Slow control for measurements

Phys150 Special topics

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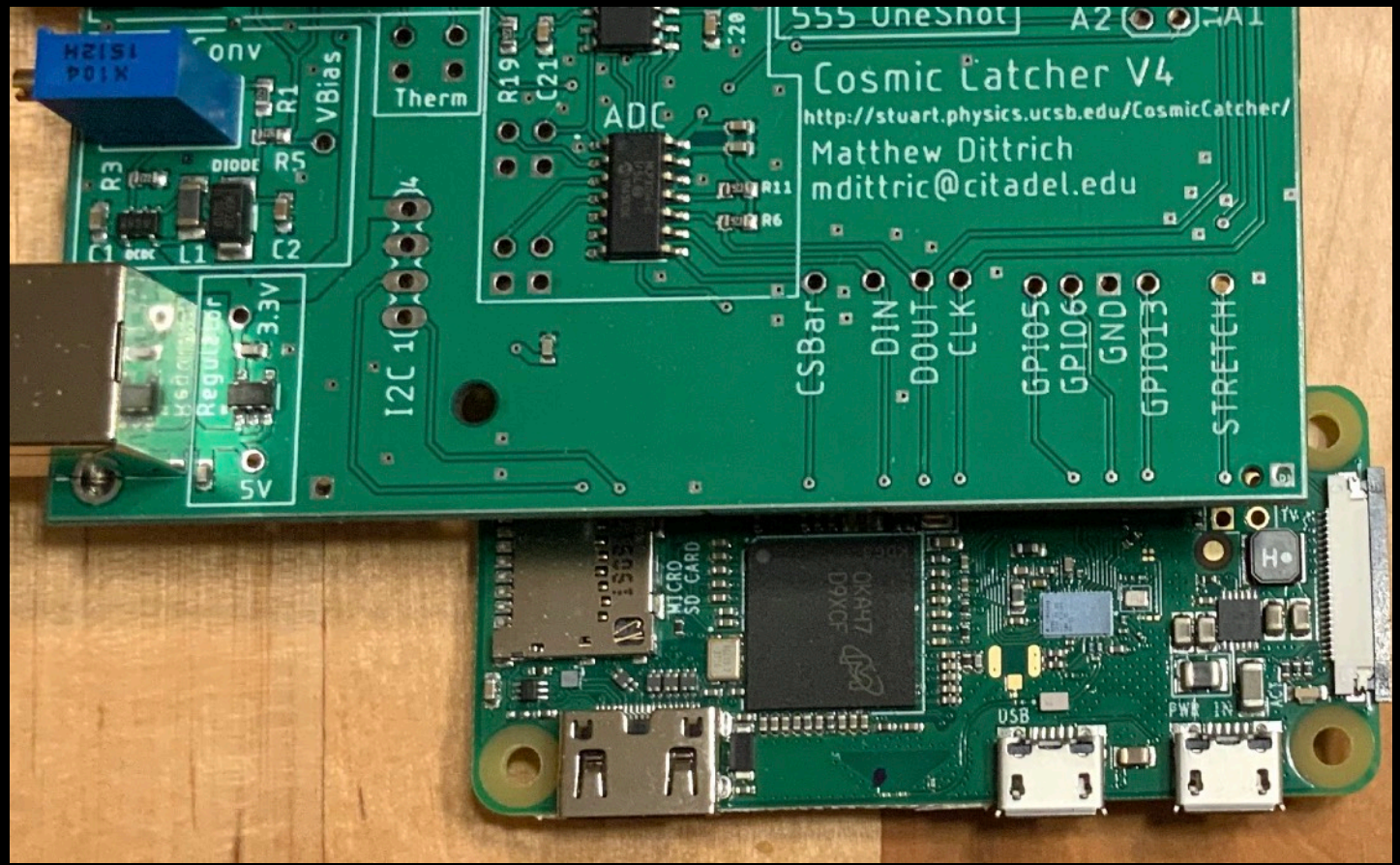
```
curl -s http://dstuart.physics.ucsb.edu/Lgbk/pub/E40915.dir/CosmicSoftwareUpdate > /home/pi/150/bin/CosmicSoftwareUpdate
chmod +x /home/pi/150/bin/CosmicSoftwareUpdate
/home/pi/150/bin/CosmicSoftwareUpdate
```

Adding sensors to the readout board with I2C



GPIO2 & 3 are reserved for I2C communication

Measuring altitude, angle, temperature, pulse height, …

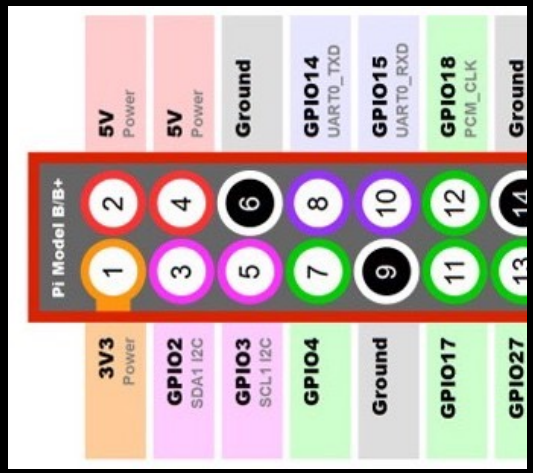
You can buy components to measure these for a few dollars:

Altimeter (pressure sensor)
https://www.newark.com/nxp/mpl3115a2/pressure-sensor-110kpa-40-to-85deg/dp/48T4344

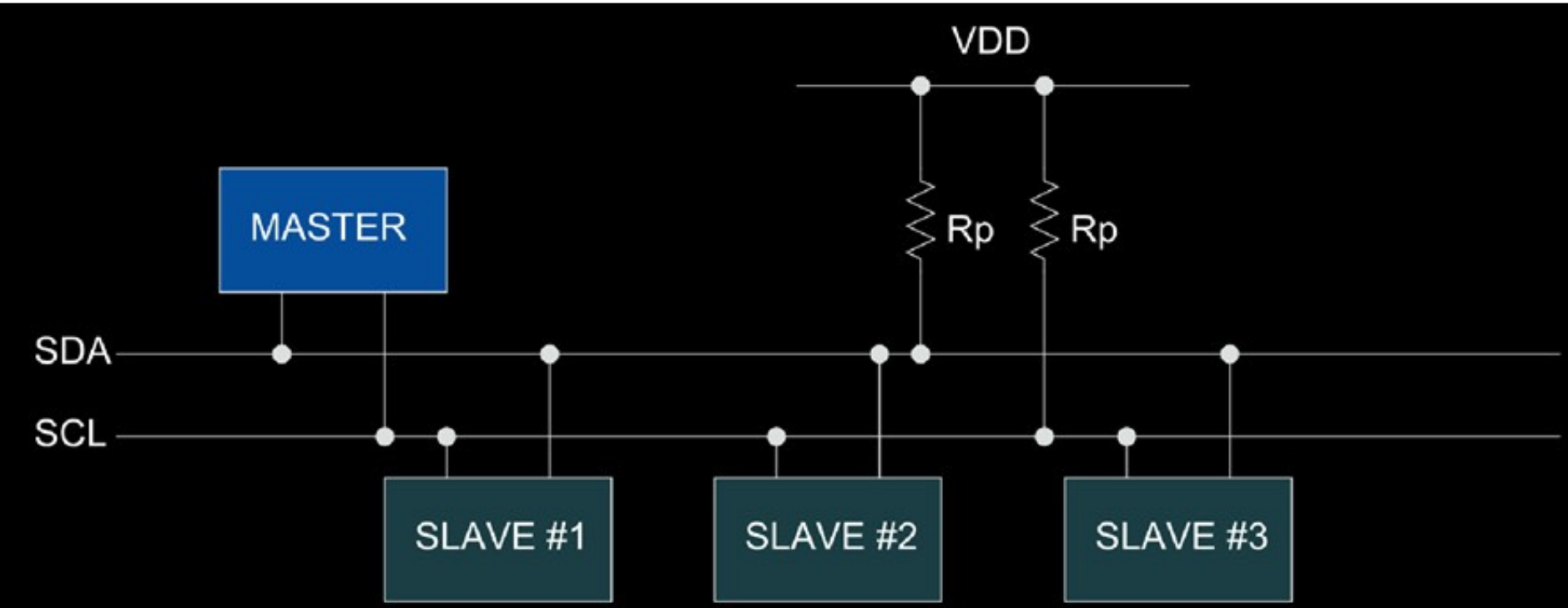
3-axis accelerometer
https://www.newark.com/nxp/mma8452qr1/accelerometer-mems-3-axis-digital/dp/28X3704

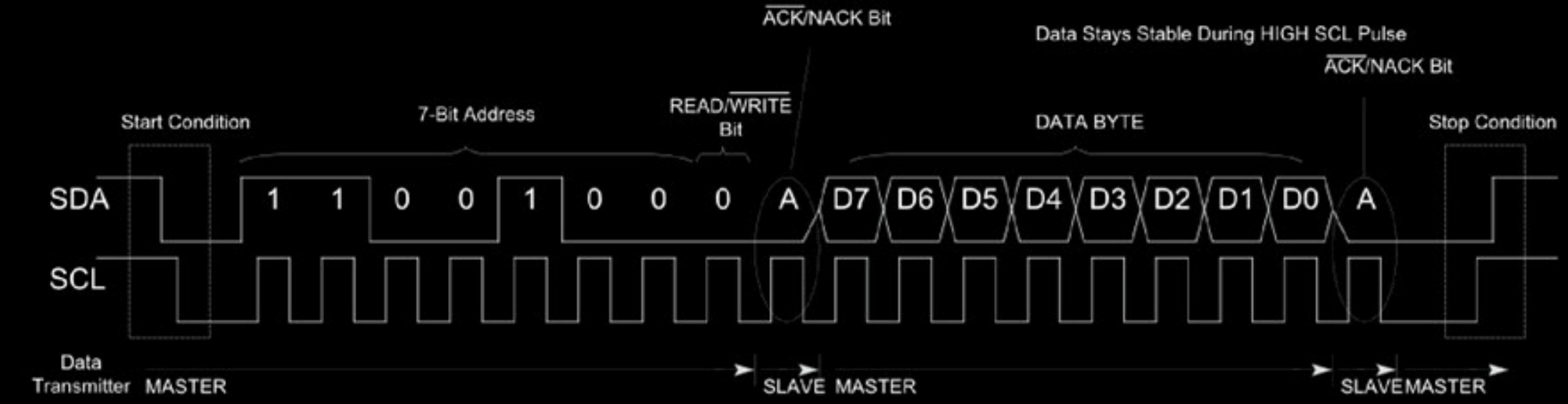
1 MSPS SAR ADC
https://www.newark.com/texas-instruments/ads7886sdbvt/ic-adc-12bit-1msps-sar-sot23-6/dp/28AH1865

These all use the standard I2C communication protocol allowing the Pi to read them with just two wires plus power and ground.



I2C = IIC = I²C = Inter Integrated Circuit





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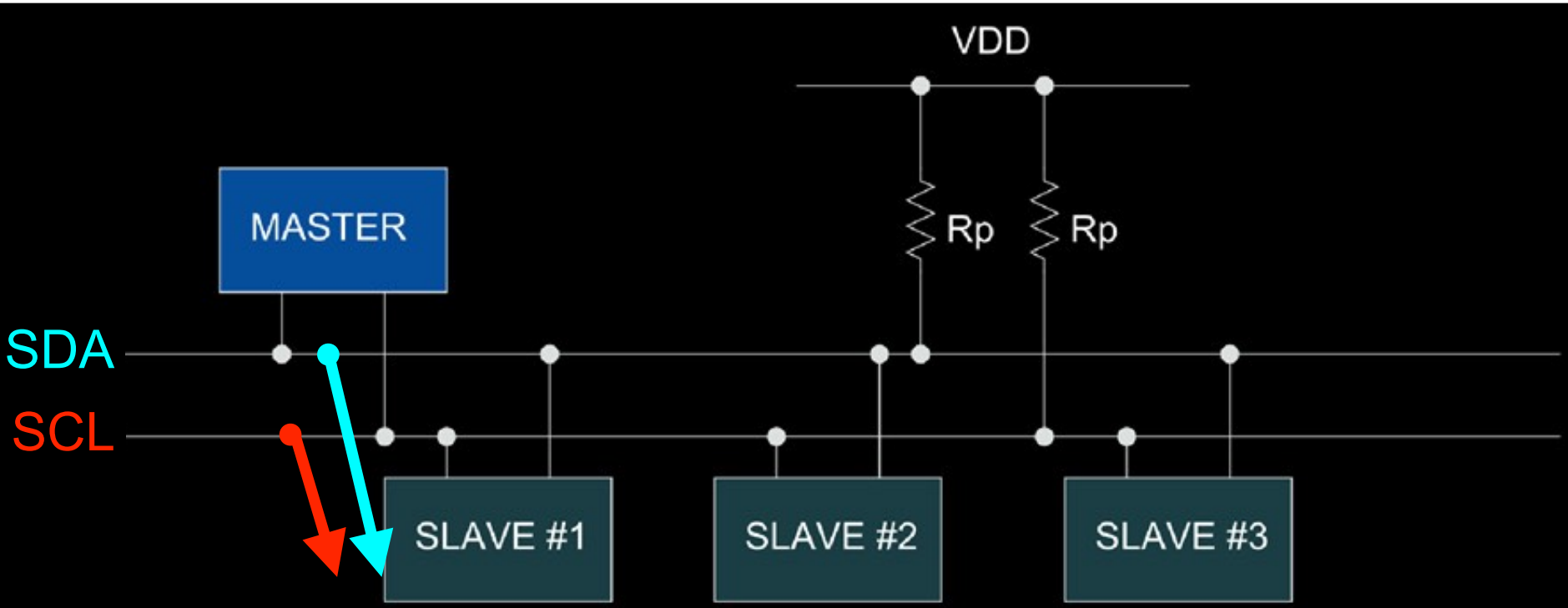
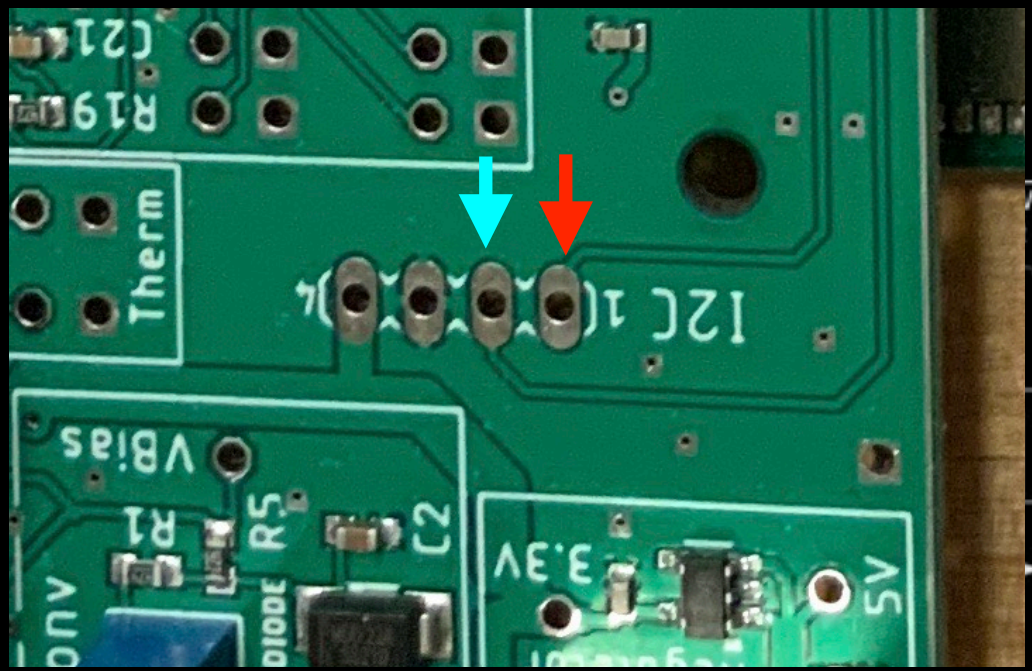
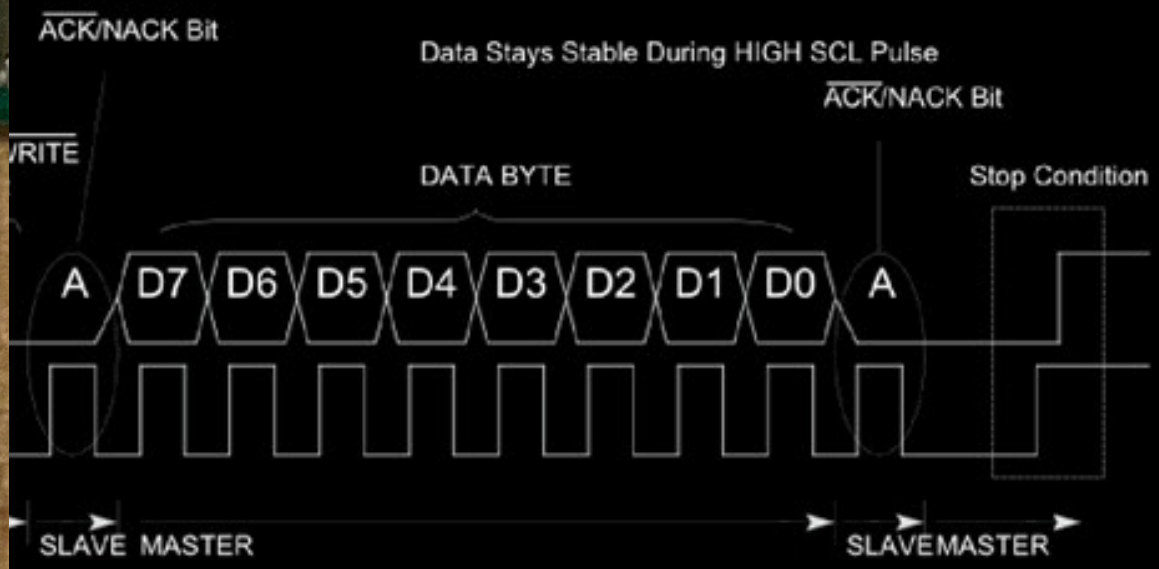
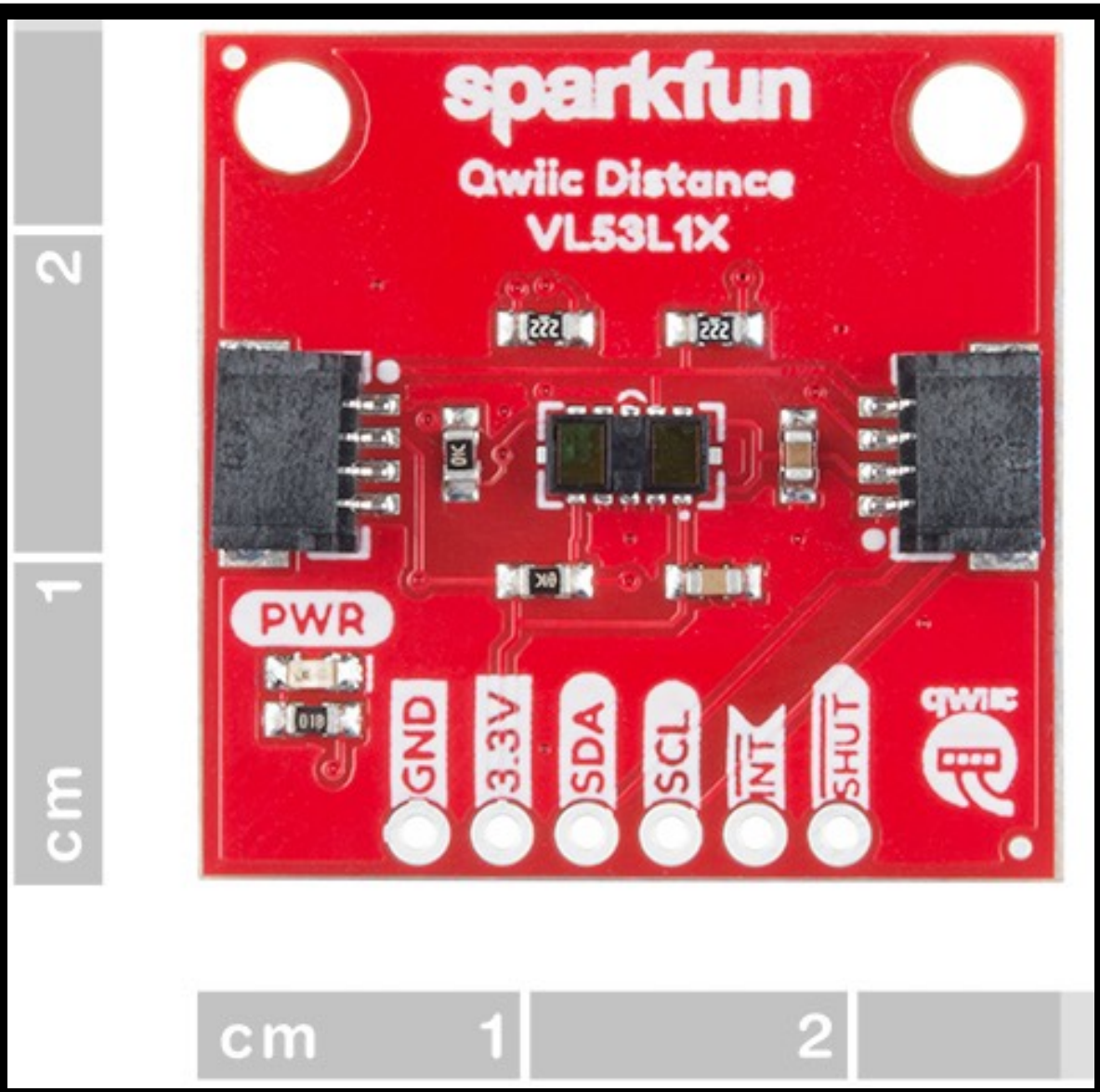


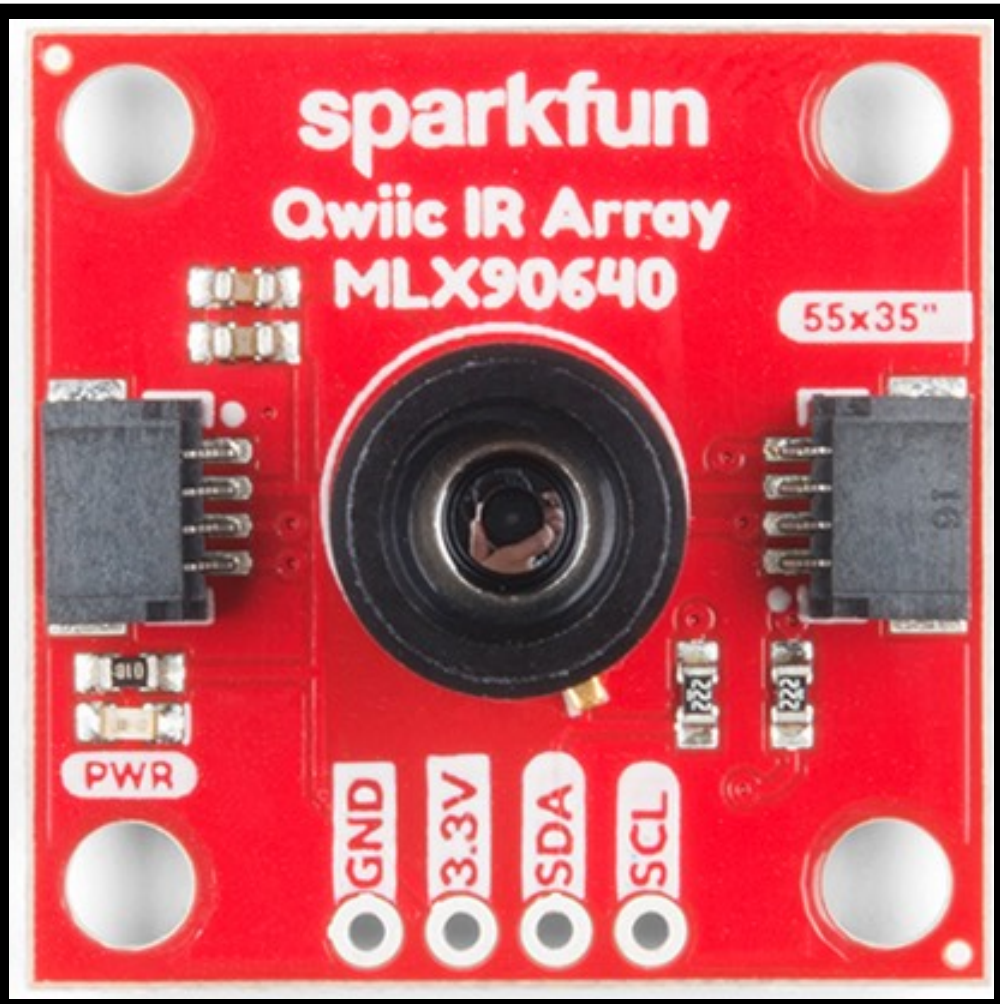




I2C = IIC = I²C = Inter Integrated Circuit; easily allows adding sensors



IR reflector to measure distance to objects



32x24 pixel IR camera

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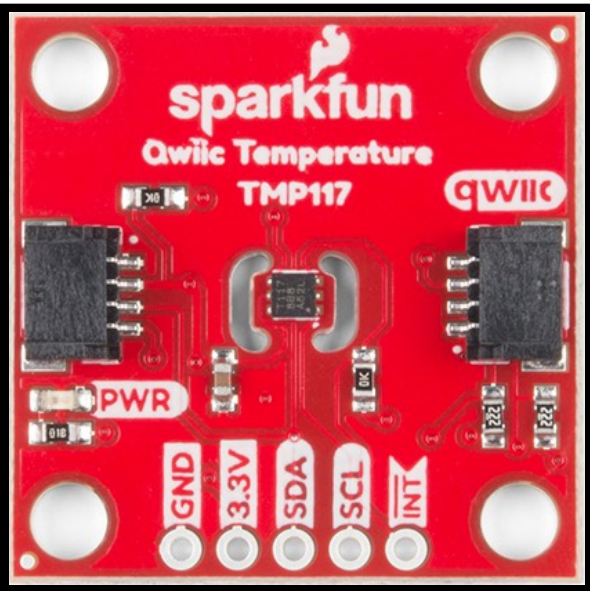
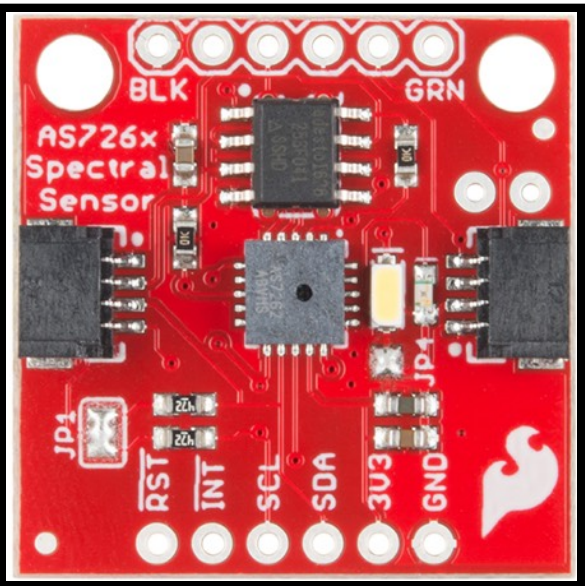
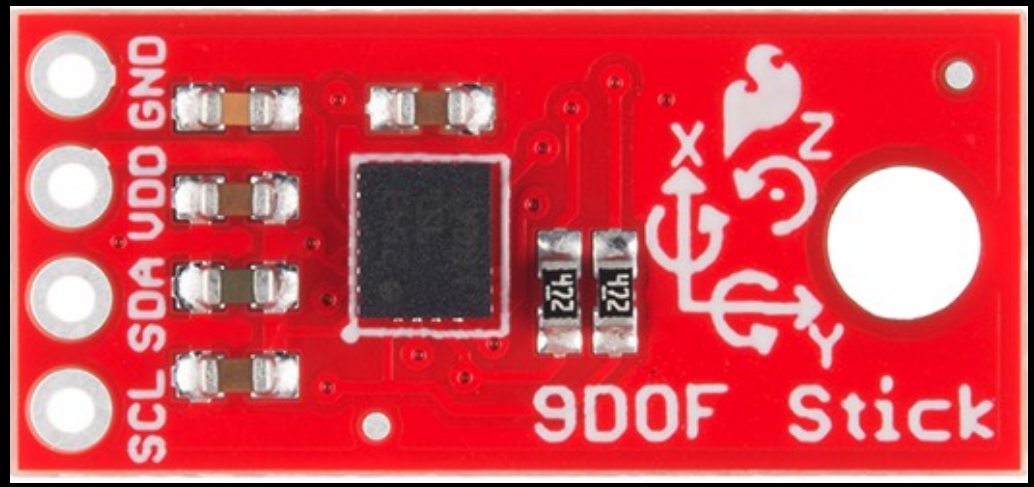
Small LCD screen



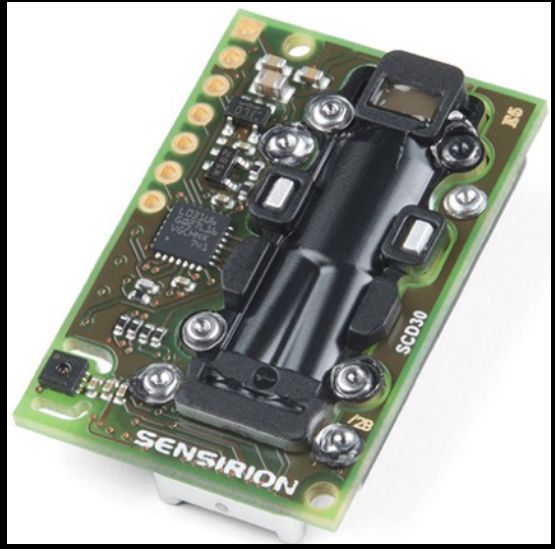
Temperature sensor



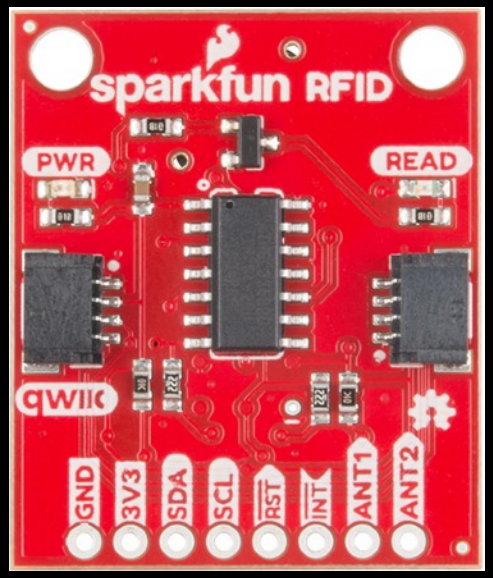
NIR spectrometer
Also a visible version



Accelerometer, gyroscope, magnetometer



CO_2 sensor



RFID reader

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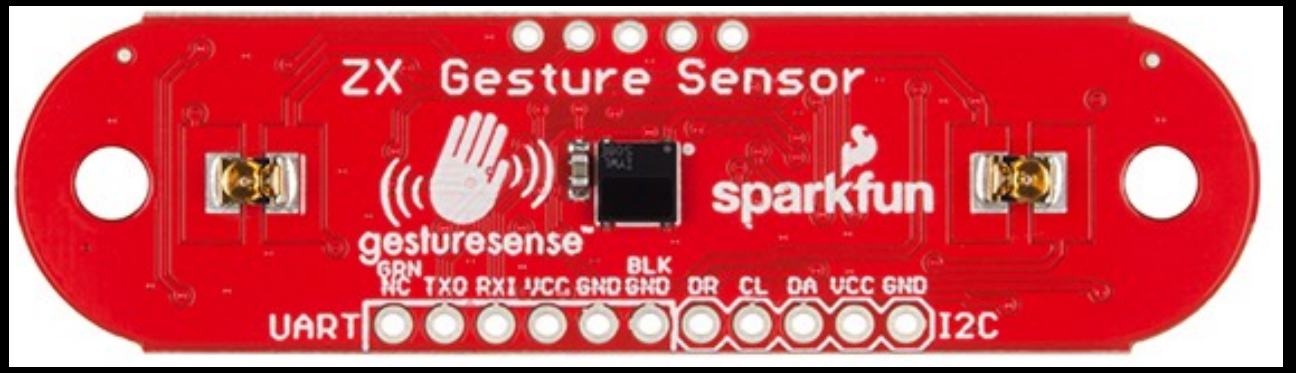
Capacitive touch slider



Gesture sensor with IR distance sensing

Key pad

Thumb controller

LIDAR

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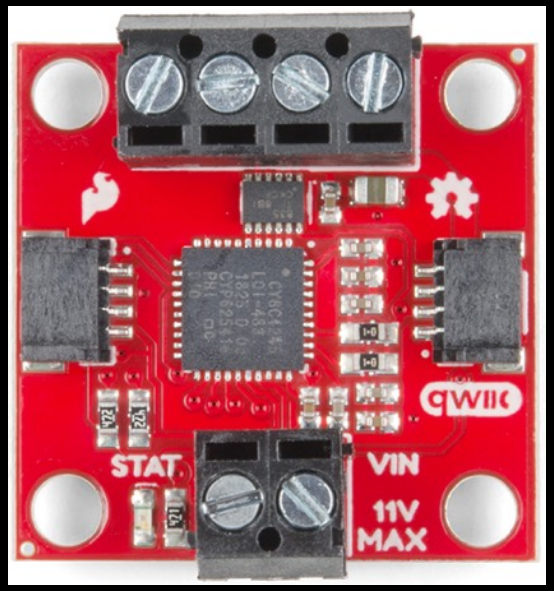
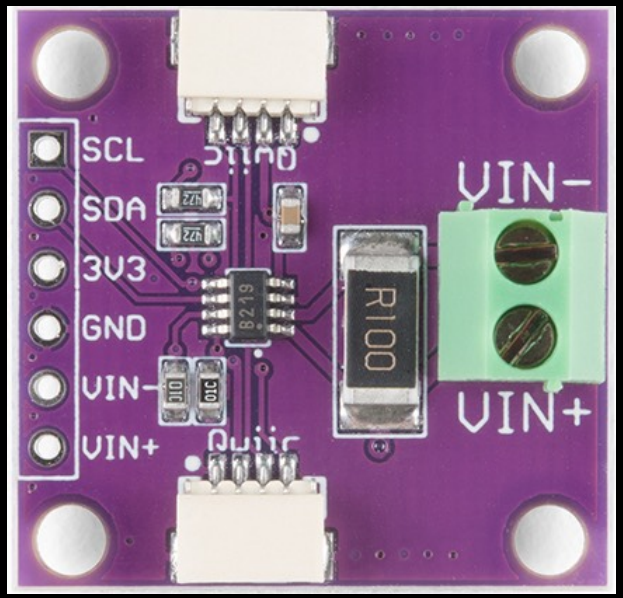
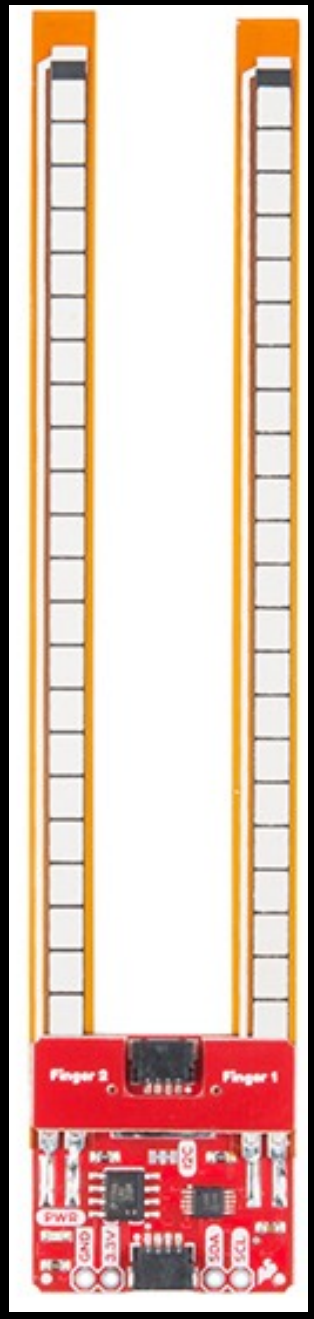


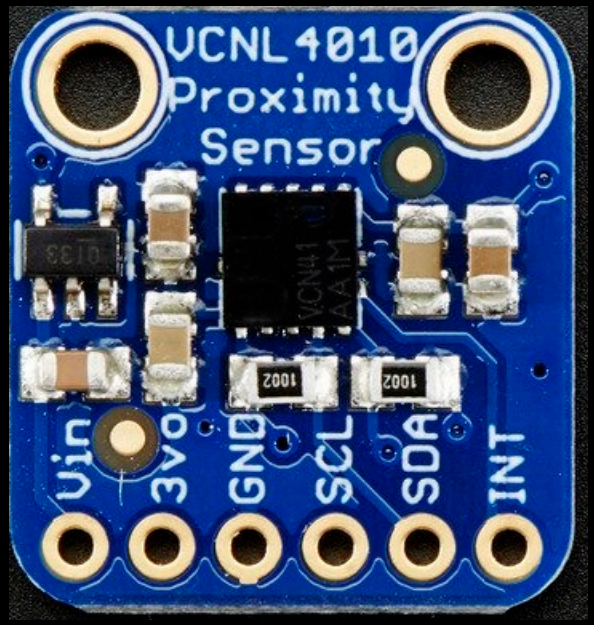
Motor controller



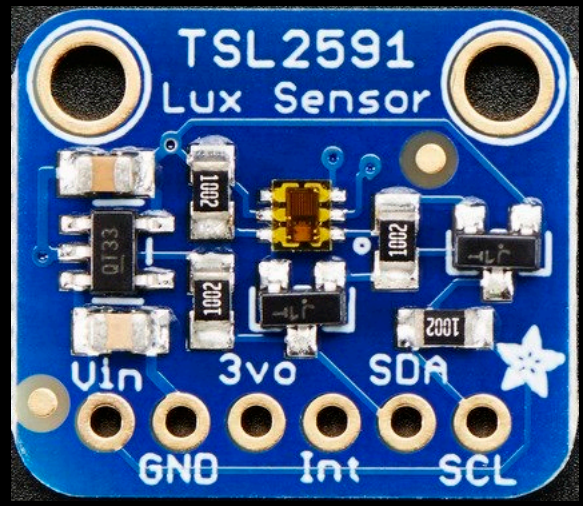
Voltage & current monitor



Flex sensor



Light-based
proximity sensor



Light sensor

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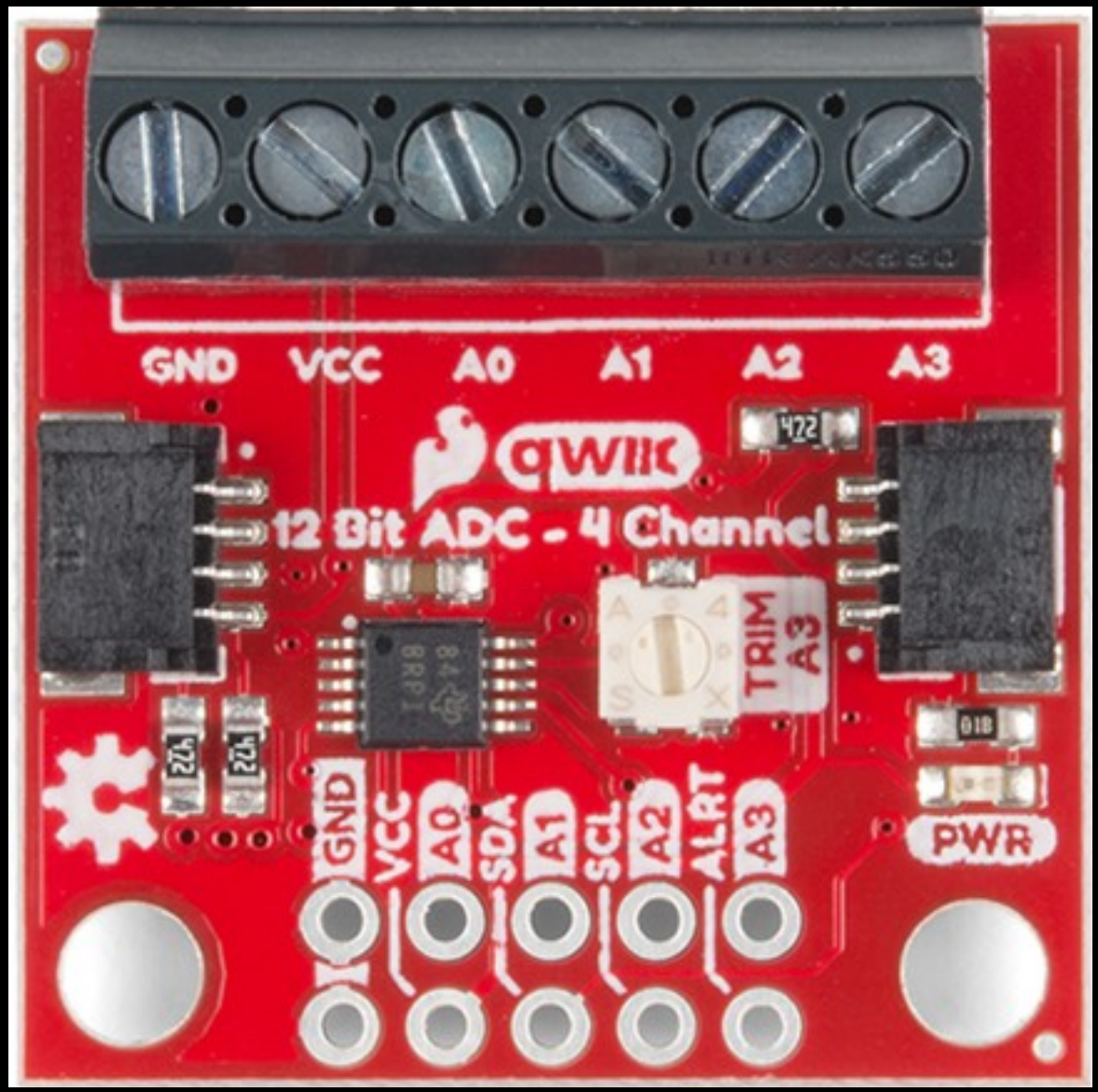

Analog to Digital Converter to monitor output of any analog sensor.