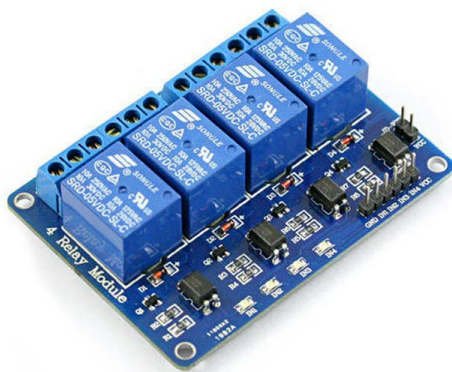
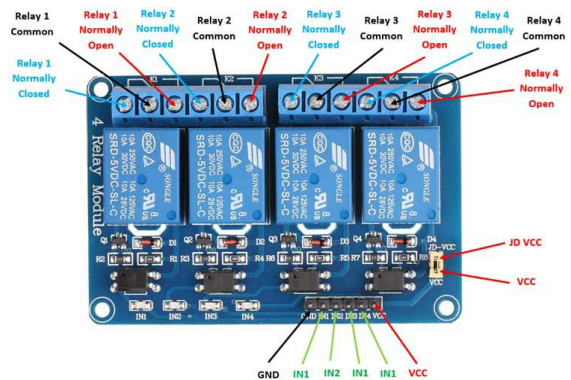


5V Four-Channel Relay Module

11 January 2021 - 0 Comments



5V Four-Channel Relay Module



Four-Channel Relay Module Pinout

The **four-channel relay module** contains four 5V relays and the associated switching and isolating components, which makes interfacing with a microcontroller or sensor easy with minimum components and connections. The contacts on each relay are specified for 250VAC and 30VDC and 10A in each case, as marked on the body of the relays.

Four-Channel Relay Module Pinout

Pin Number	Pin Name	Description
1	GND	Ground reference for the module
2	IN1	Input to activate relay 1

3	IN2	Input to activate relay 2
4	IN3	Input to activate relay 3
5	IN4	Input to activate relay 4
6	V _{CC}	Power supply for the relay module
7	V _{CC}	Power supply selection jumper
8	JD-V _{CC}	Alternate power pin for the relay module

Components Present on A Four-Channel Relay Module

Following are the major components present on the four-channel relay module, we will get into the details of this later in the article.

5V relay, terminal blocks, male headers, transistors, optocouplers, diodes, and LEDs.

Four-Channel Relay Module Specifications

- Supply voltage – 3.75V to 6V
- Trigger current – 5mA
- Current when the relay is active - ~70mA (single), ~300mA (all four)
- Relay maximum contact voltage – 250VAC, 30VDC
- Relay maximum current – 10A

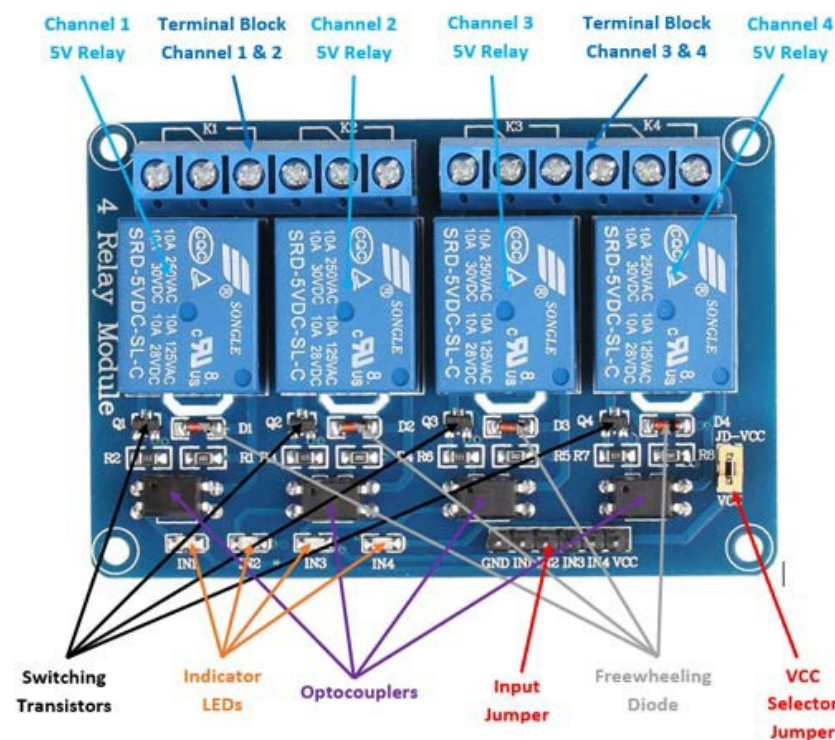
Alternate Relay Modules

Single-channel relay module, dual-channel relay module, eight-channel relay module.

Alternate Modules

SCRs, TRIACs, Solid State Relay module.

Understanding 5V Four-Channel Relay Module



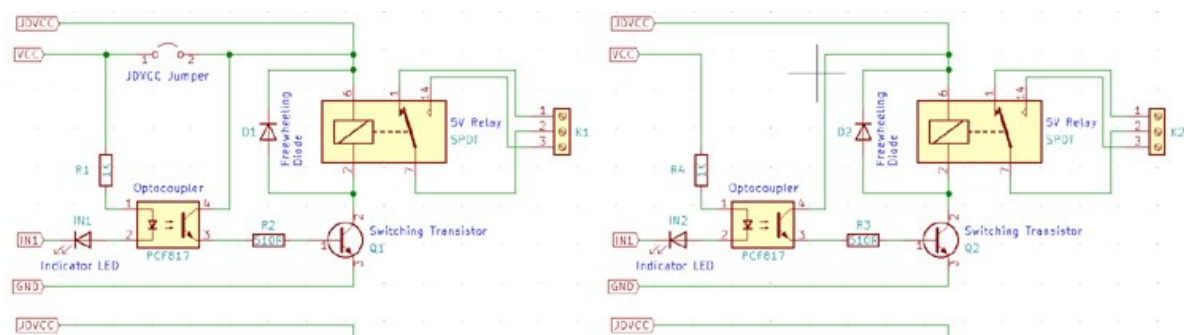
The four-channel relay module contains four **5V relays** and the associated switching and isolating components, which makes interfacing with a **microcontroller** or **sensor** easy with minimum components and connections. There are two terminal blocks with six terminals each, and each block is shared by two relays. The terminals are screw type, which makes connections to mains wiring easy and changeable.

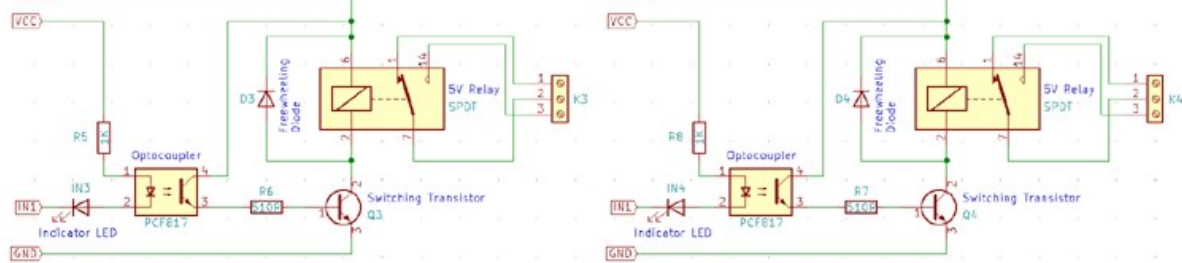
The four relays on the module are rated for 5V, which means the relay is activated when there is approximately 5V across the coil. The contacts on each relay are specified for 250VAC and 30VDC and 10A in each case, as marked on the body of the relays.

The switching **transistors** act as a buffer between the relay coils that require high currents, and the inputs which don't draw much current. They amplify the input signal so that they can drive the coils to activate the relays. The freewheeling diodes prevent voltage spikes across the transistors when the relay is turned off since the coils are an inductive load. The indicator **LEDs** glow when the coil of the respective relay is energized, indicating that the relay is active. The **optocouplers** form an additional layer of isolation between the load being switched and the inputs. The isolation is optional and can be selected using the V_{CC} selector jumper. The input jumper contains the main V_{CC} , GND, and input pins for easy connection using female jumper wires.

Internal Circuit Diagram For Four-Channel Relay Module

The circuit on the board is as follows:





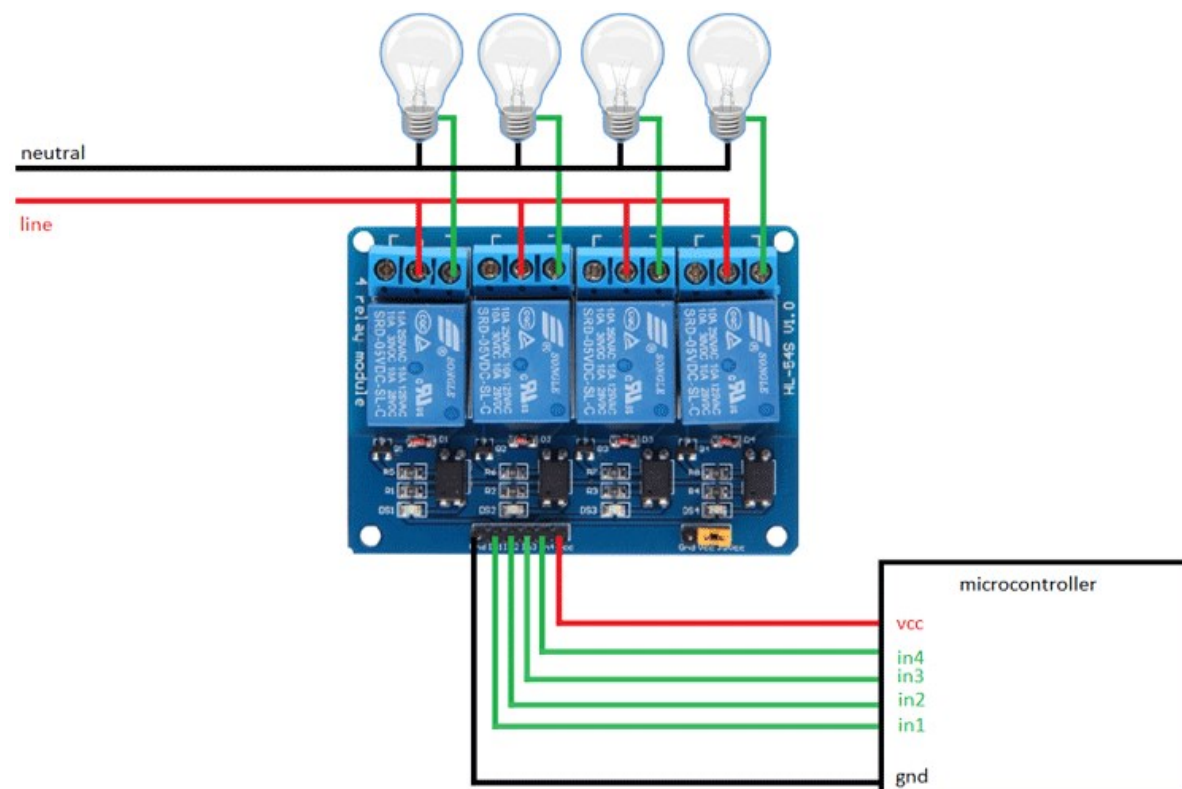
Each relay on the board has the same circuit, and the input ground is common to all four channels.

The driver circuit for this relay module is slightly different compared to traditional relay driving circuits since there is an optional additional layer of isolation. When the jumper is shorted, the relay and the input share the same V_{CC} , and when it is open, a separate power supply must be provided to the JD- V_{CC} jumper to power the relay coil and optocoupler output.

The inputs for this module are active low, meaning that the relay is activated when the signal on the input header is low. This is because the indicator LED and the input of the optocoupler are connected in series to the V_{CC} pin on one end, so the other end must be connected to the ground to enable the current flow. The optocouplers used here are the PCF817, which is a common optocoupler and can also be found in through-hole packaging.

How To Use The Four-Channel Relay Module

The four-channel can be used to switch multiple loads at the same time since there are four relays on the same module. This is useful in creating a central hub from where multiple remote loads can be powered. It is useful for tasks like home automation where the module can be placed in the main switchboard and can be connected to loads in other parts of the house and can be controlled from a central location using a microcontroller.



In this diagram, four separate loads (represented by lightbulbs) have been connected to the NO

terminals of the relay. The live wire has been connected to the common terminal of each relay. When the relays are activated, the load is connected to the live wire and is powered. This setup can be reversed by connecting the load to the NC terminal that keeps it powered on till the relay is activated.

Dual-Channel Relay Module Basic Troubleshooting

If either of the relays does not turn on:

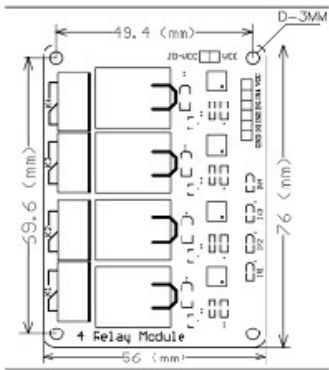
1. The contacts might be welded due to overcurrent/arcing. Shaking the module firmly might help unstick the contacts
2. The driver circuitry might have been damaged due to overvoltage.
3. Input polarity might be incorrect.
4. Jumper might not have been moved to the correct position

Dual-Channel Relay Module Applications

- Switching mains loads
- Home automation
- Battery backup
- High current load switching

2D Model Of The Module

The **dimensions of the 4-Channel Relay module** are given below.



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