Desktop MAX Automatic Tool Changer (ATC) V2 User Manual

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Desktop Tools 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 the General Power Tool Safety Warnings document 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.

Getting Started
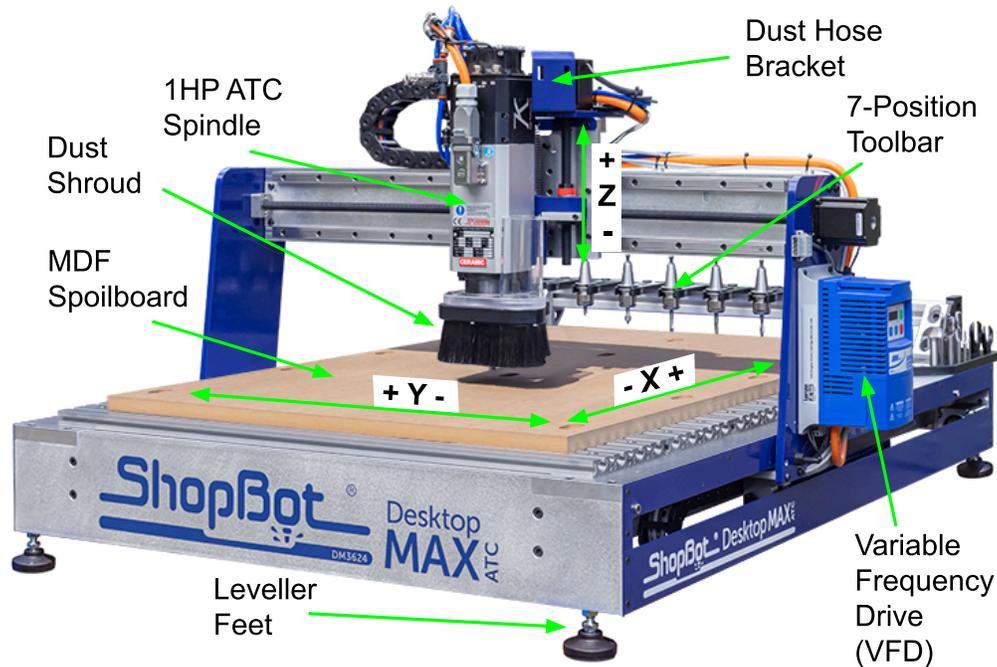
Desktop MAX ATC with T-Slot Aluminum Deck option

What's in the Crate?

The ShopBot Automatic Tool Changer (ATC) automates the bit changing process during projects that require multiple tool changes. The ATC reduces the time a project must remain on the machine by automatically changing bits between cuts, thus eliminating the need to change and calibrate tools by hand.

The ATC system includes:

- 1HP Teknomotor spindle
- Variable Frequency Drive (VFD) spindle controller
- Filter/regulator for pneumatics
- Seven-position tool bar
- Removable dust skirt
- ATC interface circuit board (inside machine)
- Machine and Accessory documentation
- USB drive loaded with SB3 control software

The 1HP Teknomotor spindle assembly is fan-cooled. The ATC requires 4 scfm at 90 psi of clean, dry, un-oiled compressed air.

It is not recommended to leave a tool holder in the ATC spindle when not using the machine. When you are done using the machine all tool holders should be removed and stored in the tool rack at the rear of the tool.

What's in the Crate (cont.)
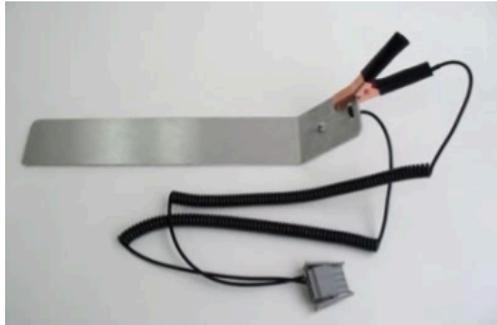
Z Zero Plate

Power Cord

USB Cable

Pendant

Collet Wrenches

Tool Holders

Collets

Uncrating

Your Desktop MAX ATC has arrived on a wooden pallet wrapped in a heavy cardboard crate. To open the crate, cut the steel banding and remove any accessory boxes from the top of the crate then lift the lid off of the top of the crate.

Inside, you will find a cardboard frame resting on top of your machine. On top of this frame will be some additional accessory boxes as well as the box containing this document. Remove these additional boxes and lift the cardboard frame off of the machine. Next, remove the sides of the crate – there may be some screws driven through the cardboard at the base of the crate, securing it to the wooden pallet below; remove these screws to allow the crate sides to be removed from the pallet. With the crate sides removed, it will be easier to lift the machine off of the foam supports between it and the wooden pallet.

CAUTION! The Desktop MAX ATC can weigh up to 180lbs depending on which options have been selected for the machine, please use at least two people to lift the machine off of the pallet to transfer it to your work area.

Once the tool is in place on your work bench, adjust the leveler feet so that the machine is level and does not rock. The feet can be raised and lowered by using a 5/8" wrench to rotate the hex collar just above the black plastic foot. Once the machine is confirmed level and stable, lock the position of the feet by using a 9/16" wrench to tighten the lock nut on the threaded stud.

Connecting the Dust Hose

The dust hose included with your machine should first be connected to the upper portion of your dust shroud assembly. Slide one end of the hose over the clear acrylic tube next to your spindle. Run the tube up to the blue dust hose bracket and secure it to the bracket with the included hose clamp by passing the clamp through the two slots in the bracket and tightening it around the dust hose. The other end of your dust hose can now be attached to your dust collection vacuum.

Connecting the Pneumatics

Locate the filter/regulator included with your tool. Inside the bag will be a mounting bracket and two M5x12mm Button Head Screws. First, attach the mounting bracket to the rear of the tool on the corner opposite the red power switch. Remove the plastic nut from the regulator and drop the regulator into the bracket and thread the nut onto the regulator to lock it in place. Pull the blue main pneumatics hose from under the tool and insert it into the orange quick-connect fitting. Plug your shop's air-line into the fitting on the left side of the filter.
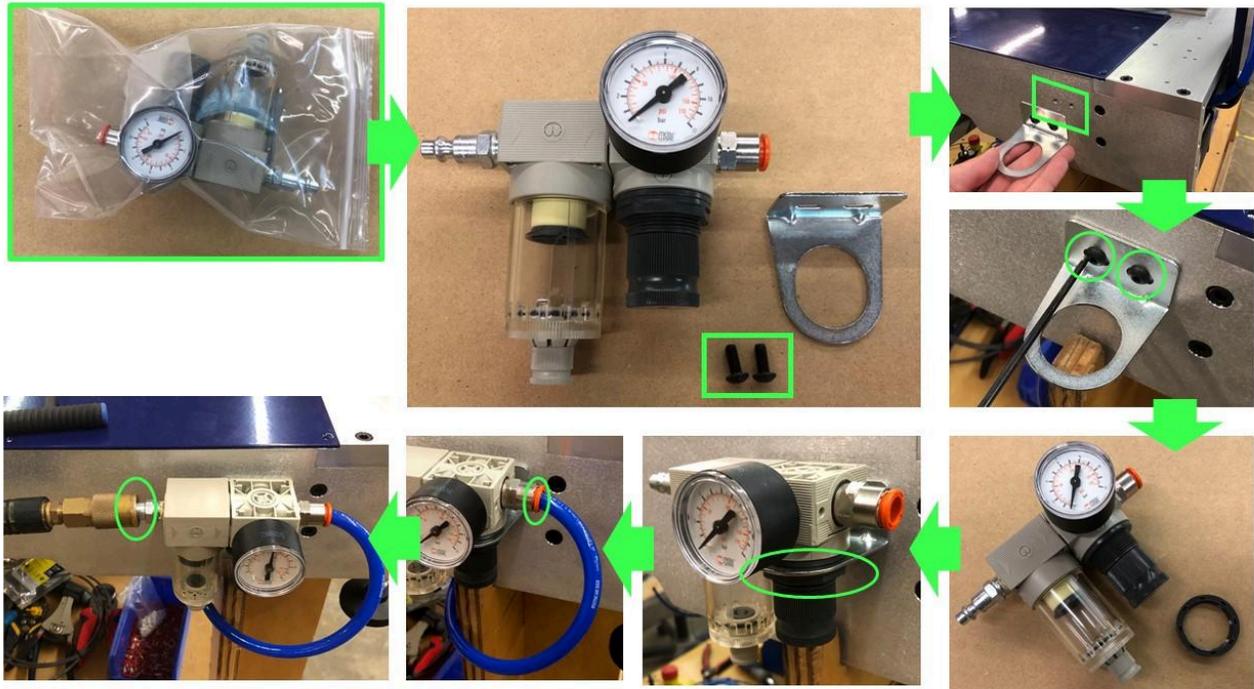
Software and Computer Configuration

Introduction

The PC running ShopBot 3 will require special setup to prevent normal Windows and background processes from interfering with tool communication and operation. All new PCs will require these changes to their out-of-the-box state in order to optimize performance.

It is highly recommended that you exclusively run the ShopBot software from a dedicated PC. If the PC running your tool is managed by an IT department or other group, we also advise a clean install of Windows **without** any management software or settings. This will ensure that the computer is at minimal usage.

Refer to the previous page for links to videos on how to configure your computer with Windows.

ShopBot tools are shipped with three software programs that can program, edit, and run part files. This section covers the configuration of your Windows computer, installation of all software and provides a basic overview of the ShopBot control software. Additional information and training can be found in the control software "Help" menu as well as ShopBottools.com and Vectric.com.

The following software will be installed during this section:

ShopBot 3: Control software used to operate the ShopBot tool and run part files.

ShopBot Editor: Enhanced text editing software used to view and edit ShopBot part files.

VCarve Pro – ShopBot Edition: CAD/CAM software used to create and edit designs, and assign tool paths to create part files.

Computer Recommendations

A PC running Windows XP to the current version of Windows is required. The equivalent of a dual core or higher processor, and a minimum of 4GB RAM (8GB preferred) is recommended.

A graphics display of 1024 x 768 will provide a good display, although a higher resolution may be preferable.

Computer Configuration

Important: Some programs and features will interrupt the proper installation of ShopBot 3 control software. To ensure trouble free installation and operation, ShopBot recommends performing the following actions before installation.

_____ 1. Install the software using an administrative account.

_____ 2. Set User Account Control (UAC, not applicable to Windows XP) to "Never Notify."

_____ 3. Set power options

_____ 4. Windows update settings/Disable network connection.

_____ 5. Disable background tasks.

_____ 6. Make sure the USB cable from the ShopBot is not plugged in.

Before continuing, open the Windows Task Manager and click on the "Performance" tab. Below is an example of a good setup. There are no processes greatly affecting CPU usage and 4GB RAM is available.
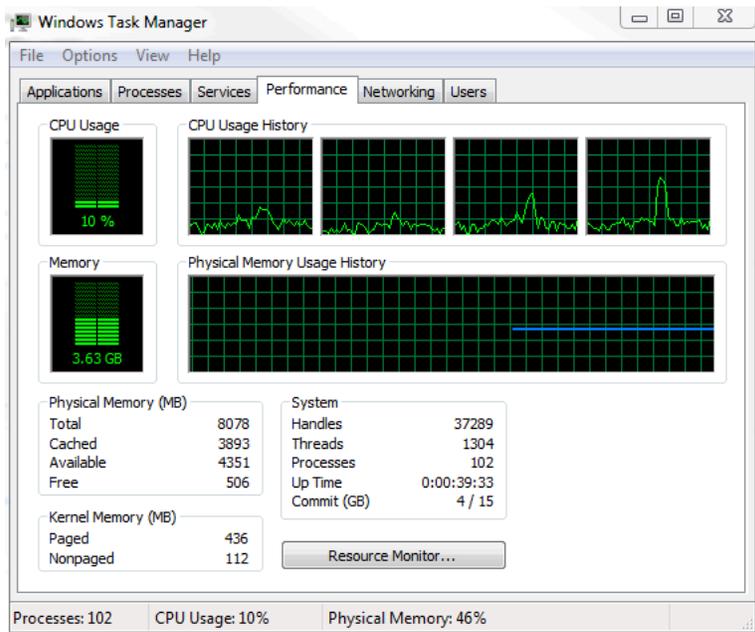
1. Install the software using an administrative account

When it comes time to install SB3 and VCarve Pro (later steps) make sure you are using an administrative account.

2. Set User Account Control (UAC, not applicable to Windows XP) to "Never Notify."

The first process to change is User Account Control. This can be found by performing a search from the Start Menu in Windows 7 & 10, or by swiping in from the right edge of the screen and selecting the "Search" icon in Windows 8. Then, type "User Account Control" or "UAC" into the search box and press Enter. This will bring up the User Account Control Settings window, containing a slider. You should ensure that this is set to "Never Notify", as it will prevent popups from interrupting software.
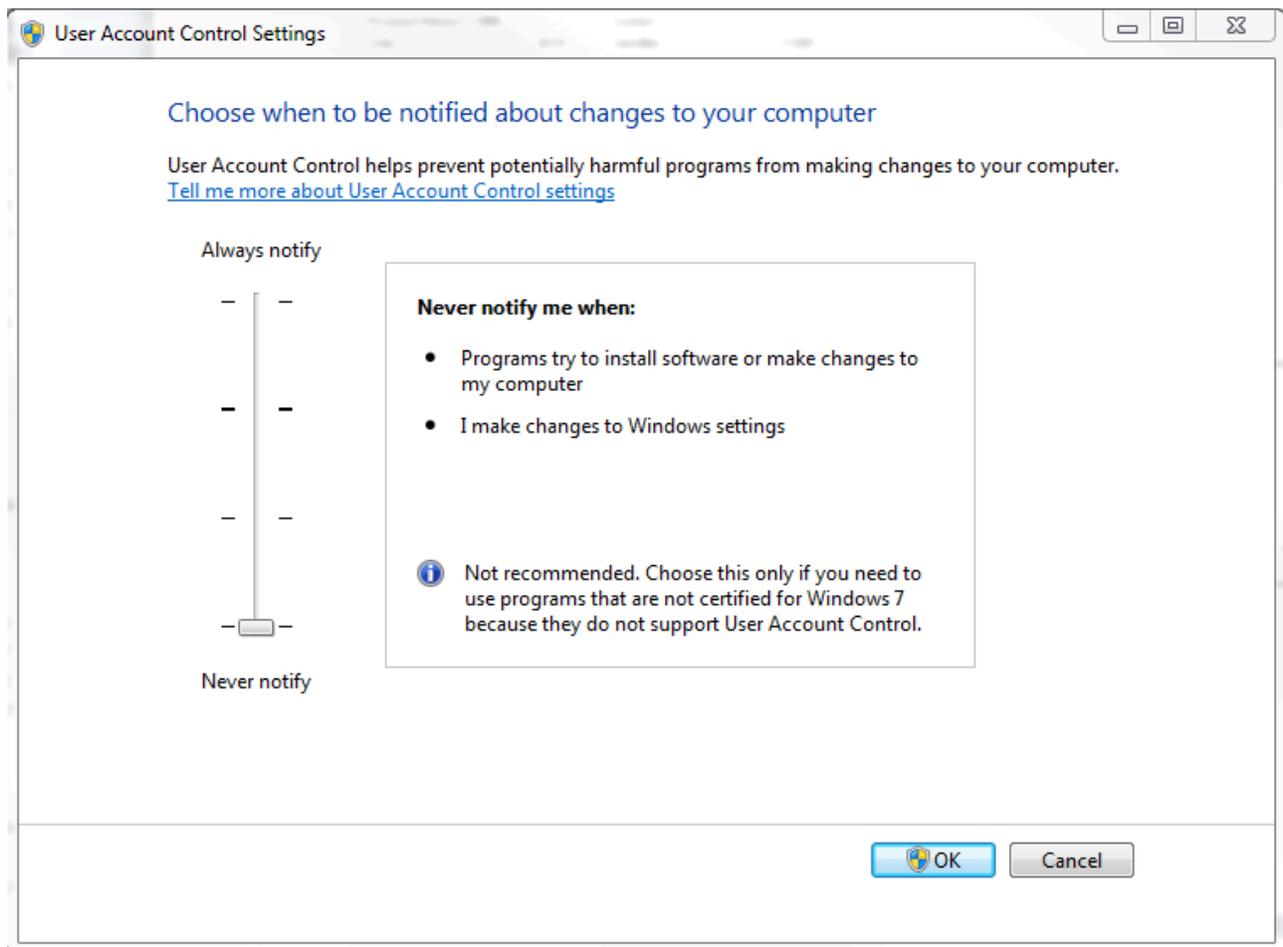

This is what the UAC settings window should look like. Note the slider is set to "Never Notify".

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3. Set power options

Next, you will want to change the Power Options. To begin, open the Start Menu (for Windows 7 & 10, click "Start"; for Windows 8, swipe from the right). Type "Power Options" in the search box and press Enter. This will bring up a menu in which you are asked to "Select a power plan"(see image below, left side).
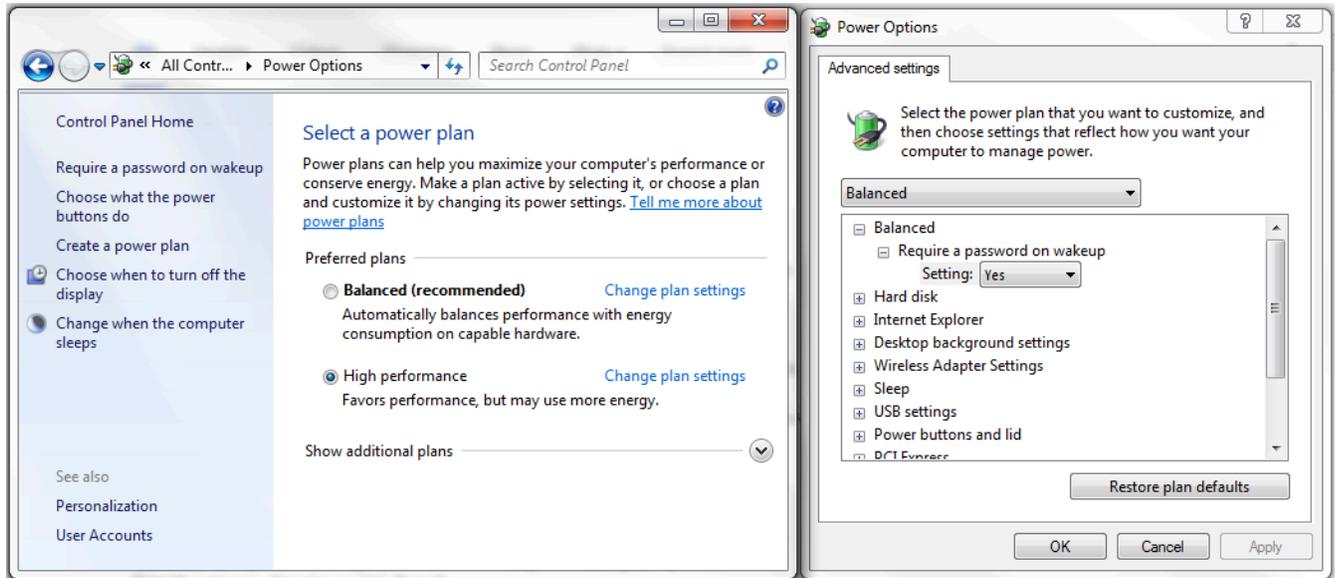
Under "preferred plans", you will see multiple options. Click "Change plan settings" to the right of one of these options to bring up the Power Options menu (see image above, right side). Expand the "Sleep" option by clicking the plus sign to its left, and set the values to the following:

Sleep after: **Never**

Hibernate after: **Never**

Allow hybrid sleep: **Off**

Next, expand the "USB Settings" option and set the values to the following:

USB selective suspend: **Disabled**

Click the "OK" button to save these settings.

4. Windows update settings/Disable network connection.

To disable Windows Updates, open the Start Menu* (for Windows 7, click "Start"; for Windows 8, swipe from the right). Type "Windows Update" in the search box and press Enter. This will bring up the Windows Update settings. In the left-hand pane, select "Change settings". Under "Important updates", select "Never check for updates (not recommended)" and click "OK".
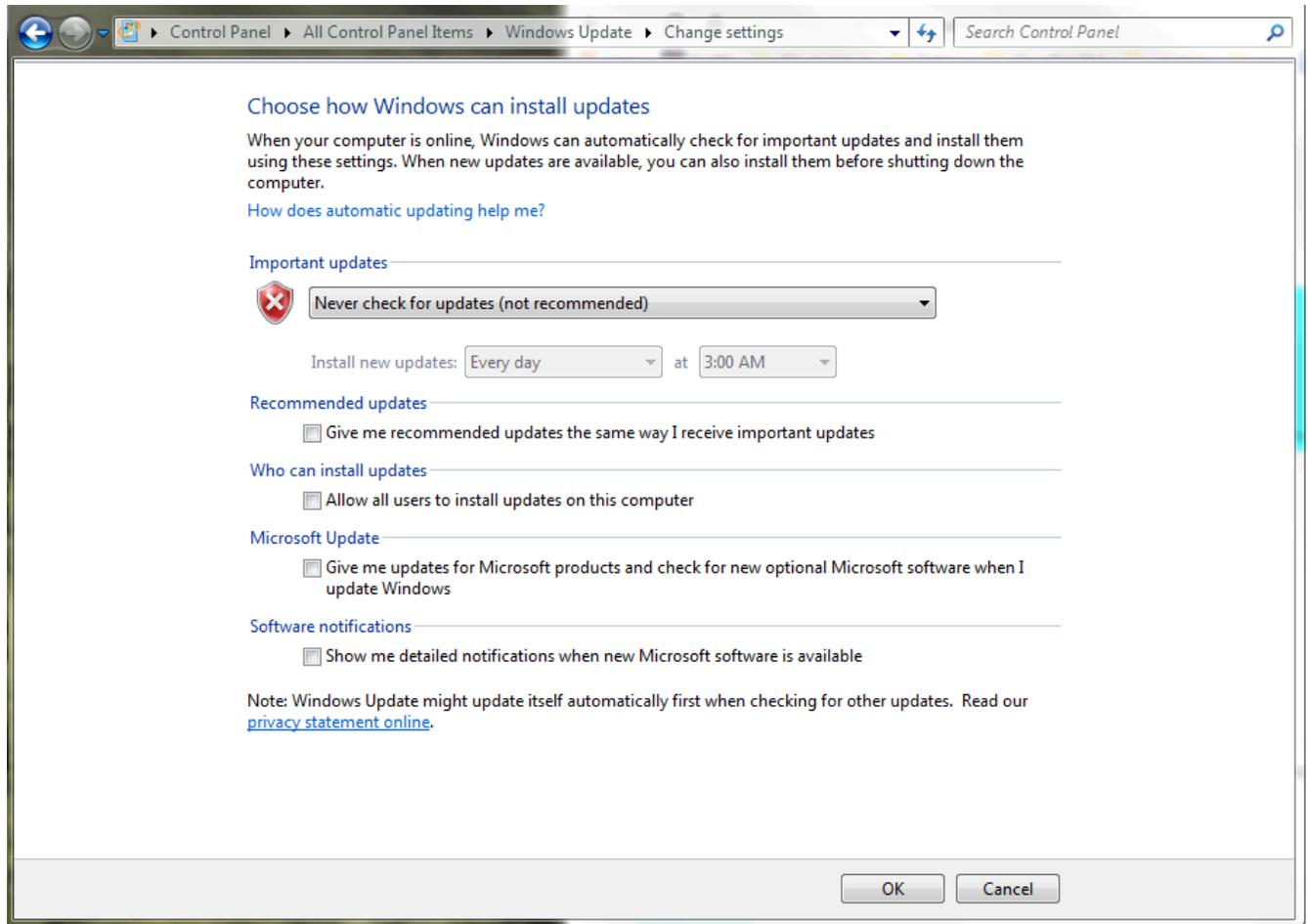
Set Windows Updates settings to "Never check for updates". This will disable automatic checks and allow you to manually update at your convenience.

*NOTE: Windows 10 does not have this same functionality. To disable updates, you can place the machine into Airplane Mode or disable the computer's Wireless Adapter.

5. Disable background tasks.

Next, you should disable any conflicting background tasks. To access the Task Manager, press "Ctrl+Alt+Delete" and select "Task Manager".
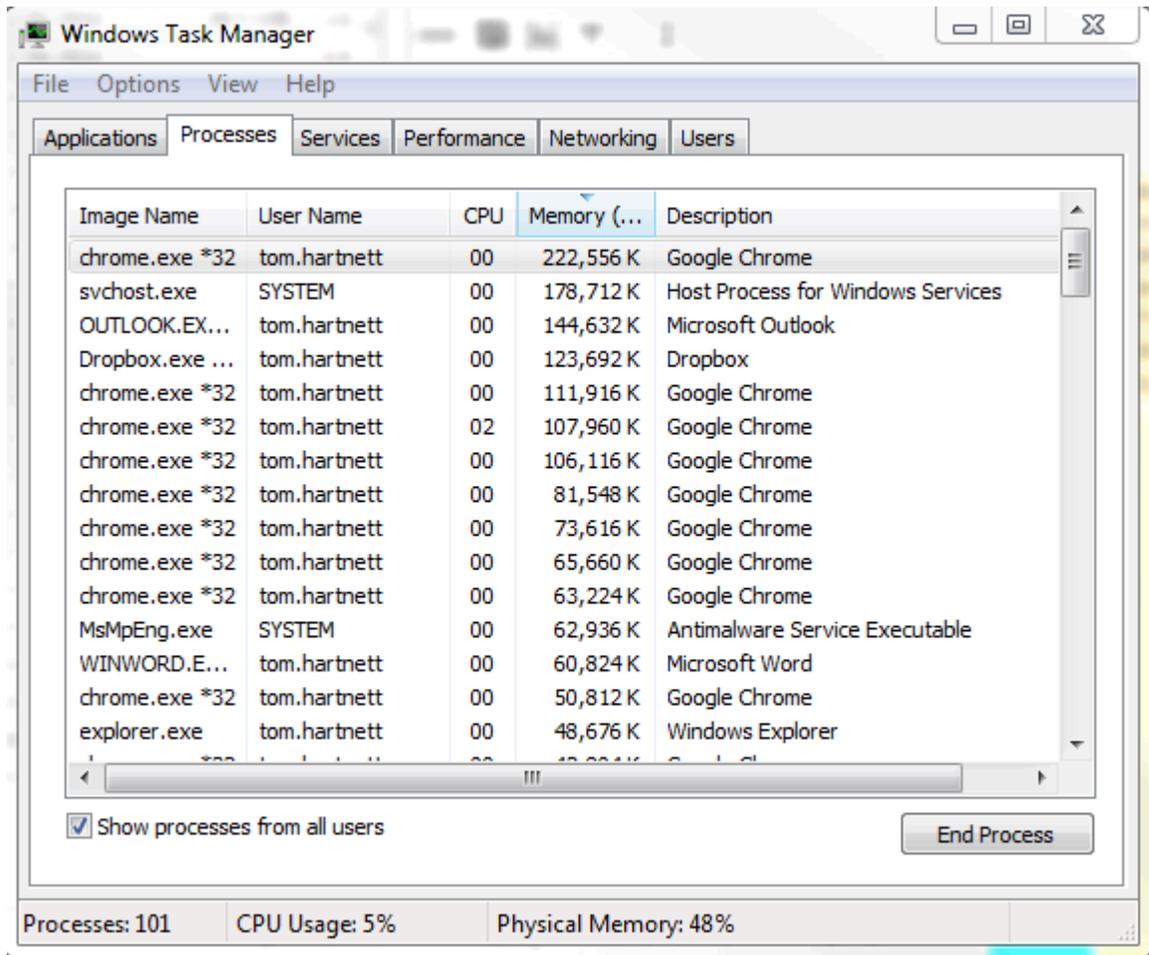
With the Task Manager open, click on the "Processes" tab, which will bring up a list. Click on the "Memory" column header to organize the list by physical memory used. Make a list of any programs that are utilizing excess memory and are unnecessary to the function of ShopBot 3. Then, sort the list by "CPU" column and do the same.

Next, we will uninstall unnecessary programs. To access the Uninstall window, search from your Start menu, type in "Uninstall", and press Enter. Then select "Programs and Features" (you can also navigate directly to **Control Panel > Programs and Features > Uninstall or change a program**) and sort the results by name or date installed.
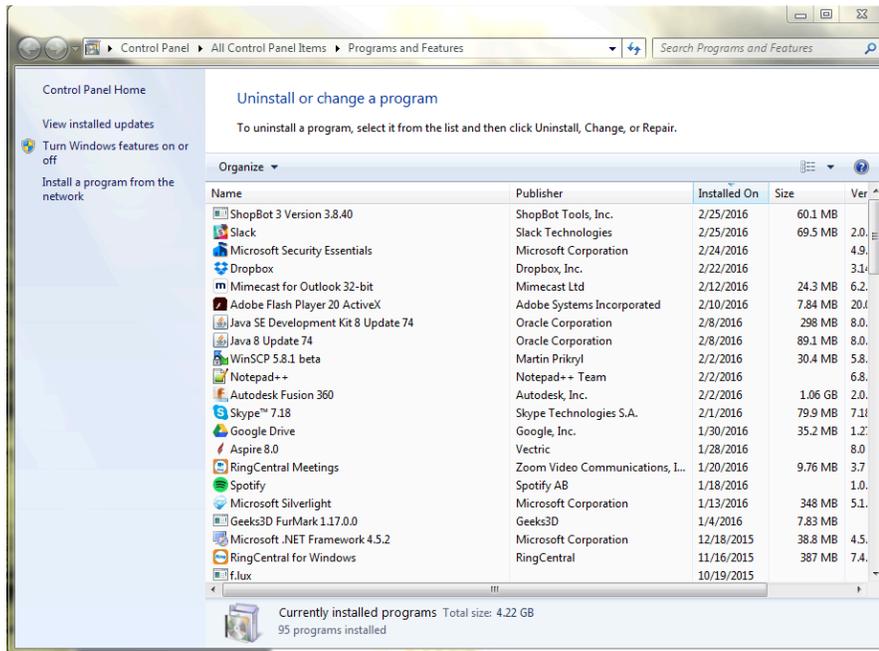
Using the list created in the previous step, address any programs that are not essential to ShopBot 3 operation. Most specifically, you will want to remove or disable any programs that perform scans or update automatically in the background.

Be sure to uninstall any third party antivirus, firewalls, anti-spyware, iTunes, file sharing, and game services. If an antivirus software is needed, Windows Security Essentials (comes with Windows 7 & 8) or Windows Defender (Windows 10) should not affect the communication of the tool.

6. Make sure the USB cable from the ShopBot is not plugged in.

Having the USB cable plugged into the tool while installing the SB3 software can cause issues with the installation, so keep the cable unplugged until all installation is done.

Conclusion

Following the preceding steps are meant for those running a ShopBot on a computer for the first time. Note that the procedure for disabling tasks and programs can vary depending on the version of Windows and software being run. It is recommended that you consult with your operating system guide, software documentation, or systems administrator before making any major changes to software. If you are unable to find a specific setting or process mentioned anywhere in this guide, a search on the TalkShopBot forums or Google can generally give the results you need.

Installing ShopBot 3 Control Software and VCarve Pro Software

Note: Make sure USB cable from the control box and VFD are **not** plugged into the computer.

ShopBot 3 Control Software: The SB3 Control Software is located on the blue thumb drive, which should be hooked to one of the rings in your ShopBot Handbook.
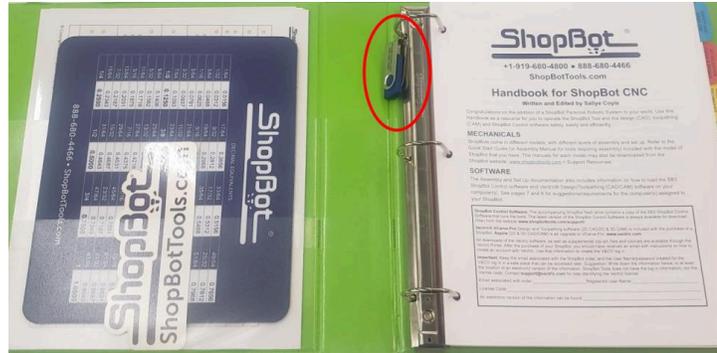
Open the drive, and then open the "ShopBot CONTROL Software" folder. Right click the Setup file and click "Run as administrator", then follow the instructions.

Note: Once the SB3 software is installed, you will need to right click the SB3 icon and choose "Run as administrator" the first time you run it to complete the installation.
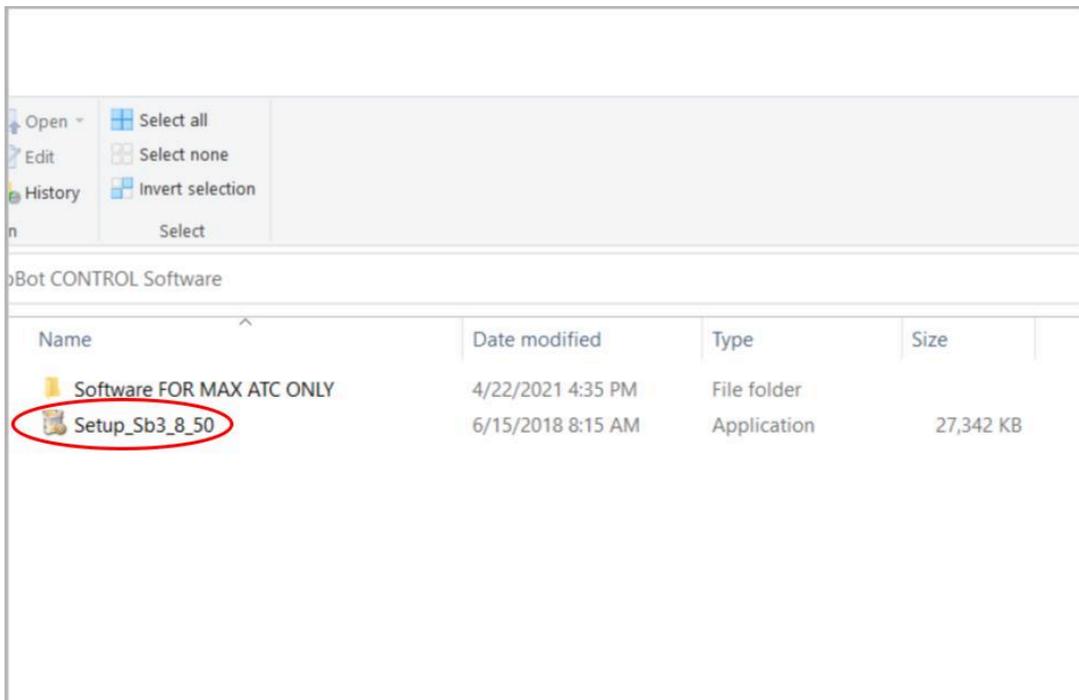
VCarve Pro Software: ShopBot customers are now able to register their Vectric software license directly and receive a V&Co. portal account.

Note: Any ShopBot customer wishing to later **update** or **upgrade** their software must do so via their Vectric customer portal (not through ShopBot).

You should have received an email after purchasing the ShopBot tool with the link to the Vectric portal and your registered username and license number.The software should be registered by the individual who will control the license and will be tied to that single contact person and the email address used to register. Any change in contact or registered email address can only be done by emailing support@vectric.com.

Note: Reach out to ShopBot if you did not receive an email with your Login info

After registering your license, you can log into your Vectric V&Co. portal again by:

1. Go to the URL: https://portal.vectric.com/

2. Enter the email address you used to register the software and the password you picked

How can I download my software, clipart and license details?

Your V&Co. account will always hold your license information, and the latest version of software (including patch upgrades) you are entitled to, so you don't have to worry about losing your details or re-installing your software if you get a new computer, but you will need to use the credentials including the email address you used to register.

1. Log into your V&Co. portal account (see above)
2. Scroll down to the section **'your latest software, clipart and licenses and click 'view downloads'**
3. Click **'view license and download'** for the required product
4. From the 'downloads' section click **'download'** for the item you wish to download and install


Software Overview

All programs included with the ShopBot are now installed. The icons below represent how they will appear on the computer desktop.

Machine Setup

Plug in Pendant and Connect Power

Power Switch
Accessory Motor Port
Main Power Connection

Pendant Connection
Toolbar Connection
USB Connection
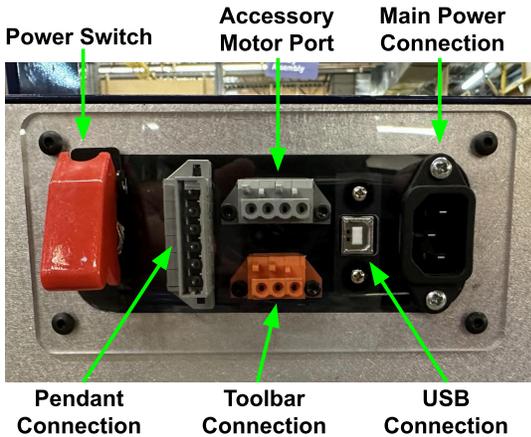
Plug the pendant into the connector on the tool located on the right side of the machine.

The pendant has three functions:

1) A keyed interlock switch to cut power to the router or spindle. The machine can still be moved with the interlock turned off, but the cutting head will not be able to spin.

2) A start/stop button. For non-emergencies, simply hit the spacebar on the computer keyboard or the start/stop button on the pendant. This will pause the tool while maintaining XYZ coordinates, allowing the cut file to resume without starting over.

3) An emergency stop switch. Pressing the emergency stop is the same as turning off the main power switch. The tool will immediately stop moving and the cutter will turn off. Machine position WILL be lost during an emergency stop. To release the emergency stop on the pendant, turn the red button clockwise until it releases and pops up.

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

Also note that if the pendant is not plugged into the machine, the machine will not power on. If the pendant comes unplugged, the emergency stop will automatically trigger and the machine will shut down.
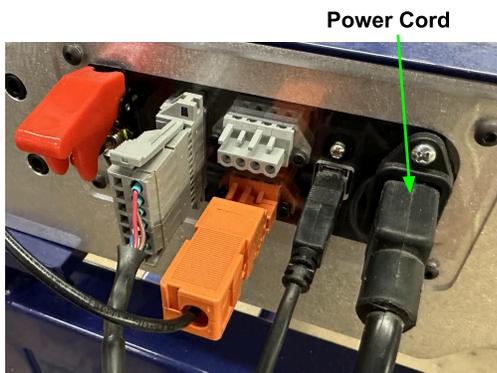
Power Cord

Install power cord into the back of the tool.

Plug the power cord into a standard 110 volt 15 amp receptacle. (International tools 220v)

Note: Do not use a ground fault circuit interrupter. (GFCI)
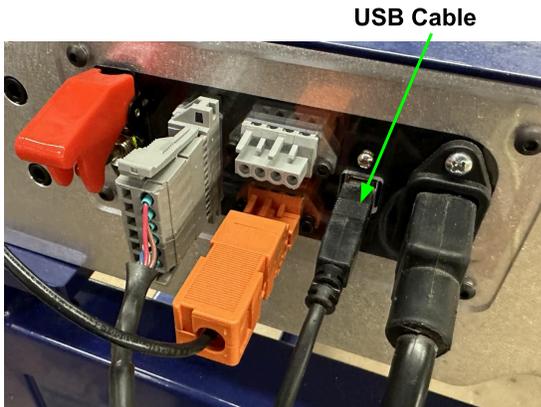
USB Cable

Install USB Cable into the back side of the machine.

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

Note: Ensure the port is a USB 2.0 port. It is best to use the same USB port every time the ShopBot is attached to the computer.

Launch Software
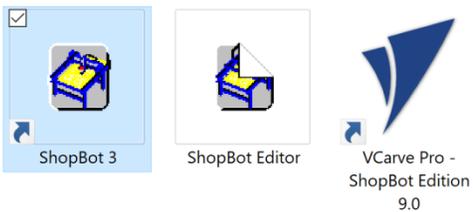
Right-click the ShopBot 3 icon and select Run as Administrator to open the machine's control program for the first time.

ATC Software Setup

This portion of the installation covers the software setup and tool calibration.

Starting the Software

If this is the first time that the ShopBot Control Software has been installed on your PC, you will be prompted to select a machine type when you first boot up the software. Select the file name that correctly describes the machine (under the "PRS ShopBots" folder, then ShopBot_PRSDesktopMAX3624.sbd) Follow prompts clicking Ok to reset default settings.

If you accidentally select the wrong tool type or need to change your tool type at some point, open the "Utilities" pull-down menu and select "Reset default Settings".
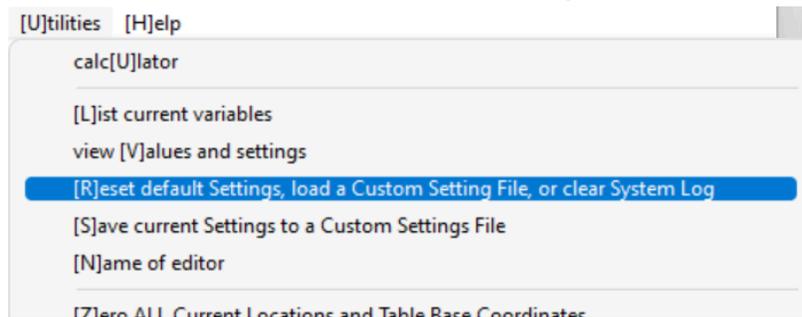

Square the Machine

This procedure will square the gantry of the machine by crashing it against the hard stops. Because the gantry is driven by one motor on each side, it is possible for the motors to come out of sync. This can happen if the machine is moved with the power off (like during shipping), or if the machine were to hit something unintended and lose position.

The squaring part of the procedure will produce a loud "grinding" sound, as the stepper motors are stalling out. This does not, however, harm the motors in any way. In the SB3 software, click the "Cut Part" button at the bottom of the window. A file browser window will now pop up. Navigate to C:\SBParts\ This folder can found by going to the "Computer" file location, then open the "C:" drive or main disc found under "Devices and Drives," there the SBParts folder should be found. Locate and Open "bb_Desktop MAX Squaring" file in the SBParts folder. Then click START to run the squaring routine.
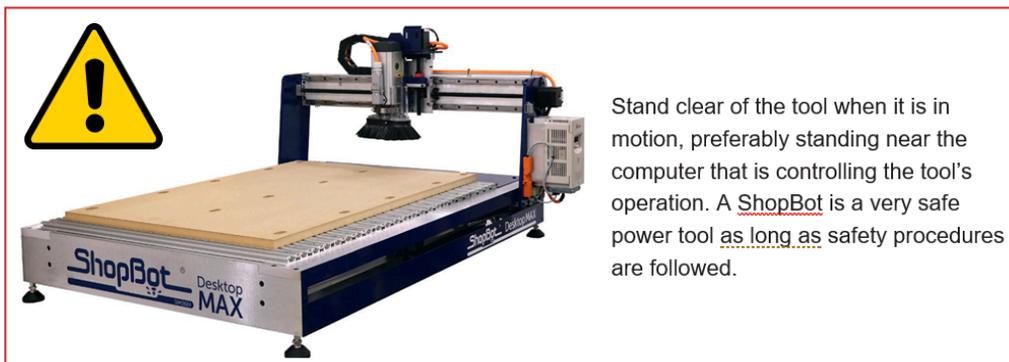
Stand clear of the tool when it is in motion, preferably standing near the computer that is controlling the tool's operation. A ShopBot is a very safe power tool as long as safety procedures are followed.

Setting up your XY Home Position

Open the "ShopBot Setup" option in the "Tools" drop-down (**TS**). Read through the window and click "Next". The second window is the "Tool Settings".
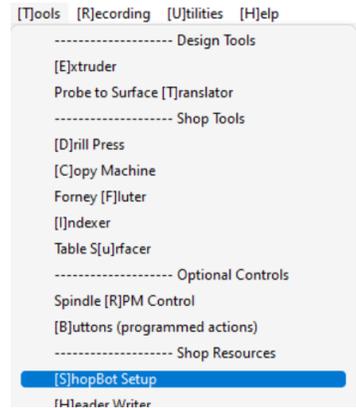
Go step-by-step through this window while verifying information about the machine. Click "Next" to move to the second screen. Here you should make sure that the correct units are selected for your machine (Inches or mm). Make sure that the checkbox labeled "**I have a Z axis prox switch**" is checked. Finally, open the dropdown menu under "Machine Type" and select "**V2 DT MAX ATC (2023+)**. Click "Next".
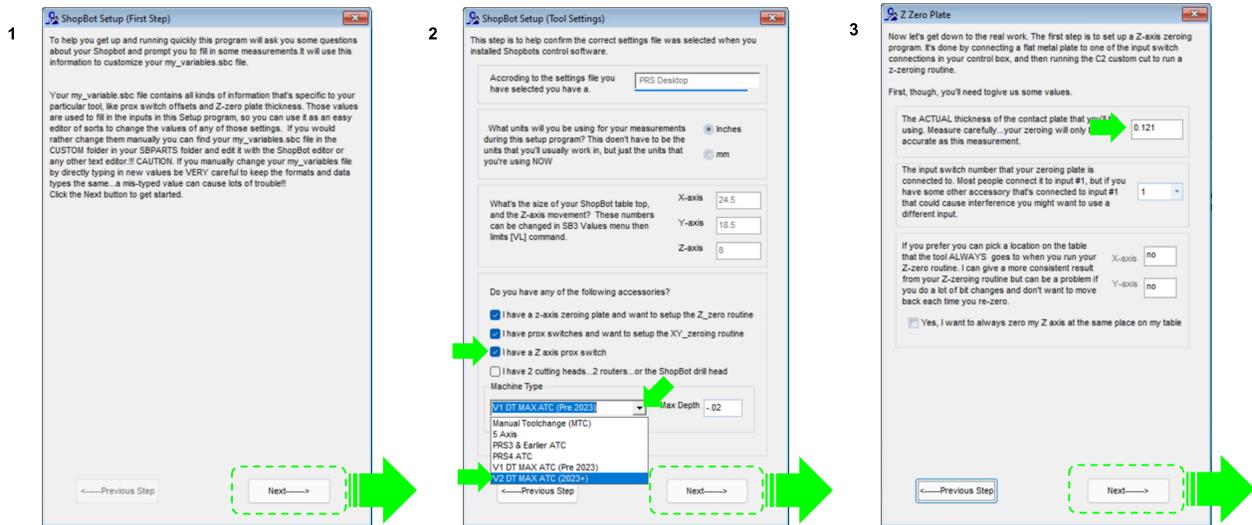
In the "ShopBot Setup (Z Zero Plate)" screen, measure the thickness of the plate and enter that value. Make sure the input switch is set to "1". **DO NOT** check the "Yes, I want to always zero my Z axis at the same place on my table". Click "Next"
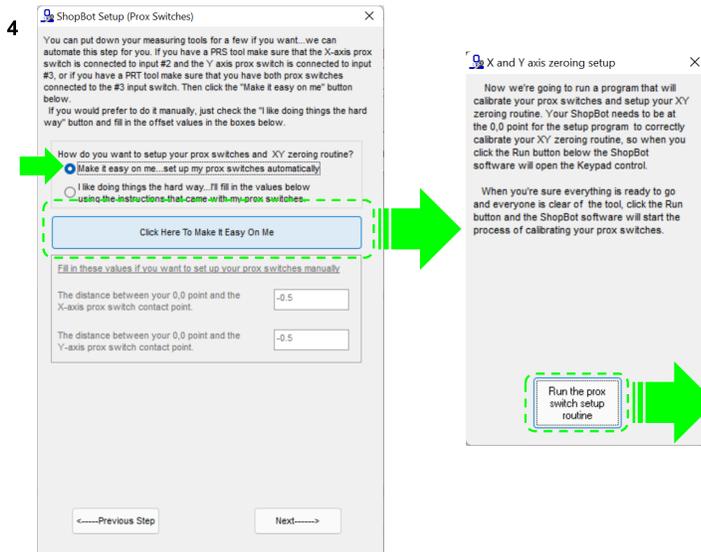
On the next page of the setup process, you'll be presented with a couple of options for setting up your XY home position. Select the radio button that says "**Make it easy on me…**" and then click the button labeled "Click Here To Make It Easy On Me".

This will launch the Prox Switch Setup Routine app. Click "Run the prox switch setup routine" to start.

Follow the prompts from the pop-up screens. Select "Yes" to open the keypad for any adjustment to the X and Y "0, 0" home position. The default home position is the corner of the spoilboard near the machine's natural "0,0", but you can set it wherever you want if you are using a specific jig or fixture.
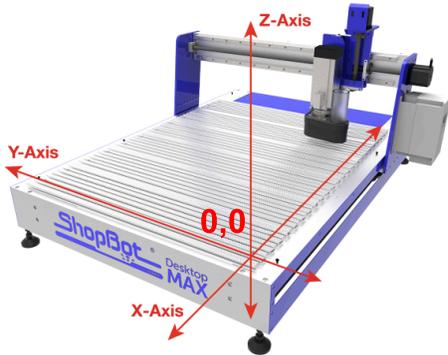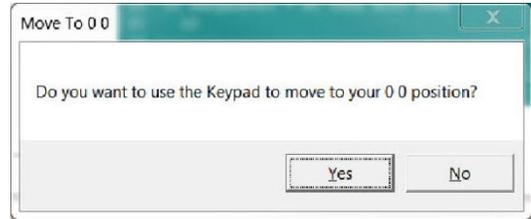
Move the machine to the zero point, and hit "ESC" to exit the keypad mode.

Click "Yes" to zero out the X and Y axes".

Click "Next" and Read through the "ShopBot Setup (Finished)" window and click "I'm done."

Zero the X- and Y-axes

Click the white button marked with the "XY." Or select the **[C]uts->C[3] Home XY Axes Using Prox Switches** function from the dropdown menu.
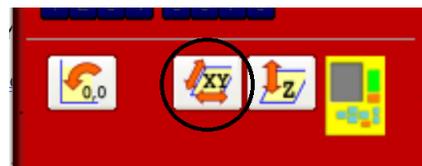
The machine will now move through an automatic routine that zeroes the X- and Y-axes to the lower left (front) corner of the machine using the proximity switches.

Once the routine finishes, the X and Y locations in the position window should now read .000 units.
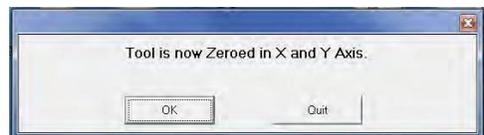
If the location is not correct, refer first to the video tutorial for steps on setting up the home location: "Desktop Series – Beginning Cuts and Operations" - https://youtu.be/vscFI13_tOE.

Click OK on the "Tool is now Zeroed" message.

Machine Features

The Position Window

This red panel provides essential machine information and controls. The following steps will walk through the most frequently used controls and steps to get up and running, this includes: installing a bit, zeroing the machines X-, Y-, and Z- axes, and cutting.

Click on the yellow button to bring up the "KeyPad" panel.

The Keypad

Note: Do not move the tool with the keypad until the "Setup Home Position and Square the Machine" step is complete.

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 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.
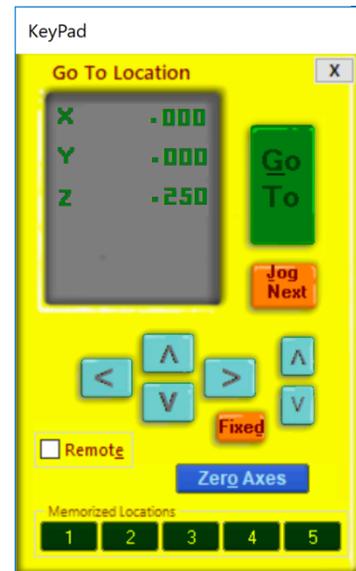
Z Zero Plate

To check the Z zero plate, insert the plug end of the Z zero plate cable into the socket located on the gantry. Touch the Z zero plate grounding clip to the Z zero plate and make sure that input "1" lights up green on the position screen.

Zero the Z-Axis

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

Refer to the Zeroing the Z-Axis section of the "Desktop Series – Beginning Cuts and Operations" video for more information and a demonstration of the process. https://youtu.be/vscFI13_tOE.
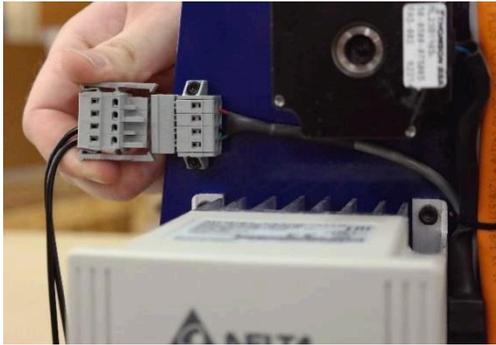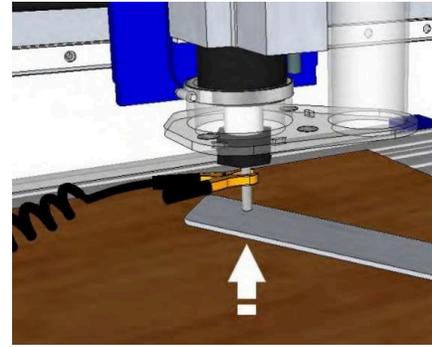
Open the yellow KeyPad and move the head towards the center of the board in the X- and Y-axis. Move the Z-axis up to around 2 inches above the table. The picture above shows the KeyPad after moving to a convenient location for zeroing the Z-axis. Now plug the Z-zeroing assembly into the corresponding socket found on the gantry table leg with the VFD and gantry motor. Attach the Z-zero grounding clip to the router bit (or collet nut) and touch the Z-zero plate to the bottom of the bit. When the Z-zero plate touches the router bit, Input 1 should light up. The Input 1 light will go off when the Z plate is removed.

Tool Draw Bar

Make sure your compressed air supply is on for the following checks.

Press the green button on the back of the gantry. While the button is depressed the internal draw bar will open, allowing the spindle to accept tools. While the draw bar is open, a rush of air will be heard, and input "8" will be lit.

With the green button still depressed, insert a tool holder into the spindle and hold it there. Release the green button. The drawbar will close, capturing the tool holder. Input "7" should light up, and input "8" should turn off.

Inserting a Tool into a Tool Holder

Your ShopBot Desktop MAX ATC shipped with 7 tool holders and 7 collets. The following instructions will show how to insert and remove bits from your tool holders and how to insert a tool holder into your toolbar.

The Image to the right shows the components of a tool holder assembly, the tool holder, collet and collet nut. The pull stud at the top of the tool holder is what the drawbar mechanism in the spindle holds onto to keep the tool holder in the spindle when the drawbar is closed.
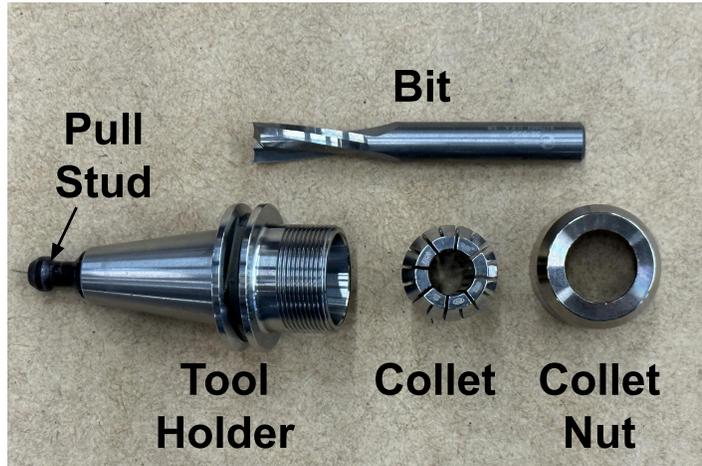

Behind the toolbar on your machine, there are a set of slots designed to hold your collet and toolholder wrenches when they're not in use. When you want to insert or remove a tool from a toolholder. Take the toolholder wrench out and slide it into the slot next to the wrench storage space.
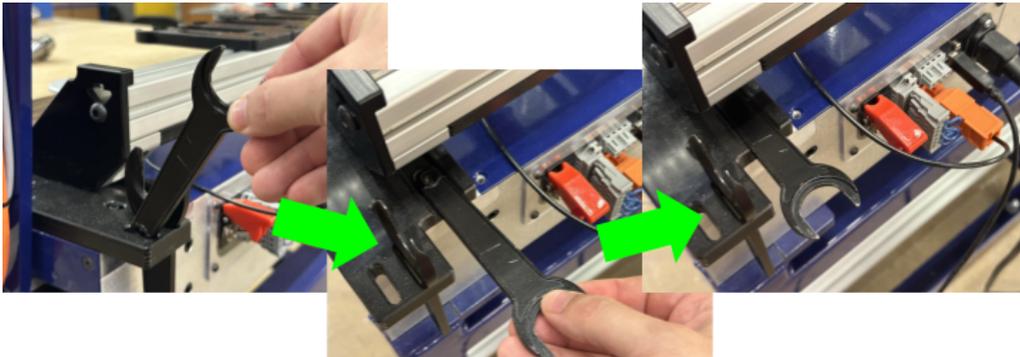
Between the two large bevelled collars on each toolholder, wrench flats have been cut to match the toolholder wrench. Locate these flats and align them when the wrench to slide the toolholder into place with the pull-stud pointing down towards the floor.

Next, select a collet sized to match the bit that you want to insert into the toolholder. Drop the collet into the toolholder with the longer, tapered end pointing down into the toolholder cone. Place the collet nut on top of the collet and give it a few turns by hand to get it started on the threads of the toolholder.


Insert the bit into the hole at the center of the collet. Many bit manufacturers add marks on the shank of the bit to indicate how far a bit should be inserted into a collet, but if your bit does not have these marks, try to make sure that at least 0.75" of the bit shank is inserted into the collet. Hand tighten the collet nut so that the bit doesn't slip while you grab your collet wrench. Find the two slits cut on the side of the collet nut; insert the collet wrench through these two slits and use the wrench to tighten the collet.
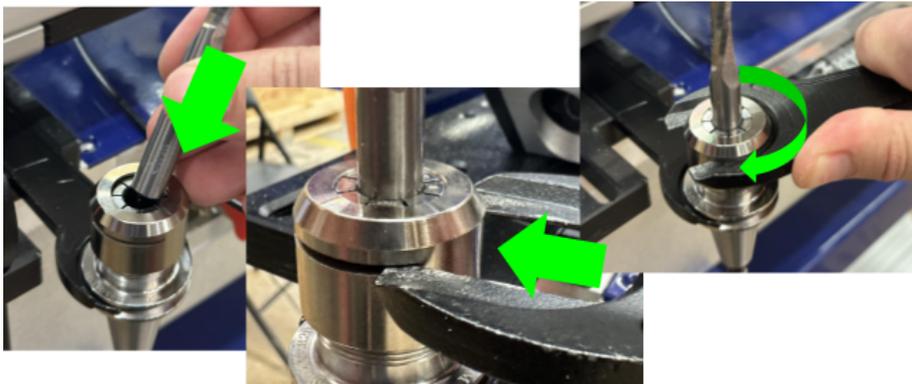
Remove the tool holder from the tool holder wrench. At the toolbar, align the top edge of the tool clip with the same space that the tool holder wrench connects with the tool holder. Gently press the tool holder into the clip with the pull stud pointing upwards.
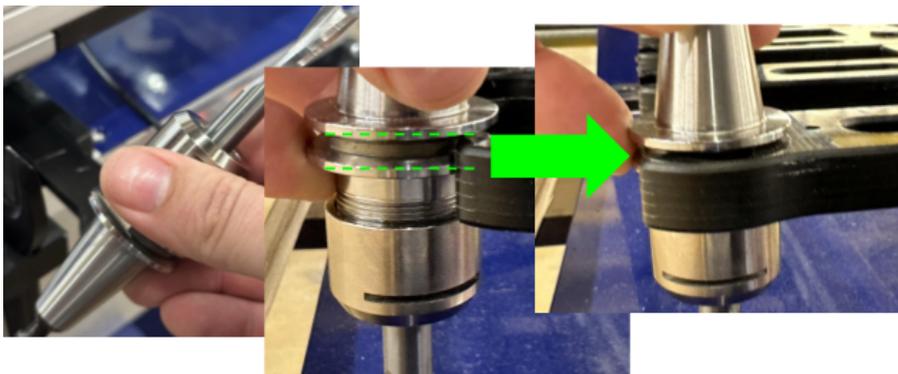
Calibrating the ATC (CN,74)

**REMOVE ALL TOOL HOLDERS FROM TOOL BAR PRIOR TO CALIBRATION**

Prior to starting the calibration routine, be sure to remove any tool that is currently inserted into your spindle. To start the calibration routine, open the "Cuts" menu in your ShopBot control software and click on "CN,74 - ATC - Calibrate Tools In Rack"
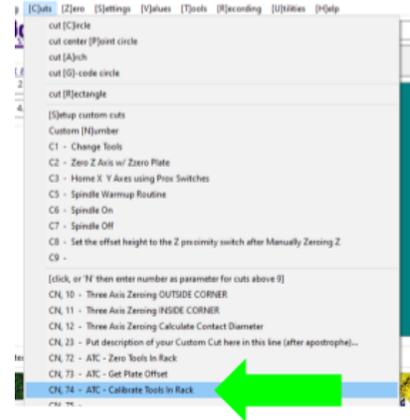
When the calibration routine starts, your machine will be automatically homed using the "C3" XYZ homing routine. You'll see a message informing you that the software has not detected a tool present in the spindle and is resetting for "Zero Tool" – meaning no tool.


The machine will move the spindle back towards the toolbar and come to a stop above the first tool clip on your toolbar. Once the machine comes to a stop above the first tool clip.

You'll receive a series of three prompts instructing you to set up the toolbar for calibration. The first will ask you to insert an empty tool holder (No tool, no collet, no collet nut) into the spindle. Next you'll be asked to clip another empty tool holder into the first tool clip with the pull-stud pointed down towards the electronics enclosure cover. Finally, you'll need to connect the grounding clip to both the pull stud of the upside-down tool holder and the edge of the fixed Z-Zero Plate.
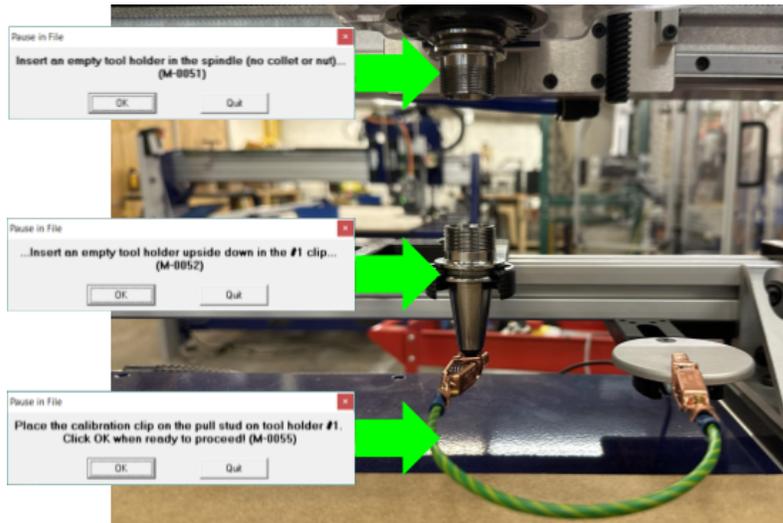
Once you click "OK" on the final prompt. The machine will begin a series of 4 probing moves to accurately locate the position of the first tool clip on your toolbar. Because the spacing of the tool clips has been designed to be very consistent, only the position of the first tool clip is required to determine the position of all tool clips on the toolbar.

Measuring Tool Lengths (CN,72)

Tool lengths must be measured any time a new bit is added to your toolbar. This could either be when you choose to introduce a new type of bit to your library – or when you're replacing a worn/broken bit on your toolbar with a bit of the same kind. Tool length measurements will ensure that your Z heights are accurate between tool changes. (Note: ATC Calibration must be completed before starting tool length measurements).

To start a tool length measurement, open the "Cuts" menu in your ShopBot Control Software and select "CN,72 - ATC - Zero Tools In Rack"
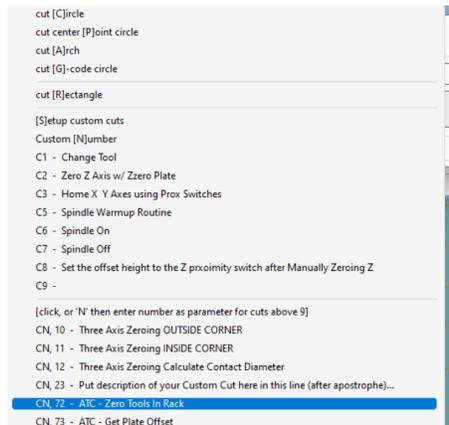
Once the routine begins, you will be prompted to enter the number of the tool that you wish to measure. If you have just replaced one of your tools, you can enter the tool position of that bit (e.g. "3" for tool # 3); however, if you are setting up a new toolbar or would like to re-measure all of your bits, enter the number "0" to measure all tools.

Press "OK" to continue – if the tool you've chosen is not currently loaded into the spindle, the machine will put away the current tool and load the selected tool before proceeding to bit measurement. The process of bit measurement is fully automated and there is no need to attach any grounding clips or plug in a z-zero plate. The machine will move over to the fixed z-zero plate and touch off once on the plate with the bit.
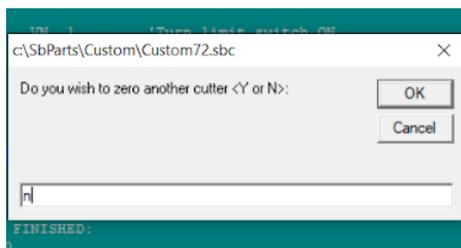
If you've chosen to measure all bits, the machine will pick up each bit, one-by-one and complete measurements before unloading the spindle and returning home. If you have selected a single tool to measure, you will be asked whether you would like to measure another tool at the conclusion of the tool measurement routine. Answer "Y" to this prompt if you want to measure another tool or "N" if you are finished and would like to exit.

Plate Offset Measurement (CN,73)

The final piece of information that the software needs to accurately set the z height of your machine between tool changes is the Z axis offset between the fixed Z-Zero plate and the cutting surface of your machine. Whenever you resurface your spoilboard, this surface will be lowered by the amount of material that was remove during surfacing – because of this, you will need to re-run this routine whenever you resurface or change your spoilboard. This measurement should always be done against the surface of your spoilboard, not onto any material that is resting on top of the spoilboard.

To begin Plate Offset Measurement, open the "Cuts" menu and select "CN,73 - ATC - Get Plate Offset".
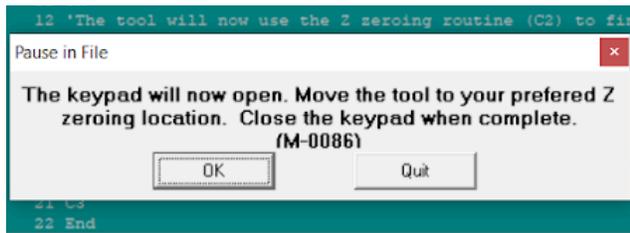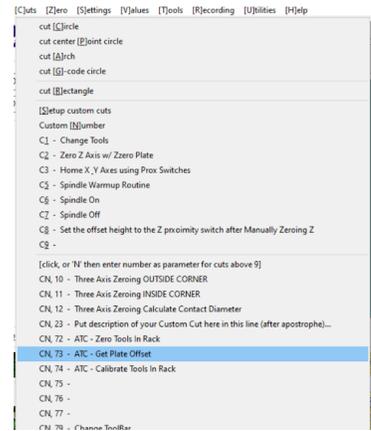
Once the routine begins, you'll be notified that the machine will first run the homing routine (C3) to verify the X,Y,Z home position of the machine. Next, the manual control keypad will be opened to allow you to choose the location on your spoilboard where the plate offset will be recorded. It is best to choose a location towards the center of your spoilboard.

Plug the Z-Zero plate into the connector located directly above the VFD, attach the copper grounding clip to the tool holder and place the Z-Zero plate under the bit before continuing.
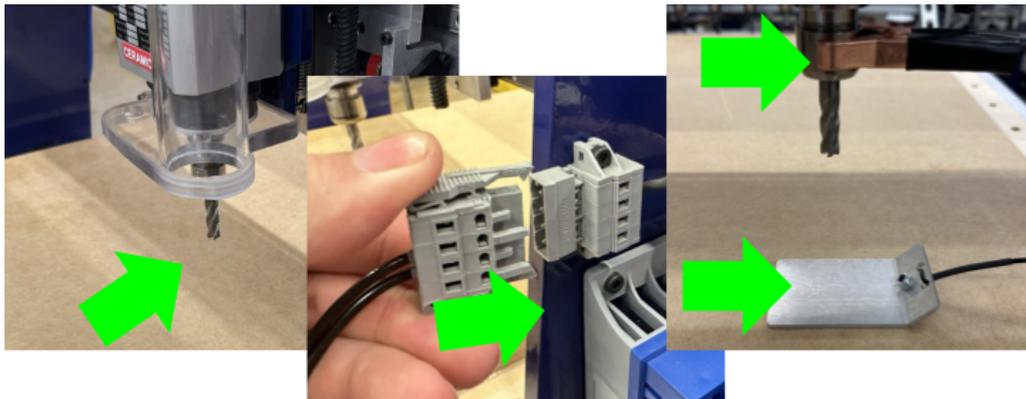
Once the bit has touched off on the plate, the offset will be recorded and the machine will home once again using the C3 routine to confirm the offset values. The Z-Zero plate can be put away now, the routine is finished.

Creating a Tool Change File

The design software must first have the information to enable the ATC to do a tool change. For the software to work correctly, the tooling must be designated to specify particular tool holders.

When setting up a tool database inside the design software, create a group named "Tool Changer" or "ATC". This will allow separation of tools that are setup specifically for the tool changer.

Within the group, create new tools that will be used with the ATC. The tools created need to have the same tool number in the characteristics of the tool as the location of that tool holder on the ATC. This tool number within the design software is what dictates what tool is selected during the tool changing process.
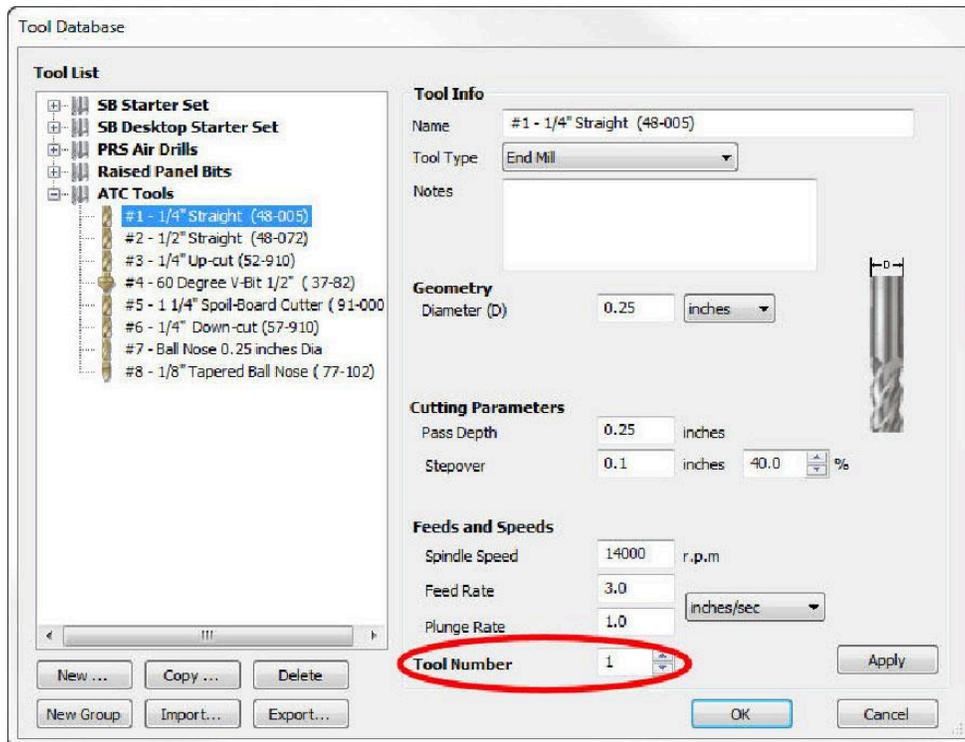
Create a drawing within the design software and toolpath it using the tools under the tool changer group that you have created. When all toolpaths are created, set the order of the tool paths under the Toolpath List. Select the save icon (disk) under "Toolpath Operations". Make sure that the proper post processor is selected. In VCarve Pro it will read:

ShopBot TC (Inch)(*.sbp) or ShopBot TC (MM)(*.sbp).

In Aspire it will be:

ShopBot(inch)(Toolchange)w/speed(*.sbp) or ShopBot(mm)(Toolchange)w/speed(*.sbp).

NOTE: Pay attention to where Z zero is set in the CAM file to avoid damaging the table surface or cutting the wrong depth.

Spindle Warmup Routine (C5)

Before running an ATC file, make sure that the spindle has been properly warmed-up. Failure to warm the spindle could lead to premature spindle failure. Type C5 ("Spindle Warm-up Routine") to start the 9 minute routine that runs the spindle and then shuts it off. On desktop models there is no automatic speed control. It is recommended to run the spindle at 9,000rpm for the first 3 minutes, 10,000rpm for the next 3 minutes, and 12,000rpm for the last 3 minutes of the routine. If the machine sets idle for longer than an hour, run the warm-up routine. If unsure whether or not to run the warm-up cycle, go ahead and run it to be safe.

Run the File

Open the file and run by typing (FP) or clicking the "Load Part File" button on the ShopBot position screen.

Advanced Techniques

The following sections will explain some more advanced features available on your Desktop MAX ATC. These additional techniques should only be tried after you have become familiar with the basic operation of your machine. Following these procedures will allow you to cut larger pieces, expand your tool library and speed up your workflow!

Going Above Tool #7

The toolbar included with your Desktop MAX ATC only has positions available for 7 tools; however, it is possible to load tools that aren't stored on your toolbar using a semi-automated process built into your software.

By purchasing extra toolholders from ShopBot, you have the ability to set up an additional 21 bits (tools 8-28) in your tool library for use during your cuts.

Before using one of these bits in a cut, you'll need to perform bit measurement on these bits. Start by loading the CN,72 Bit Measurement routine. Enter the tool number that you'd like to set up (e.g "8" for Tool # 8).

If any of the tools 1-7 are currently loaded into the spindle, the tool will be dropped off at the toolbar. The machine will then move the spindle to a central location on the table that should be easy to access by hand.

You'll be prompted to press the green button on the back of the gantry and insert the tool that you want to measure. Once you click "OK" the tool measurement process will continue as normal. When measurement is complete, you'll be prompted to decide if you would like to zero additional bits. If you select another tool that is not on the toolbar, the machine will return the spindle to the same central location and prompt you to unload the current bit, before requesting the new bit that you'd like to measure. Continue measuring bits until you've set up all of the extra bits in your library.

When you create a cut file that uses one of these extra bits, the cut will pause and the tool currently loaded into the spindle will be unloaded, and you'll be prompted to insert the bit that you designated in your cut setup. The cut will then resume as normal until the tool in use needs to be unloaded at the next toolchange.

Setting Up for Oversized Material

Occasionally, you may need to perform cuts on material that is longer than the normal cutting area of your ShopBot; this is no problem! Normally the toolbar would prevent you from passing long material through your machine – however, the Desktop MAX ATC can operate in semi-auto mode with the toolbar removed. A sensor on the machine will automatically detect that the toolbar has been removed and modify the toolchange routine to default to manual tool insertion and removal.

To remove your toolbar; first, unplug the orange connector from the back of your machine, next to the plug for the handheld pendant. This will signal to the machine that the toolbar is no longer present.

Next, you will need to remove the 5 bolts that secure the toolbar to the frame of the machine. Store these somewhere safe so that they are not misplaced!

Finally, set the toolbar aside on a table near your machine so that you have easy access to your tools while performing semi-auto changes on your machine.

Performing Bit Measurements with the Toolbar Removed

When the toolbar has been removed from your machine, you will not have access to the fixed Z-Zero plate and will instead need to use the plug-in Z-Zero plate to perform bit measurements.

When you launch the tool measurement routine using CN,72 – instead of moving back to the fixed Z-Zero plate, you will be prompted to move the spindle to a open space on your spoilboard to perform bit measurement. The keypad will open, allowing you to manually position the spindle; choose a place where you can set the Z-Zero plate directly on the spoilboard surface.


If a bit change is required to load the bit that you've selected for measurement, you'll follow the normal prompts to load a bit when the toolbar is not attached to the machine.

Bit measurements performed this way will still apply when the toolbar is eventually reinstalled on the machine, so you will not need to remeasure bits when the toolbar is reinstalled.

Using Extra Toolbars/Reinstalling Toolbars

When you are finished with the work that required the removal of the toolbar from your machine; there are a few simple steps required to reinstall your toolbar. First, place the toolbar on the back of your machine. Slide it forward so that the two notches in the base of the toolbar line up with the edges of your vacuum deck or t-slot extrusion deck. Next, reinsert the 4 screws that were removed to take the toolbar off of the machine. Finally, reinsert the orange connector into the socket at the rear of the tool.
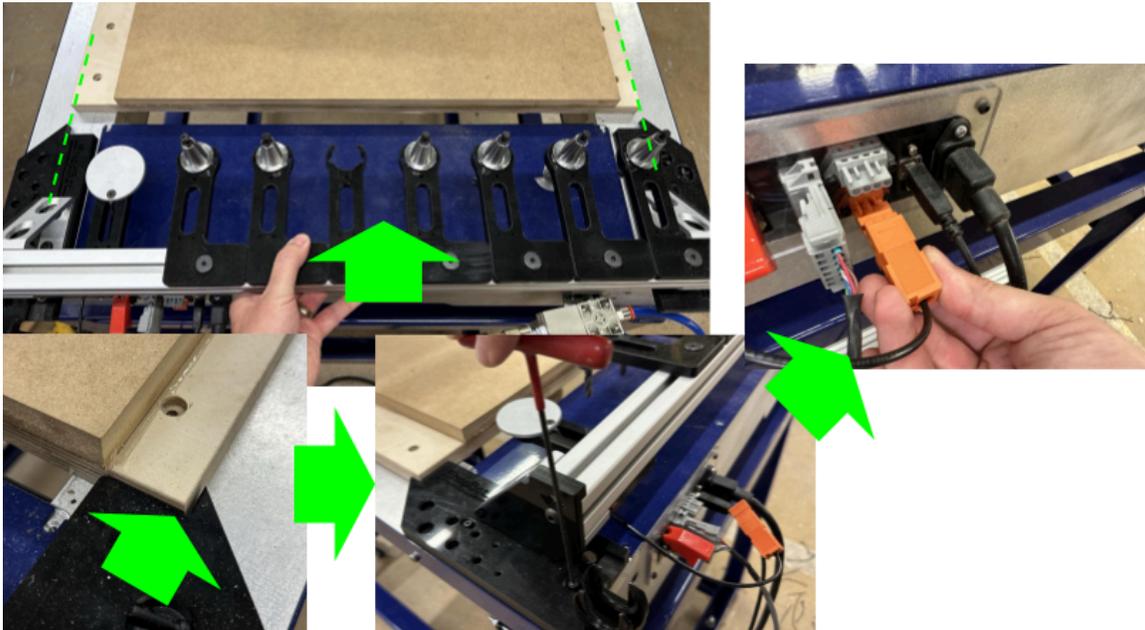
The ShopBot software also give you the option of setting up multiple toolbars that can be swapped on the machine for tools 8-14, 15-21 and 22-28. The installation process for additional toolbars will be the same as the process for installing and removing your main toolbar. Once you've installed an alternative toolbar, you'll just need to run one command in the software to set up for using your alternative toolset.

On the "Cuts" menu, select "CN,79 - Change Toolbar"

When prompted, enter the number of the toolbar that you wish to use. Tools 8-14 are on toolbar number "2", tools 15-21 are on toolbar number "3" and tools 22-28 are on toolbar number "4". Press "OK" and your settings will be saved. To go back to using tools 1-7, just run the routine again and select toolbar number "1". Any manual bit measurements that you've performed in the past will still be valid when those tools are loaded into your new toolbars.
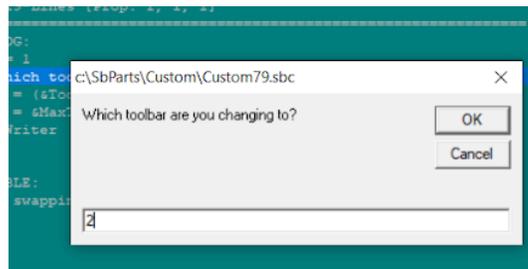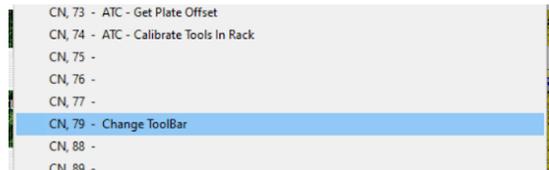
Troubleshooting

To check what tool the software thinks is in the spindle head, open "C:\Sbparts\Custom\ATC_Local_Data\ATC_tool_variables.sbc".

Issue: The spindle is not releasing the tool holder when changing tools.

Resolution: The spindle manufacturer recommends that the spindle not be left holding a tool overnight or for any extended period of time; leaving a tool in overnight may cause the tool holder to "stick" in the spindle. Use the 17mm wrench to apply pressure and push the tool holder out if this occurs. Also, confirm that the regulator on your filter/regulator unit is set to supply 90psi to your tool; inadequate air pressure can prevent the spindle's draw bar from opening completely when trying to drop off a tool.

Issue: The tool is not aligning the tool holders with the tool clips when dropping off or picking up bits.

Resolution: Re-calibrate your tool clip locations using the calibration routine covered in the "Calibrating ATC" section of this document.

Issue: Depth of cut is inconsistent between bits.

Resolution: Re-measure your bit length using the "CN72" routine referenced in the "Zero Tools in Rack" section of this document.

Issue: The tool is not cutting in the correct location.

Resolution: The default "origin" point for cuts designed in v-carve is the bottom, left hand corner of the cut area. Be sure to run the C3 "homing" routine before starting a cut in order to align the tool to this origin location. The JH (Jog Home) command can be used to send the tool to its origin.

Issue: The tool was cutting fine but suddenly started cutting in the wrong place part-way through a cut

Resolution: If the tool is unable to complete a motion either due to an obstacle (ex. hard metal fixture) or being driven at excessive speed (ex. 10 inches per second at full depth in ¾" plywood) it will lose its reference position and need to be re-homed using the C3 routine. This does no damage to the motors on the tool, however the motors will not be able to recover their correct position.

If in doubt – contact the ShopBot tech support team; give us a call at 886-680-4466 or send an email to support@shopbottools.com