QUASAR PROJECT 3074v2 - PC PARALLEL PORT RELAY BOARD

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.co.uk/componentid. 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 0.5mm^2.

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.

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With the rapid progress in computer technology many people now have a surplus computer just gathering dust somewhere. Thus these computers are free to be used as dedicated controllers for a variety of uses: turning on/off lights or other devices around the home, office, laboratory or factory come to mind. All that is needed is the interface to connect it to the real world.

This Kit provides both the hardware and the software to do this. The hardware PCB plugs in directly to the parallel port of the computer. It carries 8 relays. Each relay is switched on or off by one bit of the output byte which usually goes to your printer to print a character. Each relay output is rated to switch resistive loads of up to 48Vac or 28Vdc @ 5Amps maximum current.*

*WARNING: This board is not recommended for use with mains voltage (110Vac or 230Vac).

You can download a relay general information sheet from **www.quasarelectronics.co.uk/pdf/relay_faq.pdf**

Power the board using a 12Vdc, 500mA (minimum) centre positive power Supply (e.g. Order Code **660.446UK**).

HARDWARE
The PCB contains eight identical switched relay positions, power input positions to the relays (either 2.5mm jack centre positive, or via the terminal block) and a DB25 connector to the parallel port of a PC. Use a straight-through 25 pin cable (DB25 male at one end, female at the other) cable from the PC to connect to the Kit. To keep the kit simple no input latches have been put on it. Relays will momentarily activate during the PC boot routine (this does not happen with our 3108 Serial Relay Board). For important applications you should use a UPS to keep the computer operating in the case of mains power failure.

Solder the resistors into place first. Make sure to get the right ones in the right place. The components for the first relay position are given in the Components listing. Add the relays last.

The relays are under direct control of the output byte (8 bits) from the parallel port. When a pin is high a nominal 5V is presented to the input of IC1, **ULN2803A** an 8 channel high voltage, high current Darlington transistor array, used here as a relay driver.

There are a number of different types in the series – the 2803 is directly compatible with TTL and CMOS logic when operating at a supply voltage of 5V. The output is 'open collector' and features built in diode protection, making it ideal for use as a relay driver. Each relay is connected between the output pin and +12V. When the input is high the corresponding output goes low and the relay operates. For a discussion of 'open collector' see
www.quasarelectronics.co.uk/ds/opencol.txt

This IC has replaced 8 transistors, 16 resistors and 8 diodes which were used to drive the relays in the previous version of this kit. This has greatly reduced the time and effort required in assembling the kit.

SOFTWARE
Download the software from our website and unzip **www.quasarelectronics.co.uk/software/3074disk.zip**

DOS Utilities. The **3074_dos.txt** file give full details on how to use these DOS files in batch files. Of course, you can write your own programs in any language to output a byte to the printer port and the bits which are high will turn on the corresponding relay. The overlay on the PCB shows which bit in the output byte turns that particular relay on. For example, output 00010001, or 11 in hex turns on relays 1 & 5. Each relay number is also marked on the overlay for easy reference.

Windows 9x/2000/NT/XT. After you run setup read the **drivers.txt** file and follow the instructions. Put an icon on your desktop of the **3074.exe**. Play with the program and you will soon learn how it works. Time files can be saved. Read the Help file for more information.

Linux software for Kit 3074 has been written by James Cameron. You may get it from our website at: **www.quasarelectronics.co.uk/software/3074-1.0.tar.gz**

COMPONENTS		
Resistors 5%, carbon, 1/4W:		
1K brown black red 1N4004	R1,2,3,4,5,6,7,8	8
diode	D1	1
5mm red LED	L1,2,3,4,5,6,7,8	8
2 pole terminal block	X10	1
3 pole terminal block	X1,2,3,4,5,6,7,8	8
100uF/25V ecap	C1	1
2803A relay driver IC	IC1	1
IC socket, 18-pin	for IC1	1
12V relay RWH-SH-112D	RL1,2,3,4,5,6,7,8	8
Power jack 2.5mm	X9	1
D25 connector, right angle, male, PCB mtg	CN1	1
3074v2 PCB		1

See our website for all our kits. If you like Kit 3074 also look at our other relay controller kits 3108 and 3165.
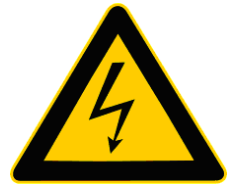
www.quasarelectronics.co.uk

(Documentation April 5, 2010.)

GENERAL RELAY INFORMATION

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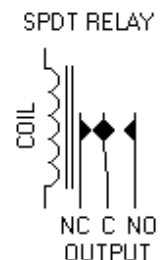
Relay Terminals
Most boards have SPDT (Single Pole Double Throw) style relays. These have three outputs:

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 <u>from</u> 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 <u>to</u> 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
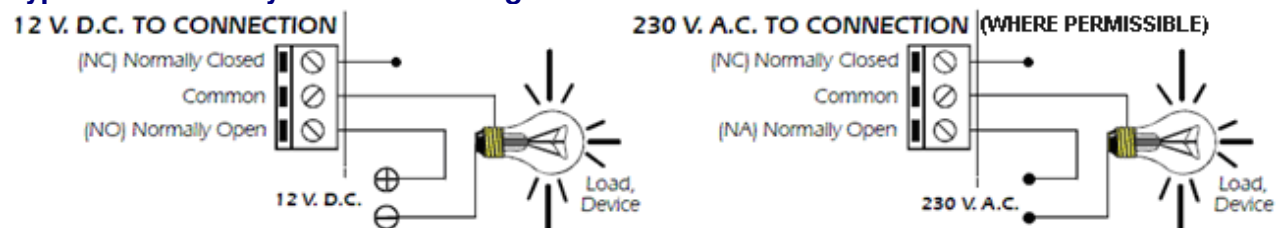
Anti-Spark SPDT Relay Connection Diagram
Sometimes the connected equipment can cause arcing across the relay contacts. This must be corrected by installing a resistor and capacitor (not supplied) between the two contacts of the relay as shown below. Component values are for 230Vac mains.
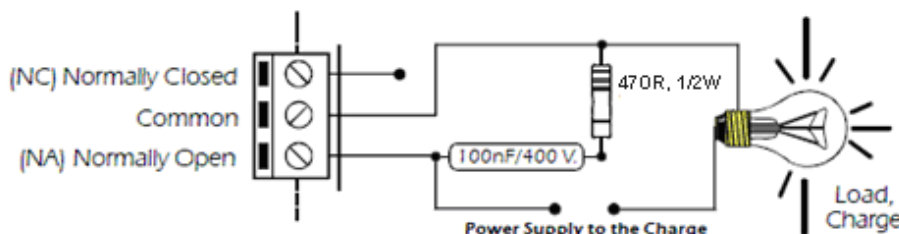
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