

How to drive a small motor using an Arduino

Control DC motor's speed using Arduino

For one of my projects I needed to drive a small motor at different speeds, so I gave this a go by reading and learning more about what is required.

We can achieve that with an Arduino microcontroller by using [PWM](#) signals. For this project I am using an [Arduino Mini](#) clone, and decided to drive the motor with a N-Channel [MOSFET](#) (voltage controlled transistors), activated by a PWM signal.

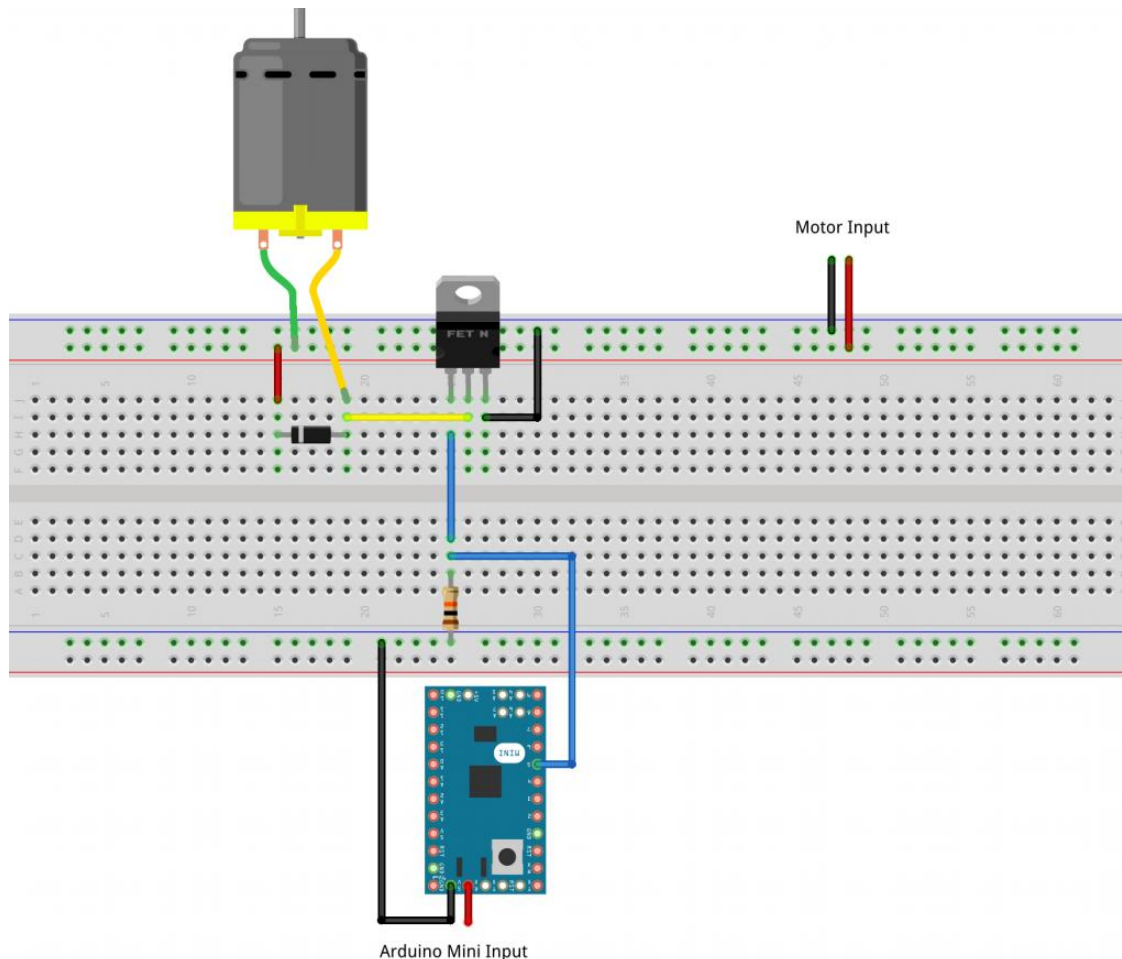
Keeping the frequency of the signal constant, and varying the width of the "on" time vs the width of the "off" time (changing the [duty cycle](#)), will make the motor spin at different speeds.

The signal values that Arduino expects for the duty cycle is from 0 to 255 and it can be set by using the function `analogWrite(pin, value)`. By providing a different duty cycle value to our Arduino pin (in my case PWM pin number 5), the motor will spin at different speed.

Material Used

- Arduino Mini clone
- Small DC motor (3 – 4.5V input, 23g/cm)
- N-Channel MOSFET – [FQP30N06](#) (up to 60V and 30A)
- Diode – 1N4001 or similar (to prevent reverse currents from the the motor)
- 10kΩ resistor (used for pull-down)
- Correct voltage input/voltage regulators for both the Arduino and for the motor

Schema



Drive a motor using an Arduino and a MOSFET

Sample Codes

Three speeds DC motor code:

```
const int motorpin = 5;
const int divider = 3;
int motor_speed = 0;
void setup()
{
  Serial.begin(57600);
  pinMode(motorpin, OUTPUT);
}
void loop()
{
  for(motor_speed = 0; motor_speed <= 255; motor_speed += (int)(255/divider))
  {
    printSpeed(motor_speed);
    analogWrite(motorpin, motor_speed);
    delay(5000);
  }
}
void printSpeed(int motor_speed)
{
  Serial.print("Current Speed: ");
  Serial.println(motor_speed);
}
```

[view rawmotor-with-mosfet-three-speed.ino](#) hosted with [by GitHub](#)

Slowly increasing speed DC motor code:

```
const int motorpin = 5;
int motor_speed = 0;
void setup()
{
  Serial.begin(57600);
  pinMode(motorpin, OUTPUT);
}
void loop()
{
  for(motor_speed = 0; motor_speed <= 255; motor_speed += 5)
  {
    printSpeed(motor_speed);
    analogWrite(motorpin, motor_speed);
    delay(250);
  }
  delay(5000);
}
void printSpeed(int motor_speed)
{
  Serial.print("Current Speed: ");
  Serial.println(motor_speed);
}
```