

QUASAR PROJECT KIT # 3010 - TOUCH SWITCH/PLATE

General Guidelines for Electronic Kits and Assembled Modules

Thank you for choosing one of our products. Please take some time to carefully read the important information below concerning use of this product. The assembly and operating instructions are on the following pages. Help with component identification can be found on our website at www.quasarelectronics.com/componentid.htm. If you are unsure about any aspect of the assembly or use of this product please contact our Support Team before proceeding.



WEEE Directive (Waste Electrical and Electronic Equipment)

Notice To All European Union Citizens. Important environmental information about this product.

The crossed out wheeled bin symbol on this product, package or documentation indicates that disposal of this product after its lifecycle could harm the environment. Do not dispose of this product (or batteries if used) as unsorted municipal waste. It should be disposed by a specialized company for recycling.

The unit should be returned to your distributor or to a local recycling service. Please respect the local environmental rules. If in doubt contact your local authorities about waste disposal rules.

Safety: General rules concerning safe use of our Kits or Modules.

To ensure your safety, please observe these safety measures. In no way are these complete. As safety requirements vary, please check with your local authorities, in order to comply with local requirements. If in doubt, seek the help of a qualified person.

Battery or wall-adaptor operated devices are safe devices. They do not require special attention unless mains voltage is connected to an output e.g. a relay.



To ensure electrical safety, and also protection from fire or personal injury, make sure your mains operated equipment complies with these safety hints:

- Use a suitable plastic enclosure. If a metal enclosure is used, make sure it is properly earthed.
- Use a power switch if the device consumes more than 10W. Use a double pole switch for mains operated, transformer-less kits.
- Mount a fuse in series with the mains switch. Use a slow blow (T) 50mA fuse for transformers up to 10W and a 100mA fuse for transformers up to 20W.
- Use a mains input connector, or a robust power cord with a clamp.
- Internal wiring carrying mains voltages must have a minimum cross-sectional area of 0.5mm².

If supplied, attach the power rating label near the power cord of the device and fill-out the mains voltage, frequency, power consumption and fuse values.

Troubleshooting and Support

90% of non working kits are due to poor soldering.

We operate a Get-You-Going service for non-working kits but there is a charge based on the time and components needed to complete the repair. Quite often it is not economically viable for us to repair and it is cheaper to supply a new ready made product at full cost.

Disclaimer

Quasar Electronics reserves the right to change product specifications or to discontinue products without notice. Quasar Electronics cannot be held responsible for any loss or damage, direct or indirect, which might occur from the use of a product. Quasar Electronics Kits or Modules are intended for educational and demonstration purposes only. They are not intended for use in commercial applications. If they are used in such applications the purchaser assumes all responsibility for ensuring compliance with all local laws. In addition, they are not suitable for use as or as a part of life support systems, or systems that might create a hazardous situation of any kind.

QUASAR PROJECT KIT # 3010 - TOUCH SWITCH/PLATE

This Kit combines a Touch Switch and a Touch Plate all together in the same Kit. In the Touch Switch two leads must be shorted together by your finger touching them. In the Touch Plate only one plate needs to be touched. The Touch Switch only needs a battery to activate it but the Touch Plate requires a mains power supply.

The relay output is rated to switch resistive loads of up to 48Vac or 28Vdc @ 3A max. You can view our relay FAQ sheet at www.quasarelectronics.com/pdf/relay_faq.pdf The board requires a regulated 9-12Vdc power supply (e.g. Order Code PSU446).

NOTE: We do not recommend that you use of the relay output to switch mains power supply since the tracks on the PCB are not big or thick enough.

The kit is constructed on a single-sided printed circuit board (PCB). Protel Autotrax was used to design it.

CIRCUIT DESCRIPTION

The main part of the circuit are the two NAND gates of the (1)4011 Integrated Circuit which are connected as a flip-flop. Pins 9 and 13 are the ON and OFF contacts. The two gates are connected to the positive rail by the two 10M resistors. Shorting one of the gates with the ground rail by touching it (this is equivalent to connecting about 50K between the gate and ground) FLIPs the output to that state. Shorting out the other contact FLOPs it back.

The output of the flip-flop drives a transistor connected as a switch. It switches an LED and a relay. The relay is rated to switch 240V. Connecting the two 1K resistors connects the other two NAND gates of the IC into the flip-flop and makes it much more sensitive to touch. The touch plate may in fact work with only the first two gates connected. But it will be much more sensitive with all four gates connected as a flip-flop. The touch switch works by capacitive pickup of the mains hum. When the contact is touched body capacitance picking up general

RF in the air is enough to short the plate to ground. Because the touch plate uses mains hum as it method of shorting the gate to ground a mains connected power supply must be used to supply power to the switch. A **battery will not work.**

ASSEMBLY INSTRUCTIONS

Add the components lowest height ones first. Follow the overlay on the PCB. Connect the two PCB's with the 3 wire cable strands provided.

WHAT TO DO IF IT DOES NOT WORK

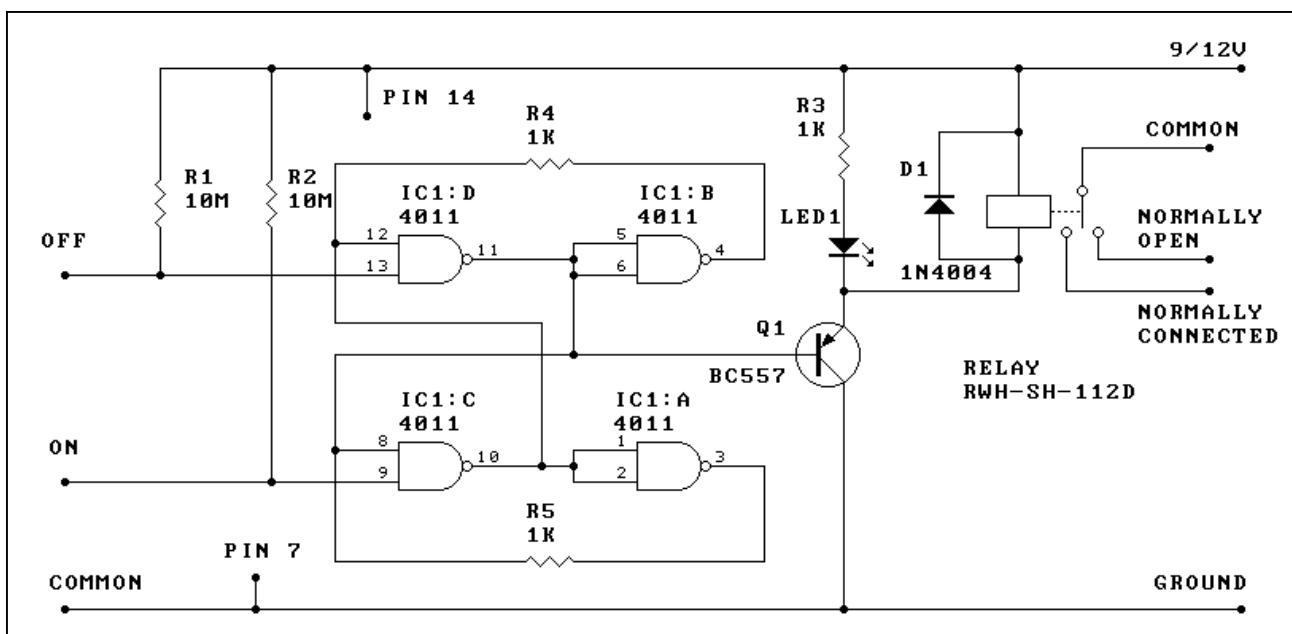
Poor soldering is the most likely reason. Check all solder joints carefully under a good light. Next check that all components are in their correct position on the PCB. Thirdly, follow the track with a voltmeter to check the potential differences at various parts of the circuit. Check that the IC is in the correct way. Check no pins are bent up. Are the transistors in the correct way.

WHAT TO LEARN FROM THIS KIT

The kit introduces the (1)4011 integrated circuit. Go through the connections of the IC to determine the LOW/HIGH levels as the OFF and ON plates are touched. Notice how connecting the 2 1K resistors increases the sensitivity of the circuit. You can download the 4011 data sheet from www.quasarelectronics.com/ds/cd4011.pdf

COMPONENTS

1K resistor 5% 1/4W brown black red	3
10M resistor 5% 1/4W brown black blue	2
1N4004 diode	1
12V relay Goodsky RWH-SH-112D	1
IC (1)4011 IC	1
14 pin IC socket	1
Hookup wire	4"
5mm LED	1
Kit 3010 PCBs	2
battery snap	1
BC557	1

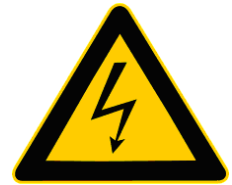


GENERAL RELAY INFORMATION

Warning! Risk of Electric Shock!

This information concerns kits and modules with relay outputs. TO USE THE RELAY OUTPUTS SAFELY YOU MUST OBSERVE THE MAXIMUM VOLTAGE AND CURRENT LIMITS QUOTED IN THE **PRODUCT DOCUMENTATION** (this is because the board design may not be rated to switch the maximum voltage and current limits printed on the relay itself or specified in the relay manufacturer's data sheet).

Controlling mains equipment with relay outputs must be treated with extreme caution. Electric shocks can cause severe and permanent injury or even death. Construction, installation, testing and commissioning should only be attempted by suitably qualified persons, or under the supervision of a suitably qualified person. These products are not suitable for children. Before connecting mains powered equipment to the relay outputs please check with the relevant authorities in order to ensure compliance with all current safety regulations. Many areas of the assembly may operate at mains voltage. A suitable isolating enclosure must be used. Exposed screw terminal blocks on some products must be insulated to prevent contact with exposed metallic parts at mains potential. Connected equipment should be suitably fused.



You will find relay outputs on many of the kits and modules that we sell. A relay is an electrically operated on/off switch. The voltage and current limits specified in the product documentation generally relate to resistive or light inductive loads.

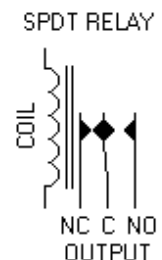
Relay Terminals

Most boards have SPDT (Single Pole Double Throw) style relays. These have three outputs:

C = Common

NO = Normally-Open contacts connect the circuit when the relay is activated; the circuit is disconnected when the relay is inactive. It is also called a Form A contact or "make" contact.

NC = Normally-Closed contacts disconnect the circuit when the relay is activated; the circuit is connected when the relay is inactive. It is also called a Form B contact or "break" contact.

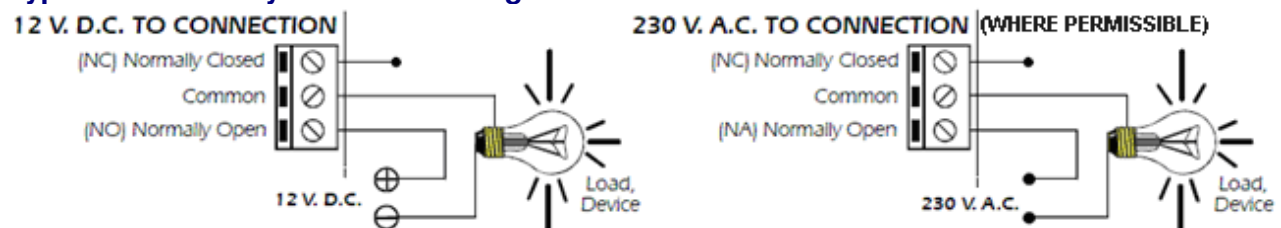


Connecting the Device you want to Control

You must provide an external power source to the device you want to control. No voltage is present at the relay terminals (remember it is just a switch). The relay is normally connected in *series* with the positive (+) power wire of the device you want to control.

In this case, the positive wire from the power source should be connected to Common. Then either the NO or NC terminal (as appropriate for your purpose) is connected to the positive (+) wire going to the device you want to control. The negative (-) wire does not connect to the relay at all. It goes directly from the power source negative output to the device negative (-) terminal.

Typical SPDT Relay Connection Diagrams



Anti-Spark SPDT Relay Connection Diagram

Sometimes the connected equipment can cause arcing across the relay contacts. This must be corrected by installing a resistor and capacitor (not supplied) between the two contacts of the relay as shown below. Component values are for 230Vac mains.

