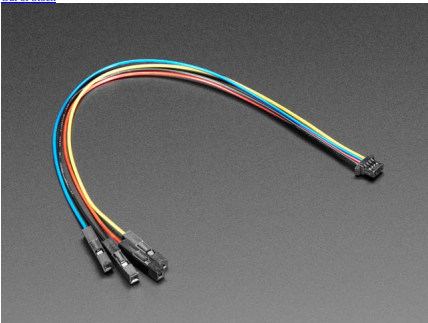STEMMA QT / Qwiic JST SH 4-pin Cable - 100mm Long
Out of Stock

- STEMMA QT / Qwiic JST SH 4-pin Cable with Premium Female Sockets
Out of Stock

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Beginner
Product guide

## Python & CircuitPython

It's easy to use the **ICM20948** with Python and CircuitPython, and the Adafruit CircuitPython ICM20X module. This module allows you to easily write Python code that reads measurements from the accelerometer and gyro, and will work with either sensor.

You can use this sensor with any CircuitPython microcontroller board or with a computer that has GPIO and Python thanks to Adafruit_Blinka, our CircuitPython-for-Python compatibility library.

CircuitPython Microcontroller Wiring

First wire up a ICM20948 to your board exactly as shown below. Here's an example of wiring a Feather M4 to the sensor with I2C using one of the handy **STEMMA QT** connectors:
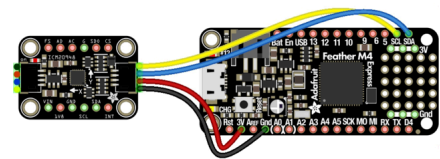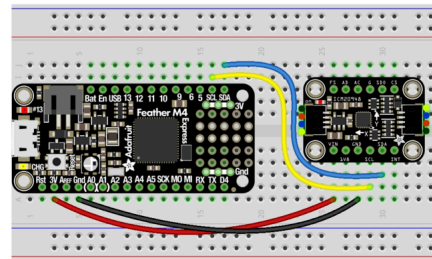

- **Board 3V** to **sensor VIN (red wire)**
- **Board GND** to **sensor GND (black wire)**
- **Board SCL** to **sensor SCL (yellow wire)**
- **Board SDA** to **sensor SDA (blue wire)**

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

- **Board 3V** to **sensor VIN (red wire)**
- **Board GND** to **sensor GND (black wire)**
- **Board SCL** to **sensor SCL (yellow wire)**
- **Board SDA** to **sensor SDA (blue wire)**

Python Computer Wiring

Since there's *dozens* of Linux computers/boards you can use, we will show wiring for Raspberry Pi. For other platforms, please visit the guide for CircuitPython on Linux to see whether your platform is supported.

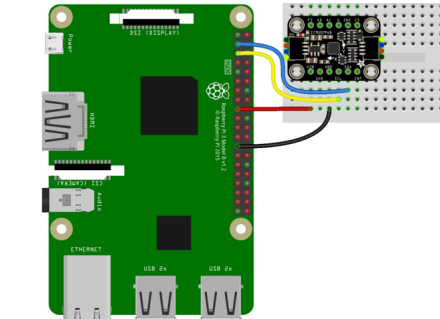Here's the Raspberry Pi wired to the sensor using I2C and a **STEMMA QT** connector:
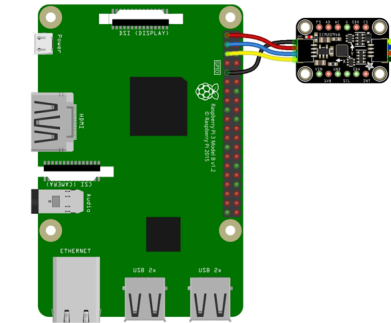
- **Pi 3V** to **sensor VCC (red wire)**
- **Pi GND** to **sensor GND (black wire)**
- **Pi SCL** to **sensor SCL (yellow wire)**
- **Pi SDA** to **sensor SDA (blue wire)**

Finally here is an example of how to wire up a Raspberry Pi to the sensor using a solderless breadboard

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- **Pi 3V** to **sensor VCC (red wire)**
- **Pi GND** to **sensor GND (black wire)**
- **Pi SCL** to **sensor SCL (yellow wire)**
- **Pi SDA** to **sensor SDA (blue wire)**

CircuitPython Installation of ICM20X Library

You'll need to install the Adafruit CircuitPython ICM20X library on your CircuitPython board.

First make sure you are running the latest version of Adafruit CircuitPython for your board.

Next you'll need to install the necessary libraries to use the hardware--carefully follow the steps to find and install these libraries from Adafruit's CircuitPython library bundle. Our CircuitPython starter guide has a great page on how to install the library bundle.

For non-express boards like the Trinket M0 or Gemma M0, you'll need to manually install the necessary libraries from the bundle:

- adafruit_icm20X.mpy
- adafruit_bus_device
- adafruit_register

Before continuing make sure your board's **lib** folder has the **adafruit_icm20X.mpy, adafruit_bus_device**, and **adafruit_register** files and folders copied over.

Next connect to the board's serial REPL so you are at the CircuitPython **>>>** prompt.

Python Installation of ICM20X Library

You'll need to install the **Adafruit_Blinka** library that provides the CircuitPython support in Python. This may also require enabling I2C on your platform and verifying you are running Python 3. Since each platform is a little different, and Linux changes often, please visit the CircuitPython on Linux guide to get your computer ready!

Once that's done, from your command line run the following command:

- sudo pip3 install adafruit-circuitpython-icm20x

If your default Python is version 3 you may need to run 'pip' instead. Just make sure you aren't trying to use CircuitPython on Python 2.x, it isn't supported!

CircuitPython & Python Usage

To demonstrate the usage of the sensor we'll initialize it and read the temperature and humidity measurements from the board's Python REPL.

Run the following code to import the necessary modules and initialize the I2C connection with the sensor:

Now you're ready to read values from the sensor using these properties:

- **acceleration** - The acceleration forces in the X, Y, and Z axes in m/s^2
- **gyro** - The rotation measurement on the X, Y, and Z axes in degrees/sec
- **magnetic** - The magnetic forces on the X, Y, and Z axes in micro-Teslas (uT)

For example, to print out the acceleration, gyro and magnetic measurements use this code:

Example Code

Download Project Bundle
Copy Code

```
# SPDX-FileCopyrightText: 2021 ladyada for Adafruit Industries
# SPDX-License-Identifier: MIT
```

```
import time
import board
import adafruit_icm20x

i2c = board.I2C()  # uses board.SCL and board.SDA
# i2c = board.STEMMA_I2C()  # For using the built-in STEMMA QT connector on a microcontroller
icm = adafruit_icm20x.ICM20948(i2c)

while True:
    print("Acceleration: X:{:.2f}, Y: {:.2f}, Z: {:.2f} m/s^2".format(*icm.acceleration))
    print("Gyro X:{:.2f}, Y: {:.2f}, Z: {:.2f} rads/s".format(*icm.gyro))
    print("Magnetometer X:{:.2f}, Y: {:.2f}, Z: {:.2f} uT".format(*icm.magnetic))
    print("")
    time.sleep(0.5)
```

View on GitHub

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