

**Al-Mustaqbal University**  
**College Of Engineering & Technology**  
**Department of Computer Engineering Techniques**  
**(Stage: 3)**  
**Digital Control**  
**Lecture 14**  
**Arduino programming**  
**Dr.: Fanar Ali Joda**

## **Single Channel Relay Module**

---

A **single-channel relay** is an electronic switch that can be controlled by a low-power electrical signal, such as the output from an Arduino microcontroller. By using an **Arduino Uno** and a single-channel relay module, you can control high-voltage or high-power devices, such as lights, motors, and appliances, from your computer or mobile device.

## Single Channel Relay Module Pinout

 Power	 NO	 NC
 GND	 COM	 IN



### Single Channel Relay

#### PINOUT



**VCC** - this pin provides power to the module

**GND** - this is the common ground

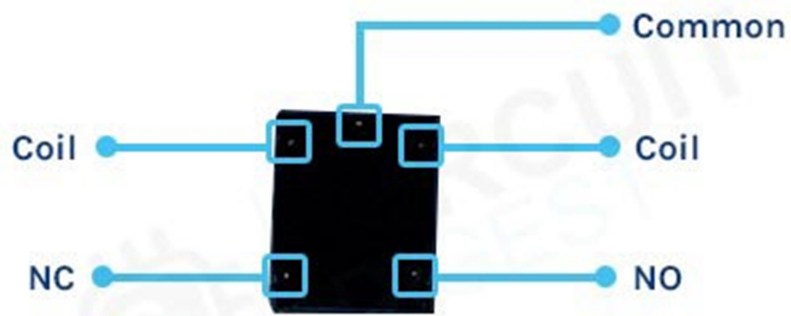
**IN** - This pin is also called the control pin because it is used to control the output of the relay.

**COM** - is connected to the device you intend to connect.

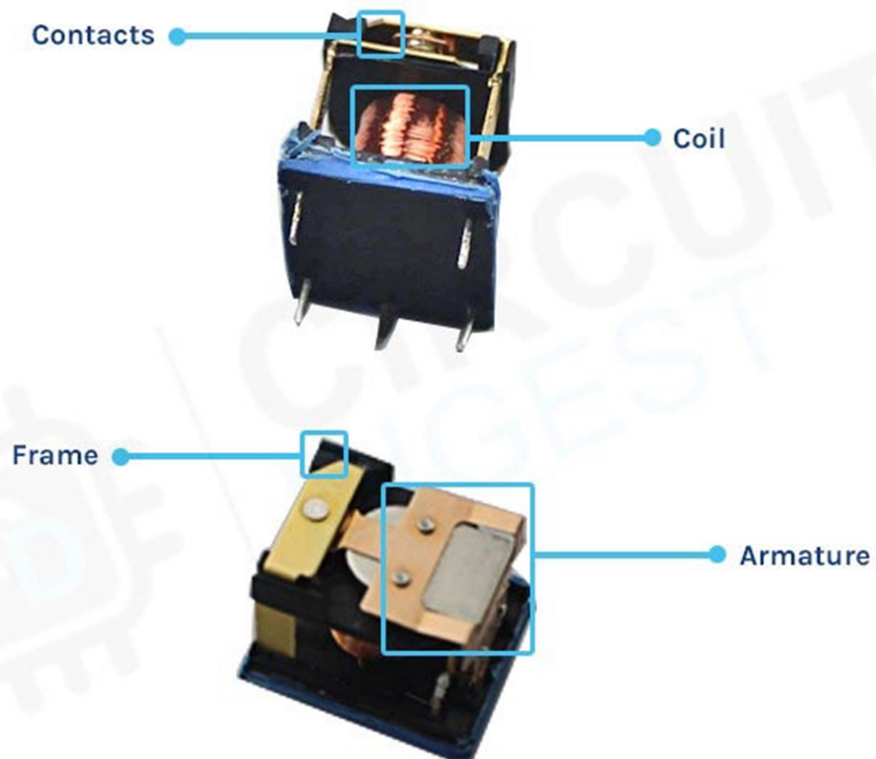
**NC** - terminal is connected to the COM terminal by default unless you activate the relay which breaks the connection

**NO** is normally open unless you activate the relay which then connects it to the COM terminal

## Single Channel Relay Module Parts



**RELAY TERMINALS**



The construction of a single-channel relay typically consists of the following components:

1. Coil: The coil generates a magnetic field when an electrical current is passed through it, which is used to open or close the switch contacts.

2. Contacts: The contacts are the switching elements of the relay and can be **normally open (NO)** or **normally closed (NC)**. When the coil is energized, the magnetic field attracts a movable armature, which opens or closes the contacts.

3. Armature: The armature is a movable component that is attracted by the magnetic field generated by the coil. It opens or closes the contacts, depending on the state of the coil.

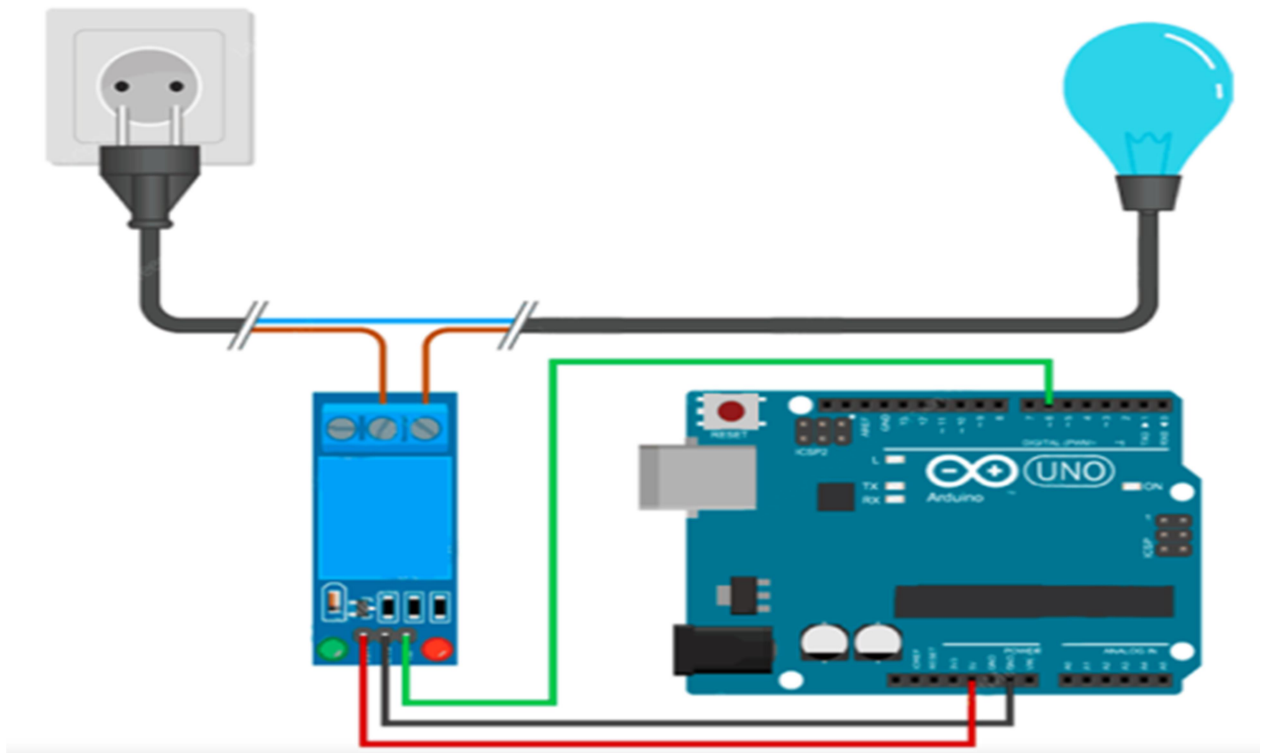
4. Frame: The frame provides mechanical support for the relay components and protects the relay from external damage.

5. Terminals: The terminals provide a means of connecting the relay to external circuits. The coil is connected to a control circuit, while the contacts are connected to the load.

In addition to these basic components, some relays may also include additional features, such as LED indicators, protection diodes, snubber circuits, or other components to enhance their performance and reliability.

## Circuit Diagram of Interfacing Single Channel Relay with Arduino UNO

Below is the circuit diagram to **control AC appliances using Arduino and relay**:



```
int relay_pin = 6;
void setup() {
    pinMode(relay_pin,OUTPUT);
}
void loop() {
    digitalWrite(relay_pin,HIGH);
    delay(2000);
    digitalWrite(relay_pin,LOW);
    delay(2000);
}
```