

In this description you'll find all necessary informations of how to build your own cheap but well working throttle quadrant for PC-flight simming. But before starting think about two things:

1. Do you have a little experience in handicraft things like, sawing, drilling, soldering, painting and so on and do you have the tools for this? If so you CAN do it.
2. Can you get the necessary things like the trim pots, the ply wood, the cables and the plug?
If so you SHOULD do it.

How to start?

Start with building one of the mounting brackets with a trim pot and a handgrip. If you succeeded, build the other two or three (one could be a trim wheel).

Fix these brackets on a appropriate piece of wood like 20 x 30 cm (8 x 12 inches) about 2 cm thick.

After having done this, its time for the first electrical wiring to try out if it works. Take the 15 pin male plug and sold the several cables to it. Make a notice which cable (coded by colours) is connected to which pin.

Now sold the other ends of the cables to the pots and/or switches. To make it easier you can start with only one pot and / or one trigger. **BE SURE TO USE THE RIGHT PINS**, a mistake might couse some damage in in your PC (even I don't think so).

If you have finished this, it's time to connect your throttle quadrant to the PC. As I mentioned you can connect it directly to the gameport. Now go in Windows to Start - Settings - Game controllers.

Add a new one like two axis - two switches or whatever you want.

At this time its only about to try out if it works. When added this new device you should get a connect: OK.

If so, the worst thing is done. If not there is something wrong, probably concerning the connected pins or the pot itsself. **DISCONNECT IT IMMEDIATELY!**

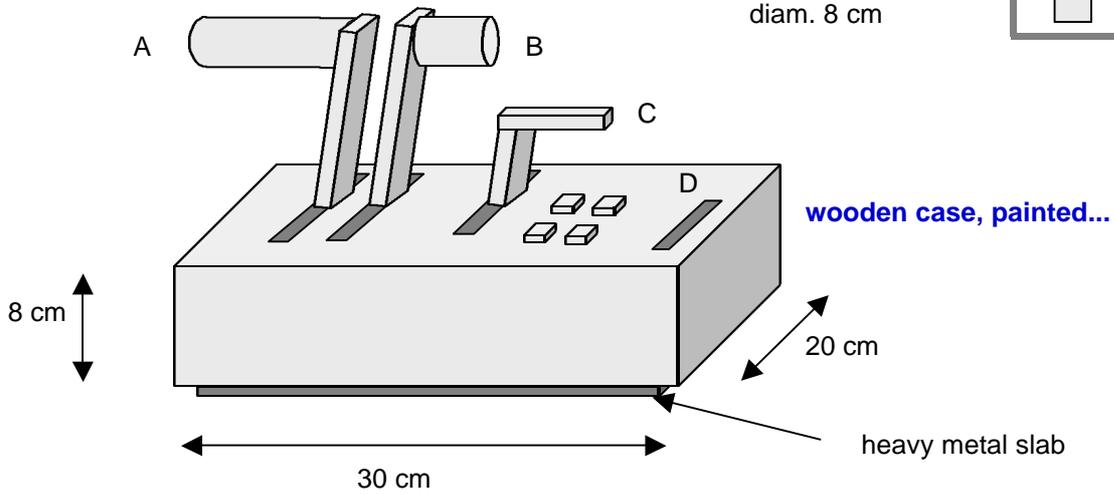
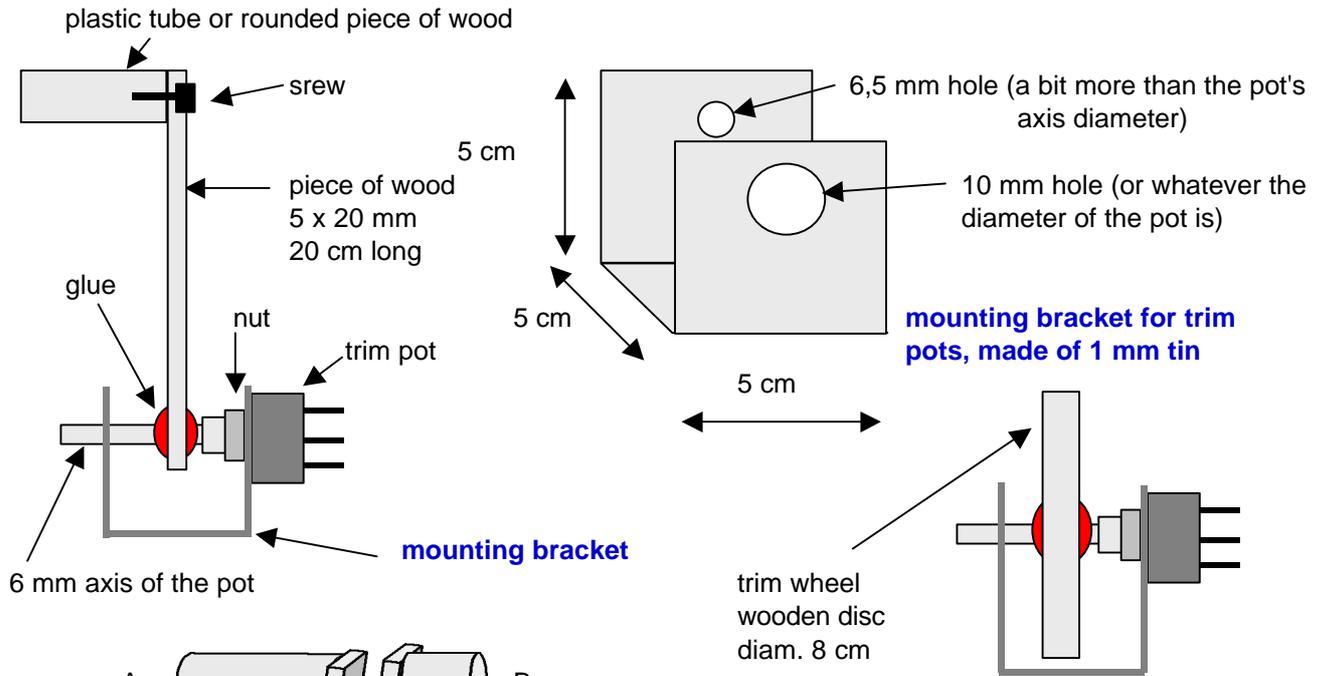
If you got the OK you should be able to check it's properties. So now move the handgrip and you should see a move of the position indicator on the screen. Push one of the triggers, one of their indicators should flash. It still needs to be calibrated but not at this time.

So now continue with the rest of the handgrips and switches (try to get some which can be mounted in the top of the box by a nut - that's the easiest way, you only need to drill a appropriate holes into the top piece of wood). The last thing to do is to build the box with the holes in the top around the wooden base. Use some sand paper and finish with some paint. I would recommand to build the box that way that it's top can be removed for maintenance. For more stability you fix a metal slab underneath the wooden base.

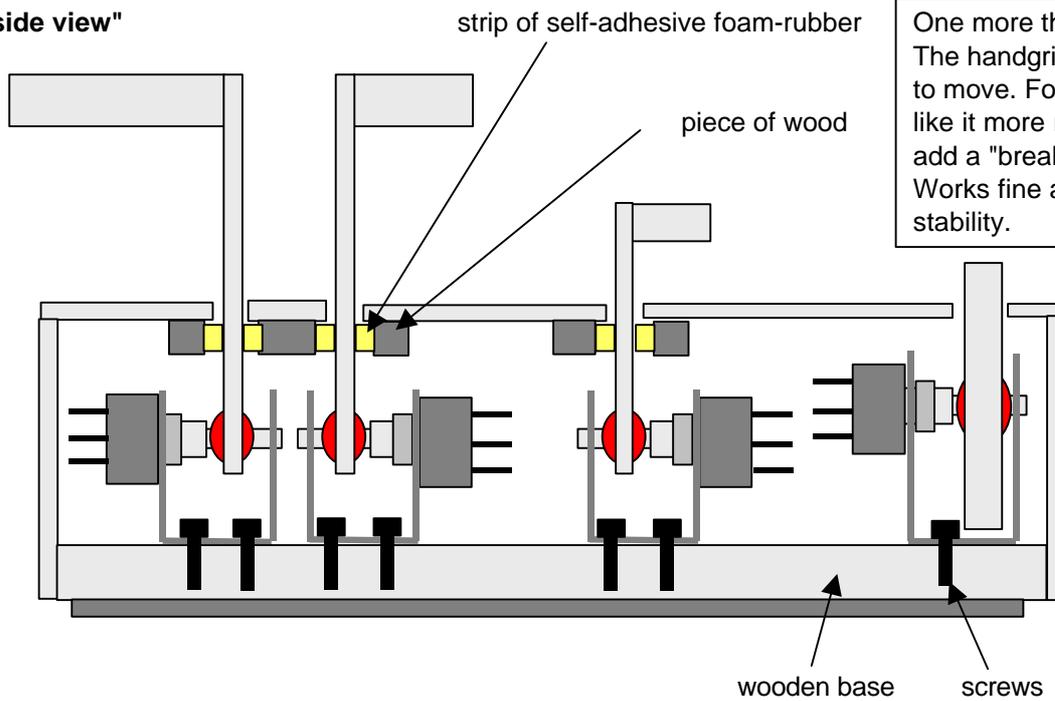
Now you're done and you connect it again, add it as an 4 axis 4 switch device, give it any name and calibrate it. In FS2002 you now have two contollers which you can assign the different axis.

I hope my description is good enough to make you understand what's it about. I also hope you dare to start - it's not as difficult as it sounds...

Building Scheme

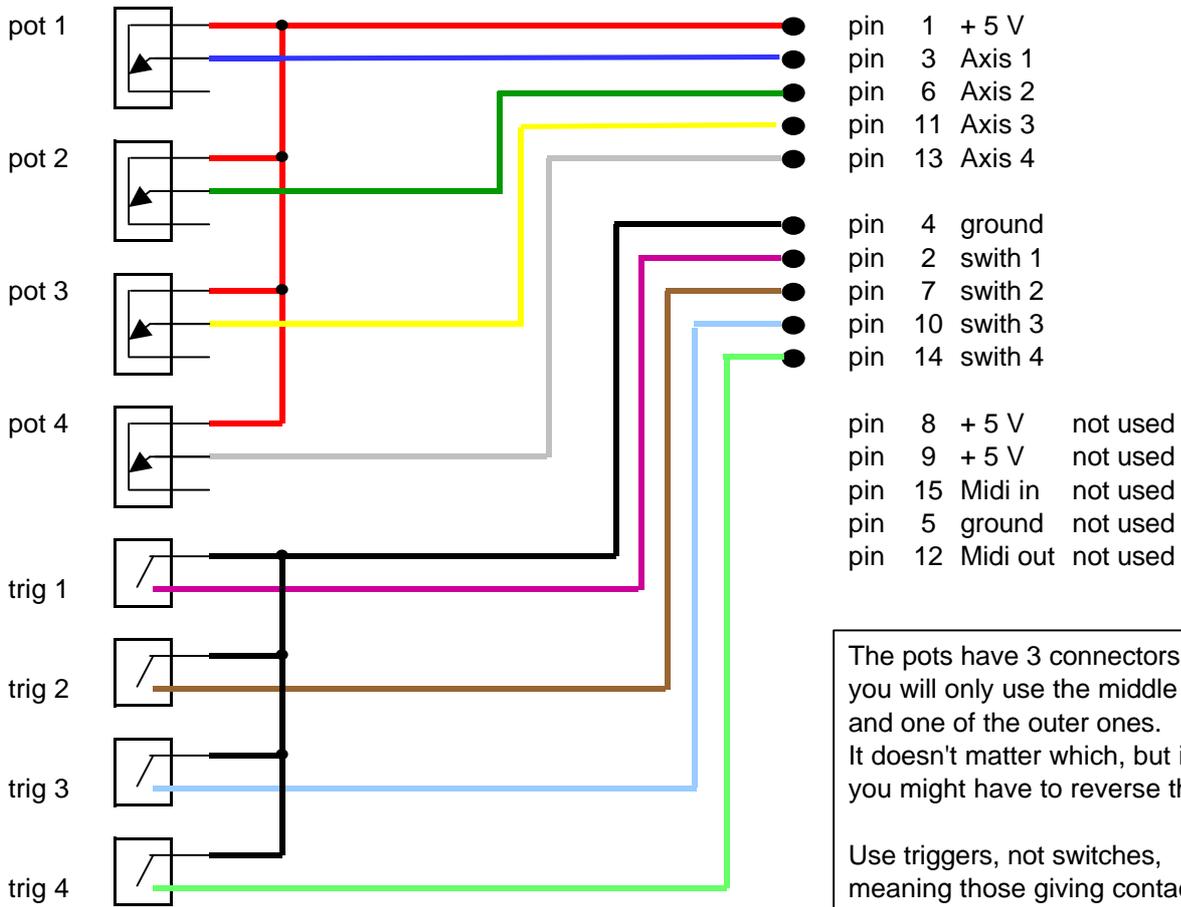


"inside view"



One more thing to mention:
The handgrips are very easy to move. For those of you who like it more realistic: add a "break" to the handgrip... Works fine and gives more stability.

Electrical Wiring



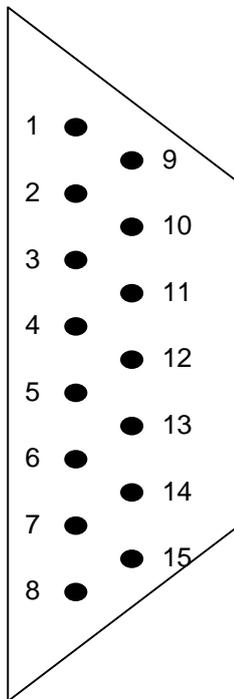
electric symbols aren't correct, and my english should be better... I'm working on it...

The pots have 3 connectors but you will only use the middle one and one of the outer ones. It doesn't matter which, but in FS you might have to reverse the axis.

Use triggers, not switches, meaning those giving contact only for the time you press the button.

Usually the PC expects trim pots of 100 k Ω linear, but concerning to your construction of the handgrips you can't use the full range of the pot, so better use a 200 k Ω

I'd recommend to install FSUIPC which allows a much better callibration of joysticks than the MS Windows control panel. FSUIPC is an addon for FS2002



numbering of the pins at the male plug for gameport connector view from the back, meaning from inside the plug (the pins should be numbered somewhere on the plug)

Use a shielded cable, connect the shield with the plug's ground / case

my assignments of the 4 axis:

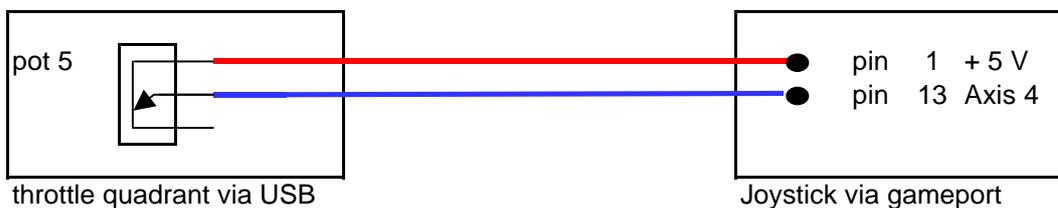
	A	B	C	D	
single prop	throttle	- -	prop	elev. trim	The 4 triggers are assigned to flaps up / down, gear and parking break
twin prop	throttle 1	throttle 2	prop both	elev. trim	
twin jet	throttle 1	throttle 2	spoiler	elev. trim	

If you connect this throttle quadrant directly to the gameport, it will work fine.

If you decide to connect it via USB (using an gameport to USB converter) you will notice, that the elevator trim isn't working sensible enough. This is because the USB input allows only 16 or somewhat values for an axis. This is not enough for rudder trim.

There are several solutions: Change the elevator trim effectiveness in the relevant aircraft.cfg, try some tweaking in the sensibility settings of the axis in FS 2002 or do what I did:

I wired the elevator trim axis of the throttle quadrant as the 4th axis of my joystick, which is connected to the gameport. So I could add a 5th axis to the throttle quadrant which is wired as it's 4th axis. I assigned it to Mix (I built it as a turn knob, which you can see in the pictures. This is the reason why there are two cables coming out of the box...)



The regular trim pot of the joystick's 4 th axis has to be disconnected.

And these are the prices for the material I used:

1 15 pin plug	1,5 Euro
2 m of 10 wire shielded cable	2,5 Euro
3 trim pots 200 K Ω linear (for the hangrips)	3,9 Euro
2 trim pots 100 K Ω linear	2,6 Euro
4 switches	6,0 Euro
some wood	4,0 Euro
some tin	4,0 Euro
some screws, nuts etc...	2,0 Euro
some paint, glue cable...	3,0 Euro
30,00 Euro	= ~ 30 US \$

It took me about 2 days to build it, but the real net building time lasted only a few hours. And believe me, building was at least half the fun...

Here some pictures of my homebuilt throttle quadrant

