ShopBot®

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Desktop MAX CNC Quick-Start Guide

*Tool shown with optional spindle and speed controller.

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Durham NC 27704

Table of Contents

Desktop MAX Safety and Precautions

WARNING! Read all safety warnings, instructions, illustrations and specifications provided with this power tool. Failure to follow all instructions listed below may result in electric shock, fire and/or serious injury.

Save all warnings and instructions for future reference. Refer to General Power Tool Safety Warnings sent with the User's Guide.

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.

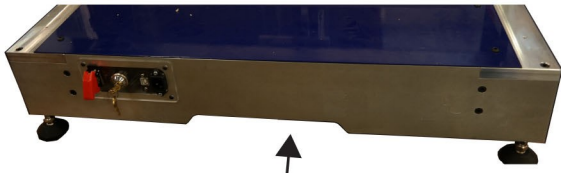
Desktop MAX Safety and Precautions (cont'd)

Limitations on ambient conditions - This tool is intended for indoor use; Do not run the tool outside or in wet weather.

This tool is intended to be used with wood, plastic, or other non-ferrous materials. It is not intended for use with ferrous materials.

Transportation - This tool can be transported by two people by grabbing from the bottom front and rear locations.

Front Lifting Points
(along bottom of tool)



Rear Lifting Points
(along bottom of tool)

What's in the Crate?

Desktop MAX D3624

Shown with optional spindle and speed controller.

Manila Envelope, which includes:

- Desktop MAX Quickstart Guide
- Desktop MAX Enclosure document (if applicable)
- User's Guide Binder
- Thumb drive with software

1/4” and 1/2” Spindle or Router Collet Sets

Collet Wrenches

Bit Kit (Optional)

Z-Zero Assembly

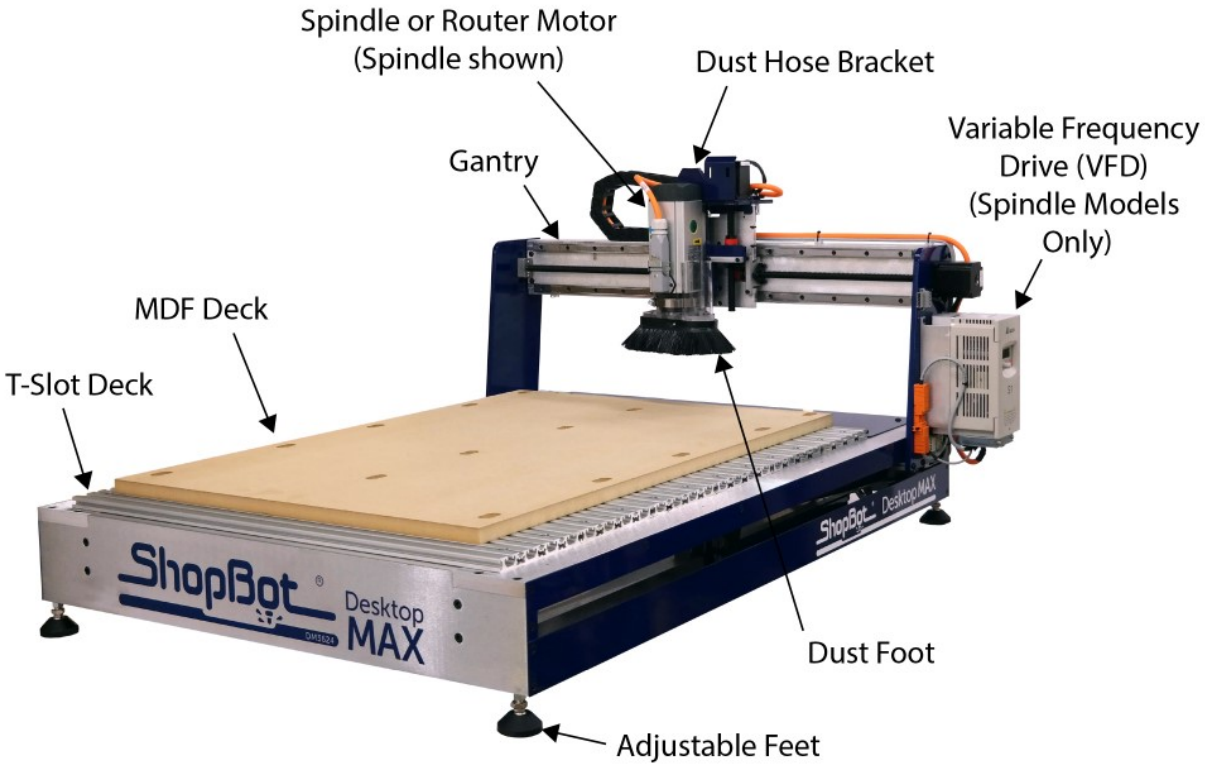
Power Cord

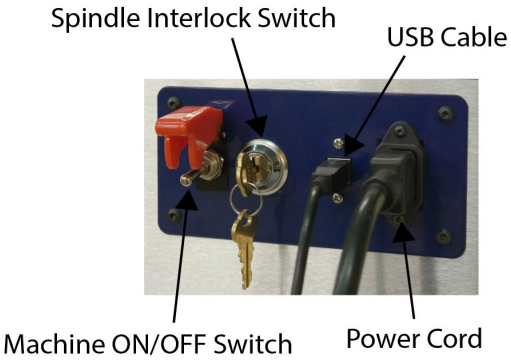
Hold Down Bolts

USB Cord

Spindle Interlock Keys

ShopBot Desktop MAX Overview - Model DT3624





Uncrating

The ShopBot Desktop MAX comes securely crated for shipping. Use a claw hammer to remove each of the four metal clips. Use caution, clips are under tension and may spring during removal.

Remove all accessories packed with the Desktop MAX.

Remove packing materials and sides of crate.

Lift Desktop MAX onto a sturdy table or bench.

CAUTION!!

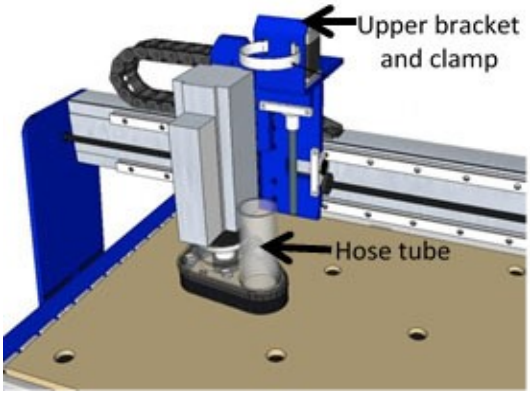
The ShopBot Desktop MAX is a substantial tool and depending on accessories, it can weigh from 175 to 190 lbs. Have AT LEAST one additional person help lift the tool.

Assemble Parts

Adjust leveling feet with 5/8” wrench so the tool doesn’t rock, then use 9/16” wrench and nuts to lock the leveling feet into position.

If the Desktop MAX is equipped with dust collector, slide the supplied hose over the vertical hose tube and attach hose to the upper bracket with hose clamp. **Note:** The bottom of hose should not be clamped so it can freely slide up and down on the tube during operation.

Refer to Desktop Dust Collection Setup Manual in Desktop section of Shopbot Docs at Shopbottools.com.

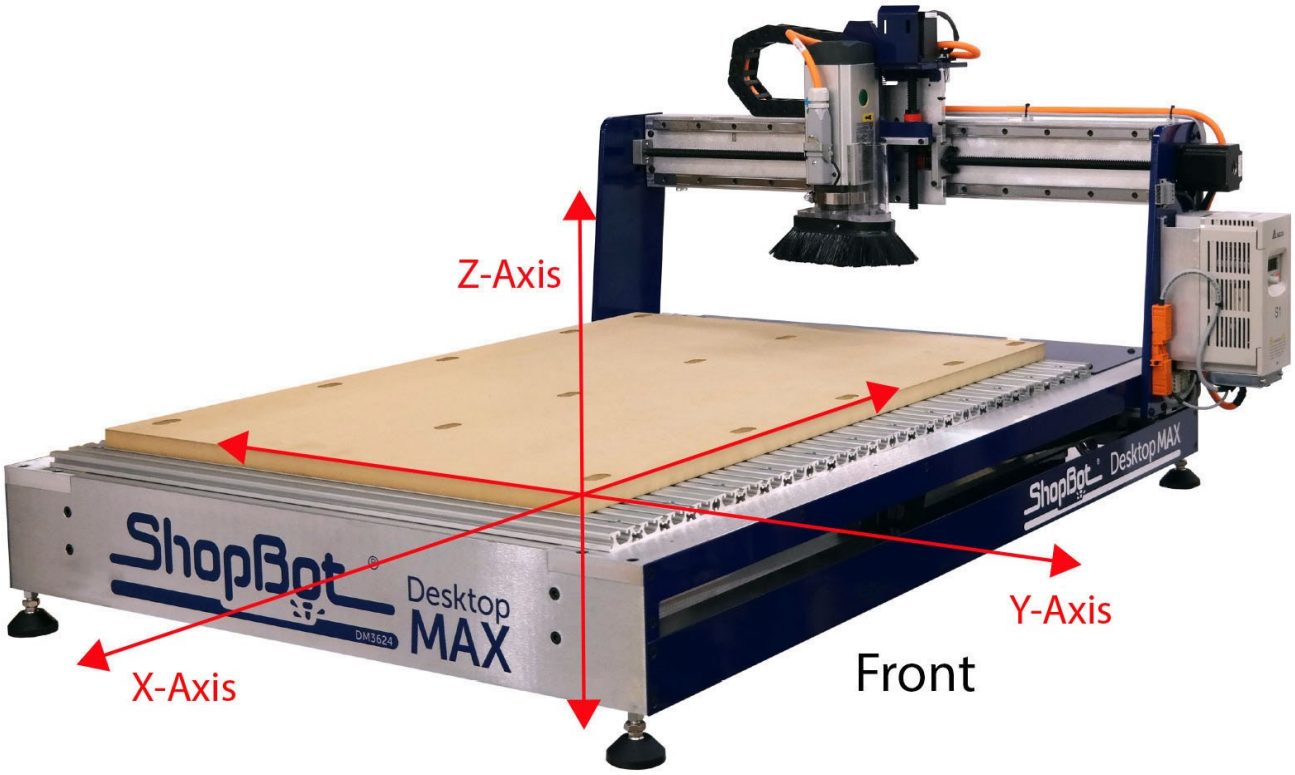


Refer to the Desktop MAX Mini Enclosure instructions to install the enclosure if applicable.

Tool Orientation and Direction of Axes

The picture below shows the axis orientation for the ShopBot Desktop MAX.

Normally, the 0, 0, 0 point is located at the intersection of the three axes as shown, and “front” is considered the side noted below.



Software and Computer Configuration

Refer to the Uninstalling and Reinstalling ShopBot and VCarve Software document for software installation and software and computer configuration.

Connect Power

In any situation where the tool loses power unexpectedly (including a power outage, a tripped circuit breaker, or any other event), if it is ever necessary to shut down the Desktop MAX via the main power switch during a cut, there are a few steps required to get the machine back up and running.

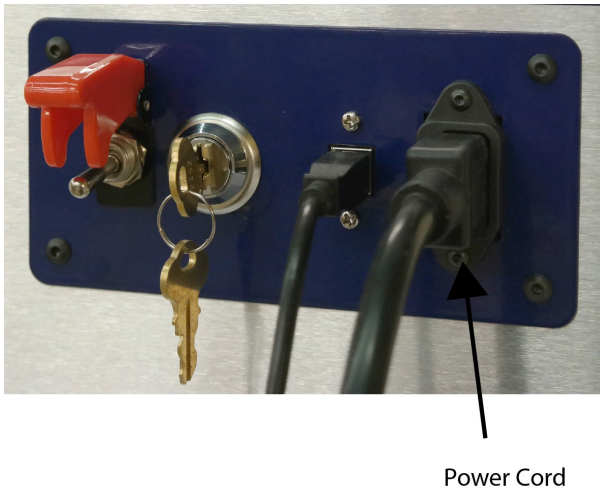
It is important to remember that when the machine is powered off, there is nothing holding the motors in place and they may move out of position, albeit slightly. Therefore, when the machine is turned back on, the location coordinates may no longer be accurate.

Turn on the power switch. If necessary, use the yellow Keypad function to move the Z height of the bit to a safe location above the work pieces. Zero the X-, Y-, and Z-axes as usual. An error message may occur saying that communication with the tool has been lost. Click OK to continue past the message. If there are any further errors, or additional trouble opening the Keypad, exit and restart the software.

Repeat “DT MAX Setup and Squaring” process.

The presence of an emergency stop switch does not alter the need for good safety procedures while operating the ShopBot tool.

For non-emergencies, simply hit the space bar on the computer keyboard. This will pause the tool while maintaining XYZ coordinates, allowing the cut file to resume without starting over.



Install power cord into back of the Desktop MAX. Plug in power cord to a standard 110 volt 15 amp receptacle.

Note: Do not use a ground fault interrupt (GFI) circuit.

Plug in the power cord into a standard 110 volt 15 amp receptacle.

Note: Do not use a ground fault interrupt (GFI) circuit.

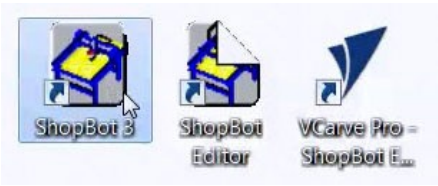
USB Cable

Install USB cable into back of the machine.

Connect USB cable to computer and Windows will recognize a “New Device.”

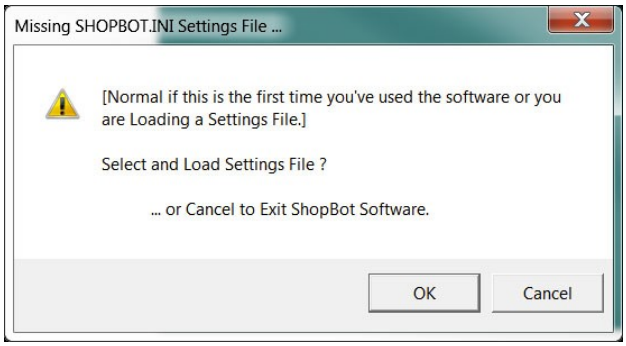
Note: It is best to use the same USB port every time the ShopBot is attached to the computer.

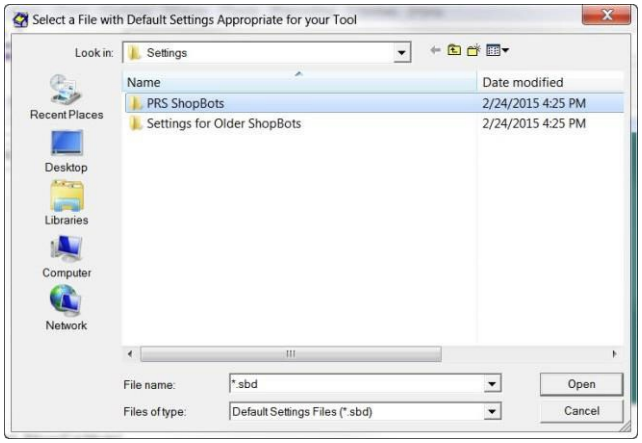
Launch Software



Double-click the ShopBot 3 icon to open the machine’s control program.

The first time the program is opened, there will not be a settings file for the machine. Click “OK” and a prompt will appear to load a settings file for the machine.



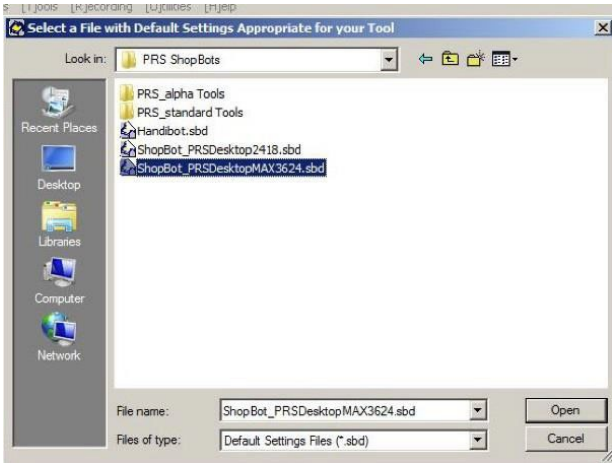


Access the folder for PRS ShopBots.

Find the desktop MAX setting file, “ShopBot_PRS-DesktopMAX3624.sbd”.

(NOTE: If this file is not available, it can also be found at http://www.shopbottools.com/mSupport/control-software.htm.)

Save file to thumb drive for future reference.



Tool Movement

The “Easy” Control Panel

This panel provides essential machine information and controls. The following steps will walk through some of the most frequently used controls, including installing a bit, zeroing the machine’s three axes, and cutting a couple of sample projects.

Click on the yellow button to bring up the “KeyPad” panel.

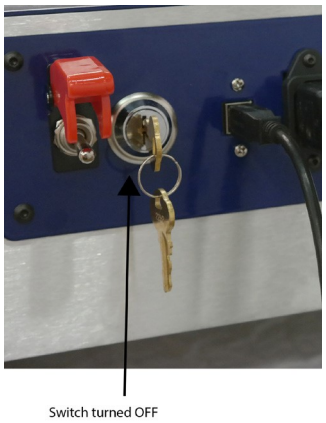
The Keypad

This window allows the user to manually move the X-, Y,- and Z-axes of the machine. Click on the blue arrows to move the spindle/router and gantry.

X- and Y-axes can also be moved with the cursor buttons on the computer keyboard. Use the “Page Up” and “Page Down” buttons on the keyboard to move the Z-axis up and down.

Move the spindle/router to a safe Z position below the Z proximity switch and near the middle of the deck.

Click on the X in the upper right corner to close yellow KeyPad.



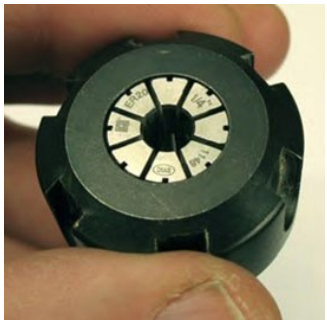
Switch Off Router or Spindle First

If a router is being used, ensure the switch is turned off.

Then, for BOTH ROUTERS and SPINDLES, make sure the switch under the main power switch is turned to OFF (counter-clockwise). This will cut the power to the spindle or router.

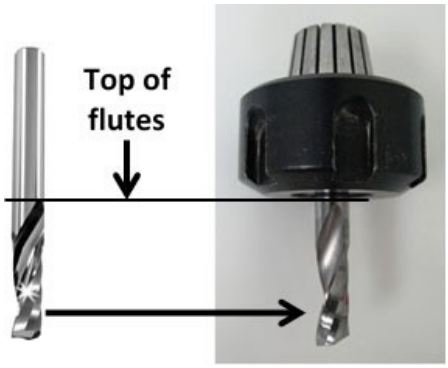
For routers, the collet nut and collet come locked together as a single unit.

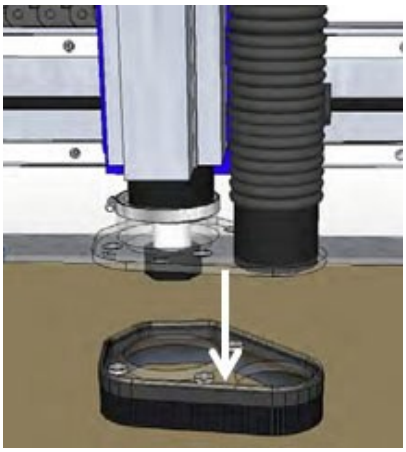
For spindles, the collet and spindle nut come separately.



Press the spindle collet into the spindle nut and listen for the “click.” It may be necessary to press it in at a slight angle. Confirm that the collet is snapped in place by holding the nut upside-down (shown in the photo at left) and letting the collet hang freely. It should not fall out.

Locate the 1/4” diameter upcut spiral bit that came with the machine and slide the bit into the collet. Ideally, the shank of the bit should fill up at least 75% of the collet to provide sufficient gripping surface. It’s okay if the shank of the bit extends above the top of the collet (maximum 3/8” of excess). Make sure that the collet grips only the shank of the bit, keeping the top edge of the flutes outside of the collet.





Remove bottom of dust foot by pushing it down. It’s attached with magnets, which makes it easy to remove. Set dust foot out of the way.

Hold spindle to keep it from turning, and hand-thread collet nut onto spindle. It should go on very easily. If resistance is encountered, do NOT apply force. Stop and try again until it goes smoothly. Once the nut is finger-tight, reposition the bit if it has slipped.

Use the included wrenches to fully tighten nut.

Over-tightening will make collet difficult to remove and may damage it. Under-tightening will allow the bit to slip during operation.

A firm one-hand squeeze is usually sufficient - a torque of approximately 59 ft-lbs.

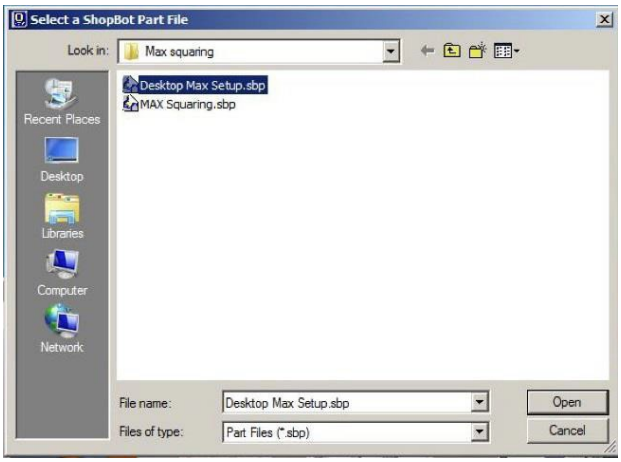
Stand clear of the tool when it is in motion, preferably standing near the computer that is controlling the tool's operation. A ShopBot is a very safe power tool as long as safety procedures are followed.

Go to www.shopbottools.com > ShopBot Docs > Desktop MAX > Files > DT MAX Machine setup Files and download the DT MAX Setup Squaring file. Open the zipped folder containing the setup and squaring .sbp file.

These files will set the MAX proximity switch offsets, then run a squaring program, which will run the gantry along the Y axis until it hits the end. The motors will sound like they are grinding, but in actuality, this is NOT damaging the machine, nor is it causing any shortage of product lifespan.

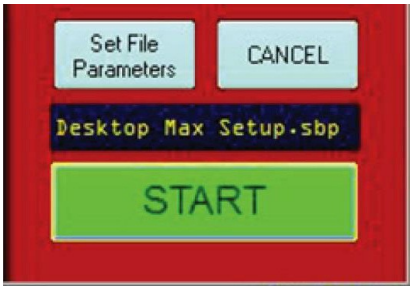
Open zipped folder and copy the two files to a convenient location.

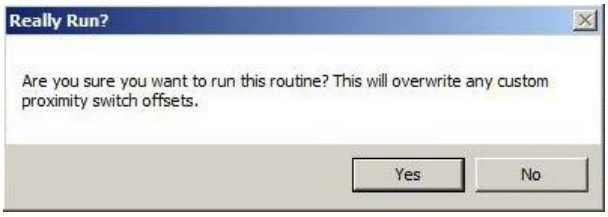
Ensure Desktop MAX is connected to computer and powered on. Start SB3, the press "Cut Part" button.



Locate and open “Desktop MAX Setup.sbp”.

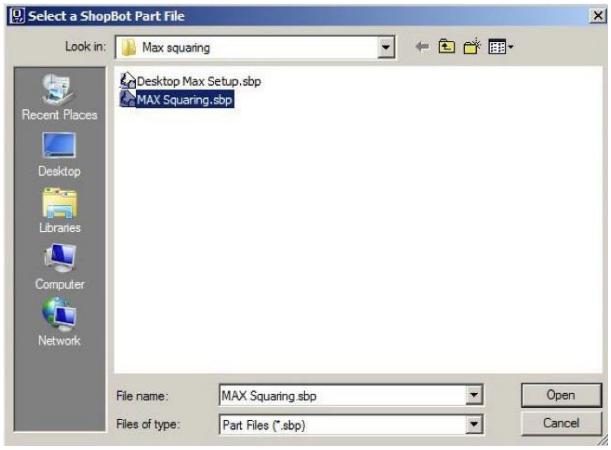
Click START.





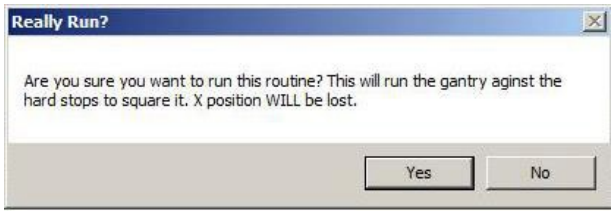
When prompted, click “Yes” to run routine.

Press “Cut Part” again.



Locate and open “MAX Squaring.sbp”.

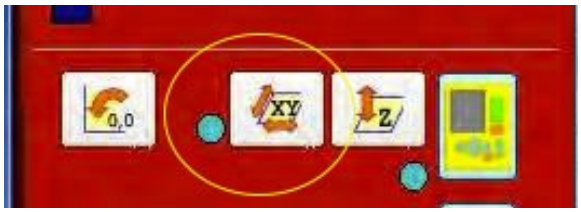
Click START to run the squaring routine.



When prompted, click “Yes” to run routine.

IMPORTANT! This procedure should be performed any time the machine is crashed, after the gantry is moved by hand with the power turned off, or the after the machine is moved, to ensure that the gantry is square. If this process is not performed, the cut program could be noticeably off.

Zero the X- and Y-axes

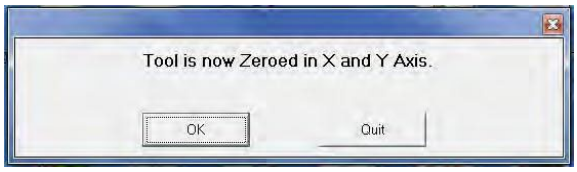


The spindle/router should now be in the left lower (front) corner of the deck. X=0, Y=0 position.

Click the middle white button marked with the X, Y. The machine will now move through an automatic routine that zeroes the X- and Y-axes to the left lower (front) corner of the machine using the proximity switches.

The X and Y locations in the control panel should now read .000 in.

Note: Ensure the setup and squaring process has been run prior to performing this step!

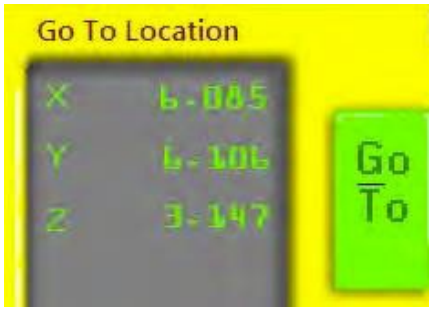


Click OK when this message appears.

The spindle/router should now be in the left lower (front) corner of the deck. X=0, Y=0 position.

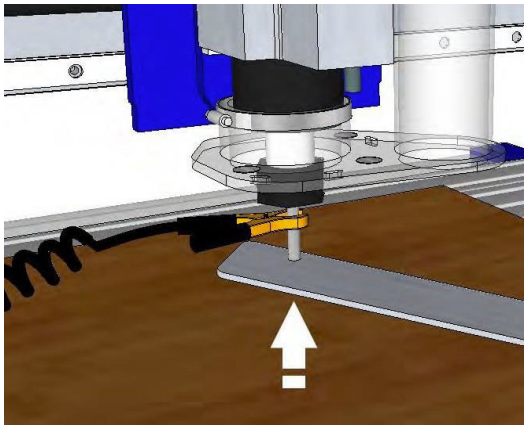
Zero the Z-axis

Zeroing the Z-axis requires a few more steps than zeroing the X- and Y-axes, so it should be practiced a few times to ensure it is properly understood.



Open the yellow KeyPad and enter X=6, Y=6. Close the KeyPad by clicking on the “X” in the upper right corner of the yellow keypad or by pressing the “Esc” key on the keyboard. This puts the spindle in a convenient location for zeroing the Z-axis.

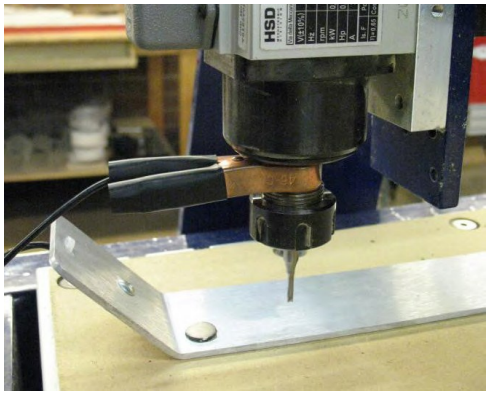
Plug in Z zeroing assembly into front left of machine.



Attach Z zero grounding clip to router bit (or collet) and touch the Z zero plate to the bottom of the bit.

When Z zero plate touches router bit, Input 1 should light up. Input 1 light will go off when Z plate is removed.

It's important to check this each time the grounding clip is connected to verify that the contact is good. If Input 1 doesn't light up, ensure the grounding clip is well connected and try again.

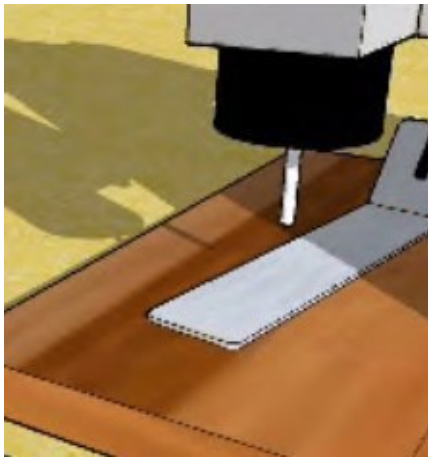


Place Z zero plate on top of spoil board beneath the router bit.

Note: Machine can be Z zeroed to the top of the spoil board or to the top of the project material depending on how it is set up in the design file.

Click the white button marked "Z".

This message will appear to ensure the Z zero plate is under the router bit. Double check the location of the Z zero plate and click OK. An alarm sound will signify that the Z-axis will start moving down in a couple of seconds. Place the Z zero plate under the bit and on top of the deck while the Z zero routine takes place.



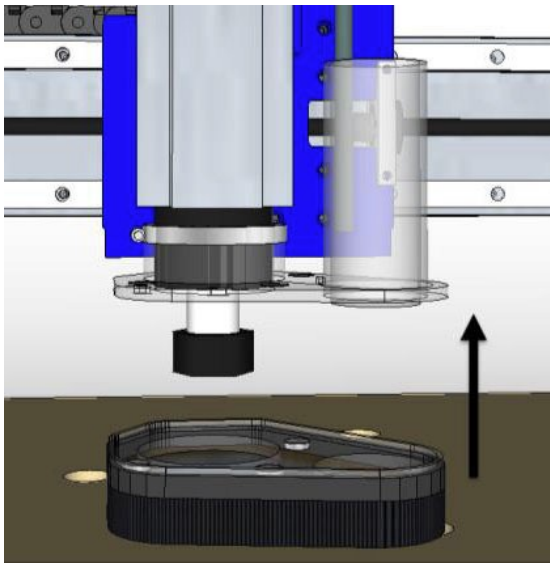
The spindle/router will lower until the bit contacts the Z zero plate. It will then retract and repeat the process again.

Wait for the router bit to contact the Z zero plate twice before removing the Z zero plate or the grounding clip.

After bit makes second contact, bit will retract to a position of 1/2” above the deck. The Z-axis is now zeroed to the top of the MDF deck.

Unplug and remove Z zero plate and clip from machine.

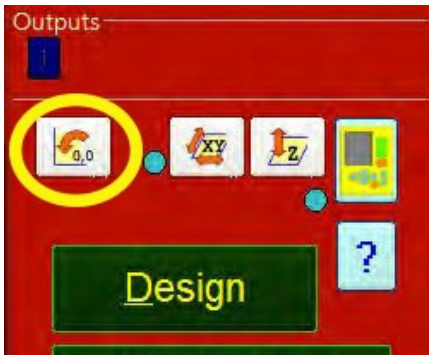
Press “OK” to exit the program.



Re-attach dust foot.

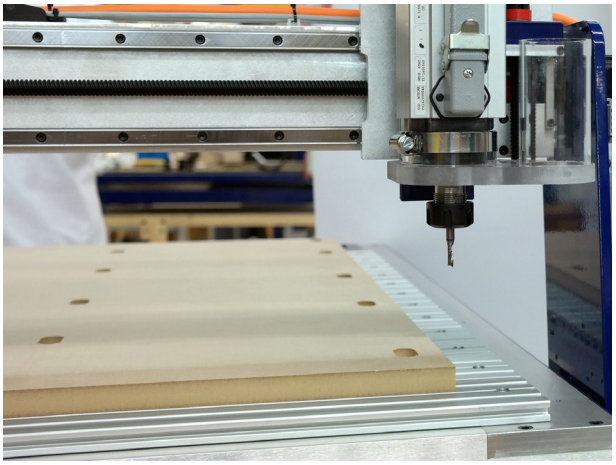
During operation, keep area around machine free from people and objects.

Move to Home Position

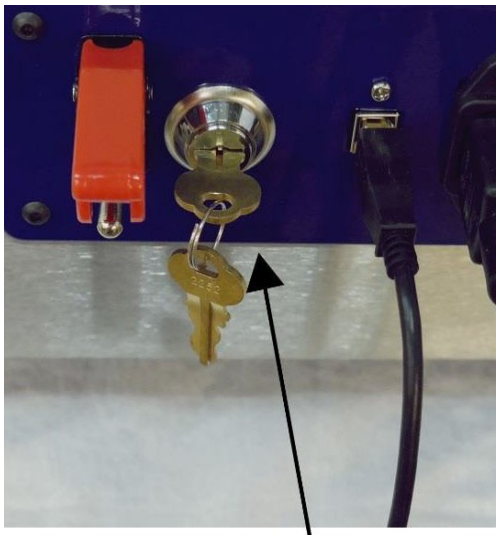


Click the white button marked 0, 0.

This will move the spindle/router to the machine home position in the left lower (front) corner of the machine, which is the default zero position for both the X- and Y-axes.



Warm Up (Spindle Models Only)



Key Switch in ON position

Desktop MAXs equipped with a spindle also have a variable-frequency drive (VFD), which is used to control the RPMs of the spindle.

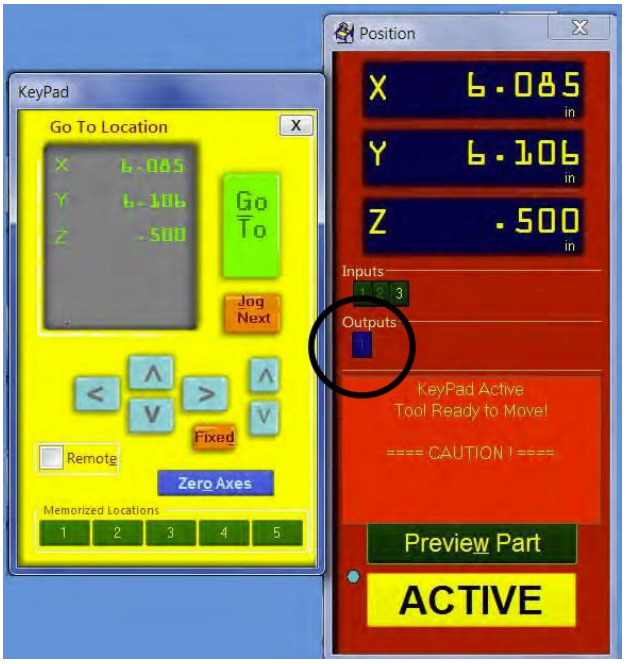
There is a spindle interlock switch that locks out the spindle power for additional safety. (shown engaged with the key in the lock in image to the left)

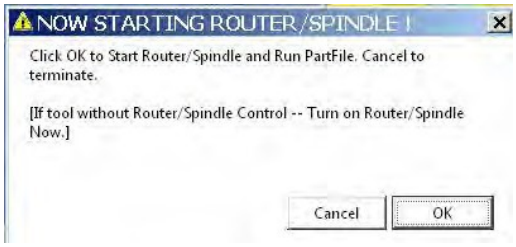
Turn the spindle interlock switch ON by turning key in clockwise motion.

Turn the knob on the VFD so it reads approximately F 100. F 100 equals 6000 RPM or about half of the typical operating speed for cutting wood.

To maximize service life, a spindle requires a warm up cycle to bring the bearings up to operating temperature. Before cutting, run the spindle at 1/2 of the intended cutting RPM for 10 minutes at the beginning of each day and after the spindle has been idle for more than 3 hours.

Open the yellow KeyPad, and click on the Output 1 button in the position window.

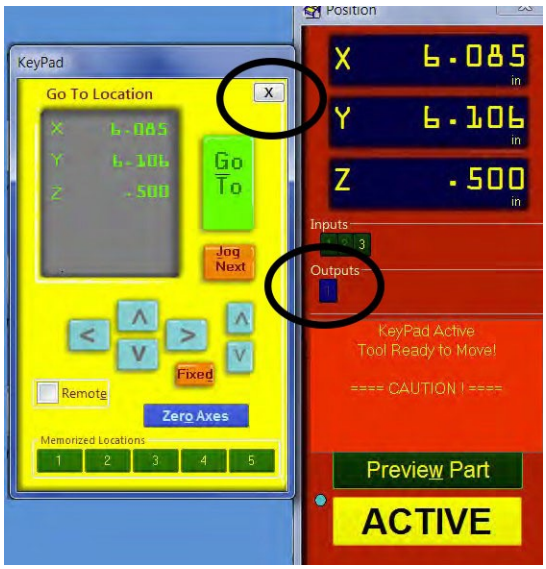




Click “OK” for the spindle to start. Allow it to run for 10 minutes to warm up.

After the spindle has run for 10 minutes, adjust the VFD so it reads approximately F200. The spindle increase in speed as the dial is adjusted.

F200 equals 12,000 RPM and is a common operating speed for carving and cutting wood.



Turn off the spindle by clicking on the output #1 button.

Click on the “X” to close the yellow KeyPad.

Desktop MAX Spindle RPM Settings

The display on the VFD will show the frequency. To find RPM, multiply the listed frequency by the Hertz setting.

Frequency to RPMs for 60Hz (US, Canada, and Mexico. May apply to other countries):

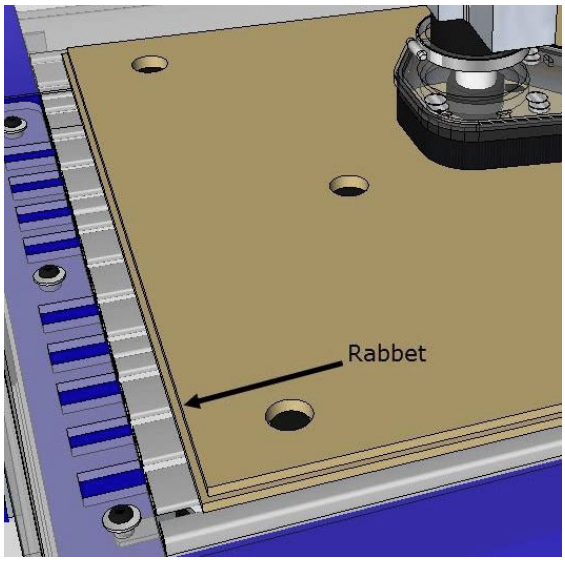
Display	Spindle RPM
300	18,000
266	16,000
233	14,000
200	12,000
166	10,000
133	8,000
100	6,000

Frequency to RPMs for 50Hz (Europe and most other regions):

Display	Spindle RPM
300	15,000
266	13,300
233	11,650
200	10,000
166	8,300
133	6,650
100	5,000

Trim the Deck

Note: Do not proceed with this section until X-, Y-, and Z-axes have been zeroed and the spindle is warmed up!



This step will rout a rabbet around the perimeter of the basic deck to reveal the 24” x 36” cutting area. Ensure the X-, Y-, and Z-axes have been zeroed prior to proceeding.

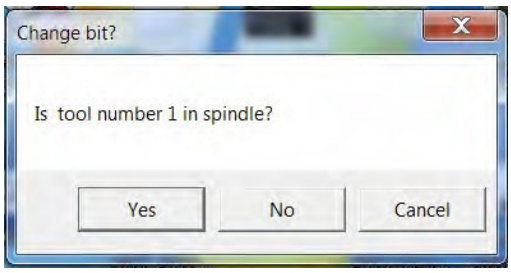
If the ShopBotEASY control is not currently open, double-click the ShopBot 3 shortcut icon.

Click the “Cut Part” button on the position screen.

Go to www.shopbottools.com > ShopBot Docs > Desktop MAX > Files > Desktop MAX Work Area Cut File and download the zipped folder containing the rabbet .sbp file.

The file name will now appear in the display window in the ShopBotEASY-controller.

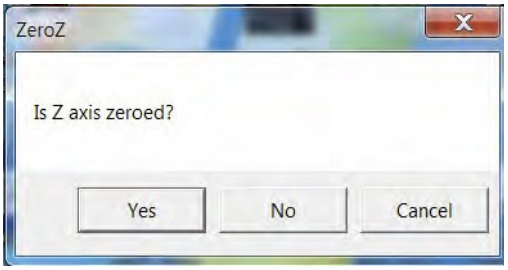
Click the “START” button to run file.

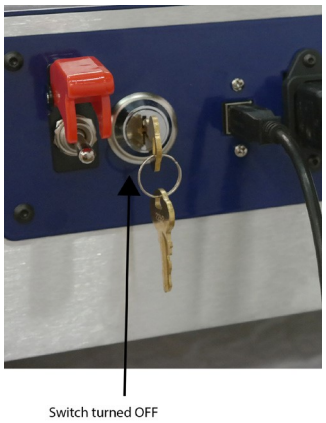


Verify that there is a 1/4” spiral upcut bit installed in the tool and click “Yes.”

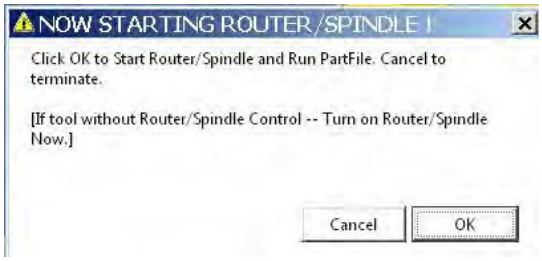
Note that the tool may be a number other than 1.

If Z-axis is zeroed to the top of the spoil board, click “Yes.”





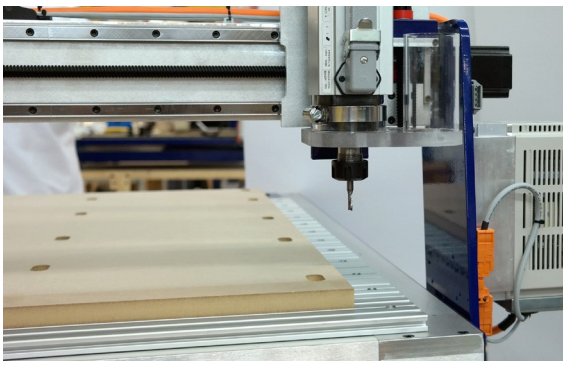
Turn on power to router/spindle. If a router is equipped, its' power switch will need to be engaged and then the interlock switch (shown in image to the left) will need to be turned clockwise.



Click "OK" and the tool will take two passes around the perimeter of the deck creating a rabbet that is approximately 1/8" wide by 3/8" deep.

Things to keep in mind:

The center section of the deck represents the actual useful cutting area of the Desktop MAX, which is 24" x 36".



The left front (lower) corner of this center section represents the home position for the X- and Y-axes.

By default, the router returns to this position after it completes the cutting program.

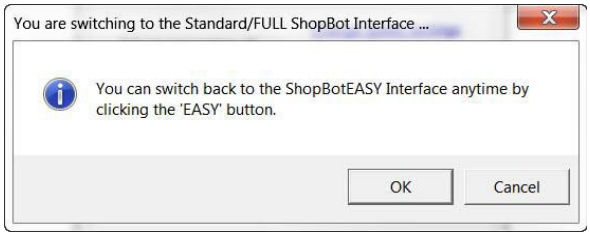
This home position aligns with the center of the bit when the router is positioned above it.

Most X, Y measurements for designing and routing are based off this location.

Switch to ShopBot FULL

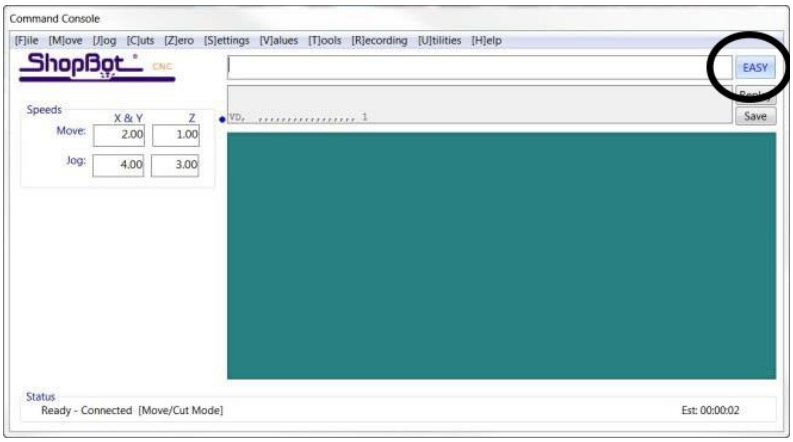
ShopBotEASY has limited functionality; in order to use all of the tools, switch to ShopBot FULL. To do this from the ShopBotEASY position window, click on the help (?) button.

At the bottom of the window, click on the “Switch to FULL” button.



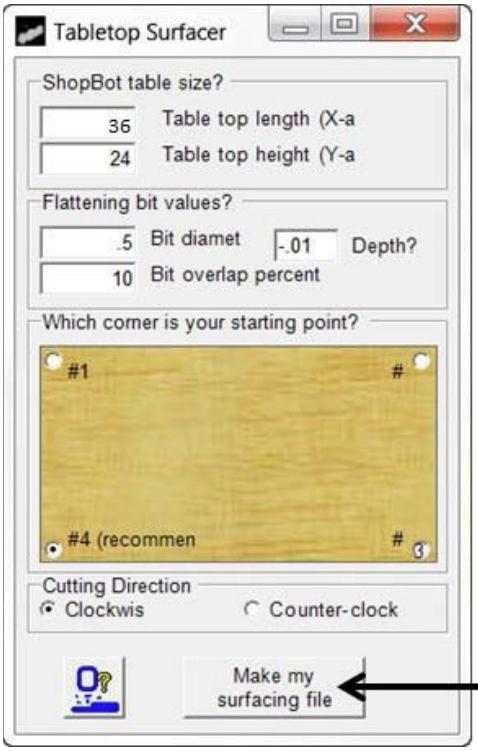
Click “OK” to continue to the FULL interface.

When the command console pops up, notice the “EASY” button that can be used to switch back to ShopBotEASY when necessary.



Surfacing the Deck

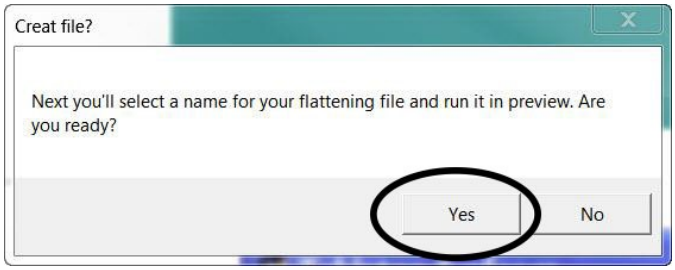
The basic deck is made out of MDF. It makes a good sacrificial deck, but the thickness can vary due to the manufacture of the material and changes in humidity. For most cutting this doesn’t matter, but for critical depth cutting/pocket cutting or v-carving, the MDF should be surfaced first. Use the “Table Surfacer” routine under “Tools” in the FULL ShopBot control. It can also be accessed by typing “TU”.

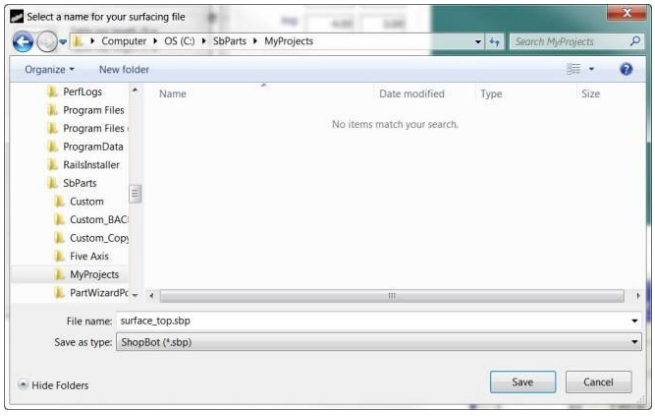


Choose a straight bit that's 1/2" or greater in diameter. Then zero the bit to the top of the MDF. A lot of sawdust will be generated. Make sure the dust collector is hooked up and running before cutting.

The default table size numbers are for a 96" X 48" table. Change these values to 36" x 24", set the depth to -.01", and change the bit diameter to the size of the bit chosen (1/2" in this example). Click the "Make my surfacing file" button.

Click "Yes" to proceed to the save window.



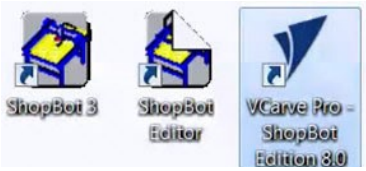


Save the file with a name that is easy to remember, in a location that will be easy to find. Include the tool in the name for convenience later.

Click "Save". A preview file will appear. Open and run the cut file. If an area of the deck is left un-surfaced, re-zero to the area that was missed and rerun the surfacing program. Repeat this program any time the deck gets worn from use. When the MDF deck gets thin and close to the bolts holding the deck to the machine, simply glue on a new piece of MDF – there's no need to remove the thin part that's still attached.

Beyond the Basics

Vcarve Pro

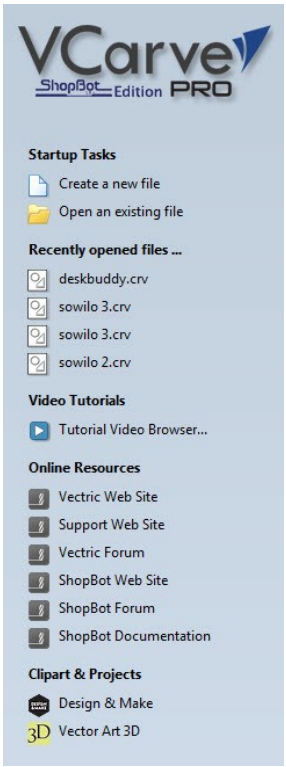


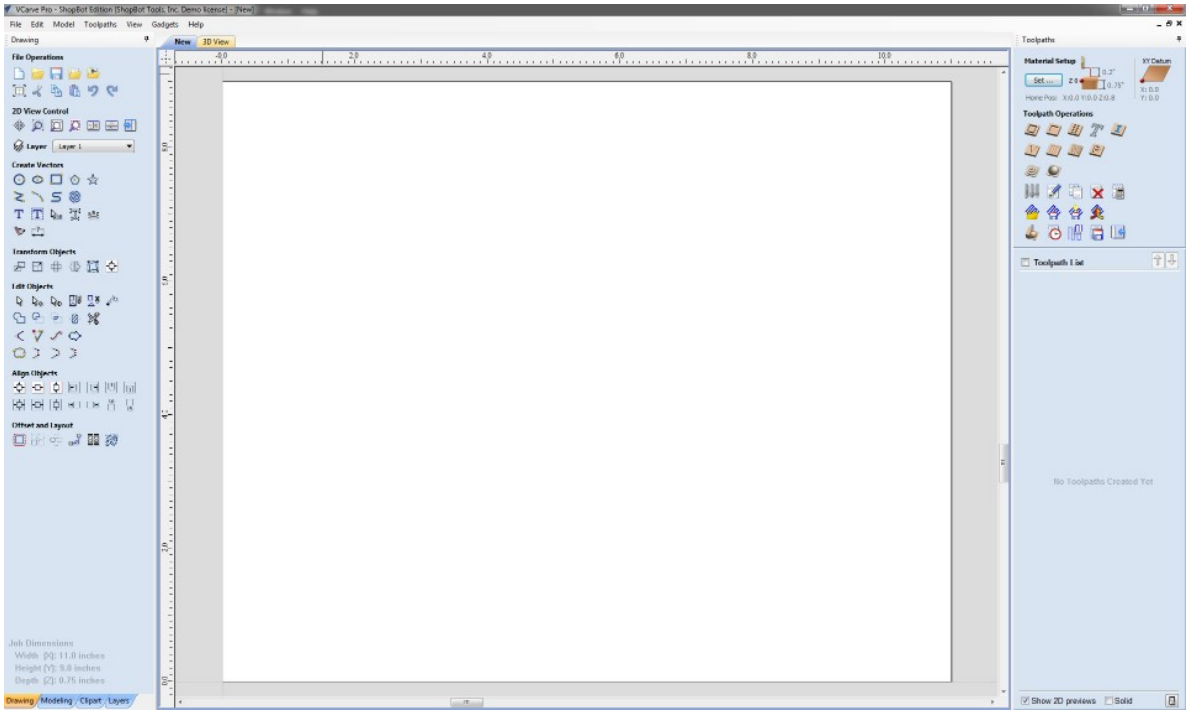
VCarve Pro is the design/tool-pathing program that is included with the ShopBot and is used to create the part files for cutting. This program can be installed on two separate computers, such as the main ShopBot computer and a separate design computer.

When VCarve Pro is installed, it can be started through the Shortcut icon shown above or through the start menu.

When first using VCarve Pro, it will be necessary to enter the I.D. number attached to the cover of the print version of this guide sent with the machine.

Tutorials will be copied to the computer as part of the installation process. They are located at Tutorial Video Browser.





The graphic above is a basic overview of the program interface. There are many resources available about how to use this program. Some examples are tutorials, training at ShopBot, online training through ShopBot, help files provided in the program, and online support. Be sure to take advantage of these resources, many of them are listed on the next page.

Maintenance

The ShopBot Desktop MAX doesn't require a lot of maintenance. The table below covers general maintenance.

Item/Duration	Maintenance
Motor Screws	Wipe screws with a clean dry cloth. **DO NOT USE** any kind of lube or solvent-based cleaner on the Teflon coated screws. Doing so could cause the Teflon to flake off.
Rails	Wipe them with a clean, dry rag, Apply a light coat of a machine oil. Wipe off excess oil as too much will attract dust.
After every 40 hours of use	Check for loose screws and parts.
On an as needed basis	Remove the clear plastic enclosure from the back of the machine and gently blow out any dust that has accumulated in the control area. **This is especially true** if cutting aluminum.
On an as needed basis (approx. every six months)	Wipe clean collets, collet nuts and collet end of arbor. Apply a light coat of machine oil with an oil dampened rag (not soaked or dripping) to keep from rust.
NOTE: Damage or wear due to misuse or an accident will require additional attention depending on the problem.	

Transportation

The Desktop MAX doesn't require any special considerations when moving or transporting the tool. Again, the tool can weigh 175-190 lbs. Ensure at least one additional person helps to carry or move the tool.

DO NOT quickly or forcefully move the gantry, as a charge can build in the motors and discharge through the control board. If possible, secure the gantry during transport.

After transporting, ensure to perform the Tool Movement and Axis Zeroing procedures described earlier in this document.

Resources

ShopBot Tutorials & Videos

www.shopbottools.com/mSupport/tutorials.htm

ShopBot Training Classes

www.shopbottools.com/mSupport/training.htm

Information on a variety of different CAD/CAM software packages for design

www.shopbottools.com/mProducts/software.htm

Tooling, materials, and more

www.shopbottools.com/mSupport/resourcelist.htm

ShopBot Forum

http://www.talkshopbot.com/forum/forum.php?

Technical support

http://www.shopbottools.com/support.htm