ME 433 Lecture 04/21/16

Our chip contains both accelerometer and gyroscope (6 DoF)

Accelerometer:

* Measures acceleration in x y z
* Signed 16 bit number
* Establish sensitivity based on G
  + +/- 2G, 4G, 8G, 16G
  + we will generally be in the +/- 1G range
* when you are not accelerating it should output zero, but in reality there will be noise so integrating up to position will yield wrong results ☹
* use this chip to determine the “down” direction 🡪 sensitive to acceleration due to gravity g

Gyroscope

* rotation sensor (senses roll pitch and yaw angular acceleration)
* range from +/- 125 dps to 2K dps

Combining Accelerometer and Gyroscope you get a better idea of which direction is down ( subtract off any rotation measured by gyro to get a more accurate down direction measured by accelerometer)

Chip Data Sheet

* we will use i2c to communication ( but it can use spi aswell)
* 3.3V regulator and level shifters incorporated ( so you don’t burn out)
* pins to wire:
  + 3.3 – Vin
  + GND – GND
  + SDA
  + SCL
* Supply 2 mA current
* Look at sample ardrino code to figure out what bits are sent ( but can’t directly use code)
* Operating modes
  + Turn on accelerometer, read only gyro
  + Vice versa
  + Read both
  + FIFO
    - First in first out: don’t have to read each bit of data as it is made, wait until FIFO is full then read
  + Bypass mode : do not use FIFO
* Registers
  + WHO\_AM\_I
    - Write sample code that reads WHO\_AM\_I and make sure it reurns the correct value
  + CTRLX\_C
    - Control configurations
  + OUTX\_L \_ and OUTX\_H
    - Read from chip