

# Sensors and actuators

## Sensors

A **sensor** is an object capable of **detecting physical or chemical quantities** and transforming them **into electrical signals**.

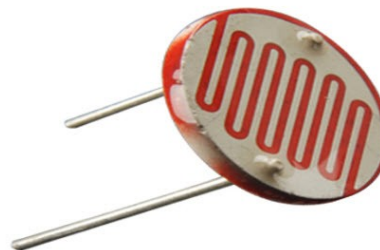
Depending on the type of the electrical signal produced they can be **DIGITAL, ANALOG or DATA**.

- **DIGITAL:** a digital sensor only has two possible states: pushed or not pushed. E.g: An electronic pushbutton sensor with two pins, ON/OFF, 1/0, digital sensor with two pins



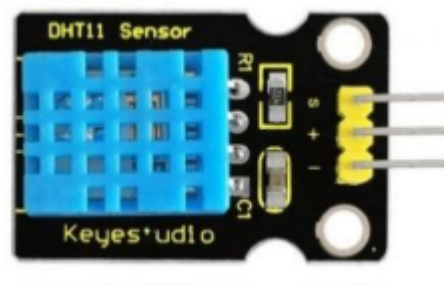
possible states: pushed or not pushed.

- **ANALOG:** This sensor can provide a range of values normally a variable voltage or current value, depending on the signal detected. E.g: A light sensor with two pins, variable of its resistance with an increment of light detected.



resistance with an increment of light detected.

- **DATA:** the sensor offers its information through a digital interface. E.g: A DHT11 sensor with four pins, digital sensor measures temperature and humidity.



DHT11

sensor measures temperature and humidity.

There are

lots of different sensors. To get further information click on [here](#).

## Actuators

An **actuator** is any device capable of **performing actions** in the physical world that we **can control** from a processor board (like Arduino)

Depending on the type of action produced they can be:

- **LIGHT:** The most common is the **normal LED**, but there is also RGB LED's, neopixel lightsaber, laser or LCD displays

## Light Actuators



LED



RGB Led



Neopixel LED



LCD Display

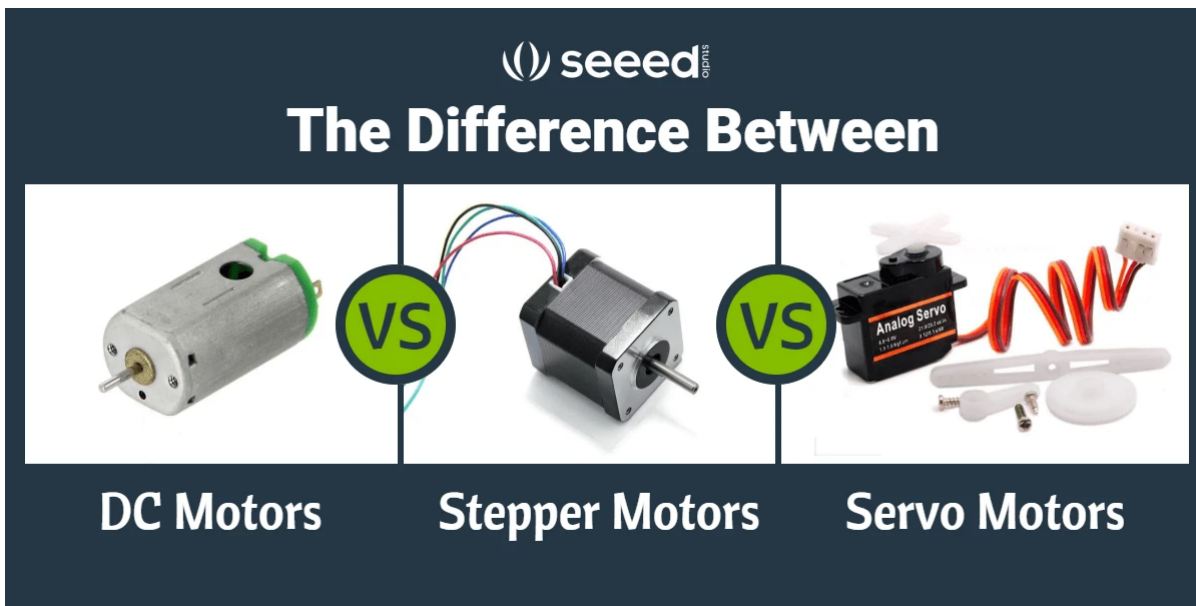


Laser LED

- **SOUND:** There are active and passive **buzzers**. Active buzzers play a tone of a frequency determined when they receive a digital "1" whereas a passive buzzer only plays the wave that receives.

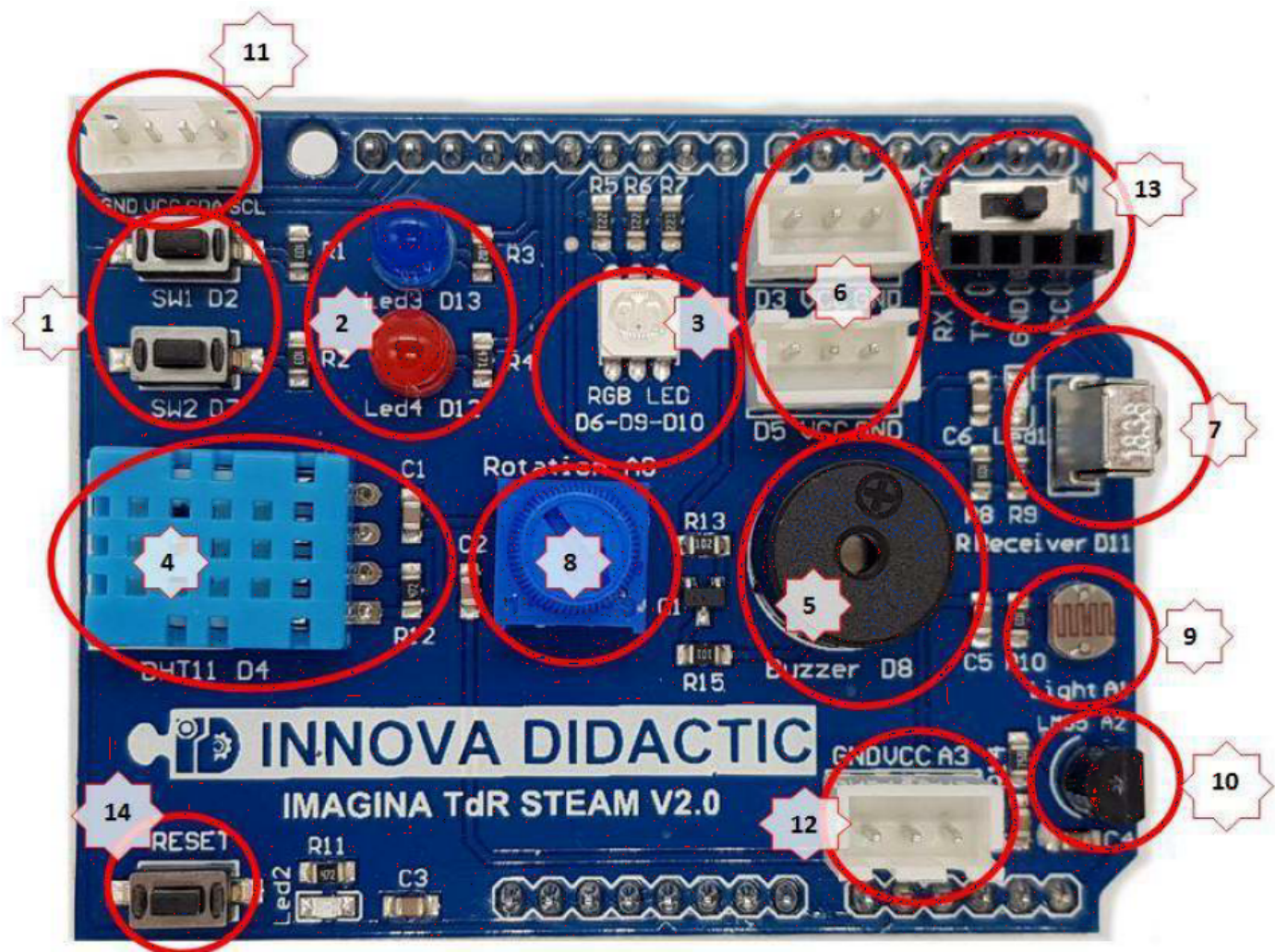


- **MOTION:** There are different types of motors depending on their properties. They usually need auxiliary elements to be controlled by processor boards, because of the voltage they require.



## Imagina TDR Steam shield

We will use in our projects one shield called **Imagina TDR Steam** which is integrable into Arduino UNO, with a multitude of integrated sensors and actuators.



	Sensor/Actuator/Module
1	Two pushbuttons (SW1, SW2)
2	Two LEDs (Blue Led3 and Red Led4)
3	Led RGB
4	DHT11 Temperature and Humidity Sensor
5	Buzzer
6	Two digital outputs/inputs
7	Infrared receiver module (IR)
8	Rotary potentiometer module

9	Light sensor (LDR)
10	Temperature sensor (LM35)
11	I2C Interface
12	Analogic input
13	Bluetooth and Wifi connection
14	Reset button

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