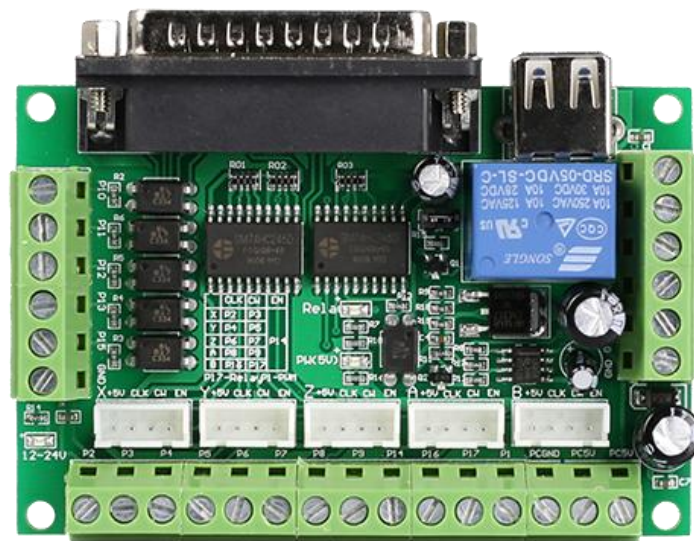


# User Manual of 5Axis Breakout Board



## **Safety Statement**

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Assembling electrical CNC machine component like power supplies, motors, drivers or other electrical components involve dealing with high voltage like AC alternative current or DC direct current which is extremely dangerous and need high attention & essential experience and knowledge of software, electricity, electro-mechanics or mechanics.

For technical question please contact us at [sales@vallder.com](mailto:sales@vallder.com) before purchase.

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# 1 Introduction and Features

## 1.1 Introduction

The latest upgraded 5 axis breakout board is specially designed for the CNC single axis 2-phase stepper driver controller, such as M542, M542H, MA860H, 2M542, 2M982, DM542(A), DM860(A) etc. single axis stepper driver controller series. With this 5 axis breakout board, any 1-5 single axis stepper driver controllers can be directly controlled by the PC via the MACH3, EMC2, KCAM4, etc.

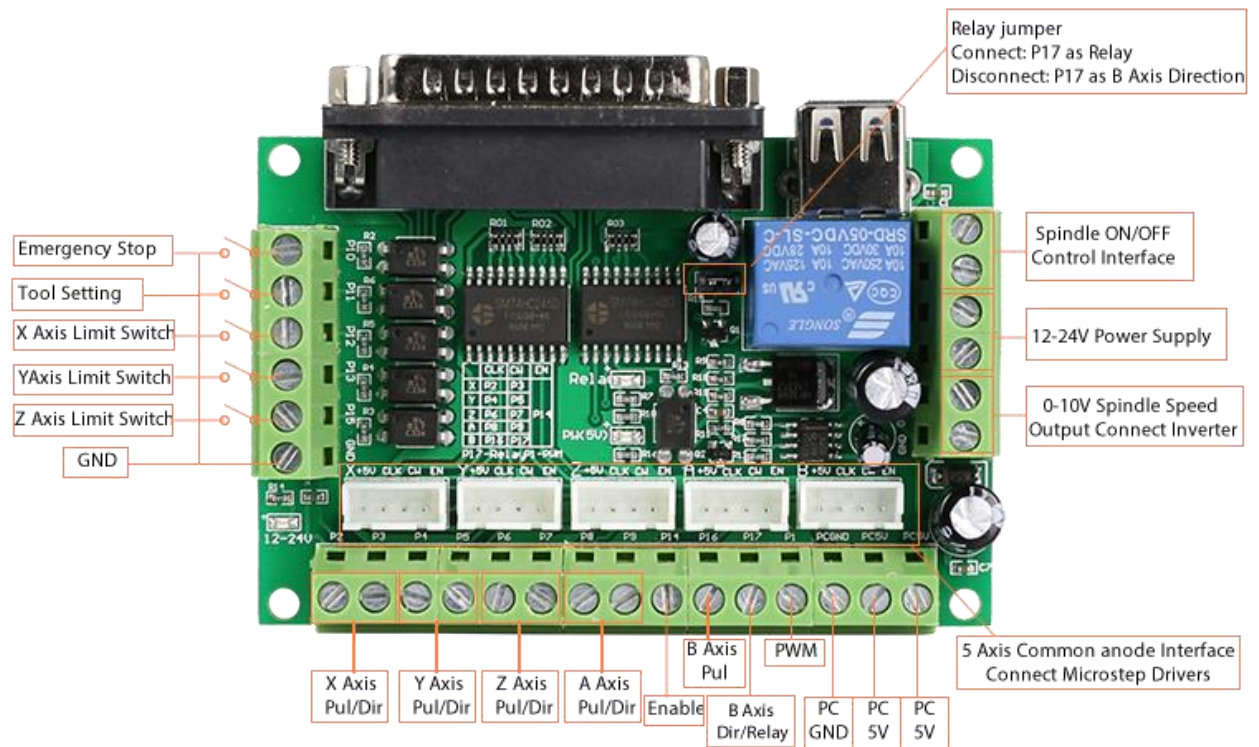
## 1.2 Features

- Maximum support 5-axis stepper motor driver controllers
- Compatible with MACH3, Linux CNC (EMC2) etc. parallel-control CNC software.
- USB power supply and peripherals powered phase are separated to protect computer security.
- All the signals are opto-isolated which can protect your computer security.
- 5-input interface to define the Limit, Emergence-Stop, Cutter alignment, etc.
- Wide input voltage range: 12-24V, and with anti-reverse function.
- One relay output control interface, accessed by the spindle motor or the air pump, water pump, etc.
- Output 0-10V analog voltage for inverter to control the spindle speed.

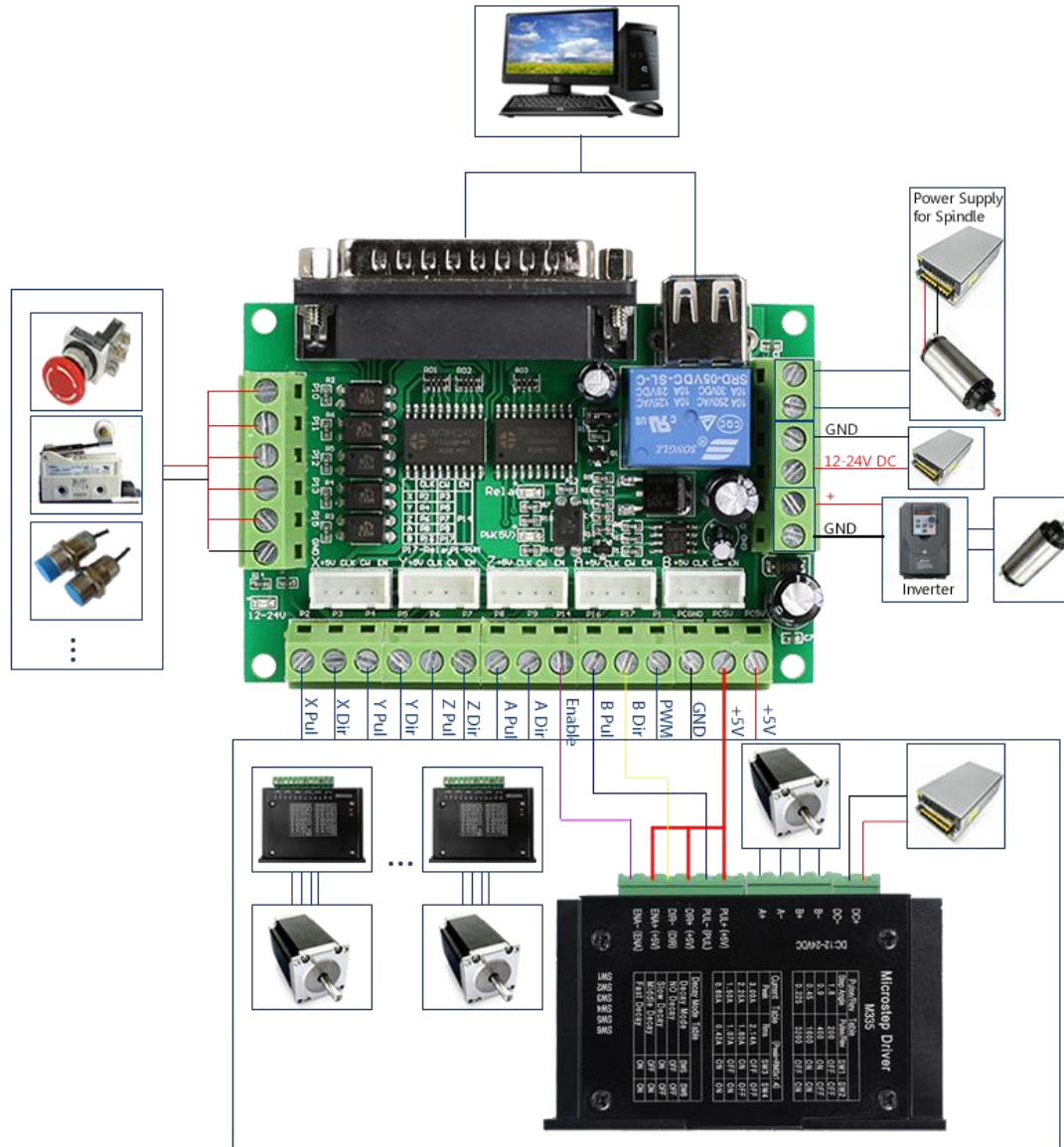
# 2 Specifications

Electrical properties(ambient temperature Tj = 25 °C)	
Input Power	USB port to directly get power from PC and 12-24V power supply(optional)
Compatible Stepper Motor Driver	Max 5 2-phase Microstep controllers
Driver type	Pulse and Direction signal control
Net/Total Weight	Approx 75g
Dimensions	90 * 70 * 20mm (L*W*H)

### 3 Interfaces



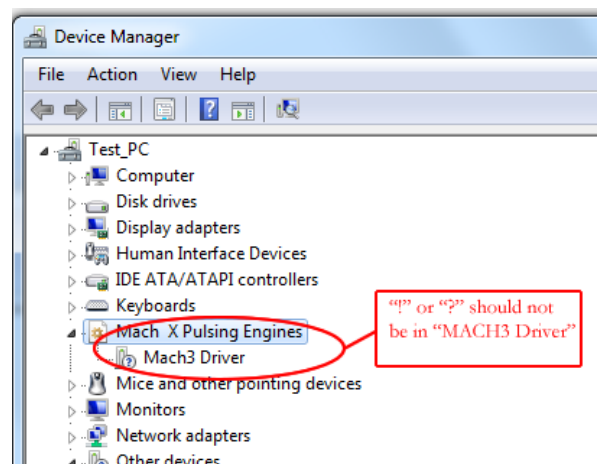
## 4 Wiring Diagram for Reference



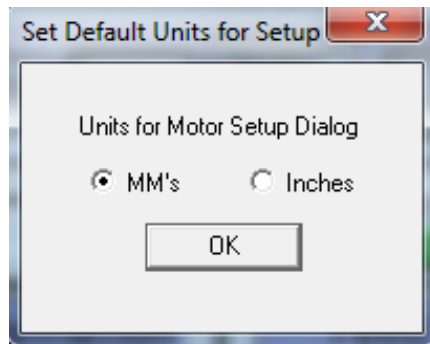
## 5 MACH3 Software Settings

Note: The settings on MACH3 below is in condition that breakout board and stepper drivers are connected in common anode.

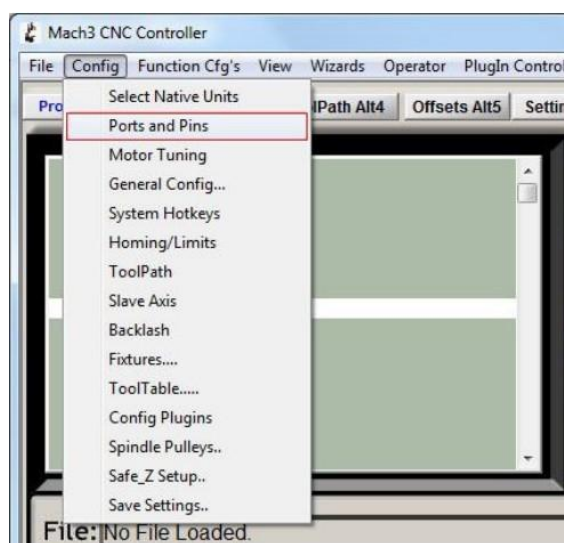
1. Check whether the MACH3 driver is installed correctly.



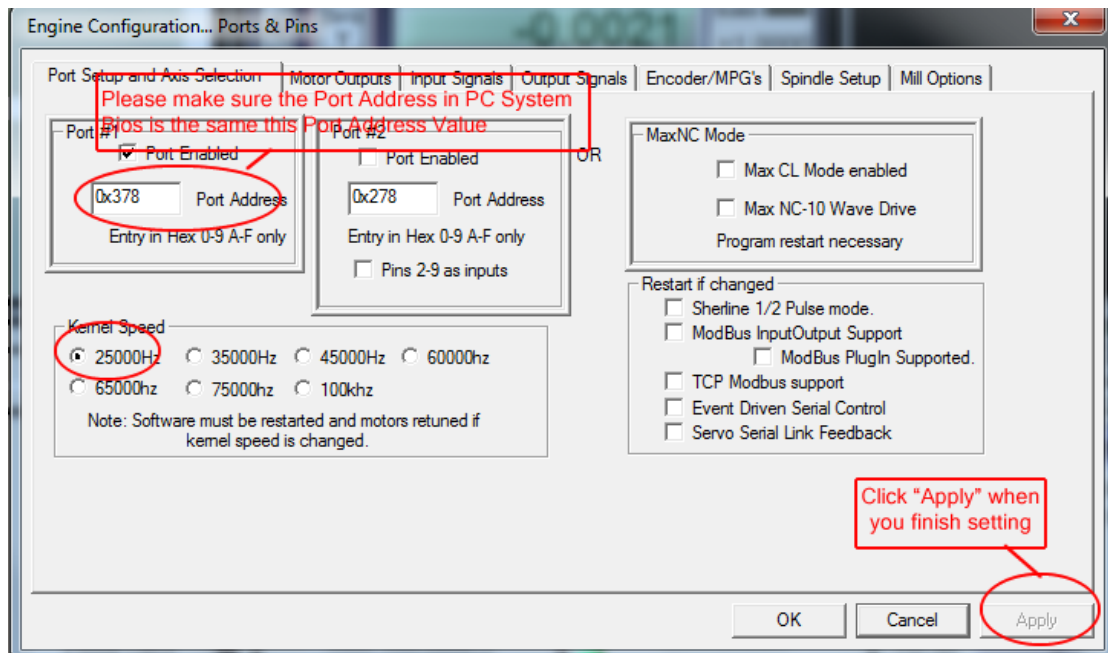
2. Setup Units: Choose “MM’s” in **Config->Set Default Units for Setup**



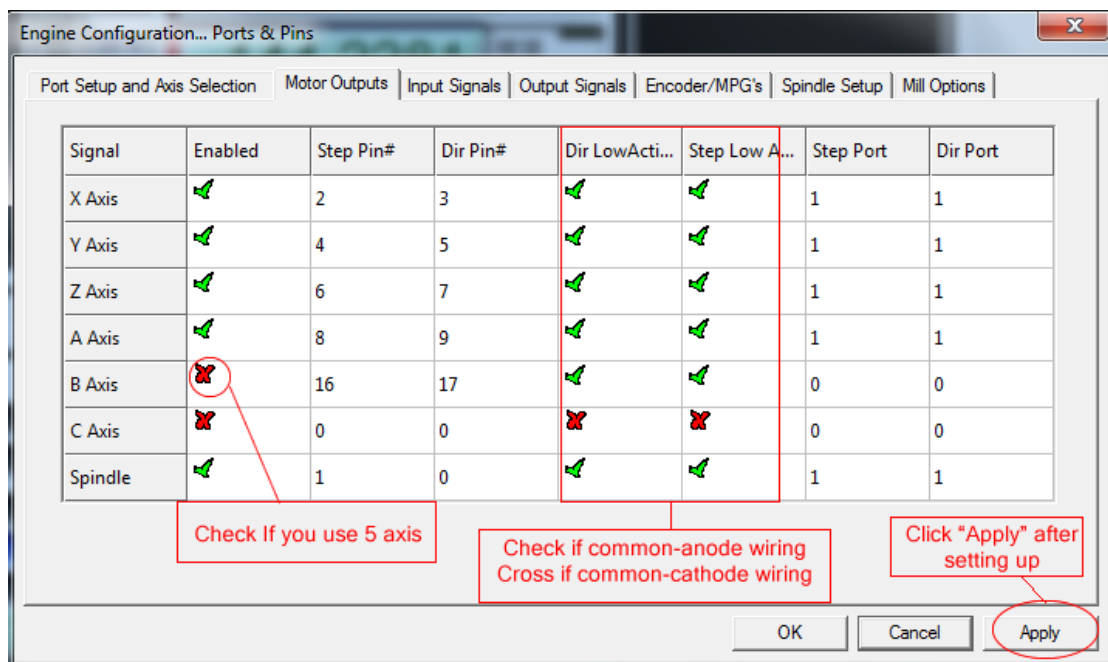
3. Click “**Config**”->”**Ports and Pins**” on Main Interface.



- Enter in “**Port Setup and Axis Selection**” to set “**Port#1**” and “**Kernel Speed**” shown as below.

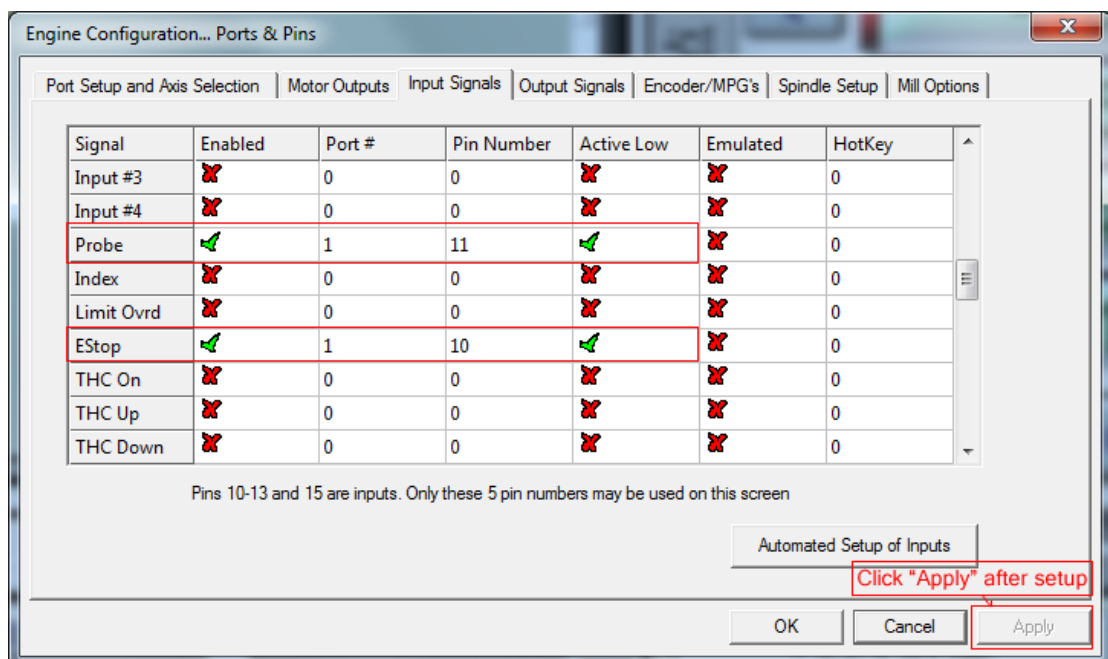
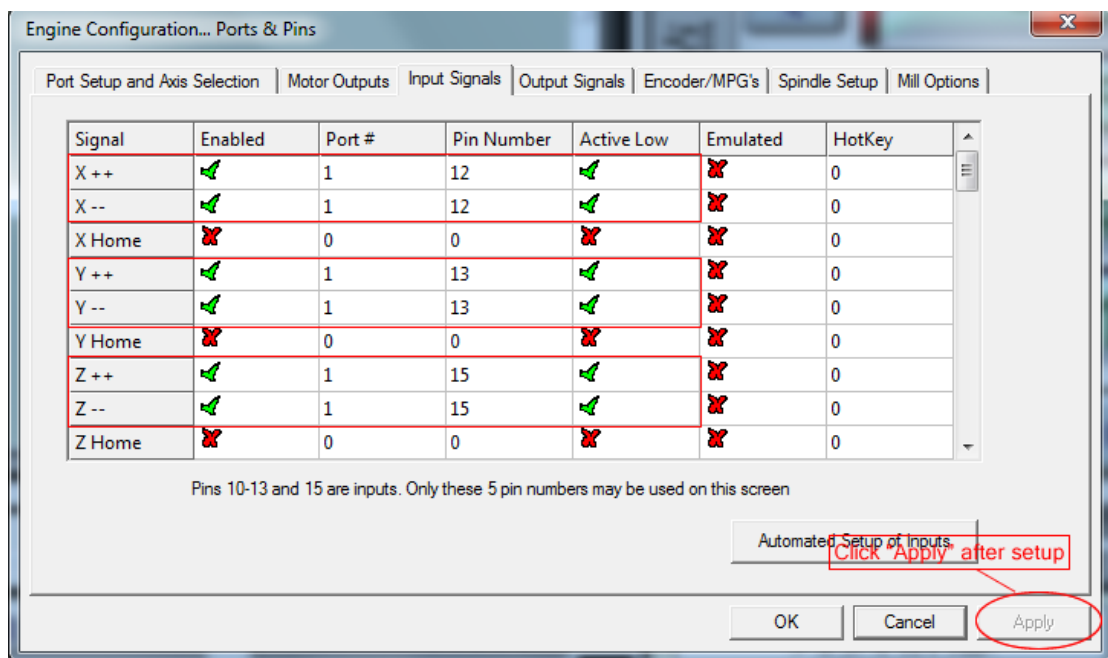


- Click “**Motor Outputs**” to set it shown as below.

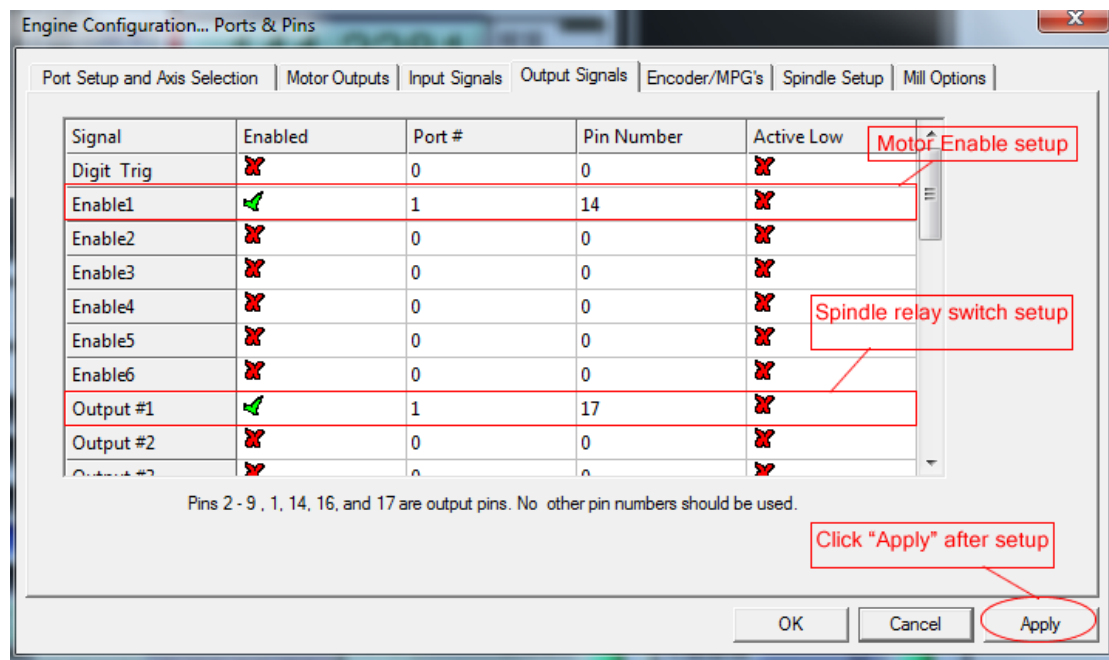


- Click “**Output Signals**” to set it shown as below.

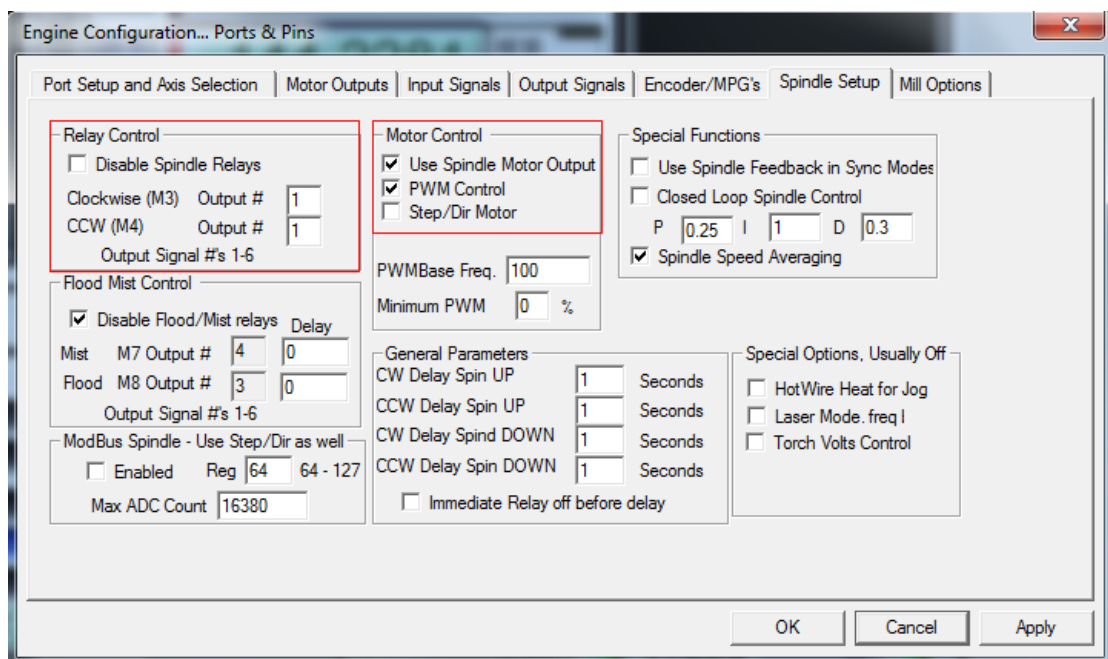




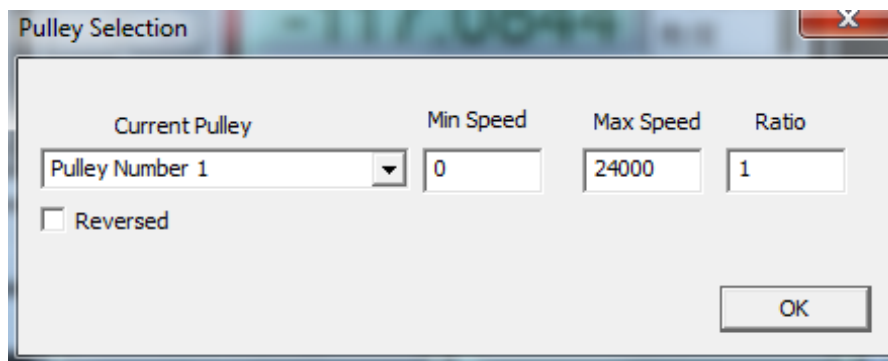
7. Click "Output Signals" to set it shown as below.



- Click "Spindle Setup" to set it shown as below.



If you use PWM to control the spindle speed, you have to click “**Pulley Selection**” to set it shown as below.



#### 9. Motor debugging. Click **Config->Motor Turning and Setup**

The 'Motor Tuning and Setup' dialog box has a title bar with a close button. The main area contains a graph titled 'X - AXIS MOTOR MOVEMENT PROFILE'. The y-axis is 'Velocity mm's per Minute' ranging from 0 to 3281.25. The x-axis is 'Time in Seconds' ranging from 0 to 0.5. The graph shows a blue trapezoidal profile. To the right of the graph is an 'Axis Selection' panel with buttons for X Axis, Y Axis, Z Axis, A Axis, B Axis, C Axis, and Spindle. Below the graph are input fields for 'Steps per' (320), 'Velocity in's or mm's per min.' (200), 'Acceleration in's or mm's/sec/sec' (100), 'G's' (0.050988), 'Step Pulse 1 - 5 us' (5), and 'Dir Pulse 0 - 5' (5). A 'SAVE AXIS SETTINGS' button is located below the 'Step Pulse' and 'Dir Pulse' fields. There are also 'Cancel' and 'OK' buttons at the bottom right.

Annotations:

- Steps per: Steps required to mobile 1 mm. This value must be the same with the "PulE" in manual control.
- This value is calculated in the following formula: Steps per =  $(360/1.8) \times x/l$ ; x: Microstep. l: screw pitch. E.G. Microstep=8, screw pitch = 5mm. then Steps per = 320
- Setup X,Y,Z,A Axis separately
- Click this button after you finish each axis setting, or it will not save the data

10. Click “**System HotKeys Setup**”. Set X, Y, Z axis hotkey shown as below. Then you can manual control the corresponding axis motor turning via hotkeys.

