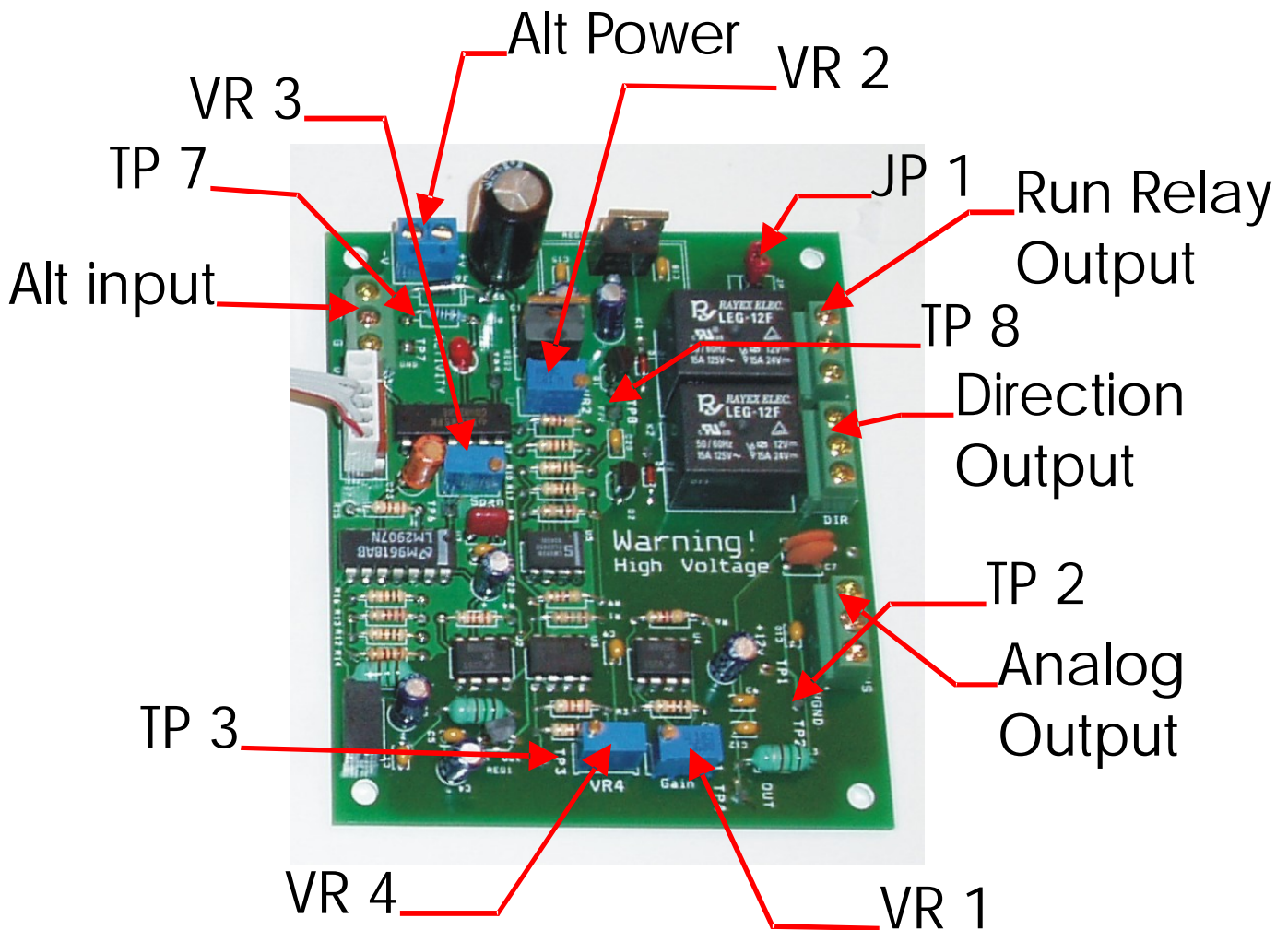# Sound Logic Spindle Speed Control

Rev 2

The spindle speed control accepts step and direction signals form Mach2 and converts the step signals to a 0 to 5 volt or 0 to10 volt analog (DC) signal for driving a VFD, or DC motor drive. Warning VFDs analog in ground is not at earth potential , in fact it is often greater that 300 volts. The spindle speed control board uses an isolated power supply and an analog optical isolator to provide the necessary safety for the installer and operators well protecting the electronics.

Set up and Adjustment:

Do not connect the spindle speed control board to the breakout   board while power is applied to the breakout board.

The first thing to do is configure Mach2 to provide the step and direction signals on the proper pins. Mach2 also needs to be setup to output the step frequency range.

Refer to the screen shots to configure Mach2. Spindle speed screen snapshots are available for download.

Here are some of the important settings.

Ports and Pins / Port setup and Axis Selection: Put a check in the box for "**Spindle Axis Enabled (step and direction)**".

Output pins: Spindle Step set to active low, port 1 and pin 1.
　　　　　　　Spindle Dir set to active low, port 1 and pin 14.

NOTE: The first two outputs are being used for the spindle speed control. This leaves you with one relay output plus the charge pump relay output.

Motor Tuning: Click on the Spindle option and set the Velocity to 1000 and the steps per unit to 9. The acceleration can be set to 5000. The minimum Pulse width to 1 and the Direction PreChange to 0.

On the Logic Configuration page select Pulley Ratio # 4 and set the value to 3600. You may also want to set up one of the other pulley Ratios for your top speed.
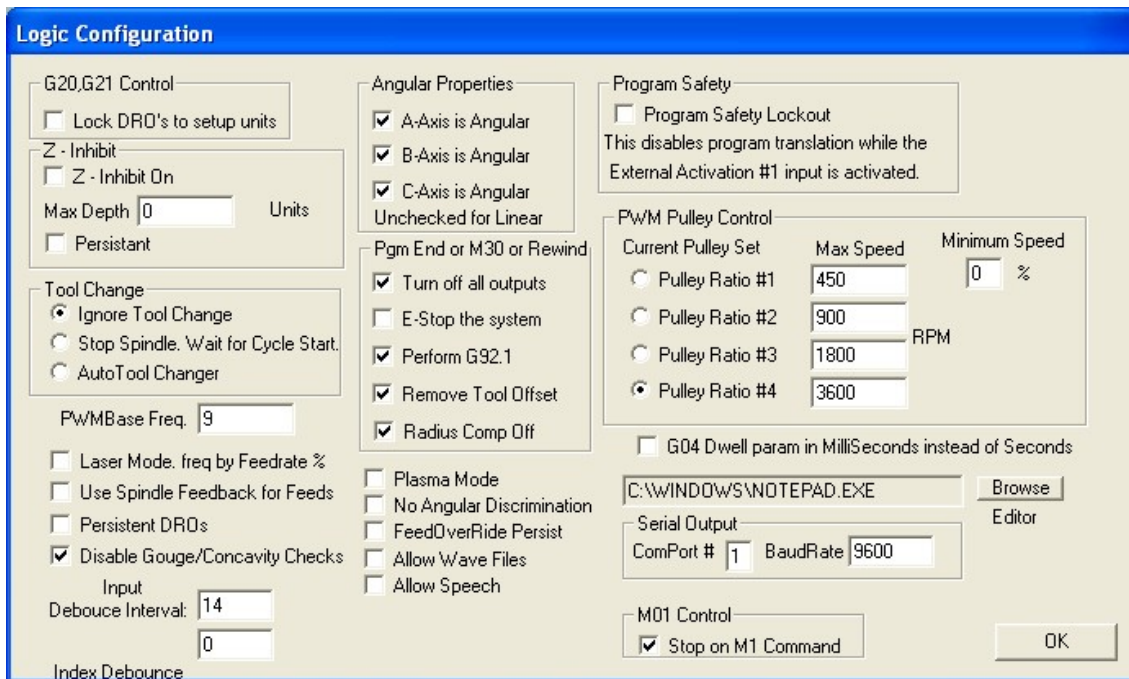
Once Mach2 is configured make sure the power is **off to the breakout board.**

1. Connect the cable provided with the spindle speed control to the breakout board and the spindle speed control board.

Do not connect the motor drive at this time.

2. Enter the Pulley Ratio four value into Mach2 spindle speed RPM DRO and press enter. (run screen shot). The example shows **3600**. For testing we used 3600. Once the spindle speed board it checked out and calibrated you can use a different spindle speed in Ratio 4 or set your maximum speed in another pulley speed and then make that pulley your current pulley.

3. Apply **power** to the breakout board. The Charge pump LED should come on.

4. Clip the ground lead of your volt meter to TP7 and the plus lead to Tp8.

5. Click on the **Spindle Button** on the Mach2 screen . The output 1 Led should come on.

6. Adjust VR3 for +5.00 vdc. If it doesn't adjust, make sure that your are adjusting Vr3.

.Warning VFDs analog in ground is not at earth potential Makes sure the VFD is disconnected.

7. Move the meter ground probe to Tp2

8. Move the plus probe to TP1 to verify +12

9. connect the Plus probe to TP3 and adjust VR4 for +5.00vdc.

10. Move the plus probe to TP4 and adjust VR1 (Gain) for +5 vdc or +10 vdc which ever you drive requires.

11. Change the spindle speed DRO to 1800 and press enter.

12. the output will go to ½ the value of step 10.

13. Change the spindle speed DRO to 100 and press enter

14. you will see the activity LED blinking.

15. Adjust VR2 full CW then CCW until the Run relay energizes Use an ohm meter between the center connector (COM) and NC on the RUN relay K1. It will show continuity when the RUN relay energizes. This sets the low speed cutoff. It can be set at the lowest speed you can safely run the motor. The motor will run much hotter at low speeds so keep this in mind when you adjust it. It can also be controlled in Mach2/config/logic/ low speed %.

16. This completes the set up and adjustments.

The drive has high voltage at the connection points so **BE CAREFUL!!!**
Power every thing down, computer, breakout board and the VFD for safety.

Connecting the drive:

The drive has high voltage at the connection points so BE CAREFUL and remove power from the drive!!!

There are more than one way that manufactures set there VFDs up.
The analog is simple, just connect the SPD output of the spindle speed board to the analog input of the drive. The GND will connect to the analog ground.

The direction and start/runs is where the difference is.
Some drives start as soon as they receive a direction signal , normally a FWD and REV input to the drive.
Others you set the direction with the FWD and REV input that give a start/run signal.

If your drive starts to run when the direction signals are applied, install the jumper JP1 on the spindle speed control PCB. The board is normally shipped with the jumper installed.

Connections:

DIR terminal block

NC to Fwd of the drive
NO to REV of the drive
LEAVE COM OPEN. The ground to your drive will come from the Com screw terminal on the Run terminal block. Internally the Com terminal on the Dir terminal block is connected to the normally open terminal on the Run terminal block.

The Run terminal block

NC in open
NO to start or Run input to the drive
Com to the GND input of the drive

If your drive requires the start/run signal as well as the direction signal

Remove Jumper JP1 on the spindle speed control board. (place it on one of the pins to keep it with the drive PC board.

Connections:

DIR terminal block:

NC to Fwd of the drive
NO to REV of the drive
Com to the GND input of the drive

The **Run** terminal block:

NC in open
NO to start or Run input to the drive
Com to the GND input of the drive

If you find another configuration please let me know and we will help you get it wired.

The Sound Logic Spindle Speed board can be used with other breakout boards.

NOTE: The spindle speed board can be run from any breakout board that can supply power (15 to 24 VDC) to J6 and step and direction signals to J4.

External power:
J6 + = 15 to 24vdc
     - = ground

External step and dir signals:
J4

Step   Parallel
 Gnd   Parallel port ground
 Dir   Parallel