

Analog Input from a Potentiometer

A potentiometer is a passive device that provides an adjustable electrical resistance. A potentiometer is a convenient way of allowing user input to a running Arduino program.

The left side of Figure 1 is a photograph the potentiometer included in the Sparkfun Inventor's Kit¹. of a typical the schematic representation of a potentiometer called a trim-pot.

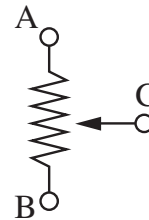
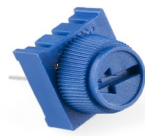


Image from <https://www.sparkfun.com/products/9806>

Figure 1: A typical rotary potentiometer (left). Schematic for a potentiometer (right).

A potentiometer has three electrical contacts and functions as an adjustable voltage divider as depicted by the schematic in the right side of Figure 1. Terminals A and B have a fixed resistance. Terminal C, called the wiper, is mechanically adjusted by turning the knob² with the embossed arrow shown in the photograph on the left side of Figure 1. In the typical potentiometer circuit, a supply or input voltage is applied across terminals A and B. The output voltage is measured between terminals C and B or terminals C and A.

Figure 2 is a schematic of the electrical wiring of a potentiometer used as a variable voltage tied to an Arduino analog input pin. Terminals A and B are connected to a 5V supply and ground. The wiper is connected to an analog input pin. Figure 3 shows the wiring of a potentiometer connected to analog input pin 3 of an Arduino.

The `potentiometer_input.ino` program in Listing 1 reads and prints the voltage between the wiper and ground for a potentiometer wired as in Figure 3. The reading will be an integer between 0 and 1023. To convert to voltage, multiply the reading by 5/1023.

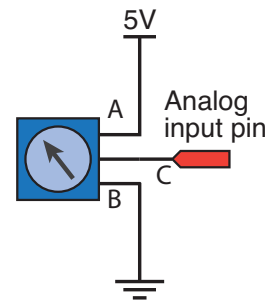


Figure 2: Schematic of a potentiometer connected to an Arduino analog input pin. The A, B, and C pins correspond to the terminals in Figure 1.

¹<https://www.sparkfun.com/products/11227>

²Potentiometers may have knobs, screws, or sliders for adjusting the wiper position.

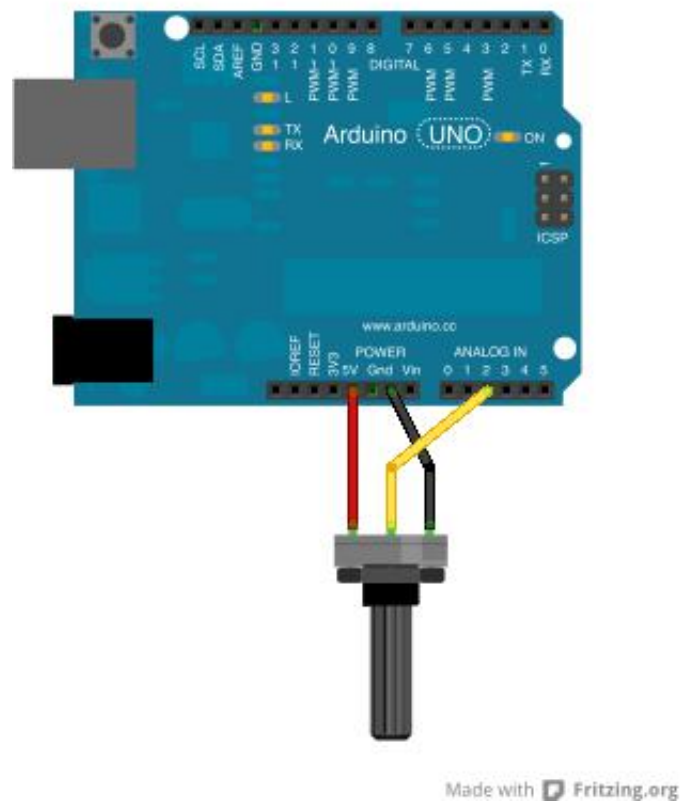


Figure 3: Arduino wiring of a potentiometer circuit for analog input on pin 3.

```
// File: potentiometer_input.ino
//
// Read a potentiometer and print the raw analog input value

void setup()
{
  Serial.begin(9600);
}

void loop()
{
  int potPin=3, potVal;

  potVal = analogRead( potPin );
  Serial.println( potVal );
}
```

Listing 1: Arduino program to read and display voltage across a potentiometer with the wiper connected to analog input pin 3.