

# Arduino Dual Stepper Motor

## Context

The following Arduino tutorial code is an instructible to guide your way through setting a desired stepper motor rotation speed for two separate motors. This will be useful during the timeline of our project since the dual-stepper motor will be capable of rotating two motors at different set speeds while completing both rotations at the same time which allows for linear motion with two degrees of freedom.

## Hardware Required

- Arduino Uno microcontroller (x1)
- Stepper motor (x2)
- Stepper motor driver (x2)
- USB cable (x1)
- Wires (x12)

## Set-up Instructions

1. Using the USB, plug the Arduino Uno microcontroller into a computer
2. Opening the Arduino coding software, insert the program explained below
3. Plug both stepper motors into the stepper motor drivers
4. Using two wires, connect the positive 5V terminal and ground terminal on the Arduino Uno to the positive and negative terminals on the breadboard
5. Using the first stepper motor driver, use 2 wires to connect the positive and negative terminals on the driver to the positive and negative terminals on the breadboard
6. Input 4 wires into inputs 1-4 on the stepper motor driver while inputting the other ends of the wire to pins 3-6 on the Arduino Uno microcontroller
7. Using the second stepper motor driver, repeat steps 5-6 while inputting the other ends in step 6 to pins 8-11 on the Arduino Uno microcontroller
8. Run the program on the Arduino coding software

## Program Code

```
#include "AccelStepper.h"           // grab from library

#define HALFSTEP 8                  //half step for motor

#define motorPin1 3                  // IN1  stepper1 pins defined
#define motorPin2 4                  // IN2
#define motorPin3 5                  // IN3
#define motorPin4 6                  // IN4
#define motorPin5 8                  // IN1  stepper2
#define motorPin6 9                  // IN2
#define motorPin7 10                 // IN3
#define motorPin8 11                 // IN4

AccelStepper stepper1(HALFSTEP, motorPin1, motorPin3, motorPin2, motorPin4); //pins to motor
AccelStepper stepper2(HALFSTEP, motorPin5, motorPin7, motorPin6, motorPin8);
```

```

long Rot1;                                //how many rotations variable

long Rot2;

long Distance1;                           //how many steps variable

long Distance2;

int finish_check = 1;

int Revolution_Steps = 4096;              //how many steps per rotation

void setup() {
  Serial.begin(9600);                     // Start the Serial monitor with speed of 9600 Bauds
  stepper1.setAcceleration(5000.0); //sets acceleration to motors
  stepper2.setAcceleration(5000.0);
  Serial.println("How many rotations do you want each motor to take(One number for each motor)"); //initial question
}

void loop() {
  while (Serial.available()>0) {          //when there is a user input
    finish_check=0;                        //check to zero
    Rot1= Serial.parseInt();               //grabs first user input for first motor
    Rot2= Serial.parseInt();               //" " for second motor
    Distance1 = Rot1 * Revolution_Steps;   //step/rev times user input for rotations
    Distance2 = Rot2 * Revolution_Steps;
    stepper1.setCurrentPosition(0);        //set each motor to position zero every loop
    stepper2.setCurrentPosition(0);
    stepper1.moveTo(Distance1);             //sets steps for each motor to take
    stepper2.moveTo(Distance2);
  }

  if (Rot1 > Rot2){                         //if the first motor has more rotations to take than the second
    stepper1.setMaxSpeed(500);              //steady rotaion for the first motor
    stepper2.setMaxSpeed(500*Rot2/Rot1);    //ratios the two roataion numbers for the second with same base speed
    as one
  }

  else if ( Rot2>Rot1){                     //vice versa from previous
    stepper1.setMaxSpeed(500*Rot1/Rot2);
    stepper2.setMaxSpeed(500);
  }

  if ((stepper1.distanceToGo() != 0) || (stepper2.distanceToGo() !=0)) { //if there is steps to take

```

```
stepper1.run();                                //run the motors
stepper2.run();
}
if ((finish_check == 0) && (stepper1.distanceToGo() == 0) && (stepper2.distanceToGo() == 0)) { //if the motors are done
with their travel and check is zero

    finish_check=1;                            //check to one
    delay(1000);                               //wait a second
    Serial.println("How many rotations do you want each motor to take(One number for each motor)"); //ask again
}
}
```