ShopBot

ShopBot Quick-Start Guide
For PRS Buddy Tools

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General Safety and Precautions

This safety summary contains general safety warnings that should be understood during operation of this machine. Failure to observe these precautions could result in injury.

Learn and understand safe use of the machine. Do not allow untrained individuals to operate the machine without supervision. Be aware of the location of the Emergency Stop switches at all times.

Eye and ear protection MUST be worn by the machine operator as well as any bystanders or observers. Flying sawdust, material chips, and other debris can cause serious eye injury.

Wear closed-toe shoes at all times.

Make sure that your material is properly secured before cutting, and be aware of any small parts that may come loose after being cut. If a small part catches the edge of a spinning bit, it can be thrown forcefully in any direction, causing injury or damage.

Never place your hands on the rails of the ShopBot. Be aware that the machine may move unexpectedly in any direction, which can cause serious injury if your hands are in the path of movement.

Never wear gloves while operating the machine. As with any power tool, a glove can get caught in moving or spinning parts and pull your hand into the machinery.

Never leave a machine running and unattended. Understand that a spinning tool generates friction and heat, creating a risk of fire. This risk is minimized by using correct chip load, using sharp bits, and by always double-checking your files before cutting. Be prepared to pause or stop the cut if something seems incorrect or unsafe.
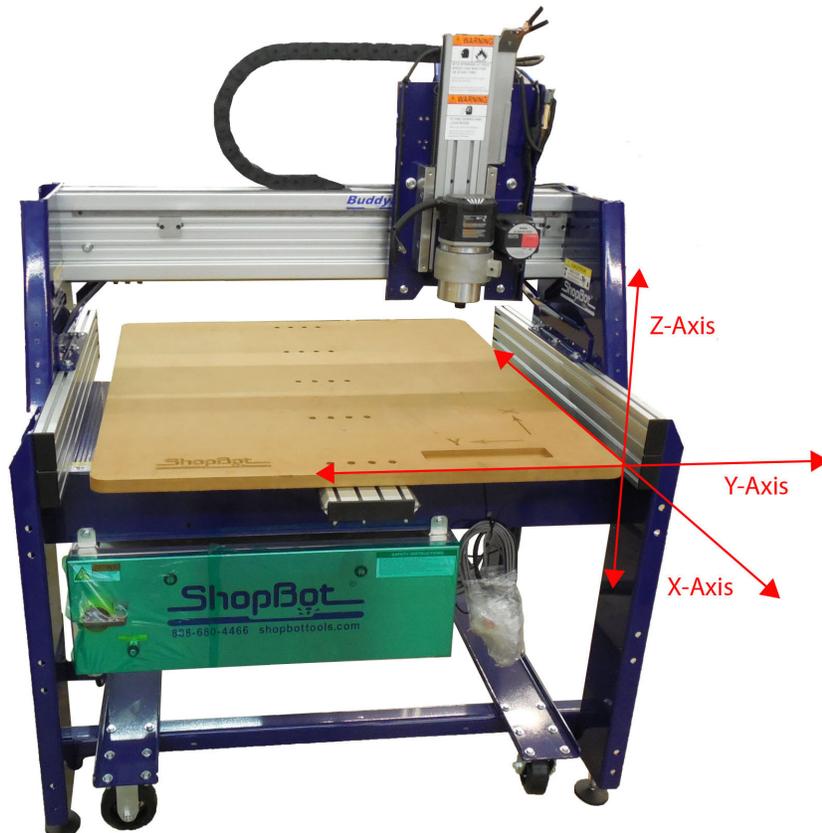
Keep a working fire extinguisher within reach of the machine, for the reasons listed above.

Main Parts of the ShopBot Buddy

E-Chain

YZ Car

Gantry

Router/Spindle

PowerStick

Dust Foot

Table

Interlock
Switch

Table Leg

Spindle
Interlock Key

Control Box

Leveling Foot

Caster
(Optional)

Axes Orientation

Z-Axis

Y-Axis

X-Axis

Introduction

The ShopBot Buddy Quick Start Guide provides instructions for unpacking and setting up the ShopBot PRS Buddy® Tool. It does not include instruction on software, troubleshooting, or maintenance. This and additional documentation are available at www.shopbotdocs.com.

Removing the ShopBot Buddy from Crate

Remove corner brackets from side of crate marked "RAMP END." Lay ramp on the ground and align pre-drilled holes where ramp meets the pallet.

Insert carriage bolts (located in one of the machine legs near the ramp) into these holes to secure ramp before continuing.

Insert carriage bolts into pre-drilled holes in pallet.

Remove screws from top edge of crate and lift/slide off top. Carefully remove crate sides by unscrewing edge brackets and freight gussets.

Remove any boxes, accessories, packaging or support material from around machine, including the L-brackets that secure legs to the pallet.

Moving the ShopBot Buddy Tool

⚠️ **WARNING! The ShopBot Buddy® weighs 600 pounds (270 kg) or heavier, depending on configuration. Use caution when moving the machine.**

With Optional Caster Kit:

Use a 1/2" wrench to raise the leveling feet until the machine is resting on all four casters. With at least two people on each side, slowly roll the machine down the ramp and position it where it will be used.

Without Casters:

If the machine does not have casters, it should be moved with a forklift. Place the forks under the two cross-support bars as shown here.

If possible, spread the forks so they are as close to the legs as possible. This will help prevent any deflection or damage of the machine frame when lifting.

Adjusting the PowerStick

The standard PowerStick is already fitted with an initial deck. Adjust or remove the PowerStick by pulling out the release knob on the right side of the Buddy. Move the knob to the right to lock it in the released position. This disengages the X motor pinion and rack so that the PowerStick can be moved freely.
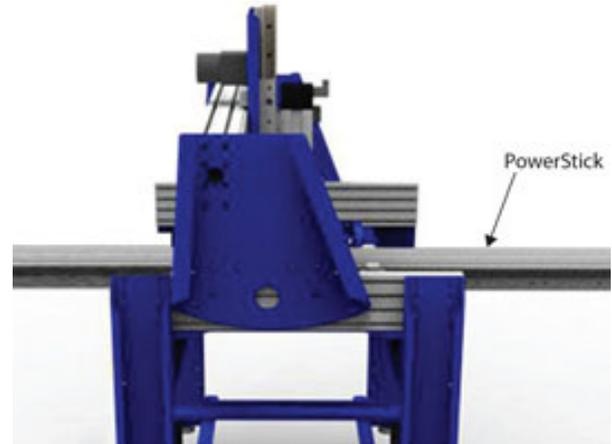
Leveling Machine Frame

Machines with casters: Once the machine is in position, lower the leveling feet until the casters are raised off the ground again.

Note: Do not operate the machine with the feet raised with the weight placed on the casters.

Use a 48" level to check for level along the PowerStick (the X axis) and along the underside of the gantry beam (the Y axis).
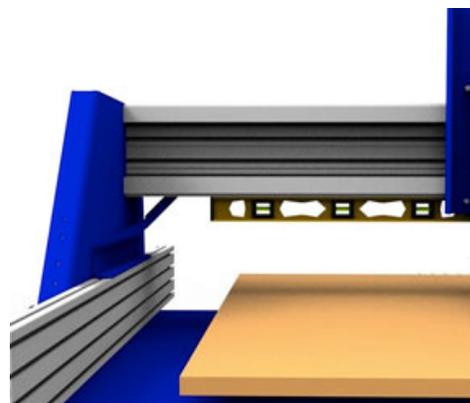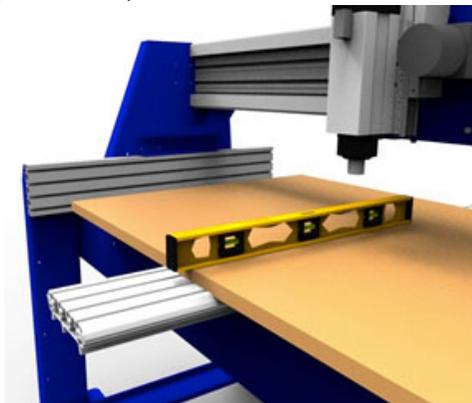
Adjust the leveling feet until the machine is level in both X and Y axes.

When finished leveling, tighten jam nut on each leveling foot to lock it into position.

Electrical Connections

WARNING: RISK OF ELECTRIC SHOCK - The ShopBot Buddy needs to be connected to electrical service by a licensed electrician who has experience with industrial equipment. Do not risk personal injury or damage to the machine by having an unlicensed individual perform this job.

Note: A PRS Standard Buddy® Tool with a Porter-Cable Router is the only model that does not require an electrician to connect it. However, it will require a dedicated 20A circuit.

Wiring diagrams, electrical specs, and spindle manufacturer's documentation are located inside the control box and at shopbottools.com/ShopBotDocs/wiring. Refer to the control box part number listed on the order and on the control box to determine the appropriate power and wiring diagrams.

The ShopBot Buddy® is either a PRSalpha or PRSstandard model.

PRSalpha: Power to the control box should be wired into a fused disconnect by a licensed electrician familiar with industrial equipment.

PRSstandard: For a PRSstandard with a Porter-Cable router, plug the included cable into a 110V 20A (230V 15A for select international tools) circuit. For PRSstandard tools with spindles, power to the control box should be wired into a fused disconnect by **a licensed electrician** familiar with industrial equipment.

General Precautions for All Models:

Motor connections: DO NOT connect or disconnect the motor cables while the control box is powered on. This can damage or destroy the motors or drivers.

Induced currents: Avoid moving any axis by hand when the control box is powered off. If it is necessary to push or pull an axis by hand, do so very slowly. Spinning the motors can generate an electric charge and damage the drivers or other electronic components.

Please contact tech support with any questions about wiring before turning on the power: 1-888-680-4466.

Install Dust Foot

Refer to Installing PRS Dust Foot document , which should have been sent with this tool. However, if not, please access the document via www.shopbottools.com/ShopBotDocs.

Decks for the PowerStick

The deck is the first level of support for the work surface. All ShopBot Buddy® tools ship with a standard PowerStick (24" nominal work area; 48" stick) and Extira® deck already installed. The Extira® works well for a general purpose deck, but can be swapped out for a different design if desired.

Often, it is beneficial to attach a sacrificial sheet of material (also called a spoil board) to the deck. A plenum for a vacuum hold-down system can also be attached. The 80/20 t-track slots in the Power-Stick provide a convenient system for securing the deck to the PowerStick.

Sizing the Deck

The deck can be sized as narrow or wide as desired; however, if the deck was sized an inch or two wider than the PowerStick, it would aid in keeping debris from accumulating on the tracks. Keeping the deck at least 3" (75 mm) wider than a projects' work area will improve dust collection by providing an extended surface at the edges for the dust skirt to work.

We recommend that the length of the deck be extended to within about 6" (150 mm) of the PowerStick at each end. **Keeping the deck long is a SAFETY measure.** It avoids creating a pinch point behind the front and back rollers under the deck.

Suggested Materials

Deck Base Layer:	
½" or ¾" Plywood	Best combination of stability, weight, and price. Two laminated pieces of ½" are particularly stable.
¾" MDF or LDF	Not as stable, but works well for applications when not using a full size deck.
½" or ¾" Phenolic	
½" Aluminum Plate	
Spoil Board:	
¾" MDF or LDF	
½" or ¾" Plywood	

Spoilboard

The spoilboard is a sacrificial layer of 3/4" Medium-Density Fiberboard (MDF). As it gets damaged over time, it can be re-surfaced to a perfectly flat work surface until the entire board has been used up, and then simply replace it with a new sheet.

Spread a thin, even coat of glue across the entire surface of the base layer. A cheap paint roller works great.

Have someone help set the MDF sheet(s) onto the base. Place the spoil board on top of baseboard with 1/4" of overlap on all sides.

Place clamps and heavy objects onto spoil board to help glue cure.

Working with Longer PowerSticks

PowerSticks of varied lengths add great versatility to the ShopBot Buddy®. PowerSticks can be used as multiple work fixtures that can be readily swapped in and out at any time.

WARNING! The PowerStick can move very quickly, moving in and out over a much longer distance. Ensure that there is adequate clearance around the tool so that no one is likely to come into contact with the moving PowerStick.

Do not program the PowerStick to move faster than 12 inches/sec.

Outfeed Support System

Even though the PowerStick seems quite rigid, weight or pressure on a long, unsupported stick can cause the work surface to bow and affect cutting. A PowerStick over about 6' will typically need some sort of out-feed support. ShopBot offers an outfeed system for use with long PowerSticks. The support system uses UHMW polyethelyne sliders to support the Power Stick. There are many other out-feed support solutions that should suffice for PowerStick work, including adjustable-stands, shop rollers, or fabricat**ing special-purpose feed systems.**
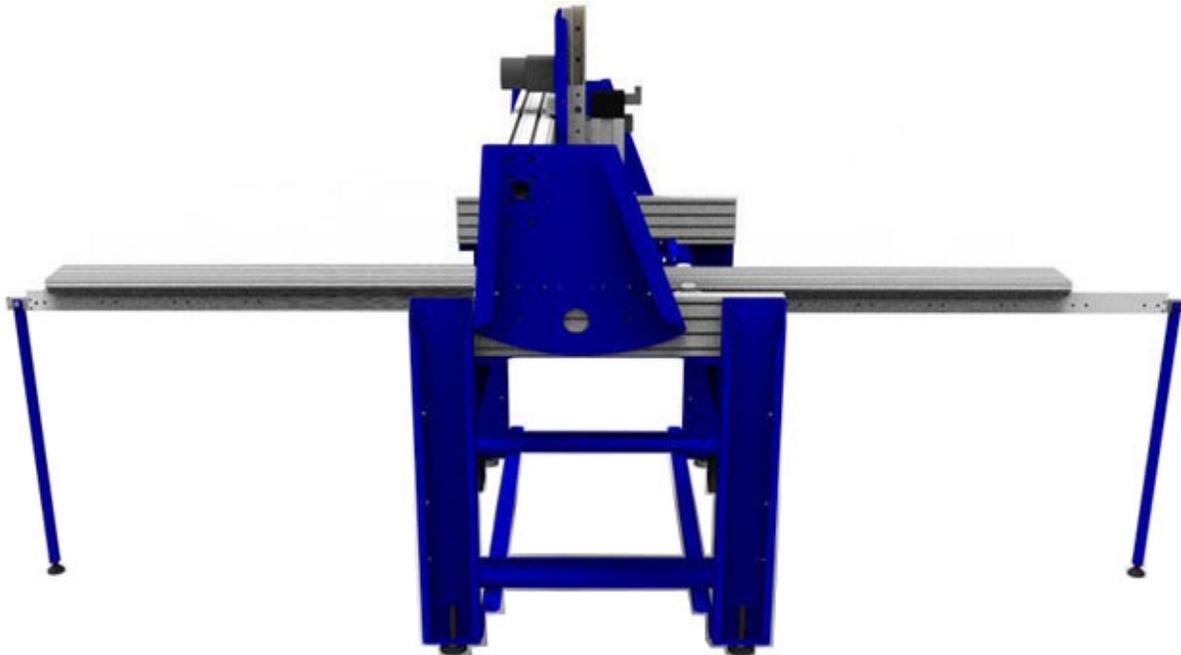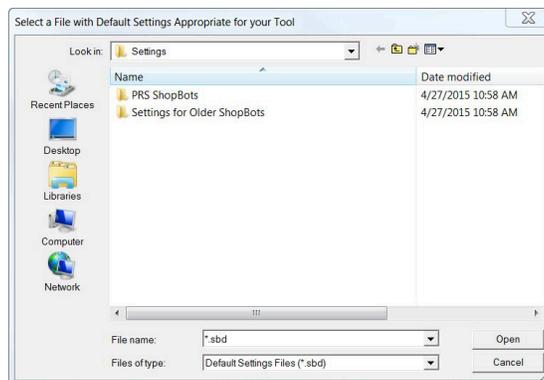
Connect ShopBot to Computer

Connect USB cable from ShopBot control box to computer. Connect the RPM controller USB from variable frequency drive (VFD) unit into another USB port on the computer.
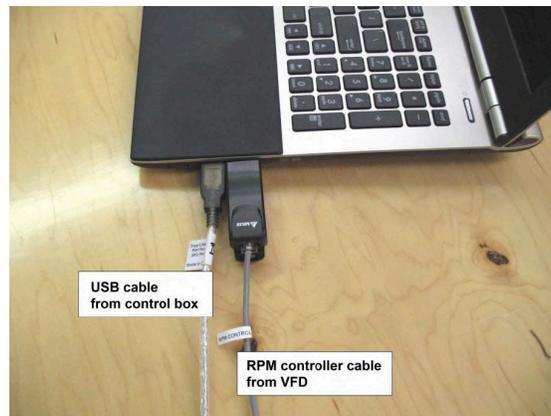
Load Settings File

When prompted to load a default settings file for the first time, the following screen should appear:

Double-click on "PRS ShopBots", and choose the "Buddy" option. Choose the correct table size, and this will return to the main screen.

Note: Custom tools will not have a default setting preprogrammed in the software. Choose the correct type (Alpha or Standard), and the size closest to the tool. Edit the table limits using "Values" and "Limits for table". Save the new setting as a custom settings file in the "Utilities" menu.

ShopBot Control Software

The ShopBot control software works in two modes: "Easy mode" (by default) shows only the necessary functions to set up and run a cut file. "Full mode" shows all available functions and settings. Switch be-tween the two modes by clicking on the Help/options button in the red position window.

Axis coordinates (current position)

Input switch indicator lights

Open keypad move window

Help / options

Open a design program or access tutorials

Load a part file for a virtual preview

Cut a part file or enable keypad movement

Displays current location: Double-click to specify a location to move to, then hit Enter

Switch from move to jog (rapid transit) speed for next move

Manually move each axis: corresponds to keyboard arrows

Move by fixed increment when using arrow keys

Zero an axis in its current location

Memorized locations: Hold down button to save current location (just like your car radio), then click that button to return to this exact position later

Test Each Axis with the Keypad

Turn ON the control box. Click on the yellow keypad window icon within the red position window. If the icon is not visible, click "move/cut" under "Mode" on the red position window.
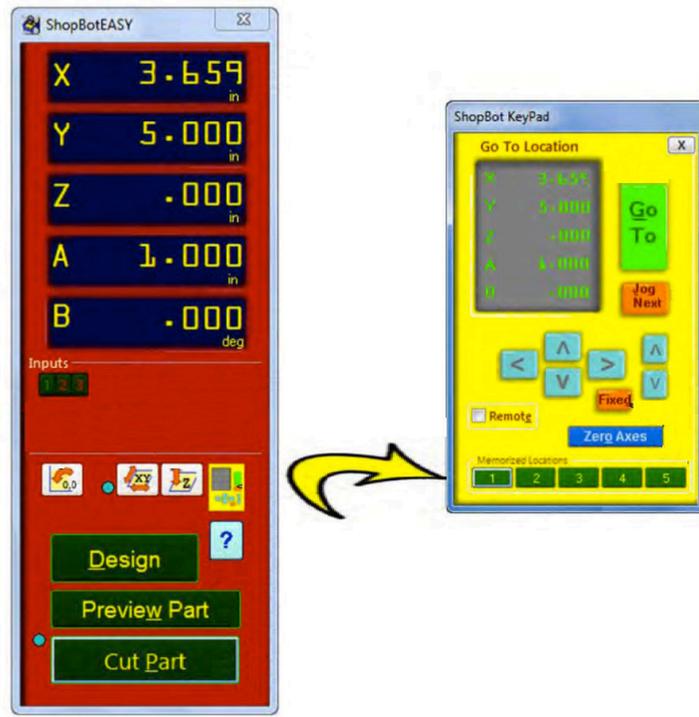
Use the buttons on the keyboard (see below) to move the spindle/router along each axis.

X axis positive (away from zero)

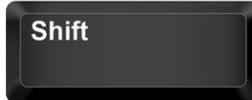**X axis negative** (towards zero)

Y axis positive

Y axis negative

Z axis up

Z axis down

Alt + page up — **A axis** (second spindle) **up**

Alt + page down — **A axis down**
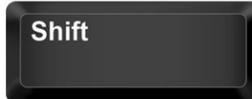
Shift + page up — **B axis** (rotary indexer) **clockwise**

Shift + page down — **B axis counter-clockwise**

Test the Spindle/Router

Locate the key attached to the collet wrench. Insert this key into the safety lockout next to the power switch and turn the key to "ENGAGE".

Note: Older Desktop tools do not have an interlock switch. Instead, they have an on/off switch on the underside of the VFD unit. It is illuminated red when off and green when on.

Routers: Make sure that the router's power switch is in the ON position before proceeding.

In the main console window, type "K" to bring up the keypad move command. Notice that output 4 lights up in the red position window. Click output 1 to turn the output on. This will create a prompt to start the router/spindle.
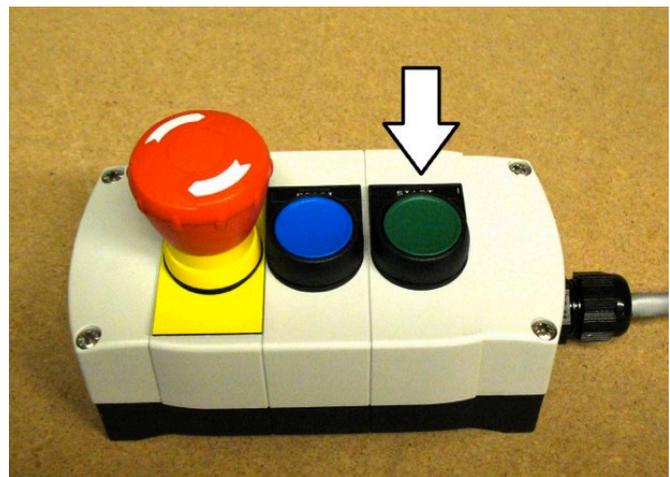
For PRSstandard models, press "OK" to start the router/spindle.

For PRSalpha models, after toggling output 1, press the green "START" button on the three button pendant.

To turn the spindle off, click the output 1 switch again or close the keypad window.
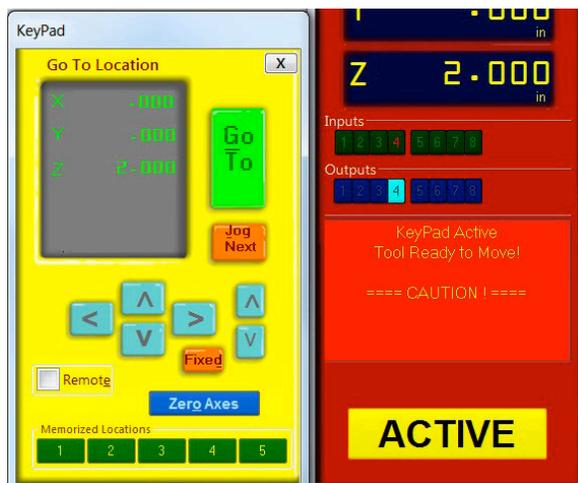

All models: turn on output 1 through keypad

Alpha models only: press the start button

Running a Part File

This section covers setup procedures performed prior to previewing or running the part file.

Zeroing the Z-Axis

The Z-axis must be zeroed each time that the machine is turned on or bits are changed. Zeroing can be done to either the top of the material or to the table surface.
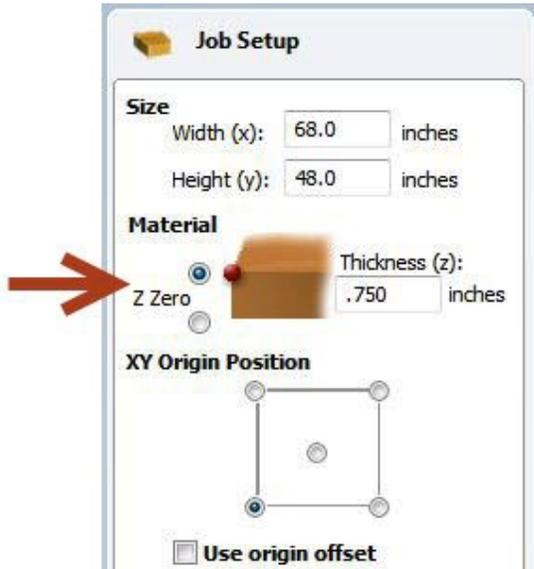
Zeroing to the top of the material is a better choice when a precise cut depth is needed (when cutting an inlay pocket, for example).

Zeroing to the table surface is a better choice when through-cutting parts in wood. Because wood products naturally vary in thickness, the top surface of any given area may be higher or lower than other areas. Zeroing to the table surface will provide the most consistent through-cutting results.

Whichever location is chosen, the location must be identified in the CAD/CAM program (as shown here for VCarve Pro). Failure to match what is specified in the software with what is done at the table can result in ruined material and/or broken bits!

Z-Axis Zeroing Process

Ensure that the software is set to Move/Cut mode.

Place the grounding clip on the bit, if possible. Otherwise, place it on the collet nut or shaft of the spindle.

Set the plate down directly beneath the bit.

NOTE: To test the circuit before running the zeroing routine, touch the plate to the bottom of the bit. Check that input 1 lights up on the screen and goes off as soon as contact is broken.

Click on the Z zero button, or type a C2 command. The Z-axis will touch the plate twice and then move up to a safe height. The Z-axis is now calibrated and the machine is ready to cut.

Place the Z zero plate back in its holster. Remove the grounding clip from the bit and secure it safely.
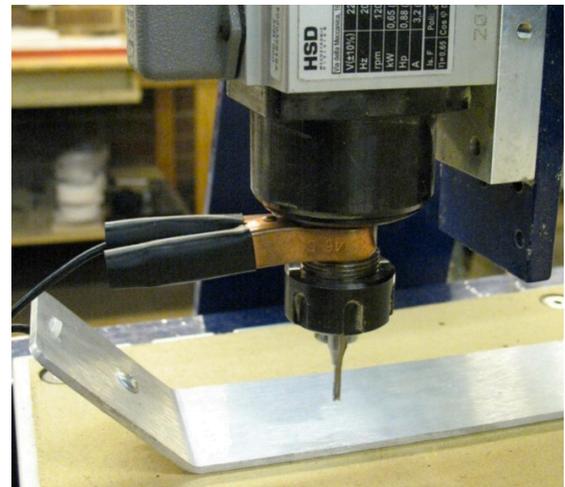
Zeroing the X- and Y-Axes

The best way to zero the X- and Y-axes is by using the proximity switch homing process. This process instructs the machine to touch off from each switch to establish a zero location, which creates an accurate and repeatable start point.

Click the XY Zero button or type a **C3** command to use this feature. To make a permanent adjustment to the location of your 0,0 point based on the switches, click on [T]ools > ShopBot Setup, and "Next" until you see the screen that's marked "ShopBot setup: Prox switches." Then click "Click here to make it easy on me." The program will help set up the new permanent zero location.

To set up a temporary zero location, simply move the spindle/router to the desired location. Write down these coordinates to ensure the exact location for later. Type a **Z2** (for Zero 2 axes) command. Notice that the X and Y coordinates now read zero. **This is the new 0,0 location that the cut file will reference.**

Changing Bits

Note: Spindles and routers have different collet styles. Instructions are included for both.

Make sure collet and nut are completely clean. If necessary, use a wire brush, compressed air, and/or mineral spirits to remove dust or excess grease.

Spindles: Before inserting the bit, press the collet into the nut and listen for the "click." If collet does not seat, press it in at a slight angle. Confirm that the collet is snapped in by holding the nut upside-down and letting the collet hang freely.

Routers: The router collet and nut are held together by a retaining clip. It is not necessary to disassemble the components for cleaning or bit changes.

Slide bit into collet. Make sure that the collet grips only the shank of the bit, keeping any parts of the flute outside of the collet. Ideally, the bit shank should fill at least 75% of the collet.
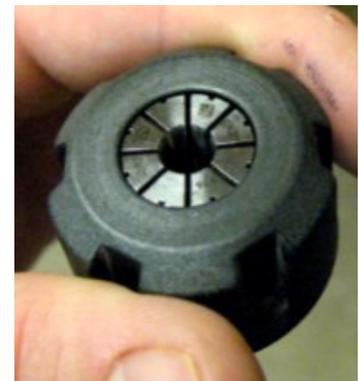
Thread collet and nut onto router or spindle. It should go on very easily. DO NOT apply force if nut is resistant. Stop and try again until it goes smoothly. Once the nut is finger-tight, check the bit again to make sure that it has not slipped. Use the included wrenches to fully tighten nut.

Spindles: snap collet into nut, then flip it over to ensure it is snapped in securely

Ensure no part of flute enters collet

Setting Up the RPM Control

This section only applies to PRSstandard and PRSalpha tools equipped with a spindle.

Ensure the RPM controller USB plug (from VFD unit) is connected to the computer.

In the main console window (should have a pic to identify this window), click on "Tools" and then "Spindle RPM Control." Drag the box below the position window to keep it out of the way. It must remain open at all times for the software to communicate with the VFD unit.

Click on "RPM" in the left corner of the Spindle RPM box to open a settings window. Change the fol-low-ing parameters in the settings window:

Start when SB3 Starts:	**1**
Hertz: varies by country	**60** (US, Canada, Mexico and Japan)
	50 (Europe, and most other regions)
Hertz Scale:	Same as Hertz setting unless adjustment is required
	to match VFD unit and software RPM displays.
VFD 1:	**Yaskawa V1000**
VFD 2:	Leave blank unless tool is equipped with two spindles.

Click "OK" to save your settings.

To test the function of the RPM controller, turn on the spindle and click on the listed RPM value in the spindle control window. Change it to something different and then click "Enter". The value on the VFD unit display should match what was just entered.

Holding Down Material

Small parts can be caught by the cutter and thrown, potentially causing serious injury or damage. It is imperative to choose the proper hold-down method for the project. Refer to "Holding Down Material for Cutting" in the User Guide binder provided with this tool.

Warming Up the Spindle

Note: This step is not necessary for ShopBot machines with routers.

To maximize spindle bearing life, warm up the spindle before cutting, after letting it sit idle for longer than four hours. Click on "Tools" then "Spindle RPM control" to open the spindle control window. Leaving this window open, start the spindle warm up routine (C5 command). This will run the spindle at 9000, 10000, and 12000 RPM for three minutes each, and will turn off the spindle when finished.

Previewing a File with an Offset

There are several ways to perform a "test run" with-out actually cutting the material. First, enter Move/Cut mode, and click on the "Cut Part" button (or "File" and "Part File Load"). Select part file, and the following screen will appear.

Locate the line marked "Offset in 2D or 3D."

A **2D offset** will cut the file at normal depth in a dif-ferent X,Y location on the table. Once the X, Y, and Z axes are zeroed, simply move the cutter to the new location and load the part file with a 2D offset. Its current location will be used as 0,0.

A **3D offset** will cut at a different X, Y, and Z position. This is often referred to as "air cutting," since it allows you to run through the file in the air above the material. To avoid cutting into the workpiece, make sure that the starting distance between the bit and the material is greater than the maximum cut depth.

Click "START" or Enter on the keyboard to proceed.
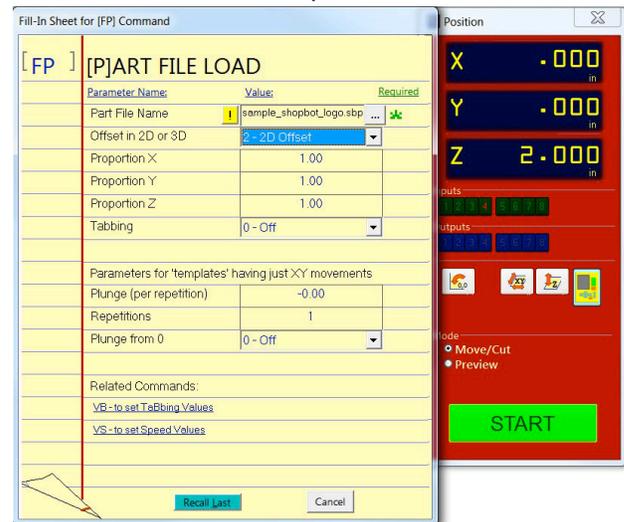
Running the Cut

If the test run looks good, click on "Cut Part" (or type **FP** command), and select part file. At the Part File (FP) setup screen (shown above), ensure "Offset in 2D or 3D" is set to "No Offset." Click "START," or Enter on your keyboard. You'll see the following screen:
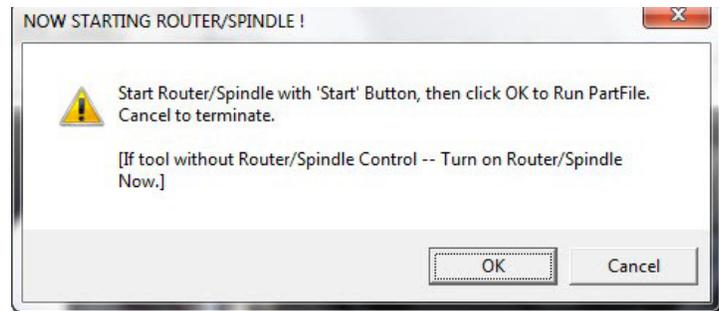
For **PRSalpha** models, press the "Start" button on the three button pendant BEFORE clicking OK.

For **PRSstandard** models, click "OK" and the router/spindle will start automatically.

Pausing or Stopping a Cut

There are two ways to stop the tool while it is moving or cutting a part file. An emergency stop cuts power to the tool and stops it the fastest. A software controlled stop, or pause, will decelerate the tool, lift the Z-axis to a safe height and stop the router/spindle.

Software Controlled Stop

The gentlest way to stop the machine during a cut is to hit the space bar on your keyboard. This will bring the machine to a "soft stop," and will retain zero locations. The soft stop is useful during non-emergency situations when adjustments or corrections are needed.
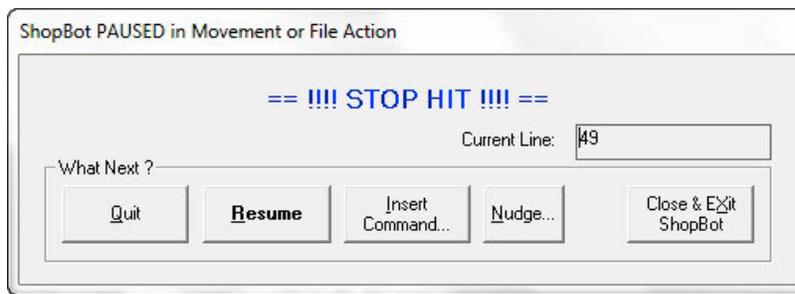
Note: The "Stop" button on **PRSstandard** tools acts as a soft stop. For a true emergency stop twist the main stop switch on the cover of the control box.

Emergency Stop

To immediately stop the spindle/router and all motors, use the red emergency stop button or switch, which will cut off power to all systems. To continue, you will need to re-zero all axes because the locations will no longer be accurate.
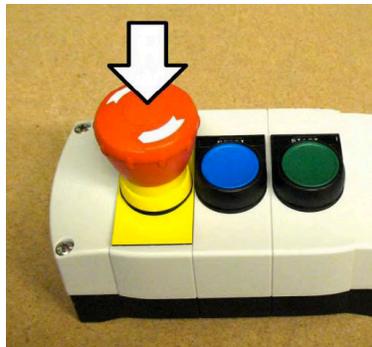
PRSalpha models

PRSstandard models

Basic Information

The ShopBot website (www.shopbottools.com) houses many documents that can help with understanding additional uses of this tool. Information can also be found in the User's Guide binder (provided with the tool), or from the resources listed in the back of this guide.

Bits (Refer to "Feeds and Speeds" document provided in User's Guide manual)

Machine Maintenance (Refer to "PRS Maintenance Schedule" located at http://www.shopbottools.com/ShopBotDocs/files/PRSMaintenanceSchedule.pdf for additional information)

ShopBot machines require very little maintenance, but to keep the machine running at its best, verify the following items each day:

- **For spindles only,** warm up the spindle using the spindle warm up routine (C5).

- Clean collet, nut, and all bits, and check for signs of wear or damage. Clean collet and nut with a brass brush and/or compressed air. Clean bits with an appropriate solvent that removes any residue or gunk. Discard dull or damaged bits.

- Visually inspect all wiring and hoses. Check for cuts, scrapes, or pinch points on the cables. If motor cable is damaged, DO NOT run the machine as motor and driver damage is at risk. Call ShopBot tech support (919-680-4800) for advice on how to proceed.

- Ensure the machine and the area around it are clean. Check for any obstructions on the rails and brush away any debris.

- Turn on the power. Push and pull the machine near each motor, along its axis of movement. The motors should be locked in place with no movement. Mechanical looseness in any of the axes should be corrected before proceeding. Contact ShopBot tech support (919-680-4800) for detailed instructions specific to the machine.

- Check the gear rack on each axis and make sure that it is clean and free of any obstructions (large chips, material scraps, etc.).

Resources

To the best of our knowledge, these links are current. If you find that any of them are no longer working, please contact us so that we can update them accordingly.

Detailed chip load charts:
http://www.onsrud.com/plusdocs/Doc/index.html?model.code=FeedSpeeds

ShopBot user's forum:
http://www.talkShopBot.com/forum

Vectric training videos:
http://www.vectric.com/WebSite/Vectric/support/support_vcw_tutorials.htm

Additional Vectric support available within VCarve software: click on Help > Help Contents for an interactive PDF file.

100K Garages:
Post information, bid on projects, and connect with people who want to get things made!
http://www.100kgarages.com