BU0836A 12-Bit Joystick Controller

A small USB joystick interface board with pin header connectors to connect buttons, potentiometers, sensors, rotary encoders and switches to a PC or Mac.

Inputs

- 8 analog inputs with 12-bit (4096 steps) resolution each
- 32 button / 16 rotary encoder inputs
- 8-way "point-of-view" hat switch input

Dimensions

- Length 2.2" / 55mm
- Width   1.25" / 32mm
- Height 0.57" / 14.6mm
- Recommended Wire Size   24AWG to 20AWG
- Mounting Screw Hole Size   M2.5 or #3-56 - DO NOT ENLARGE THE MOUNTING HOLES

Connection to PC

The PCB has a standard USB B type connector for connection to PC or Mac. No drivers are required. Plug it in and use straight away.

Pin Header Connection

Eight 3-pin and two 6-pin connectors are included with each controller to solder your wires to (to save soldering directly to the pins on the PCB) or connect using our 3-pin and 2-pin cables. Pin header has standard 0.1" (2.54mm) pitch.

32 digital inputs for buttons and switches via wiring matrix

We recommend ready-made matrix add-on board for easy matrix wiring.

Connects to six ROWS and six COLUMNS pins on the controller. Looking at the diagram below you can see connecting two wires from a simple push button to Row 1 and Column 1 would activate S1 (Button 1), Row 1 and Column 2 activates S2, Row 2 Column 1 activates S7 etc. There is no need for any ground pins to be connected however diodes are required if there will be 3 or more contacts activated simultaneously. Most diodes can be used - 1N4148 or 1N4004 are good ones and can be found at most local electronics supply stores.

First 32 buttons are standard buttons. Last 4 contacts make up 8-direction point-of-view hat (coolie) switch.
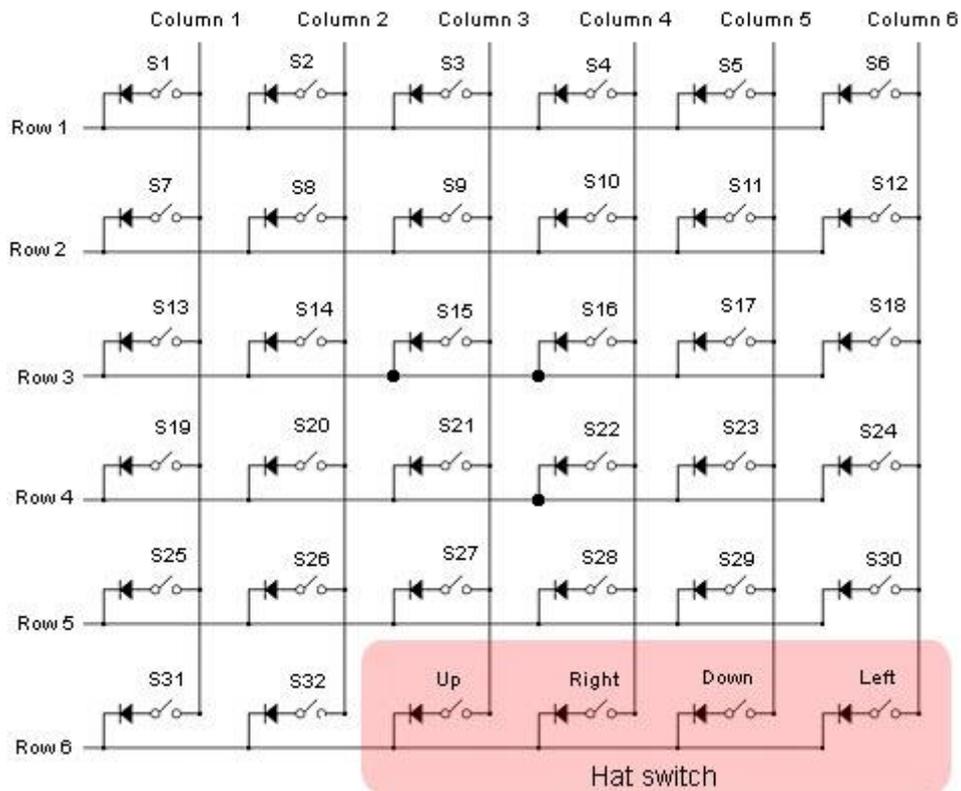
Simplified Direct Button Connection

Connect up to 12 buttons or switches without wiring in matrix. No diodes are needed even with switches or toggle buttons. Connect each switch to the board using one GND pin (from analogue input pins) and one of the 12 input pins (rows and columns). GND wires can be shared(daisy chained) between buttons and/or potentiometers.
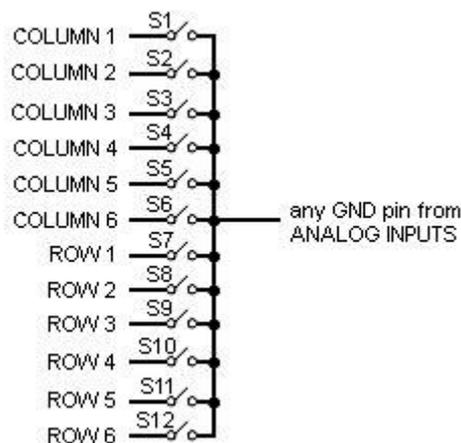
Support for up to 16 rotary encoders

A pair of digital inputs can be connected to a rotary encoder. All main types supported (1, 2 and 4 pulses per detent. Check the datasheet of your encoder to find out which type you have). Once connected, download our encoder software in the product downloads tab and set the pair of inputs to the encoder mode you require. Always use negative number for the first input, ie. 1-2, 3-4 etc.

Wiring encoders into the button matrix example:
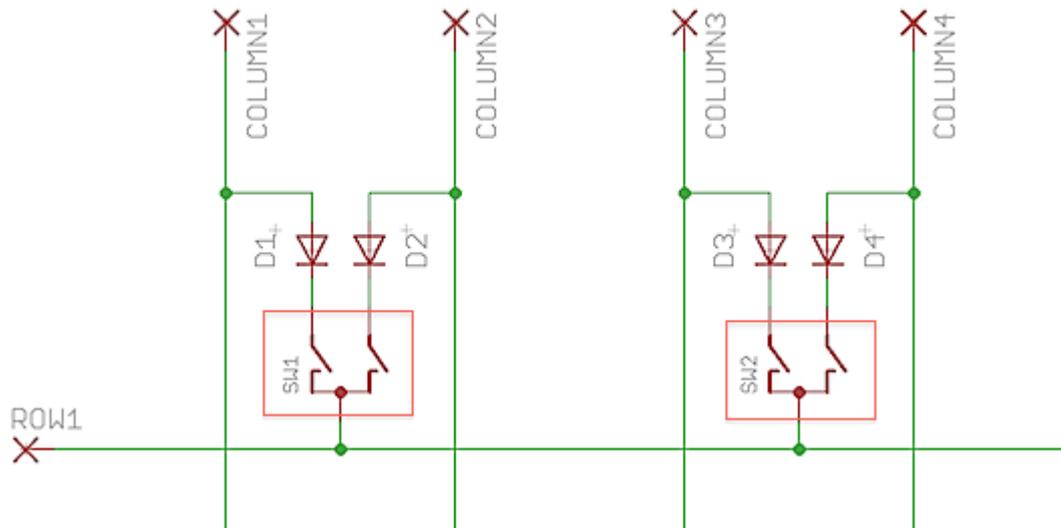
8 analog inputs with true 12-bit resolution and independent wiring

You must only connect potentiometers with the USB cable unplugged from the device.

4096 steps of resolution. Even 1/4 of this range is still 1024 steps!

To support true 12-bit performance each analog inputs has independent set of +5v and GND terminals, oversampling and sophisticated signal filtering.

Simple potentiometer wiring example:

Potentiometers: 1kOhm .. 100kOhm

Connect up to 8 potentiometers
Each to its own set of 3 pins:
+5V, INPUT, GND

Make sure middle contact (wiper)
is connected to BU0836 INPUT pin
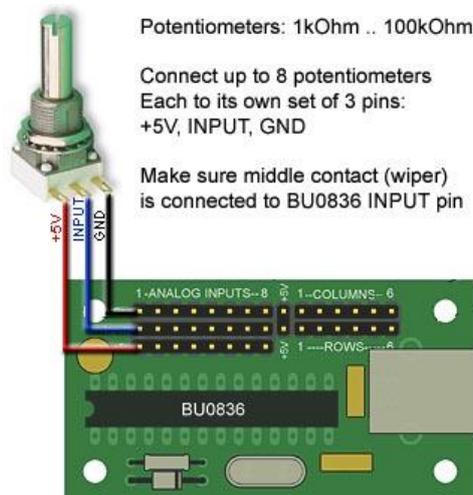
8-direction POV hat switch.

Connect a hat switch like ours - (click here), third party hatswitchs or even make your own by connecting any four buttons of your choice. Diagonal directions are made by pressing two directions together ie, UP and LEFT = NW. (the hatswitch inputs are only accessible if using the wiring matrix. Diodes should be used if connecting other buttons in the matrix.)

A = UP - COLUMN 3

B = LEFT - COLUMN 6

C = DOWN - COLUMN 5

D = RIGHT - COLUMN 4

PUSH - Any other button input (only columns 1 or 2 if no diodes are used)

COM.(Ground) - ROW 6

Example Hatswitch Wiring in Button matrix.
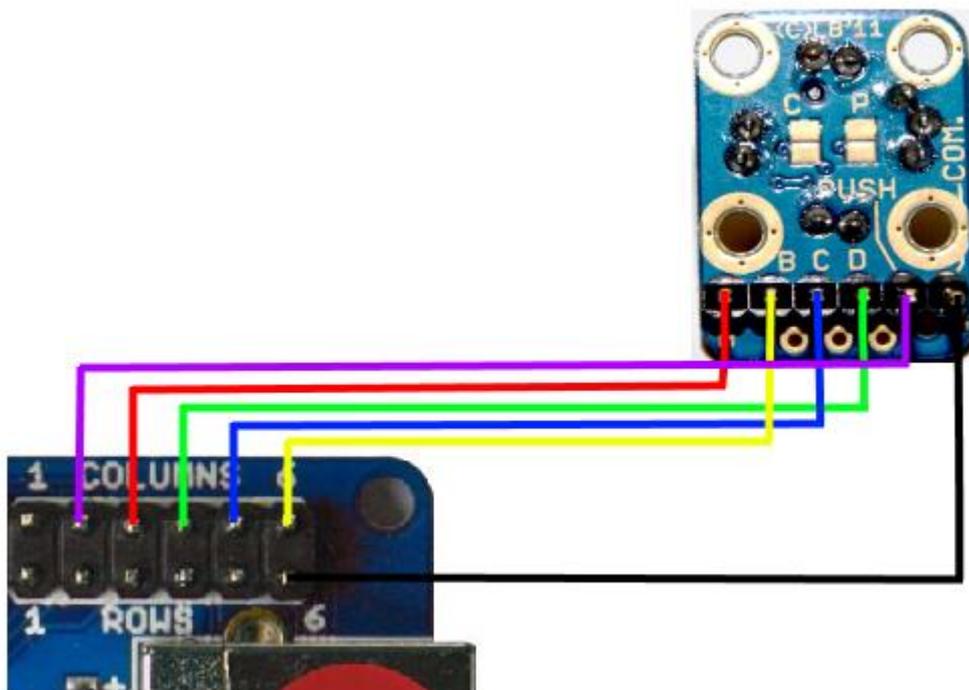
Can I be turned into keyboard or other device? - Mapping button presses or potentiometers to other functions such as mouse/keyboard or hat switch controls can be done emulated using third party software such as Joy2Key. Look in the downloads tab for alternative software solutions.

Check data sheet of component you wish to connect for the correct pin out - The PCB is labelled clearly to show where each pin from your component should connect.

Once you have connected everything you need - Connect to a PC or Mac using a standard USB A to B cable and the device will be recognised as a generic game device named - BU0836A. You can then either calibrate or assign your controls using your chosen game or software as you would with any other game controller. That's it!

Construction tips

What to do with unused inputs?

Unconnected buttons will appear as not pressed - just ignore them

Unused analog inputs are automatically disabled. They will appear as soon pots are connected and BU0836A is powered up. In other words, if they are not connected - you will not see them.

Which pots are the best?

Any value from 1kOhm to 100kOhm will work fine. If you don't know where to start, get 10kOhm ones

Use linear pots (taper B.) Avoid non-linear, log pots with tapers A, D or Y used in audio level controls

Any pot would work but the best ones are industrial quality Spectrol (Vishay) and Bourns. They have life expectancy of few million shaft revolutions.

Good wiring helps. For ultimately clean signal use shielded wires and ground the pot's case if it's metal

Try to use as much of pot travel range as possible.