



28 BYJ-48 Redüktörlü Step Motor ve ULN2003A Step Motor Sürücü Kartı

Stepper Motor Basics

What you get

Stepper motor, 28BYJ48, with a 5-way connector

Driver board, containing 4 Darlington drivers (ULN2003) and 4 LEDs



Motor Connections

The diagram to the left shows the 5 wires connected to the motor. Plug the motor into the driver board.

The Arduino should be connected to the ULN2003 driver board as shown below:

5V+ connect to +5V

5V- connect to 0V (Ground)

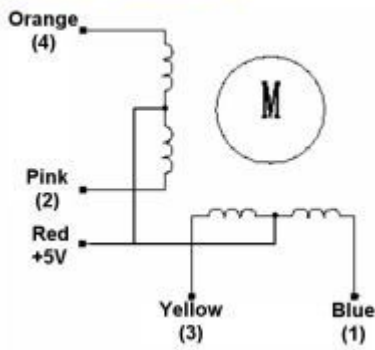
IN1: to Arduino digital input pin 8

IN2: to Arduino digital input pin 9

IN3: to Arduino digital input pin 10

IN4: to Arduino digital input pin 11

WIRING DIAGRAM



Driving the Motor

You should drive the motor by enabling the pins in an 8-phase order as shown to the left (Clockwise movement):

Drive IN4 only

Drive IN4 and IN3

Drive IN3 only

Drive IN3 and IN2

etc.

For anti-clockwise motion, simply follow the sequence in reverse

SWITCHING SEQUENCE

Lead Wire Color	---> CW Direction (1-2 Phase)							
	1	2	3	4	5	6	7	8
4 Orange	-	-						-
3 Yellow		-	-					
2 Pink			-	-				
1 Blue					-	-		

Example Code

```
// This Arduino example demonstrates bidirectional operation of a
// 28BYJ-48, using a ULN2003 interface board to drive the stepper.
// The 28BYJ-48 motor is a 4-phase, 8-beat motor, geared down by
// a factor of 68. One bipolar winding is on motor pins 1 & 3 and
// the other on motor pins 2 & 4. The step angle is 5.625/64 and the
// operating Frequency is 100pps. Current draw is 92mA.
```

```
////////////////////////////////////
```

```
//declare variables for the motor pins
```

```
int motorPin1 = 8; // Blue - 28BYJ48 pin 1
```

```
int motorPin2 = 9; // Pink - 28BYJ48 pin 2
```

```
int motorPin3 = 10; // Yellow - 28BYJ48 pin 3
```

```
int motorPin4 = 11; // Orange - 28BYJ48 pin 4
```

```

// Red - 28BYJ48 pin 5 (VCC)
int motorSpeed = 1200; //variable to set stepper speed
int count = 0; // count of steps made
int countsperrev = 512; // number of steps per full revolution
int lookup[8] = {B01000, B01100, B00100, B00110, B00010, B00011, B00001, B01001};
////////////////////////////////////////////////////////////////
void setup() {
  //declare the motor pins as outputs
  pinMode(motorPin1, OUTPUT);
  pinMode(motorPin2, OUTPUT);
  pinMode(motorPin3, OUTPUT);
  pinMode(motorPin4, OUTPUT);
  Serial.begin(9600);
}
////////////////////////////////////////////////////////////////
void loop(){
  if(count < countsperrev )
    clockwise();
  else if (count == countsperrev * 2)
    count = 0;
  else
    anticlockwise();
  count++;
}
////////////////////////////////////////////////////////////////
//set pins to ULN2003 high in sequence from 1 to 4
//delay "motorSpeed" between each pin setting (to determine speed)
void anticlockwise()
{
  for(int i = 0; i < 8; i++)
  {
    setOutput(i);
    delayMicroseconds(motorSpeed);
  }
}
void clockwise()
{
  for(int i = 7; i >= 0; i--)
  {
    setOutput(i);
    delayMicroseconds(motorSpeed);
  }
}
void setOutput(int out)
{
  digitalWrite(motorPin1, bitRead(lookup[out], 0));
}

```

```
digitalWrite(motorPin2, bitRead(lookup[out], 1));  
digitalWrite(motorPin3, bitRead(lookup[out], 2));  
digitalWrite(motorPin4, bitRead(lookup[out], 3));  
}
```