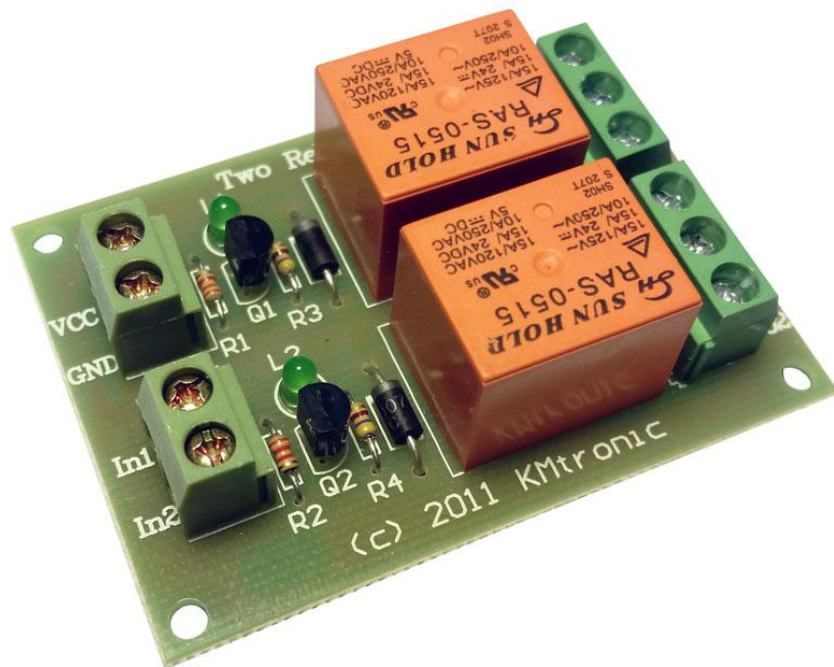


KMTRONIC  
LTD

# Relay Controller Model C2R5 User Guide



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# I. CONNECTING AND OPERATION

## 1. Security and Handling

Safety Instructions:

This device may be used to control external devices connected to its onboard relays. Incorrect wiring or shorts on the board can potentially cause damage to the board itself, your device. Extreme care must be taken when using this device to avoid any damage to your equipment. In particular, make sure you always disconnect the power of external device before touching the board.

KMTronic, its shareholder, employees, suppliers, distributors and/or resellers are not liable for any damage or loss of data as a result of the use of this device, including special, incidental, or consequential damages resulting from the use of this device, or under any legal theory, including lost profits, downtime, goodwill, damage to or replacement of equipment or property, and any costs.

**Your use of this circuit indicates your acceptance of these terms**

## 2. An Overview

KMTronic Two Channel Relay is a versatile product for controlling electrical and electronic devices. Connects easily to microcontrollers, Raspberry Pi, Arduino or other TTL devices.

Some of the possible uses of the module include

- Home Automation
- Lighting Control
- Garden Equipment Control
- Industrial Automation
- Test Fixtures
- DIY and Hobby

### 2.1 Specification

- Number of Relays : 2
- Rated voltage: DC5V
- Relay switching power: 15A/24VDC(125VAC) 10A/250VAC
- Dimension: 61mm x 43mm x 17mm

### 2.2 Package Contents

The following is included in the Two Channel Relay package

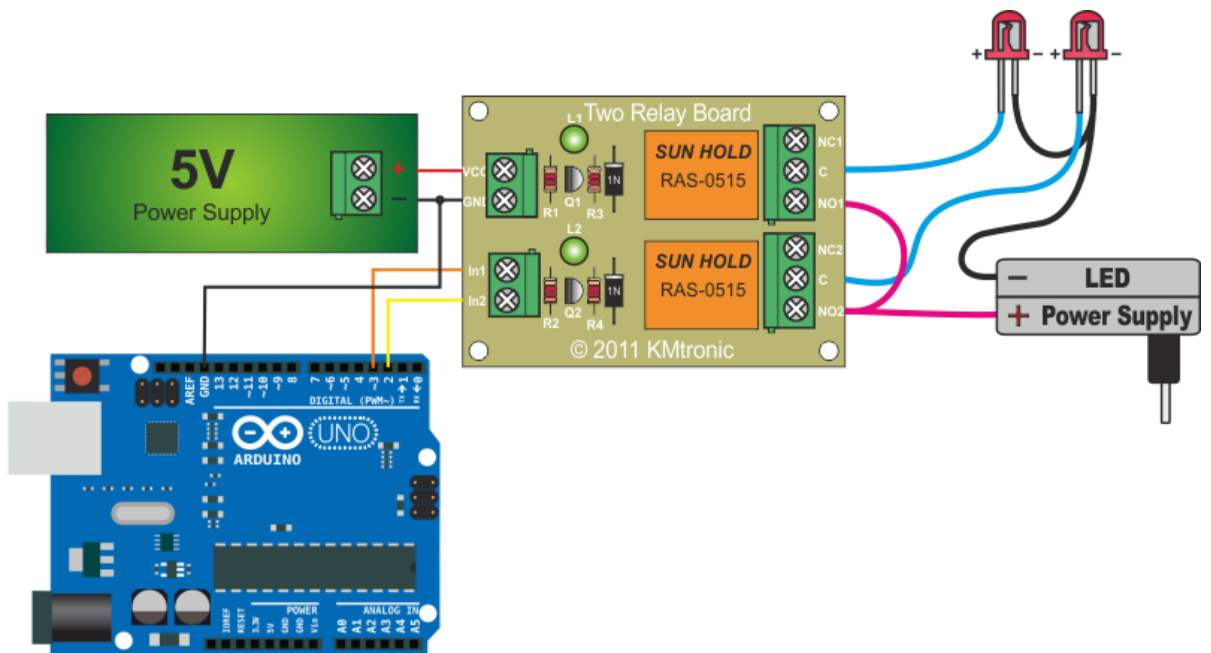
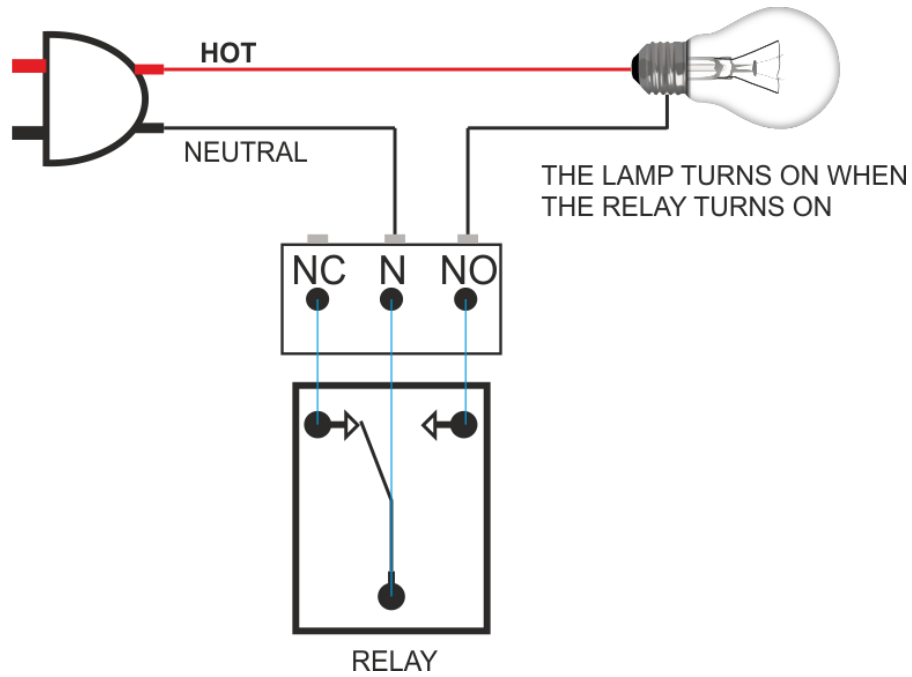
- Two Channel Relay

## 2.3 Operation Requirements

- 5V DC Power Supply
- Medium size screw driver

## 3 How to use Two Channel Relay

### 3.1 Connection Details



Above images shows basic connection diagram that can be used in most of the situations. The connection diagram is same for both AC and DC loads. Please make sure to use a freewheeling diode or snubber circuit if the load is inductive. More details about using inductive loads are available elsewhere in this document. It is important to make sure that the wires used to connect loads are sufficiently rated to handle expected load current. Exercise caution while working with high voltages. Short circuits can cause damage to the module. The following sections identify individual connections in detail.

**IMPORTANT NOTE**

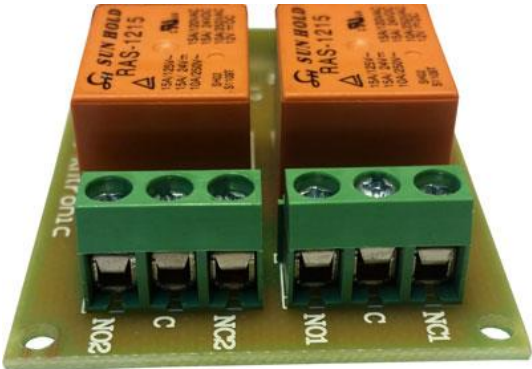


**This circuit involves high voltage AC main power wiring when used to control high voltage AC devices. Please note that handling, testing and operating high voltage AC powered equipment can be dangerous and fatal when basic safety rules are not followed. ALWAYS disconnect the circuit from the AC line prior to performing any work on the circuit.**

**If you are inexperienced or not confident in working with high voltage AC powered circuits, we strongly recommend that you DO NOT attempt to use this circuit and seek help of a licensed electrician.**

**Relay Contacts**

All contacts on each relay are available externally on screw terminals for easy user access. The relays are rated for AC and DC supply voltages. Please see the electrical parameter table for more details. Each relay has three contacts(C, NO and NC). C is the common terminal and is used in both normally open and normally closed positions. The contacts NC and C will be connected when the relay is turned off and will be disconnected when relay is turned on. And vice versa, the contacts C and NO will be disconnected when relay is turned off and will be connected when the relay is turned on. Table below summarizes possible relay contact



Relay State	Connection between NC and C	Connection between NO and C
OFF	Close	Open
ON	Open	Close

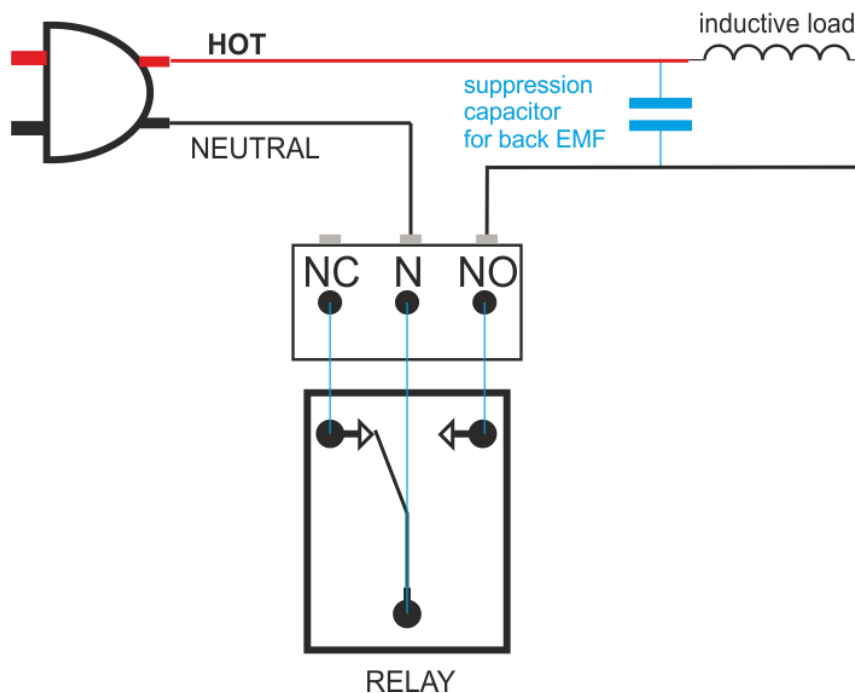
## 4 Additional information

### 4.1 Handle inductive loads

General-purpose relays are typically designed to drive resistive loads, not inductive loads.

This is why electromechanical life ratings are published for ohmic loads and not inductive loads. Inductive loads can best be defined as anything with a magnetic coil, such as a motor, solenoid, or a transformer. The purpose of this capacitor is to absorb the high voltages generated by inductive loads. Unlike resistive loads, inductive loads love power, and they will do everything they can to hold on to it. The unpleasant result of this power hunger is inductive kickback, and it has a devastating effect on the contact life of most general-purpose relays. This is true of both ac and dc inductive loads, although the inductive kickback is far worse with dc loads due to the constant current characteristic of dc power. How bad is the kickback? A 24-Vdc solenoid with a current consumption as low as a quarter of an amp will create a negative inductive kickback of more than 300 V.

Adding a suppression capacitor could easily reduce the problems. It has to be installed as close as possible to the Relay Board.



DME Polyester Film Capacitors are suitable for this job with capacitance around 0.47uF – 0,68uF will be satisfied.

Choose larger voltage rating than your power supply.

Search it at digikey.com -

<http://www.digikey.com/scripts/dksearch/dksus.dll?FV=ffec2aa9%2Cfff40002%2Cfff80010%2Ce340003&k=Polyester+Film+Capacitor&vondor=0&mnonly=0&newproducts=0&ptm=0&fid=0&quantity=0&PV13=46&PV13=47&PV13=49>

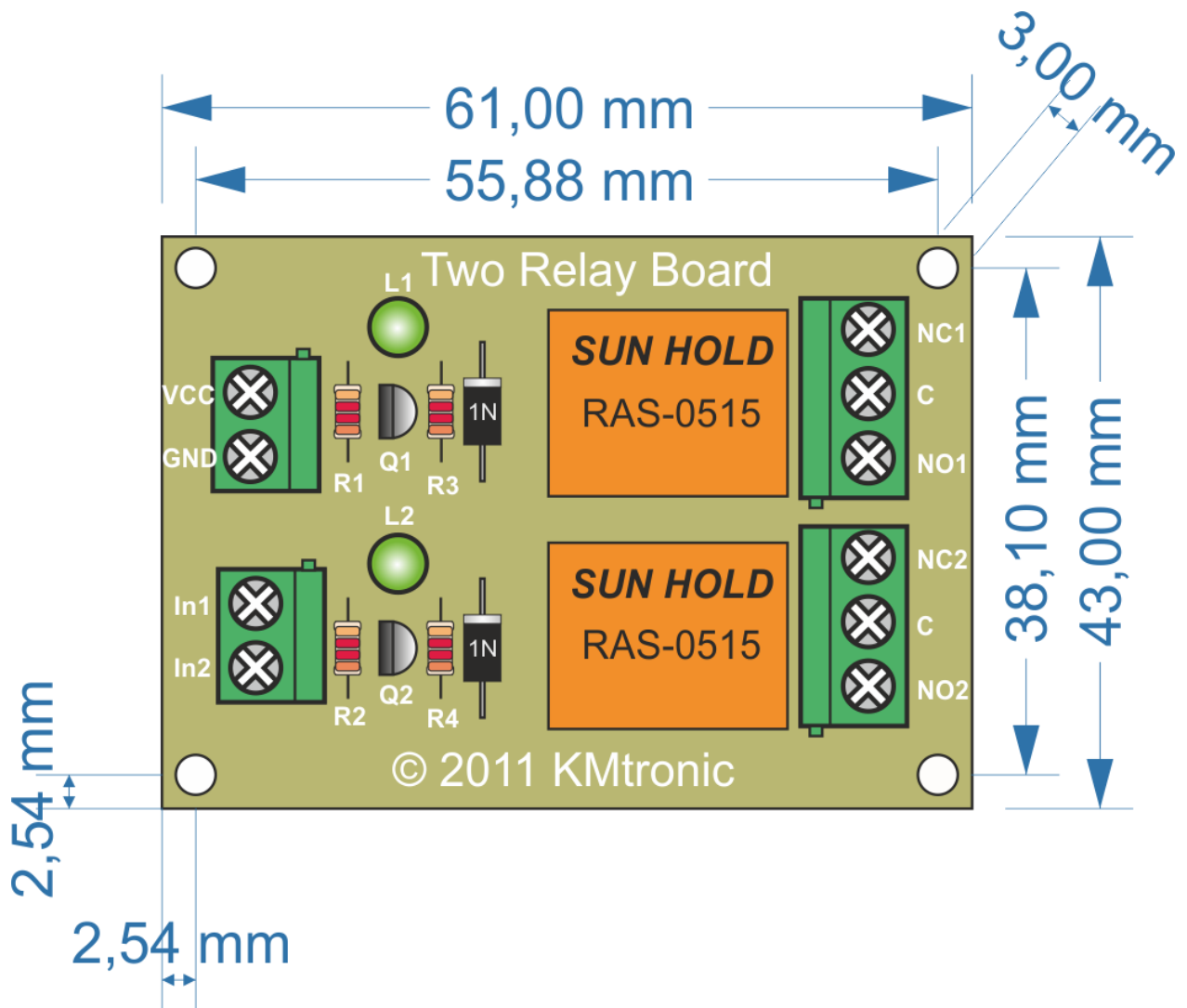
If you can't find it you can use other Metalized Polyester Film Capacitor.

## 5 Technical specifications

Parameter *	Value	Unit
<b>Basic Specification</b>		
Number of relays	2	
Digital circuit power supply voltage (USB or external)	5	V
Standby current		mA
Maximum current drawn by digital circuitry	160	mA
Low level input signal	0 ÷ 2	V
High level input signal	3 ÷ 12	V
<b>Relay Specifications</b>		
Nominal relay coil voltage	24	V
Nominal coil power consumption (per relay)	360	mW
Relay contact material	Ag alloy	
Contact rating	AC125V 15A AC250V 10A DC24V 15A	
Maximum switching voltage	AC 240V DC 110V	
Maximum switching current	20	A
Maximum switching power	2500VA	
Contact resistance (initial)	50	mΩ
Life expectancy (Electrical)	100,000 ops	
Life expectancy (Mechanical)	10,000,000 ops	
Nominal insulation resistance	100MΩ (DC500V)	
Maximum switching on response time	10	ms
Maximum switching off response time	5	ms

\* All parameters considered nominal. KMTronic LTD reserves the right to modify products without notice.

## 6 Physical Dimensions



## 7 Sample code & Demo Applications

You can find sample code and a demo application, as well as additional information and downloads at:

<http://www.kmtronic.com/>

*Manufacture By:*

**KMTronic LTD**

Bulgaria



# 8 Schematic

