

## Hardware

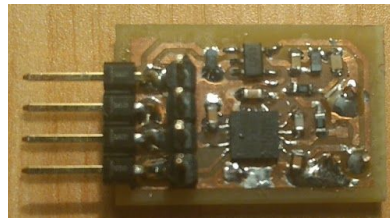
For this project, two separate PCBs were designed to provide the functionality needed to determine the multiple angles between the joints of the hand. The PCBs are to be attached to a glove.

One PCB implements the MPU6050 six dimension sensor (accelerometer/gyro) which is small so that it can be placed on each joint of the finger and back of the hand. The MPU6050 uses I2C protocol to communicate with the raspberry pi.

### MPU6050

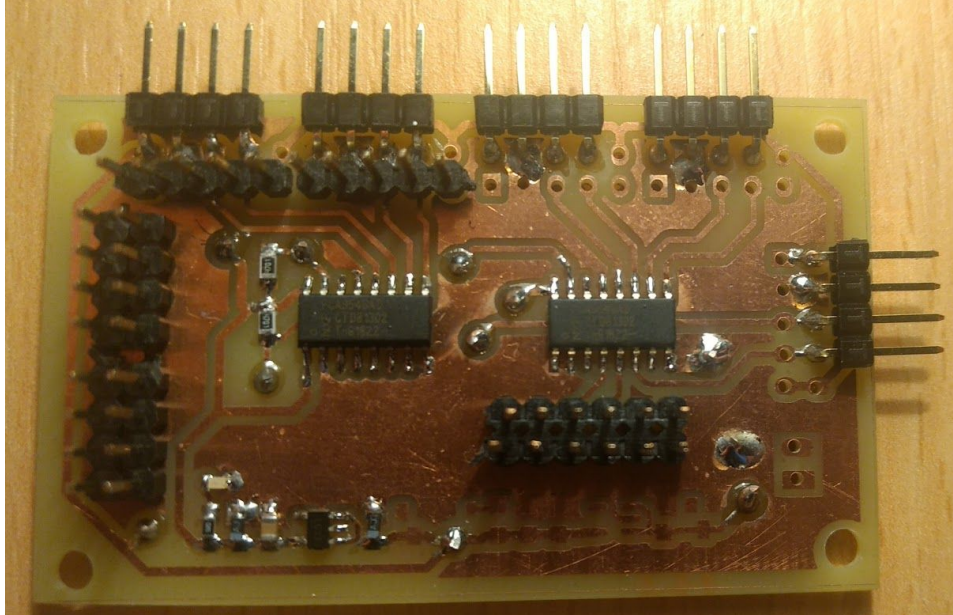
Seen in figure x is the MPU6050 board which was designed so that it was physically small enough to fit on the joints of the fingers. The board connects to one of the 4 pin headers located on the main board which provide 5V, ground, SDA and SCL.

Since the MPU6050 only has two addresses, 0x68 and 0x69, an I2C multiplexer was added to the design to address up to 16 MPU6050 boards. This will be discussed in the next section



## Main board

Seen in figure x is the main board which is designed around two PCA9546AD I2C multiplexers, each providing 4 channels. This gives 8 different I2C channels and so 16 MPU6050 boards can be accessed by the raspberry pi. The header on the main board takes 5V, GND, SDA and SCL from the raspberry pi.



### 3.2.3 Glove

Both of the PCBs will then be mounted on the glove as shown below. Ideally each joint of the hand would have an MPU6050 board on it. However, due to the COVID-19 lockdown only one board was assembled before access to the labs was denied.



