

EXR1

Single external relay board

C R H Electronics Design

Specifications

- Single pole 240V AC 16A Relay contacts.
- High Intensity LED indicators display of power and active states.
- Board size 60 X 50 mm. 1 oz copper, FR4, RoHS compliant.
- Can be driven direct from parallel port.
- 12 Volt operation, consumption <100mA
- Optional covered plastic mounting box
- Easily mounted in close proximity to the motor or pump and removing high voltages away from computer and low voltage circuits.

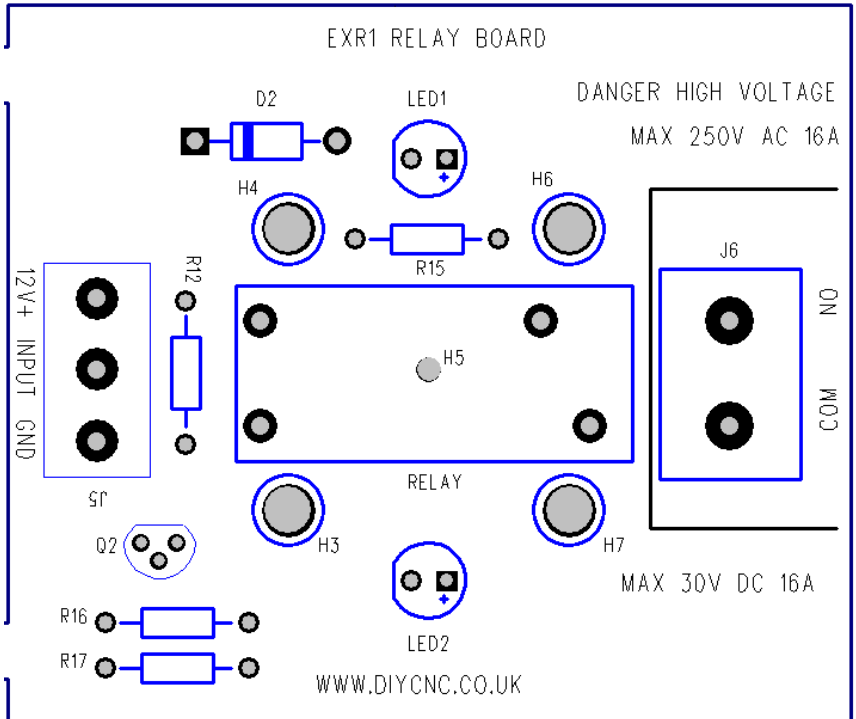
The board is able to take signals from a standard parallel port or a buffered parallel board and switch power lines to spindle motors, coolant pumps etc. The relay contacts are rated at 3800 Watts or 240V AC at 16 Amps or 480 Watts DC. There are three input connections, power, signal and ground. The board has two LED's one indicating power on the 12V rail, a second that illuminates when the relay is activated. Power to the board should be a regulated 12 Volts but can be in the range of 10V minimum to 15V Maximum. The pins normally used to control the external relays are pin14, pin16 and pin17 on a standard parallel port and these are easily configured in software such as Mach 3. This enables you to issue M control codes in software to Start and Stop the motors as desired.

WARNING

Computer control of a powerful motor can be dangerous if precautions are not taken. The last thing you need is for the motor to start up while you are changing a cutting tool or have your fingers in the machine. It is recommended

that you have an isolation switch to remove power from the motor completely while setting up the machine and only applying power when completely ready to run the machining program.

EXR1 EXTERNAL RELAY BOARD LAYOUT



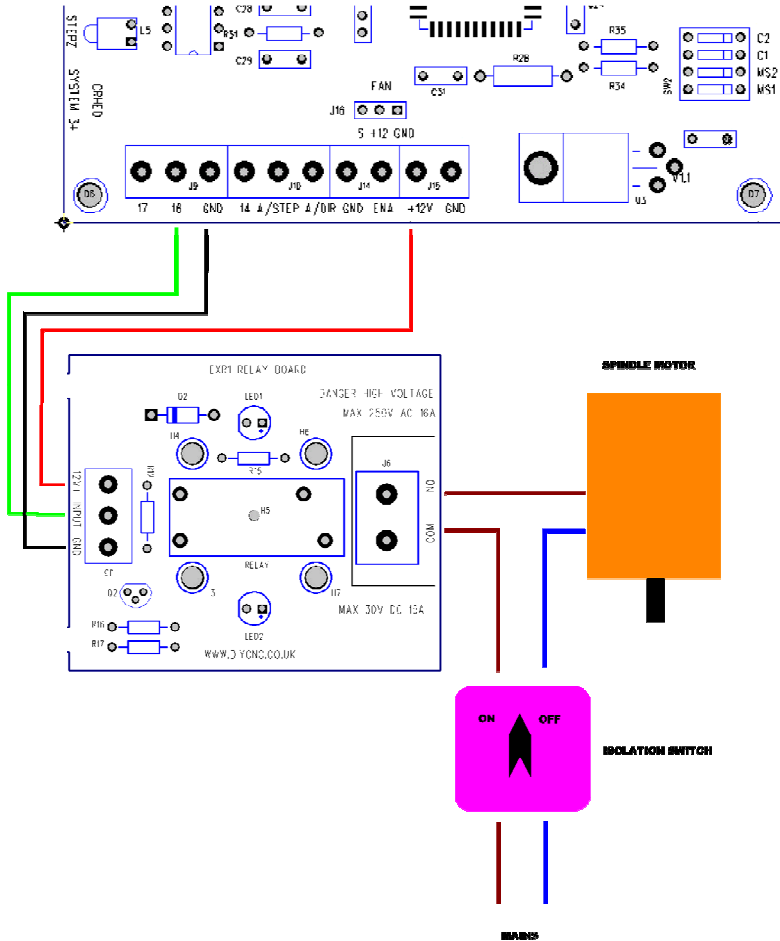
Signal Input

Normal 5V, maximum input 12V

Normally the relay will be driven either directly from a parallel port breakout board or via a buffered board like the PBB20 which has the advantage that it has a charge pump interlock to prevent false triggering during computer power-up and in an E-Stop situation. These systems will generally provide a 5 volt switching signal. You may however use a signal from some other device as long as the maximum potential does not exceed 12 volts.

Typical wiring Diagram

The diagram below shows connections made to incorporate the Ex-Relay to a spindle motor controlled by the System3+ board. Improvements could be made by fitting a three way isolation switch to give Off, Auto and Manual Control.



KIT CONSTRUCTION

Building the board should take less than 15 minutes. You will need a good soldering iron, preferably temperature controlled. The solder provided is lead free with an active flux. This helps it to flow easily but you need an extra 50 degrees higher temperature compared to lead solders. With reference to the board layout diagram start by placing the resistors as these have the longest leads and will need cropping after soldering. After soldering and cropping the resistor leads next place the transistor. The LED's are mounted at full lead length in holders if the plastic enclosure is to be used. The longer of the two leads on the LED's is the anode or positive and goes to the square pad. Finally fit the relay and the connector blocks. The relay output terminals are a 20 Amp two way connector.

Full Component parts list.

R12	2.2k 5% 1/W
R15, R16, R17	1k 5% 1/4W
D2	1N4004 Diode
Q2	BC182 Transistor
L1	LED Green 5mm
L2	LED Red 5mm
J6	2 way terminal 7.5mm
J5	3 way terminal 5mm
RELAY	12V SP Relay 16A

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