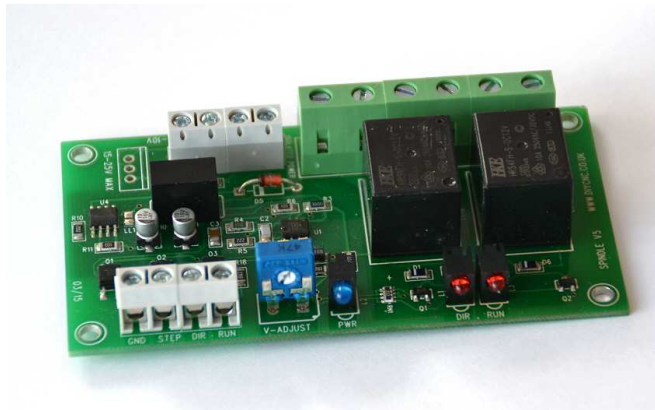


SPINDLE V5

C R H Electronics Design



SPINDLE V5

Opto Isolated Digital to Analogue convertor board C R H Electronics Design

Specifications

- Twin relays for various configurations of CW/CCW, for Run/Stop and Forward/Reverse or Coolant pump etc, 240V AC ,10A rating, two way.
- 3KV Opto isolation
- 0-10 volt buffered output.
- Board size 95 X 51 mm, FR4, RoHS compliant.
- Can be driven direct from parallel port.
- 12 Volt or optional 24V operation, consumption <150mA
- Power indication and Relay operation LED's
- DC/DC power isolation
- Uses Step, Direction and Run signals
- Surface mount design.
- Easily mounted in close proximity to the spindle motor removing high voltages away from computer and low voltage circuits.

Hardware V1.0 April 15

Manual V1.0 April 15

The latest version of the popular board is able to take signals from a standard parallel port or a buffered parallel board to drive a spindle motor board that normally uses a potentiometer to control spindle speed. This is achieved by converting stepper pulses from the parallel port into a voltage level suitable for the spindle drive board. The relay with contacts rated at 240V AC up to 10 Amps suitable for switching power to the motor if required or via a power inverter with the direction signal being used for forward / backward motion. The pins normally used to drive Spindle V5 are either the A Axis outputs, or spare pins 14, 16 and 17 of the parallel port. These pins are easily configured in software such as Mach 3 for this purpose. Some motor control boards have

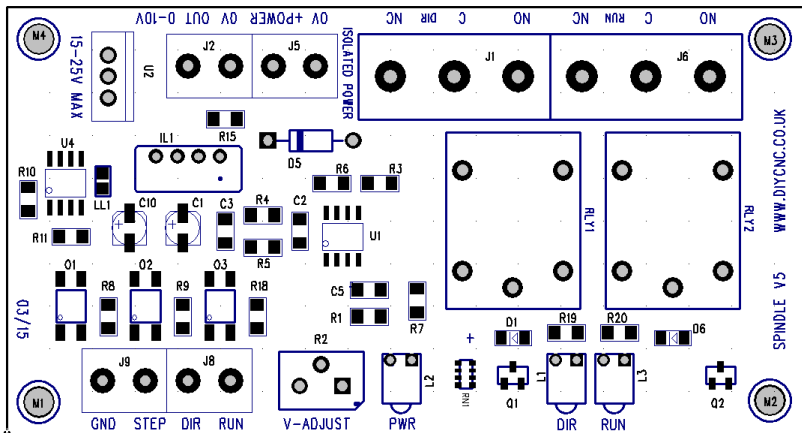
provision for an e-stop button and if not used there is a link on the PCB. This is also an ideal place to connect the Run relay to control the board as this only requires switching a low current circuit. The feature of DC/DC power isolator eliminates the need for a separate isolated supply.

WARNING

It should be noted that some motor inverter boards have no mains isolation and instead rely on being self contained systems. Connecting other circuits to these boards present a possibility of hazardous voltage levels which may result in electrocution or severe damage to circuit boards. Do not handle the SpindleV5 board when power is present. They may be high voltages between various parts of the board.

Fig1

SPINDLEV5, DIGITAL TO ANALOGUE BOARD LAYOUT

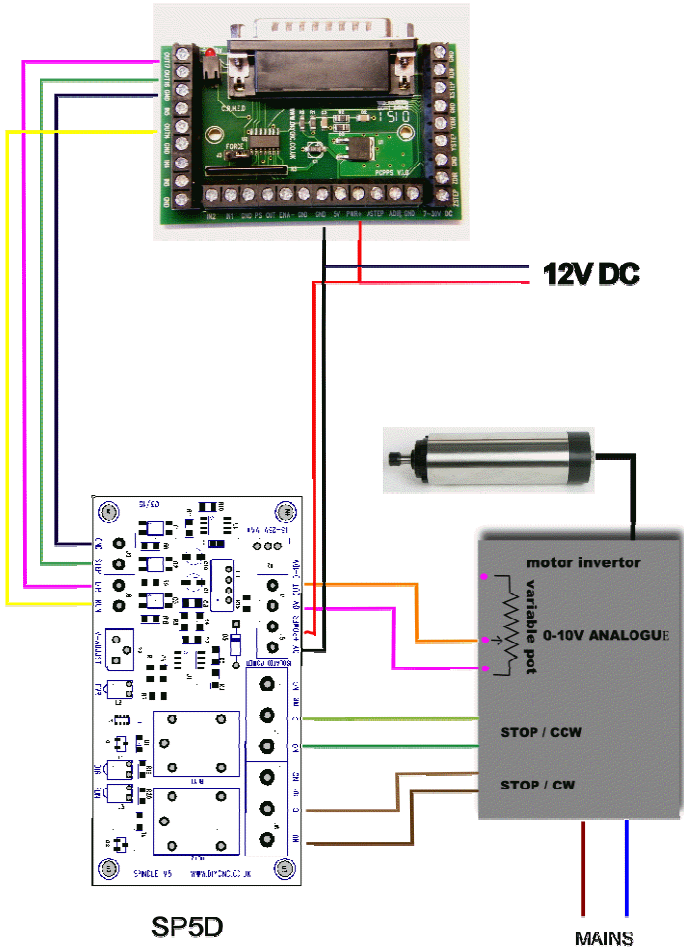


Output voltage adjustment

Preset resistor R2 gives a small range of output voltage adjustment to calibrate motor speed. This is normally trimmed to give 10 volts output for 2000 pulses per second, but software like Mach3 allows adjustment of values and no preset adjust is necessary. The board gives a good performance for converting the pulses into a voltage and should be better than 2% linearity.

Spindle 5 Setup with parallel interface and motor inverter

PCPPS

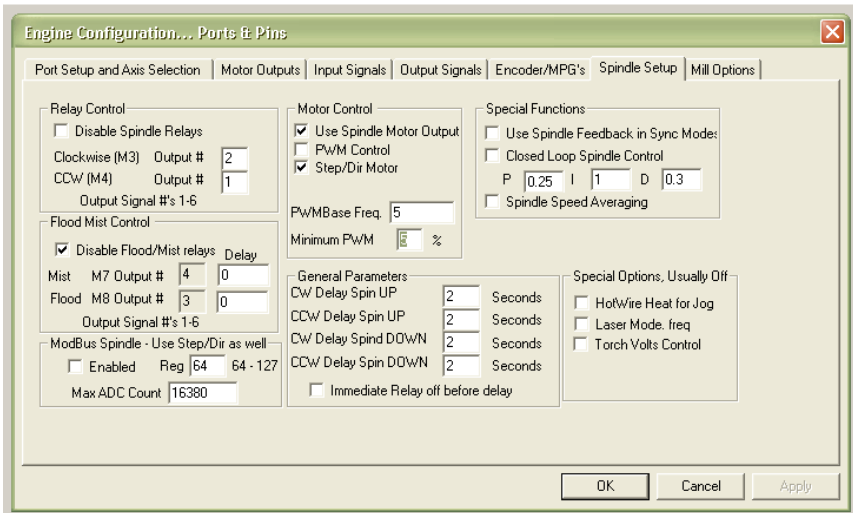


If converting an existing potentiometer controlled manual system you need to remove connection from the centre wiper and wire to V-out pin of spindle board. The bottom end of the pot or minimum speed end should then connect to the 0V pin next to V-out. New power invertors usually have an analogue 0-10V pin which again goes to V-out and 0V to inverter Gnd or 0V Input. Although you may use a basic breakout board to control the Spindle 3 board, this offers no protection of false triggering of the relays while the PC is being powered up or down or in a crash condition. The output pins of the parallel port are in unknown state unless under full software control and an interface board with a charge pump circuit enabling the output pins is recommended. A secondary manual power switch on the power feed to the spindle motor is also advised and only activated just before running the CNC program. The 12V DC input connectors have a limited protection system for over voltage and reverse connection. If smoke appears from the input resistor R15 then switch off immediately and recheck connections. The board overvoltage protection operates over 13V. Alternatively the board can be purchased with a 15-25V regulator.

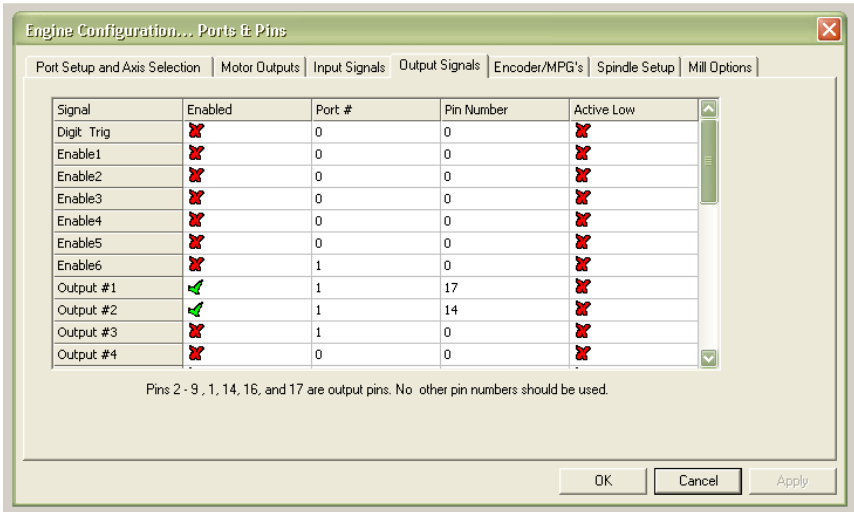
Mach3 Typical Spindle setup

Note: Step/dir Motor checked and Use Motor Output.

Relays assigned to outputs 1 & 2, also allow at least a couple of seconds for spin speed changes, more for high speed motors.



Mach3 Output signals Relay settings



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