Arduino Uno R3

Arduino Uno R3 is an open-source microcontroller board based on the ATmega328P. It is the most popular version of Arduino, ideal for beginners and prototyping.

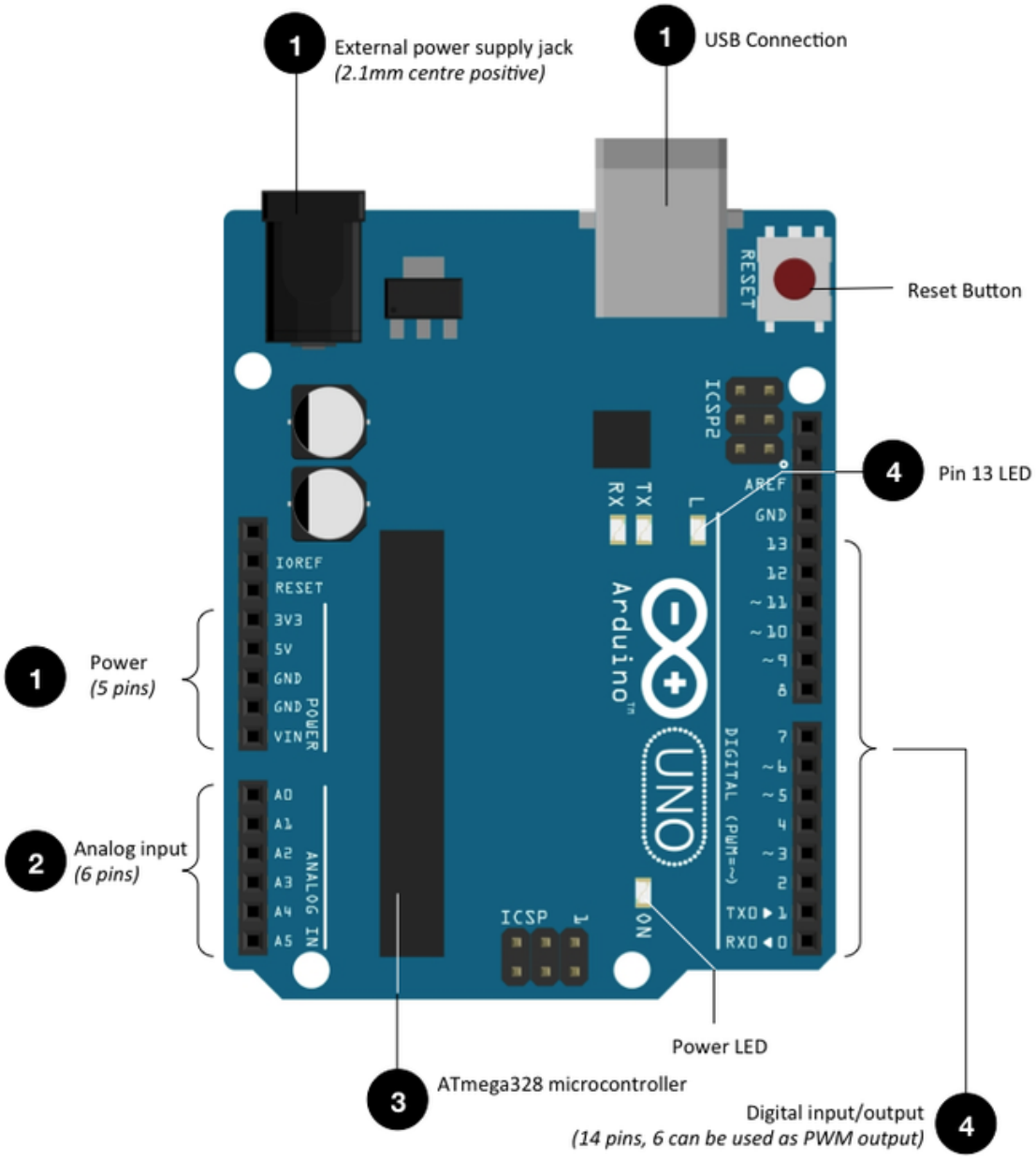

Fig: Arduino Uno R3 Pinout

Pin Layout:

1. Power

- the board can be powered via the USB connection or with an external power supply (range 7V to 12V)
- Vin - supply voltage through this pin or via the power supply jack when using an external power supply
- GND: ground pins
- 5V: regulated power supply used to power the components on board
- 3v3: a 3.3V supply voltage
- RESET: bring this line LOW to reset the micro-controller. Typically used to add a reset button to shield which block the one on the board (reset button)

2. Analog Input

- each input provides 10-bits of resolution (ie. 1024 different values). By default they measure from GND to 5V, mapping values from 0 to 1023 respectively

3. Memory

- 32KB of flash memory for storing code (sketch of your program)

4. Digital Input/Output

- each pin can be an input or output, using *pinMode( )*, *digitalWrite( )*, and *digitalRead( )* functions
- each pin operates at 5V and can provide or receive a maximum of 40mA
- PWM: 3, 5, 6, 9, 10, 11 - provide a PWM output with the *analogWrite( )* function
- LED13: built-in LED connected to pin 13. When this pin is HIGH, the LED is on, when this pin is LOW, it is off

Key Features:

- 14 Digital I/O pins (6 PWM)
- 6 Analog inputs
- 16 MHz clock speed
- USB-B port for programming
- Power jack (7-12V)
- ICSP header and reset button

Working Principle:

Connect to PC via USB. Write code using Arduino IDE (C/C++). Upload sketch to flash memory. Interact with the real world using sensors, motors, LEDs, etc.

Variants:
- Arduino Mega
- Nano/Mini
- Leonardo
- Due

Applications:
- Robotics
- Home automation
- IoT systems
- Wearable devices
- Educational kits

Advantages:
- Easy to program and use
- Huge online community and libraries
- Plug-and-play hardware
- Cross-platform support

Disadvantages:
- Limited memory and speed
- Not suitable for commercial embedded systems
- Lower performance than Raspberry Pi