

Purpose:

Build an arduino code to use a DM542T to rotate a NEMA 23 stepper motor from 0 degrees to 80 degrees over 30 minutes and then from 80 degrees to 0 degrees over 30 minutes. The DM542T is connected as follows: PUL+ to pin 9, PUL- and DIR- to GND, DIR+ to pin 8 on the arduino.

To control a NEMA 23 stepper motor using a DM542T stepper driver and an Arduino, you can use the AccelStepper library to simplify the task of generating the step pulses and controlling the direction. Make sure you have the AccelStepper library installed in your Arduino IDE. You can install it via the Library Manager.

Here's a sample Arduino code that rotates the NEMA 23 stepper motor from 0 to 80 degrees over 30 minutes and then back to 0 degrees over 30 minutes

```
#include <AccelStepper.h>

// Define stepper motor connections
#define PUL_PIN 9
#define DIR_PIN 8

// Define the number of steps per revolution for your motor
#define STEPS_PER_REV 200 // Change this according to your motor's specifications

// Create an instance of the AccelStepper class
AccelStepper stepper(1, PUL_PIN, DIR_PIN);
void setup() {

    // Set the maximum speed and acceleration
    stepper.setMaxSpeed(1.2); // Adjust this value as needed
    stepper.setAcceleration(100); // Adjust this value as needed

    // Set the initial direction to move clockwise
    stepper.setSpeed(stepper.maxSpeed());

    // Set up the serial communication (for debugging)
    Serial.begin(9600);
    Serial.println("Stepper test!");
}

void loop() {
    // Move from 0 to needed position over 30 minutes (counterclockwise)
    stepper.moveTo(-STEPS_PER_REV * 80 / 360*50); // Convert degrees to steps and multiplies by a
    // factor to rotate it enough times to get dish into position
    stepper.runToPosition(); // Blocking call until the target position is reached

    // Move back to home over 30 minutes (clockwise)
    stepper.moveTo(0); // Return to the initial position
    stepper.runToPosition();
}
```

Notes:

We include the AccelStepper library and set up the stepper motor's connections and parameters.

In the `setup()` function, we set the maximum speed and acceleration for the stepper motor and initialize the serial communication for debugging (you can remove this if not needed).

In the `loop()` function, we repeatedly rotate the motor from 0 to 80 degrees and then back to 0 degrees over 30 minutes each.

Make sure to adjust the `STEPS_PER_REV` value according to your motor's specifications, as it represents the number of steps required for a full revolution of your NEMA 23 stepper motor. Additionally, fine-tune the speed and acceleration settings based on your specific motor and application requirements.

An example wiring diagram is shown below:

