lamaPLC: Multi-channel Solid State Relay Module

Microcontroller-compatible Solid-State Relays (SSRs) connect low-power microcontrollers to high-power AC devices. Unlike traditional mechanical relays, SSRs lack moving parts and instead use light and semiconductors for safe, quiet switching of electrical power.

A key feature of an SSR is safety via optical isolation. When an Arduino pin outputs a HIGH signal (usually 5V or 3.3V), it activates a small internal Infrared (IR) LED. The chip contains a physical gap that prevents high-voltage AC from returning to the microcontroller, but allows light to pass. A light-sensitive semiconductor, such as a phototriac, is positioned opposite the LED. When it detects IR light, it becomes conductive, completing the circuit and powering the load.

Crucial Limitations

- **AC Loads Only:** The SSR uses a TRIAC output and cannot switch DC loads. Attempting to control a DC motor or LED strip will keep the relay in the “ON” position until power is completely disconnected.
- **Minimum Load Requirement:** SSRs have a small leakage current of approximately 1.5 mA. If you connect a load that draws very little current, such as a tiny 0.5W LED bulb, the light may glow faintly or flicker even when the relay is off.

G3MB-202P Multi-Channel Solid State Relay Module

The OMRON G3MB-202P is a low-cost, subminiature, PCB-mounting *Solid State Relay* (**SSR**) designed for high-density applications. It is widely used in DIY electronics, Arduino, and Raspberry Pi projects to safely switch AC loads up to 2A using low-voltage DC signals.

Key Specifications

- **Load Voltage:** 100 to 240 V AC (50/60 Hz).
- **Maximum Load Current:** 2 A.
- **Input Control Voltage:** 5 V DC (standard model variant).
- **Switching Method:** Zero-cross function (turns on when AC voltage crosses zero to reduce noise).
- **Form Factor:** 4-pin compact SIP (Single In-line Package) layout.