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3" Indexer Install

For Desktop and Desktop MAX

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Overview

This document covers basic set-up and installation of the indexer for ShopBot Desktop and Desktop MAX tools. There will be certain steps that are different based on which model and year you purchased your machine.

Please Note: if the indexer was purchased along with the Desktop tool, the wiring installation has already been completed. Skip to the "**Connecting the Motor Cable**" section of the manual.
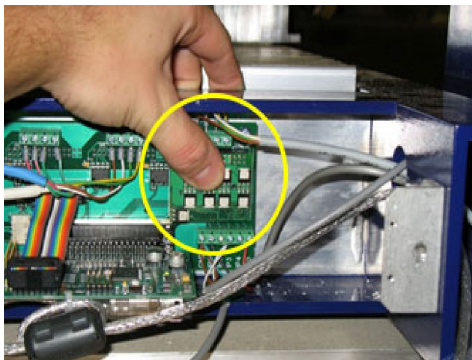
Installing the Driver

WARNING: RISK OF ELECTRIC SHOCK: Unplug power to the ShopBot before starting this process. Failure to do this can result in electric shock and/or damage to the ShopBot.

Desktops purchased before Oct. 2012
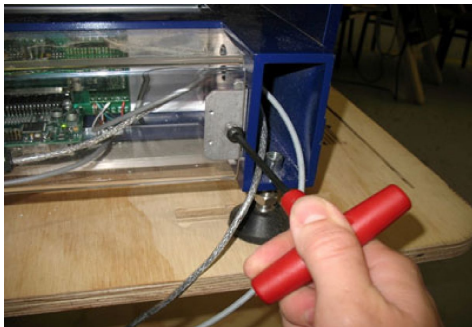
Using an allen wrench, remove the two bolts holding the plastic cover in place, then carefully pull the plastic cover off the machine.

The small driver card that came with the indexer kit fits into the plug directly underneath the green terminal blocks, on the right side of the board. Ensure it is properly aligned and press it into the plug until it is fully seated.
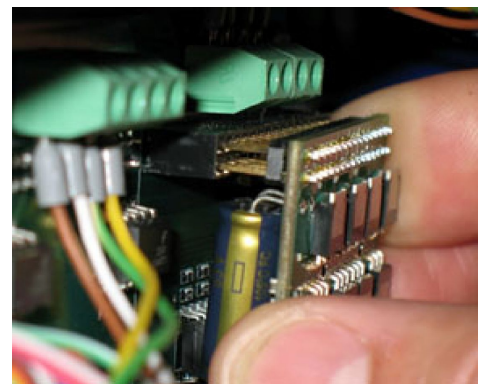

IMPORTANT: The control board may be damaged if any of the pins are out of line. Take care to align it properly.

Next, take the loose end of the accessory cable and route it through the hole in the side of the frame (right side when looking at it from the back).
Locate the green terminal blocks on the top right corner of the board (above the driver card you just installed) and loosen each screw. Insert one wire into the top of each block in the following order, going from left to right:

**Brown – white – green – yellow**

Pay close attention to the order of these. If you have trouble getting the wire ends into the terminal blocks, it may help to use a pair of small needle nose pliers. When you are finished, gently pull on each wire to make sure it is tightly screwed into the block.
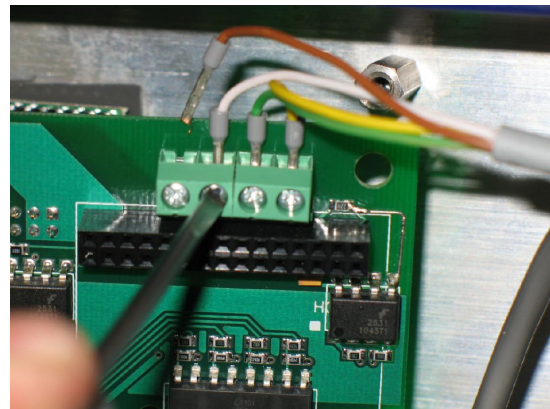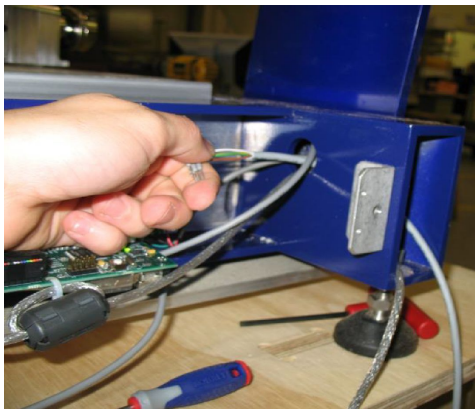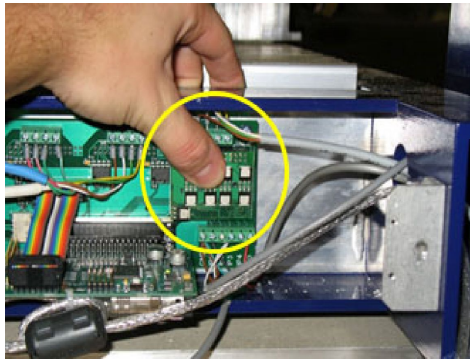

Once this step is finished, you can replace the plastic cover and skip to "**Connecting the Motor Cable**".

Desktops purchased between Oct. 2012 - Aug. 2017

For Desktops purchased in this time frame, the only thing you may need to do is add the driver to the control board. Before doing so, look through the clear plastic cover on the back and check if there is a driver already installed (see following page for location of driver). If there is one installed, skip ahead to **"Connecting the Motor Cable".**
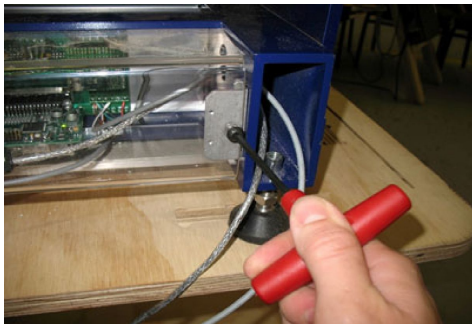
Using an allen wrench, remove the two bolts holding the plastic cover in place, then carefully pull the plastic cover off the machine.

The small driver card that came with the indexer kit fits into the plug directly underneath the green terminal blocks, on the right side of the board. Ensure it is properly aligned and press it into the plug until it is fully seated.

Driver may already be installed

Once this step is finished, you can replace the plastic cover and skip to **"Connecting the Motor Cable".**
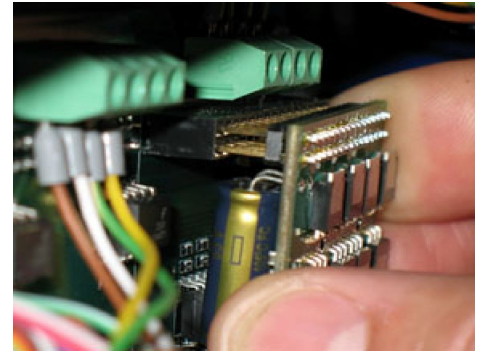
Desktops and MAXs purchased after Aug. 2017

For these tools, the electronics are located under the blue cover at the back of the machine.

First, remove the last piece of aluminum decking so you can access all the bolts to the blue cover.

Note: This step only needs to be done on a Desktop, not a MAX

Remove the 6 flathead bolts using a 2.5mm allen wrench. Be careful not to strip out the bolts.
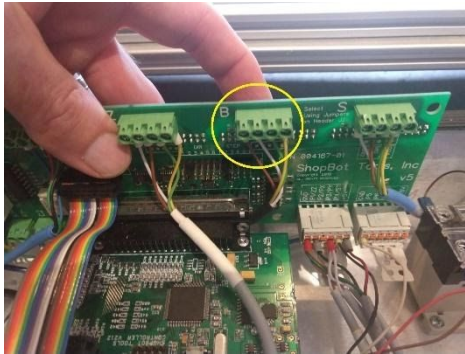
The control board is located on the left side of the electronics tray. Remove the 4 screws using a small phillips screwdriver.

Gently pull the control board away from the drivers that are mounted on the backside of the electronics tray.

Locate the connection interface marked "B" on the control board. The driver will mount to the back side of the control board in the slots that align with this interface.
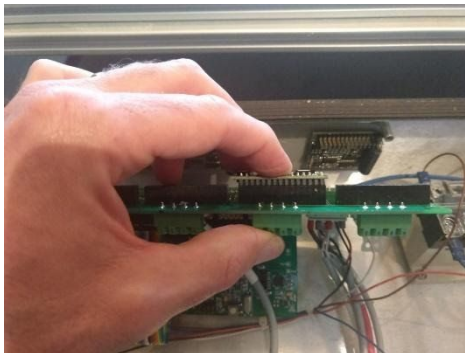
Align the pins on the new driver with the slots in the control board, making sure they line up left to right, and up and down. Gently press the driver into place, making sure it is fully seated.

Mount the control board back onto the drivers that are mounted on the back of the electronics tray, making sure all the pins line up perfectly with the slots in each driver. At this point, it would be good to test the indexer to make sure the driver is functioning properly before closing up the electronics tray.

Connect the motor cable coming from the motor on the indexer to the open connector on the back of the machine. Turn the power on to the machine.

With the power on, try to turn the jaws on the headstock with your hands. Using average force, you should not be able to turn the headstock if the motor is receiving power. If it is receiving power, you can go ahead and screw the control board, blue tray cover and aluminum deck back in place. If not, please call our tech support team for further assistance.

Connecting the Motor Cable
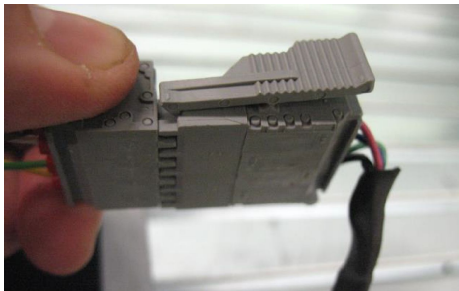
The gray Wago connector is the indexer's link to the machine for data and power. Clip one end of the accessory cable into the motor cable on the headstock, making sure that the two sides of the connector are fully pressed together.

Clip the other end of the motor cable into the Wago connector located on the back of your machine.

Desktop purchased after Aug. 2017

Desktop purchased before Aug. 2017

Mounting the Headstock and Tailstock

Installing the Headstock

With the bolts and T-nuts partially started, slide the headstock into two adjacent grooves in the aluminum decking. Tighten the bolts, then repeat the same process for the tailstock, but leave the bolts for the tailstock loose so it can be adjusted to the correct size of your material.

Using the Chuck

The chuck jaws can be reversed for gripping the inside of a surface (for example, a hole created with a forstner bit). This is useful for working on large-diameter stock. Rotate the knurled ring behind the chuck body to open and close the chuck jaws. Rough adjustments can be made by hand, but for better leverage, insert the black rods ("tommy bars") into the holes on the chuck body and knurled ring. Looking at the face of the chuck, rotate the ring clockwise to tighten the jaws, counterclockwise to loosen them.
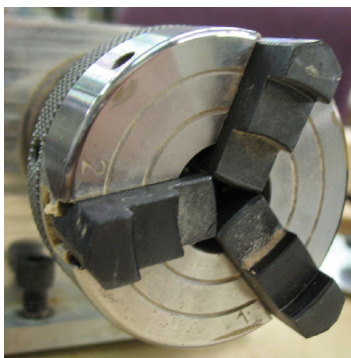


Chuck jaw gripping inwards
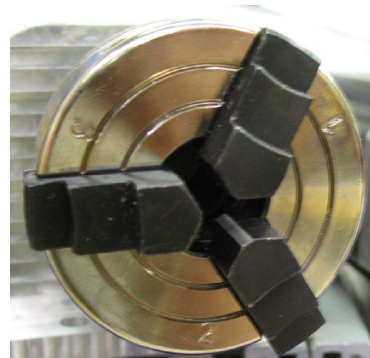

Chuck jaw gripping outwards

To remove the chuck jaws, open the chuck as wide as it will go and pull the jaws out one at a time. Wiggle the knurled ring back and forth if necessary while pulling outwards on the jaw until it comes free.

To put the jaws back in, seat them in the correct slot. Slots are numbered 1 through 3 on the chuck face, which corresponds to the number stamped on the chuck jaw. Jaw #2 always sits in the same slot, but jaws 1 and 3 will have to switch places when switching from inwards-gripping to outwards-gripping. Regardless of orientation, always start with the jaw that aligns with #1, then work your way around to #2 then #3.
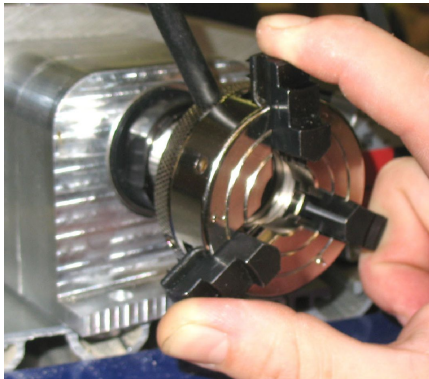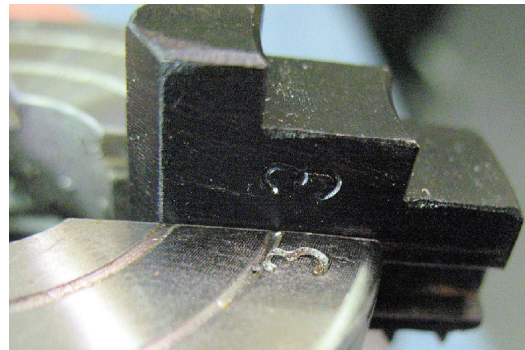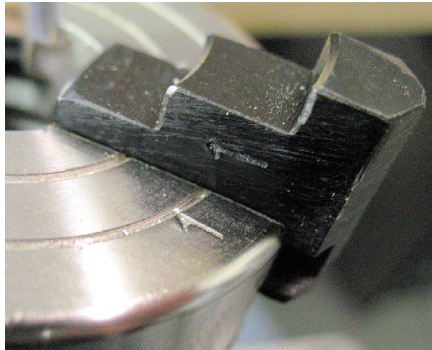
Once the jaws are in the correct slots, maintain even pressure on each jaw while rotating the knurled ring clockwise. Be sure that the jaws are moving evenly towards the center of the chuck. If they seem uneven, reverse direction to remove the jaws and start over.

Adjusting the Tailstock
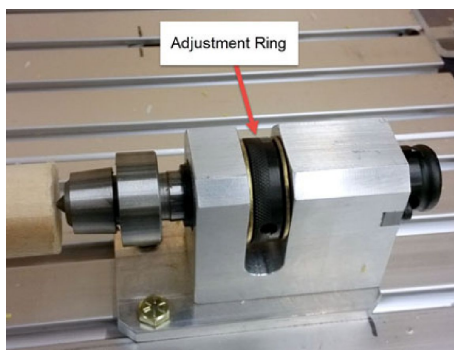
The knurled ring on the body of the tailstock allows for adjusting the pressure of the center point against the material. Once the material clamped in the chuck jaws, rotate this ring so that the center point recedes back into the tailstock. Slide the tailstock up against the material and tighten down the screws. Rotate the ring in the opposite direction to push the center point into the material.

The center point only needs to be slightly indented into the material. Excessive force will shorten the life of the bearings inside the center and can stress the motor.

Make Changes to ShopBot Software

Open the control software and type a **VD** command into the yellow command box (or click **Values** > **Display Values** on the top menu bar.). A yellow fill-in sheet will appear. Change **Units type B axis** to **Rotary (deg)** and change **Number of Axes** to 5. Click **OK** at the bottom of the sheet to save the changes.

NOTE: The indexer is the B axis in the software. Moving axis B will turn the indexer.

Type a **VU** command or click **Values** > **Unit values**. Change the **B Axis Unit Value** to **33.3333** (go to four decimal places). Do not make changes to any of the other values. Click **OK** to save changes.

Setup and Operation of Indexer

Testing the Indexer

CAUTION: Avoid rotating the motor by hand when power is off. Doing so can generate an electric charge, which may damage the driver and/or control board.

If you haven't already done so, plug in the other end of the accessory cable into the motor cable located on the headstock.

Turn on the ShopBot and ensure software is in move/cut mode.

Type a ZB command (Zero B-axis). This sets the current location of the indexer to 0. Now, type in MB 360 (Move B-axis to 360) and watch the indexer. Confirm that the indexer turned 360 degrees from the starting point. If it didn't, refer to page 15 and confirm you entered the correct value in the VU command.

Zeroing the Tool Before a Cut

Zeroing in B: If turning the stock to a finished shape, there is no need to zero the B-axis before cutting. However, if making cuts in a very specific location, rotate the axis with move commands until the desired face or point is facing straight up (level/parallel with the table surface) - then type a ZB command for Zero B-axis.
NOTE: This step will be done after you zero the other axes and load your material

Zeroing in Z: Zero to the center point (Cylinder axis) or to the top of the material (Cylinder surface). Whichever location is chosen, make sure that the Z zero setting in the software matches what happens at the machine.

If zeroing to the center point, see the following page for **Zeroing Point and Setup.**

If zeroing to the top of the material, use the Z zero plate as usual.

Zeroing Point and Setup

To find the center of the indexer axis, insert a pointed bit in both the headstock and the spindle.

Note: This section is written for all indexer styles. The indexing head pictured may not match the indexer on hand, but the procedure will be the same.
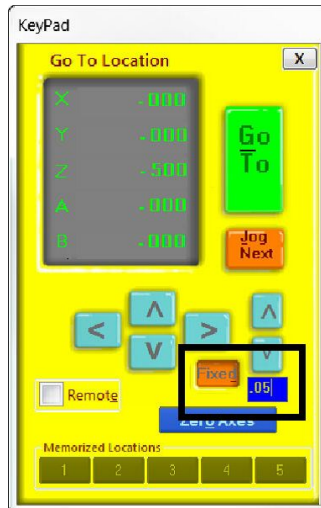

Click on the yellow button in the position window or push the "K" key to pull up the keypad window for positioning and setup of the tool head. Use the keyboard direction arrows or the blue buttons for coarse movements.

Push the "Fixed" button when finer control is needed. A numerical display box will appear, and tool distance can be specified with each push of a button. A good starting value is 0.050, while a finer value might be 0.003 inches per press.

Finding Zero location for X, Y and Z axes

To find the center of the axis, chuck up a pointed bit in the head stock. Rotate the B axis to show any offset that may be present in the bit. Correct any offset to ensure accurate positioning.
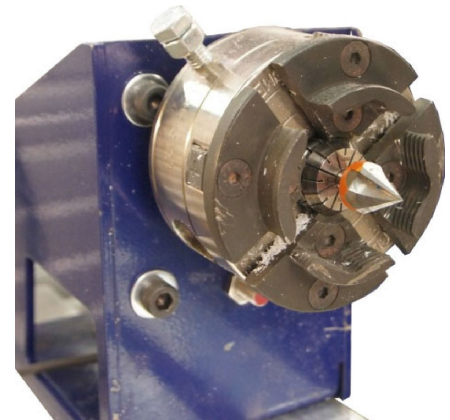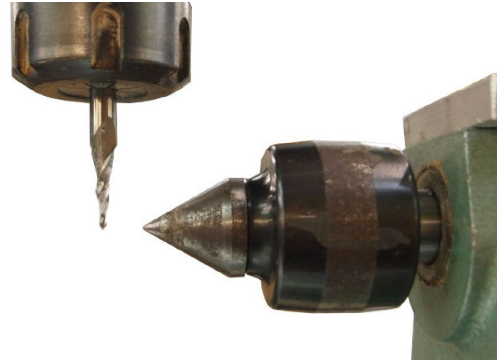

Chuck another fine bit into the spindle. Sharp ended bits allow precise identification of position relative to one another. Use the keypad to move the spindle bit about 1/8" in front of the center bit.

Center the spindle, as close as possible, relative to the headstock. Once in place, use the fixed mode on the keypad to make fine adjustments.

Move the spindle down the indexer axis so that the spindle bit is within 1/8" of the tailstock. The bit should be level and centered as it was at the headstock. If it is not, adjust the square of the indexer setup or the height of the headstock or tailstock.

From here, where you zero your axes depends on how your drawing file is set up and how you've mounted your indexer.

In your CAD software (examples below are from Vcarve) there should be a Job Setup screen. In this screen, you will be able to specify zero locations for the X, Y and Z axes.
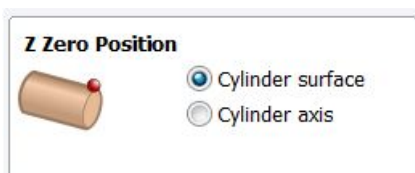
NOTE: Make sure all the software settings match what happens at the machine.

If zeroing Z to the surface, use the Z zero plate as usual.
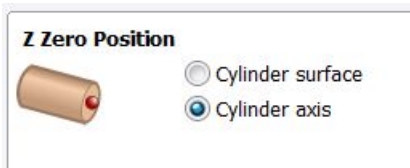
If zeroing Z to the cylinder axis, type a ZZ command while the spindle bit is centered with the bit in the headstock.
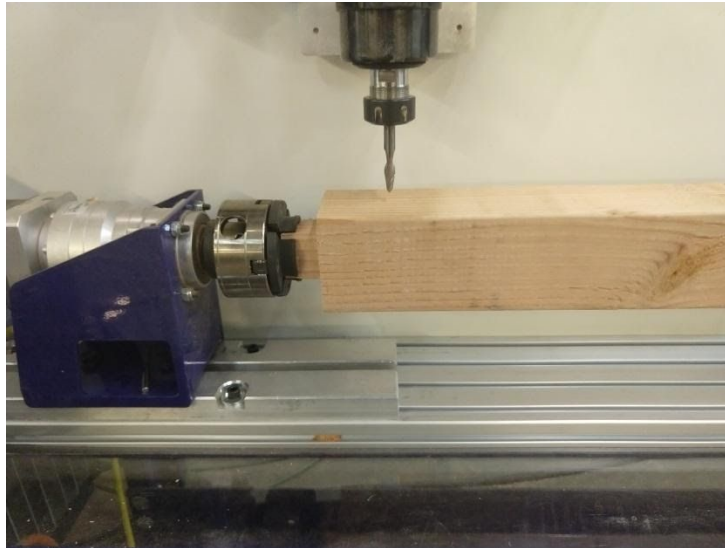
Now it gets a little tricky. If the spindle will be moving in the X direction while cutting, then you will want to type a ZY command now, since the Y axis won't be moving. Similarly, if the spindle

is moving in the Y direction while cutting, then you would type a ZX command now, since the X axis won't be moving. All of this is determined by how you mounted your indexer.
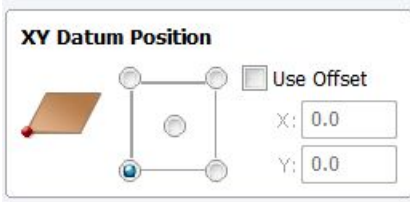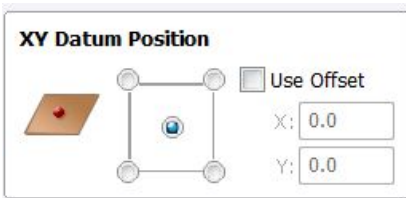
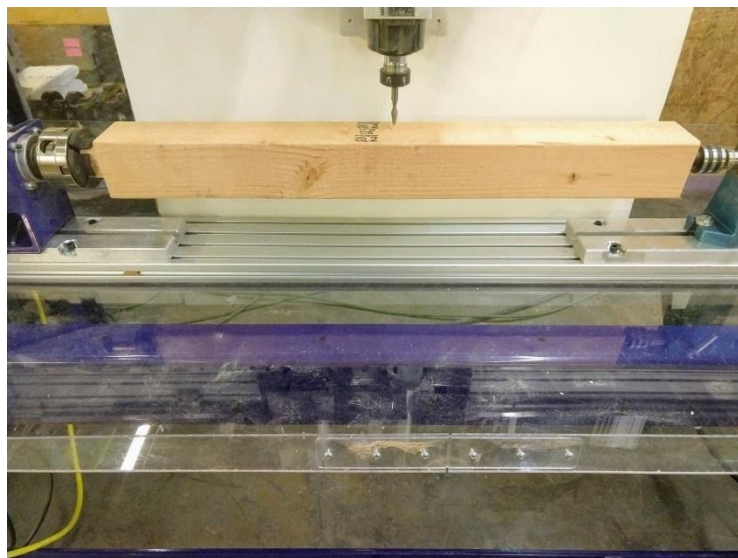Lastly, you will need to determine the zero location for the final axis (X or Y).

If you plan on ~~at one end of~~ ~~you'll zero the~~ appropriate represents the when doing **(See picture** starting the cutting your material, then axis in the spot. The corner end of the material rotary cutting. **below)**

If you plan on in the middle of move the located directly the material, here. **(See picture** starting the cutting the material, then spindle so it is in the middle of and zero the axis **below)**

# Finding Z Zero Offset (if zeroing at cylinder axis)

The Z Zero offset will allow for quickly locating the center of the indexer using the Z zero plate.

Confirm that the Z-axis is level with the headstock bit when at 0, then move the Z-axis high enough that the bit will clear the top of the indexer head.


Identify the location where the z zero plate can be laid flat and move the spindle over this location. Note and record the X or Y offset from the zero position - in this example -10 inches. This will be programmed into the software later.

Place the zeroing alligator clip on the collet and the plate on the reference surface. Use the keypad to lower the bit until it just touches the zeroing plate (use the fixed key when the bit is close to the plate). The Input 1 indicator on the position window will light up when the bit touches the plate. Note and record the Z-axis offset measurement.
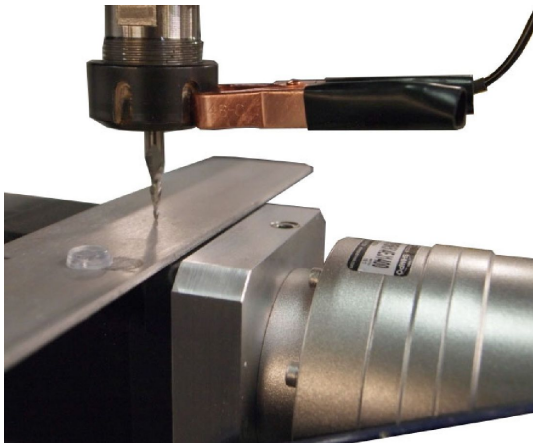
Setting up the software
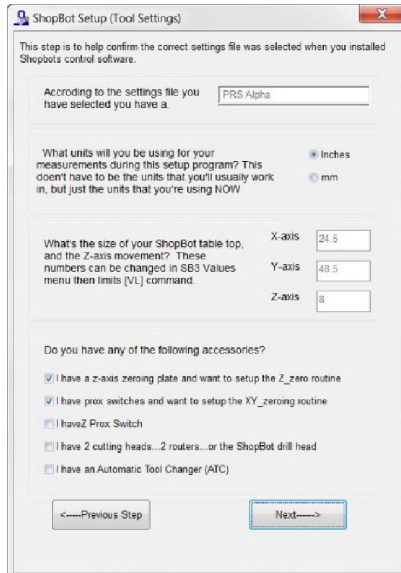
Open the ShopBot Setup program in the Tools tab. Read through the directions and then choose "Next."

ShopBot Setup can double-check the correct type and size of tool selected, and modify the offsets used for zeroing the tool.

Confirm settings file, units, and table dimensions are correct.

Check boxes for setup of the Z and XY zeroing routines, then click next.

The next screen sets up the Z zero routine, which uses the Z zero plate and a clip to create a simple circuit, telling the machine when it has reached a certain point.
Insert the offset value between Z zero and the reference plate.

Check the box for zeroing at the same place, and input the position identified for performing the Z zeroing routine. Click "Next".
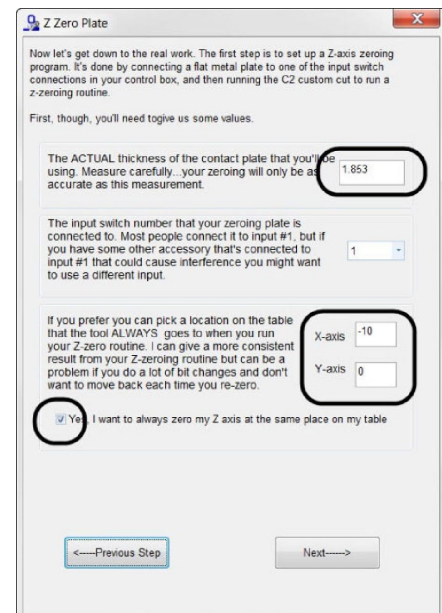
Click the button "Click Here To Make It Easy On Me."

The software will go through the process of moving to the zero point using the keypad. Once the keypad is closed, the tool will move to find the X and Y proximity sensor targets one at a time. The distance traveled will then be recorded and used during the XY zeroing routine (C3).

Tip: Record these offsets for future reference in case it's necessary to switch to different table configuration offsets.
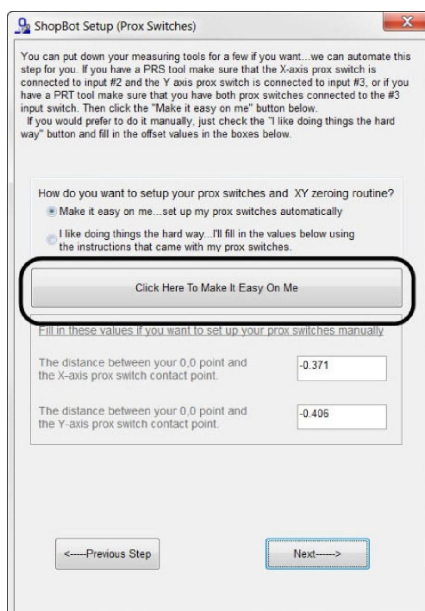
# Switching Between Indexer and Table Configurations

The offsets used for the X, Y, and Z zeroing routines are generally different from those used for standard 2D cutting. These settings, along with many other user variables, are stored in the SbParts folder installed on the computer's C drive. The simplest way to switch between setups is to change out the SbParts folder. This requires creating a setup file for both configurations.
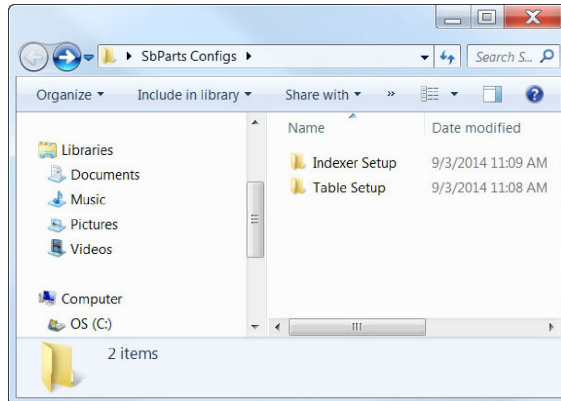
Create a folder to store both indexer and table setup files. In this example, a folder was created on the desktop.

A copy of this file must be in the C:/SbParts folder for the ShopBot software to operate correctly.

If setup has already been completed for the standard table, then copy and paste this folder into the Table Setup folder created earlier.
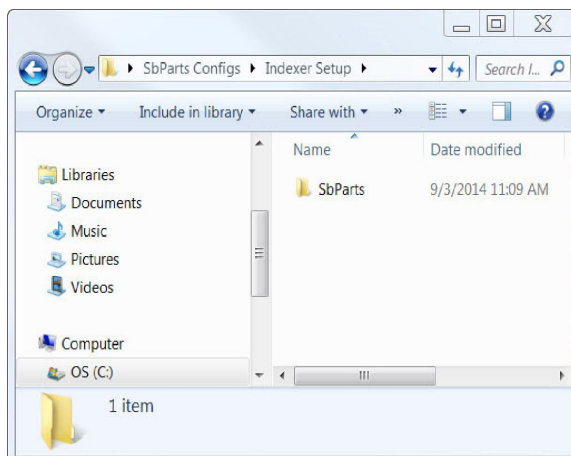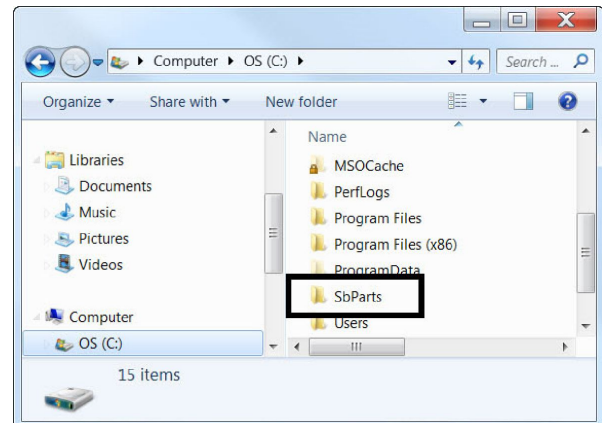
Make sure an SbParts folder is still on the C drive. Go through the ShopBot setup routine outlined in this document, test that the routines work as needed, and the tool behaves as you expect. The current SbParts folder is now configured for indexer operation. Copy and paste this folder from the C drive into the Indexer Setup Folder.

Once both configurations are saved and stored, it is possible to change between them by replacing the

file on the C drive with one from the needed save location.

Setting up the Post Processor

Once you've created your drawing and calculated the toolpaths, the last step will be to save your toolpaths.

- Click on the "File" tab at the top left of the screen in Aspire or Vcarve
- Click on "Open Application Data Folder…"
- Double-click the "My_PostP" folder and leave open, you will copy new post processors here
- On your computer's desktop, right click Windows Explorer, and open another Windows Explorer
- Locate and open "SbParts" in the new Windows Explorer screen
- Open the "PartWorksPosts" folder
- Copy and paste both the "ShopBot_TC_inch.pp" and "ShopBot_TC_MM.pp" files into the "My_PostP" window that you opened earlier
- Now back to the other window, open "PartWorksPosts_ARCHIVAL"
- Copy and paste both the "ShopBot_Indexer_X_inch.pp" and "ShopBot_Indexer_Y_Inch.pp" files into the "MyPostP" window.
- Close and re-open Aspire. This needs to be done to create the new post processor list in Aspire
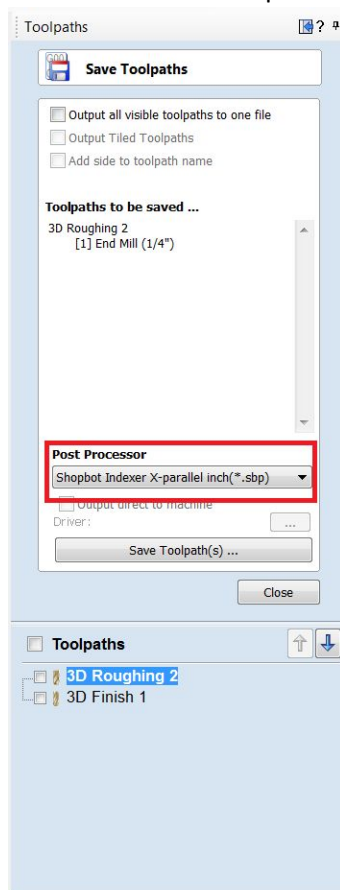
Now, when you click on "Save Toolpath", the post processors you need will be listed in the drop-down menu.

Select "ShopBot Indexer X-parallel inch(*.sbp)" if the spindle will be moving back and forth along the X axis.

Select "ShopBot Indexer Y-parallel inch(*sbp)" if the spindle will be moving back and forth along the Y axis.