

Control module with optocoupler relay



AI Overview

A relay module with an optocoupler allows safe control of high-power devices from low-voltage circuits by providing electrical isolation between the control and load sides.

Overview A relay module with an optocoupler integrates a standard electromechanical relay with an optical isolator. The optocoupler uses an internal LED and phototransistor to transmit signals without direct electrical contact, protecting the control circuit from voltage spikes, noise, and high currents. These modules are commonly used with microcontrollers like Arduino, ESP32, or ESP8266 to switch AC or DC loads safely.

Key Components

- Optocoupler** (e.g., PC817, 4N35): Provides electrical isolation between the control signal and the relay coil.
- Relay** (e.g., 5V or 12V coil): Switches the high-power load; can have single or multiple channels.
- Transistor** (e.g., NPN 2N3904): Acts as a driver to supply sufficient current to the relay coil.
- Flyback diode** (e.g., 1N4007): Protects the transistor and control circuit from voltage spikes generated when the relay coil turns off.
- Resistors**: Limit current to the optocoupler LED and transistor base.
- Input pins** (IN, VCC, GND): Connect to the microcontroller or control circuit to trigger the relay.

Working Principle A low-voltage control signal is applied to the module's input pin. The optocoupler LED lights up, activating the internal phototransistor. The phototransistor drives the transistor switch, which allows current to flow through the relay coil. The relay contacts switch the high-power load, while the control side remains electrically isolated.

Practical Considerations Ensure the relay coil resistance is compatible with the optocoupler and transistor to avoid overheating; typically, the coil should not draw more than 30-50 mA directly through the optocoupler. Use a flyback diode across the relay coil to prevent back EMF damage. Modules can be single-channel or multi-channel, allowing control of multiple devices from one microcontroller. Optocoupler relay modules are widely used in industrial automation, home automation, and microcontroller projects for safe switch...

Article Content

Industrial isolated 8-Channel ESP32-S3 WiFi Relay Module RS485

ESP32-S3-ETH-8DI-8RO is an industrial-grade 8-channel WiFi network relay based on ESP32-S3 main controller and supports WiFi, Bluetooth, RS485, network port and other peripheral interfaces. It has

Arduino 4 channel relay module 5V control board with optocoupler Relay ...

Working status indicator lights are conducive to safe use. 4-channel relay interface board, which can be controlled directly by a wide range of microcontrollers such as- Arduino, AVR, PIC, ARM, PLC, etc. It

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Robust solution for controlling various devices with ease. This relay board ensures durability, featuring eight channels that can be individually controlled through USB connection. For professional in

How to Use Relay with optocoupler: Examples, Pinouts,

Learn how to use the Relay with optocoupler with detailed documentation, including pinouts, usage guides, and example projects. Perfect for students, hobbyists,

How to properly use a relay module with JD-VCC from

Short answer The OP's 4 channel relay module is "Low Logical Level Triggerable" (Low Trigger) with the "JD-Vcc jumper" to suit different

5V Two 2 Channel Relay Module With optocoupler For PIC AVR DSP

5V Two 2 Channel Relay Module With optocoupler For PIC AVR DSP ARM Arduino TxHang Electronic (581962) 99.4% positive

User's Guide: 12V 4-Channel Relay Module with Optocoupler

This module allows microcontrollers to control high-voltage devices (AC or DC) using opto-isolated relays. Each channel can be triggered by either HIGH or LOW logic, selectable via

Generic 2 Channel Relay Module with Optocoupler Isolation, High and

Product details Optimize your automation control systems with this 12V 2-Channel Relay Module. Engineered for durability, it utilizes premium relays capable of handling AC 250V/10A or DC 30V/10A

Industrial Control Board USB Relay PRO 3-Way Relay Isolation Rail

Industrial Control Board USB Relay PRO 3-Way Relay Isolation Rail USB/TTL4836
Advanced Functionality: This USB/TTL Control Relay is designed for robust industrial applications, featuring 3

4 Channel 5V Relay Module with Optocoupler

Featuring four independent relays, optocoupler isolation for safety, and LED indicators for easy monitoring, it's compatible with Arduino, Raspberry Pi, and

3.3V 5V 3 Channel Relay Module 5mA With

3.3V/5V 3-channel relay module with optocoupler isolation, 5mA, DC power, sealed protection, low power contact load, compatible signal, 1 piece per pack, 11x11x3

Relay 5V 4CH 30A with optocoupler isolation support high and low

Using double-sided FR-4PCB board Using high-power relay, control the load up to 30A
With each optocoupler isolation, anti-interference ability Black 9500 terminals, more convenient for high-current

Arduino Tutorial: 2-Channel Optocoupler Relay Module

Step 1: Experiment: 2-Channel Relay Module with Optocoupler Protection for Arduino Expansion Boards

How to Use One Channel Relay with Optocoupler: Pinouts, Specs,

Learn how to use the One Channel Relay with Optocoupler with detailed documentation, including pinouts, usage guides, and example projects. Perfect for students, hobbyists, and developers

38-3D 16 Channel Relay Module

5V 16-Channel Relay Module with Optocoupler Isolation (High/Low Level Trigger) This 5V 16-channel relay module uses SMD optocoupler isolation to provide stable performance and reliable driving

2-relay module 5V with optocoupler low-level trigger compatible with ...

Thanks to an additional transistor, the module can be switched with most microcontrollers with little current. Equipped with transistors, diodes

Relay Module 2 Channel USB to CH340 Serial Control Relay Module ...

Beskrivelse og detaljer Oversigt 1. USB serial port control relay, serial port control, long life, overcurrent protection 2. USB serial port control relay, newly upgraded and advanced version, with new

6Pcs DC 3.3V Relay Module 1 Channel Optocoupler

It is essentially an "automatic switch" that uses a smaller current to control a larger current. It is used to control 10A250VAC, 10A30VDC loads, and has an output
msrelay

Founded in February 2007, Meishuo Technology is a high-tech enterprise specialising in the research, development, production and sales of relay control

Relay Module Optocoupler: Schematic and Working

This article shares the Relay Module Optocoupler Schematic and Working principle. Cheap DIY relay module project with guidance.

3.3V 5V 3 Channel Relay Module 5mA With

3-Channel Isolated Control Equipped with 3 independent channels, each featuring optocoupler isolation, this module ensures safe and reliable switching for multiple

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