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Software

## Servo Motor Integration with Arduino

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# 1 INTRODUCTION

In this project, we integrate a servo motor, specifically the MG90S, with an Arduino board. The objective is to control the servo motor's position, causing it to move from 0 to 180 degrees and back repeatedly, with a delay of 15 milliseconds between movements. Servo motors are widely used in various applications requiring precise control over angular position, making them ideal for robotics, automation, and other motion-related projects.

## 2 COMPONENTS USED

### 2.1 Hardware Components:

#### 2.1.1 Arduino Uno:

- Includes 14 digital pins and 6 analog pins.
- Operates at a voltage of 5V.
- Microcontroller: ATmega328P
- Uses the ATmega328P microcontroller.
- Runs at a clock speed of 16MHz.

#### 2.1.2 MG90S Servo Motor:

- The MG90S servo motor typically has three pins: Signal (SIG), Power (VCC), and Ground (GND).
- Operating Voltage: It operates within a voltage range of approximately 4.8V to 6V, making it suitable for use with standard power sources like batteries or regulated power supplies.
- Angular Range: The MG90S servo motor can rotate approximately 180 degrees, allowing for precise control over its position within this range. This angular range makes it versatile for various motion control applications.

### 2.2 Software Components:

#### 2.2.1 Arduino IDE:

- Integrated Development Environment (IDE) for Arduino boards.
- Provides a user-friendly interface for writing, compiling, and uploading code to the Arduino Uno.
- Offers a wide range of built-in functions and libraries for interfacing with hardware components.

### 2.2.2 Servo Library:

- **Installation:** The Servo library is installed directly from the Arduino IDE Library Manager.
- **Source:** This library is maintained and provided by Arduino as part of the standard Arduino libraries available for use in projects.
- **Functionality:** The Servo library simplifies the control of servo motors by providing easy-to-use functions for setting the position and speed of servo movements. It abstracts the complexities of pulse-width modulation (PWM) signals required to drive servo motors, allowing developers to focus on their application logic without dealing with low-level hardware details.

## 3 HARDWARE CONNECTIONS SETUP

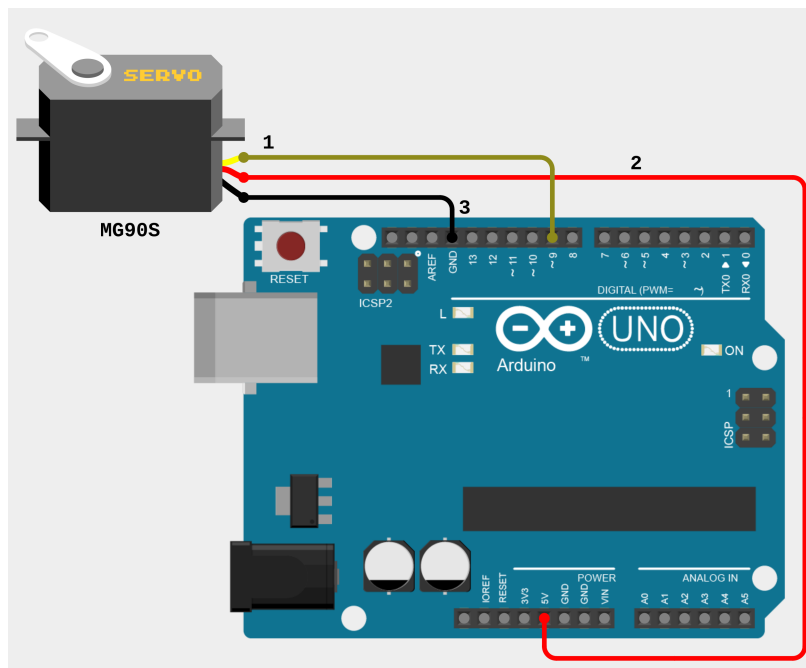


Figure 2: Hardware Connections Setup Circuit Diagram

1. Signal pin of the servo motor is connected to the 9th digital pin of the Arduino Uno.
2. VCC pin of the servo motor is connected to the +5V pin of the Arduino Uno.
3. GND pin of the servo motor is connected to the GND pin of the Arduino Uno.

## 4 RESULT

The servo motor smoothly rotates from 0 to 180 degrees and then back to 0 degrees with a delay of 15 milliseconds between movements, creating a continuous back-and-forth motion.