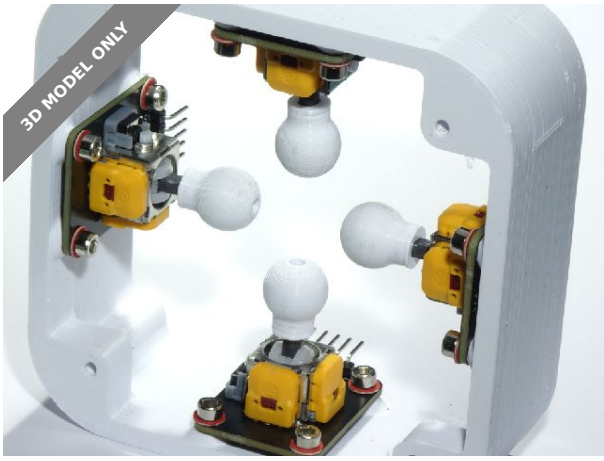

Hall Effect Joysticks For the Space Mouse

Kempy

VIEW IN BROWSER

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Summary

Switching to Hall Effect joysticks has been a game changer. They have no dead zones unlike potentiometer joysticks.

Gadgets > Computers

I feel that this is a major step up for the open source Space Mouse.

The current potentiometer joysticks used have two main issues:

1. They work by wiping a metal contact on a carbon track - the carbon track will eventually wear out.
2. There is a dead zone round the home position of the joysticks where a small movement has no effect on output.

The Hall Effect modules do not have these issues. The lack of dead zones has really improved my Space Mouse.

Before: small joystick movements had no effect, move the joystick some more and it kicked into action with a movement that was more than I would have desired.

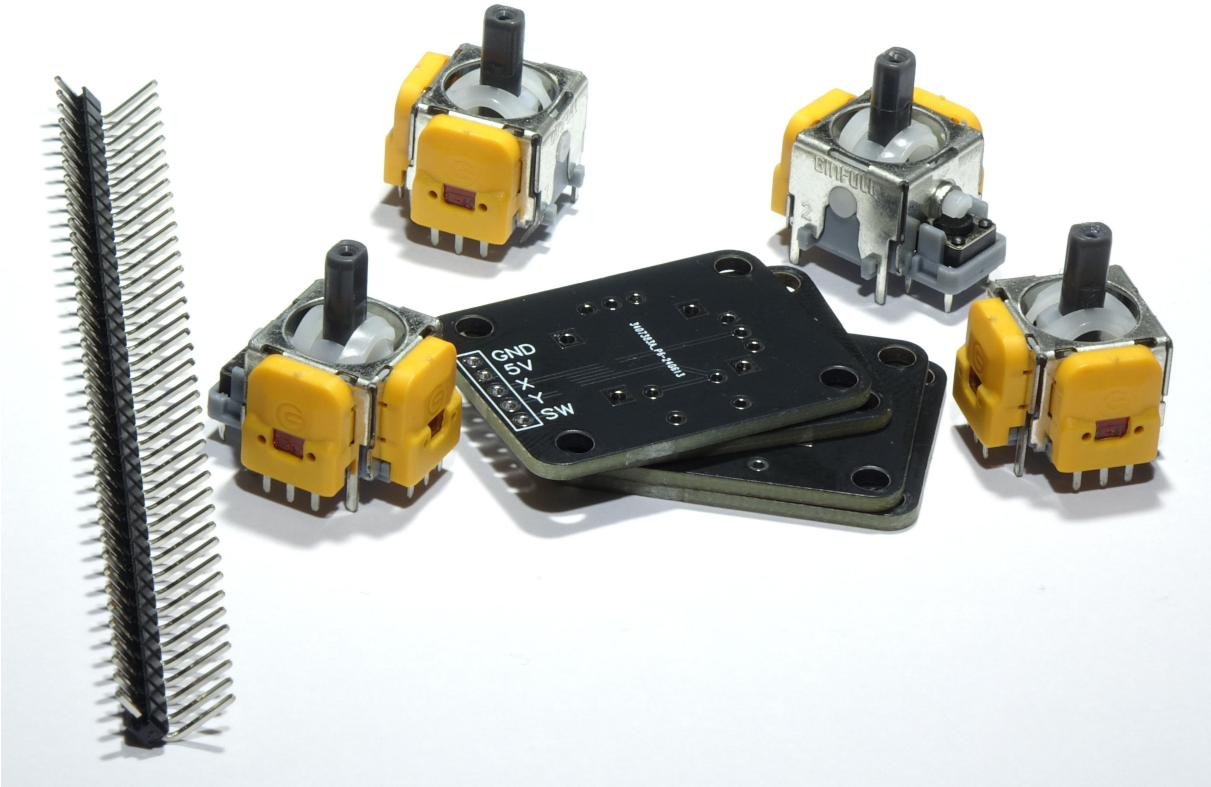
Now: Small joystick movements actually work and give small, smooth movements to whatever model you are manipulating on screen.

I used PS5 Hall Effect joystick modules. They need to be mounted on a PCB to enable them to be used in the various Space Mouse iterations here.

I have designed such a PCB and had a batch manufactured (for those of you that don't want to order them via a PCB manufacturer (and also get them quicker)).

The PCB is a drop-in replacement for the current potentiometer joysticks. Connections to the Arduino are the same and the hole spacings are the same as the current joystick (with the subtle difference that the PCBs I designed have the joystick in the exact centre between the mounting holes).

As well as the Hall Effect joystick modules you will need some PCB headers - search for “2.54 mm Right Angle Single Row Pin Header Male 90 degrees” on Ali Express, eBay, Amazon etc.



(You don't need to use the pin headers if you prefer to solder your wires directly to the boards)

Getting your PCBs

There are two options:

1. Order them from a PCB manufacturer of your choice using the Gerber file **“Gerber Files Hall-Effect Joystick PCB.zip”**

2. Get them from eBay - I have listed them in sets of four PCBs (I am charging a low price that just about covers my costs. I'm not trying to make money from you). Search for eBay listing 326171361770

https://www.ebay.co.uk/itm/326171361770

https://www.ebay.com/itm/326171361770

Getting your Hall Effect joystick modules.

They are available via Ali Express, Amazon, eBay etc. (I have had good results getting them via Ali Express).

Search for “PS5 Hall Effect joystick module” - you are looking for the PS5 version (that has given me good results).

Just because a seller describes it as a PS5 Hall Effect module does not mean that it is one! Below is guidance on what to look for and what to avoid.

PS5 Hall Effect Joystick Modules

What to look for when shopping for them

OK

- **2 X yellow/orange modules with red circuit board visible through a hole in the yellow/orange module?** ✓

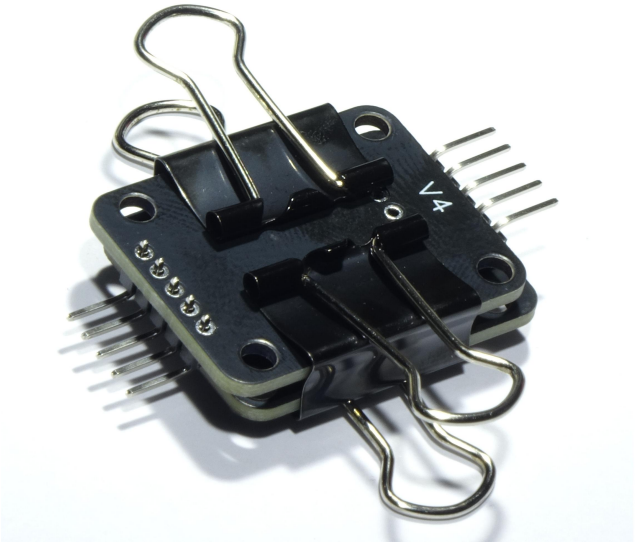
NOT OK

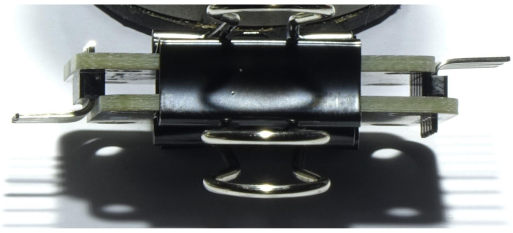
- **2 X yellow/orange modules with red circuit board visible through a hole in the yellow/orange module?** ✗

Some soldering tips

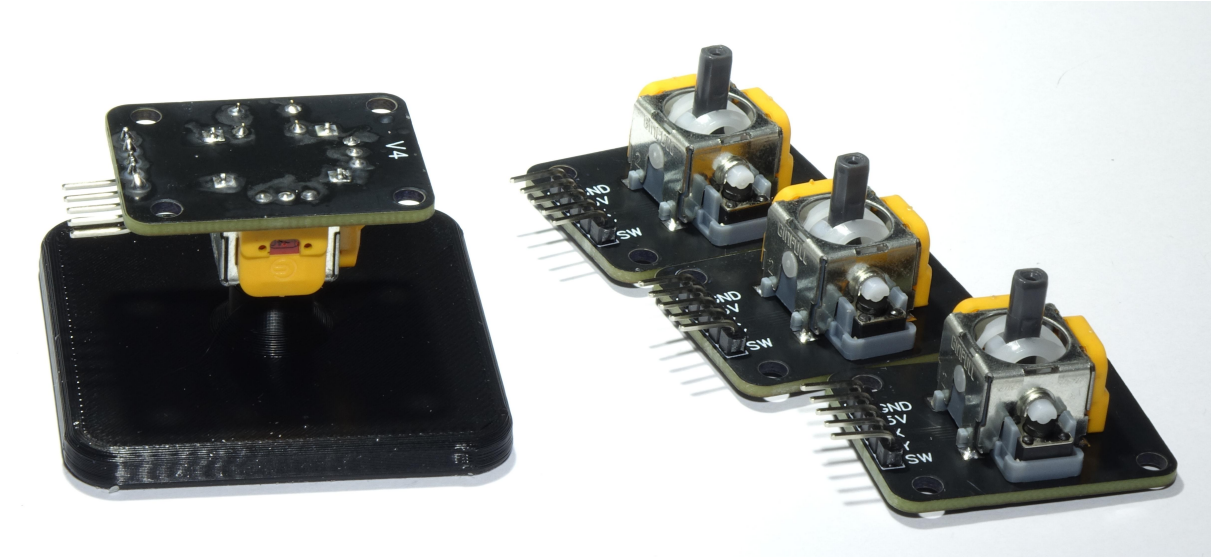
I'm not going to tell you how to solder 😀 but here are a couple of ways I found to make life easier.

Binder clips are a great help to keep the pin headers in position when soldering them.





"**Soldering Stand.stl**" is great for holding the joysticks when soldering boards onto them.



Software changes.

Because of the lack of a dead zone with these joysticks, I found that I had to set "**int DEADZONE"** to a value of 20.

I ran the calibration routine for max and min values - no problems there.

I have yet to change any sensitivity values. What seems to happen is that the joystick sometimes does not return to its central position and the model on screen is still moving (albeit slowly). This seems to be a mechanical issue because a very slight nudge on the joystick stops this slight movement.

(**Update:** a squirt of “Dry PTFE” spray onto the balls and their sockets seems to have cured this 😁 Additionally, I have set “int modFunc = 3; ” - you get really fine control over all movements)

Current firmware (thanks Andun_HH@Andun_HH).

https://github.com/AndunHH/spacemouse

A request to the community

The Hall Effect joystick modules take the Space Mouse up a level. I feel that there are even more improvements ahead - mechanically and in software.

Give these joysticks a try, any improvements you can think of? - Post them here

This remix is based on

Open source SpaceMouse - Space Mushroom remix

by TeachingTech

Model files

soldering-stand.stl

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soldering-stand.step

Other files

gerber-files-hall-effect-joystick-pcb.zip

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