

## Requirements

- 1) Ethernet Smooth Stepper
- 2) C11G breakout board
- 3) Mach3 Software
- 4) Grizzly G0704 with KBIC-125 or JYMC-220B-II DC motor controller

## Overview

In this configuration spindle on/off works as well as speed through the 0-10V analog section on the C11G. Voltage is 12V in, 0V out with the spindle not spinning and the inhibit relay is closed.

- 12V connected to 12V (V+) power supply and trimmed to 12V
- 0-10V output being checked with voltmeter
- GND connected to 12V (V-) terminal

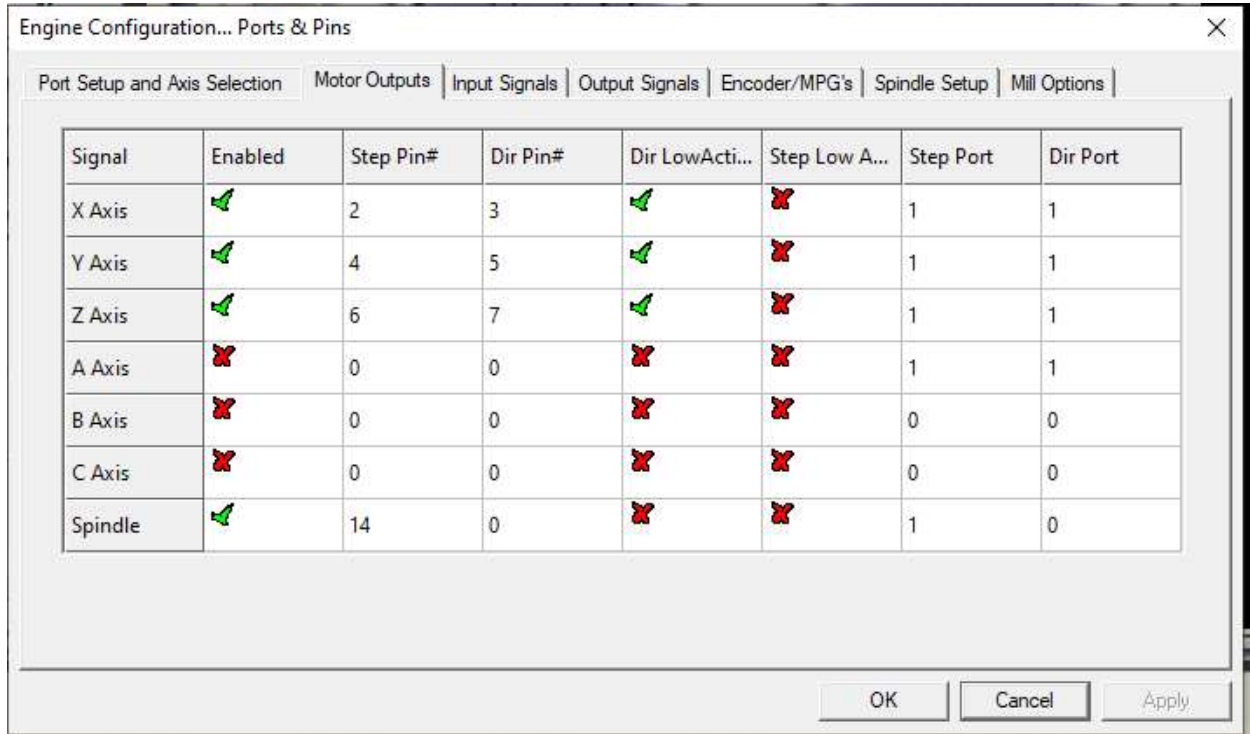
With the command: S1000, M3 the inhibit relay (output 1 is set to pin 14)

10V at the 0-10 output, inhibit relay open

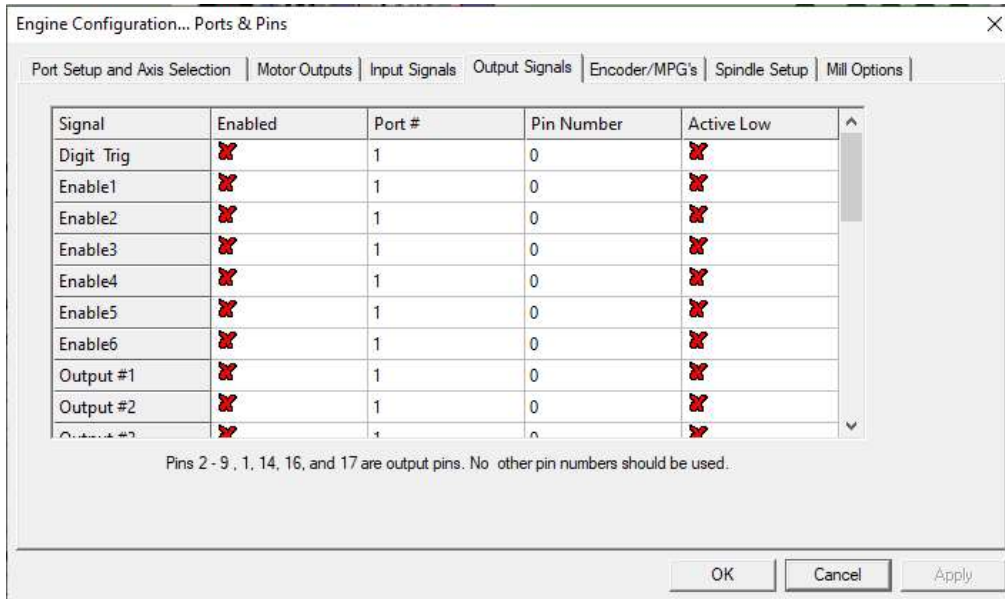
With the command M05 0V at 019V output and inhibit relay closed.

## Mach3 Setup

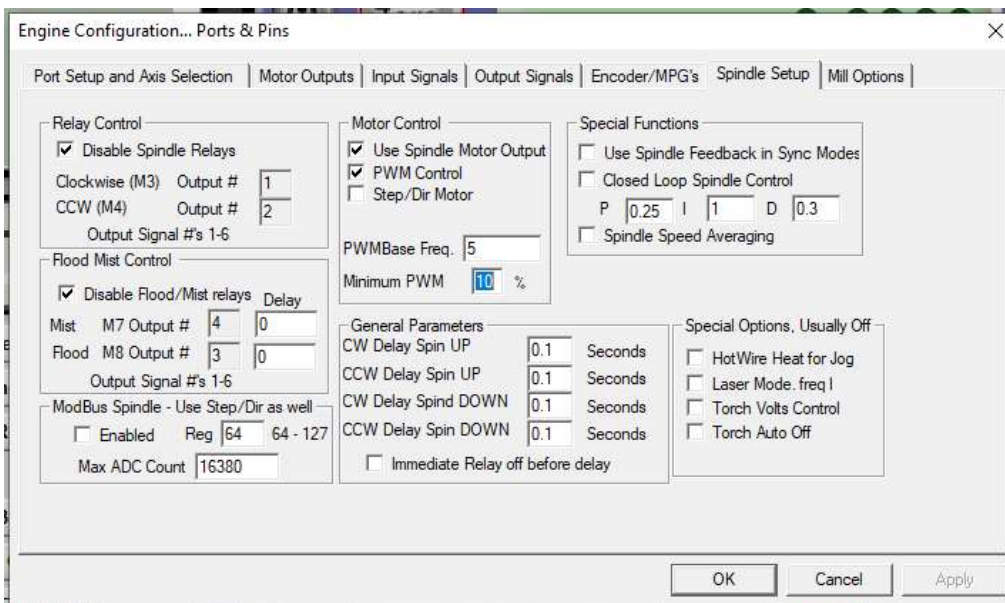
Spindle step pin should be set to 14, no DIR pin is needed. That can be used for other relay functions such as flood/mist/whatever. **The step port must be set to 1.** Output 1 is used for Spindle Inhibit.



Spindle Control on the G0704 using Mach3, ESS, C11G, KBIC-125 boards.



There is no need to configure Output 1. I added this screen because conflicting information seems to be widely available.

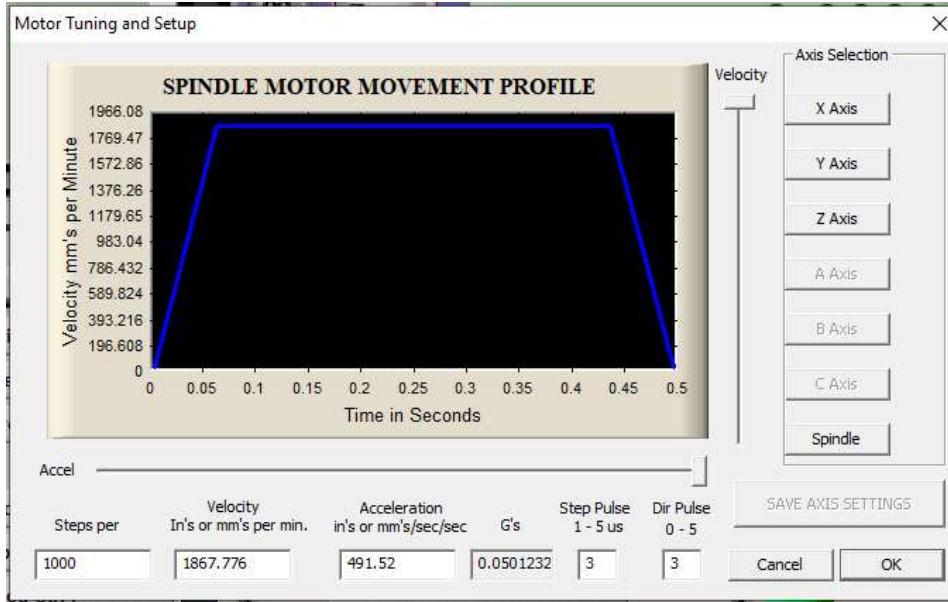


Check off “Disable Spindle Relays”. The Output 1 Inhibit still works because of the spindle settings under the motor outputs tab Spindle Step being set to port 14, which is output 1.

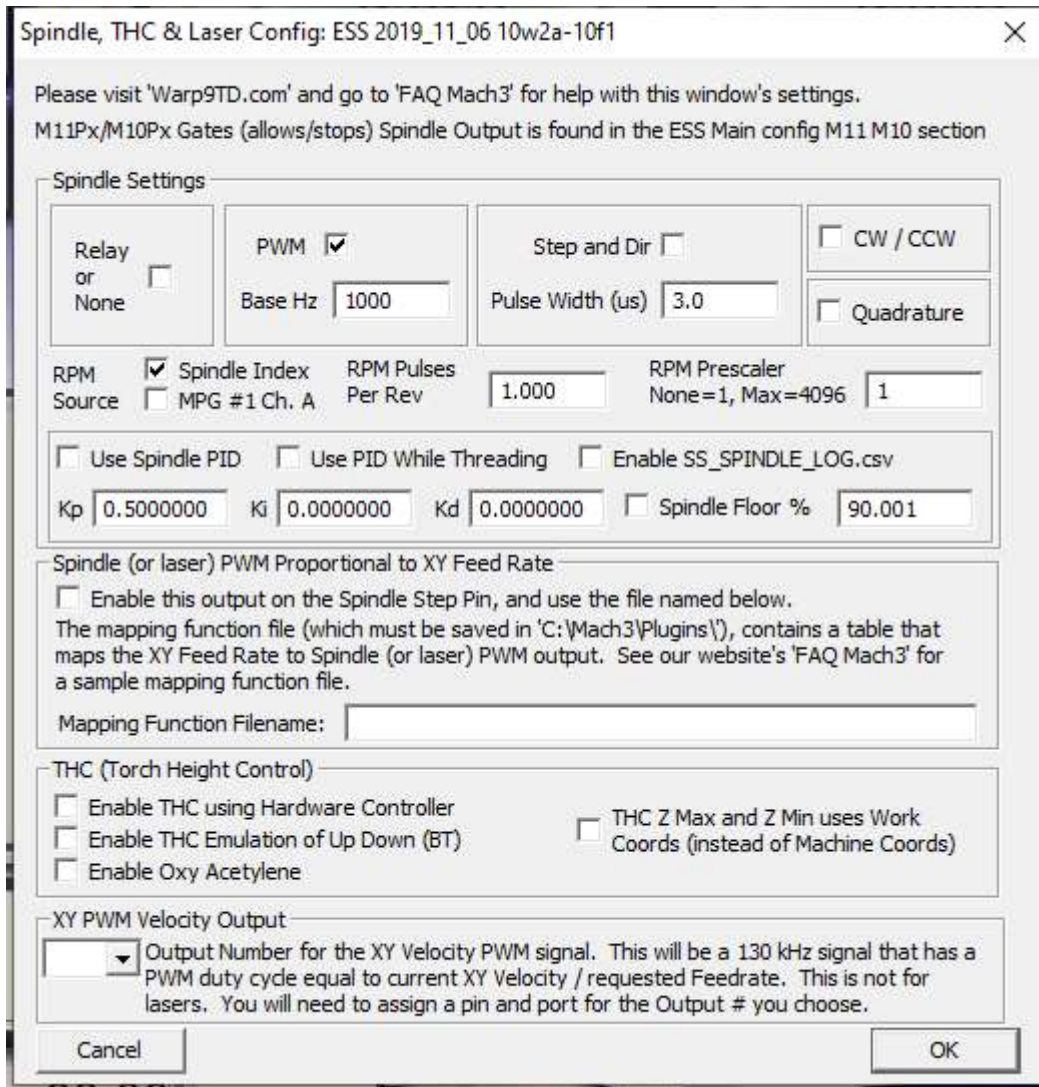
I changed the delay, but that seems to have little effect. There is still a delay between when you click or issue M3 or M5 and the inhibit relay working.

Under the “Motor Tuning and Setup” screen in the Config Menu, set both Velocity and Accel to max by using the sliders. Typing in numbers does not work.

Spindle Control on the G0704 using Mach3, ESS, C11G, KBIC-125 boards.

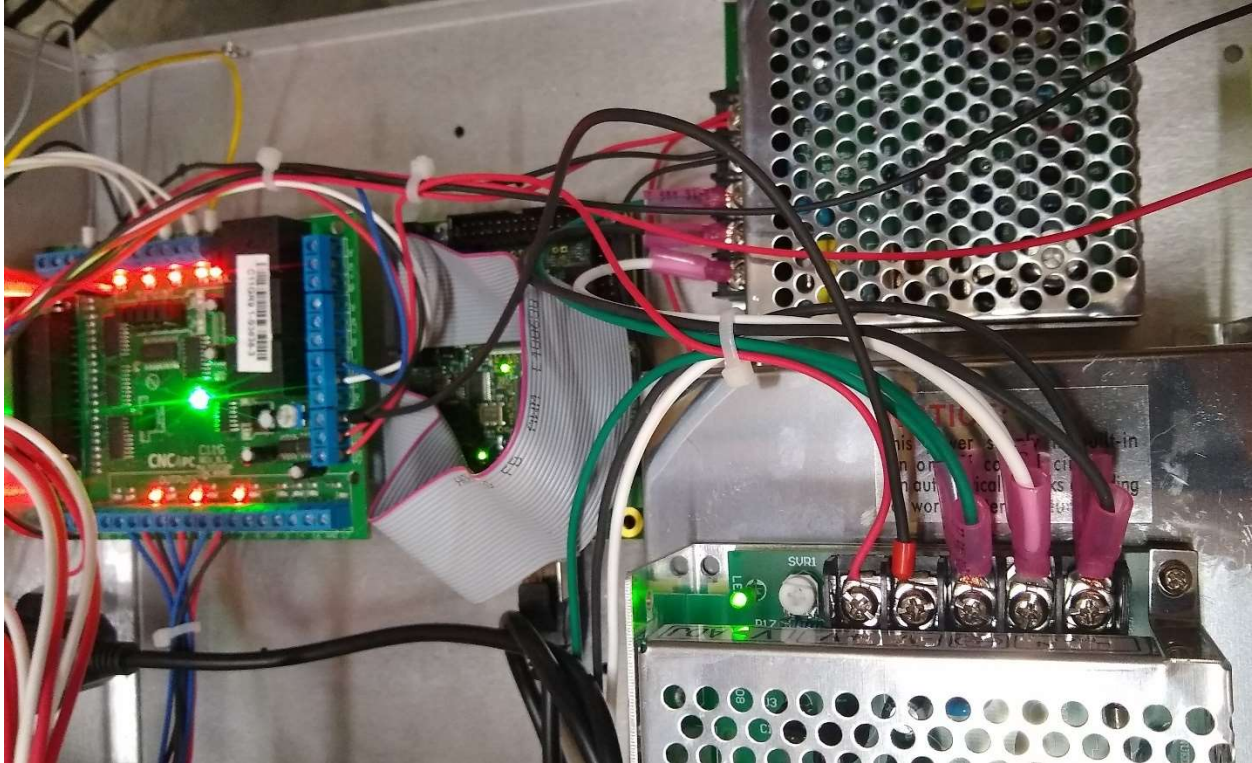


Spindle Control on the G0704 using Mach3, ESS, C11G, KBIC-125 boards.



This screen is under “PlugIn Control” Menu” PWM must be selected, Step/Dir will not work.

## WIRING



Note that in the photo on the 12V PS, V- is connected to the GND terminal of the 0-10V section

The V+ terminal should be trimmed to 12V above V- using the trim pot on the 12V power supply. DO NOT CONNECT V- to any other ground or you risk frying the KBIC-125, which I did!

### C11G Connections

Set jumpers to International (VFD to INT).

Note I would not hook up the wires to the KBIC-125 until voltages are verified.

Analog Out:

- V+ on the 12V Power supply is connected to the 12V terminal of the analog section of the C11G (Red Wire).
- V- on the 12V Power supply is connected to the GND terminal of the analog section The GND terminal of the analog section is also connected to P1 on the KBIC-125 (Black Wires).
- 0-10V is connected to P2 on the KBIC-125
- Note: P3 on the KBIC-125 should be disconnected.

Relay 1:

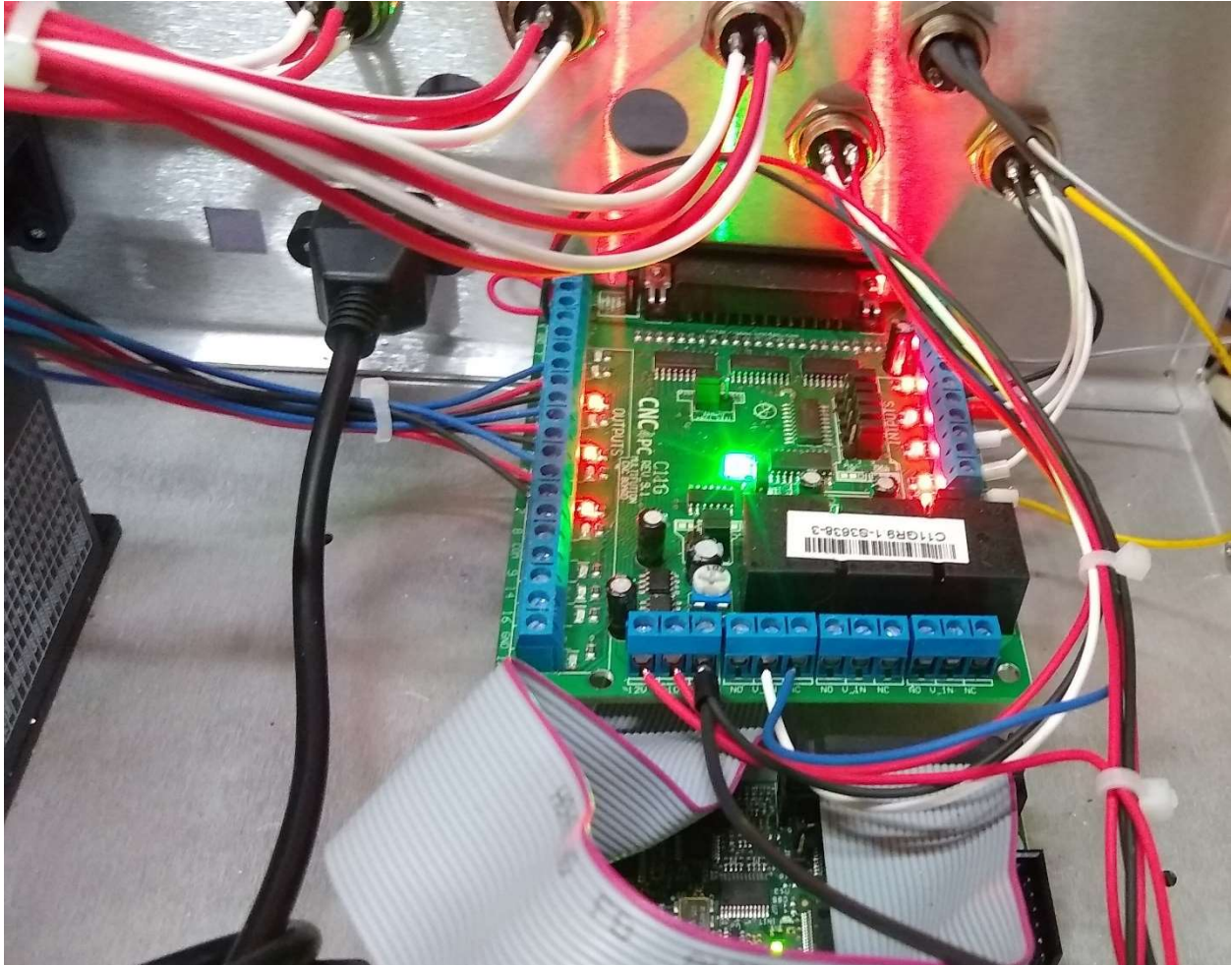
- V in is connected to I1(Motor Inhibit) on the KBIC-125 (White Wire)
- NC (normally closed) is connected to I2 (Motor Inhibit) on the KBIC-125 (Blue Wire)

Spindle Control on the G0704 using Mach3, ESS, C11G, KBIC-125 boards.

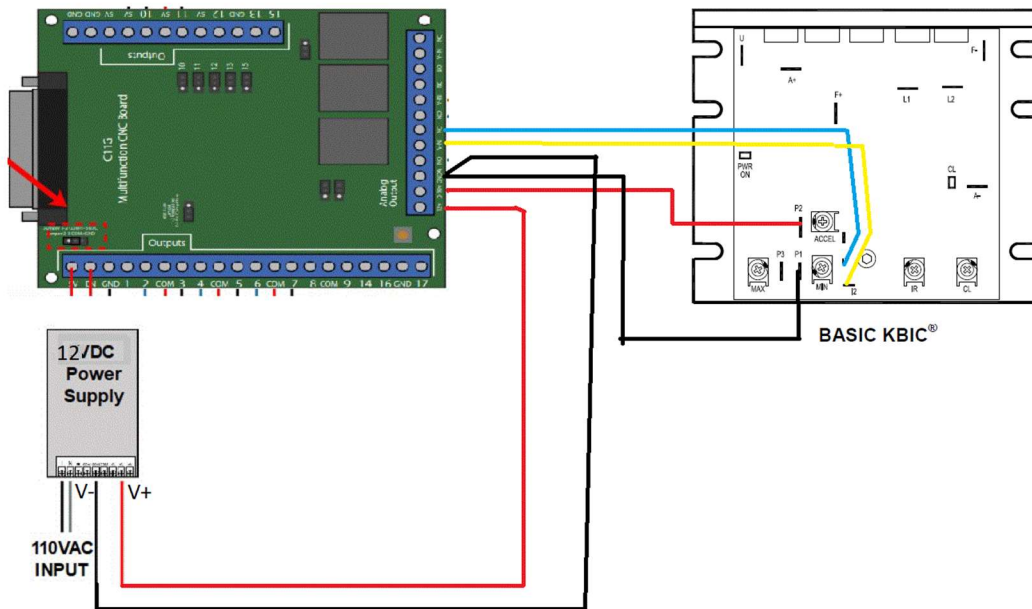
- When this relay is not powered, motor the motor inhibit circuit is closed, no motor. When the relay is powered, the motor Inhibit is open and the motor spins.

Relay 2 is not used since the KBIC-125 has no direction functionality, this is done by reversing polarity of the motor leads. Pin 16 is not needed as the DIR function is not enabled.

Pin 14 enables relay 1 and also PWM.



## Spindle Control on the G0704 using Mach3, ESS, C11G, KBIC-125 boards.

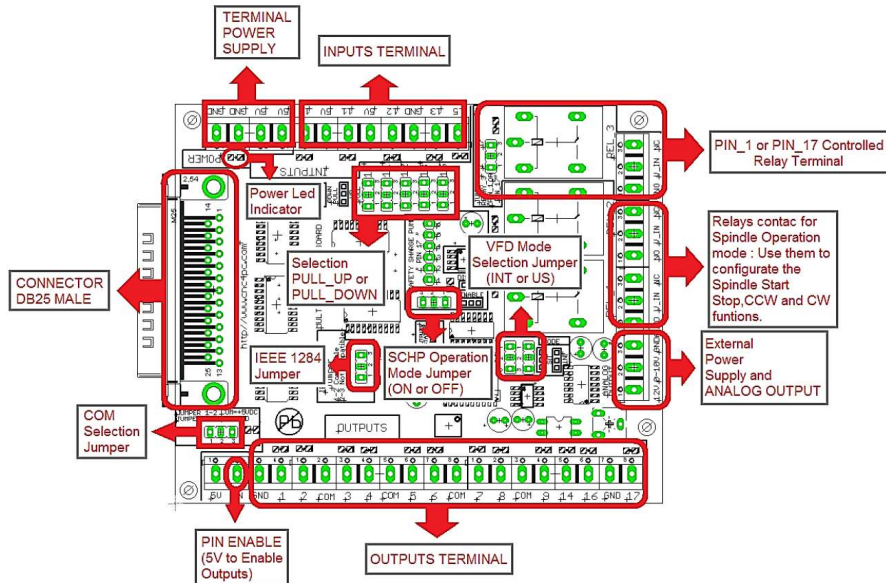


### TESTING - BEFORE WIRING THE KBIC-125

- 1) Verify all configurations and wires.
- 2) Check to make sure you have 12V across the power supply (V+, V-) and that V- is ONLY connected to GND on the analog section of the C11G. Adjust to 12V using the trim pot on the 12V power supply, if possible.
- 3) Check for 10V on the analog section and that the Spindle Inhibit relay is working
  - a. Check for continuity across relay 1, V\_IN to NC.
  - b. In Mach3 issue a spindle on command at full speed
    - i. S2250, M3
  - c. Check that the inhibit relay is working
    - i. You should hear the relay click after a brief delay
    - ii. There should be no continuity across the V\_IN and NC terminals (Blue, White Wires)
  - d. You should get 10V across 0-10V and GND on the C11G Analog Section. If not use the trim pot to adjust.
  - e. Issue an M5 or spindle stop, you should get 0V across 0-10 and GND on the analog section and get continuity across relay 1.
- 4) Check for variable speed
  - a. Issue a 45% speed command
    - i. S1000 M3
  - b. You should get roughly 4.5 volts across 0-10V and GND
  - c. The relay should break connectivity between V\_IN and NC.
- 5) If all that works, wire in the KBIC-125.



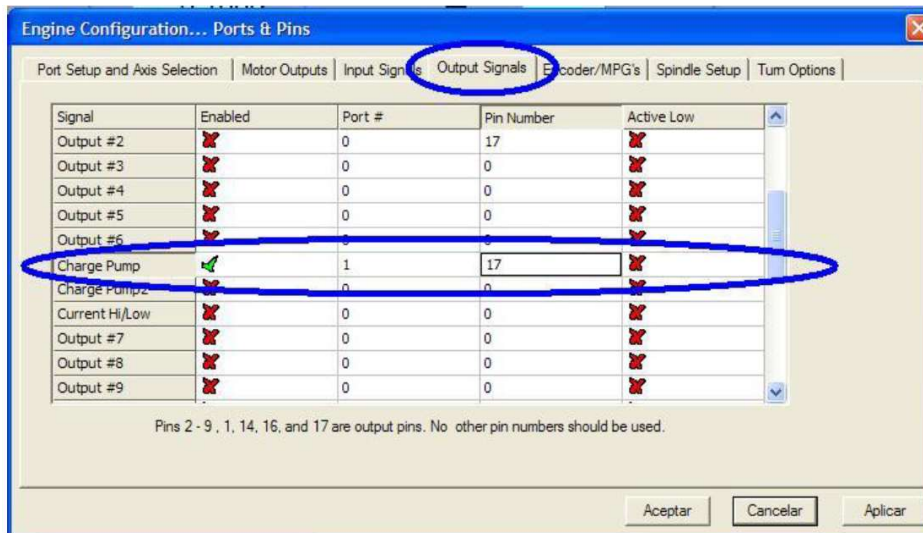
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Final Note:

It is a good idea to enable SCHP, Safety Charge Pump. What this does is kill all outputs (spindle/axis motors) unless it detects that Mach3 is in control. Lots of documentation on it, however, here's the config:

- 1) Change the SCHP jumper to enable
- 2) Set the charge pump to Enable and the Dir pin to 17.



ACKNOWLEDGEMENT

Lastly, I'd like to thank Arturo Duncan, the designer of the C11G, for all his assistance, I am just documenting what he helped me set up!