

RM412I

Isolated 4 Channel 12V Relay Module

General Description

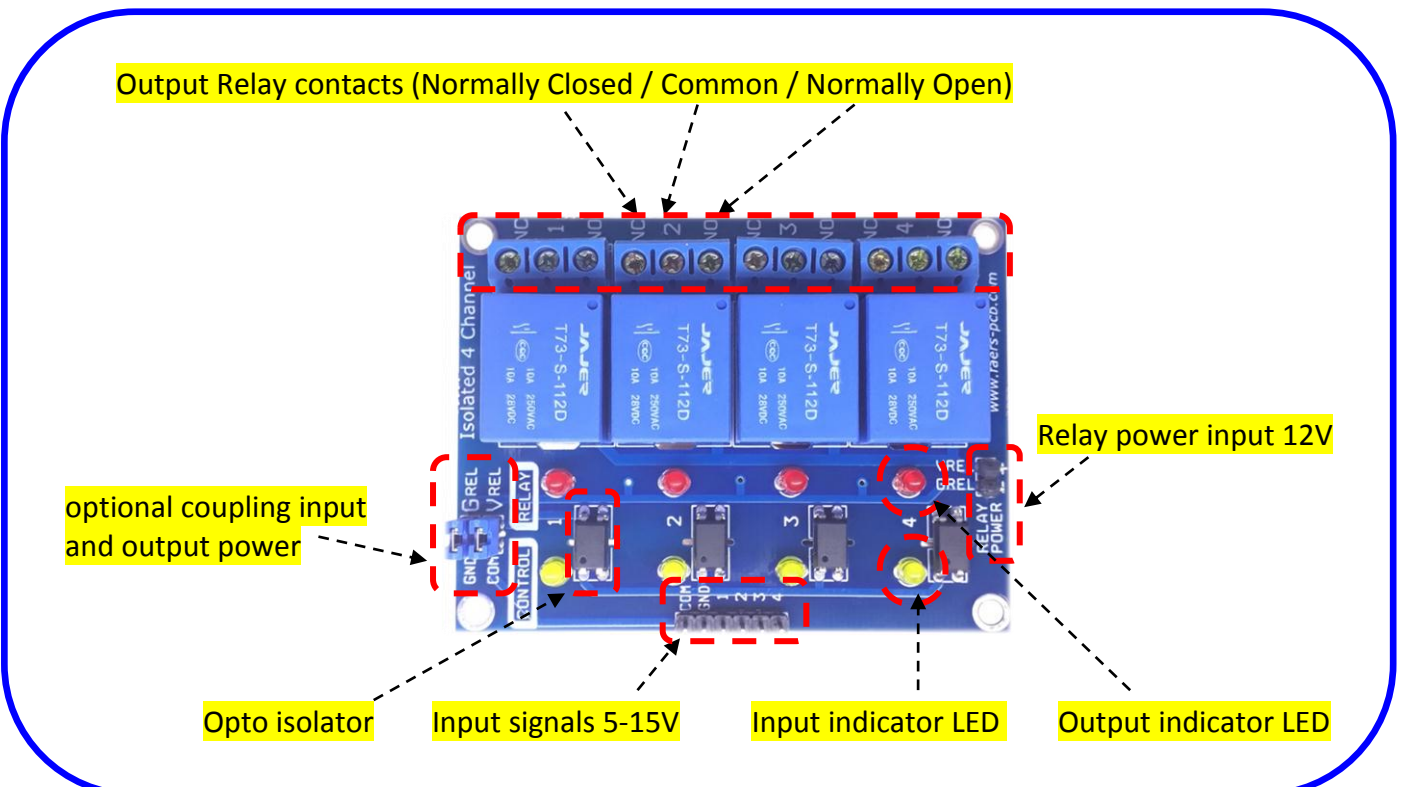
RM412I is an isolated four channel relay driver module. It can be used to control AC and DC electrical devices such as lamps, motors, locks and solenoids. **RM412I** module is powered from 5V and can be controlled directly from microcontroller or Arduino board.

Some of possible applications:

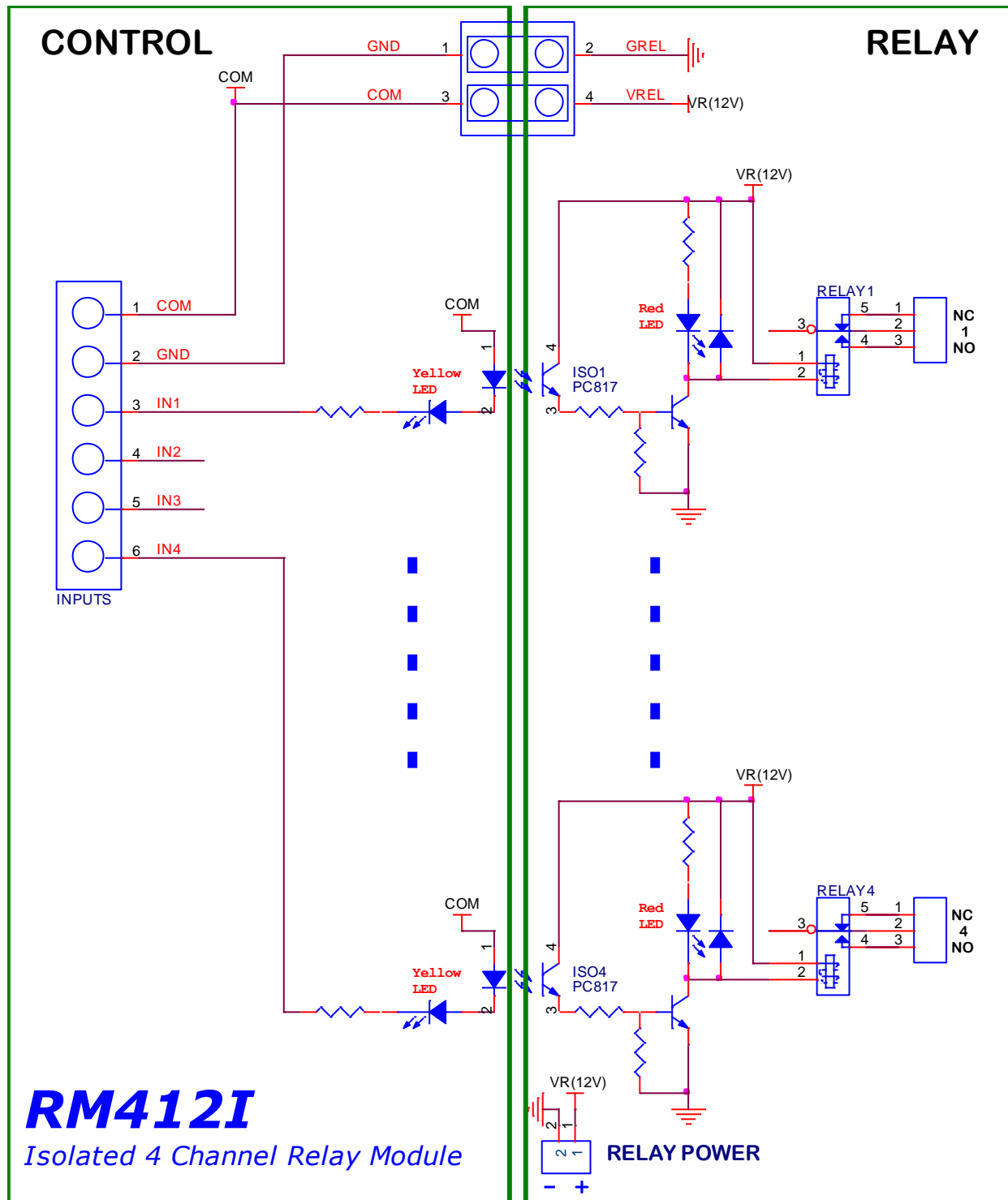
- Home Automation
- Lighting Control
- Garden Equipment Control
- Industrial Automation

RM412I key features

- Four output relays rated for 10A contacts (resistive load).
- Opto-isolated outputs for safety.
- Normally open and normally closed contacts are available.
- Yellow LED indicator for each input signal.
- Red LED indicator for each output relay.
- Dimensions: 76 x 57 x 17 mm.



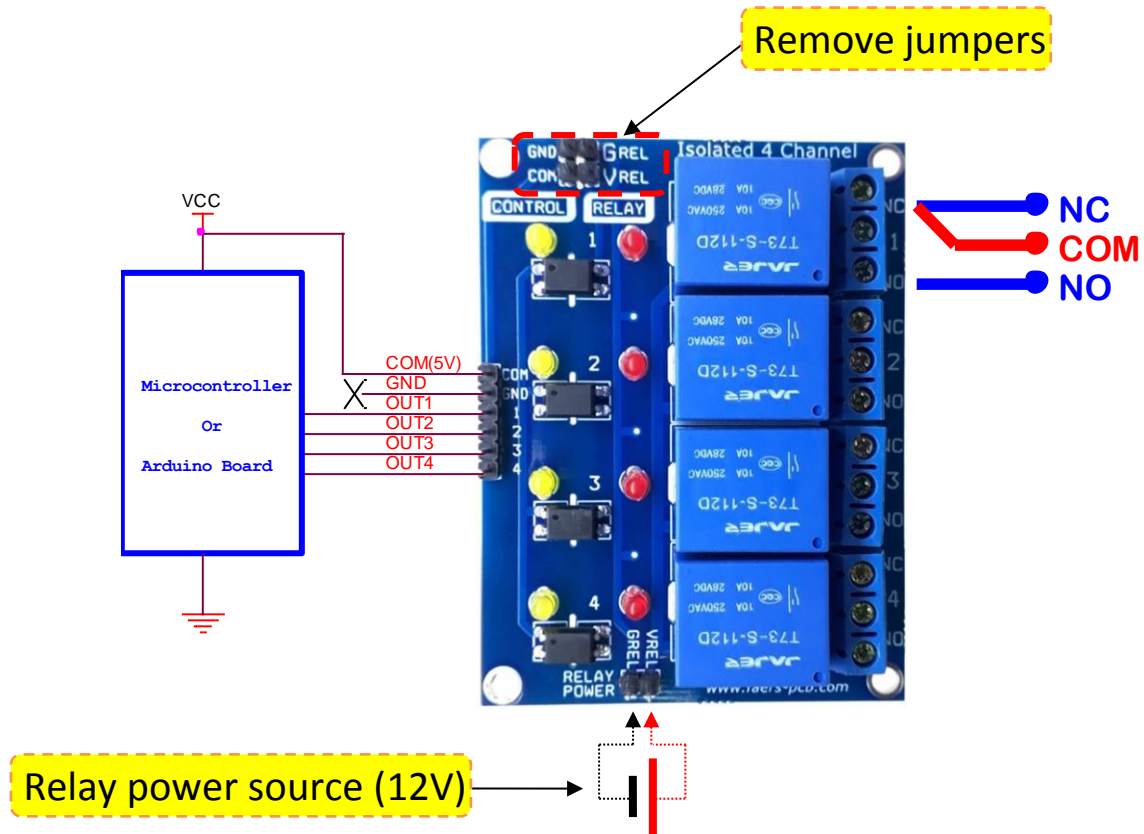
RM412I Module

**RM412I (schematic diagram)**

RM412I Module is divided into two electrically isolated circuits. Input control circuit and output relay circuit. Opto-isolators are used to isolate two circuits for safety requirements and eliminating ground loops. However, isolation can be omitted in order to power both input and output circuits from the same power source. According to the available power sources and isolation requirements there are two modes of wiring module. Isolation mode and non-isolation mode.

Isolation mode

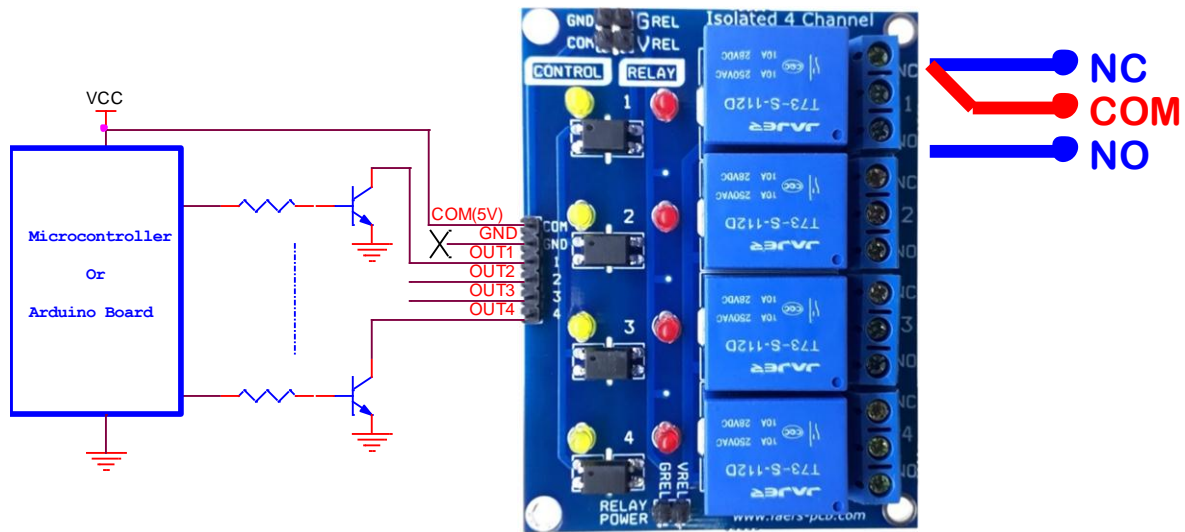
In this mode a separated power supply is dedicated to power relays. This supply is separated completely from control power. In this case remove jumpers and connect 12V separated relay power source via "RELAY POWER" header as shown below.



Direct interfacing Microcontroller/Arduino board to RM412I module in Isolated mode

Only connect controller supply voltage to "COM" input and ignore GND terminal. Inputs are active low. So, a low signal turn relay on and a high or float one turn it off. Input circuit requires 3 to 20mA (nominal 10mA). Most of microcontrollers can sink this value of current directly without any external components.

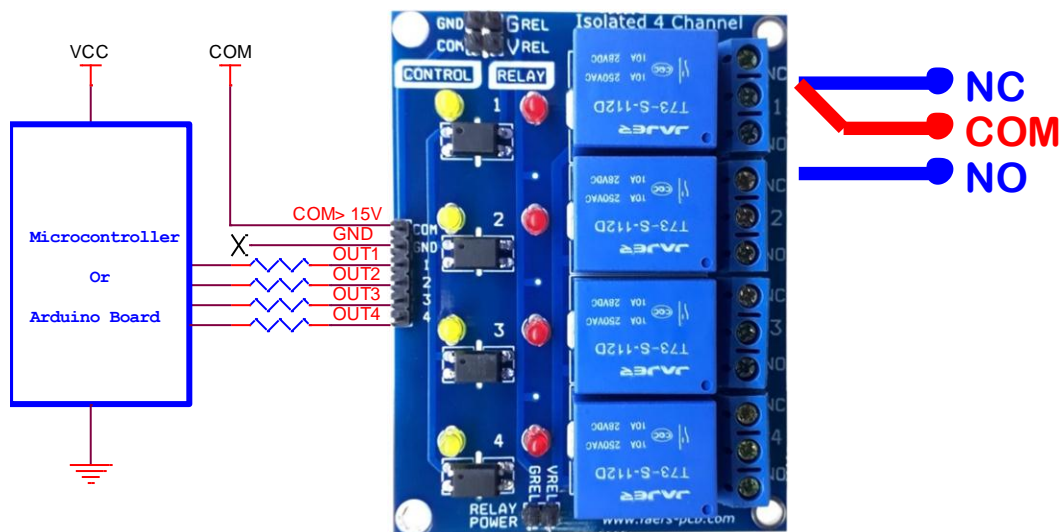
If microcontroller cannot sink enough current, use external buffer or transistors to drive module as shown in figure below



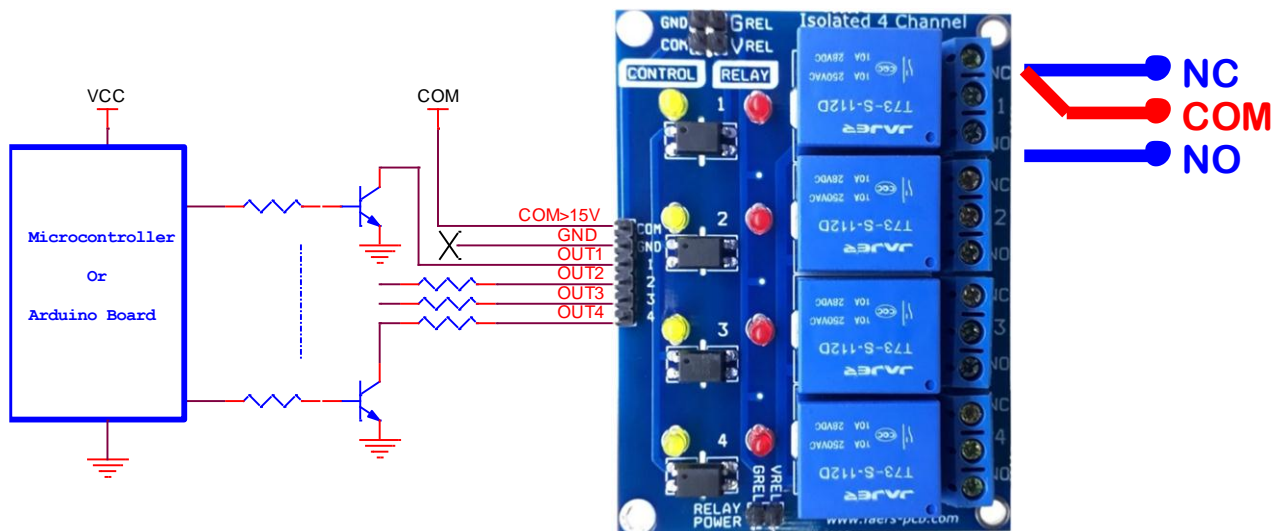
Using External Transistors

If microcontroller circuit provides a voltage larger than 15V then an external resistor should be added in series with each input signal. Table below shows required resistor value for some possible applied voltages.

Applied voltage (COM)	Resistor value	Recommended Resistor power dissipation	Current
5 - 15V	0	-	3.4 - 13.6 mA
20V	1K Ω	0.5W	13.9mA
24V	1.5K Ω	0.5W	10mA
30V	2K Ω	0.5W	10mA



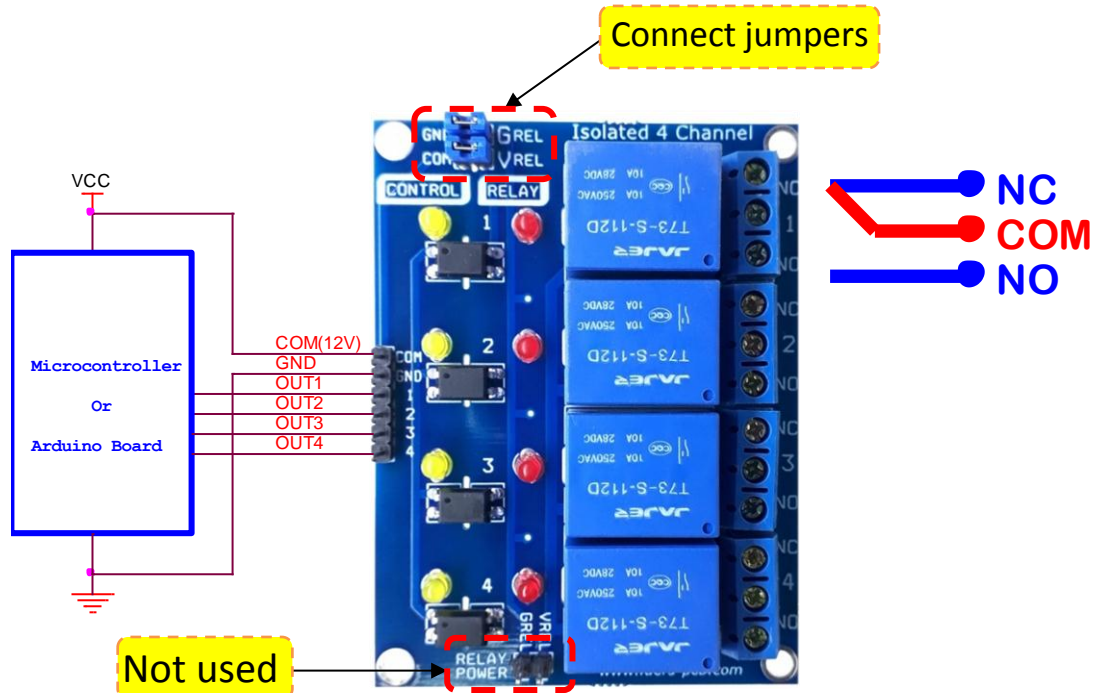
Add series resistors If control supply voltage is greater than 15V



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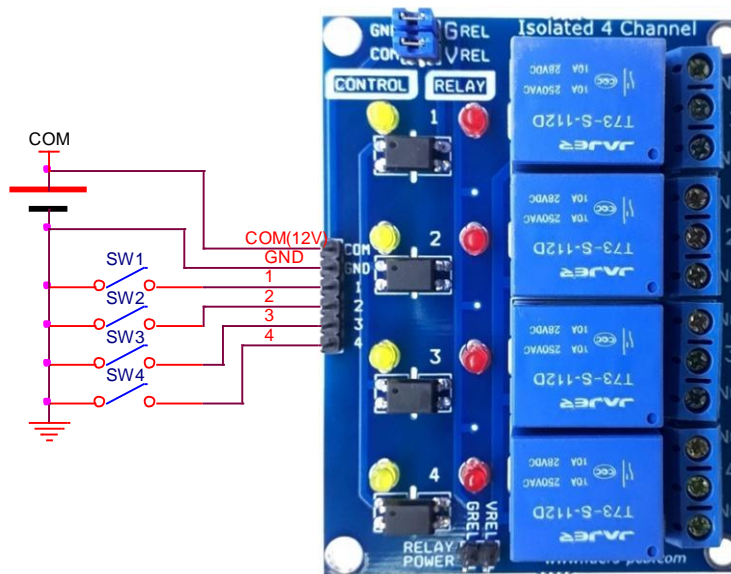
Non-isolation mode

In some applications the magnetic isolation of relay is enough and opto-isolation is not needed. **RM412I** Module can be used in non-isolated mode. In this mode one power supply source (12V) is used to power both input control circuit and output relay circuit. Connect jumpers and use only 6 pin header to power module and drive relays. No need to use "RELAY POWER" header. See figure below.



**Direct interfacing Microcontroller/Arduino board
to RM412I module in non-isolated mode**

Example of connecting External switches



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