

The Sinister



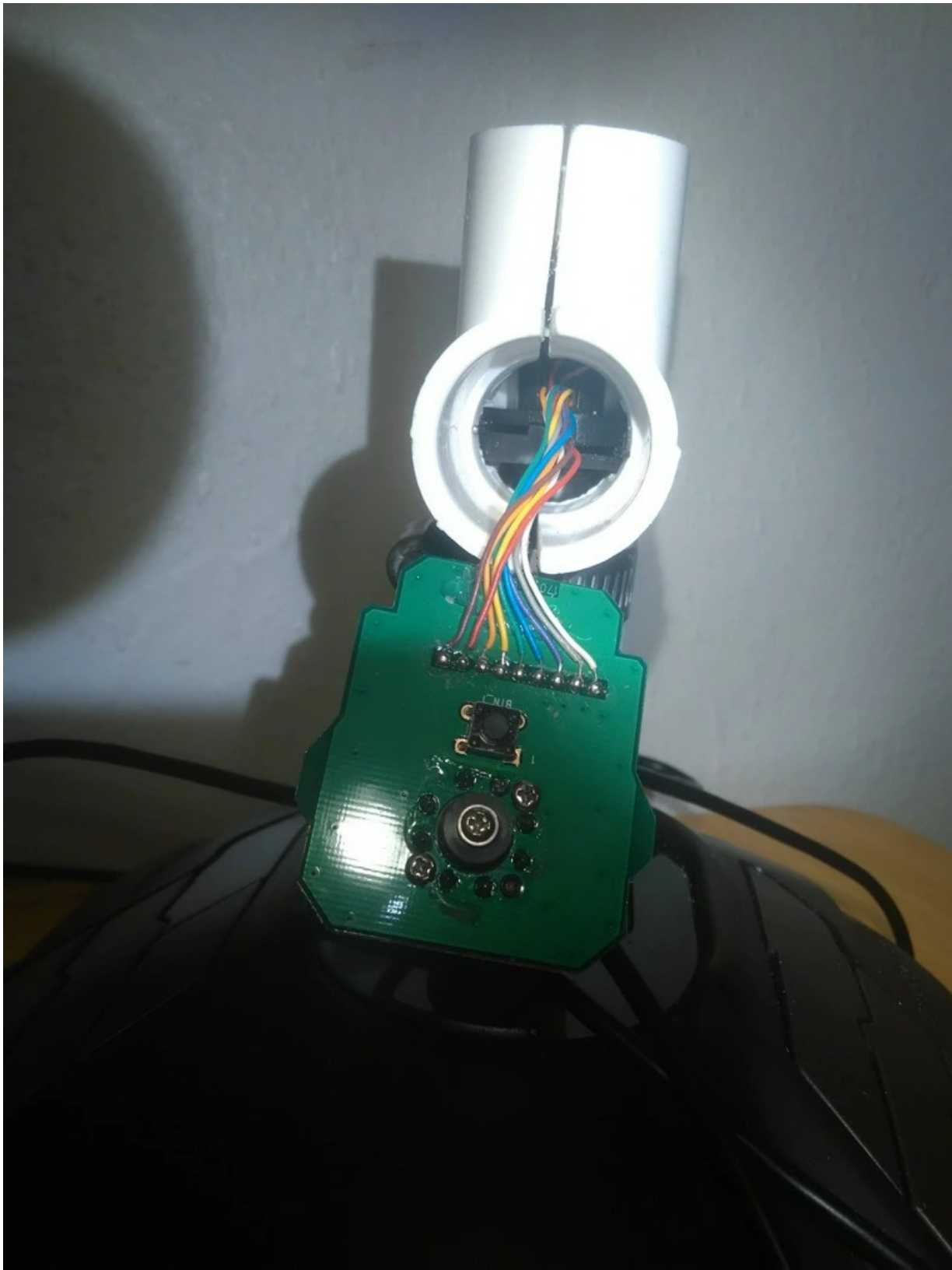
so, here it is, a hybrid between a Thrustmaster t.16000m joystick base and a Saitek x45 throttle grip... and a tiny cheap Arduino clone called ProMicro running the excellent MMJoy2 software by the mighty MegaMozg. Thanks man! The idea was to get the t.16000m's contactless X and Y axes, preserve twist, and run wires from all these buttons on the bottom through the shaft to the grip; I chose an x45 grip because it has a rudder rocker and a handy space for controls (though the original x45 controls were kinda useless: two rotary dials, two 3-position switches, 1 proper hat, 1 "mouse nub" that's essentially another hat, and a couple lame buttons). now this baby has 10 axes, 3 hats and 4 push buttons.



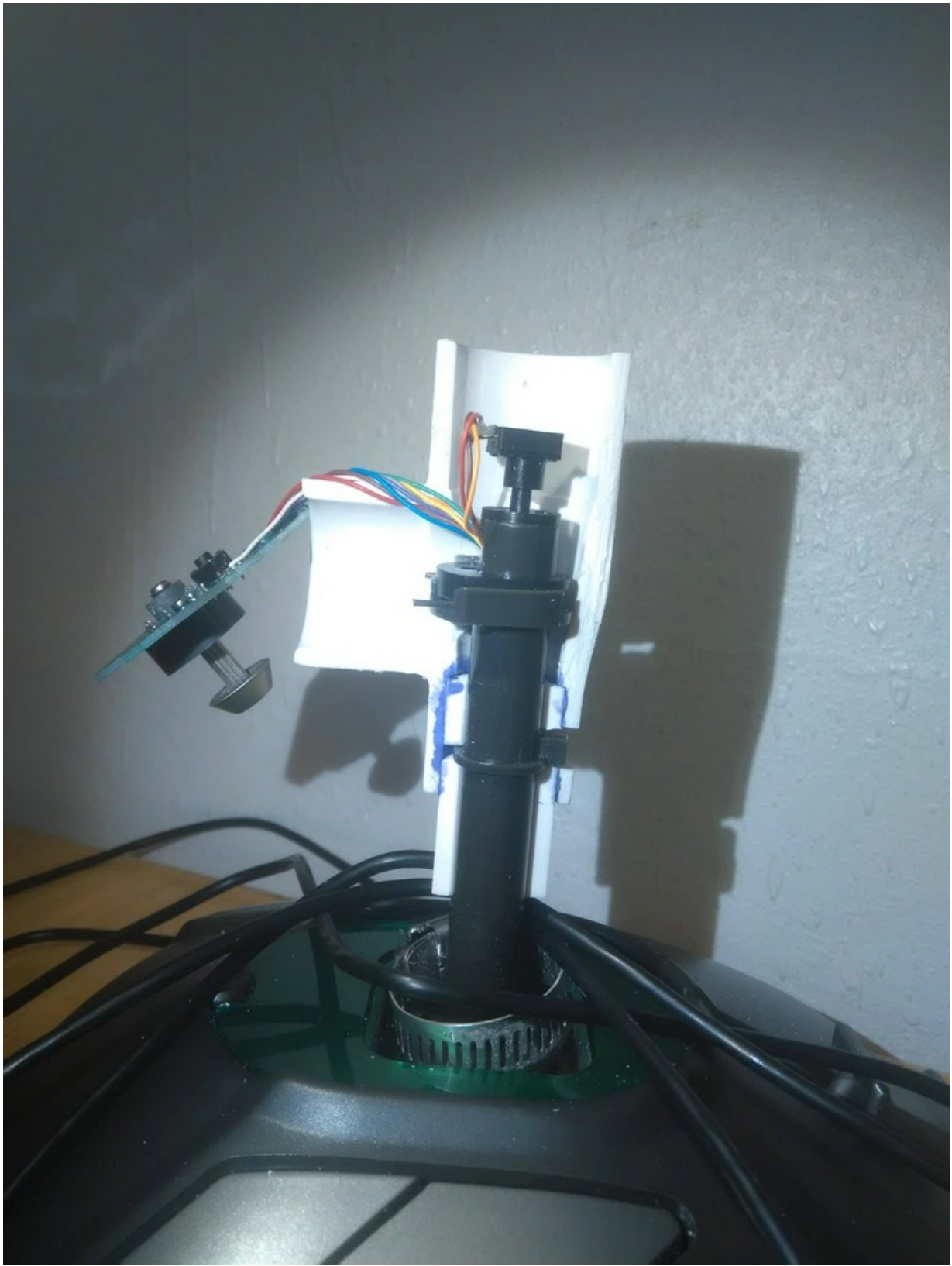
humble beginnings. a PVC 3/4x1/2x3/4 reducing tee plus some modifications. the inside diameter of the 1/2" PVC pipe I got at Home Depot was a very close match to Thrustmaster t.16000m shaft diameter. I had to sand the pipe insides a tiny bit, though. be very careful when buying PVC pipe: outside dimensions are standard, but inside diameters vary.

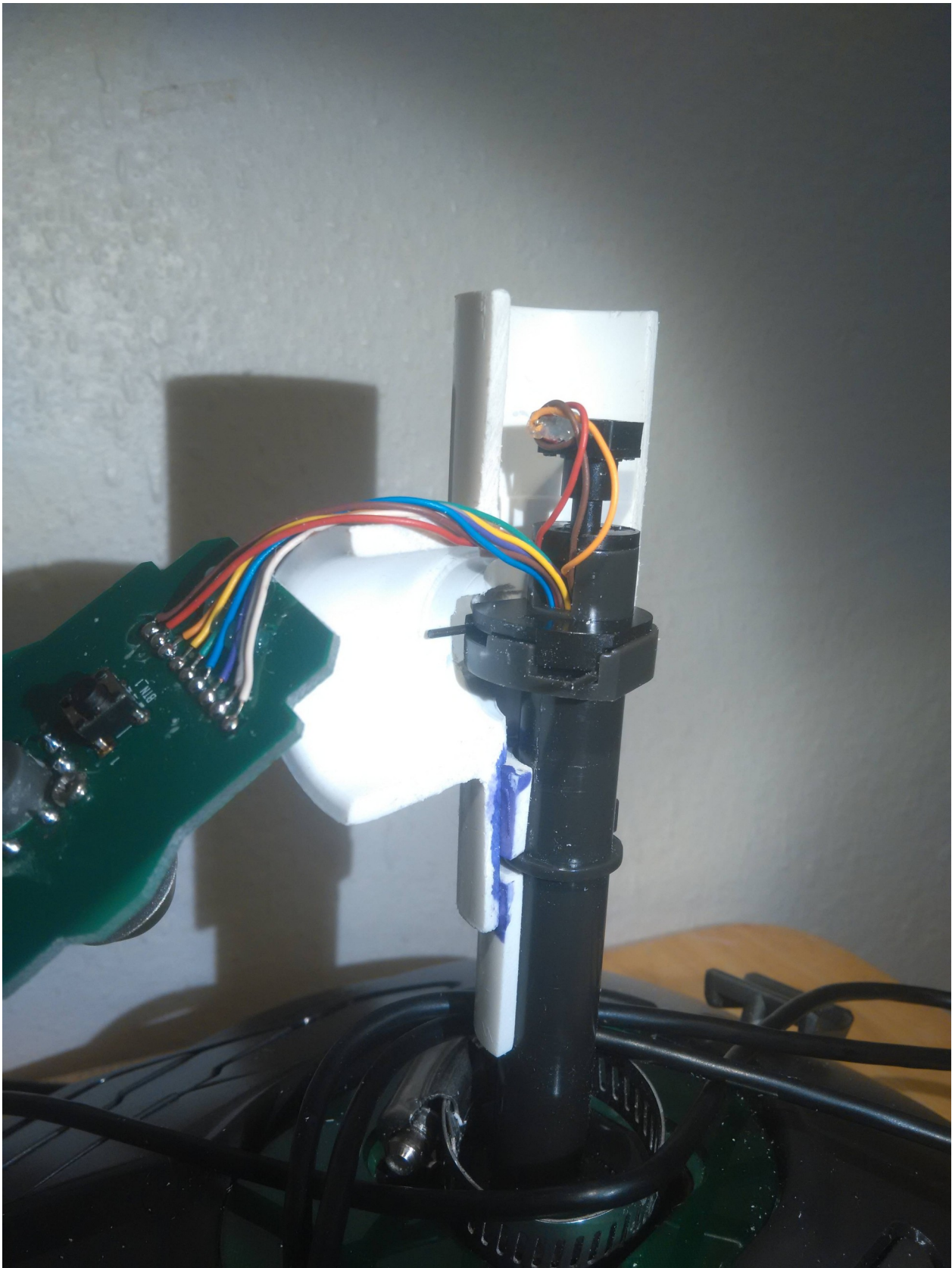


these holes are necessary to accommodate the twist spring housing on the shaft



note how the twist spring fits the 3/4 socket perfectly



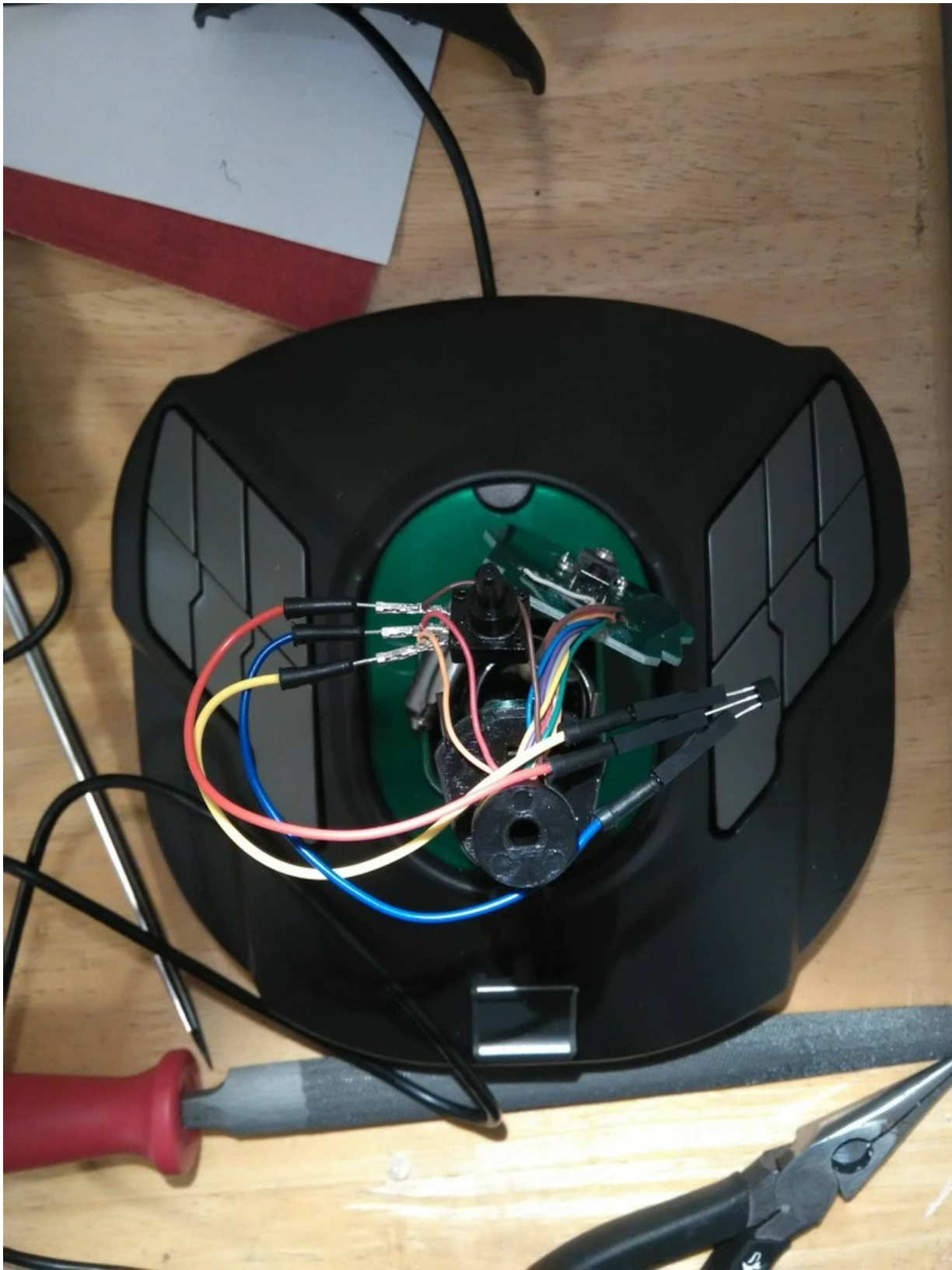




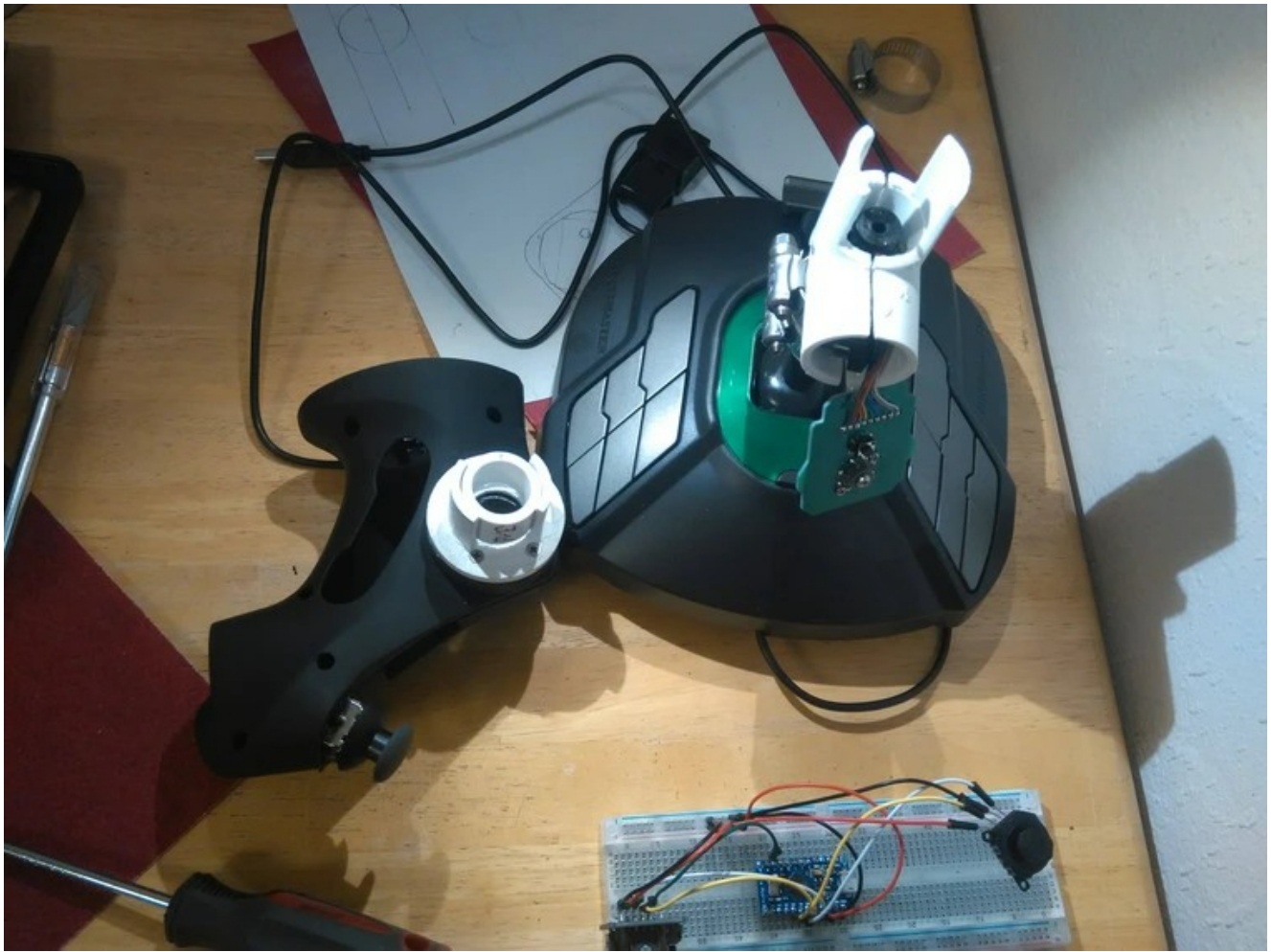
sawn-off 1 1/2 x 3/4 reducer bushing. I needed something like a flange to accommodate screws that would go into the bottom of the throttle grip



I made a wedge-shaped insert between the throttle and the base out of Celtek 10mm expanded PVC sheet (great stuff, helped me out in a couple more places here). thumbstick already installed, replacing a rotary resistor. at the bottom of the photo is a ProMicro board with a couple thumbsticks attached, running MMJoy2.



works great. I tested this with some magnets I had on hand, and ordered some diametrically magnetized ring magnets that fit inside a 1/2" pipe and accommodate the hall sensor inside the inner diameter.



I took out parts of these two details, now they interlock snugly. also it helped shave about an inch off total height



tightening collars hold the whole monster together pretty well





I had to remove the original wires from the shaft and run two 16-wire cables that I cut from the x45 15-pin cable. using all parts of the animal :) here you can see the ring magnet I talked about, and a couple more PVC parts that will grip the top of the joystick shaft and accommodate this magnet.



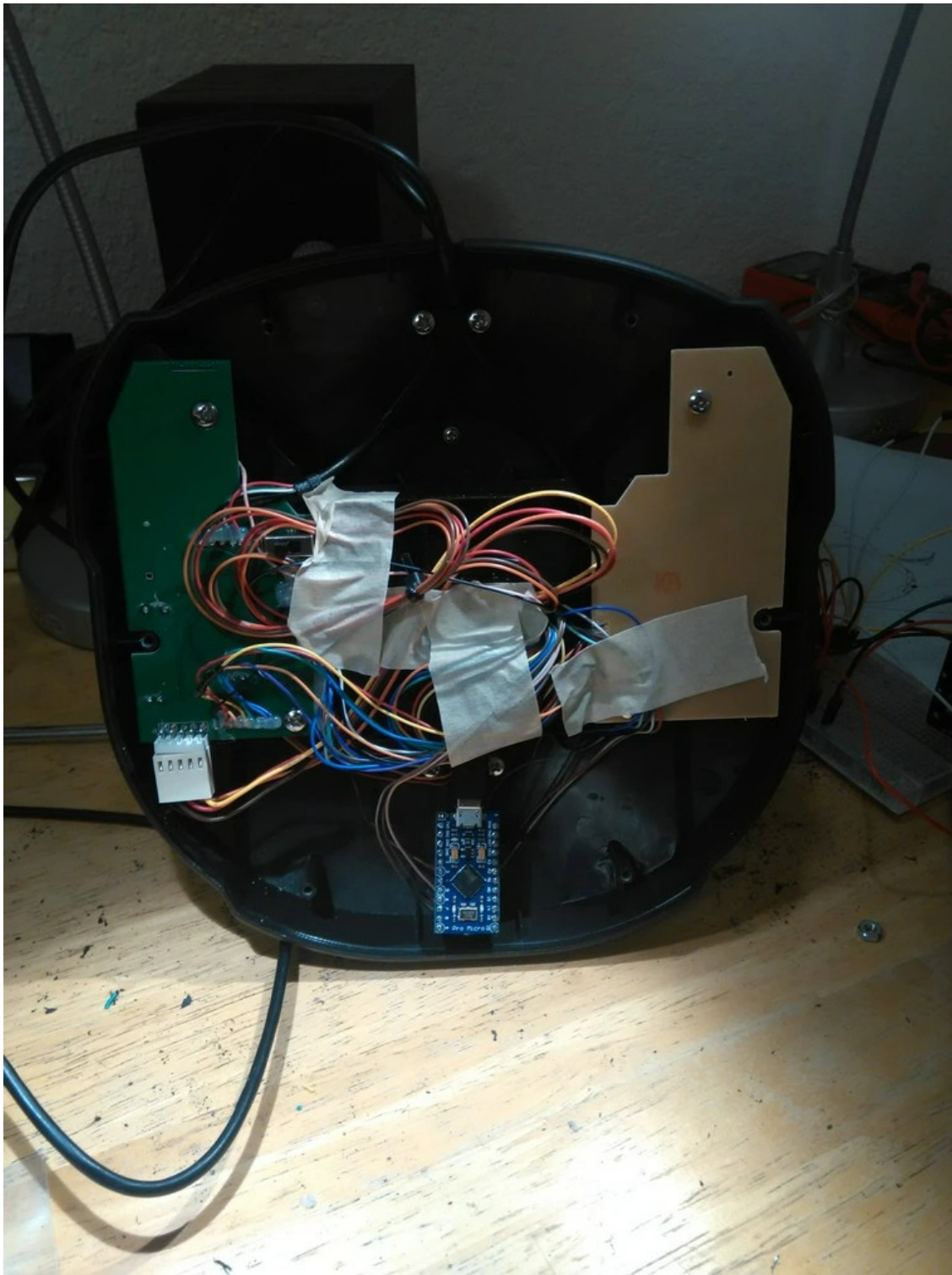
there's a dye you can add to clear PVC cleaner so that it will stain white PVC. kind of like the purple primer, but you have more color options :) don't know about other colors, but looks like the black works great.



made a rubber cork to hold the hall sensor. the magnet is crazyglued to an insert made of that expanded PVC stuff, with a slot for a screwdriver so I can adjust the angle. the arrangement is a bit flimsier than ideal, but seems to work just fine.



soldered everything. the Saitek rudder board proved a great donor for running my Arduino axes through. it was originally a button matrix, so I had to remove several diodes and patch the gaps with wire, but overall it was pretty straightforward.



messy, I know. it's a good thing that it'll be invisible :)



a rotary dial, an 8-position hat, and a pinkie trigger. the trigger is done from a power tool trigger and some moldable plastic dyed black. it works, but I'm not too happy with how smooth it works. may need to revisit later. oh, and of course the rudder rocker underneath the grip! that thing was kind of the whole point of this experiment.





okay, so top to bottom, left to right. a slide resistor connected to t.16000m's throttle axis (I left the original connected, too, and now it curiously lets me control the curve of the axis while the pot in the grip works as a throttle). next, a PSP thumbstick, held in place by hot glue and Russian expletives. it's not too precise, but I expect I'll find some use for it. then a 5-position switch (basically a hat + pushbutton) with a cap made of moldable plastic. works great! these 5-position switches are a bastard to use, though, I was lucky that it fit the button hole so perfectly. then the original pushbutton and 4-way nub assembly from x45, and then a PS2 thumbstick that's more precise than the PSP thing.



oh, yeah, the wall! the x45 grip had a metal insert there, and I needed to run the wires through the bottom and add the trigger, so I just made my own version out of my expanded PVC sheet. have I mentioned that it's very handy? it's very handy.



Gametraxx ECS in the background. a great device for the price, but not very useful in a space sim



bringing the axis count up to 14 :) the device came out pretty comfortable but tall. I may have to create some kind of mount for it in the future. that also affects its balance a bit: the original t.16000m grip is lighter and the hand rests lower on it so the weights in the base are about enough to keep the joystick steady, but now it's easier to tip the base if it's not held down by velcro or something.