

**CONNECTING YOUR TQ Using the
BU0836 Precision Joystick
Emulator from Leo BODNAR v1.2**

December 2006

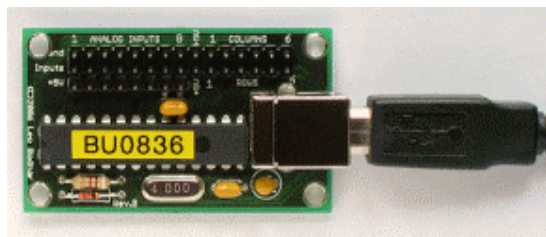
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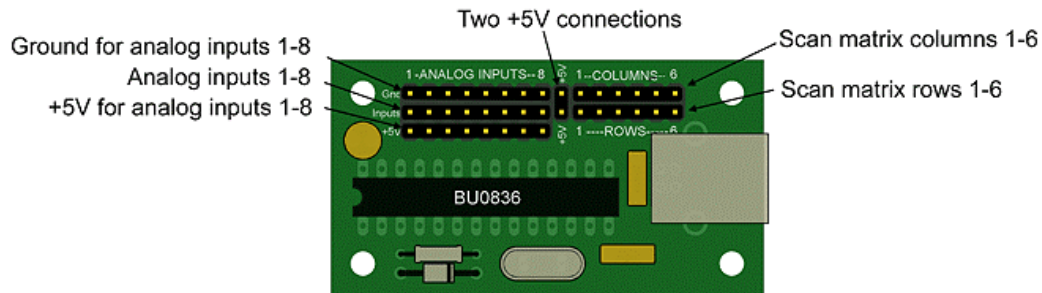
Originally I connected my TQ up using the OPENCOCKPITS Joystick Emulator Card. Excellent card for the money, but the drawback was that it only gave me 5 Joystick axes, where to run the TQ properly, I needed

6. 2 throttles, 2 thrust reversers, Spoiler, Flaps = total six. One day I came across the BU0836 Precision Joystick Card from Leo BODNAR which you can check out at <http://www.lbodnar.dsl.pipex.com/joystick/>. This allows the connection of upto 8 analogue input axes to control anything in your sim that is usually controlled by a joystick action. Additionally, it scans a 6 x 6 matrix to give 32 Joystick Buttons and a 4 way POV. So I decided to remove the OPENCOCKPITS card and the SAITEK ST90 card I also had installed and replace them with the BU0836. Keeps everything tidy and 1 less USB lead to fall over :o)

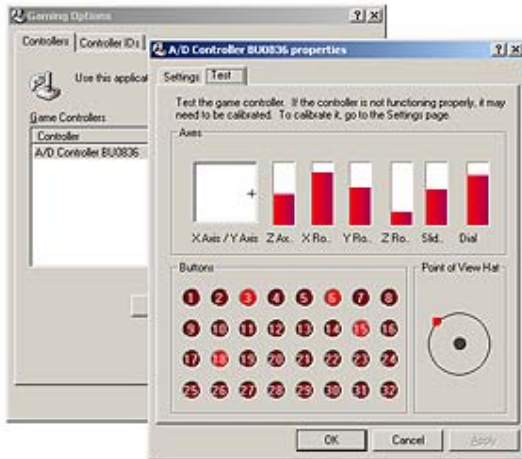


In this Document, I am going to assume that you are familiar with the components that control joystick axes and how to connect them. If you are unsure or need a little help, see the Connecting your TQ Part 1 document (my original, when setting up the OPENCOCKPITS card) on the Technical Page at www.737NG.co.uk

This will help you get your head around it all and how things go together. It contains a description of what goes on in very simple terms.



OK, this is the BU0836 controller card. If you look at the top of the image, you will see three rows of header pins. Two rows of 15 and one row of eight. These are standard 2.54mm pitch, so any standard IDC cable is going to fit onto them. I use an ordinary 40 pin data cable from a computer (you know connects your CD-ROM and DVD etc). I connect to the top two rows only. There is a 5v pin on each row, so I have disregarded the 5v separate supplies to each input & grouped them (less wires to worry about).

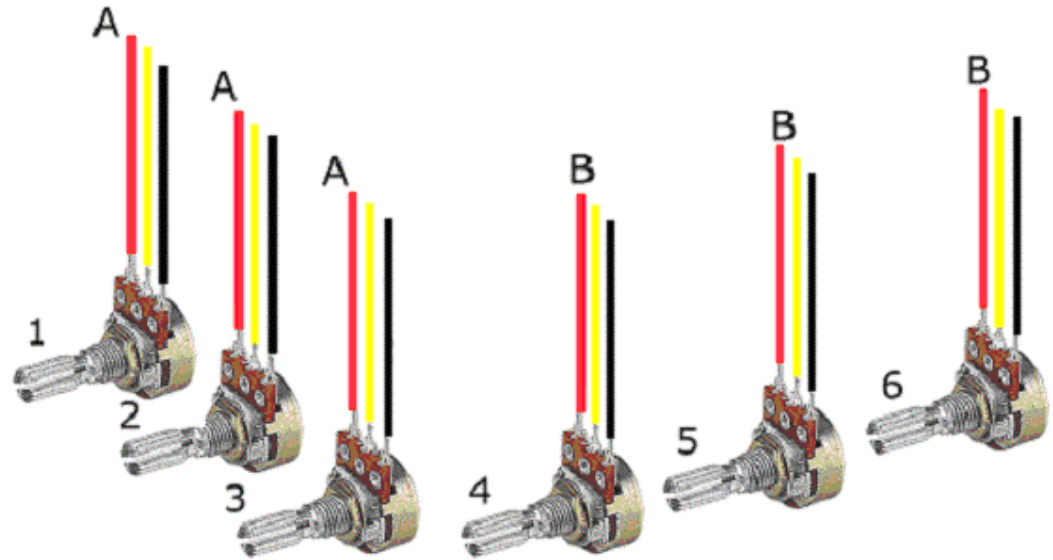


When you attach the card to your computer, it will recognise it as a Joystick which you will be able to calibrate using the Windows Game Controllers Page in the Control Panel. One good thing is that if you only have 3 axes connected, then the BU0836 will report only 3 or if you have 6, then it reports 6. Makes setting up and calibrating so much easier.

Unused buttons will not appear as pressed. This helps you identify which button is active when you press it.

Right it's down to the 'nitty gritty' .

Each axis is controlled by a variable resistance which changes as you rotate your potentiometer thus causing a voltage differential between the 5v and GND (ohms law). It is this voltage change that your computer reads as a position report of where the wiper is along the axis of the rotation (hence you increase your throttle or move a flaps position) etc.



If you look at the above diagram, there are 6 variable potentiometers which are inside the TQ. This is the setup. The numbers of each pot relates to the input no. on the board.

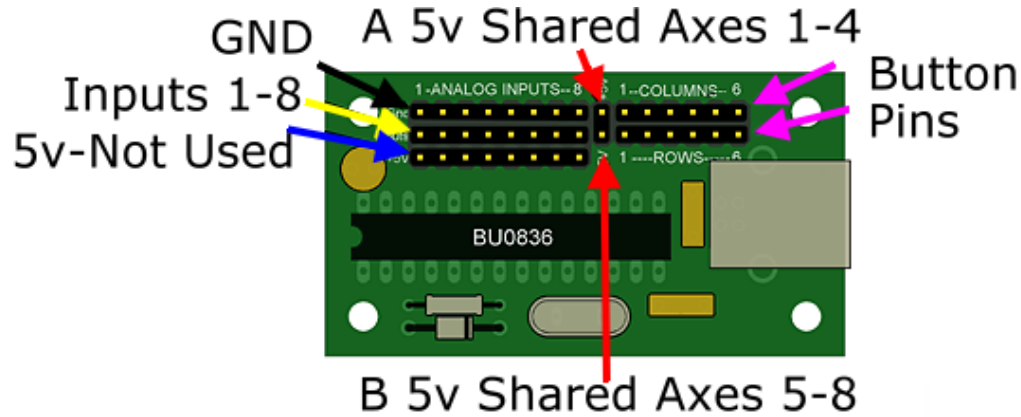
- No 1 is Throttle 1. X Axis
- No 2 is Throttle 2. Y Axis
- No 3 is Reverser 1. Z Axis
- No 4 is Reverser 2. X Rotation
- No 5 is Spoiler. Y Rotation
- No 6 is Flaps Lever. Z Rotation

I only use 6 axes, because FSUIPC which I use to calibrate can only recognise this number of axes on any joystick (I found out the hard way).

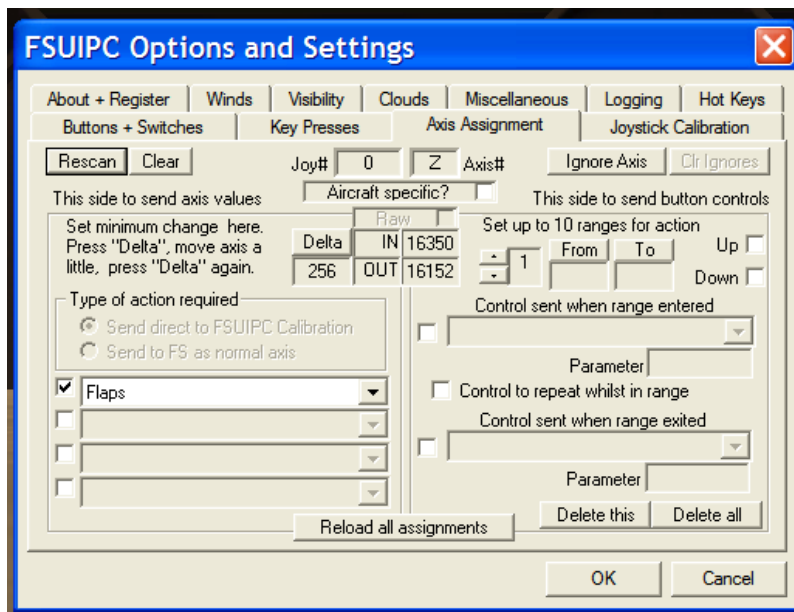
The trim, I have connected to a rotary encoder and fed thru the Flightdeck Technology board.

Again as with any electrical apparatus, you have to be real careful. I found by grouping the 5v supply to several pots that sometimes I got erroneous interference between them. For example when you increased the X axis, the Y rotation would also move. So the answer is you have to keep them separate. This technically is known as decoupling. Placing a 1uf capacitor between the 5v and GND on each pot cured the problem :o)

Each **Red** Lead is a 5vdc supply to each pot. You will see that they are marked either A or B. This is because I have lifted the 5v from the top two rows of the header pins (5v+) on the BU0836 and shared them between two groups of 4 pots each.
 Each **Black** Lead is the GROUND (or GND) for each respective input.
 Each **Yellow** Lead is the Actual Input to each respective axis.

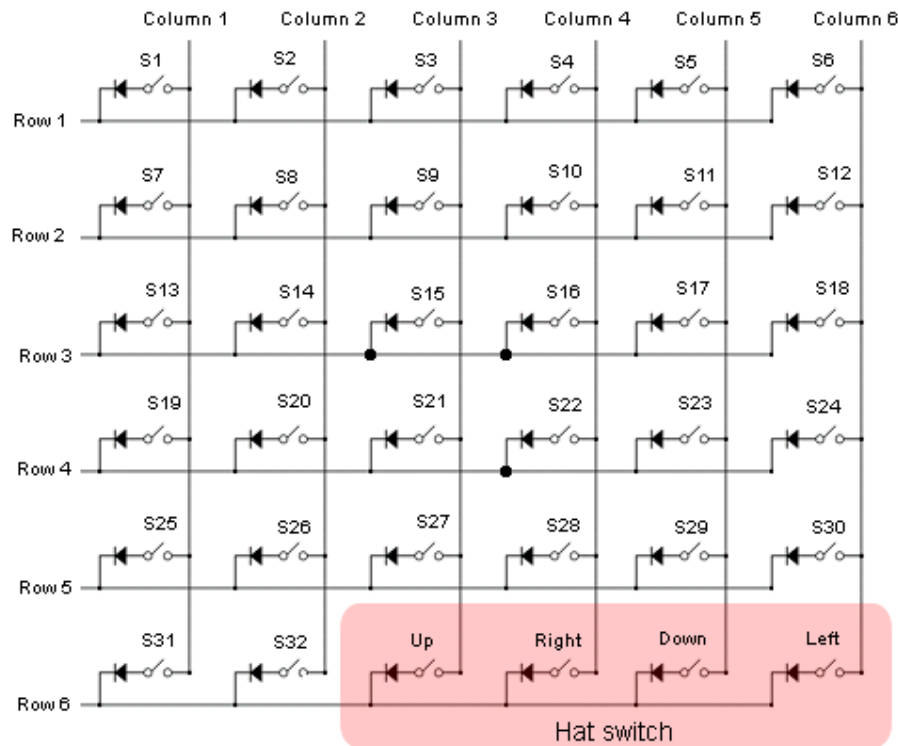


Right then, once you have connected all the axes to the card and calibrated them, it's time to assign the axes to the function you require. Refer to the description above for how I assigned mine. You may care to choose a different connection regime, so make a note of what axis is controlling what function. I much prefer to let FSUIPC take care of the control of the axes, so I always assign them and calibrate a second time using this superb utility.



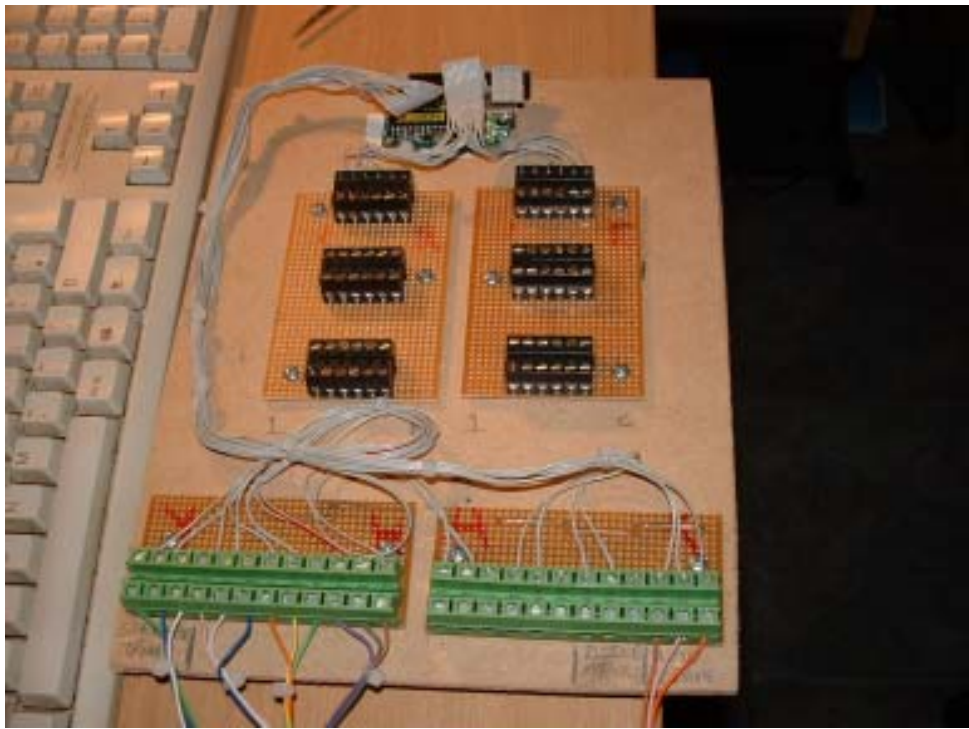
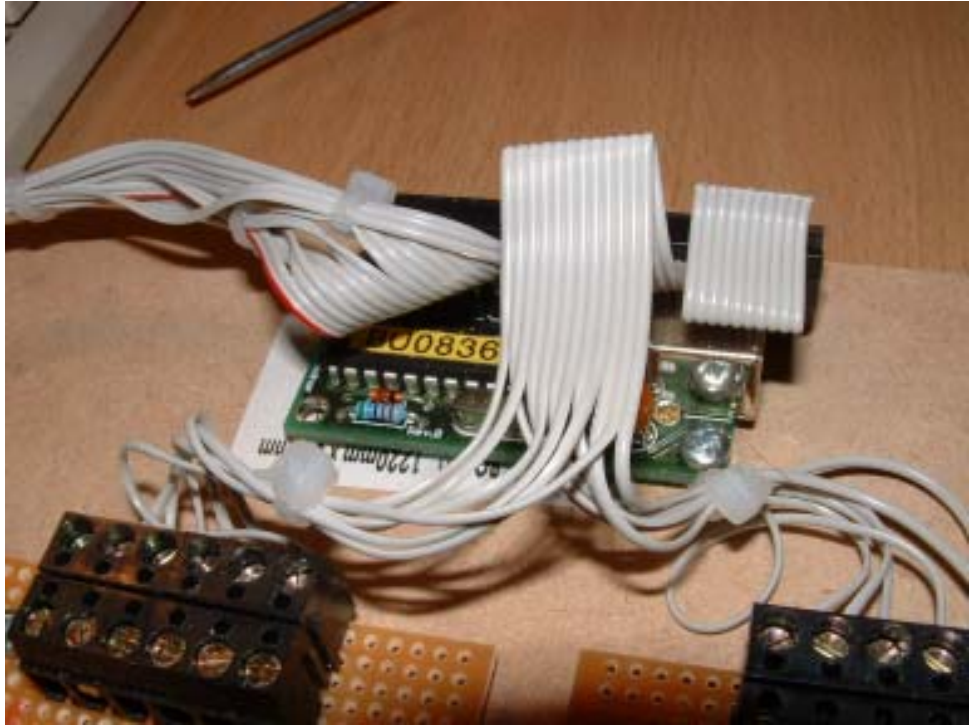
You need a registered version of FSUIPC to do this, but in the latest version Pete Dowson gives us the opportunity to 'fine tune' all our axes via FSUIPC. Much more reliable and accurate than FS for my money. Just bear in mind that you need a different version for FS2004 than for FS-X. I have v3.71 in use at the time of writing (Dec 2006). There's no purpose in me writing a step by step guide to using these functions in FSUIPC as Pete's documentation that comes with it is very good. You can get the latest version of FSUIPC at www.schiratti.com/dowson.

Now a word about Buttons....BU0836 gives you the opportunity to add up to 32 extra Joystick Buttons. What it does is scan a 6 Row x 6 Column matrix to give us a choice of adding another 32 buttons with the last 4 matrix addresses assigned to a 4 way Point of View control.



Now I'm sure we can all use some extra buttons, either to send a command directly into FS or via FSUIPC as a specific command. The above diagram is really self explanatory. Button 1 is closed by connecting Row 1 to Column 1. Button 16 is closed by connecting Row 3 with Column 4, Button 21 is closed by connecting Row 3 with Column 3. See what I mean :o)

The next step is to decide how you want to connect to the board. From experience 'KEEP IT TIDY', otherwise you will have wires going in all directions and you won't know which is going where. With something like this I always like to fit it to a board that I can hide inside something. Like this below. The data cable connects the header pins on the BU0836 to the connectors. Black connectors are for the Joystick Buttons (Left are Rows and Right are Columns) and the Green connectors are for the Axes (from the left 1 thru 8). Connection is simple and can't be misunderstood what is what. I usually write on the board what connection is for what function as well.



Notes to Help You:

If your Potentiometer operates the wrong way round, swapping the 5v and ground leads will cure that.

All Ribbon Cable has the No.1 lead marked. In my case with a Red Line. So how do you know which pin is No.1 on the Card. All even numbers are GND and all odd no's are Inputs. So your inputs are 1,3,5,7,9,11,13 & 15 and your Ground leads are 2,4,6,8,10,12,14 & 16.

17 & 18 are 5v dc (17 goes to Group A & 18 goes to Group B)
19 thru 30 are the rows and columns to connect buttons.

Finally, as always thanks to everyone who mailed me about this card.....it's the feedback that helps me iron out any wrinkles. And remember just because I did it this way, doesn't mean it's right, if you have a better way-TELL ME, don't keep it to yourself. Thanks also to Leo BODNAR for the images which I 'borrowed' to illustrate some of the diagrams. I kind of thought it would be OK because I was promoting his card :o)

Enjoy your projects and talk to you soon.....

Regards

IAN

Ian P.Sissons OSWESTRY England December 2006

SPOILER
Axis controlled by the BU0836 card, then calibrated in FSUIPC Axis 5

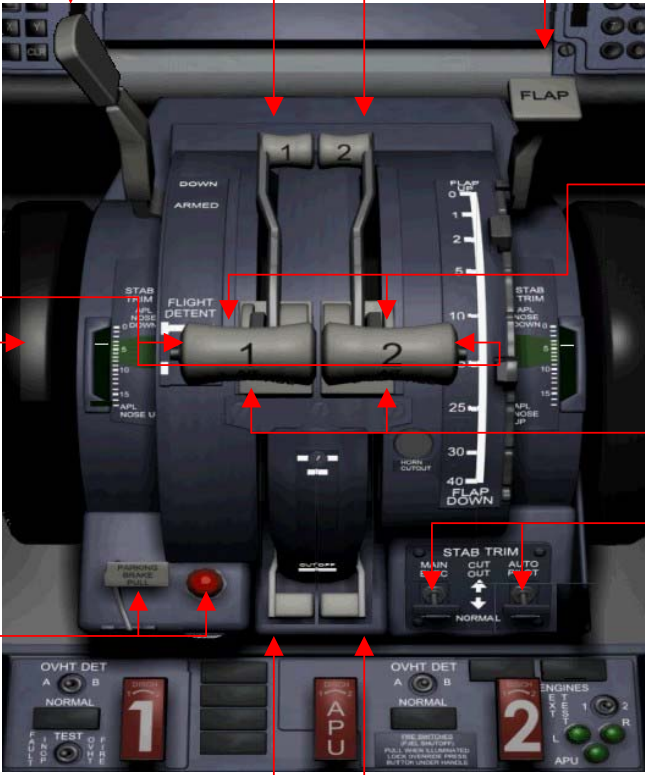
REVERSERS
Separate Reversers for Each Engine. Axes controlled by the BU0836 card and calibrated in FSUIPC Axis 3 (No1) & Axis 4 (No2)

FLAPS
Axis controlled by the BU0836 card then calibrated in FSUIPC using the Flaps Détente Function. 100% accurate. Axis 6

A/T DISCONNECT
Button sent thru BU0836, processed thru FSUIPC to send Key Command for this to the PMDG

ELEVATOR TRIM
Rotary Encoder sending Trim commands thru the Flightdeck Technology Input Board.

PARKING BRAKE
Microswitch send On or Off to MCPX1 which returns power to the LED when in the ON position



TOGA Buttons
Button sent thru BU0836, processed thru FSUIPC to send Key Command for TOGA.

THROTTLES
Separate Throttle for each engine. Axes controlled by the BU0836 card and then calibrated in FSUIPC Axis 1 & Axis 2

TRIM SWITCHES
Not augmented yet, but I think I know how I will do it.

FUEL VALVES
Microswitches on Valve Levers send Key Command direct into FS via Flight Deck Technology Input Module