**TRIAC SWITCH TO CONTROL HIGH-VOLTAGE DEVICES**

**ABSTRACT:**

From ages electro-magnetic relays are being used as switches to control high voltage devices. But because of their bulky size and noise (both electrical and mechanical) people started using TRIAC with opto-coupler as better alternative.  
  
 The circuit uses TRAIC and Opto-coupler to use small voltage to control high voltage devices. For example, micro-controller to control 220v bulb or any device which runs on high voltage.

**PRINCIPLE OF WORKING:**

**ON Condition:**   
When 5v is applied to pin 1 & 2 of the opto-coupler (MOC3021), pin 6 & 4 gets connected internally(Within opto-coupler) and allows current to flow between them. This connection provides GATE current to the TRIAC (TRIAC pin 3) and TRIAC starts conducting the main current between pin 2 & 1, which completes the circuit and makes bulb to glow.

**OFF Condition:**   
Now, when 0V is applied to opto-coupler, opto-coupler makes pin 6 & 4 electrically opened and doesn't allow any current to flow between them, as a result it stops the GATE current to TRIAC and the main current between pin 2 & 1 also stops, which finally turns off the bulb.

Both type of devices working on AC and DC can be controlled using this switch, provided proper power supply is used for them

Important to note that the mentioned snubber circuit is only required if your load is inductive (like motor etc...). For non inductive loads you can just remove C2 & R3 from your circuit and leave it open.

It is important to select proper current rating TRIAC, above circuit may support device which draws up to 4A of current.

**Benefits of this circuit**

1. Very low voltage 3V to 5V can be used to control load device.
2. Opto-Coupler maintains separation between high voltage and low voltage circuitry and never allows high voltage to flow back to micro-controller making it safe.
3. No mechanical noise.
4. Compact, occupies less volume on PCB.
5. Can be used for fast switching, electromagnetic relays cannot due to mechanical make/break.

**CIRCUIT DIAGRAM:**

