

MOZA GS V2 - USB MOD by Rec0nkill

A few notes before the guide starts:

- I did this mod on a GS V2, it should also work on a V2P, but I can't confirm it. As far as I can tell, the mod won't work on the V1 as that seems to have a different pcb design
- Perform the mod at your own risk, this will void your warranty (has already been stated by a mod in the MOZA discord). I am not responsible for any damage as a result of the mod

This mod allows the MOZA GS V2 wheel to be connected to the MOZA Hub, this makes it a standalone wheel and you can use it with any wheelbase you want.

There are two different options for the mod:

1. Using the hub as an external hub, by rerouting the cables that go to the Quick release PCB and routing them out of the wheel, so the wheel can be connected to the hub (the way you would set up other MOZA wheels like the FSR or KS).



2. Taking the hub apart and putting the whole pcb into the wheel. This way you only need to connect a USB cable to use the wheel (the way USB wheels from other brands like Ascher or GSI work)



As the 2nd option uses the same basics as the 1st option, I will start with the 1 option and then explain the extra stuff of the 2nd option in detail.

1. Open the Wheel and access PCB. To take the wheel apart you will need to remove all the screws on the front and some on the back of the wheel, as shown here:



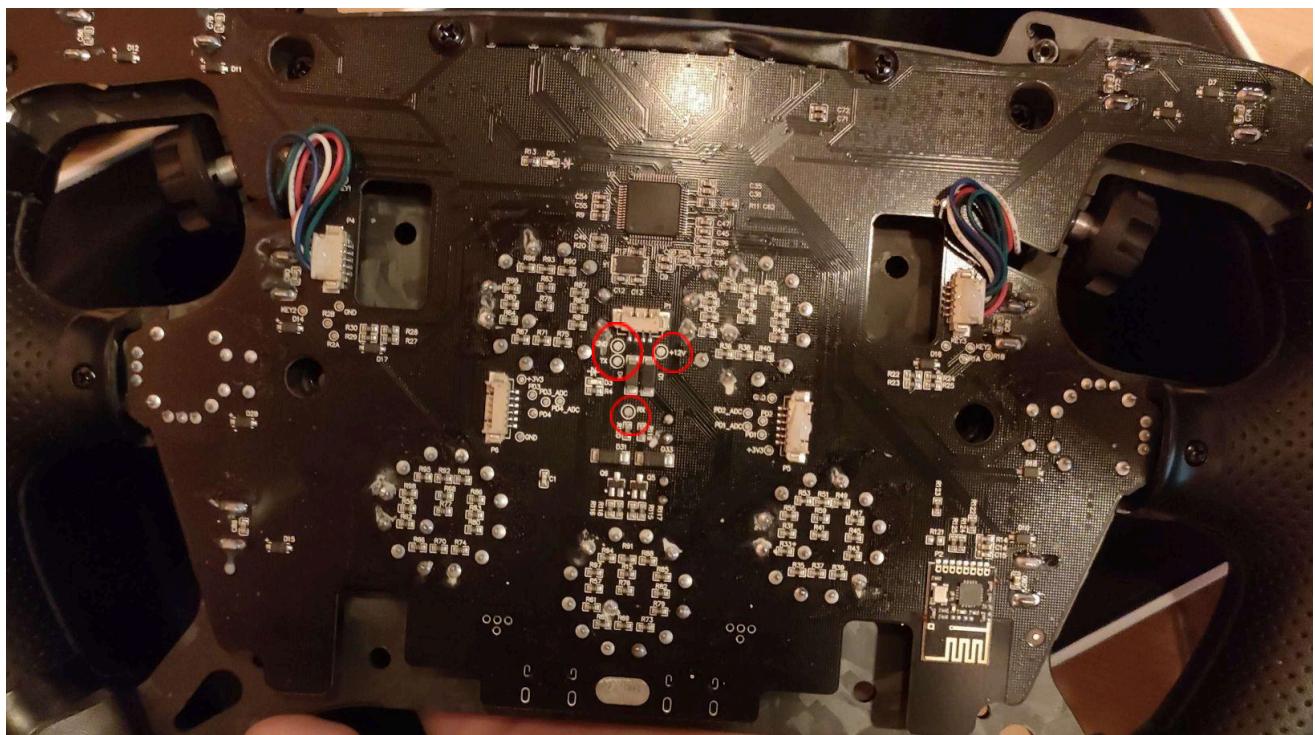
The red circled screws are needed to take the case apart. The blue circled screws aren't needed to open the wheel, but taking them off lets you remove the quick release from the rest of the wheel, making life a bit easier.

2. The main PCB has a connector in the middle where 4 wires go to the Quick Release PCB. This is the connector where we connect the custom cable.

It is a JST GH 1.25 connector. You could cut up the stock cable, but by buying an extra connector you easily reverse the mod.

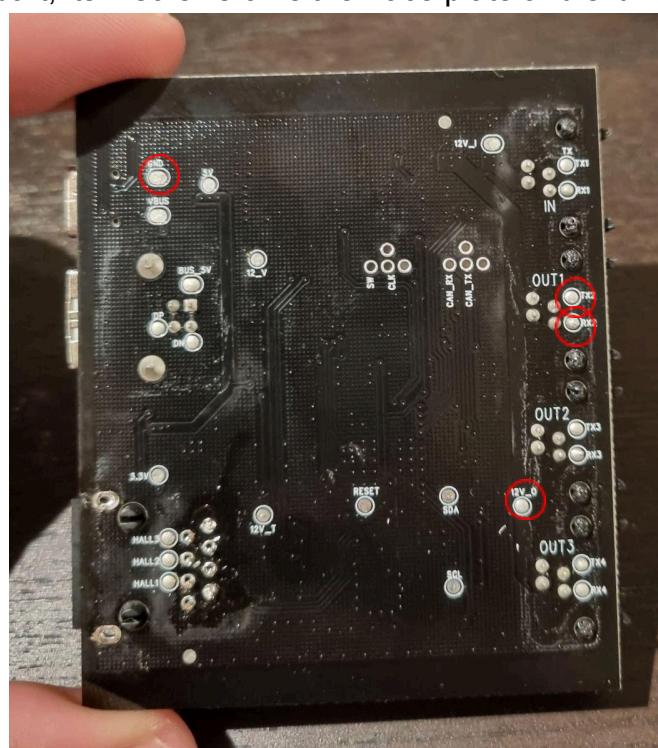
The 4 wires are: 12V, GND, TX, RX

I have marked the pads to check the pinout with a multimeter. (I didn't note any pin-out for the cables, just kept double checking with the multimeter, to see if I wired correctly)



The same can be found on the HUB pcb:

To take the hub apart, its 4 screws on either face plate and sliding out the pcb



You can use any of the 3 RJ12 OUT Ports (so OUT1, OUT2 or OUT3), I used OUT1

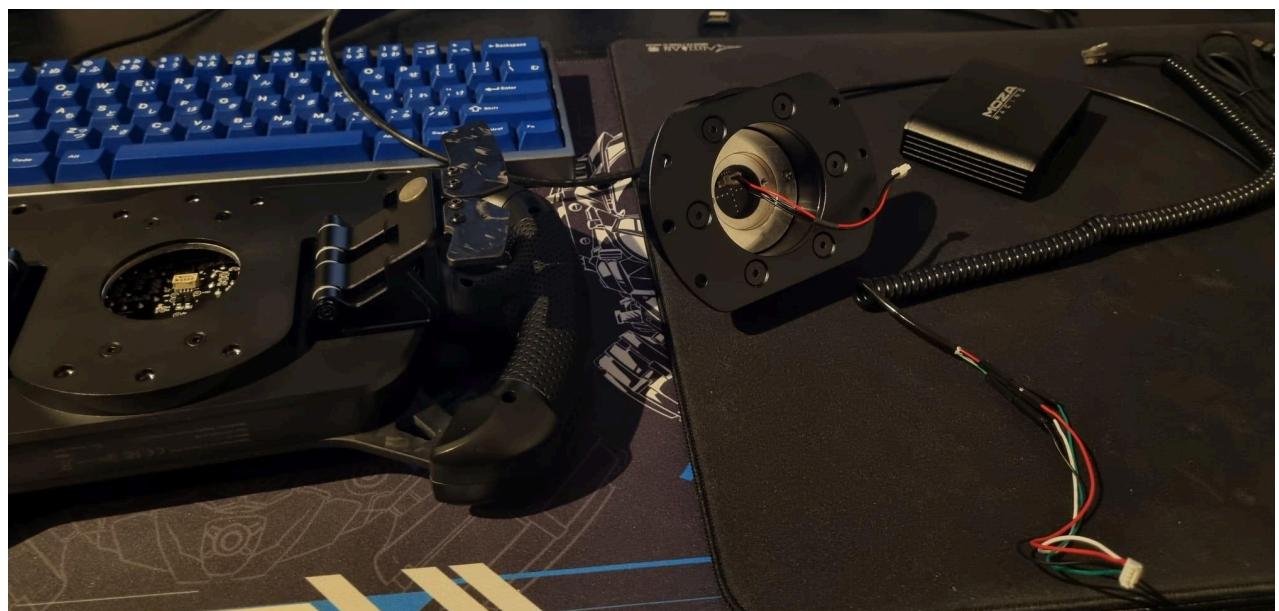
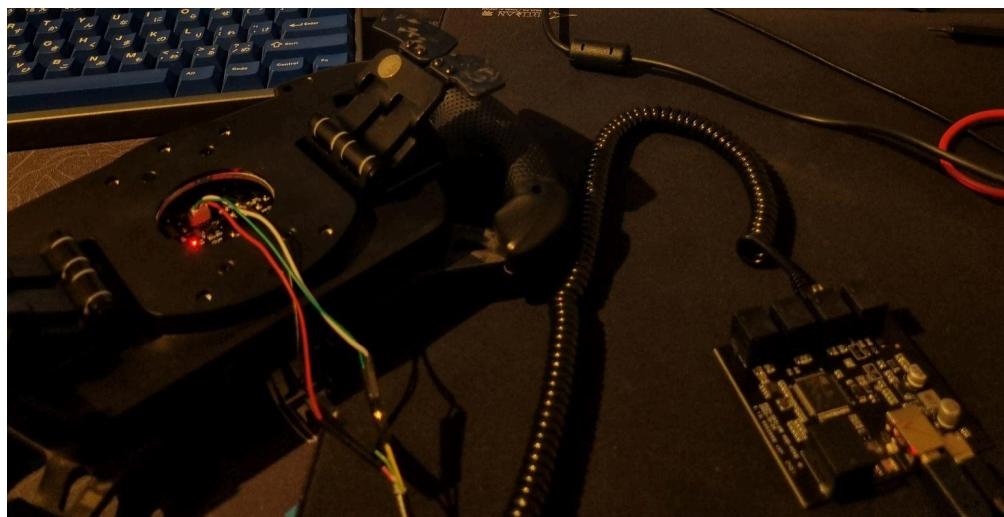
For the option 1 with the external HUB, the included spiral RJ12 cable works well.
Cut off one of the RJ12 connectors and connect them to the JST GH 1.25 connector.
The way to connect these pins is:

12v → 12v
GND → GND
TX → RX
RX → TX

Please double and triple check the wiring before turning on the hub and the wheel for the first time. You don't want to mix up the 12v wiring!!!

The connection will look like something like this:

(don't mind the wire colors, again check the connection with a multimeter, I used random wire colors)



Now these pictures above are from my first test if the idea works, it did!
But ofc, you still need to find a way to get the cables out of the wheel, once the quick release is mounted again.

The quick and dirty way, is putting a spacer between the QR and the wheel, for example with some washers like this:



The wire is non-removable like this, but it works well and it's very easy to do.
If you want to go this route, I would suggest using metal washers or getting a custom CNC spacer made if you wanna get fancy, only needs to be thick enough to let the cable pass through.

I chose a thickness that clamps on the cable a bit, to act as a strain relief so the pcb connector doesn't get pulled out.

A nicer option is mounting some kind of connector, like I ended up doing:



I went with a Lumberg connector, the same that GSI and Ascher wheels use. The part numbers are:
socket - KFV 40
plug - SV 40

But any 4 pin connector will work.

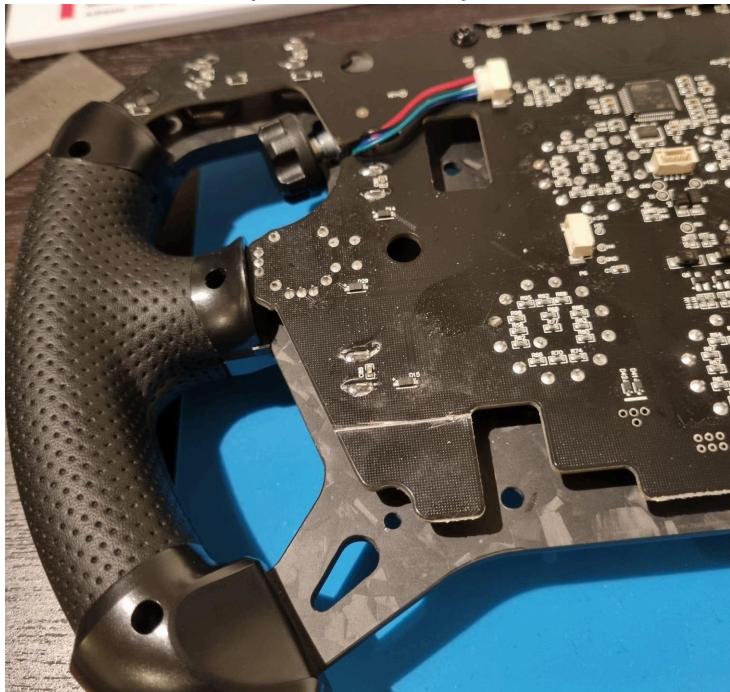
The Simagic Maglink should also be a good option, for 20€ you get a nicer spiral cable and the maglink parts. Would take the magnet pcb of the metal part and mount it onto the GS case.



The maglink option is probably the better route as it is easier to fit into the case.

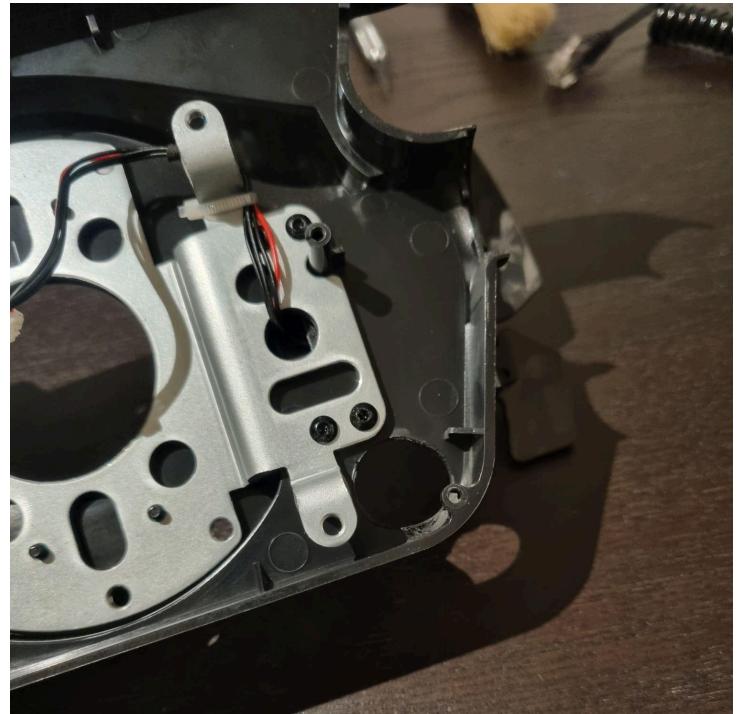
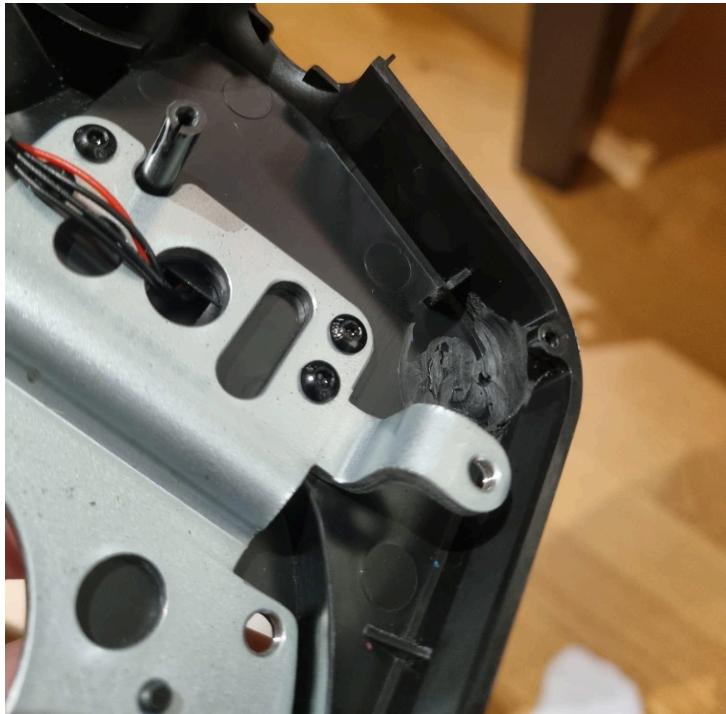
For the Lumberg connector I had to cut a corner away from the PCB and remove some plastic from the case. Here are some pictures of the process:

The line on the pcb is the corner I cut off.
There aren't any traces on that part of the pcb, but there is still risk of damage to the pcb.
Make sure you sand the cut edge, to avoid shorting pcb planes.

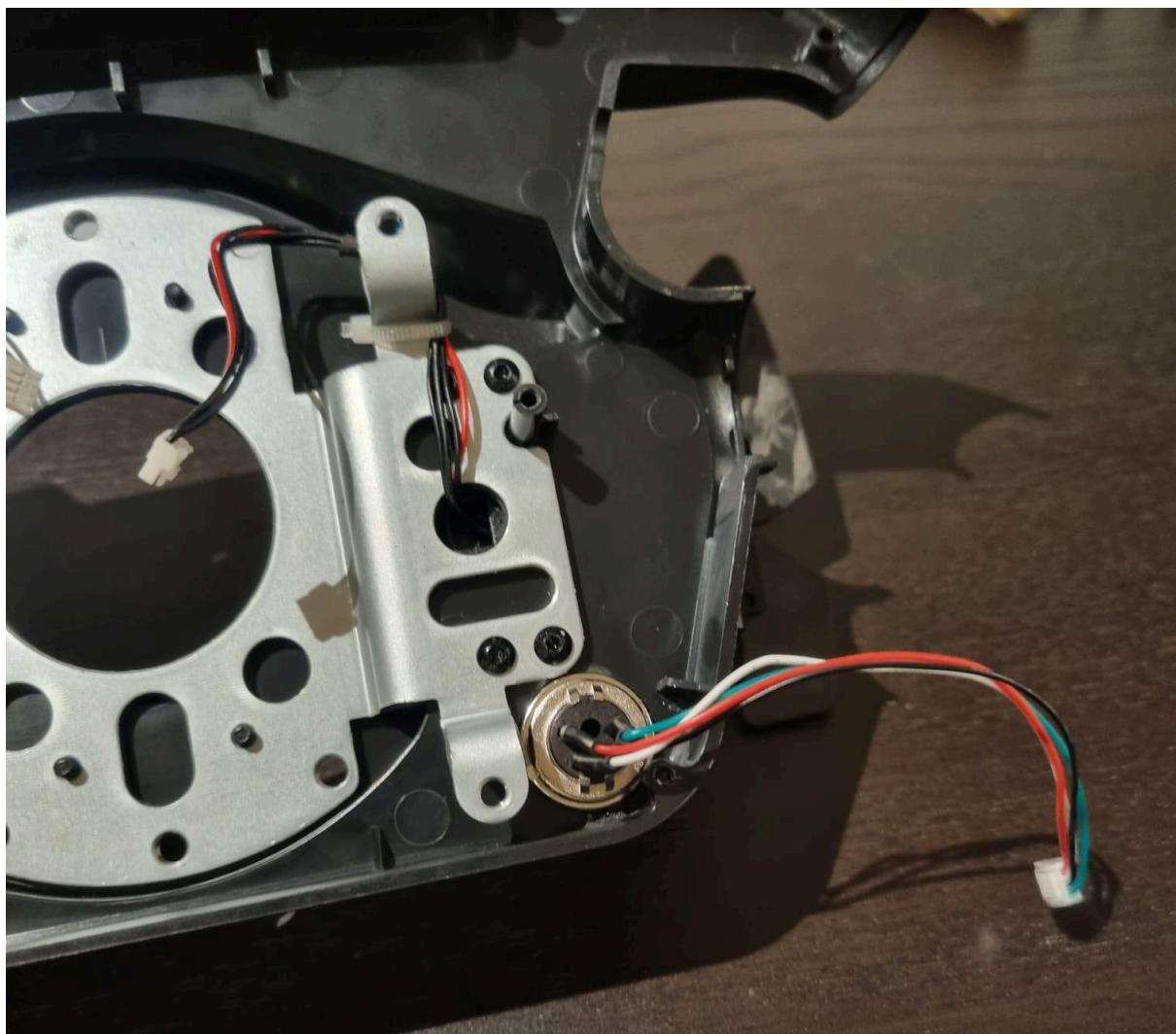


I had to dremel away the lower part of this screw post.

And made the hole for the connector



Here is the connector mounted, it's a tight fit, but it works out.



Once you have routed the cable out of the wheel, the 1 option is complete. The hub will recognise the wheel and all the buttons, shifters and LED should work as before.

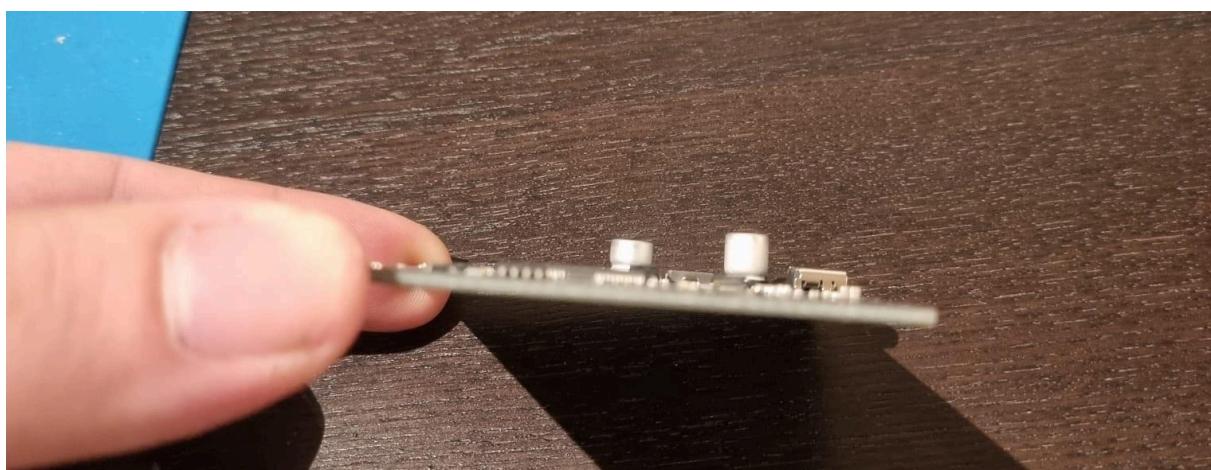
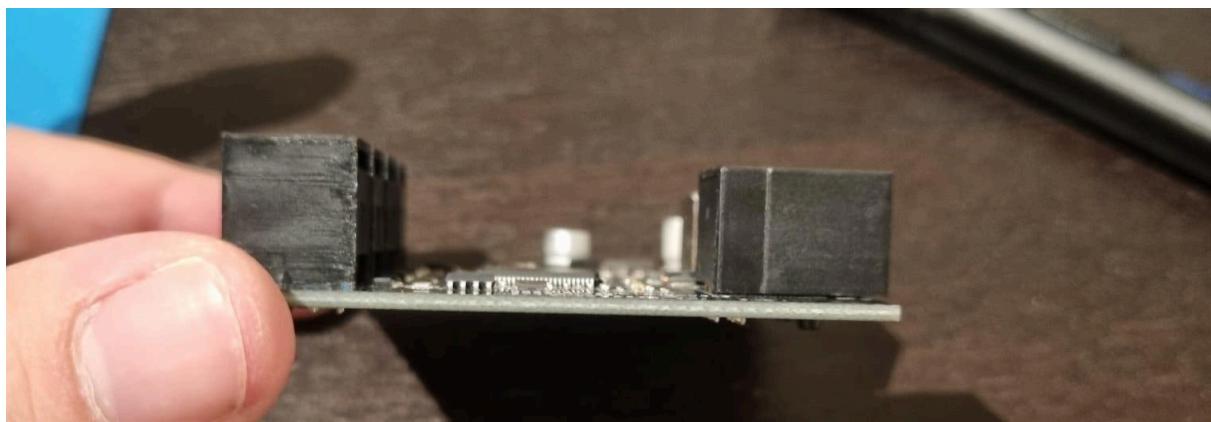
You just have to rebind the buttons and shifters in the game, because the signal is coming from the hub and not the wheelbase.

If you connect the Hub to a USB 2.0 port or a port that does not deliver enough power, the wheel might fail to power up, then you will need to use the AUX power port (USB C port on the HUB) for extra power.

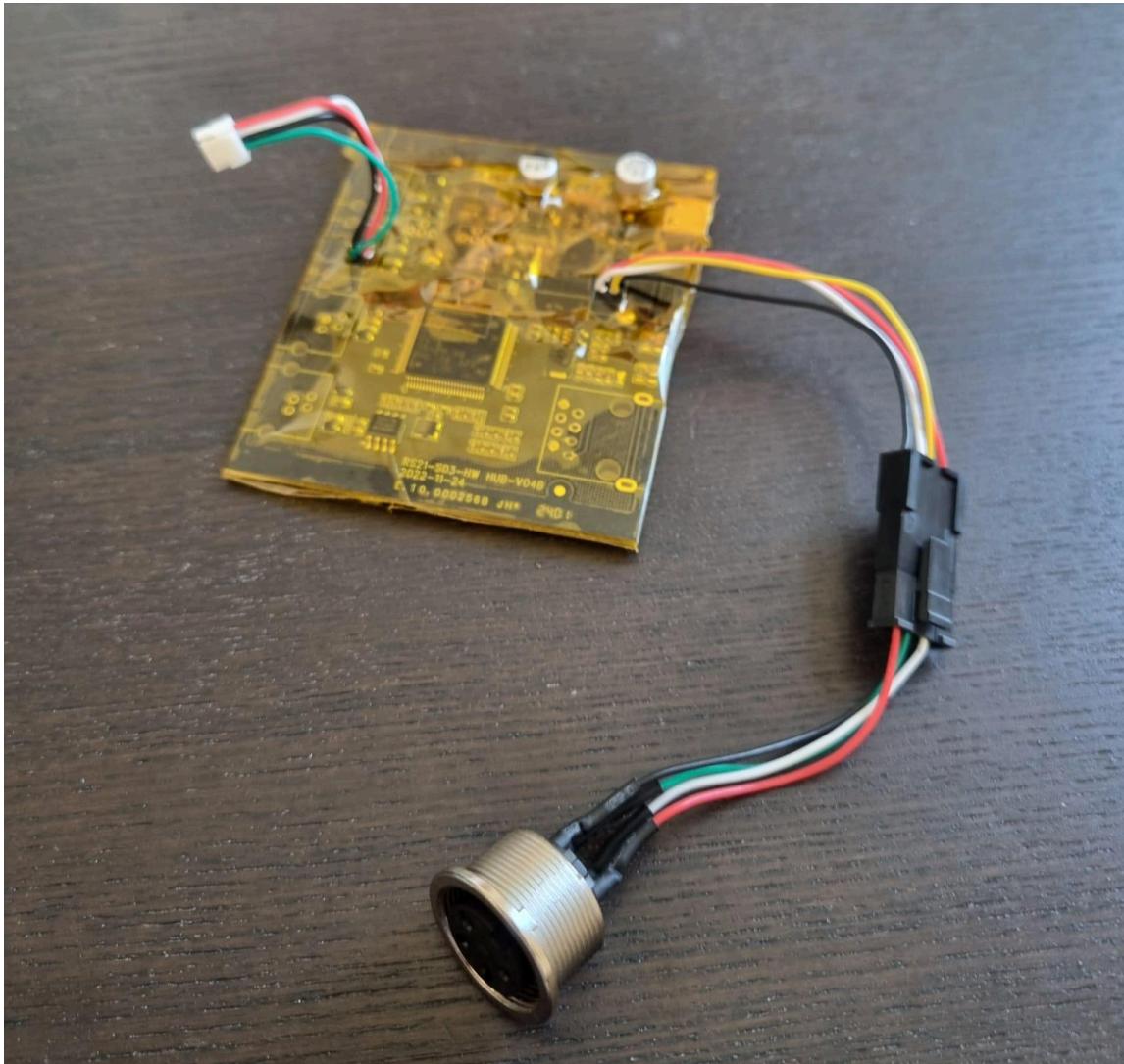
This is the route I would recommend, it's fairly simple and the result is an open MOZA GS wheel that can work with any wheelbase.

Now for option 2, putting the hub into the wheel, things get a bit tricky. Would only recommend this, if you are comfortable with desoldering.

All the ports need to be desoldered of the Hub PCB, so it can fit into the HUB



Then the cables can be soldered directly onto the pcb:



The cable to the wheel is soldered onto the OUT (1, 2 or 3) port and the external connector is connected to the USB B port.

The wheel side connection follows the same principle as explained in the option 1 part.

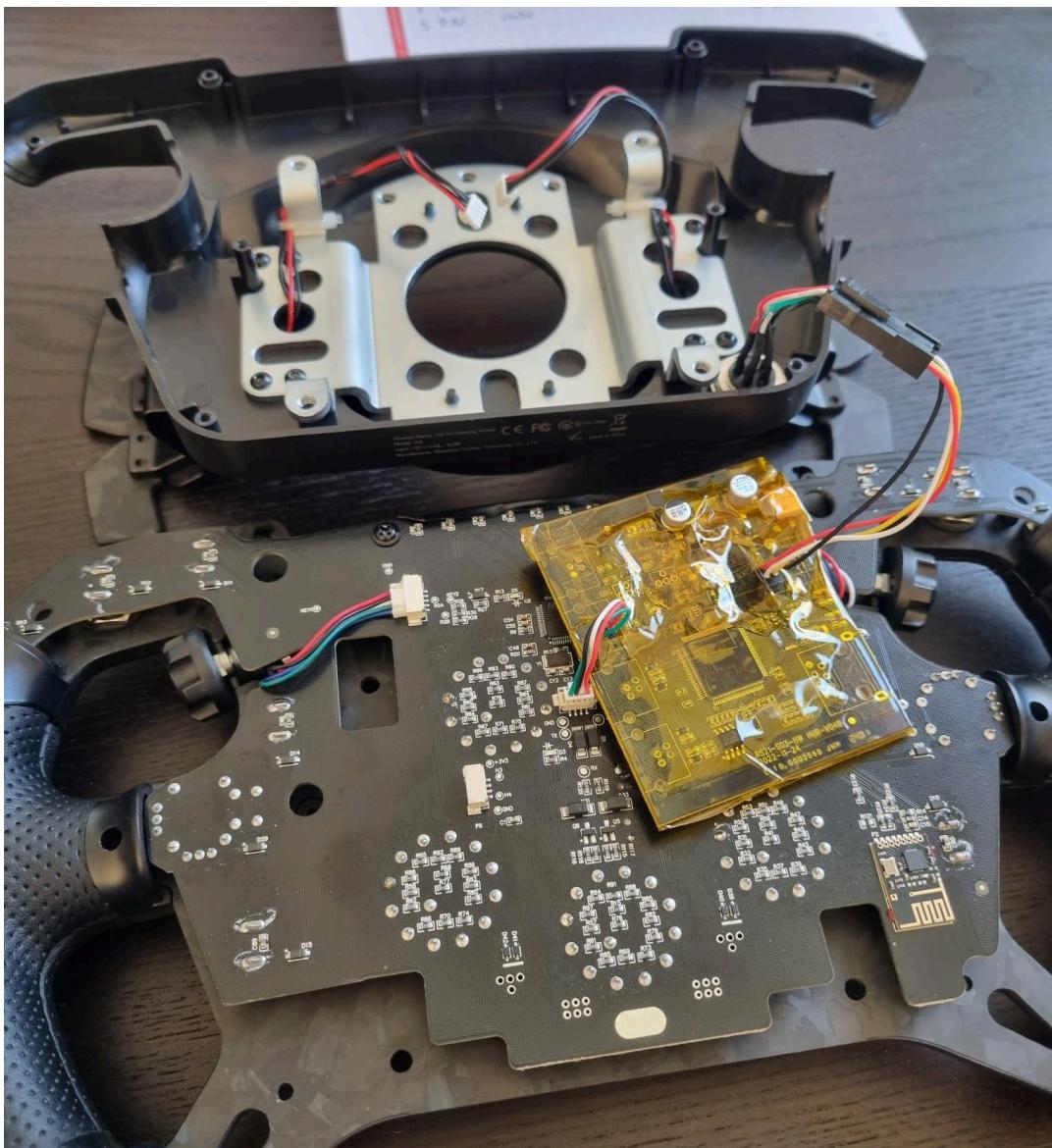
The USB side follows the USB standard (as before, don't mind the wire colors used by me)

And I will say again, make sure to check the pin-out on the cables. You now have the Wheel to hub as well as hub to USB Cable connections. And you don't want to mess up either side.

I used a Molex connector between the lumberg connector and hub pcb to make the assembly easier.

Would suggest wrapping the pcb in kapton tape, to avoid shorting out any component, as the hub pcb will rest against the wheel pcb.

This is the assembly before closing up the wheel:



It's a very tight fit and you will need a few tries to get the hub pcb sitting just right so that there is no stress on any of the components.



When the hub is in the wheel, the option for the AUX power is lost, so it is important that the wheel and hub get enough power from the single USB cable going to the hub.

I had a lot of trouble getting the Moza spiral cable working, the hub just didn't get reliable power, even with a 60W USB hub. So for now I am using the USB B cable that was used to connect the hub to the PC. Will search for a spiral cable that can deliver reliable power to the hub.

Sidenote:

When dealing with the lower power issue, the hub can get stuck in boot mode. It wont show up as connected, but will still show up on the firmware menu of the pit house software.

Then you need to flash a different firmware and then flash back to the newest firmware to get the hub working again.

This is the end of this guide, hope it helps :)

-Rec0nkill