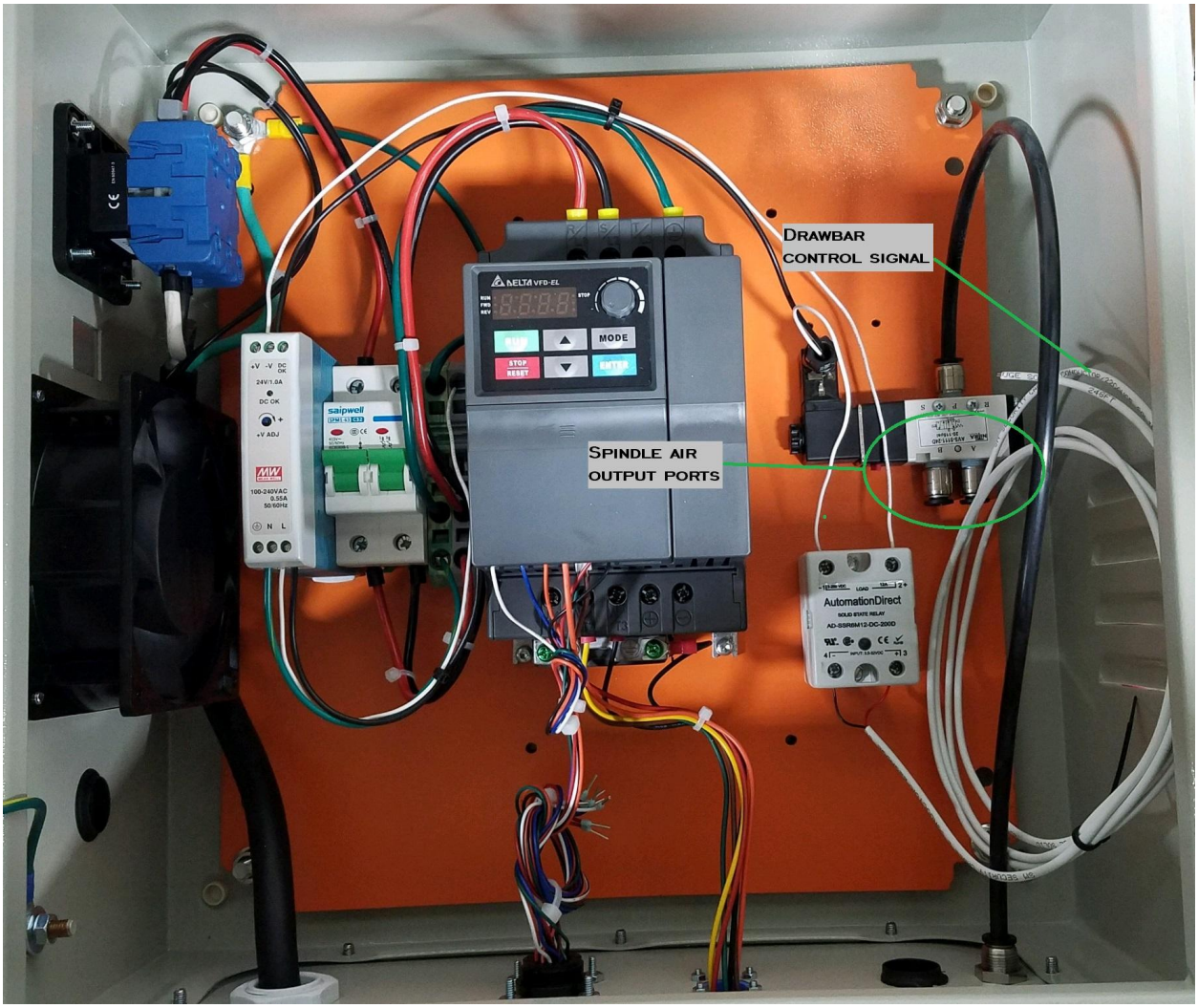
Setting up your AVID Mach 4 Controller for ATC Functionality

August 10, 2022

Hardware Setup

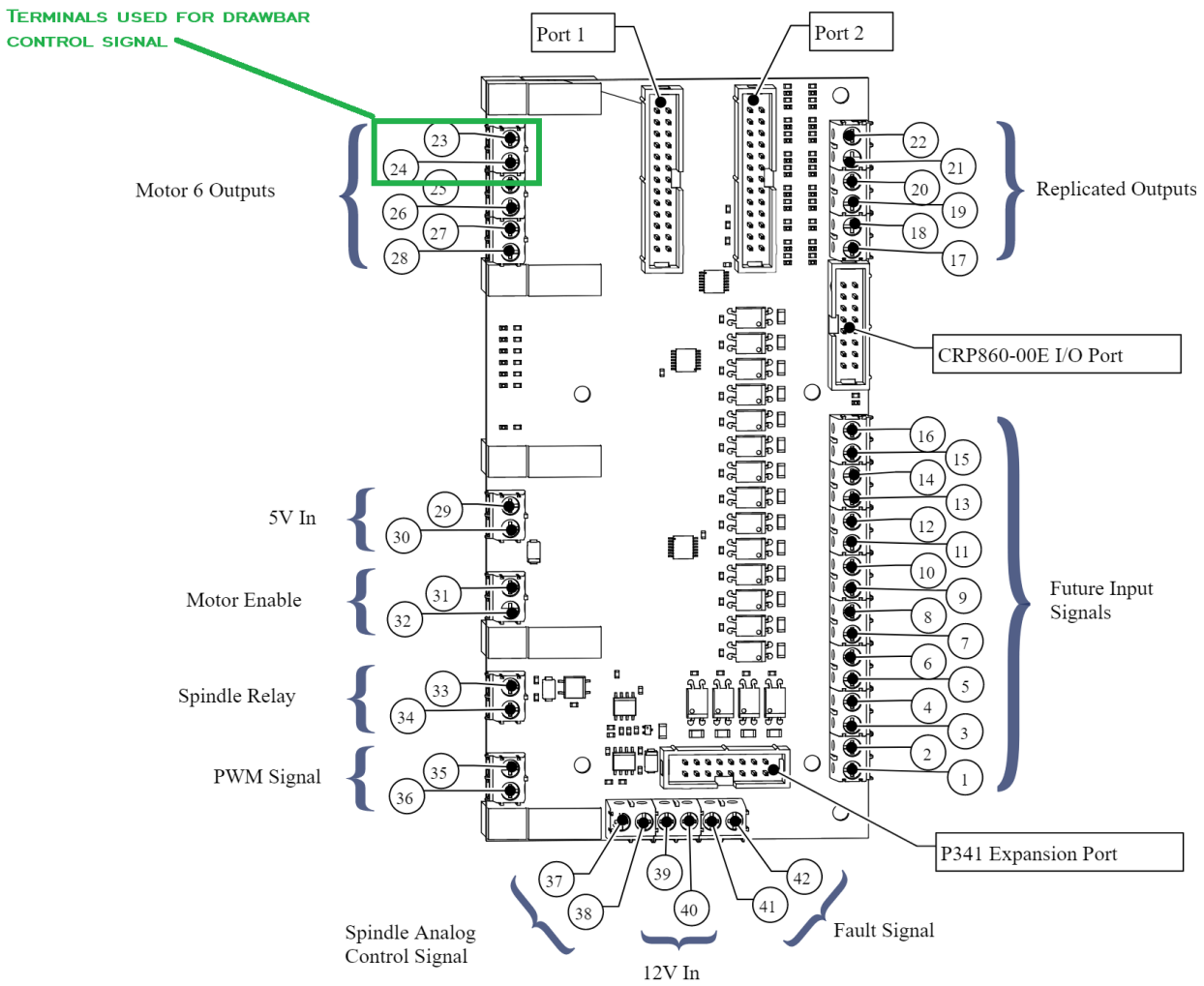
1. Follow the AVID machine installation guide as if you were setting up their machine as usual with the 8.7hp MTC spindle.
    a. The AVID spindle control box is already programmed to run the S30C spindle.
    b. The S30 spindle bolts directly to AVID's existing 3hp Tramming Mount: https://www.avidcnc.com/3-hp-4-hp-spindle-tramming-mount-p-360.html
    c. You should be able to test all motor movement, limit switches, and all other machine functionality before proceeding to the ATC setup.
2. Connect your ¼" tubing to the spindle air output ports on the drawbar control solenoid.
    a. Port A should connect to the spindle case pressure port
    b. Port B should connect to the spindle drawbar port.



3. Ensure you have a clean, dry air supply to the machine. CNC Depot modifies the AVID spindle control box to include the required pneumatic components to operate the spindle drawbar.
    a. CNC Depot supplies a ¼"NPT air inlet fitting on the bottom of the spindle control box to connect your air supply to.
    b. At minimum, you should provide a regulated, filtered (5 micron or better) air source to this input.
    c. If the machine is in a very humid environment, you should also add an active drying solution to your air source, to ensure that good quality, clean, dry air is supplied to the spindle. This will help prolong the life of your spindles, and precision machine components.

d. Set your air pressure regulator to 105psi. If you have a very long air line run from your air regulator to your spindle, you may need to increase your air pressure by 5-10psi to overcome the pressure drop in your air lines and still operate the drawbar reliably.

4. Test to ensure your air connection are made properly:
   a. Turn off all power to the machine
   b. With all of your air connections made, turn on your compressor and open any valves running to the air inlet. You should hear a small amount of air flowing out of the spindle nose. This is case pressure air, and it flows continuously
   c. With the machine powered off completely, and air connected to the machine, test to see if the spindle shaft rotates freely.
      i. If it DOES NOT rotate freely, your case pressure and drawbar airlines are reversed, and you need to disconnect air, and swap those two lines at the spindle.
      ii. If it rotates freely you are clear to proceed.
5. Make the electrical connection for the DRAWBAR CONTROL SIGNAL.
   a. This is a 5v logic signal that runs from your main AVID control box.
   b. Please reference this schematic for the AVID breakout board connections:

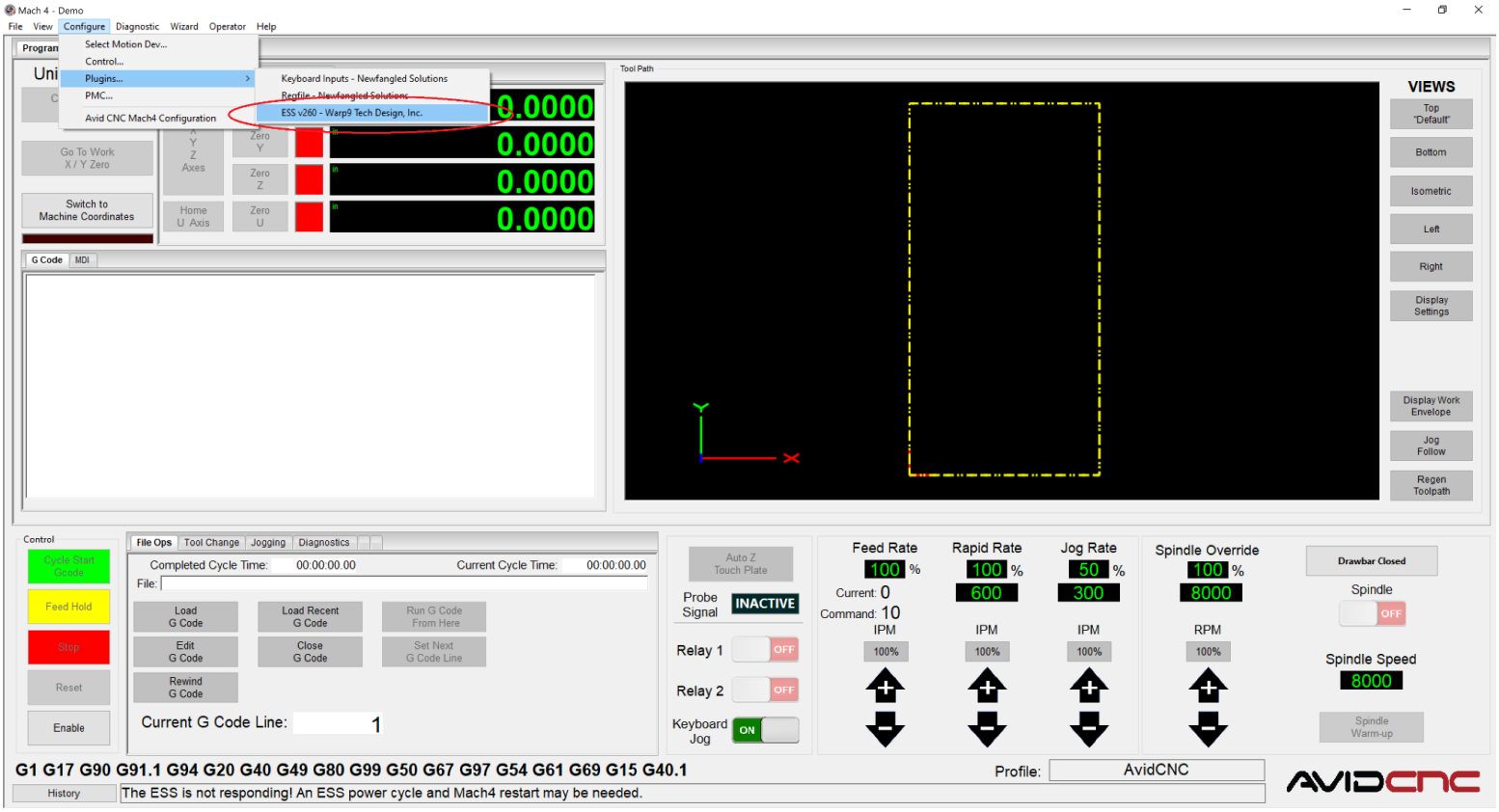


   c. Terminal 23 is the positive output pin assigned to Port 1 Pin1 in Mach 4. The RED wire should be connected here.
   d. Terminal 24 is the ground for this signal. The BLACK wire can be connected here.

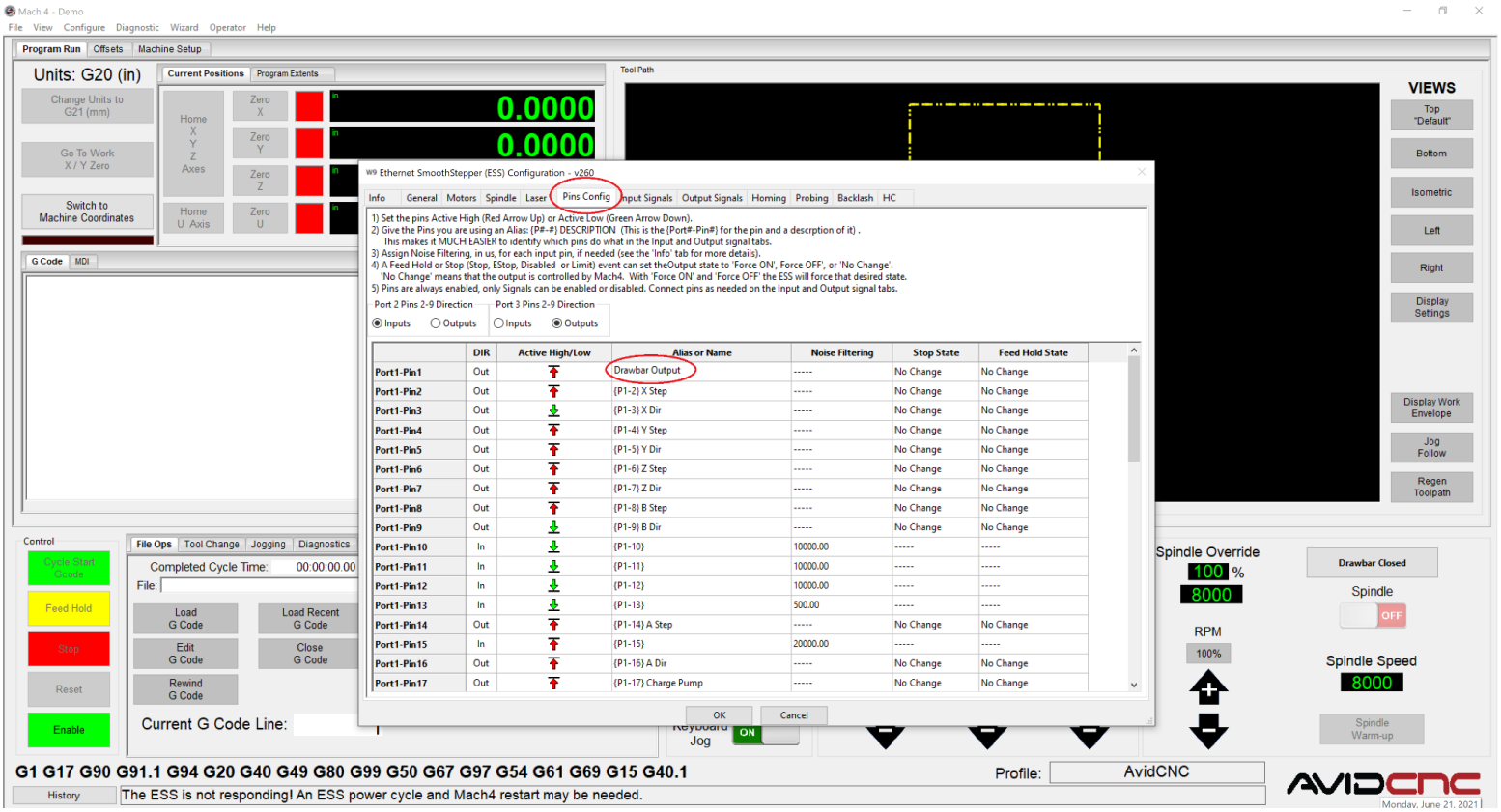
The Hardware Setup is now complete, and you can move forward to the software setup.

Software Setup

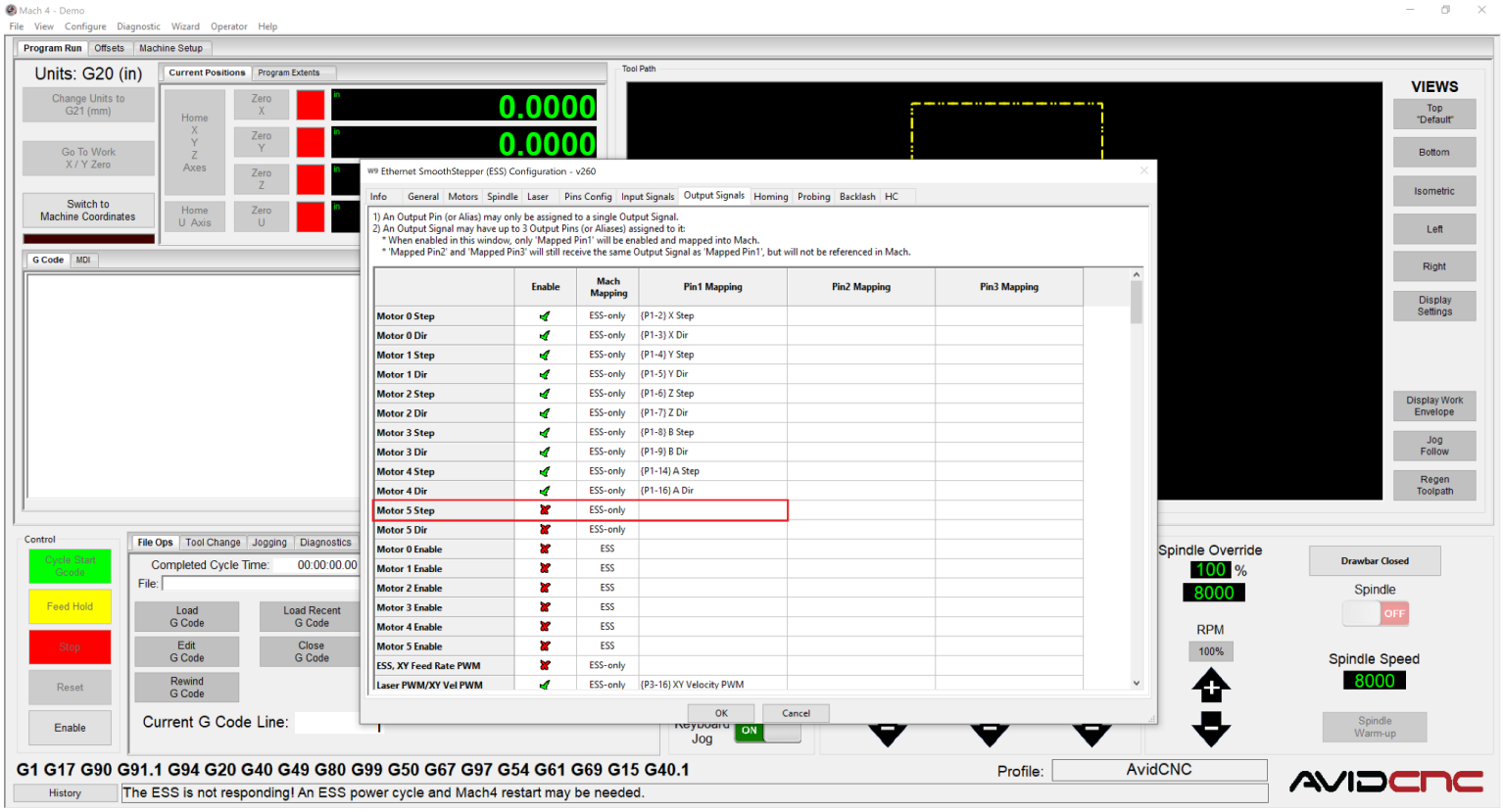
1. You must now configure the Mach 4 software to control the drawbar signal that you just installed.
    a. First, ensure that Mach 4 is disabled. Then proceed to the ESS Configuration panel, see image below:



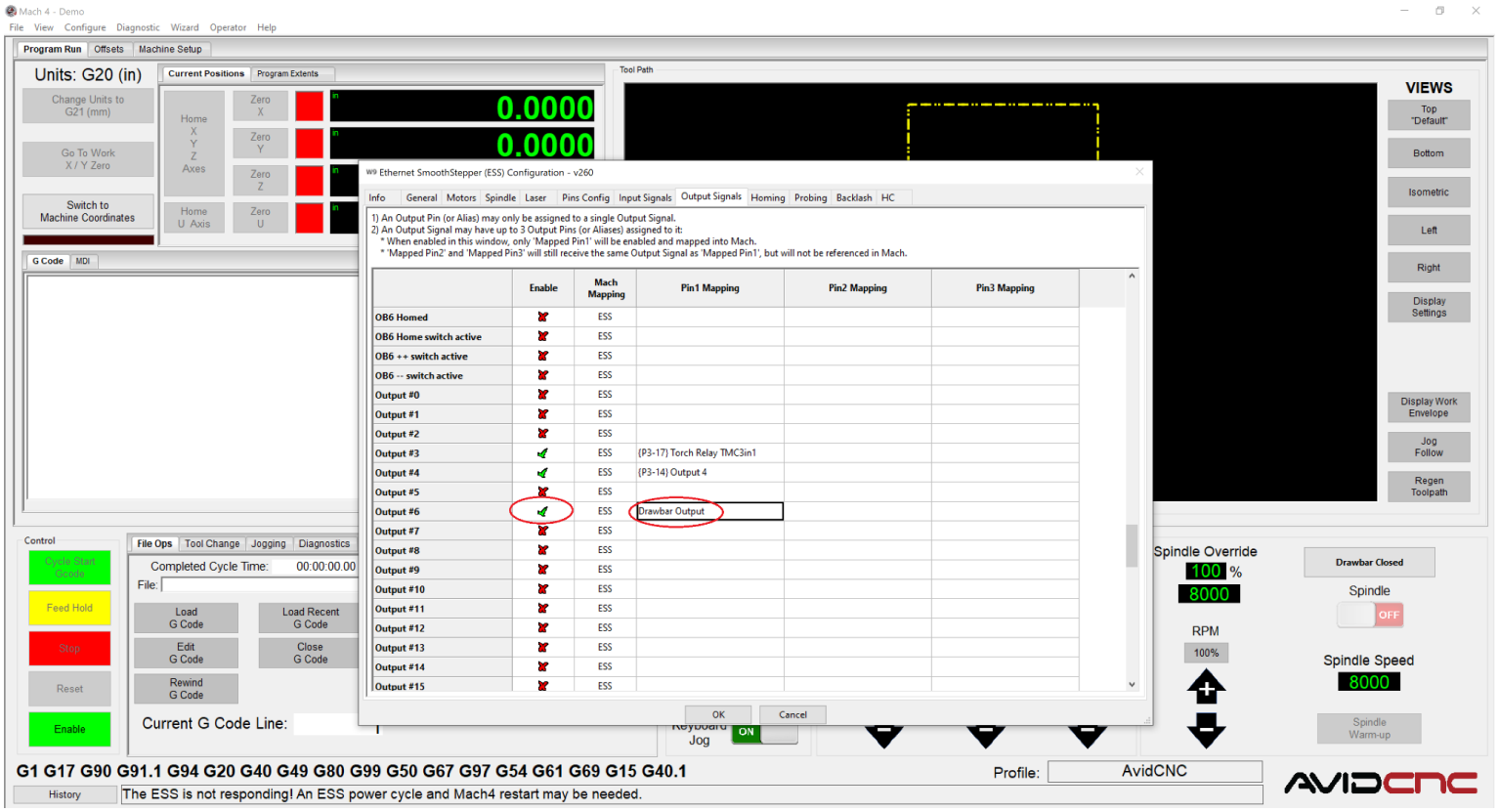
    b. Then proceed to the Pins Config tab and rename Port 1 Pin 1 to the Alias: “Drawbar Output” See the image below for reference:



c. Then proceed to the “Output Signals” tab and ensure that the Motor 5 step signal is disabled and unassigned from the drawbar output signal alias. These signals may only be assigned to one output at a time. So ensure that the drawbar output pin is not assigned to any other output.



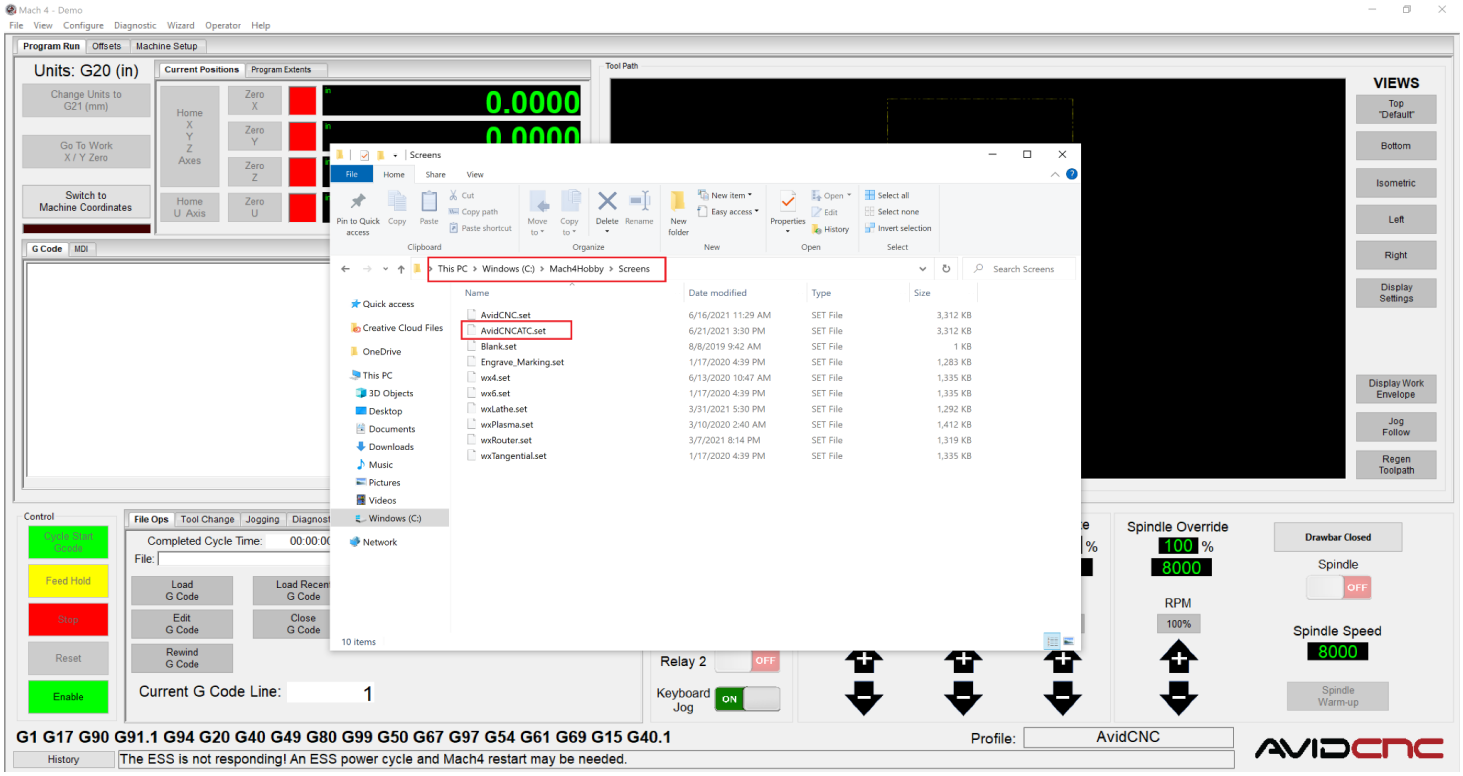
d. The you can assign the drawbar output signal to OUTPUT #6, see below:



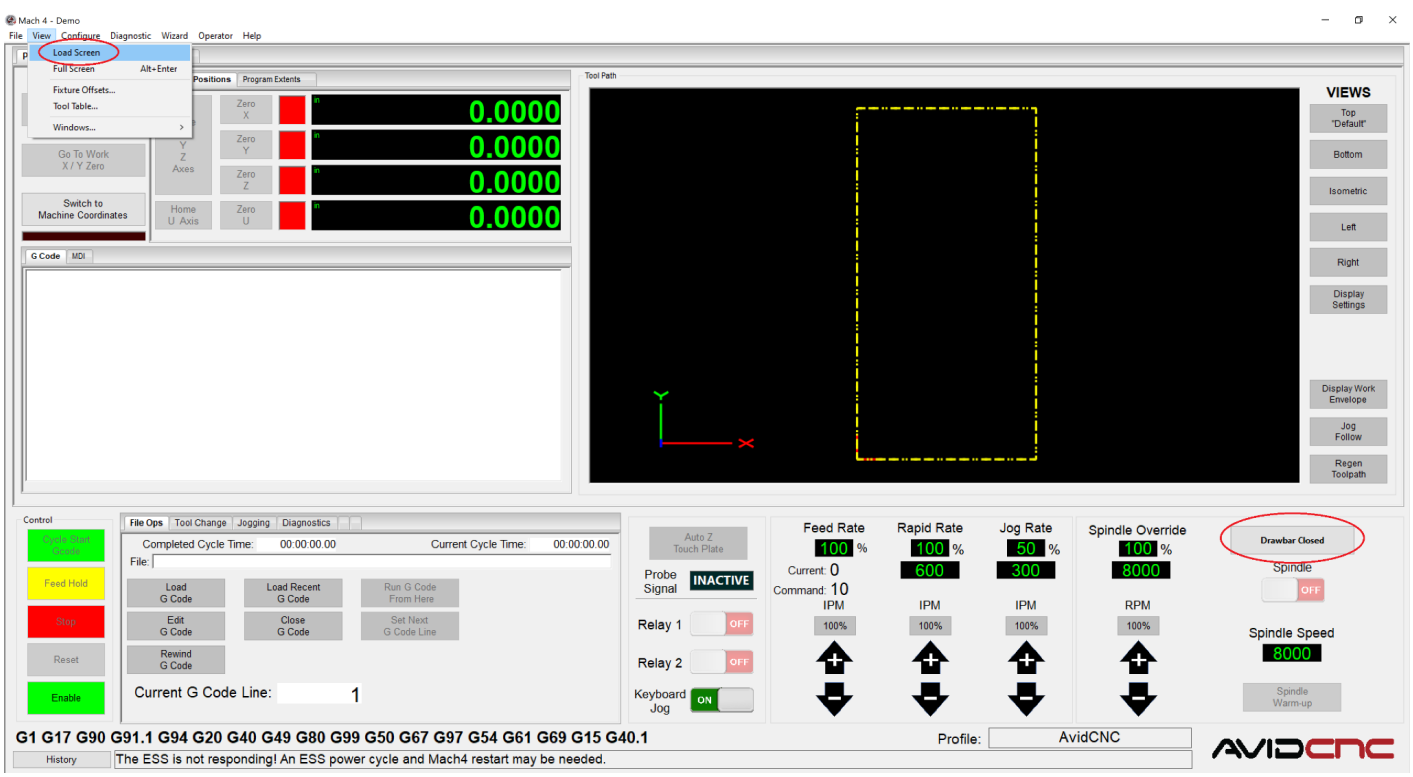
e. Click “Ok” and then you will be prompted to restart Mach 4.

f. Once Mach 4 is restarted, you can load the AvidCNCATC screen that we have provided.

i. To load the ATC screenset into Mach, ***FIRST***, copy the AvidCNCATC.set file into the Mach4Hobby > Screens directory.



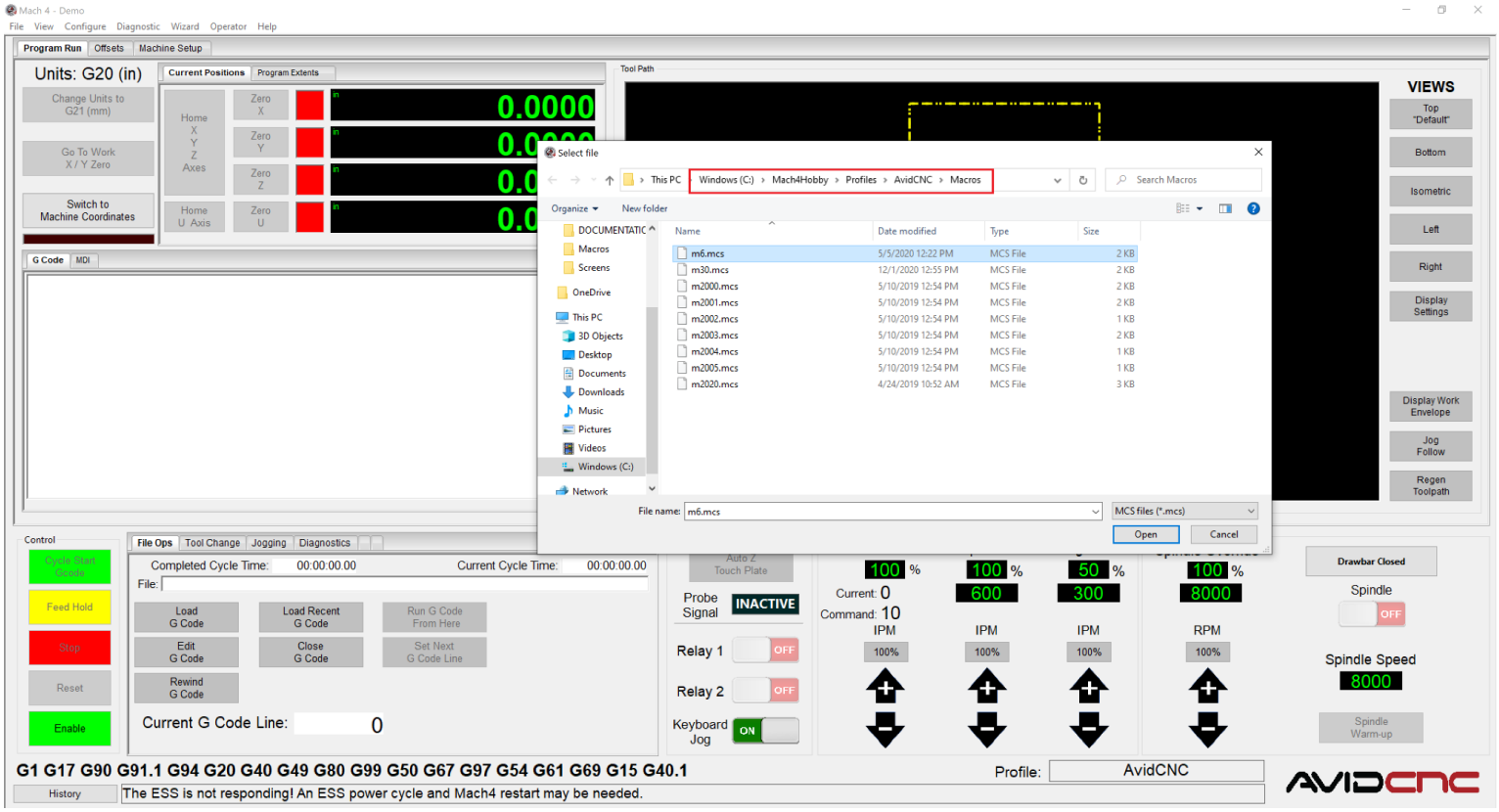
ii. Then you can load that screenset using the Load Screen command in the View menu in Mach4. Load the screen that you have copied into the Screens directory.



iii. This screenset adds only the drawbar control signal button to the Mach 4 screen. This is a toggle button, and can be used to open and close the drawbar manually. 1 click will open the drawbar, and 1 more click will close the drawbar.

DO NOT OPEN THE DRAWBAR WHILE THE SPINDLE IS RUNNING or try to start the spindle while the drawbar is open!

2. Load the M6 Macro into Mach 4
    a. The m6.mcs file can be downloaded from our website. This is the macro that controls your machine's tool change routine.
    b. The m6 macro is internally documented, and it can be altered to match your machine configuration. Please refer to the macro itself for internal changes.
    c. To load the macro onto your machine, copy the m6.mcs file into your AVID machine profile. It is critically important that this file is loaded into the correct macro folder directory. You will need to overwrite the existing m6.mcs file. See the image below for reference:



    d. When editing the macro script, always use the Mach 4 script editor, which can be found under the Operator Menu. It is called "Edit/Debug Macro Scripts". When you are finished editing the m6 macro, you can compile the script, and check it for errors inside of the script editor.

That completes the software setup for the ATC functionality on the machine. For more in depth information on editing the m6 macro for use on your machine. Refer to the internal m6 macro documentation, or contact us for further questions.

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