IMU PCBs
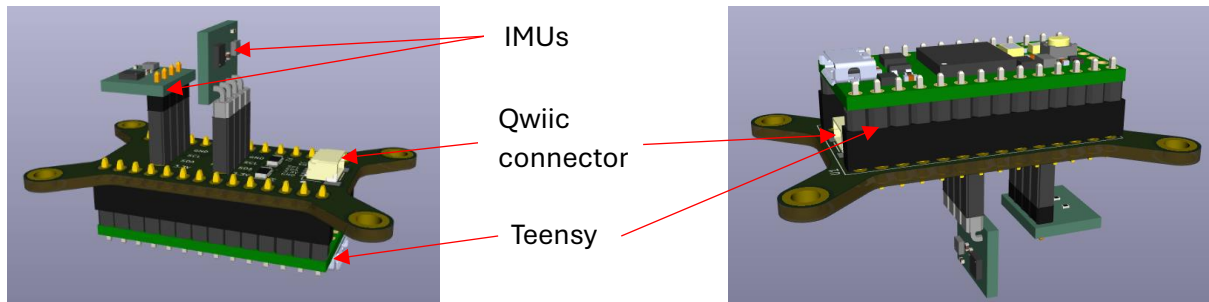
The IMU is designed to accommodate 2 IMUs (a redesigned version of the Adafruit LSM6DSOX + LIS3MDL 9DOF IMU), and a teensy microcontroller. It uses two PRT-14417 Qwiic JST connector (or also known as *SM04B-SRSS-TB(LF)(SN)*) to daisy change the PCBs.
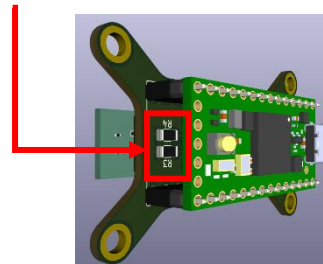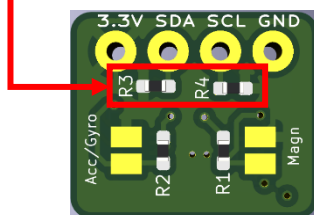

1 - Pull up resistors

Each setup uses two I2C buses. One I2C bus is used to connect to the two IMUs, and one I2C is used to connect all the PCBs together. Each I2C bus needs pull up resistors.

For the internal I2C bus (Teensy + 2 IMUs) there are two options:

- Either solder 0402 pullup resistors on the IMUs themselves (R3 & R4)
- Or solder 1206 pullup resistors directly on the main PCB (R3 & R4, directly underneath the teensy)
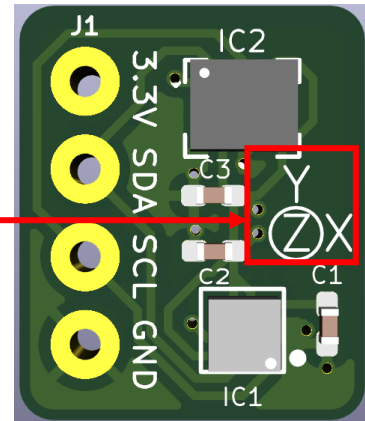

Check section 7.1 to determine how to choose the best pullup resistor value. In general, values between 4.7kΩ - 10kΩ are used.

For the main I2C bus (connecting all the PCBs together), the pull up resistors are R1 & R2. They are 1206 resistors.
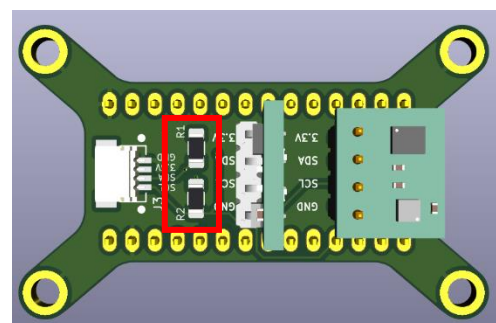
2 - IMU orientation

The three axes are written on each IMU.

3 - I2C address

The original I2C addresses of the chips are as follows:

- LSM6DSOX – **0x6A**
- LIS3MDL – **0x1C**

These addresses can be modified by soldering the two jumpers at the back of the PCB. The top jumper modifies the address of the accelerometer and gyroscope (LSM6DSOX). The bottom one modifies the address of the magnetometer (LIS3MDL).

The I2C addresses then become:

- LSM6DSOX – **0x6B**
- LIS3MDL – **0x1E**
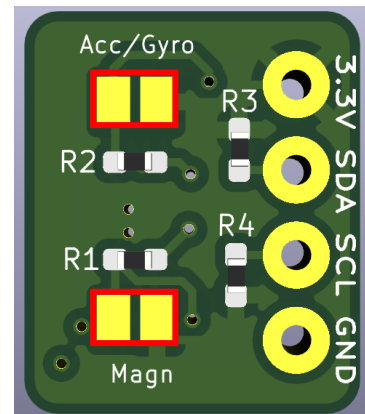
This means that maximum 2 IMUs can be connected on any I2C bus. If more IMUs are needed, multiple I2C buses (or an I2C expander) are needed

In order to keep all the PCBs the same, I recommend soldering the jumpers on the IMU that is parallel to the main PCB.

4 - Teensy placement

Be careful to place the teensy with the USB port on the side of the JST connector!
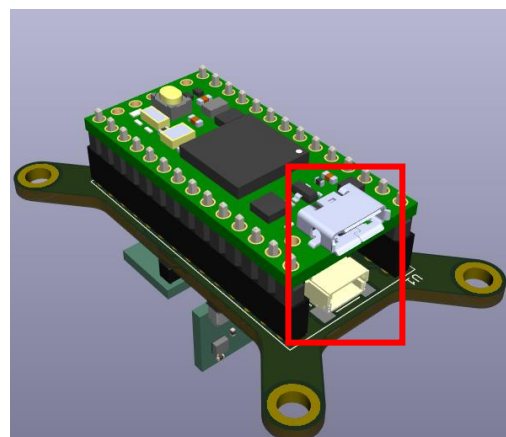
5 – BOM

Component	Number needed per set
Main PCB	1
IMU PCB	2
CRCW12064K70FKEA – 10kΩ 1206	2 (or 4 if not using pullups on IMUs)
CRCW040210K0FKEDC - 10kΩ 0402	4 (0 if using pullups on main PCB board)
M20-7820446 – 4 pin vertical socket	2
HTSW-104-08-G-S-RA – 4 pin right angle header	1
68000-204HLF – 4 pin vertical header	1
PRT-14417 – Qwiic JST connectors	2
22-28-4146 – 14 pin vertical header	2
M20-7821446 – 14 pin socket	2