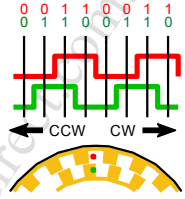# Rotary Encoder Module

This module contains an incremental rotary encoder. A rotary encoder detects when its shaft is rotated, and, in which direction it was rotated in. It also includes a normally open switch which is activated by pressing down in-line with the shaft.

Internally, the encoder contains 2 discs, one containing the rotating contact pads, and the other containing 2 static contacts. In the image at right the lower circular section represents the disc containing the contact pads which rotate (in gold), with the red and green dots representing the static contacts. The contact pads are arranged on the static disc in a specific sequence, and with each switch's contact ring out of phase with the other. This system is known as quadrature encoding as there are 4 (quad) possible states. By comparing the previous state of the contacts against the new state, the direction and rotation angle can be calculated.

The main uses for this type of control are for navigating display menu's, however variations of the disc assembly are often used to track the position of rotary motors.

Table 1: Rotary Encoder Module Pin Connections

Device	Arduino	Wire	Description
GND	GND	■	Ground connection.
+	5V	■	Positive 5 **V**olts **D**irect **C**urrent supply.
SW	D4	■	Connects to ground when switch is depressed.
DT	D3	■	Connects to rotary encoder contact A (data).
CLK	D2	■	Connects to rotary encoder contact B (clock).

D2, D3, D4 can be any digital pin.
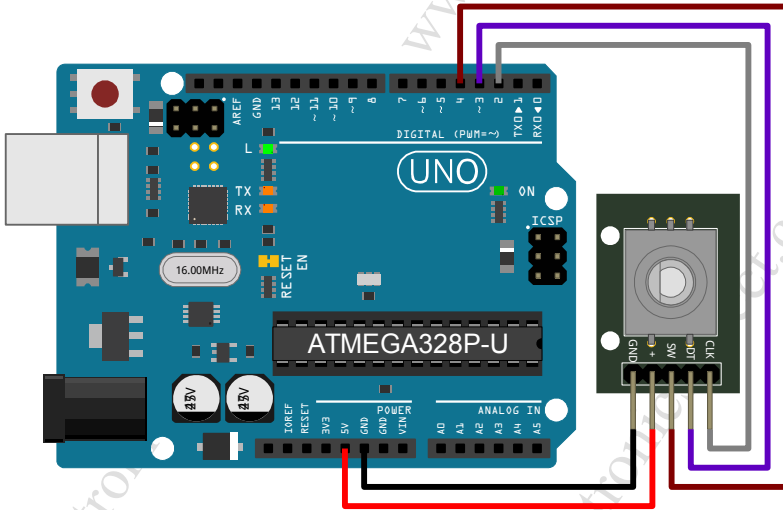
The sketch below displays the results to the Arduino Serial Monitor / Plotter.

```
int pCLK = 2;
int pDT = 3;
int pSW = 4;
int iEncoderPos = 0;
boolean bLastState = LOW;
void setup() {
  pinMode( pDT, INPUT );
  pinMode( pCLK, INPUT );
  pinMode( pSW, INPUT );
```

```
  digitalWrite( pDT, HIGH );
  digitalWrite( pCLK, HIGH );
  digitalWrite( pSW, HIGH );
  Serial.begin ( 9600 );
}
void loop() {
  boolean bEncoderCLK = digitalRead( pCLK );
  if ( ( bLastState == HIGH ) && ( bEncoderCLK == LOW ) ) {
    if ( digitalRead( pDT ) == LOW ) {
      iEncoderPos--;
    } else {
      iEncoderPos++;
    }
  }
  bLastState = bEncoderCLK;
  Serial.print ( iEncoderPos );
  Serial.print ( "," );
  Serial.println ( digitalRead( pSW ), DEC );
}
```

Module Specifications

PCB Dimensions (H × W × D) :	26.4 × 19.0 × 1.6 millimetres [mm]
Enclosing Dimensions (H × W × D) :	31.5 × 19.0 × 29.9 mm
Weight:	5.99 grams [g]
Input Voltage:	5 Volts Direct Current

Module Mounting

The module has 2.5 millimetre diameter mounting holes at the left hand side. As the bare component leads protrude through the bottom of the **P**rinted **C**ircuit **B**oard, suitable spacers and insulation must be used.

Projects

Folder: **\Modules\Interface\Rotary_Encoder**
- **Rotary_Encoder_SM**: Displays the results to the Arduino Serial Monitor / Plotter.

Rotary Encoder Module - Dimensions