# 4 CHANNEL 5V RELAY MODULE

A relay is an electrically operated device. It has a control system and (also called input circuit or input contactor) and controlled system (also called output circuit or output contactor). It is frequently used in an automatic control circuit. To put it simply, it is an automatic switch to controlling a high-current circuit with a low-current signal.
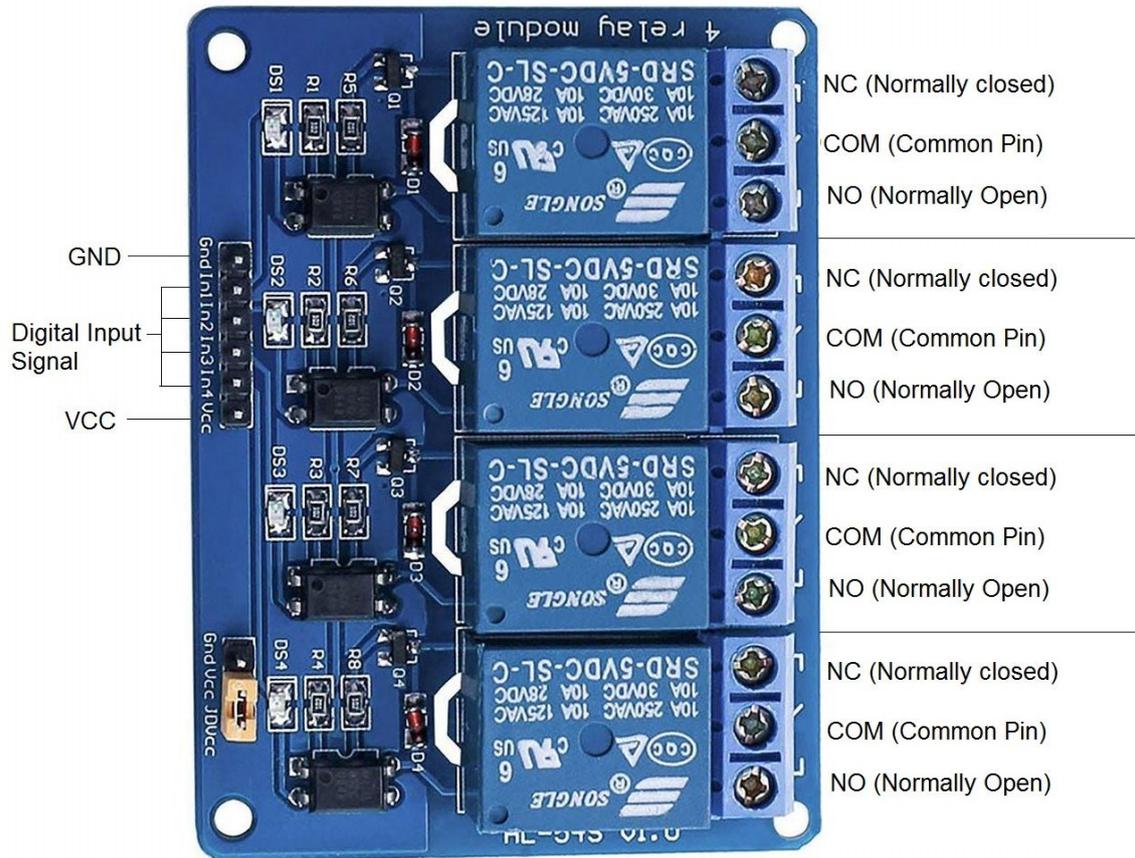
Features

- SMD opt coupler isolation
- Good in safety. In power system and high voltage system, the lower current can control the higher one, able to control various appliances and other equipment with high-current current.
- Standard interface that can be controlled directly by microcontroller (Arduino, 8051, AVR, PIC, DSP, ARM, ARM, MSP430, TTL logic).
- Indication LEDs for Relay output status.
- With a normally-open (NO) and a normally-close (NC) contact.

SPECIFICATIONS

- Number of Relays: 4
- Control signal: TTL level
- Rated load: 7A/250VAC; 10A/125VAC; 10A/28VDC;
- Contact action time: 10ms/5ms
- Current: 15-20mA per channel

UNDERSTANDING HOW TO CONTROL THE BREAKOUT BOARD

This breakout board is expecting to see a digital output signal on each of its 4 control pins so the code will be fairly simple to set up. When each Arduino pin is set "high" the connected relay will switch. When the Arduino pin is set "low" the relay will return to its off position.

PINOUT

- **COM - Common pin:** This is source pin, that starts connected to NC, and connects to NO when you apply 0v / GND (active low)
- **NC (Normally Closed):** in which case NC is connected with COM when INT1 is set low and disconnected when INT1 is high;
- **NO (Normally Open):** in which case NO is disconnected with COM1 when INT1 is set low and connected when INT1 is high.
- **INT 1- Relay 1 control port**: changes from the **COM–>NO** to the **COM–>NC** when you apply **0v / GND (active low)**
- **INT 2- Relay 2 control port:** changes from the **COM à NO** to the **COM à NC** when you apply **0v / GND (active low)**

CONNECTION
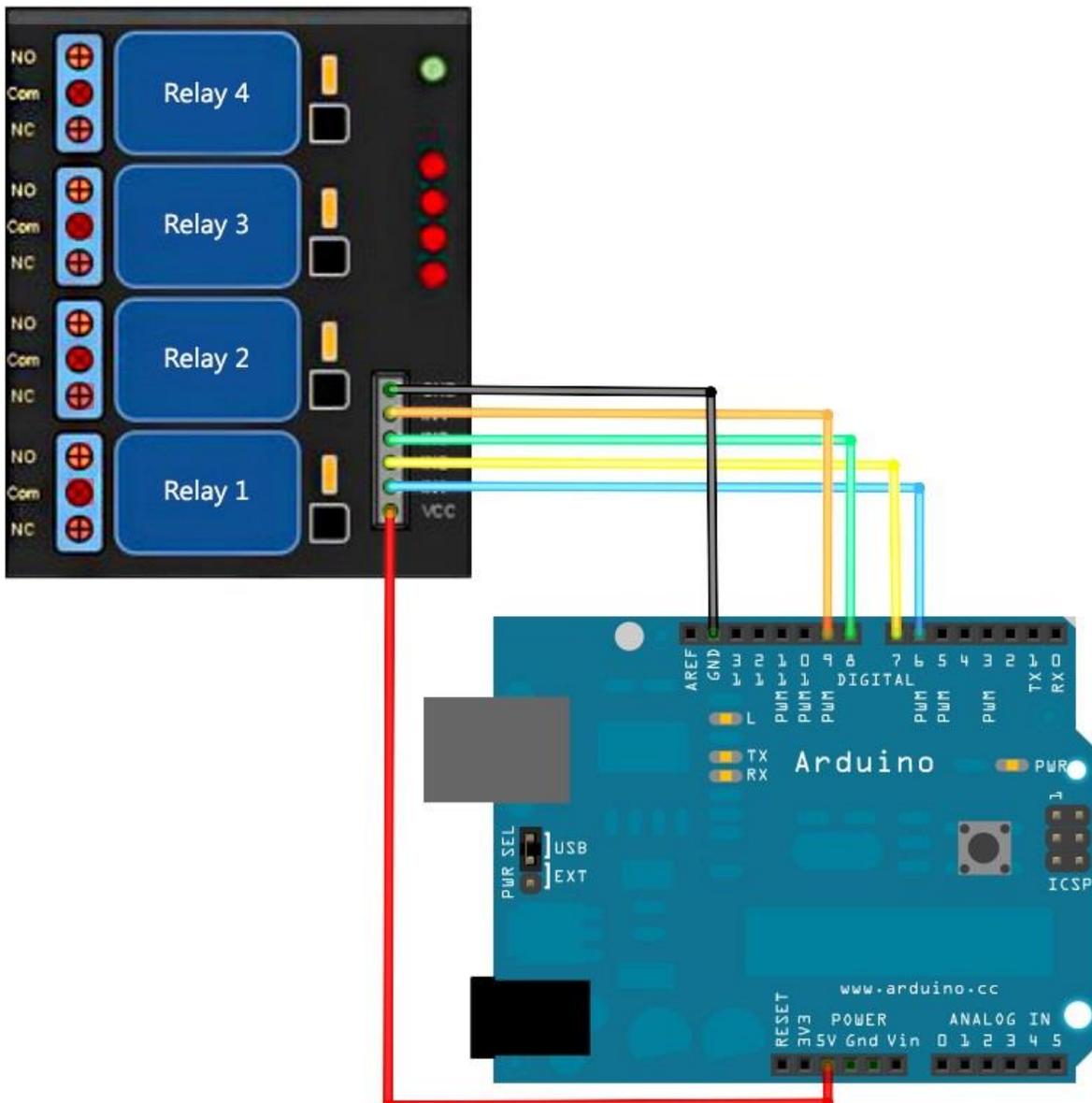
Example of connecting power and lights to a relays COM and NO connectors.
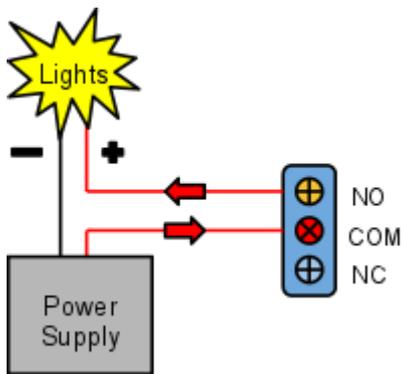
CODE

Enter the following sketch, upload it
if you open your Arduino serial monitor you will be able to see the progress.

```
// Basic 4 Realy board connection

// Each relay is turned on for 2 seconds and then off.

// You can here them click as there state changes from off to on and on to off.

// You will also see the corresponding Red LED on the 4 Relay board light up when the relay is on.

// Define names for the 4 Digital pins On the Arduino 7,8,9,10

// These data pins link to 4 Relay board pins IN1, IN2, IN3, IN4


#define RELAY1  6

#define RELAY2  7

#define RELAY3  8

#define RELAY4  9


void setup(){

// Initialise the Arduino data pins for OUTPUT

  pinMode(RELAY1, OUTPUT);

  pinMode(RELAY2, OUTPUT);

  pinMode(RELAY3, OUTPUT);

  pinMode(RELAY4, OUTPUT);

}


void loop(){

  digitalWrite(RELAY1,LOW);        // Turns ON Relays 1

  delay(2000);                      // Wait 2 seconds
```

```
    digitalWrite(RELAY1,HIGH);        // Turns Relay Off


    digitalWrite(RELAY2,LOW);         // Turns ON Relays 2
    delay(2000);                       // Wait 2 seconds
    digitalWrite(RELAY2,HIGH);        // Turns Relay Off


    digitalWrite(RELAY3,LOW);         // Turns ON Relays 3
    delay(2000);                       // Wait 2 seconds
    digitalWrite(RELAY3,HIGH);        // Turns Relay Off


    digitalWrite(RELAY4,LOW);         // Turns ON Relays 4
    delay(2000);                       // Wait 2 seconds
    digitalWrite(RELAY4,HIGH);        // Turns Relay Off
  }
```

WORKING

Now that all of the code has been written it can be uploaded to your Arduino! Click "Upload" button in the top left corner of the Arduino IDE and it should upload without any issues. After a few seconds the relays should start turning on and off in order one after another at a 2 second interval.

Stay tuned for Part II of this tutorial – we will look at using digital and analog inputs to trigger relays!

NORMALLY OPEN VS. NORMALLY CLOSED

The relay has two different types of electrical contacts inside – normally open (NO) and normally closed (NC). The one you use will depend on whether you want the 5V signal to turn the switch on or turn the switch off. The 120-240V supply current enters the relay at the common (C) terminal in both configurations. To use the normally open contacts, use the NO terminal. To use the normally closed contacts, use the NC terminal.

NORMALLY OPEN

In the normally open configuration, when the relay receives a HIGH signal the 120-240V switch closes and allows current to flow from the C terminal to the NO terminal. A LOW signal deactivates the relay and stops the current. So if you want the HIGH signal to turn ON the relay, use the normally open terminal:

NORMALLY CLOSED

In the normally closed configuration, a HIGH signal opens the switch and interrupts the 120-240V current. A LOW signal closes the switch and allows current to flow from the C terminal to the NC terminal. Therefore, if you want the HIGH signal to turn OFF the 120-240V current, use the normally closed terminal: