

BMP280 and the Pi

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Opening

This document explains connecting an Adafruit BMP280 to a Raspberry Pi

Use a BMP280 data-sheet as reference. Example

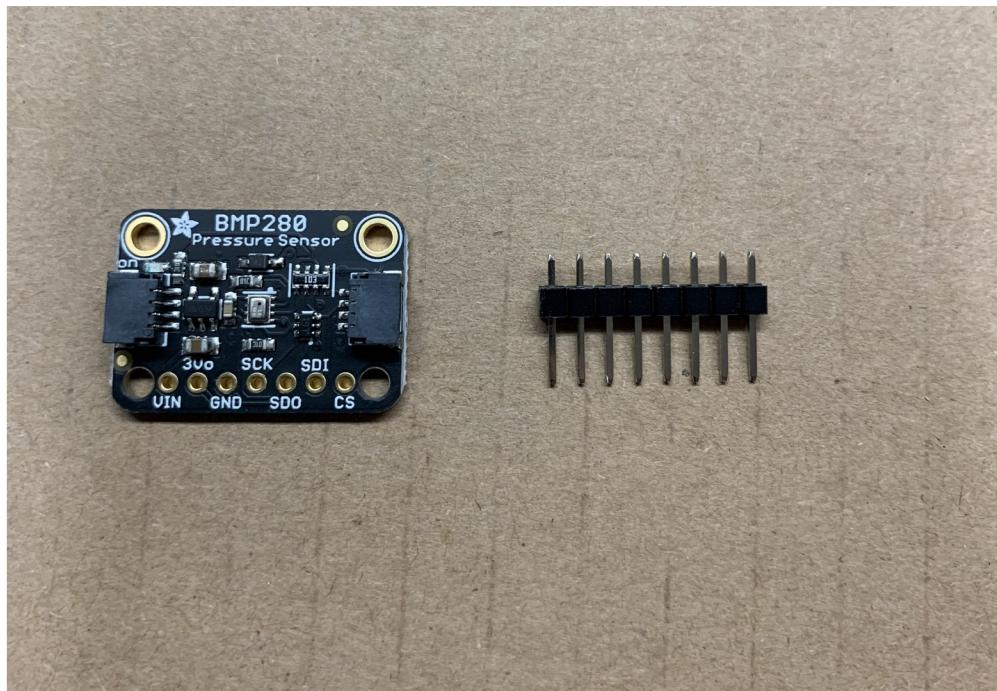
<https://www.digikey.com/htmldatasheets/production/2394371/0/0/1/BMP280-Datasheet.pdf>

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Adafruit BMP280

After soldering the pins to the PCB you could use female-female jumpers to connect directly to the Pi GPIO pins. I choose to make a simple socket-ed PCB. I can later use this board to attach other chips, up to a 28 pin ICs



Simple Direct Connections



You can directly connect this BMP280 to the Pi 40 pin connector. This provides a fast means to validate hardware and use of the Pi4j code and supporting Java device code.

Solder the header to the circuit board and connect wires as follows.

I2C Header Pin/Colors – Pi 40 pin connector

Pi pin1 3.3v to Red Vin

N/C 3v

Pi pin6 Gnd to Brown Gnd

Pi pin5 SCL to Green SCK

N/C yellow SDO

Pi pin3 SDA to Blue SDI

Pi pin17 3.3v to Orange CS

SPI Header Pin/Colors – Pi 40 pin connector

Pi p19 MOSI BMP SDI Blue

Pi p21 MISO BMP SDO Yellow

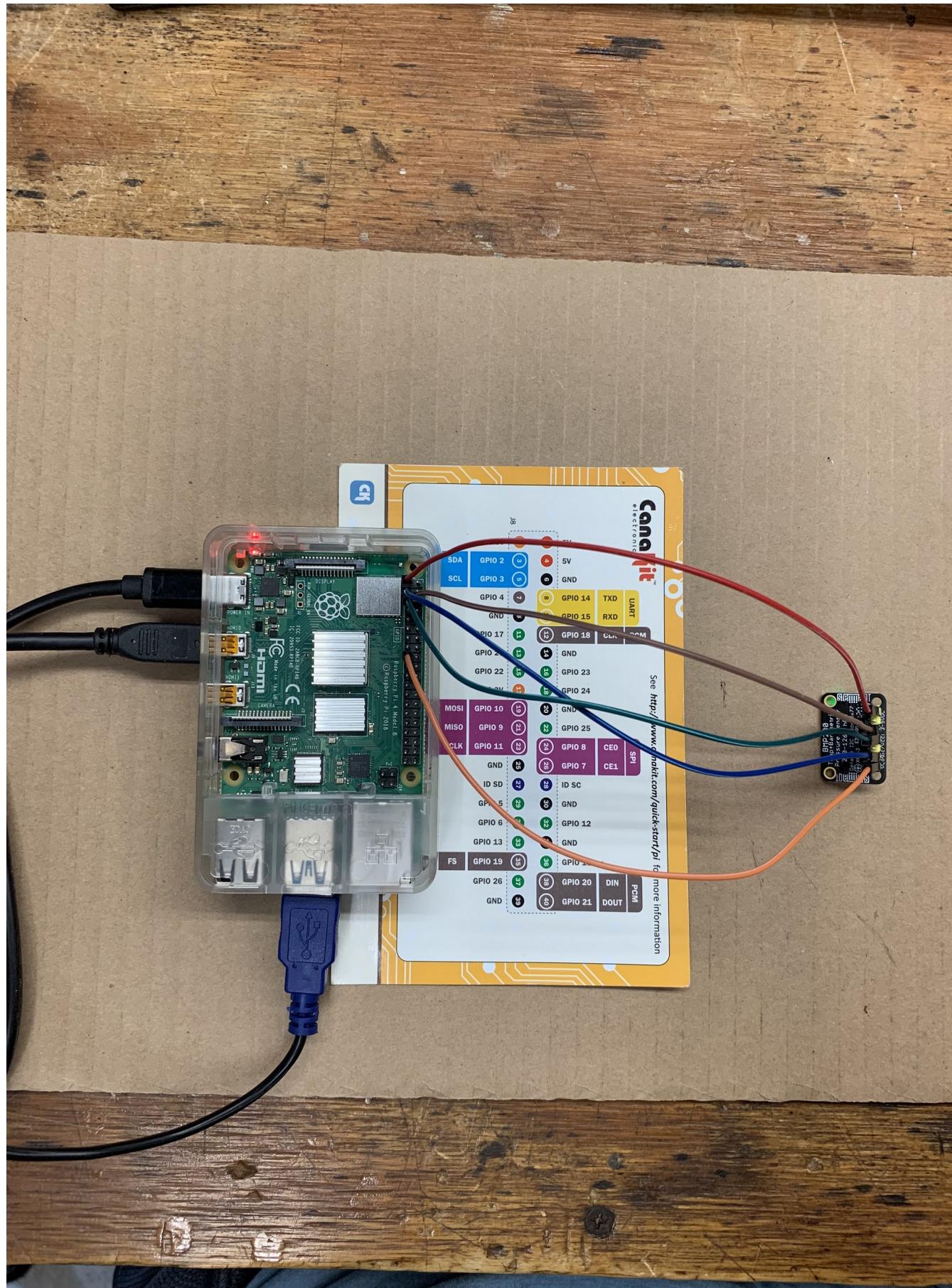
Pi p23 SCLK BMP SCK Green

Pi p40 GPIO21 BMP CS Orange

Pi Gnd BMP GND Brown

Pi 3.3 BMP Vin Red

Direct Pi Connection



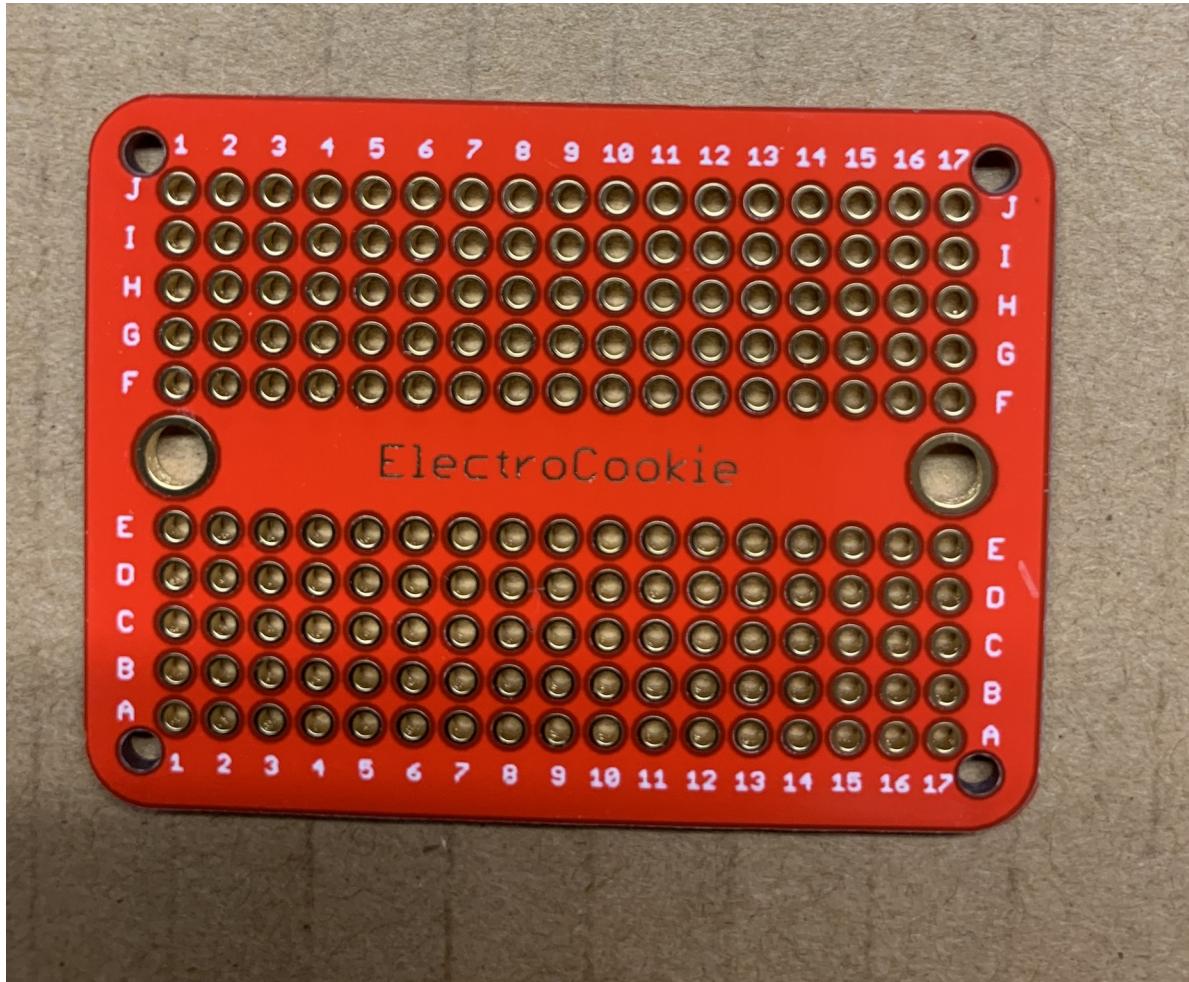
Power on Pi to Validate Device Visible

Pi command i2cdetect -y 1

```
pi@raspi464alt:~$ i2cdetect -y 1
 0  1  2  3  4  5  6  7  8  9  a  b  c  d  e  f
00: --
10: --
20: --
30: --
40: --
50: --
60: --
70: -- 77
pi@raspi464alt:~$
```

Prototype Board

If you intend to work with other chips building a prototype board is worth the time. These are steps to build and connect such a board. Once built you can plug in various chips, most importantly socketed chips.

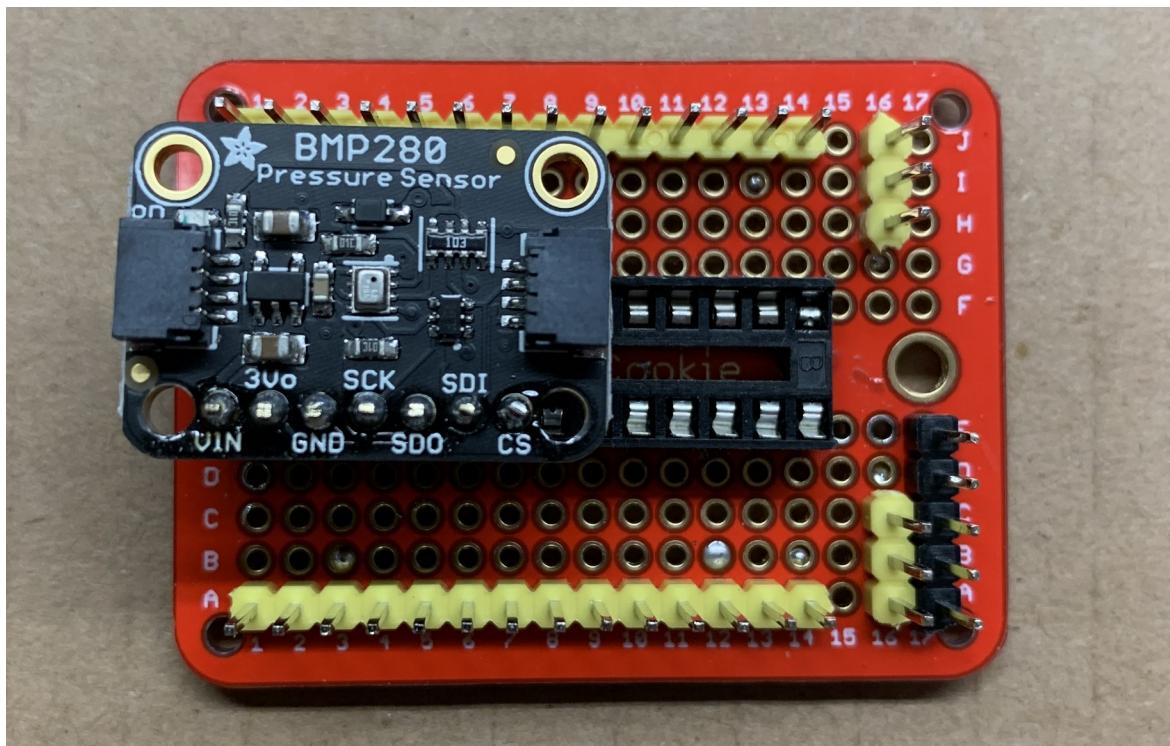


Socket



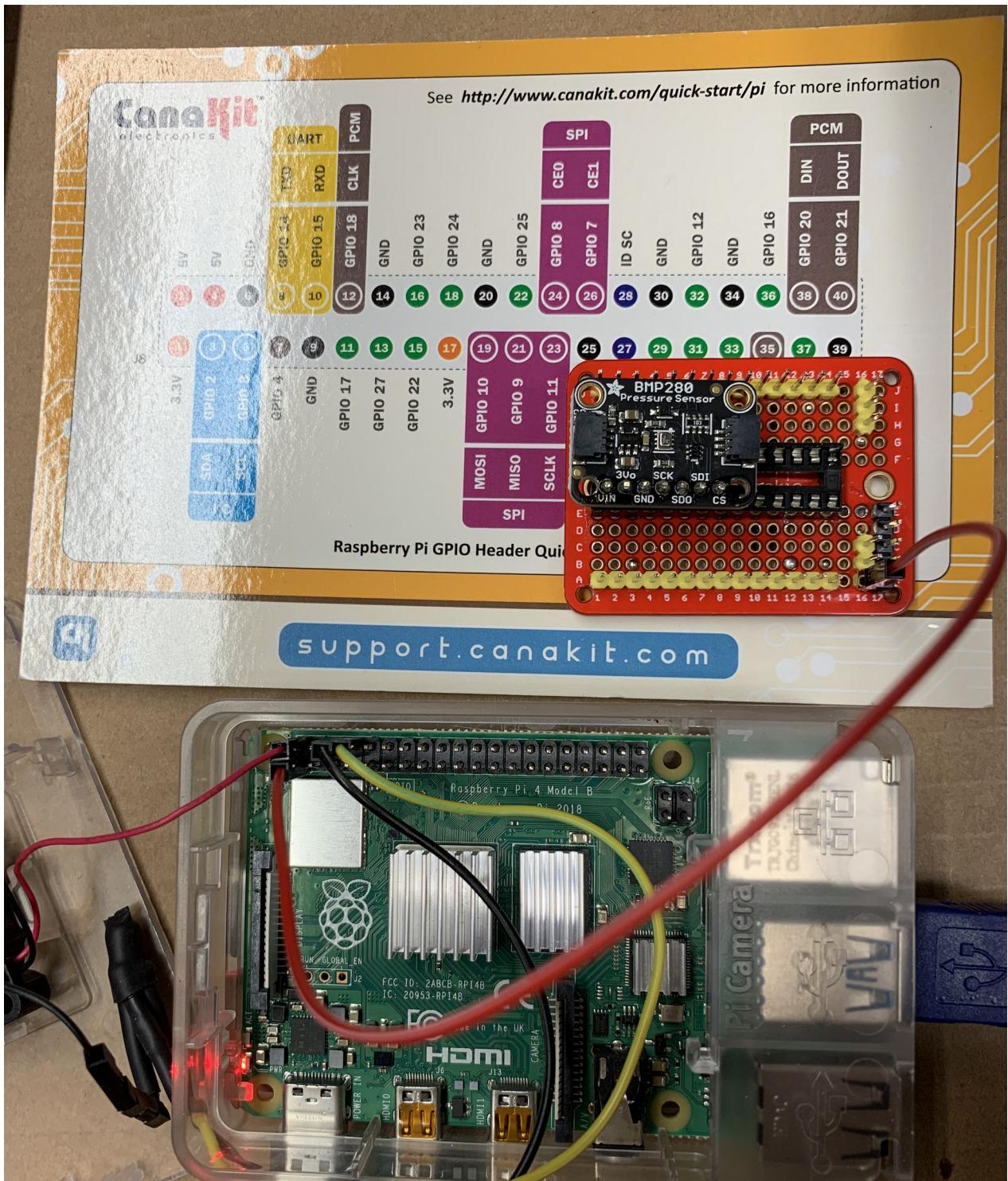
Completed Board

The board includes a pin for each of the sockets 28 connections. In addition pins will provide a common connection for 3,3v 5v and ground.

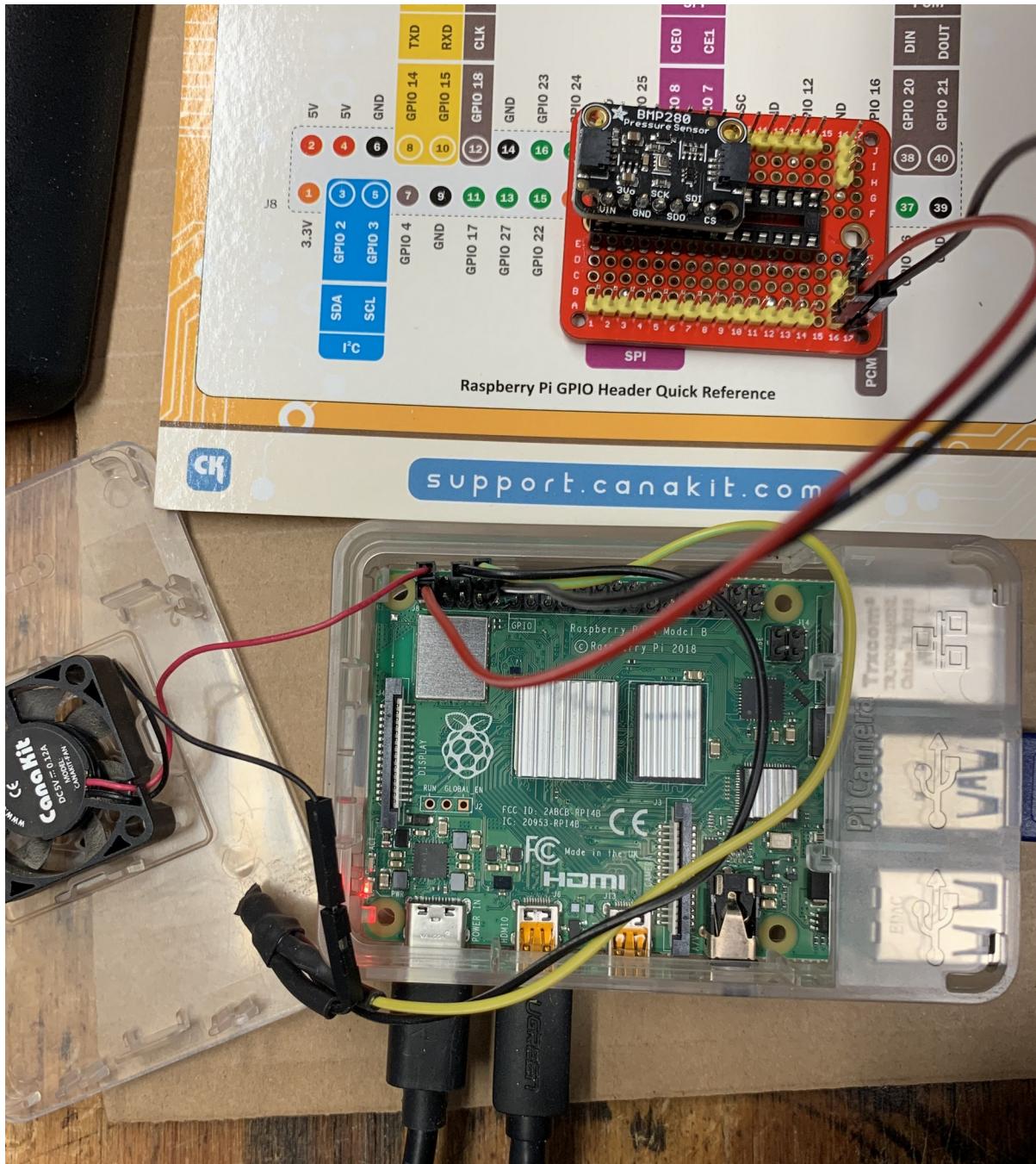


Wiring to Pi GPIO 40 Pin Connector

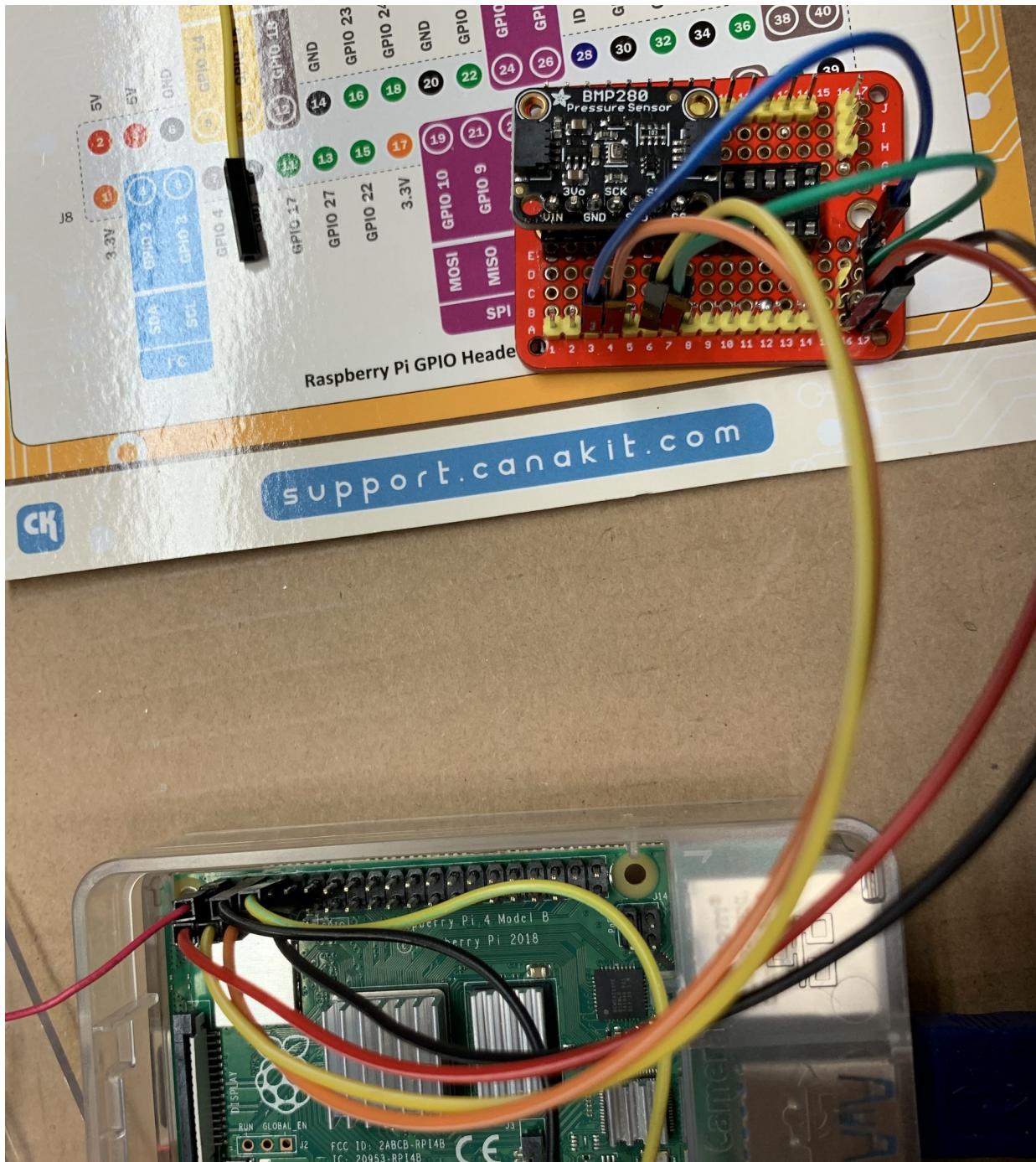
3.3v from GPIO to a common point on the board.



Ground GPIO to common point on the board



I2C from GPIO to the board



Wiring within the board

At this point the 3.3v and ground are connected from the Pi to the board. In addition the I2C SDA and SCL are connected from the Pi to the BMP280 pins. Remaining connections are within the board and they connect BMP280 pins to 3.3v or ground.

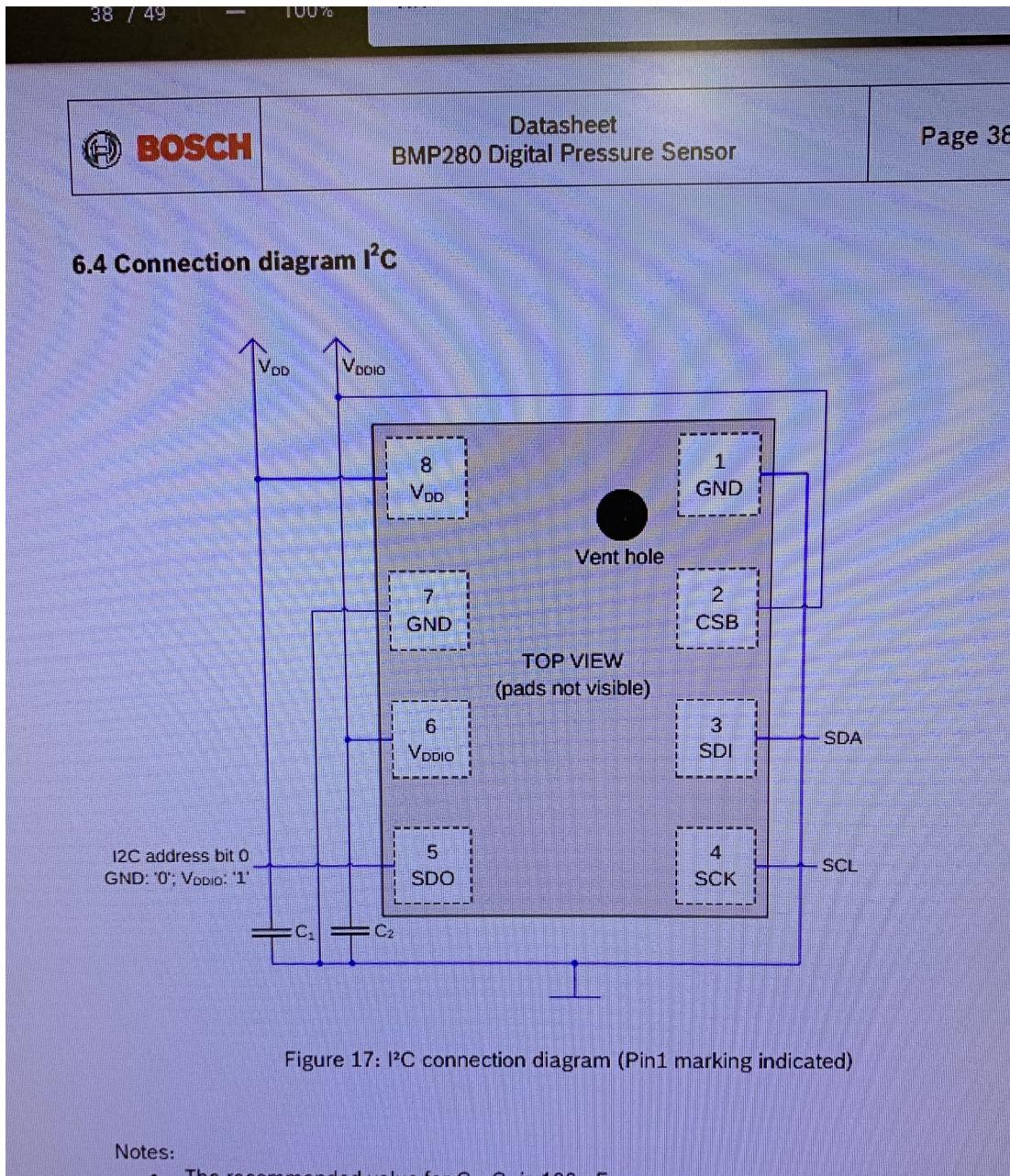


Figure 17: I²C connection diagram (Pin1 marking indicated)

Notes:

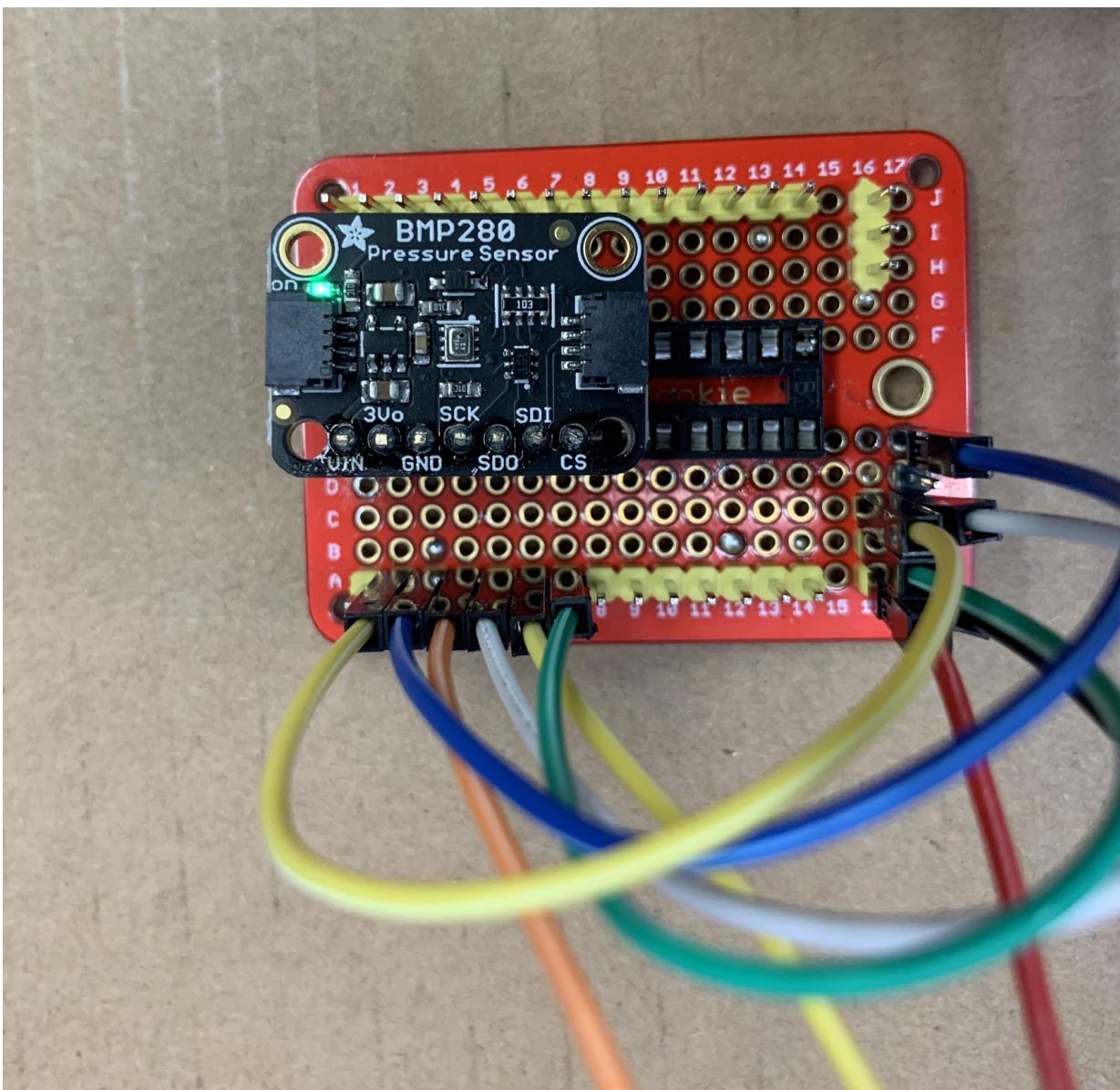
- The recommended value for C₁-C₂ is 100 pF

Final Connections

The BMP280 pins:

- vin I 3.3V
- 3v connects to 3v bus on the board.
- GND N/C
- SCK connects SCL on the Pi gpio connector
- SDO connects to ground bus on the board. Sets i2c device address 0x76
- SDI connects to SDA on the Pi gpio connector
- CS connects to 3.3v bus on the board. Enables i2c interface *

* CS must be energized with 3.3v before OR at the same time as the 3v pin to correctly enable the I2C interface.



Result

If properly connected and energized:

```
pi@raspi464alt:~$ i2cdetect -y 1
 0  1  2  3  4  5  6  7  8  9  a  b  c  d  e  f
00: --
10: --
20: --
30: --
40: --
50: --
60: --
70: -- 77
pi@raspi464alt:~$
```

The screenshot shows a terminal window with a dark background and light-colored text. The title bar of the window reads "pi@raspi464alt:~\$". The terminal displays the command "i2cdetect -y 1" followed by a table of I2C addresses. The table has columns for addresses 0 through F. The address 77 is highlighted with a blue bracket and the letter "I" is placed next to it.

