Four Channel Relay Module Wiring & Application Guide

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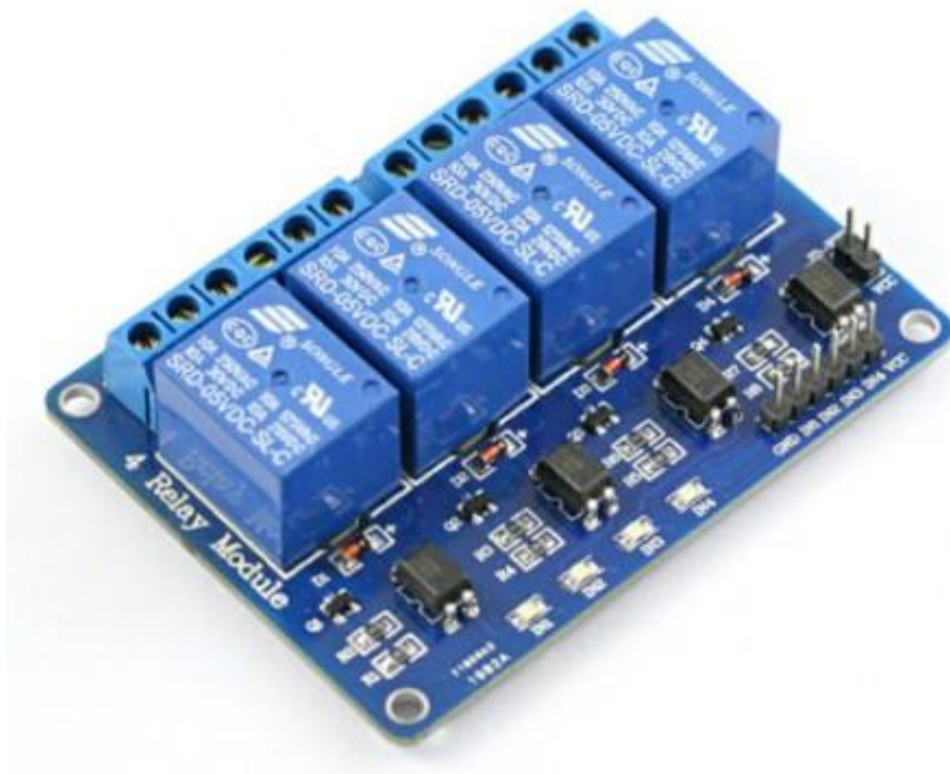
0.0 Safety Statement

All machinery, especially CNC or automated machinery, has inherent dangers and risks. It is the responsibility of the system designer to ensure that any systems built using any Viking Machinery Ltd. products are safe for use. Any technical information is provided as a reference only, and does not constitute a recommendation as to the fitness of use in any particular application.

Viking Machinery Ltd. strongly urges customers to seek expert advice when dealing with potentially dangerous electrical voltages and sources of mechanical energy. Information contained in this document does not constitute a substitute for expert advice.

Under no circumstances should this product ever be used in a safety critical application, or to switch high energy loads ("Mains" or low voltage).

1.0 Product Specifications

- Supply Voltage – 5VDC
- Operating Current – 100mA
- Approximate dimensions – 77mm (W) x 55mm (D) x 19mm (H)
- Number of channels – 4

2.0 Scope of Document

This document is designed to give an overview of the wiring options for the four channel, opto-isolated relay module. Wiring examples are given for typical CNC and microcontroller examples. These are by no means exhaustive, but are a good starting point for beginners.

3.0 Pin Map and Power Supply

Your relay module will look like the one shown below. We recommend powering the board from an external power source to maintain the optical isolation of your controller, protect against electrical noise and brown out. To do this you will need to remove the jumper, and apply power to the "JD-VCC" pin, labelled "5V External Power" in the diagram below. If you decide not to do this, leave the jumper in place and power via the "VCC" pin labelled "Controller 5V".

The logic for this board is 'active low', i.e the input pins 1-4 need to be connected to 0V to trigger the relay. When this is done, the relay will activate and the relevant LED indicator lamp will illuminate.

Applying greater than 5V DC to any of the pins will damage the board.
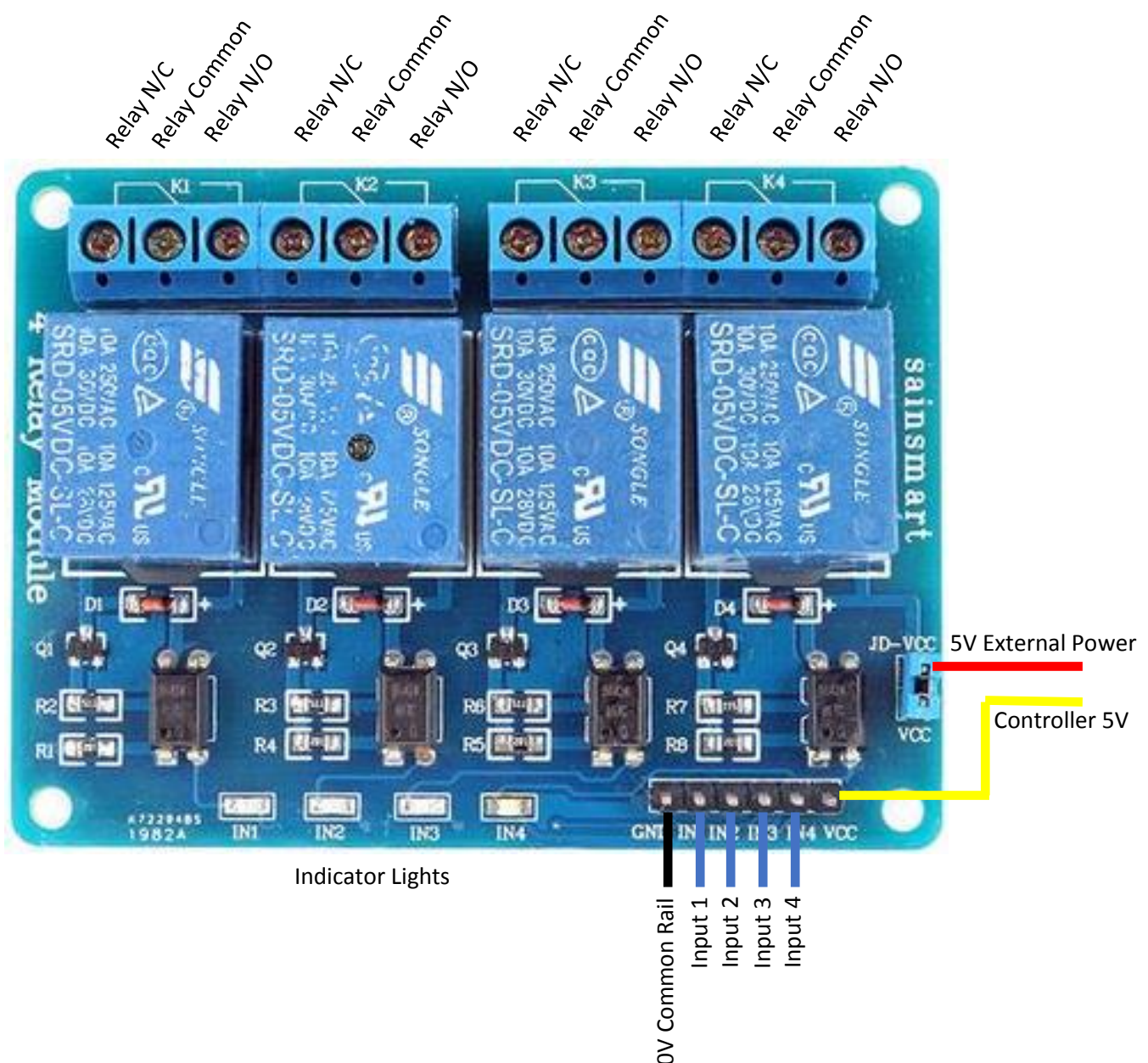
4.0 Wiring to a CNC B.O.B

The 5 axis CNC breakout board that Viking Machinery supplies can be wired as shown. This breakout board has the correct voltages across all input pins for the voltage that the board requires. If your BOB has inputs that are NOT at a logic voltage (5V typically) then you will need to protect the relay module inputs from the voltage coming from the BOB.

You can wire your relay module input pins to any of the BOB output pins you like. It is important to pull up your BOB output pins to avoid relay flutter (our BOB has these built in).
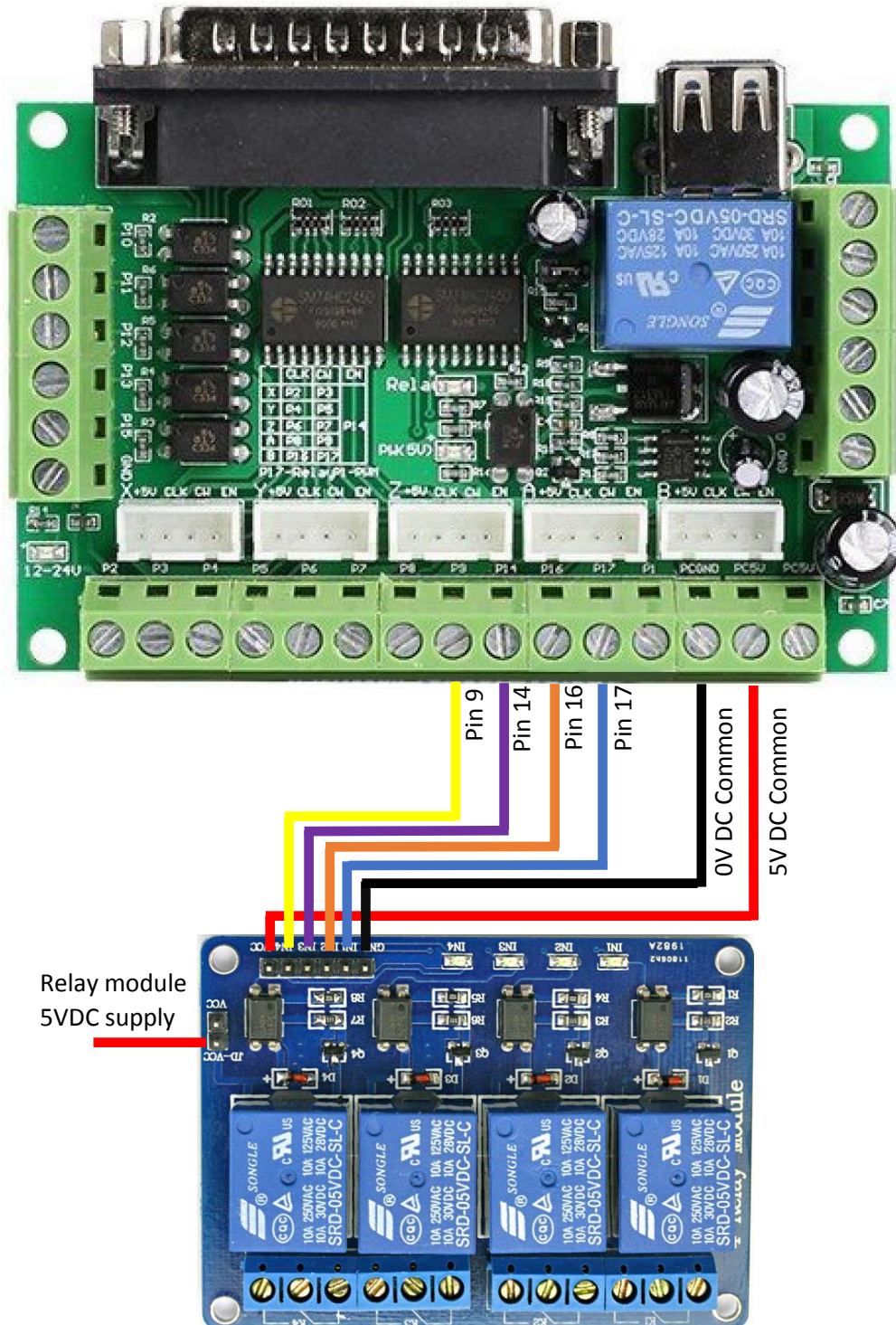
5.0 Wiring to a Microcontroller

For this example, we will use the popular Arduino micro controller. The principle is the same for most 5V TTL input devices (Arduino, Raspberry Pi, etc.). To avoid relay 'flutter' it is important to set your microcontroller output pins as pulled-up. Usually this can be accomplished via software, but if not then you will need to wire an external pull-up resistor.

In this example we have wired to the Arduino's analogue pins for a neat diagram. They would be used as digital outputs in the software.
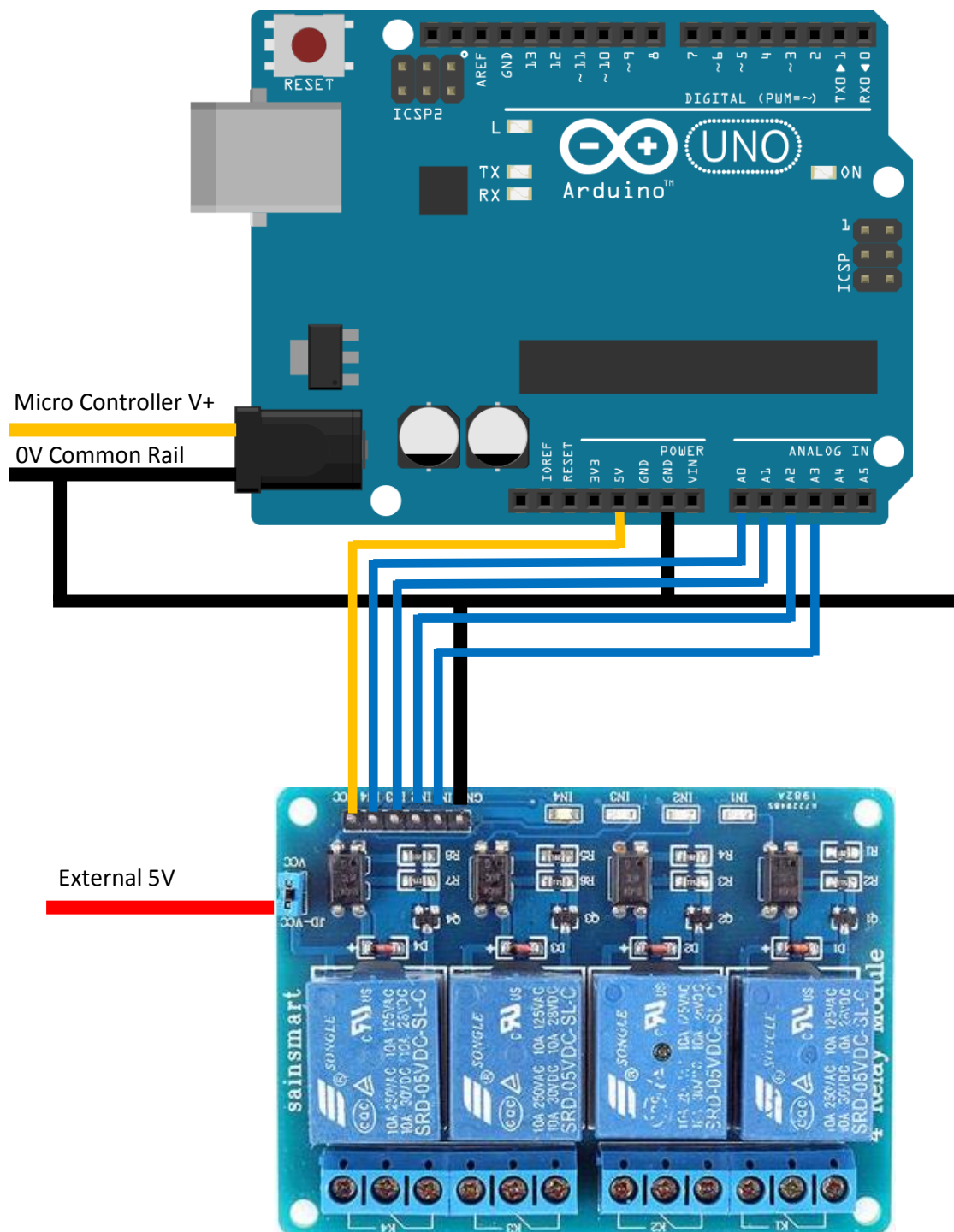
6.0 Wiring to a Proximity Sensor

Sometimes you will want to switch a power load with a proximity sensor. The easiest way to do this is to use a relay module. The wiring diagram below shows the typical wiring for one channel on our four-channel relay module, switched via the Fotek PL-05N switch that we supply. We use a small diode to protect the 5V logic circuit from the higher voltage on the sensor. This particular board has inbuilt pull-up resistors so you do not need to wire an external one.
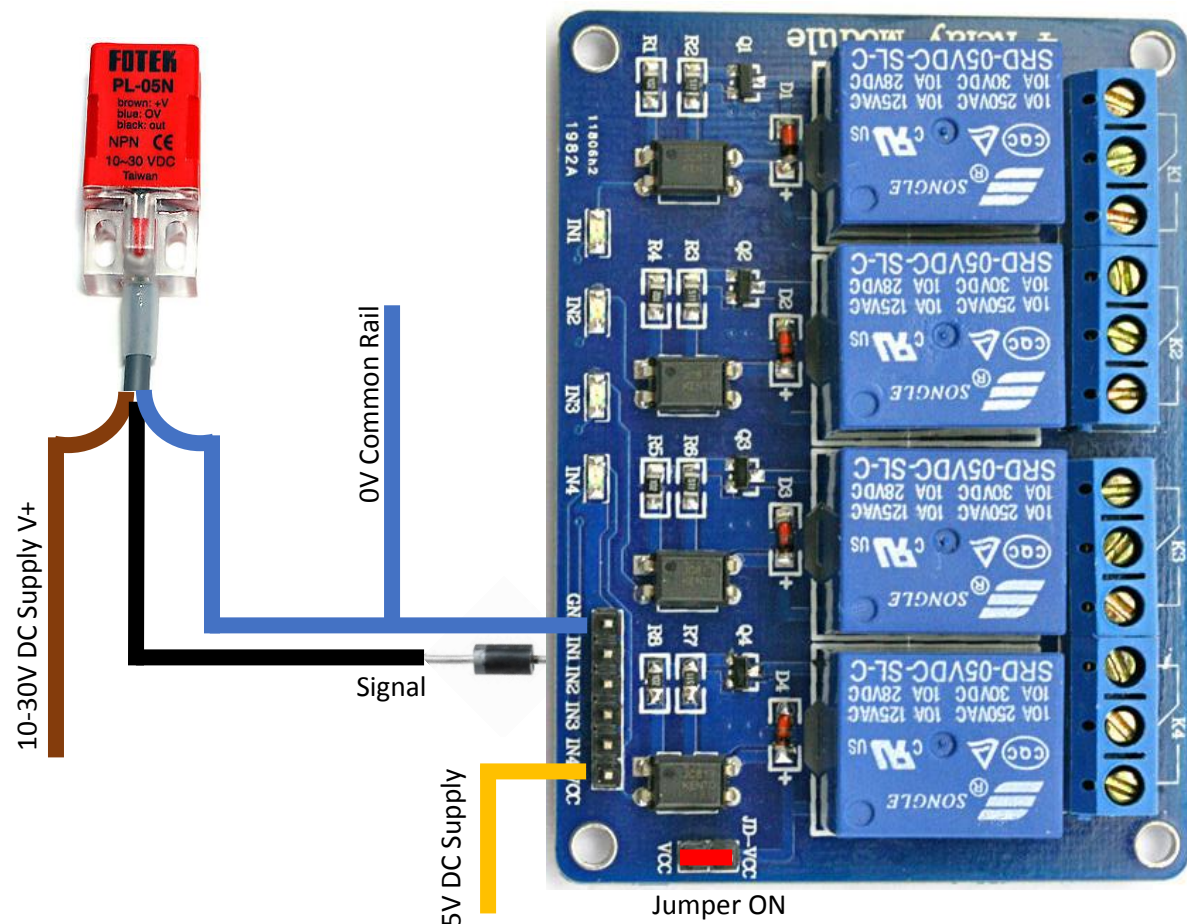
7.0 Reference Links

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https://github.com/Viking-Machinery