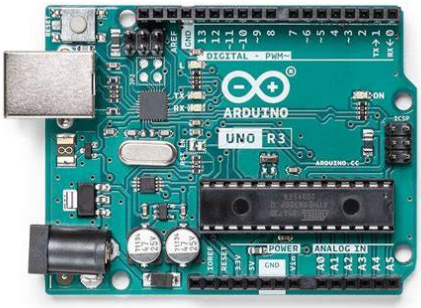
Arduino Uno R3

ATmega328P Development Board



The Arduino Uno R3 is the most popular entry-level development board. Built around the ATmega328P microcontroller, it lets beginners and professionals prototype projects by reading sensors and driving LEDs, motors, relays and displays, and it talks to other modules over UART, I2C and SPI. It is programmed from the free Arduino IDE over a single USB cable.

TOP USES

- Learning electronics and C/C++ programming
- Reading sensors and logging data
- Home-automation and control prototypes
- Robotics: motors, servos and drivers
- LCD / OLED display projects
- Fast prototyping before moving to a custom PCB

KEY FEATURES

- 14 digital I/O pins (6 of them PWM)
- 6 analog inputs with 10-bit ADC
- USB Type-B for power and programming
- 5V logic level, compatible with most hobby modules
- Onboard reset button and user LED (D13)
- Huge library collection and community support

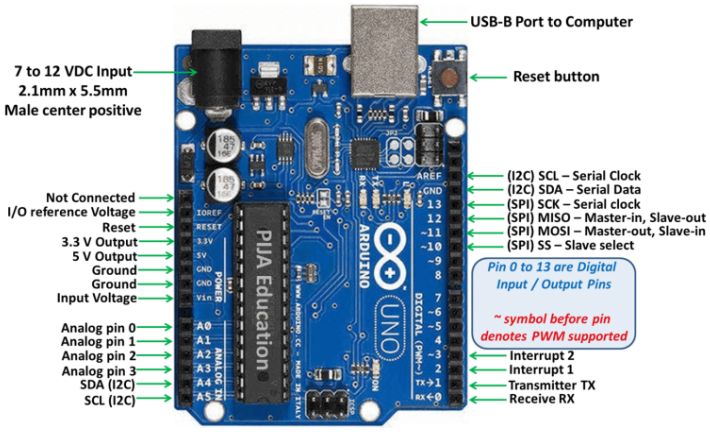
Technical Specifications

Arduino Uno R3

Parameter	Value
Microcontroller	ATmega328P (8-bit AVR)
Operating voltage	5 V
Input voltage (recommended)	7 - 12 V (limit: 6 - 20 V)
Digital I/O pins	14 (6 provide PWM output)
PWM pins	D3, D5, D6, D9, D10, D11
Analog input pins	6 (A0 - A5), 10-bit resolution
DC current per I/O pin	20 mA recommended (40 mA absolute max)
DC current on 3.3V pin	50 mA
Flash memory	32 KB (0.5 KB used by bootloader)
SRAM	2 KB
EEPROM	1 KB
Clock speed	16 MHz
Communication	UART (D0/D1), SPI (D10-D13), I2C (A4/A5)
External interrupts	D2 and D3
USB connector / chip	Type-B / ATmega16U2 (original) or CH340 (most clones)
Power options	USB, DC barrel jack, VIN pin
Dimensions	68.6 x 53.4 mm
Operating temperature	-40 to 85 C (microcontroller rating)

Pinout

Arduino Uno R3



PIN FUNCTIONS

Pin	Function	Notes
D0 (RX), D1 (TX)	UART serial	Shared with USB; disconnect devices while uploading
D2, D3	External interrupts	INT0 / INT1
D3, D5, D6, D9, D10, D11	PWM output	Use analogWrite(); marked with ~
D10, D11, D12, D13	SPI: SS, MOSI, MISO, SCK	For SD cards, displays, RF modules
D13	Onboard LED	Handy for quick tests
A0 - A5	Analog inputs	10-bit (0-1023); can also be used as digital pins
A4 (SDA), A5 (SCL)	I2C bus	Sensors, OLED/LCD, RTC modules
5V	5 V output	Powers small sensors and modules
3V3	3.3 V output	Max 50 mA
VIN	Input voltage	7 - 12 V recommended
GND	Ground	Several GND pins available
RESET	Reset	Pull LOW to restart the board
AREF	Analog reference	Optional external ADC reference

WIRING NOTES

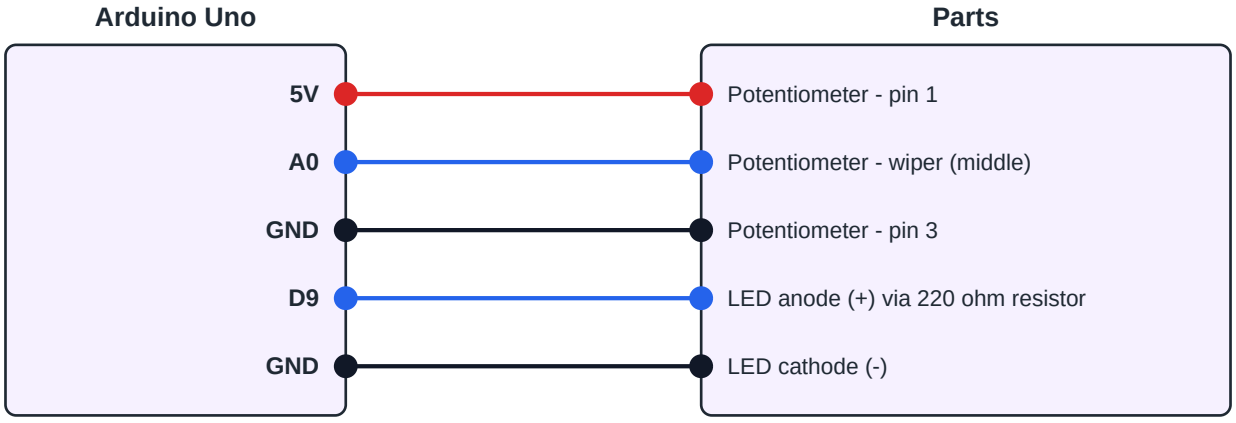
- Each I/O pin gives max 20 mA (recommended). Use a transistor or relay module for larger loads.
- Power motors and servos from an external supply and connect its GND to the Arduino GND.
- I/O logic is 5 V: use a level shifter or voltage divider with 3.3 V-only modules (e.g. ESP8266 pins).
- Keep total current drawn through all I/O pins well below 200 mA.

Example Project

Potentiometer controls LED brightness

Read a potentiometer on A0 and use its value to dim an LED on PWM pin D9. The raw reading is also printed to the Serial Monitor.

CIRCUIT



EXAMPLE CODE

```
const int POT_PIN = A0;   // potentiometer wiper
const int LED_PIN = 9;    // PWM pin (marked with ~ on the board)

void setup() {
  Serial.begin(9600);
  pinMode(LED_PIN, OUTPUT);
}

void loop() {
  int raw = analogRead(POT_PIN);        // 0 - 1023
  int pwm = map(raw, 0, 1023, 0, 255);  // 0 - 255
  analogWrite(LED_PIN, pwm);            // LED brightness

  Serial.print("ADC: ");
  Serial.print(raw);
  Serial.print("  PWM: ");
  Serial.println(pwm);
  delay(100);
}
```

EXPECTED RESULT

- Turning the knob smoothly changes the LED from off to full brightness.
- Serial Monitor (9600 baud) prints ADC values from 0 to 1023 and PWM values from 0 to 255.

Useful Links

Arduino Uno R3

Resource	Link
Official docs & datasheet	https://docs.arduino.cc/hardware/uno-rev3/
Arduino IDE download	https://www.arduino.cc/en/software
Language reference	https://www.arduino.cc/reference/en/
Built-in example code	https://docs.arduino.cc/built-in-examples/
Product page	https://techzoneegypt.com/p/arduino-uno-r3-plus-cable

COMPATIBLE COMPONENTS

- HC-SR04 Ultrasonic Sensor
- DHT22 Temperature & Humidity Sensor
- MPU6050 Accelerometer & Gyroscope
- SG90 Servo Motor
- 1-Channel Relay Module
- I2C 16x2 LCD Display

Need this component?

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https://techzoneegypt.com/p/arduino-uno-r3-plus-cable