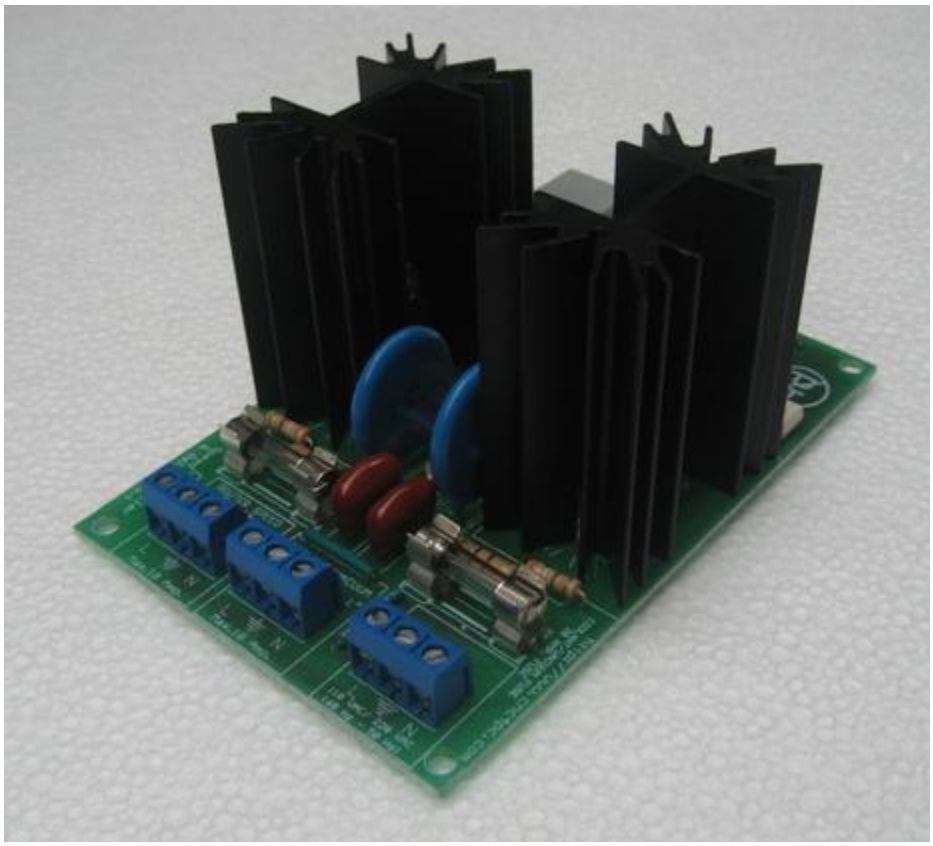
# C47 – SPEED CONTROLLER AND RELAY

# Rev. 1



## User manual

### Overview.

This unit is an easy to use speed PWM-based controller for routers. It works by modifying the output frequency according to an external control signal. This unit can be used with 110 or 220 VAC. It comes with 2 solid state relay controlled plugs. The first one has speed control and enable, the second one only enable. The first one could be used for spindle speed control and the second one for starting and stopping a coolant pump or vacuum.

## Features

- ***Easy to install and configure.***
- ***Built-in PWM-Based Speed Control. (200Hz).***
- ***RJ45 connectors for all Inputs.*** You only have to use standard networks cable to make all connections.
- ***Microcontroller Based System.*** The microcontroller based system allows the implementation of complex algorithms for monitoring the system. It also allows the possibility of having firmware upgrades without having to change the board and rewire your system.
- ***Works with 110 or 220VAC at 60 or 50 HZ.***
- ***For 2.5HP or 1800 Watt Routers.***
- ***All TTL +5VDC or +3.3VDC Signals.*** Interface directly with parallel port interface products and other cnc4pc.com cards. 5VDC (TTL) signals are very common among automation devices.
- ***Screw-On connections for all terminals.*** You only have to screw-on the wires to make all your connections.

## 1. Specifications

| INPUT SPECIFICATIONS | |
|---|---|
| **On-state voltage range** | 2 to 5V DC |
| **Minimum on-state input current** | 8 mA |
| **Maximum off-state voltage** | 0.8V |
| **PWM Frequency** | 200Hz |
| **Signal Type** | Active High |

| ON-BOARD TRIAC SPECIFICACTIONS | |
|---|---|
| **Maximum Nominal Current (AC)** | 15A RMS |
| **Maximum Peak Current (AC)** | 150A |

| OUTPUT POWER SPECIFICACTIONS | |
|---|---|
| **Maximum Motor Power** | 2.5 HP / 1800W |

## 2. Installation

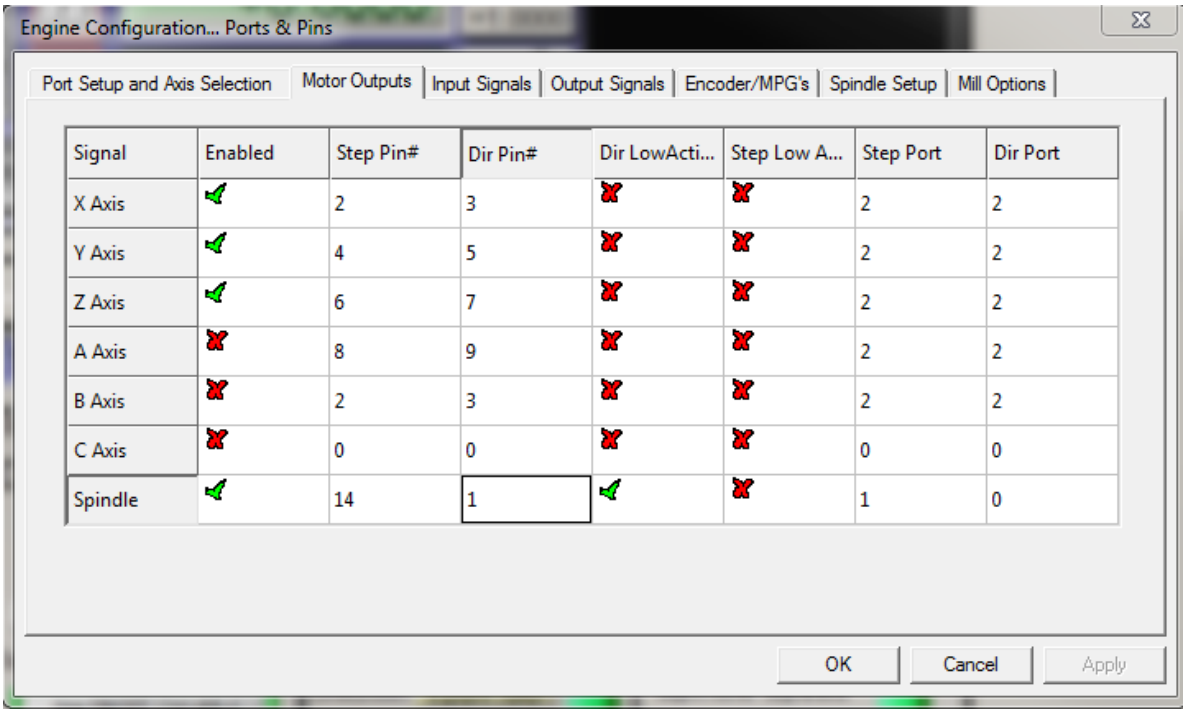
Follow these steps to get the unit up and running:

- Select the frequency of the AC source voltage (60 or 50Hz.)
- Connect to the C35 or C32 board.
- Connect to the router and Coolant/Vacuum to the board.
- Configure the control software.

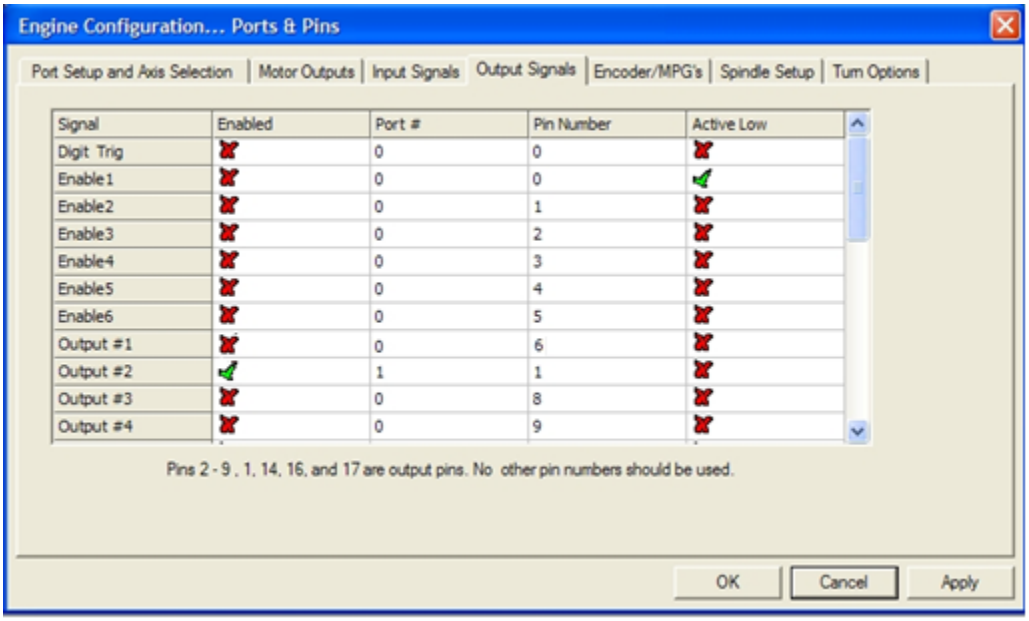
### *Configuring the Control Software:*

Configuring Mach3 for using PWM:

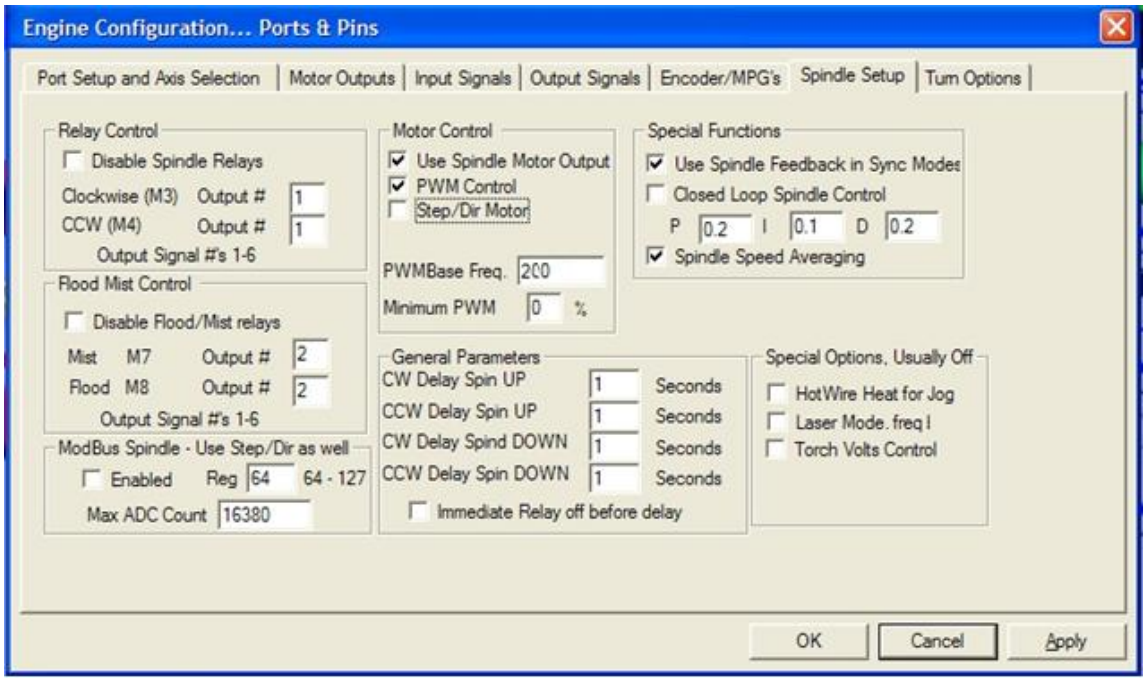
1. Go to Config / Ports&Pins / Motor Output. Enable the spindle and select the port and assign to the step pin the pin that is going to be used to deliver the PWM signal. Deselect active low.



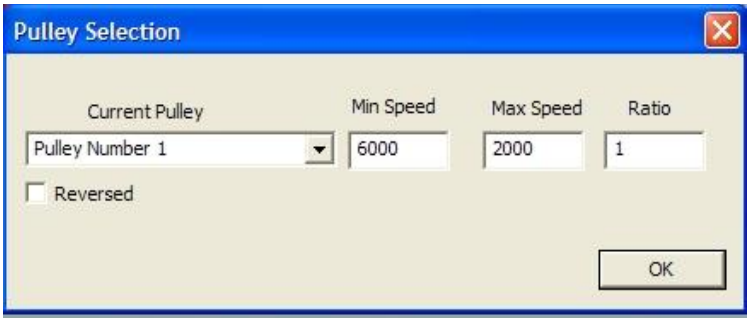
2. Go to Config / Ports&Pins / Output Signals. Enable the output that is going to be used to turn on the Coolant/Vacuum. The active low should be disabled.



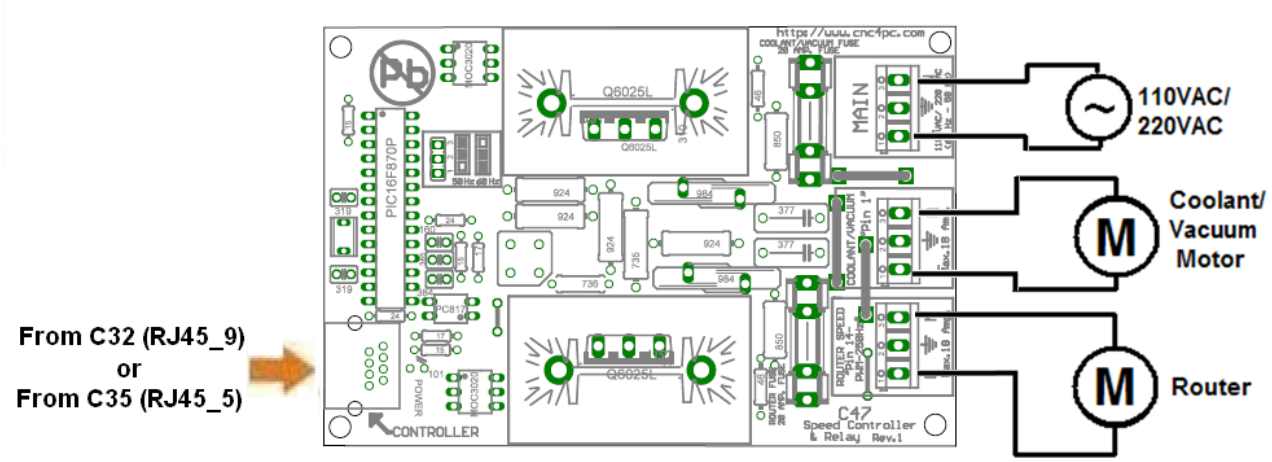

3. Go to Config / Spindle Setup. Do not disable the Relay Control and assign to it the output you configured in step 2. Activate the "Use Spindle Motor Output" option. Activate PWM Control and a set the PWM Base frequency in 200Hz.



4. Go to Config / Pulley Selection. Select speed range you expect to get.




## 5. Wiring diagram



## RJ45 Connector

The RJ45 connector is for connecting the boards directly using a standard RJ45 cable. A standard RJ45 cable has straight through wiring. That means that Pin1 = Pin1, etc…

This Connector is been provided in many of our boards and soon we will have breakout boards that will come with this connectors. This is to ease the installation process by eliminating the screw on terminals. The RJ45 connectors are used not just to carry the I/O signals, but also to power the external board. That way you will have it all in one connection.

Pin 5 carries the PWM signal and pin 4 carries the Coolant/Vacuum activation signal.

| RJ45 PIN | FUNCTION/P.P. Pin |
|---|---|
| 1 | GND |
| 2 | Not Used |
| 3 | Not Used |
| 4 | Coolant-Vacuum/Pin 1 |
| 5 | PWM /Pin 14 |
| 6 | Not Used |
| 7 | 5VDC |
| 8 | Not Used |

## *WARNINGS:*

- Do not exceed the maximum rated power capacity of the unit, 2.5 HP or 1800 Watts.

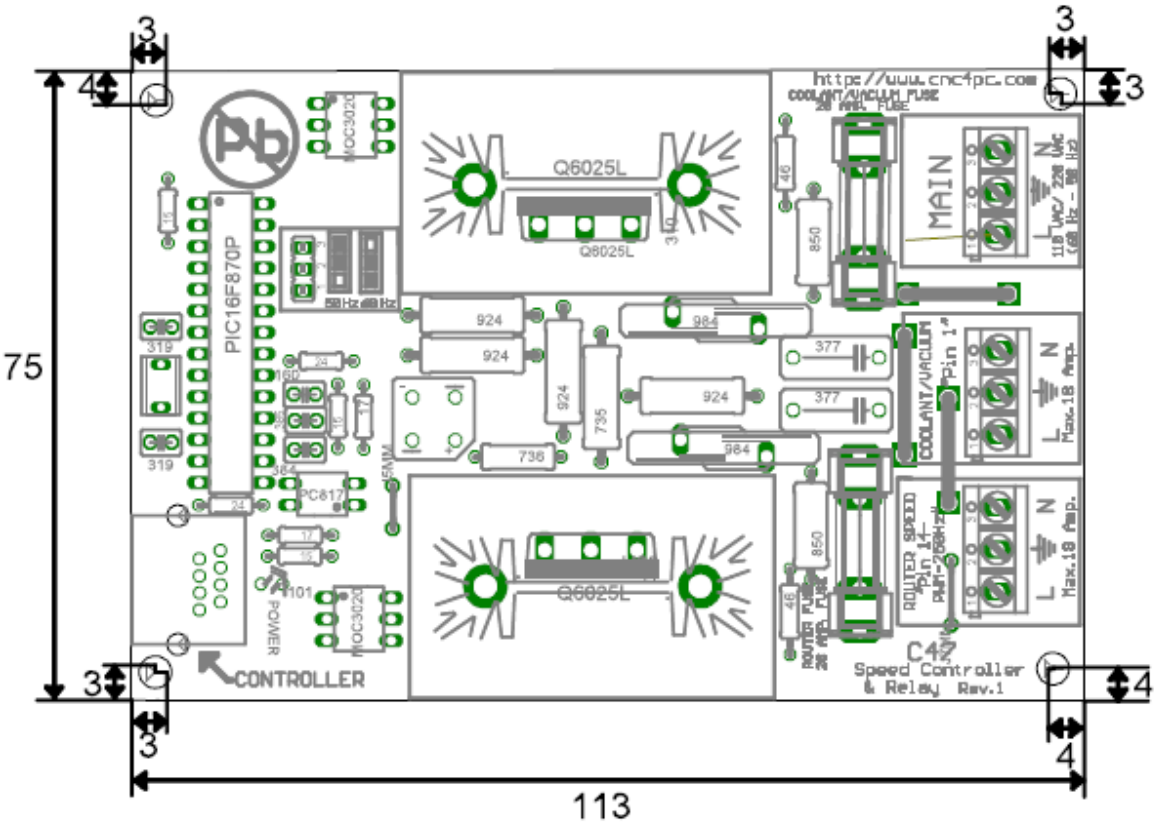
- The minimum speed is set to 30% of the maximum speed. This is to prevent the motor from stalling. Make sure the motor works fine at the low speed you are setting.

- If a motor is operated at low speeds for long periods of time it could overheat and get damaged.

- The frequency is not rectified before creating the new frequency. This gives a “chopped” type of wave form to the final frequency. This might limit the maximum torque that the motor can deliver as speeds are reduced. This way or varying the final frequency is very commonly found in router speed controllers.

- If the Router you are using already has a speed control, set it to the max speed. Do not attempt to use both controls at the same time. Doing this will deform the wave form of the final frequency and could damage the motor. If you need to have an external control for overriding the speed, it is advisable that you do this from the control software or by using the analog connection and connecting a pot in series with the analog signal.

## 6. Dimensions




All dimensions are in Millimeters.

**Disclaimer:**
Use caution. CNC machines could be dangerous machines. DUNCAN USA, LLC or Arturo Duncan are not liable for any accidents resulting from the improper use of these devices. This Board is not fail-safe device, and it should not be used in life support systems or in other devices where its failure or possible erratic operation could cause property damage, bodily injury or loss of life.