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Lab 7: Rotary Encoder

Introduction

A rotary encoder is an electro-mechanical device that converts the angular position or motion of a shaft or axle to an analog or digital code. Rotary encoders are usually placed at the side which is perpendicular to the shaft. Rotary encoders act as sensors for detecting angle, speed, length, position and acceleration in automation field.

Components list: Arduino uno board, usb cable, digital temperature sensor module, and jumper wires.
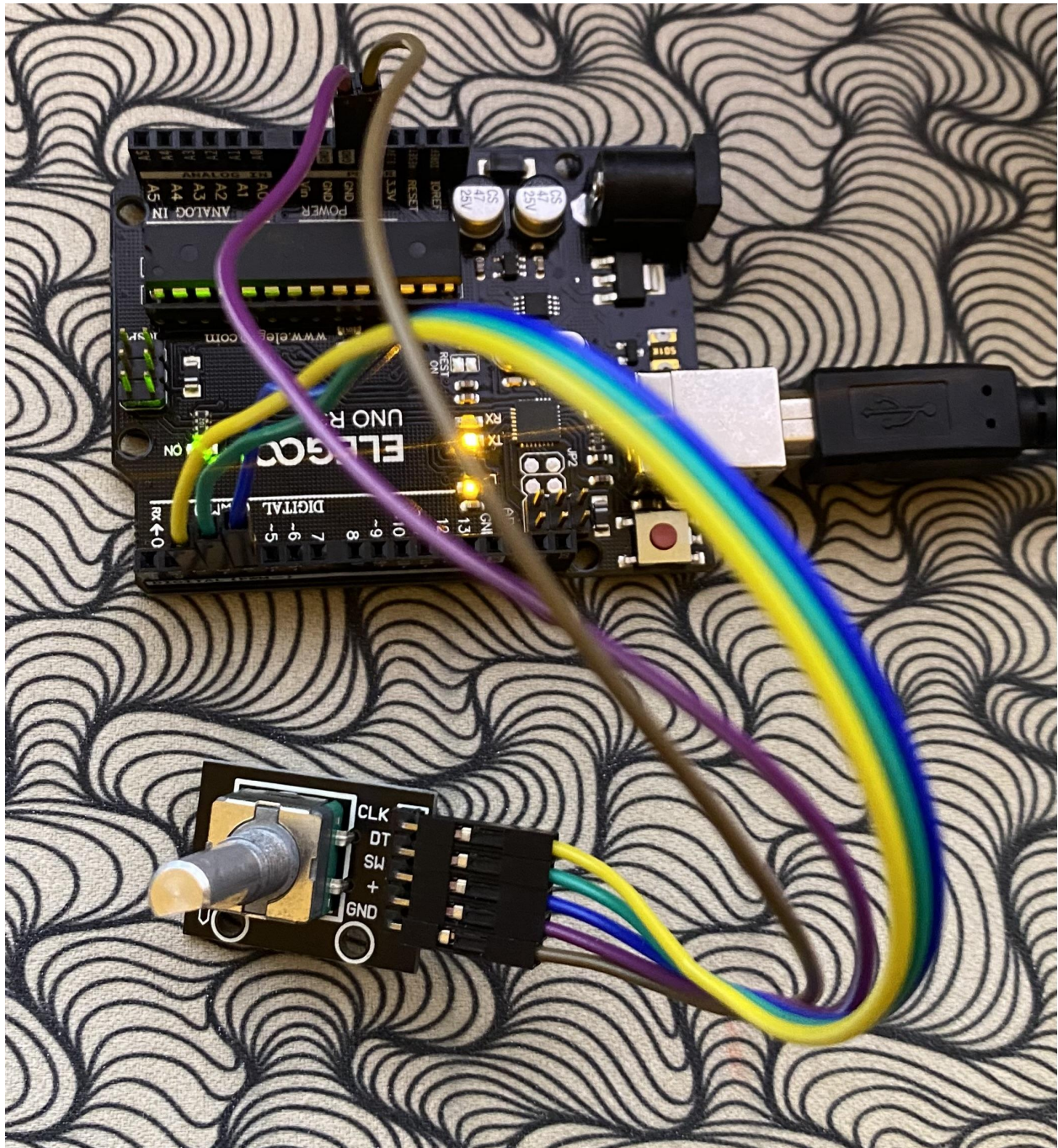
Experiment

By connecting the components as shown in the picture diagram below we can begin uploading code to the arduino and test the rotary motor..
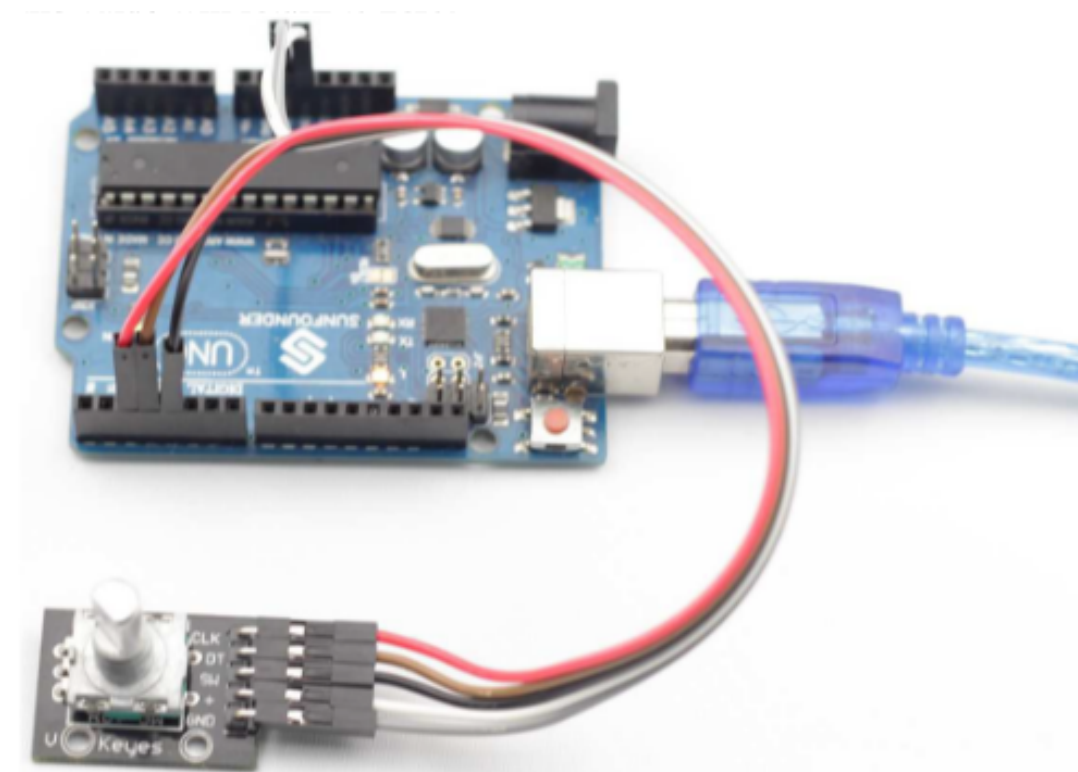
Test

Setup

Using the code below (CCW increase, CW decrease), the rotary encoder prints positive numbers if spun counterclockwise and negative if spun clockwise.

```
#define clkPin 2
#define dtPin 3
#define swPin 4 //the number of the button
int encoderVal = 0;
void setup()
{
pinMode(clkPin, INPUT);
pinMode(dtPin, INPUT);
pinMode(swPin, INPUT);
digitalWrite(swPin, HIGH);
Serial.begin(9600);
}
void loop()
{
int change = getEncoderTurn();

encoderVal = encoderVal + change;
if(digitalRead(swPin) == LOW)
{
encoderVal = 0;
}
Serial.println(encoderVal);
}
int getEncoderTurn(void)
{
static int oldA = HIGH;
static int oldB = HIGH;
int result = 0;
int newA = digitalRead(clkPin);
int newB = digitalRead(dtPin);
if (newA != oldA || newB != oldB)
{
// something has changed
if (oldA == HIGH && newA == LOW)
{
result = (oldB * 2 - 1);
}
}
oldA = newA;
oldB = newB;
return result;
}
```

Using the code below (CW increase, CCW decrease), the rotary encoder prints positive numbers if spun to clockwise and negative if spun counterclockwise.

```
#define clkPin 2
#define dtPin 3
#define swPin 4 //the number of the button
int encoderVal = 0;
void setup()
{
pinMode(clkPin, INPUT);
pinMode(dtPin, INPUT);
pinMode(swPin, INPUT);
digitalWrite(swPin, HIGH);
Serial.begin(19200);
}
void loop()
{
int change = getEncoderTurn();

encoderVal = encoderVal + change;
if(digitalRead(swPin) == LOW)
{
encoderVal = 0;
}
Serial.println(encoderVal);
}
int getEncoderTurn(void)
{
static int oldA = HIGH;
static int oldB = HIGH;
int result = 0;
int newA = digitalRead(clkPin);
int newB = digitalRead(dtPin);
if (newA != oldA || newB != oldB)
{
// something has changed
if (oldA == LOW && newA == HIGH)
{
result = (oldB * 2 - 1);
}
}
oldA = newA;
oldB = newB;
return result;
}
```

Conclusion

In this lab, I learned about how to code a program to use a rotary encoder. Using the arduino IDE, we can make a code that displays the measurement os each tick of the rotary encoder which can be either positive or negative. **Changing the buad rates in code will cause the information displayed on the serial monitor to change into unrecognizable information unless the buad rate is also changed in the serial monitor to match the code.** Overall, I liked this lab.