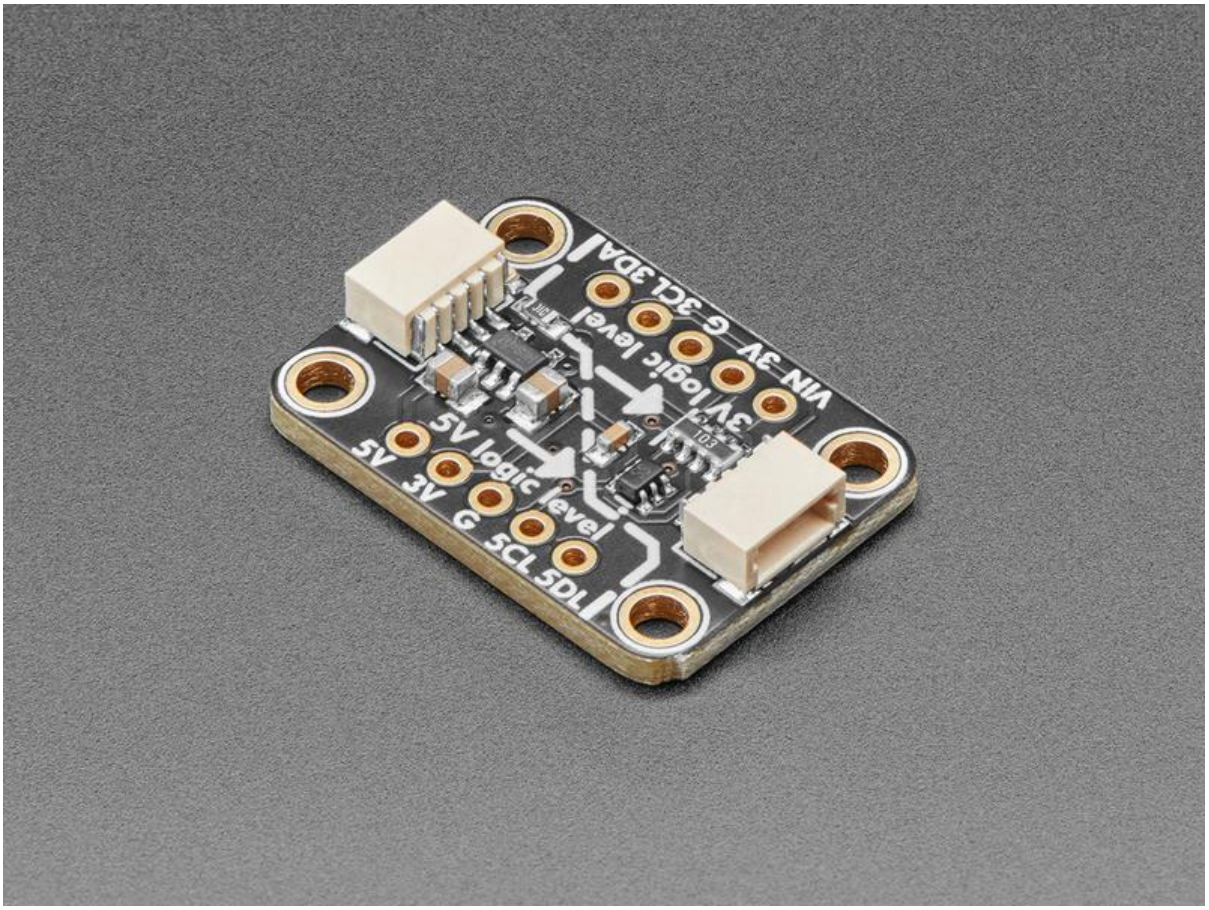
Adafruit QT 5V to 3V Shifter Breakout

Created by Liz Clark



https://learn.adafruit.com/adafruit-qt-5v-to-3v-shifter-breakout

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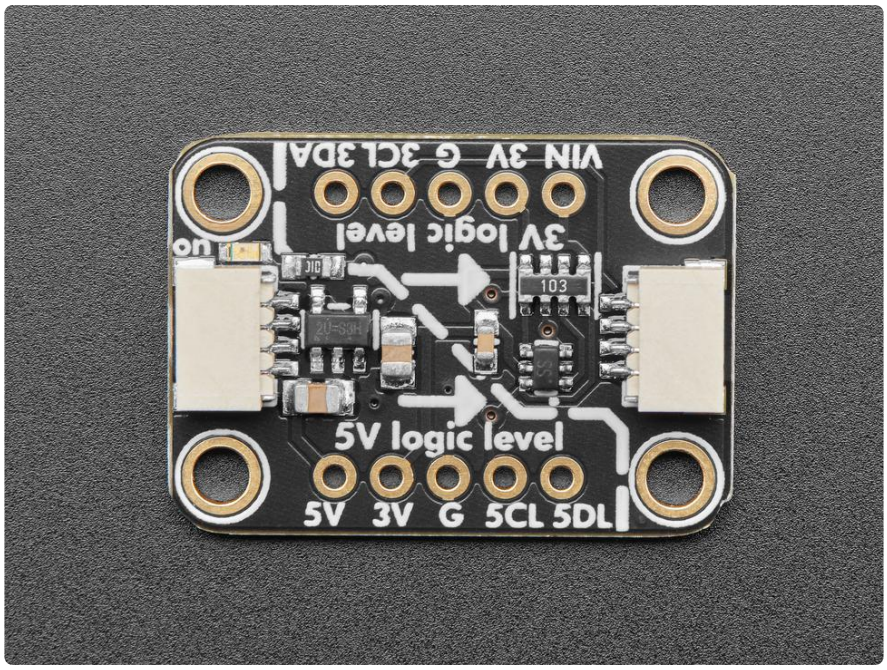
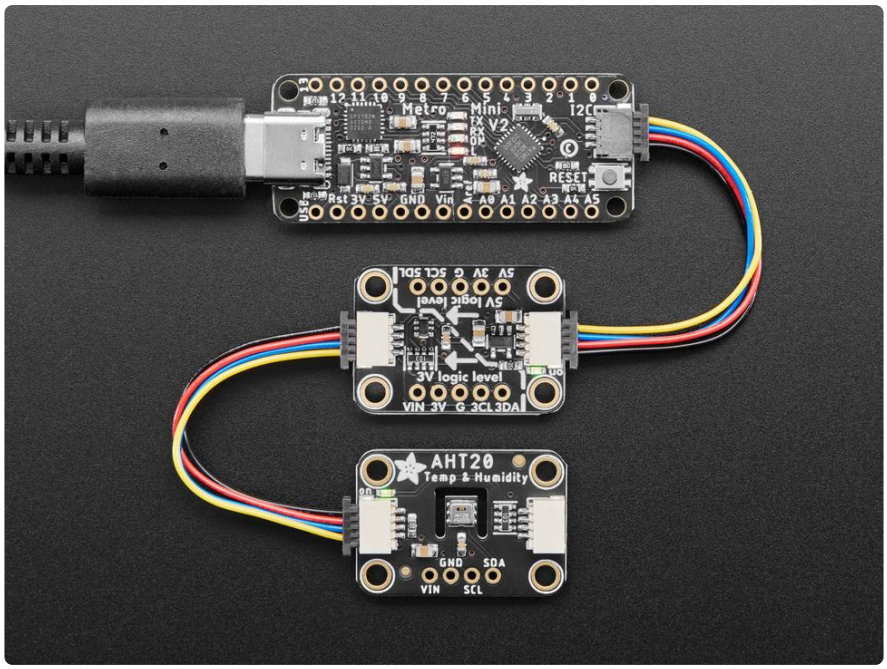
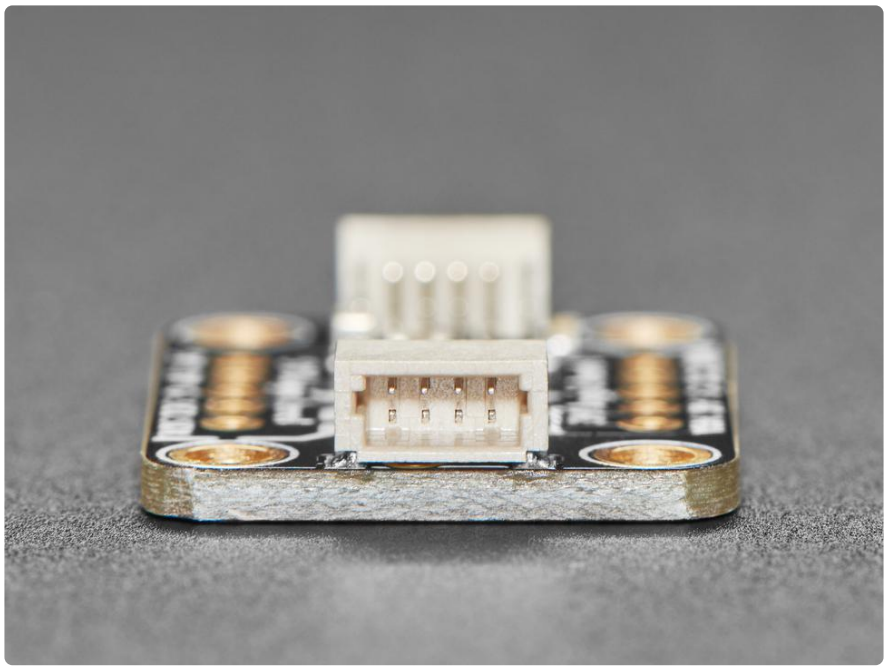
Overview



If you're hankerin' to use the new Qwiic / Stemma QT standard for your next project - but you're still using a classic Arduino UNO or other 5V microcontroller, this board is designed for you! Note that Adafruit QT boards are all 3V and 5V safe () but many other Qwiic () and other I2C devices are not 5V safe or compatible. That means that if you use wires to connect a Qwiic board to a 5V microcontroller you risk damaging your shiny new I2C sensor with over-high voltages. Unless, of course you have one of these Adafruit QT 5V to 3V Shifter Breakouts.



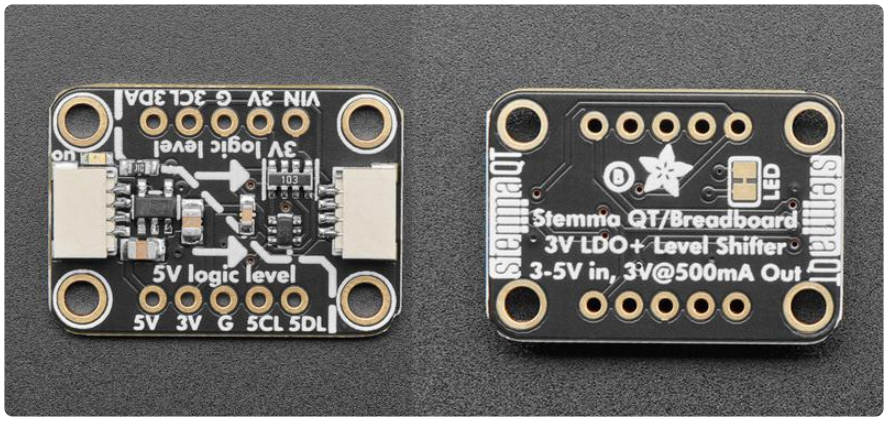
On one side is 5V-safe power and logic input. In the middle is a 3.3V regulator that can provide 500mA plus level shifting circuitry. On the opposite side is the same I2C traffic but now safely shifted down to 3.3V to allow usage with the vast number of sensors and devices that are not 5V safe.



It's simple but very effective! You also get breadboard breakout pins for breadboard usage so it can also be used as a QT-to-perfboard adapter.

The STEMMA QT connectors () on either side are compatible with the I2C connectors. This allows you to make solderless connections between your development board and the QT Shifter or to chain it with a wide range of other sensors and accessories using a compatible cable (). QT Cable is not included, but we have a variety in the shop ().

Pinouts



Power Pins

- VIN/5V - this is the power pin. It is a 5V-safe power input. To power the board, give it the same power as the logic level of your microcontroller - e.g. for a 5V microcontroller like Arduino, use 5V.
- 3V - this is the 3.3V output from the voltage regulator, you can grab up to 500mA from this if you like.
- G - common ground for power and logic.

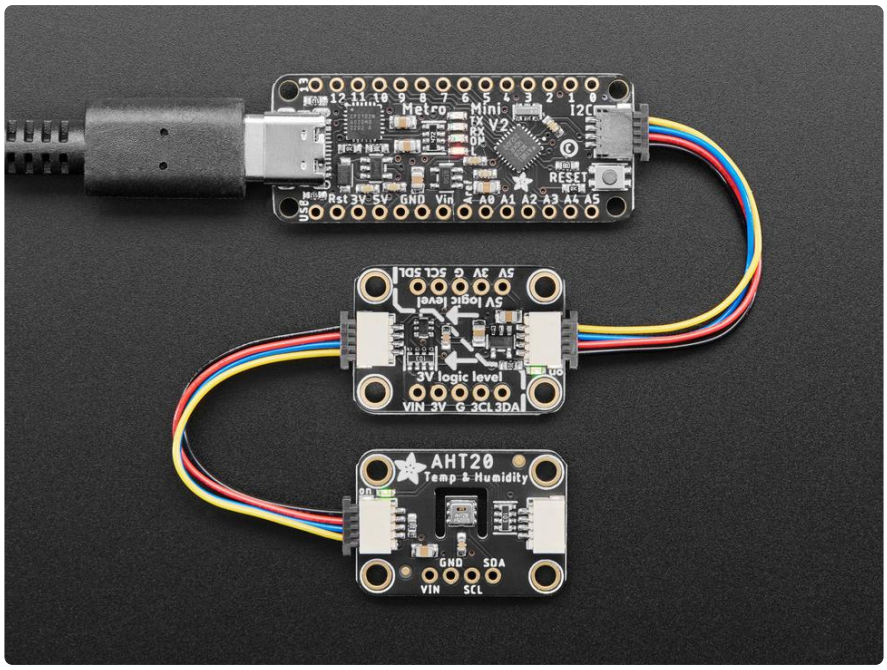
I2C Logic Pins

- 5CL- I2C clock pin for 5V logic, connect to your microcontroller I2C clock line. It's meant as the 5V logic input, but you can use 3-5V logic. There is a 10K pullup on this pin.
- 5DA- I2C data pin for 5V logic, connect to your microcontroller I2C data line. It's meant as the 5V logic input, but you can use 3-5V logic. There is a 10K pullup on this pin.
- 3CL- I2C clock pin for outputting 3V logic, connect to your microcontroller I2C clock line. It is level shifted to output 3V logic. There is a 10K pullup on this pin.
- 3DA- I2C data pin for outputting 3V logic, connect to your microcontroller I2C data line. It is level shifted to output 3V logic. There is a 10K pullup on this pin.
- STEMMA QT ()-These connectors allow you to connectors to dev boards with ST EMMA QT connectors or to other things with various associated accessories ().
    - The connector behind the arrows on the silk is for the 5V logic input
    - The connector being pointed to by the arrows on the silk is for the 3V logic output

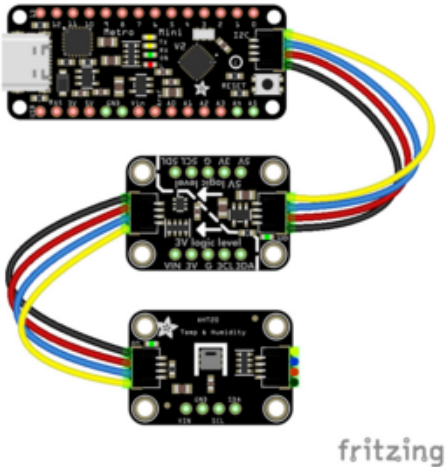
Power LED and LED Jumper

- Power LED - In the upper left corner, above the STEMMA connector, on the front of the board, is the power LED, labeled on. It is the green LED.
- LED jumper - This jumper is located on the back of the board. Cut the trace on this jumper to cut power to the "on" LED.

Wiring



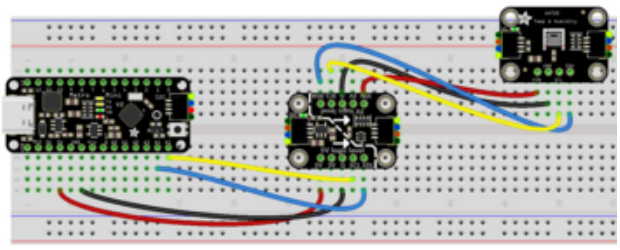
To use the 5V to 3V shifter breakout, plug a 5V microcontroller power, ground, SCL and SDA pins into the 5V logic inputs. Then, attach an I2C sensor to the 3V logic outputs. The sensor will now receive 3V logic.



You can use STEMMA QT cables to connect to the logic shifter.

Plug the 5V microcontroller into the 5V input STEMMA QT port located behind the arrows on the board silk.
Plug a STEMMA breakout board into the 3V output STEMMA QT port located in front of the arrows on the board silk.

You can also use standard 0.100" pitch headers to wire it up on a breadboard:



5V Logic Input

Board 5V to shifter 5V
Board GND to shifter G
Board SCL to shifter 5CL
Board SDA to shifter 5DA
3V Logic Output

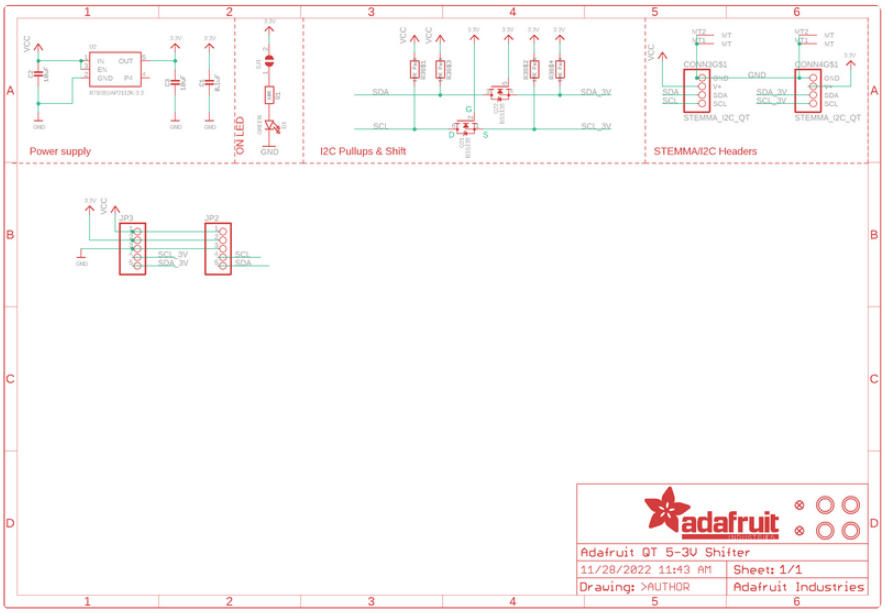
Shifter 3V to breakout VIN
Shifter G to breakout GND
Shifter 3CL to breakout SCL
Shifter 3DA to breakout SDA

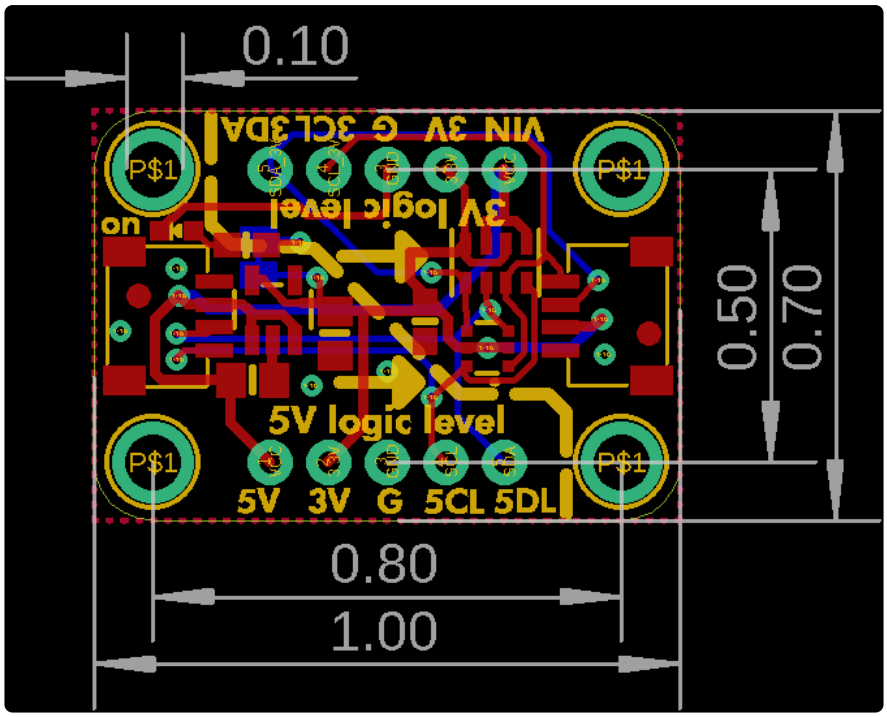
Downloads

Files

- EagleCAD PCB files on GitHub ()
- Fritzing object in the Adafruit Fritzing Library ()

Schematic and Fab Print




0.10
P$1
P$1
3V logic level
5V logic level
P$1
P$1
5V 3V G 5CL 5DL
0.50
0.70
0.80
1.00