ArduLab Sensor Recommendation List

Following is a list of sensors and output options that will lend themselves to the Ardulab projects teachers in the pilot project are likely to encounter.

Analog sensors

These are “generic” sensors that, when connected properly, output a voltage between 0 to 5 V depending on the quantity being measured.

These sensors can be connected similar to the directions in the example sketch - *analogReadSerial* in Arduino.

TMP36 temperature sensor-this sensor is in the SIK and has example code in the SIK guide, our page is here:

<https://www.sparkfun.com/products/10988>

Light sensor- this is included in the SIK and has example code and a hook-up diagram that goes with it. In addition, there is a bildr tutorial for it:

<https://www.sparkfun.com/products/9088>

<http://bildr.org/2012/11/photoresistor-arduino/>

HIH 4030 humidity sensor-this sensor will give a reading of the moisture content in an environment. It is an analog sensor.

<https://www.sparkfun.com/products/9569>

Load sensor- this sensor is used for measuring force or weight.

<https://www.sparkfun.com/products/10245>

Analog triple axis accelerometer- this sensor will measure acceleration of an object in three axes (x, y, and z). There is also a great bildr tutorial for this device:

<https://www.sparkfun.com/products/9269>

<http://bildr.org/2011/04/sensing-orientation-with-the-adxl335-arduino/>

Advanced Digital Sensors (I2C)

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| Note: These sensors are powered with 3.3 volts. It is very important to make sure they receive the correct voltage.  These sensors will use the I2C protocol to send and receive data. On the Arduino UNO, the pins will follow the following convention:  **SDA** => Arduino pin A4  **SCL** => Arduino pin A5  On the ArduLab (Arduino Mega), the pins should be wired to:  **SDA** => Arduino pin 20  **SCL** => Arduino pin 21 |

TMP102 temperature sensor- This is the sensor we used in the workshop, very simple to use and very accurate. bildr has a great resource for using this sensor.

<https://www.sparkfun.com/products/9418.>

[http://bildr.org/2011/01/tmp102-arduino/](http://bildr.org/2011/01/tmp102-arduino/%20)

BMP085 temperature, pressure and humidity sensor- This is a very handy sensor that wraps temperature, humidity and atmospheric pressure into one package. Another great bildr tutorial.

<https://www.sparkfun.com/products/11282>

<http://bildr.org/2011/06/bmp085-arduino/>

MAG3110 Magnetometer- This is a three axis magnetometer that will give feedback about the strength of magnetic fields. There is example code on the SparkFun product page, but no Bildr tutorial.

<https://www.sparkfun.com/products/10619>

L3G4200D triple axis gyroscope- A gyro will measure rate of change in attitude (angle) of an object – this is also called angular velocity. It can measure rotations in any of the three axes (x, y, or z). There is a great bildr tutorial for this one.

<https://www.sparkfun.com/products/10612>

<http://bildr.org/2011/06/l3g4200d-arduino/>

Color light sensor- This sensor can detect colors as well as intensity of light. There is a good bildr tutorial on this sensor.

<https://www.sparkfun.com/products/10701>

<http://bildr.org/2012/01/adjd-s311_arduino/>

6 degrees of freedom inertial measurement unit- This unit can give absolute position, it can be a bit complicated to use, but there is documentation.

<https://www.sparkfun.com/products/10121>

<http://bildr.org/2012/03/stable-orientation-digital-imu-6dof-arduino/>

HMC6352 Compass module- This module is a tilt compensated compass and is documented on Bildr. This will provide the actual pointing angle with respect to magnetic north – despite the tilt of the sensor.

<https://www.sparkfun.com/products/7915>

<http://bildr.org/2011/01/hmc6352/>

Camera Options

HackHD – 1080p Camera Module- This is essentially the guts of a GoPro camera. With it, you can control when to shoot photos of your experiment or record video. The video is stored onto the SD Card that is resident on this camera module, but with a small modification, you should be able to write to the SD card on the ArduLab.

<https://www.sparkfun.com/products/11418>

LinkSprite Camera Module- This is a simple CMOS camera sensor that you can pull images down to the Arduino through two wires. The camera has an infrared option, too – if you want to capture images in low light conditions.

<https://www.sparkfun.com/products/11610>

Output Devices / Actuators

In addition to reading sensor values, the Ardulab can also control motors, solenoids and servos. Below are a few examples.

TB6612FNG motor controller- this controller will allow motors to spin in both directions. The Bildr tutorial is below.

<https://www.sparkfun.com/products/9457>

<http://bildr.org/2012/04/tb6612fng-arduino/>

Motors and actuators- There are a choice of motors, the one in the SIK is ok, but there are some choices that may be more useful. Below are some options. Refer to the circuit diagrams and example code in the SIK guide.

**mini-metal gear motor (24:1 & ~415 rpm @6V):**

<https://www.sparkfun.com/products/8913>

**servo motor (like the one in the SIK):**

<https://www.sparkfun.com/products/9347>

**solenoid (for pushing or pulling things a small distance):**

<https://www.sparkfun.com/products/11015>