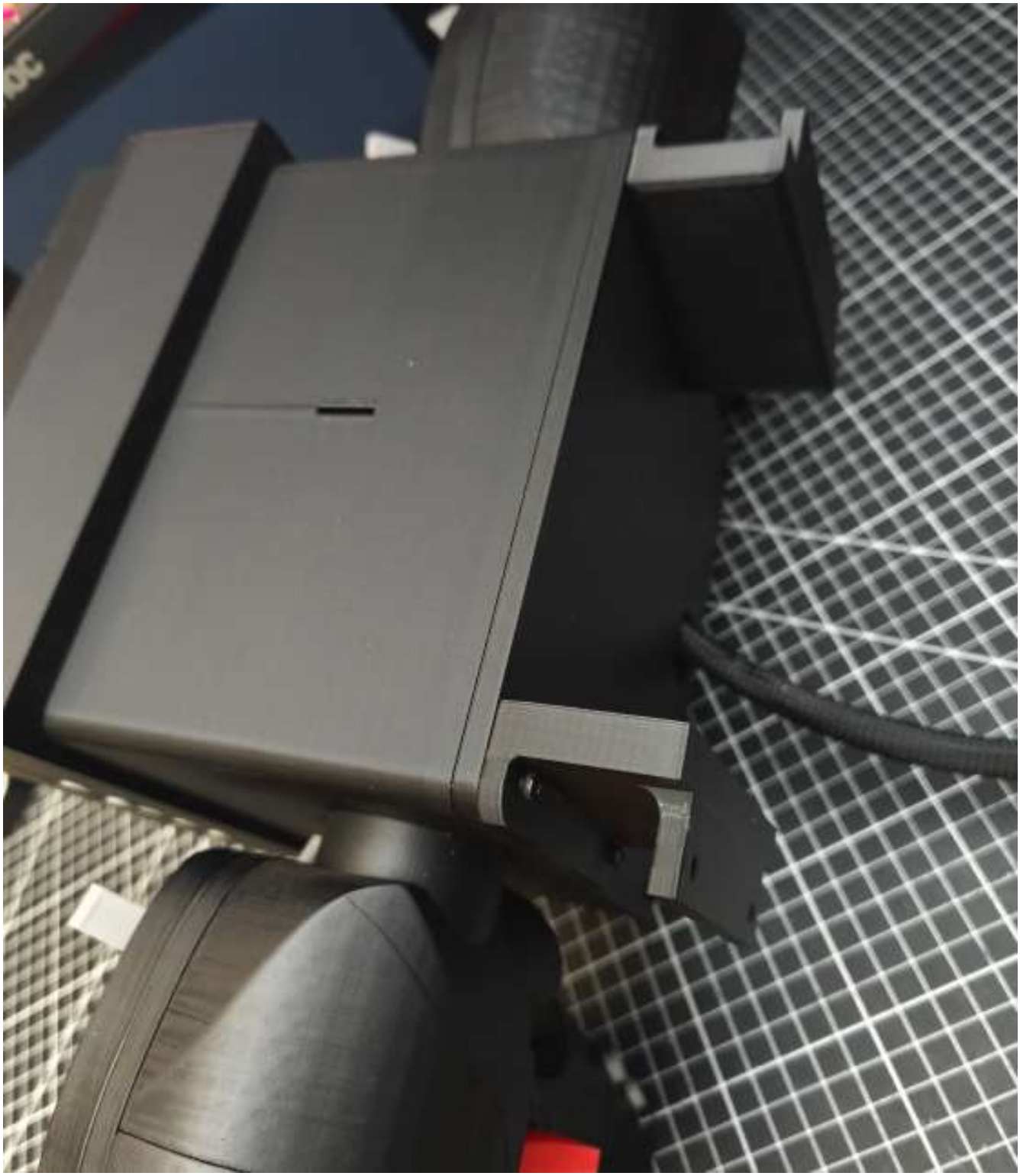
Feed the grip cables through the housing and through the counter disks



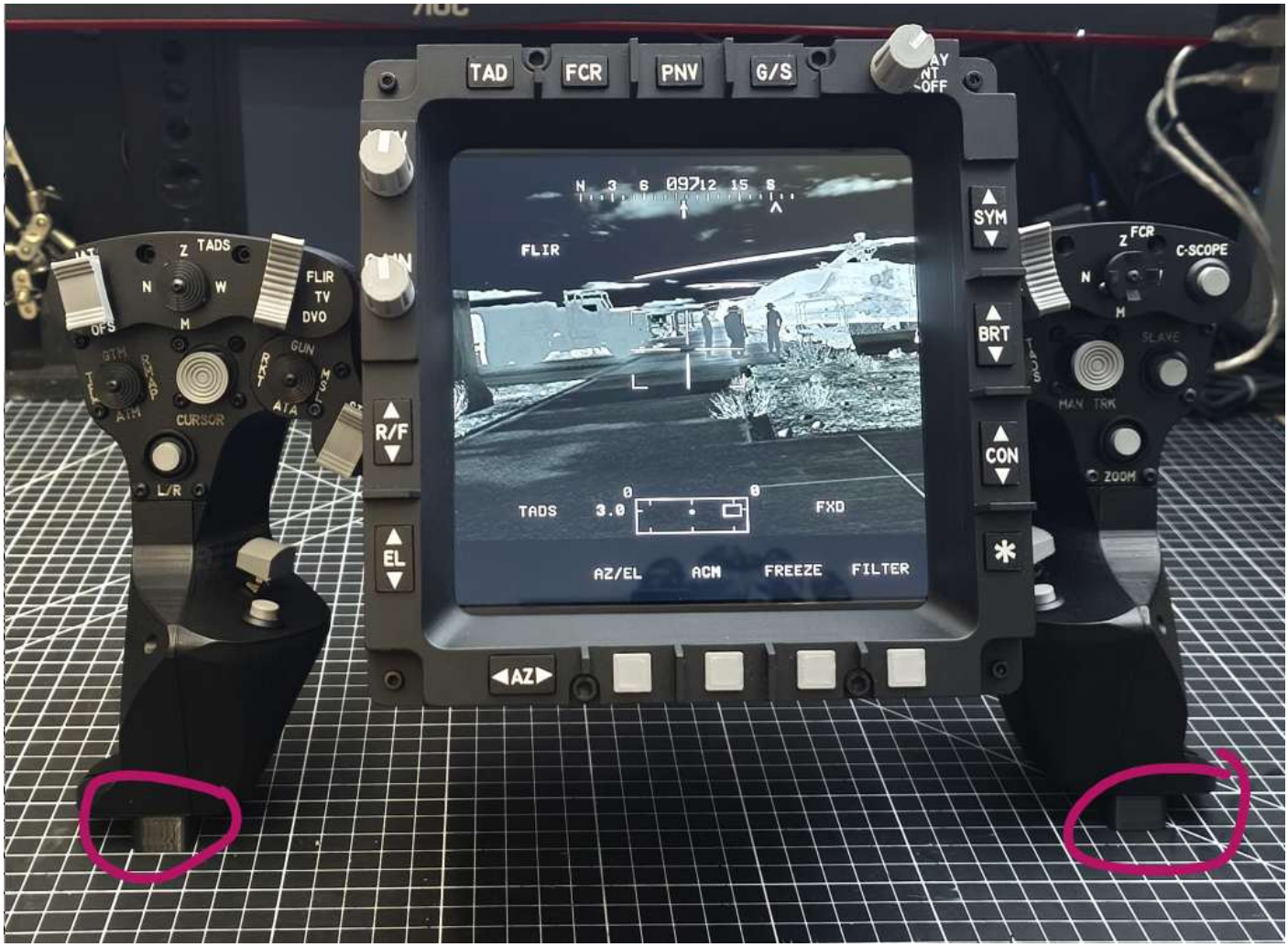
Align the grips and the counter disk relative to each other as shown in the picture.



Fasten the grips using M3×25 mm screws. First, tighten the screws fully to ensure that the ring and grips seat properly. Then loosen the screws by about half a turn — or just enough so that the grips can rotate with some applied force. Finally, wire everything up.



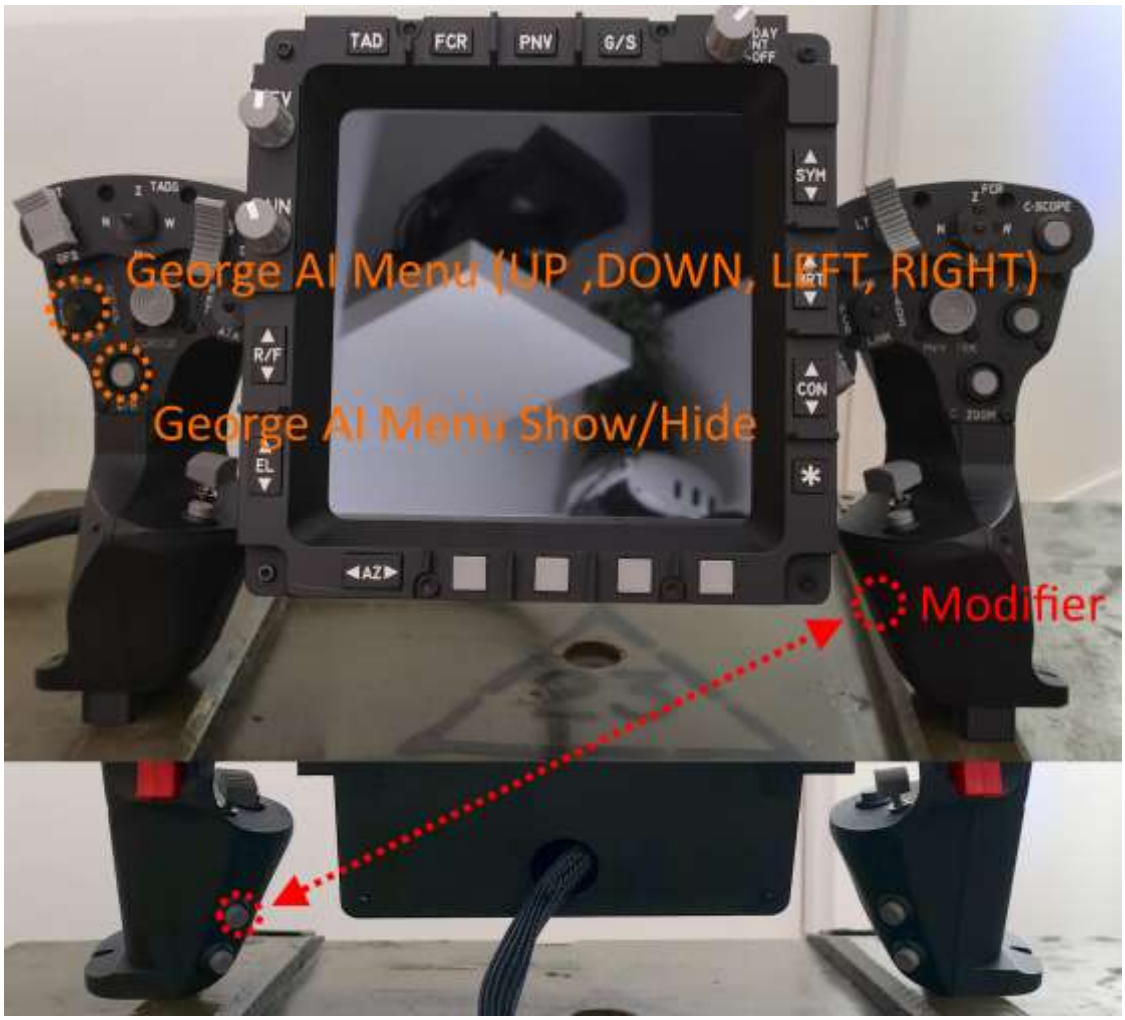
And that’s basically it. Melt in M3x5x6 inserts, throw the back cover on, and bolt on whatever mount you want.
If you’re adding mounts, use **M3×25** screws. If not, **M3×16** is enough for the cover. I bundled the four cables together using a cable sleeve and routed them out through the rear

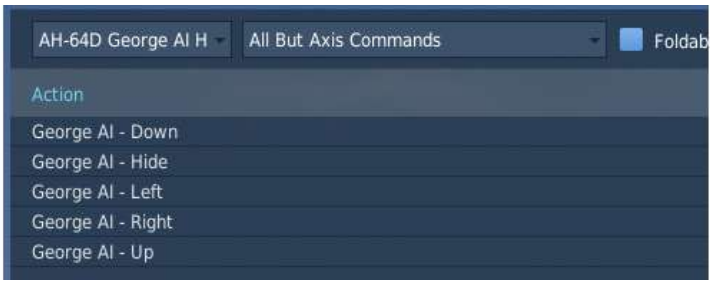


If you plan to use the TEDAC only on a desk, install the small feet on the bottom side of the grips. For these, you will also need threaded inserts and **M3×12 pan head screws**.

As a little nerdy touch, when the TEDAC is sitting in a display case or gathering dust on a shelf, you can add a 1:100 Apache postage stamp model.

Pro Tip: George AI





The **HDD button** on the TEDAC is a certified paperweight in DCS - it does absolutely nothing. Which means it's a perfect dedicated **modifier** button. With that, you can **drive George AI flawlessly straight from the TEDAC**.
Screenshot shows my preferred layout for reference.

To set it up, do the following:

- Assign your **HDD button** as a Modifier for both CP/G *and* George AI (yes, separately — don't skip this, ask me how I know…)
- Under CP/G, bind **"George AI Show/Hide" to Modifier + L/R**
- Under George AI, bind **"George AI Show/Hide" to Modifier + L/R** as well
- Then **bind George AI (U/D/L/R)** to your **Modifier + FCR 4-way HAT**

Once that's done, George becomes a well-behaved little warcrime assistant that never takes his hands off the controls.

Bonus Tip: The **Video Record button** on the LHG also has zero functionality in DCS.
I repurposed mine for **"Request Aircraft Control"** - works like a charm.

stay tunded…