

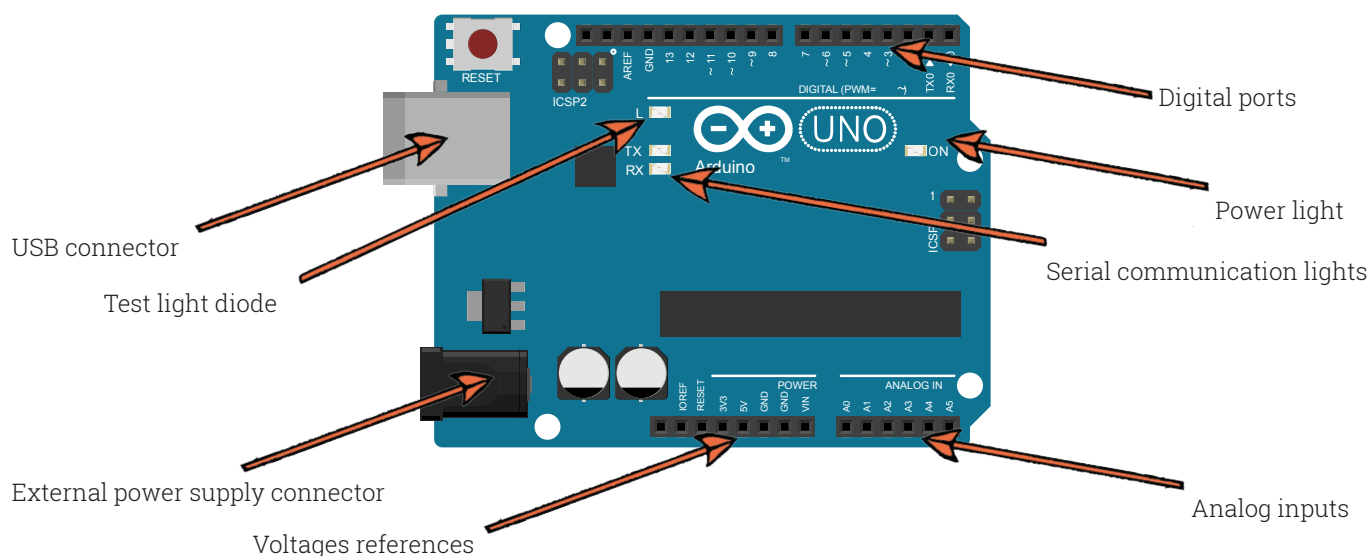
THE ARDUINO BOARD

Understand your board

"Arduino" is a generic term that covers different microcontrollers. Here, we are using the Arduino board Uno which is the most commonly used today although the content presented here is equally valid for the majority of other boards, for example the MEGA Arduino board. The reference site www.arduino.cc is a good starting point to discover the world of Arduino

The Arduino Uno board is not the most powerful microcontroller but its architecture is open-source and its entire philosophy is based on the free model. This board is a microcontroller, which is a system that resembles a computer: it has memory, a microprocessor and interfaces with the outside world. A simple search for the words "Arduino projects" would quickly show the diversity of what can be done using an Arduino board: robots, clocks and even home automation.

The Uno board



External power supply 7 – 12 V: this power supply is useful only if the board is not linked to a computer using a USB cable. It allows nomadic use of the board without a computer.

Digital ports 2 to 13: these ports can be used as input in order to read voltage, or as outputs to produce voltage. They only accept two values, 0 or 5 volts (see sheets “digital inputs” and “digital outputs”).

Ports 0 and 1 are used for serial communication with a computer using a USB cable. It is best to avoid using them in your projects.

Pseudo-analog outputs: they are marked with the symbol ~ and can be used as PWM output to create intermediary voltage between 0 and 5 volts. See “PWM outputs” sheet).

Analog inputs: the ports A0 to A5 can measure electric voltage from between 0 and 5 volts (they cannot create voltage however).

Fixed voltage outputs: these ports create fixed voltage:

- Port 5V creates a voltage of 5 volts;
- Port 3V3 creates a voltage of 3.3 volts;
- The GND ports are connected to ground (0 volts).

Test light diode: it is piloted by the digital port 13 configured as output and allows one to rapidly test the board (see “test your board” sheet).

USB connector: it is used to connect to your computer using a suitable cable. It allows communication with the board and also provides power for it to function.

Power light: it switches on when the board is powered.

Serial communication lights: they light up when the board and the computer communicate.

Some precautions

You should avoid connecting two ports that produce different voltages and avoid voltages that are too high:

- Never connect a digital output to ground directly;
- Never connect two digital outputs directly;
- Carefully check the polarity of an external power supply before switching on (or by checking with a multimeter before connecting);
- Never send voltage to fixed output ports (they are marked with 5V, 3V3 and GND);
- Never send more than 5.5 V into an input whether it is analogue or digital;
- Never draw more than 40 mA from a single port and never draw more than 200mA overall.

If you have to connect an output to ground (between port 13 and GND for example), your circuit must contain a resistor of more than 125 Ω , which corresponds to a current of 40 mA. A resistance of 200 Ω is preferable – that is to say a current of 25 mA – to leave a security margin.

All the voltages are measured based on the GND port. “Do not exceed a voltage of 5.5 V on a port” means “do not exceed a difference in voltage of 5.5 V between the port and the port GND”.