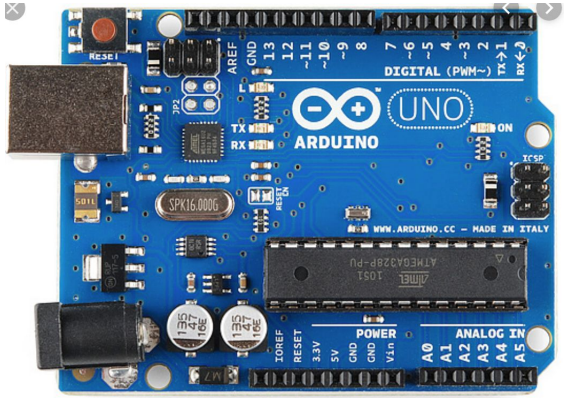
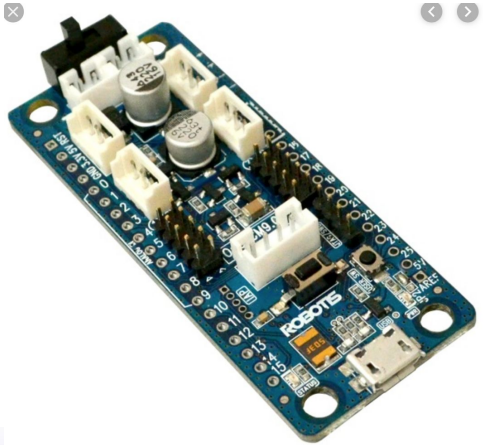
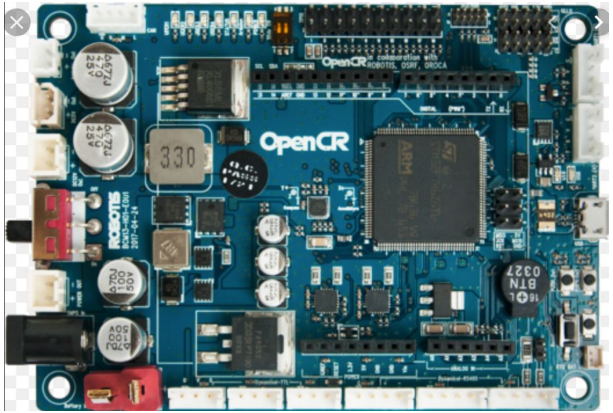
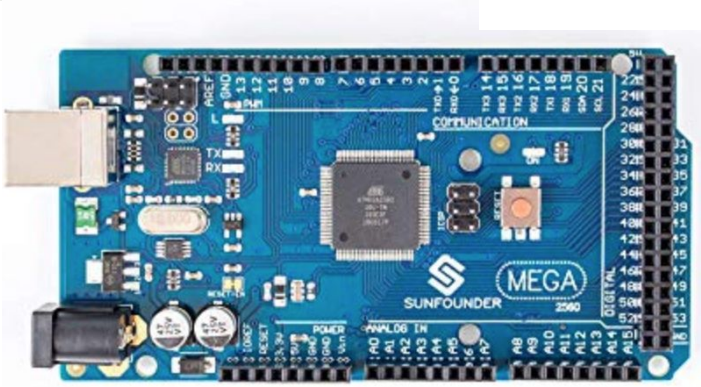
Embedded System

Microcontroller

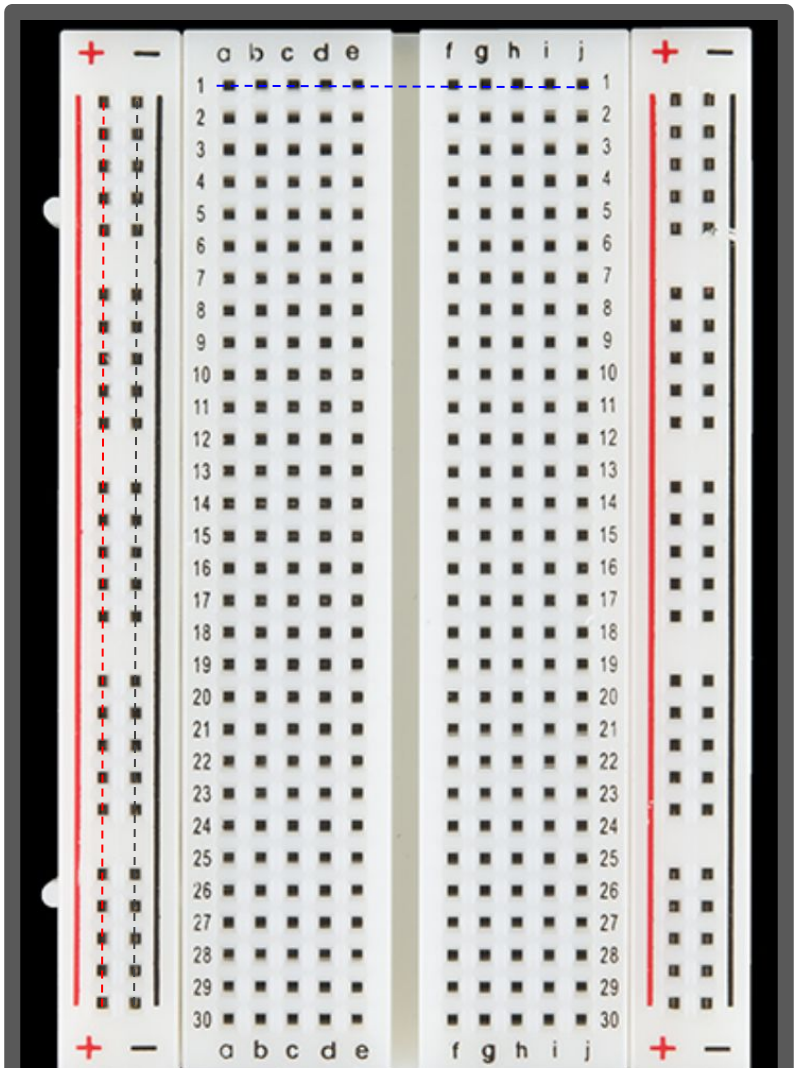








Breadboard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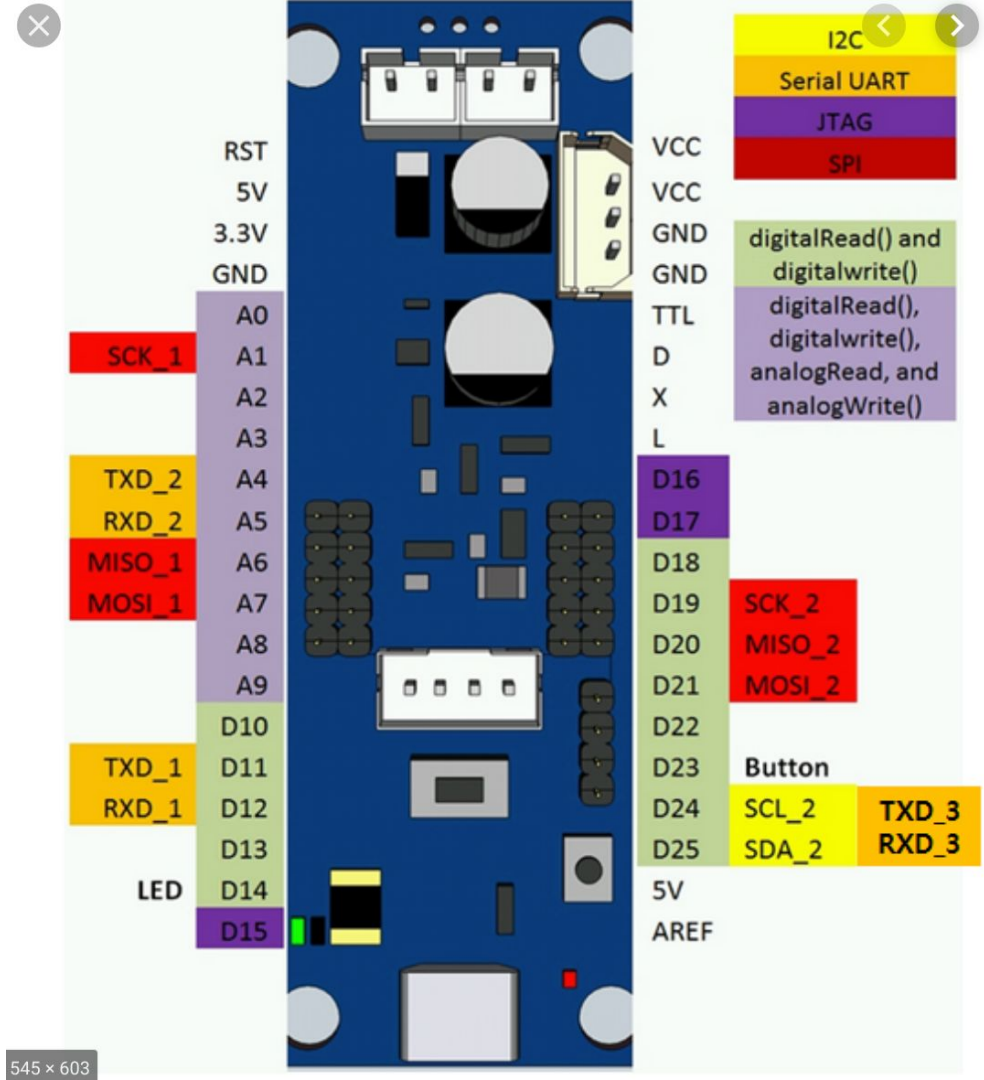
Pinout

https://www.google.com/search?q=opencm+PINOUT&sxsrf=ACYBGNQ9WUiIi213hAmRz6SyH-fS05cMyw:1571814643842&source=lnms&tbm=isch&sa=X&ved=0ahUKEwi7xP7r6bHlAhUlheAKHUSeAuAQ_AUIEigB&biw=1853&bih=900#imgrc=P5hqNfwm3rh2MM:



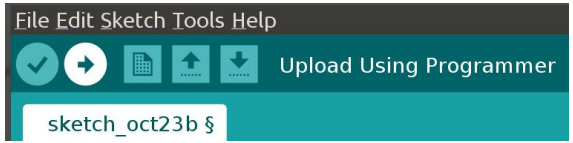
Install Arduino Software and set up opencm

Follow this link to install:

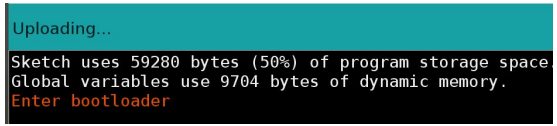
http://emanual.robotis.com/docs/en/parts/controller/opencm904/#install-on-linux

Upload code

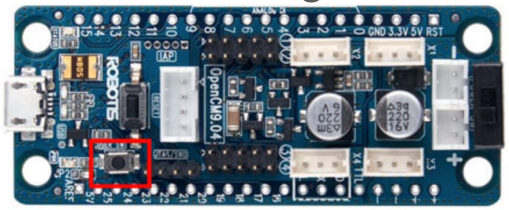
Open arduino, go to “file -> examples -> opencm9.04 -> blink_led “

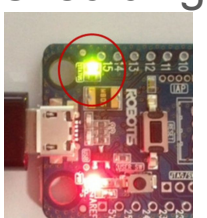


If you program stuck here more than 15 sec, click on upload again, if it give u a error, wait for 10 sec and click upload again,



If it fail more than 3 times, try unplug, then hold down this button and plug back into PC, the green led should light up, then click on upload again





Check this link for reference:
http://emanual.robotis.com/docs/en/parts/controller/opencm904/#recovery-mode

MPU6050 - OpenCM

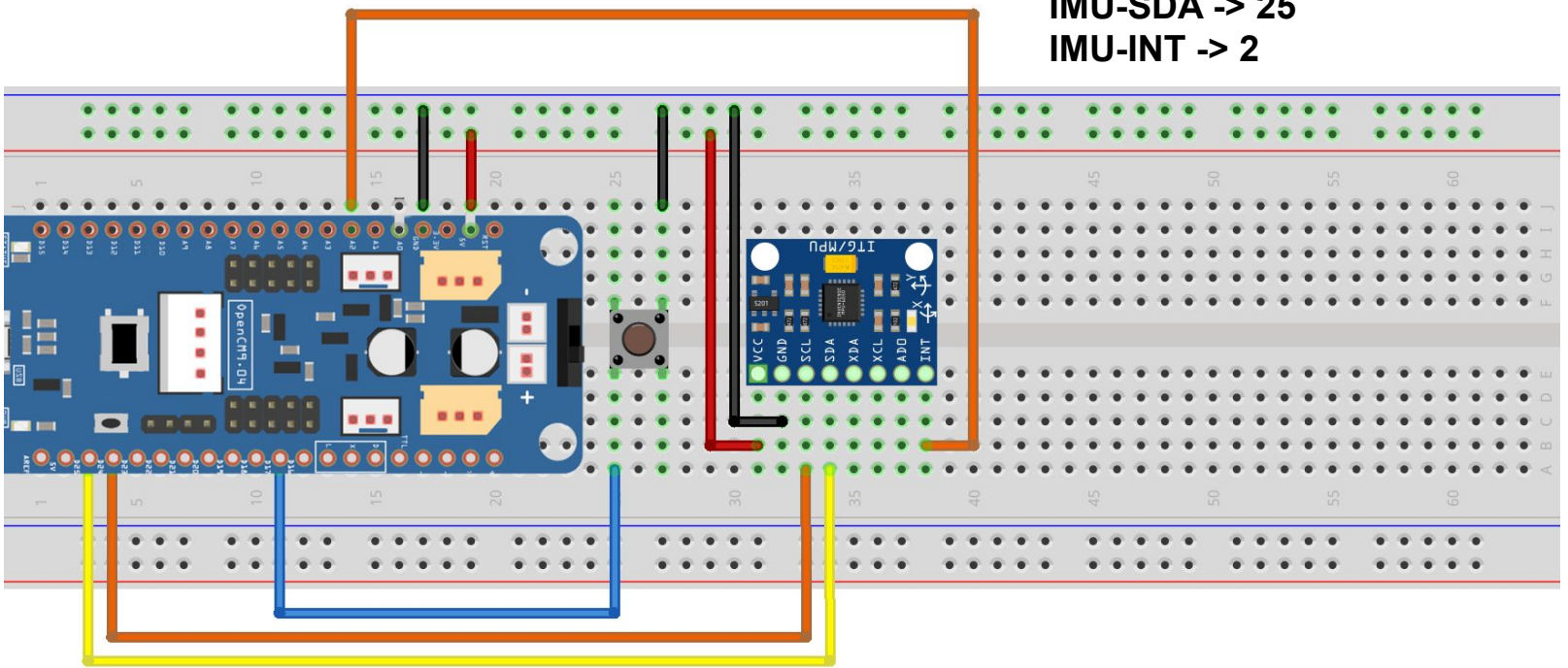
http://emanual.robotis.com/docs/en/parts/controller/opencm904/#mpu6050-dmp

Download the ZIP file and unzip into ~/Arduino/libraries/ (this folder contain all custom libraries by default)

Connection

Button-TopLeft -> 17
Button-ButtomRight -> Ground

IMU-VCC -> VCC
IMU-GND -> GND
IMU-SCL -> 24
IMU-SDA -> 25
IMU-INT -> 2



fritzing

Ros-arduino (rosserial) - install

Check out this link for reference: http://wiki.ros.org/rosserial_arduino/Tutorials

Install: (sudo apt install ros-melodic-rosserial-arduino ros-melodic-rosserial)

Create a library folder at anywhere you want, and do (rosrun rosserial_arduino make_libraries.py .)

[in tutorial, they want you to install this into arduino library folder, but it will conflict with existing one that come with opencm, so we install at some other place for reference purpose, this library contain a lot of great example]

Ros-arduino (rosserial) - usage

Check out this link for reference:
http://wiki.ros.org/rosserial_arduino/Tutorials/Hello%20World

Open the folder you just create, and go to “ros_lib/examples/pubsub” and copy it into a new arduino program. Upload code to opencm

Run (
Roscore
rosrun rosserial_python serial_node.py /dev/ttyACM0 (do ls /dev/tty then hit “TAB” key to check which port do you have, and use that one.)
)

The rest is regular ROS message passing

Example code

Check github for example code of this class:
https://github.com/ksu-cs-robotics/Software-Development-for-Robotics

It is under src/general/arduino/skeleton