

TB6560 Configuration for CO2 laser by Marco Wong

Basic about a CO2 power supply

A CO2 power supply should have an Input port for either PWM signal or an analog signal control. Usually if 5V being injected to the input pin, it will output full power. However, since a CO2 is a very high voltage device so that safety is a concern. That's why there is an 'enable' control. Its could be either TH (level high or 5V) enable or it could be TL(level low 0V) enabled. There is one more control: water flow detection. It is used to protect a Co2 laser tube. It shut of the power if no water flowing inside of the tube. Usually you need to install a water sensor in order to have this feature functioning. Note, for small machine some power supply may not have LH, WP and/or PWM control. Instead, it only has LH and +Input.

What is a 3 axis controller board?

Toshiba has introduce two chipset TB8434 (phase out) and TB6560. It's great for being high efficient and low cost. When using 3 of the TB6560 and combined a break-out board (parallel port), it ended up the board. Ideal for controlling a portable CNC machine running a 3rd parties software like Mach3, KCam, or MC^2 on Windows.

Engraving or Cutting?

Well, a common known that Mach3 or Kcam is designed for routing(vector). Those application seems not doing good job on engraving (raster). So, to use the TB6560 3 axis card for Mach3, it's great for cutting. Well, you may do engraving but the result will looks a little bit 'cold or hard' as gray scale is not possible. Plus, there is no way to control the power level.

Secrete behind the 3 axis card

Thanks to a friend of mine in Brazil. He told me that he could drive a Co2 laser by a cheap cheap 2 axis card. But he has to add a simple circuitry to make it possible. The secrete behind it is to simulate the action of Z! We all know that Co2 machine is 2D. I then use signal from Z axis to simulate the fire action. In CNC machine, it's 3 axis minimal to make it work: X, Y, and Z but in Co2 laser, all we need is X,Y and Fire. Follow me?

How to use 3 axis card for CO2 laser?

Let me ask you a question, what will you get when Z in motion? Is it a single signal or double?

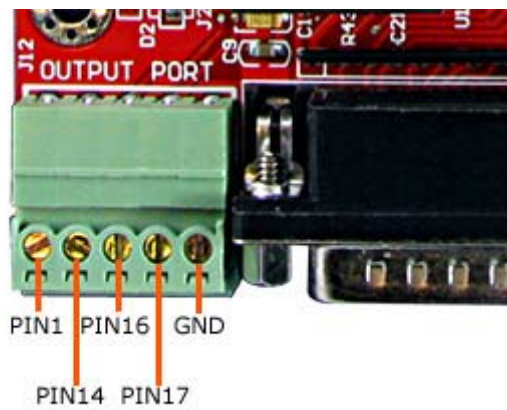
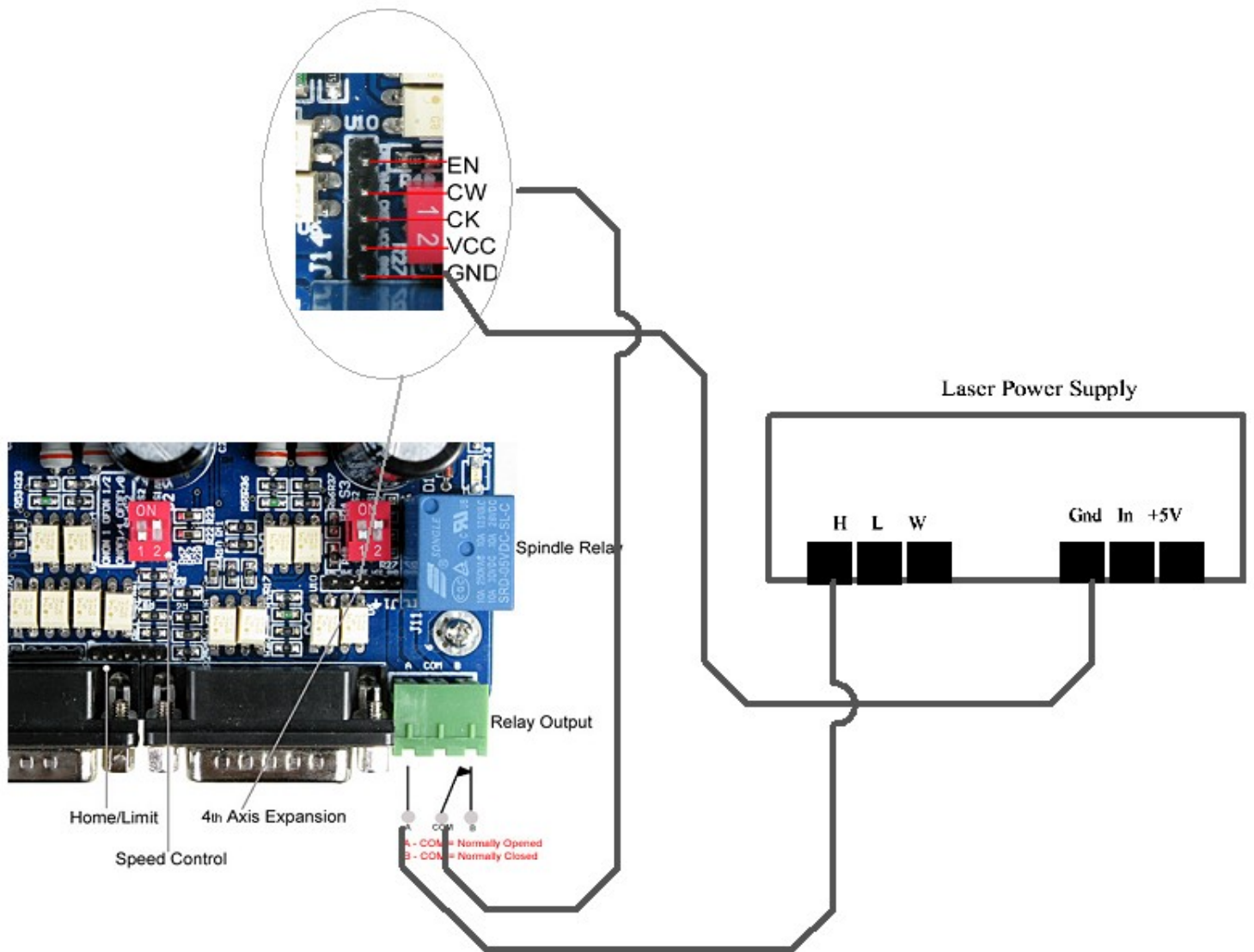
The answer is: double

What double? One is the Z+ Z-, the movement of Z running up and down. But there is one more and it's the direction of Z. When the Z is going down, the direction could be +5V and it switch to 0V when it's going up. So, I could use Z moment to do simulation but I found a problem by doing so. How much Z is needed; 0.1mm or 1mm or 10mm... it create a big headache for the use, especially someone like me who know very little about CNC and G code. Then, I came up a better idea (smart Polo). I use the Z dir to simulate the fire action. When the Z is going down, it send out a +5V regardless the deep it travel. Then, it switch to 0V when it lift up (note: this can be done on Mach3 for level high or level low control, reversed +5V and the 0V)

Connection

CW – the direction output of Z stepping motor send +5V when Z value change in positive direction (user configuration). It's connected to the COM port of the relay and the GND is connected to the Gnd(ground) of the CO2 power supply. Note, the power supply must support 5V triggering as the 'CW' output signal is TTL level, either in 0V or in 5V.

Note, the CW is configurable on Mach3. You can point Z's DIR to pin#7 (default) but you can also reallocate it to pin#14 The TB6560 card that I'm carrying is a customized board with output port available. It's a little different than the TGB8435 that I used before (see image below). But the concept behind it is the same.



Note: Only board from us provide the Output port for this feature. PIN14 can be set to the CW for the Z

