Installing the Spindle Control Board in the Yaskawa VFD

The Spindle Control Board allows the user to change the RPM of the spindle(s) from ShopBot's control software. The Spindle Control Board is wired into the variable frequency drive (VFD) Yaskawa model V74X and connects to the computer through USB. The device is controlled with SB3 (ShopBot Control software) through a virtual tool; Tools, Spindle RPM Control [TR]. The Spindle Control Board can control up to two spindles on two of the same model VFD; the VFDs should not be mounted farther than 3 feet (305mm) from each other. A jumper cable (SB#10255) is needed to connect the two VFDs. The Spindle Control Board is compatible only with ShopBot alpha and V4G boards using SB control software v3.5.6 or greater.

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WARNING

ELECTRIC SHOCK CAN KILL
Use extreme caution when working near live electrical circuits. Dangerous voltages exist inside the variable frequency drive (VFD) that can cause serious injury or death.

Use extreme caution and good judgment at all times.

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What's Included?

- Spindle Control Boards (circuit board)
- USB Cable w/ filter
- Adhesive stand-offs
- Jumper cable if you are adding 2 spindle control (SB#10255)

Installing the Spindle Control Board in the Yaskawa VFD

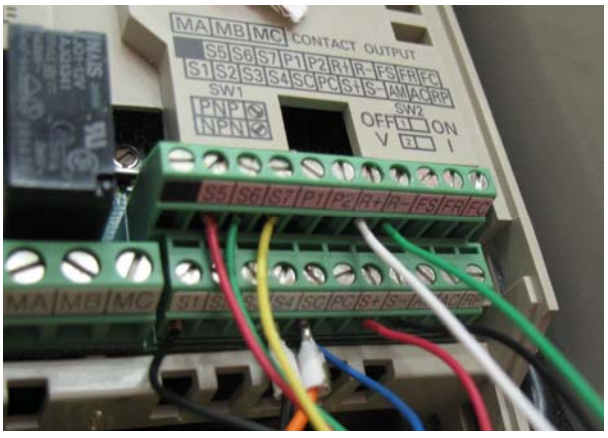
Opening the VFD

Before starting any of the procedures below, make sure that all power to the ShopBot control box and the VFD has been disconnected.

On the front face (face plate) of the VFD remove the soft rubber covers that hide the (4) screws. Remove the screws. Carefully open the face plate, disconnect the data cable from the main body of the VFD, and set the face plate aside.

Wiring the Spindle Control Board

Locate the terminal blocks on the right side of the VFD.

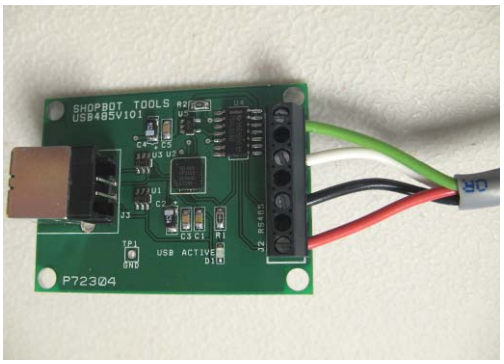


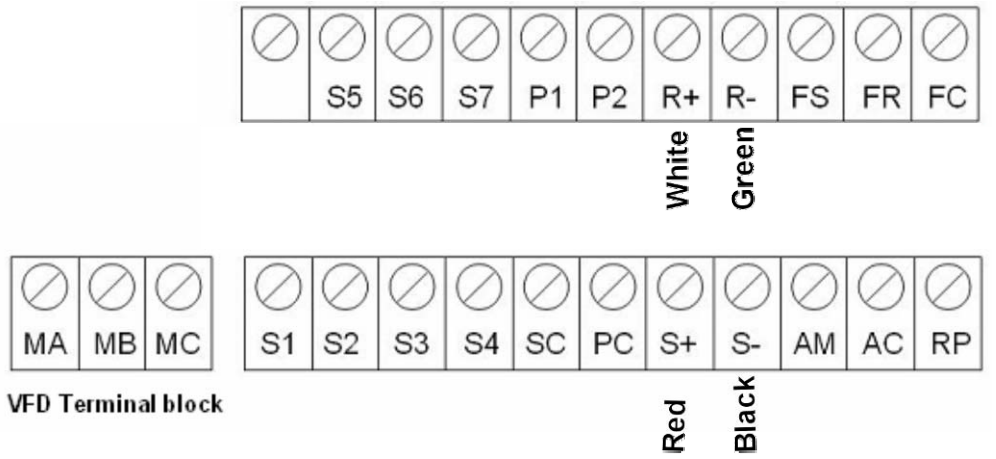
Close up of terminal blocks. See drawing next page.

The Spindle Control Board will be pre-wired at ShopBot. Connect the loose ends of the wires to the corresponding terminals in the VFD. Leave other wires in place.

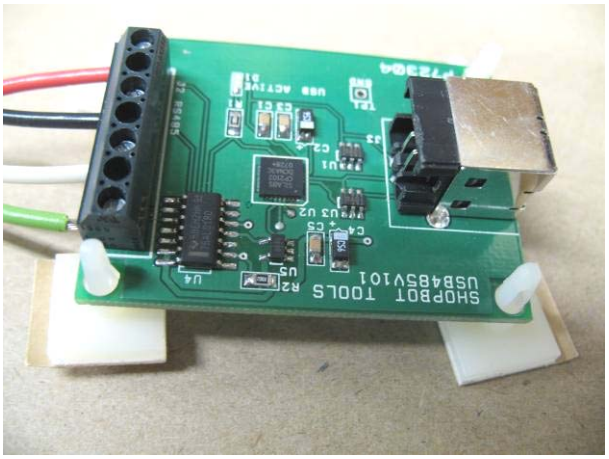
S+ (Red), S- (Black), R+ (White) and R-(Green).

Follow the diagram below to connect the (4) loose ends of the wires from the spindle control board.





Mounting the board



Insert the PCB mounting pads into the (4) holes in the corners of the spindle control board. Peel the tape off the mounting pads and stick the board to the open space inside the top of the VFD.

Running the USB cable

The USB cable connects the spindle control board to the computer's USB port. Run the USB cable through the grommet in the bottom of the VFD and to the spindle control board.

Do not connect the USB to the computer until instructed to do so.

If the spindle control board is to control the RPM of two spindles, go to the **Two Spindle configurations** section

Otherwise, reattach the face plate of the VFD and go to the **Programming the VFD** section. **Do not forget** to plug in the data cable of the face plate and tighten screws.

Two Spindle Configuration: Connecting to the second VFD

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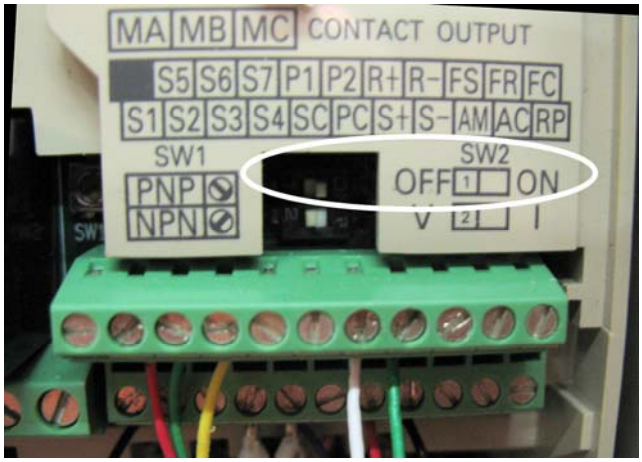
Note that the SW2 in **both** VFDs will need to be changed and set to ON. Before starting any of the procedures below make sure that all power going to the ShopBot control box and the VFDs is disconnected

In VFD#1

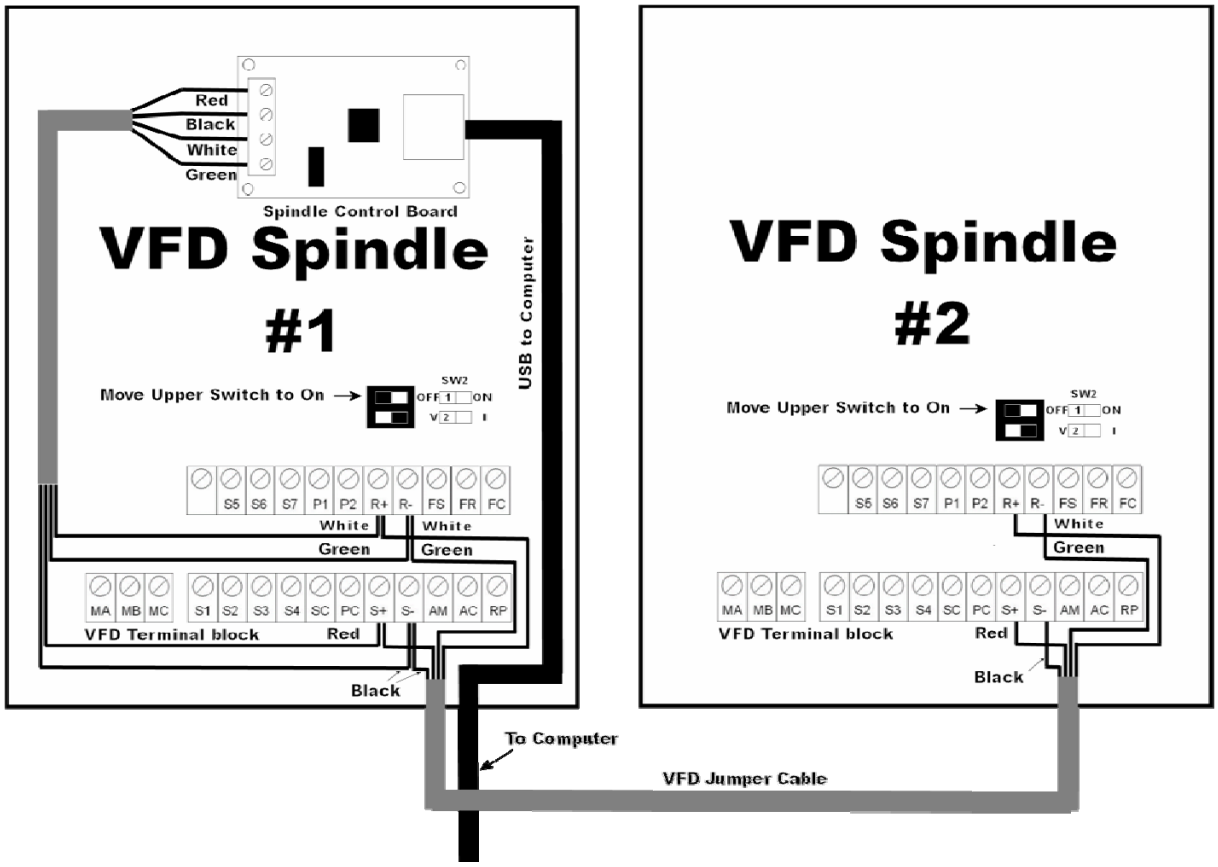
- Open VFD face plate on first VFD if necessary.
- Locate the SW2 switch (White switch circled in picture) and set it to **ON** (to your right).
- Wire in the VFD jumper using the Dual VFD diagram on the next page. (The jumper wires in VFD #1 will be shared with wires going to the Spindle control board.)
- Reattach the VFD face plate. Plug in the data cable of the face plate and tighten screws



In VFD#2

- Open VFD face plate on second VFD.
- Locate the SW2 switch and set it to **ON** (to your right).
- Wire in the VFD jumper using the Dual VFD diagram on the next page Reattach the VFD face plate.
- Plug in the data cable of the face plate and tighten screws
- Go to **Programming the VFD**. Parameter 153 will be set to the Setting Increment of 2.

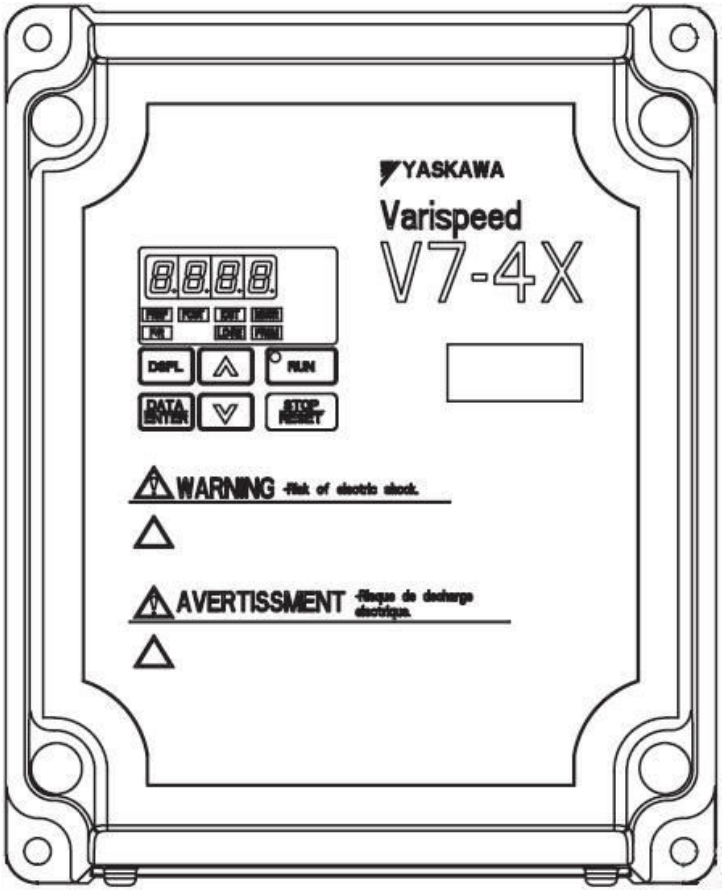
Dual VFD Wiring Diagram



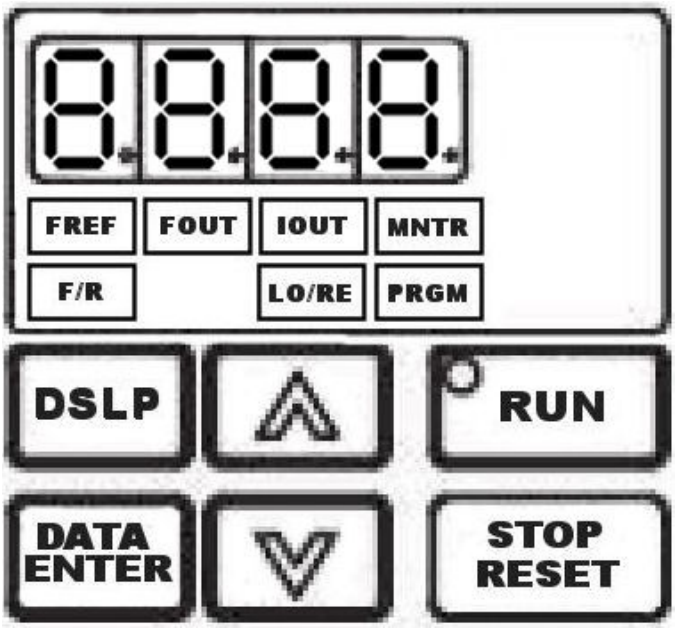
Programming the VFD

The VFD must be programmed in order for the computer to communicate with the spindle. Consult the parameters that were included with the spindle for your specific Spindle configuration.

If a second spindle (spindle #2) is to be used, program VFD#1 first, then VFD#2. The only difference is that Parameter **153** should have a Setting Increment of **1** for VFD#1 and **2** for VFD#2. The VFD must be shut off and back on for the new settings to take effect.



Setting VFD#1



- Turn the ShopBot Control Box and spindle power **ON.**
- FOR ShopBot alpha only: Press the **RESET** button on the left side of the Control Box or on remote pendant. This action will turn the **VFD ON**.
- Press the **DSLP** (display) button on the VFD keypad to scroll through the modes until **PRGM** (program mode) is illuminated. This will display a parameter number.
- Use the **Up or Down Arrow** keys to change to the parameter number **153**.
- Press **Data Enter** again to show the Setting Increment.
- Using the **Up or Down Arrow** keys to change the Setting Increment to **1**.
- Press **Data Enter** again to accept the Setting Increment.
- Press the DSLP button on the VFD keypad to scroll through the illuminated modes until FREF (frequency reference) is selected.
- Turn off the power to the VFD and spindle. The setting change **will not register** until the power is cycled off and off.
- The VFD is now set up for spindle control for the connected spindle.

Setting VFD#2, if applicable

If you have two VFDs and two spindles, set the second VFD so that Parameter#153 has a Setting Increment of **2**. Remember to cycle power off and on to register new settings.

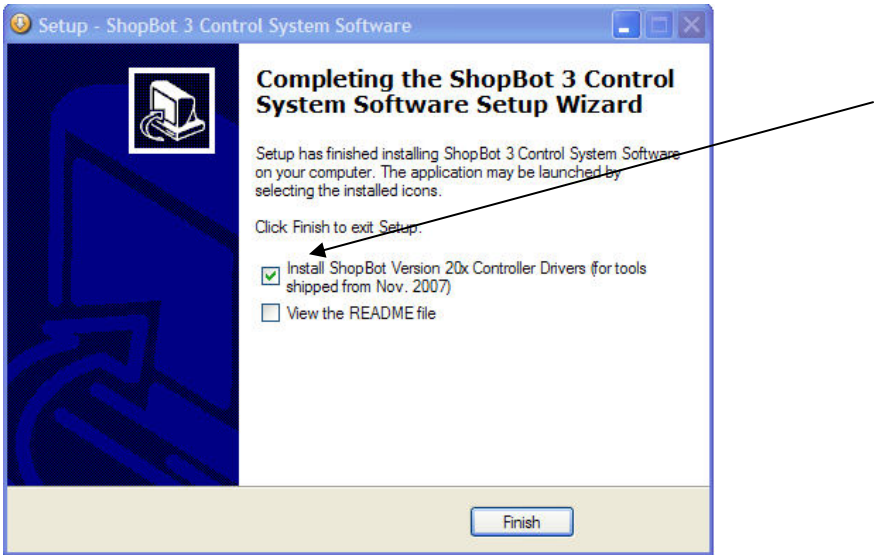
Connecting the USB cable from the Spindle Control Board to the Computer

Before connecting the USB cable from the spindle control board to the computer, check to see if the folder **SB Controller** which contains the drivers for the board is present. The default location is C:\Program Files\ShopBot\SB Controller. If this folder is present, plug in the USB and continue to **Starting the RPM control software** below. If the folder is not present install SB Control Software version 3.5.6 (or higher).

Installing Version Sb3.5.6 or later Software

The USB driver software for ShopBot will be installed at the end of the installation of the ShopBot Control Software. After the Control Software has been loaded, the option of installing the drivers for ShopBot Version 20x Controller Cards will be offered. If the ShopBot was received anytime after November 1, 2007, install these drivers. It will not hurt anything to install them if this is an older tool, or if they are already installed.

Make sure the 'Install ShopBot Version 20x Controller Drivers' box is CHECKED and click 'Finish' to start the automatic driver installation process.



A message indicating that the Drivers are being installed will appear, and soon after that another message that the installation is complete.

Plug in the USB cables from the ShopBot and Spindle Control Board and turn the Control Box on. If this is a PRSalpha ShopBot, hit the RESET button as well.

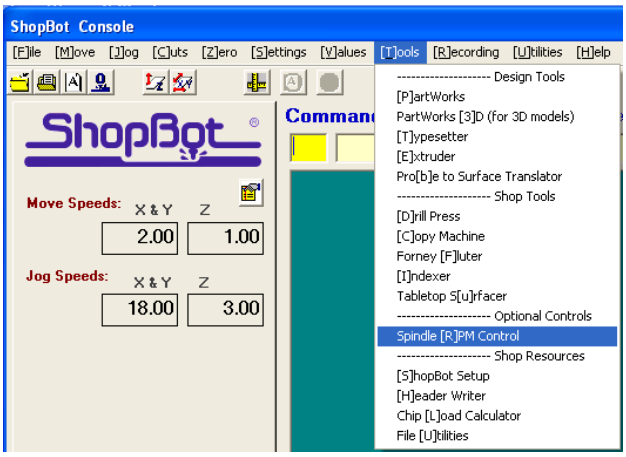
* This Installation Program can also be started by going to folder:
C:\Program Files\ShopBot\ShopBot 3\Drivers\ShopBotControllerV201
And double clicking on the program "DriverLoader.exe"

** If the USB was plugged in before installing the drivers, unplug the USB cables and plug them back in after the install.

Setting the Spindle RPM in the ShopBot Control Software

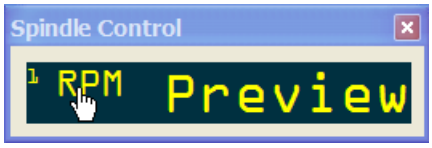
Starting the RPM control software.

Start the ShopBot control software, then go to **T**ools, Spindle **R**PM Control **[TR]**



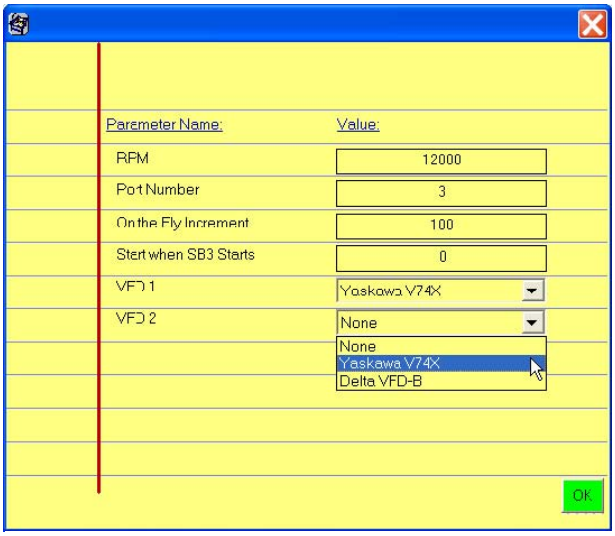
If you are using the ShopBot control software on a computer not connected to a ShopBot, the Spindle Control window will display “Preview”.

The Spindle Control Window



Click the word “RPM” in the spindle control window to bring up a fill in sheet.

The fill in sheet will have several parameters that can be defined within this sheet.

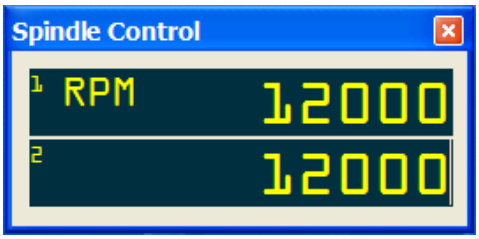


RPM: Defines current RPM value the spindle is set to. If in preview mode (preview) will be here.

Port Number: Defines the com port that the Spindle Control Board is connected to. This will happen automatically.

On the Fly Increment: Defines the amount the RPM increases or decreases when holding the shift key and (+) or (-).

Start when SB3 Starts: Default is 0; the spindle control window only opens when prompted [TR]. If set to 1; Opens and closes the spindle control window with the ShopBot control software.



VFD 1 and 2: Defines what type VFD spindles 1 and 2 are connected to. Running two different VFDs is not recommended. Selecting a VFD model under VFD 2 will open a second spindle control window.

To change the RPM,

- Click in the display window, enter a new RPM and hit Enter on the keyboard. **OR**
- Open the fill in sheet as above.

To change the RPM from within a part file

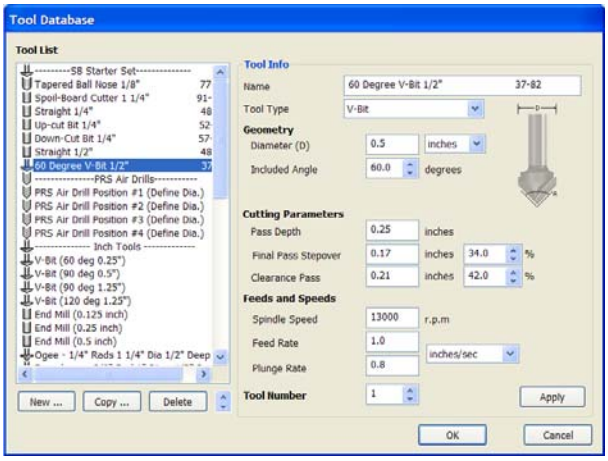
- Use the [TR] command and the new RPM. (Example: TR,12000,1 will change the rpm for spindle#1 to 12,000.).
  To change the RPM for spindle #2 (TR,12000,2).

To change the RPM when a part file is being run

- Hold the Shift key and press the + or – keys on the keyboard. By default the + will increase the RPM by 100 and the – will decrease the RPM by 100.

Outputting Spindle RPM within Design Software

Locate the area in which the feeds and speeds are set for that particular tool within tool database of the design software. Define the RPM value for that tool and apply or save. This RPM information will be specific to this particular tool.



Create desired toolpaths. When toolpaths are ready to be saved, output the toolpaths with a ShopBot post that ends with "w/speed". This will call up the RPM information for the tool used as well as start the (TR) file inside the SB control software.

If calling up the RPM for spindle #2, save the toolpath using the posts for "Head 2 w/ speed".