NEXT WAVE® CNC

SHARK® LCD Pendant Control

User's Manual

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Ready2Control is copyrighted by Next Wave CNC.

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Please read this manual carefully. It provides important setup and operational information for your SHARK CNC and software. This manual has been written with the assumption that you are experienced with the basic operation of a computer as well as the technical knowledge required to safely operate power tools.

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Warranty

Next Wave CNC warrants your new SHARK LCD Pendant to be free from defects in material and workmanship for TWO YEARS from the date of purchase. The warranty applies only to the original retail purchaser of the SHARK LCD Pendant when purchased from an authorized Next Wave CNC distributor. This warranty covers the parts and labor to correct the defect. It does not cover the cost of shipping the machine and/or parts to Next Wave CNC for evaluation or repair.

This warranty does not apply to problems arising from normal wear and tear, misuse, abuse, negligence, accidents, unauthorized repairs, alterations, or lack of maintenance. This warranty is void if the SHARK LCD Pendant or any portion of it is modified without the prior written permission from Next Wave CNC, or if the machine is located or has been used outside of the country where the machine was purchased.

Please contact Next Wave CNC to take advantage of this warranty. If Next Wave CNC determines that your SHARK LCD Pendant is defective in material or workmanship, Next Wave CNC will at its expense and upon proof of purchase send replacement parts to the original retail purchaser necessary to cure the defect. Next Wave CNC will repair the SHARK LCD Pendant provided it is returned to Next Wave CNC, shipping prepaid, with proof of purchase and within the warranty period.

Next Wave CNC disclaims all other express or implied warranties, including fitness for a particular purpose. Next Wave CNC shall not be liable for death, injuries to persons or property, or incidental, consequential, contingent or special damages arising from the use of the SHARK LCD Pendant.

Safety

Read and follow all safety instructions that appear in the **SHARK CNC Owner's Manual** that came with your machine. Copies of current owner's manuals can be downloaded at www.NextWaveCNC.com/support

LCD Pendant System Requirements

The LCD is compatible with all current SHARK HD and SD series CNC machines as well as past machines that use a control box with a Pendant cable input port. Some (but not all) older machines that lack the Pendant input port can be upgraded by switching to the new style Control Box that has the Pendant input port. For information on upgrading an older Next Wave CNC machine contact Customer Service at Support@NextWaveCNC.com

Technical Support

If you need technical assistance with your SHARK LCD Pendant, please visit our Support webpage at: NextWaveCNC.com/support or email Customer Support at: Support@NextWaveCNC.com. Please include your product model number, date of purchase, and other pertinent information associated with the issue such as .tap files, VCarve files, screen captures, or photos of your setup or the problem.

Support Email: support@nextwaveCNC.com
Available: 9am – 5 pm Monday-Friday (Eastern time).

Serial Number and Software License Information

For easy reference and record keeping, enter your SHARK Pendant and Controller information below. To locate the information see the pages listed below.

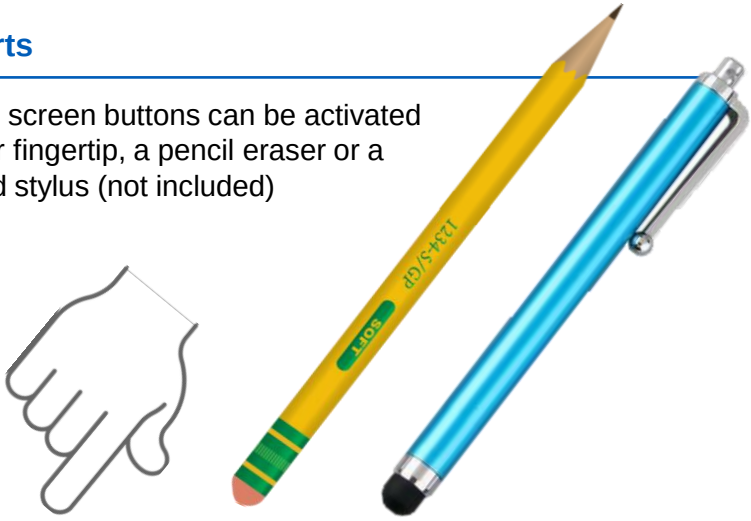
Controller Box Serial Number
(see page 60)_____

LCD Pendant Serial Number
(see page 60)_____

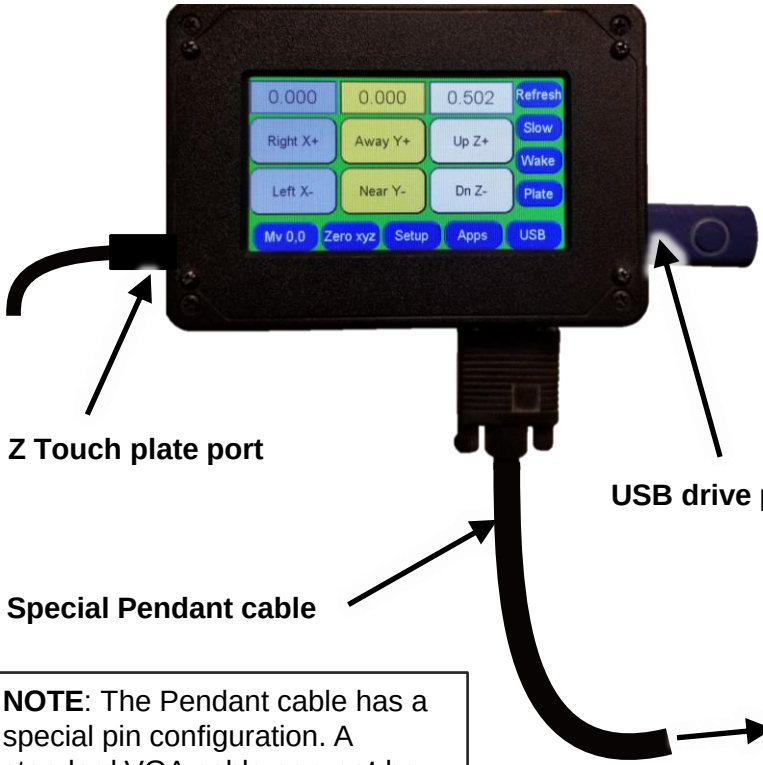
LCD Pendant Unlock Code
(see page 10)_____

Basic parts

The touch screen buttons can be activated using your fingertip, a pencil eraser or a soft-tipped stylus (not included)



LCD touch screen



Z Touch plate port

USB drive port

Special Pendant cable

NOTE: The Pendant cable has a special pin configuration. A standard VGA cable **can not** be substituted – it will not work.

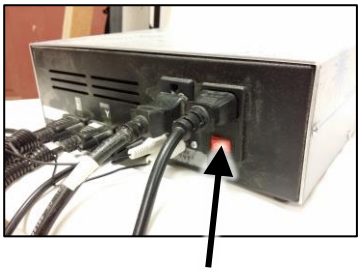
Connects to control box

Pendant Cable Connection

Control Box

First attach the pendant cable between the Pendant and the control box. Then plug power cord into a power source. Using a switched power strip is highly recommended. As well as providing surge protection for your tool, it provides another method for shutting off the machine in case of an emergency.

IMPORTANT – DO NOT plug in and turn on the power before all the motor cables have been attached. DO NOT attach or detach motor cables when the control box is powered up as this can damage the electronics and is not covered by the warranty.



Main power Switch

Emergency Switch

Step 1

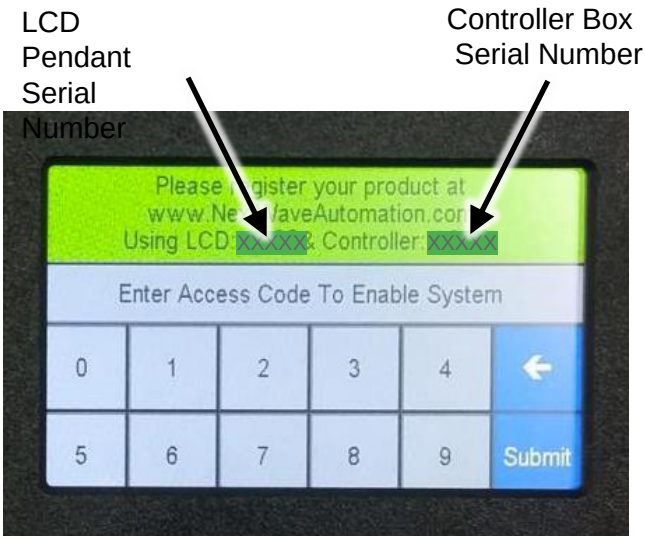
Power up your SHARK CNC control box.

- The HD machines two power switches on the control box.
- The SD machines have only one power switch.

IMPORTANT. Always turn off the power switch(s) when connecting or disconnecting any of the cables. Failure to do so can cause damage to electrical components and is not covered by the warranty.

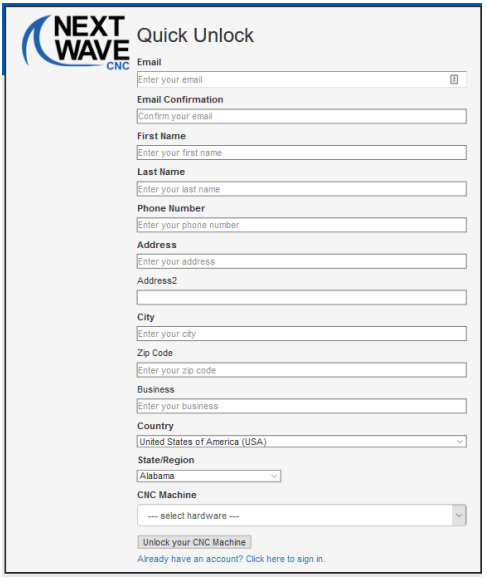
Step 2

Once you power up your SHARK CNC, an opening screen appears on the pendant. Click **Continue**.



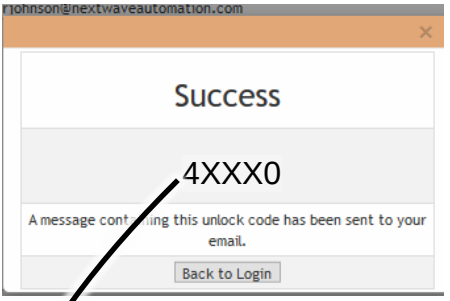
Step 3
The Registration screen appears next. It lists the serial numbers for your LCD Pendant and Control Box. Record these numbers on Page 5 of this manual.

Step 4
Go to www.NextWaveCNC.com and click on the **Product Registration** tab

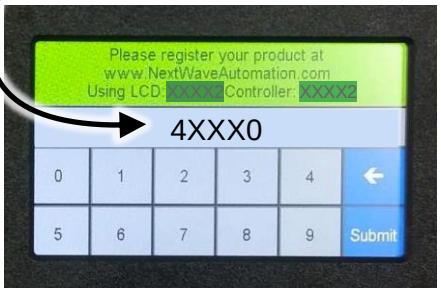


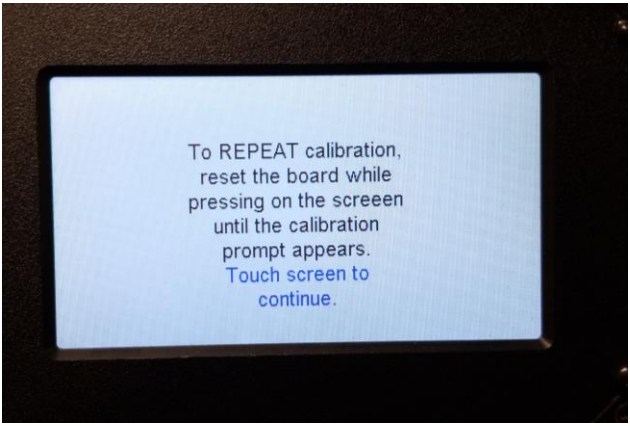
Step 5
Complete the **Quick Unlock** form, then click the **Unlock your CNC Machine button** at the bottom of the form.

Step 6
An Access Code appears on your screen. This code will also be sent to the email you entered in the registration form. Record your **Unlock (Access) Code** on page 5 of this manual.



Step 7
Use the number keys on the Pendant to enter your Unlock (Access) Code. Press **Submit**. This unlocks the Pendant.





Step 8
The **Calibration Screen** appears next. Follow the on-screen directions to complete the calibration. **Touch screen to continue.**

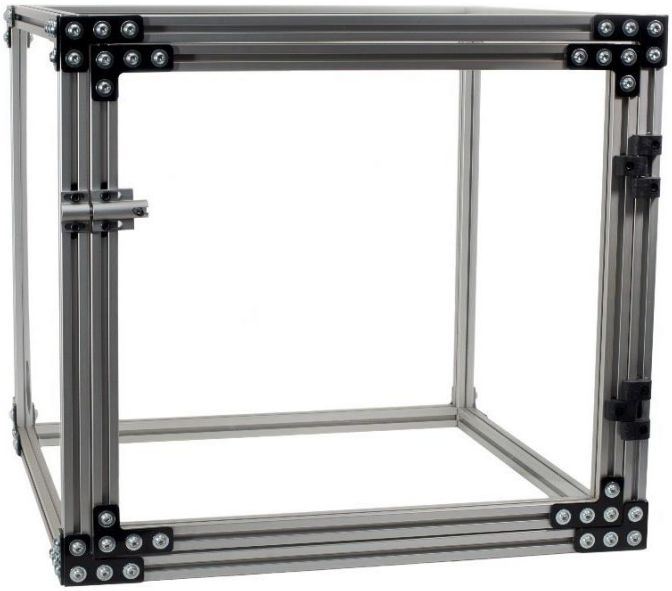
The **Calibration Screen** also appears after a firmware updates. The screen can also be opened by holding your finger on the screen while turning on the control box.

Step 9
The **Main Screen** appears at the end of calibration process. Your SHARK LCD Pendant is now unlocked.

Contain dust and noise with a
SHARK machine encloser from Next Wave CNC.

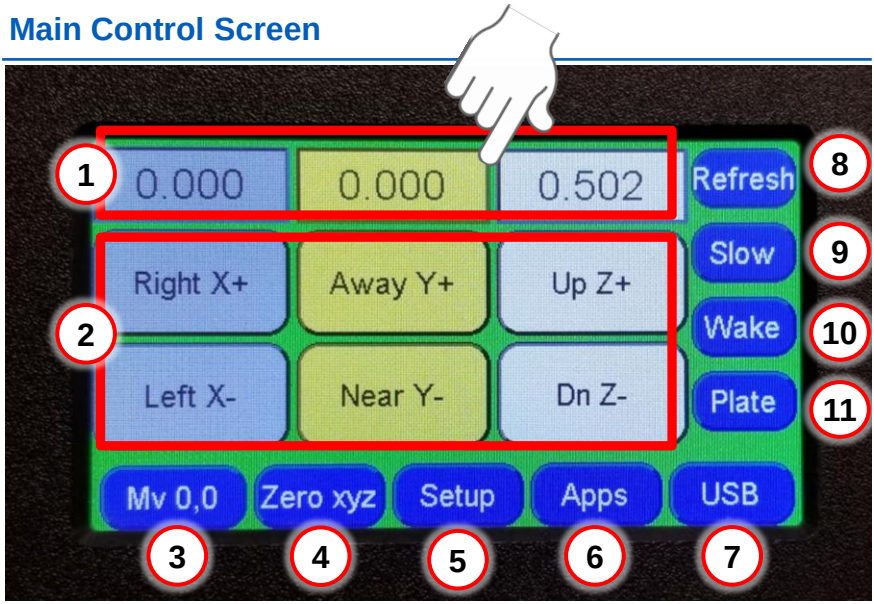
Available from your local Next Wave CNC distributor
or online at www.NextWaveCNC.com

SHARK machine enclosure



The **SHARK CNC machine enclosure** is designed to help control dust, add safety and reduce machining noise. The enclosure is made with an aluminum frame, acrylic panels, and steel connectors. The hinged access door with magnetic catch allows for easy material removal or bit changes. There are pre-drilled 3” hole for cords. The case to be placed on any flat surface. The enclosure ships flat, assembly is required.

Main Control Screen



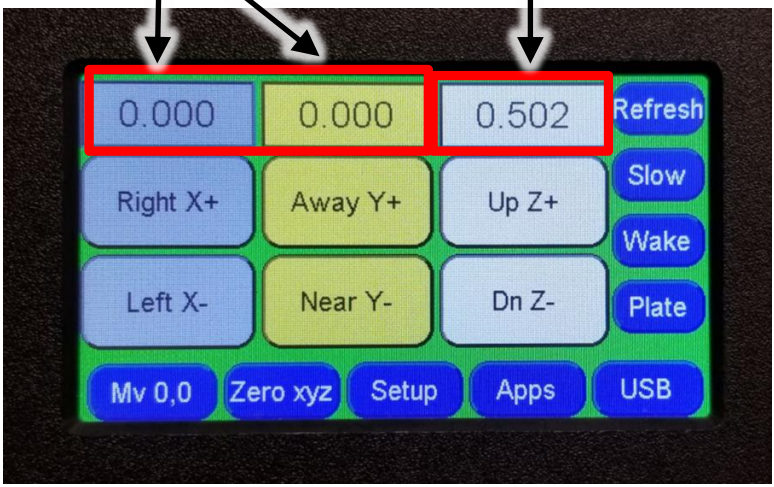
1. **Axis position fields –** Shows the current location of axis. Pressing one of these buttons to opens the Axis edit window for that axis (see pages 15,16,17).
2. **Axes Jog buttons** – Press to jog an axis in the specified direction. The jog speed can be change with the jog speed toggle button (9).
3. **Mv 0,0**
   - **Short press / Single tap (Mv 0,0)** - Moves the X and Y axes to their zero positions.
   - **Long press / Double tap (Mv 0,0,0)** – Moves the X, Y and Z axes to their zero positions.
4. **Zero xyz** – Press to zero the XYZ axes. The axes position fields (1) will all reset to 0.000.
5. **Setup** – Press to access the Setup submenu (see page 18).
6. **Apps** – Press to access the Apps submenu (see page 27).
7. **USB** – Glows blue when a USB drive is inserted into the Pendant. Press to access the toolpath selection screen (see page 38).
8. **Refresh** – Press this button if the numbers in the Position fields freeze or appear inaccurate.
9. **Slow (Med, Fast)** – Press to toggle between jog speeds (see page 19).
10. **Wake** – Press if LCD screen appears to freeze.
11. **Plate** – Press to start touchplate routine (see page 28)

Axes Position Fields

The **Axis position fields** show the current location of the axis. Pressing a field button opens the edit window for that axis.

X and Y Position fields See page 15

Z Position field See page 16,17



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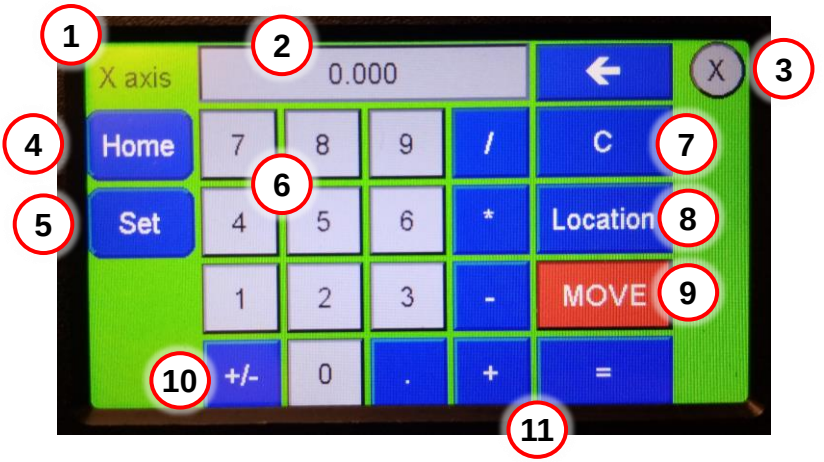
X and Y Axis Edit screen



1. **Active Axis –** The label in upper left corner shows the axis that is currently open for editing.
2. **Position field** – This field shows the current or edited position of the axis. The field can be edited using the keypad.
3. **Exit screen**– Press the X symbol in the upper right to exit the edit screen and return to the main control screen.
4. **Home –** Pressing this button to move the axis to its current zero position.
5. **Set** – After entering a new location in the position field, press this button to apply (set) the new location. The position also changes on the Main Control Screen.
6. **Number keypad** – Use these keys to enter a new location in the position field.
7. **C** – Press to delete the information in the position field.
8. **Location** – Pressing this key to enter the current axis location into the position field
9. **MOVE** – Press this button to move axis to the location currently showing in the position field.
10. **+/-** button – Toggles the position field between a positive and negative value.
11. **Function keys** – Similar to those on a typical math calculator.

Z-axis Edit screen

The buttons on the **Z edit screen** function the same as on the X and Y screens except as noted below.

1. **Active Axis –** Toggles between Z and A with the use of the "View" button (2)
2. **View A** – Press to toggle the Edit Screen and the Main Control Screen to the A axis view. (see next page for info on the A axis view).

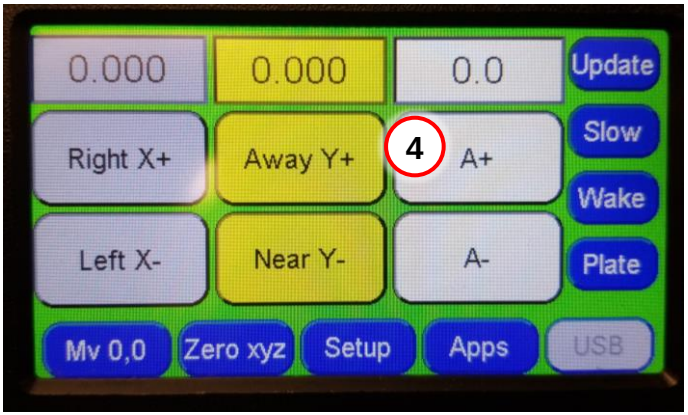
This space intentionally left blank:

A-axis Edit screen

The **A-axis** is used to set the rotational position on the Rotary 4th Axis accessory

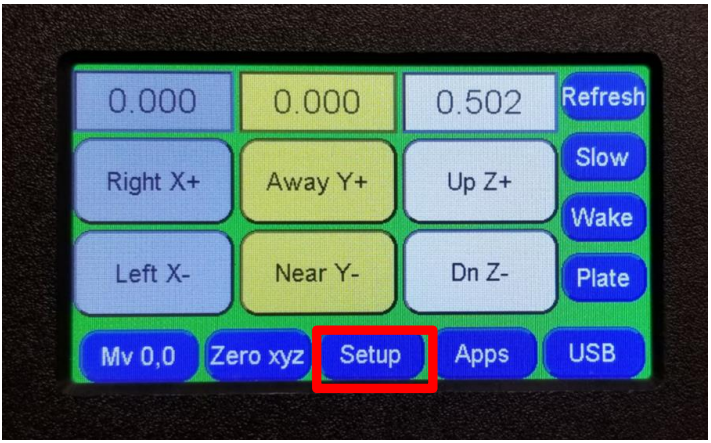
1. **Active Axis –** Toggles between Z and A with the use of the "View" button (2)
2. **View Z** – Press to toggle the Edit Screen and the Main Control Screen to the Z axis view.
3. **Position field** – The A axis position field displays "degrees" of rotation.

The other buttons function the same as those in the XYZ edit screen.

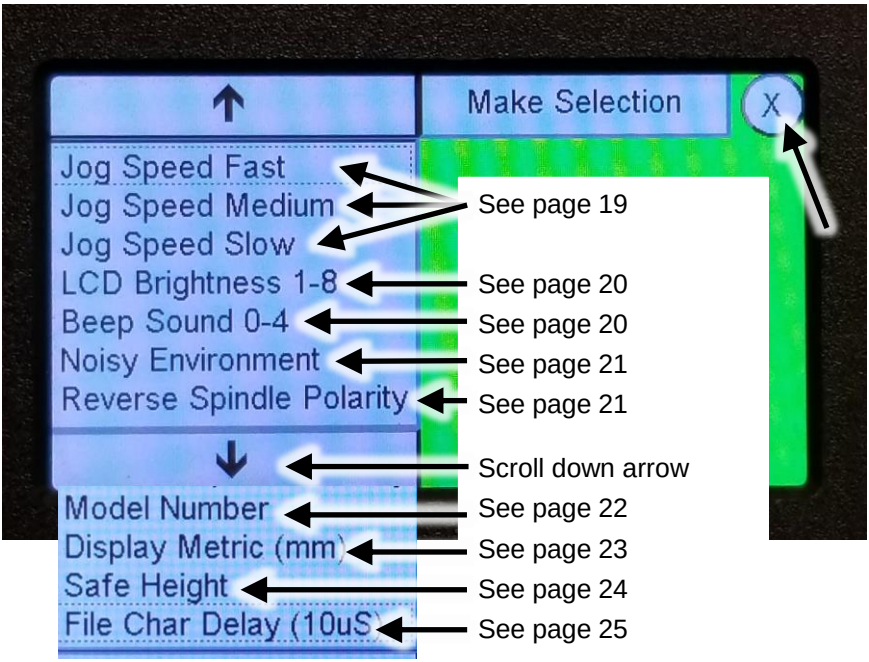


4. **A-axis controls** also appear in the Main Control Screen. The A-axis position field displays degrees of rotation.

Setup Menu Screen

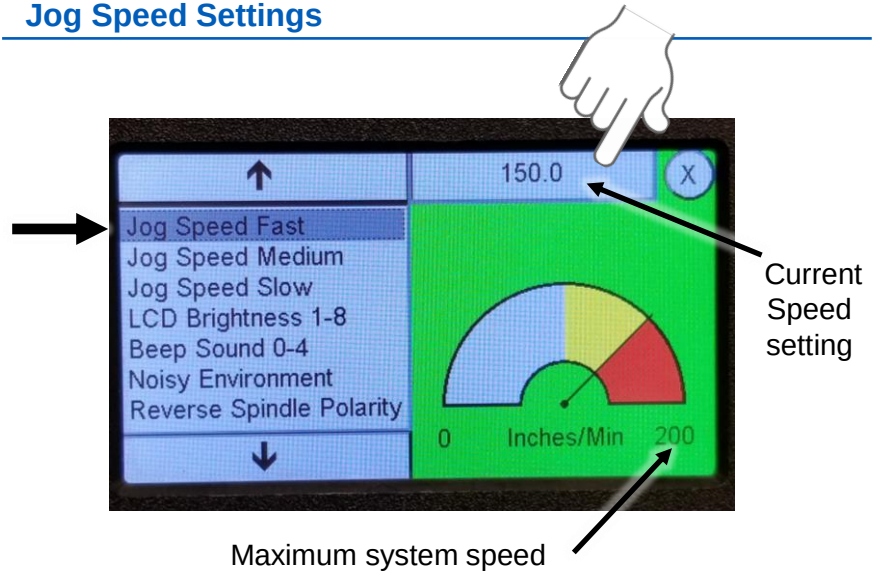


Press the **Setup** button to open the Setup submenu screen (below).

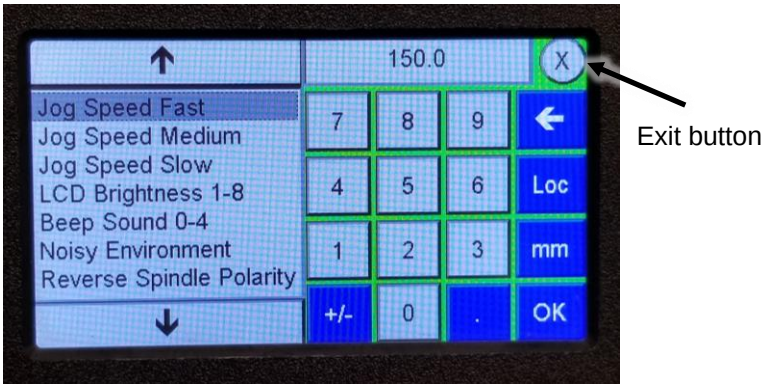


The **Setup** submenu contains options for controlling how the Pendant functions. Press a submenu item to open the settings screen for that option. To return to the Main Control Screen, press **X Press** in the upper right corner.

Jog Speed Settings



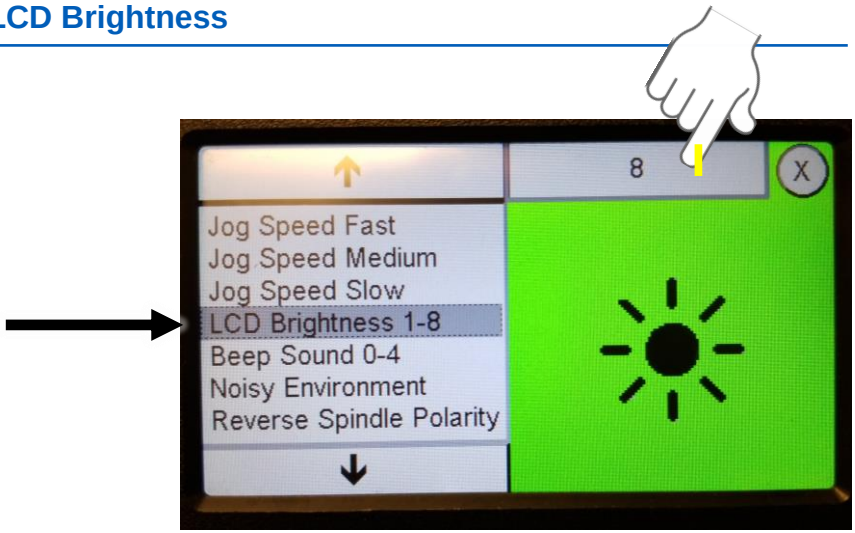
Press on one of the **Jog Speed** menu items to open the jog speed settings window. The current jog speed setting is shown at the tope of the window. Press the current speed setting field opens the keypad (shown below).



Use the keypad to change the **Jog Speed** setting. Press OK to save the setting. Press **X** to exit this window.

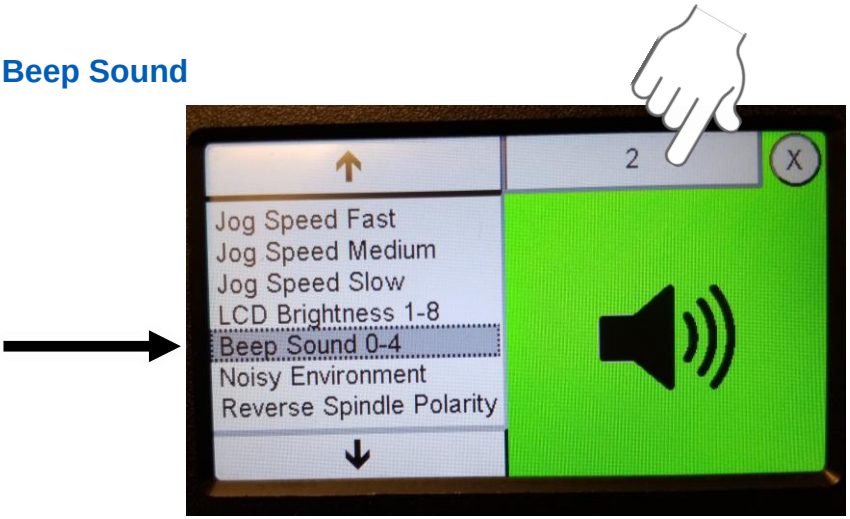
NOTE: The maximum system jog speed is 200 inches/min.

LCD Brightness



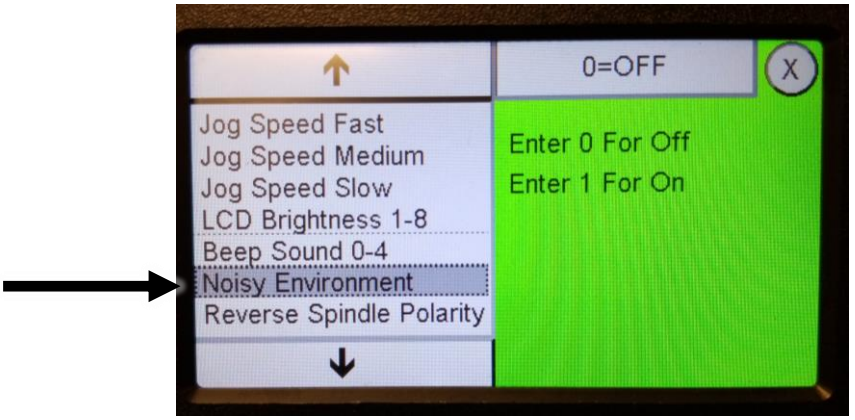
Press the Brightness setting to open the keypad. Use the keypad to adjust the **LCD Brightness**. Press **X** to exit the current screen.

Beep Sound



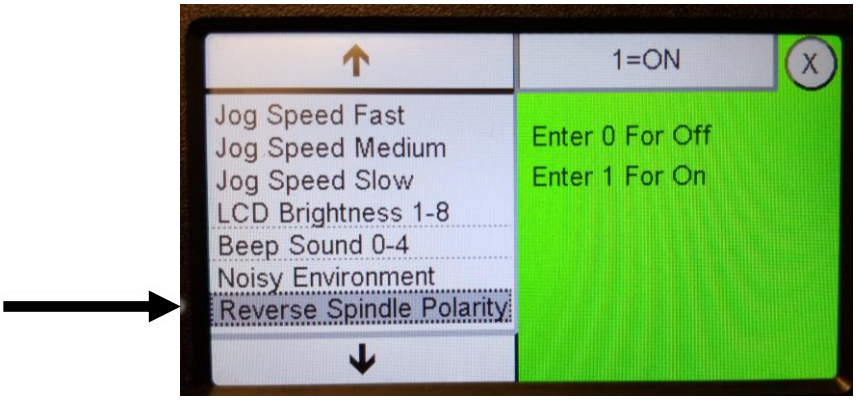
Press the sound setting field at top right to open the keypad. Use the keypad to adjust the volume of the **Beep Sound**. Press **X** to exit the current screen.

Noisy Environment



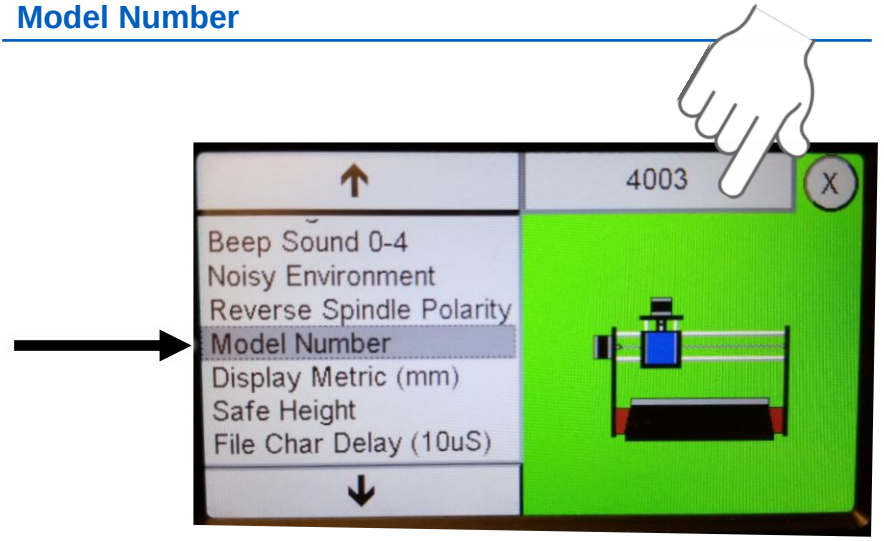
Noisy Environment is an advanced feature used by Tech Support to resolve any rare electrical interference problems.

Reverse Spindle Polarity



Reverse Spindle Polarity is a touch plate legacy feature used by only a few older machines.

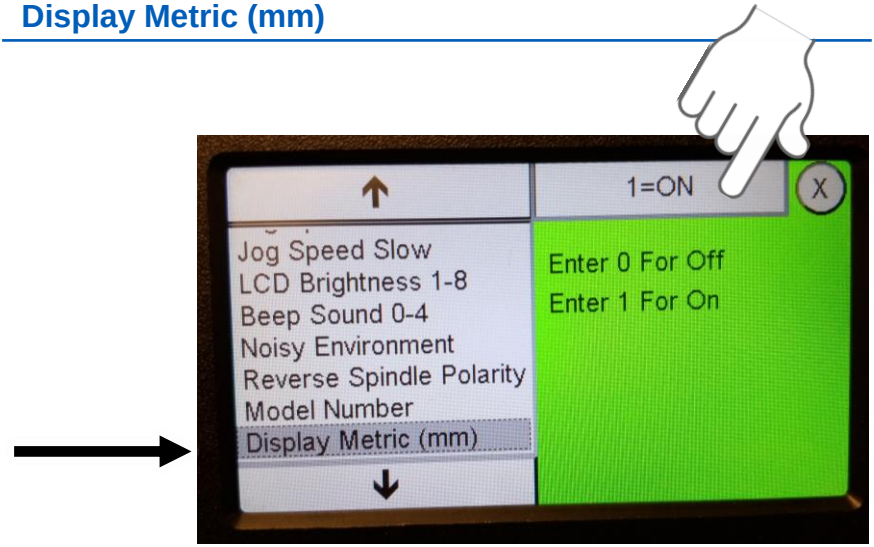
Model Number



The **Model Number** controls several default setting on your SHARK CNC such as motor rotation and XY machine orientation. Verify the model number setting for you machine using the chart below. Also, check this setting after you do a Control Box or Pendant firmware update.

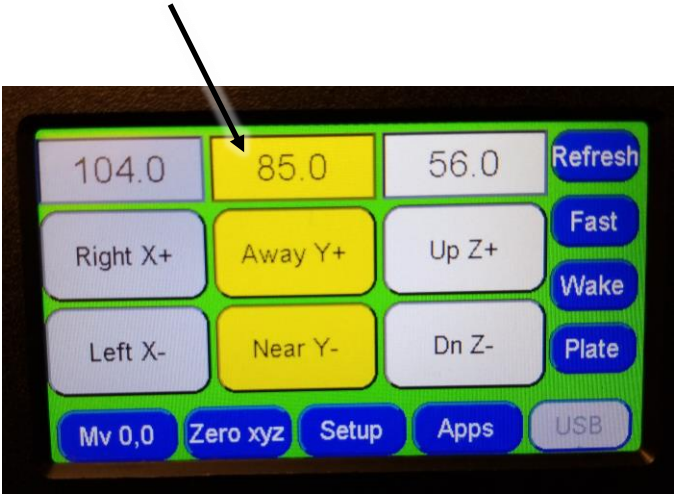
Machine	**Model Number**
SD100 / Barracuda	300
SD110 / Piranha FX	102
SD120 / Piranha XL	202
HD500, HD510, HD520	4003
Shark II, HD4, HD4 Ext.	4004

Display Metric (mm)

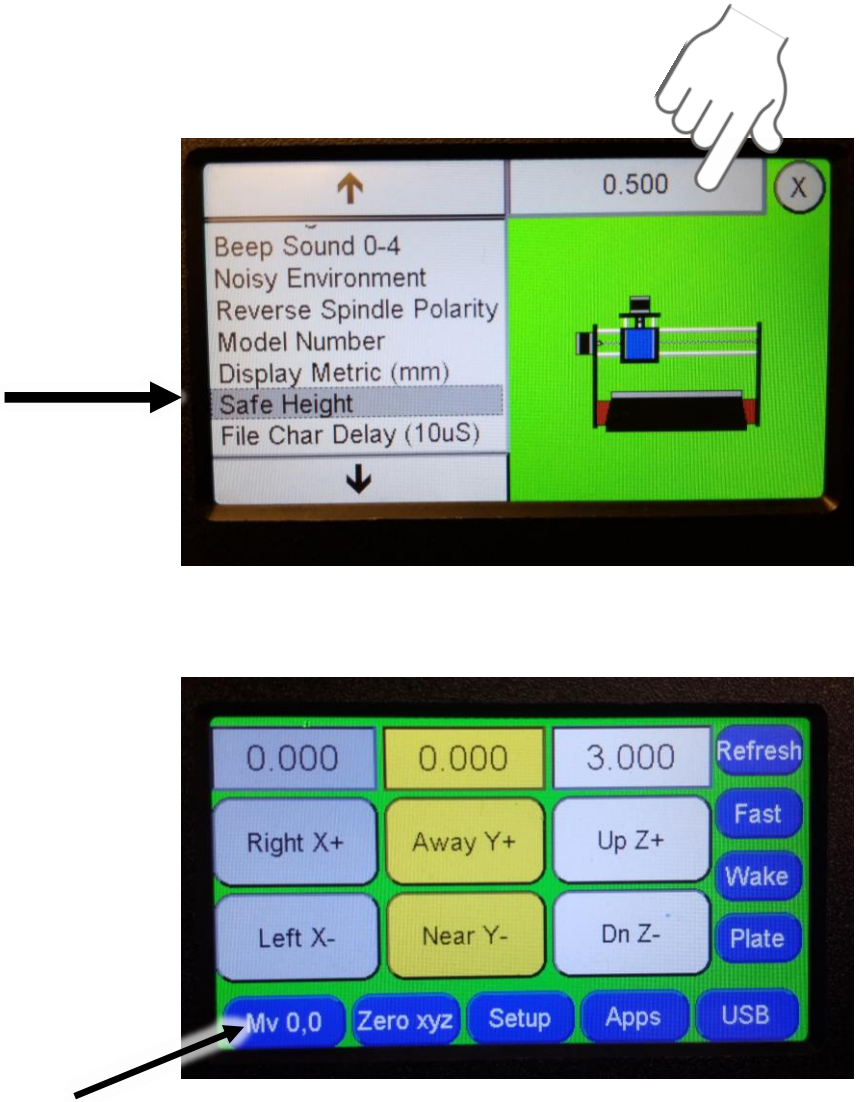


Display Metric toggles the position fields between millimeters and inches.

Position fields set to metric (mm).

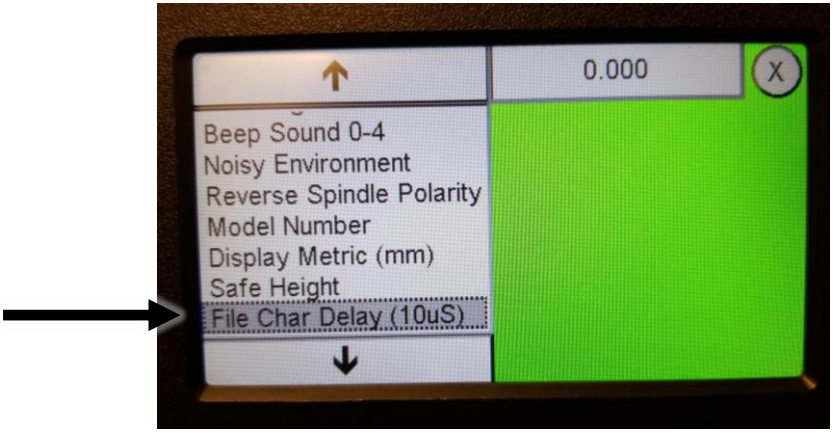


Safe Height



The **Safe Height** setting controls how far the router bit rises above Z zero when you press the Mv0,0 button.
You can adjust the Safe Height by pressing on the setting field at the top of the screen. This opens the keyboard.

File Char Delay

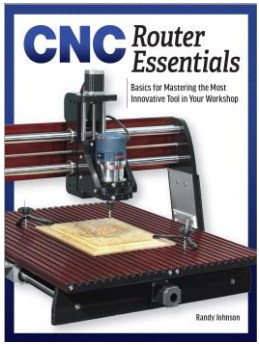


File Char Delay is for advanced setup and troubleshooting **u**sed by Tech support when troubleshooting special setups. Do not change this.

Explore and expand your CNC creativity with the book the shows you how.

Available from your Next Wave CNC distributor or online at www.NextWaveCNC.com

CNC Router Essentials
Get started right with the book that shows you how.

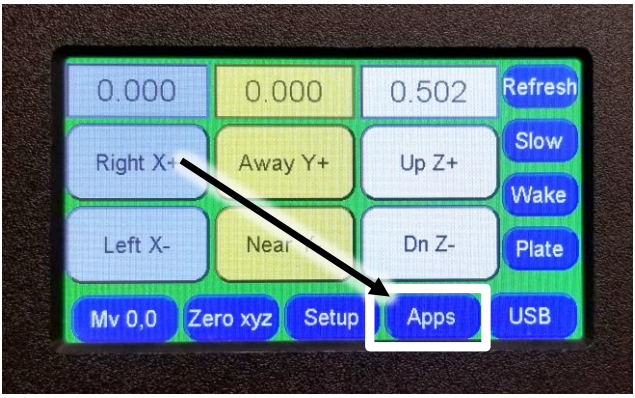


Explore and expand your accuracy with a Z Zero Touch plate from Next Wave CNC.

The Z Zero Touch Plate is available from your local Next Wave CNC distributor or online at www.NextWaveCNC.com

Z Zero Touch Plate automate your Z zeroing process with accuracy and convivence. The Standard model is 2” in diameter. The Mini model is 1” in diameter and is an add-on to the Standard model.

Apps Menu Screen



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Scroll down arrow
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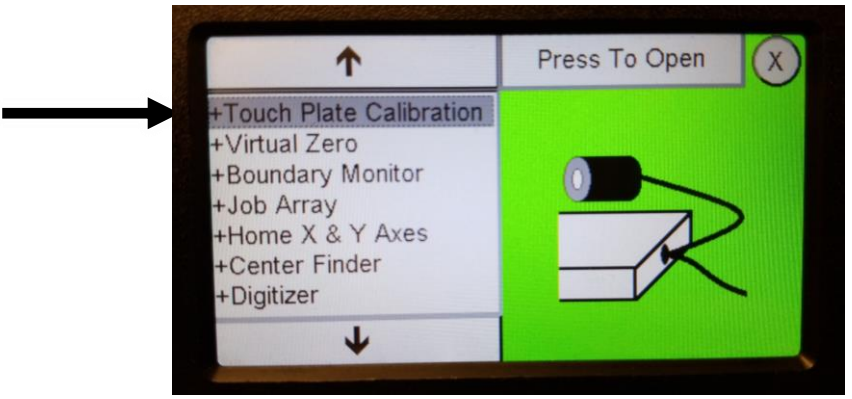
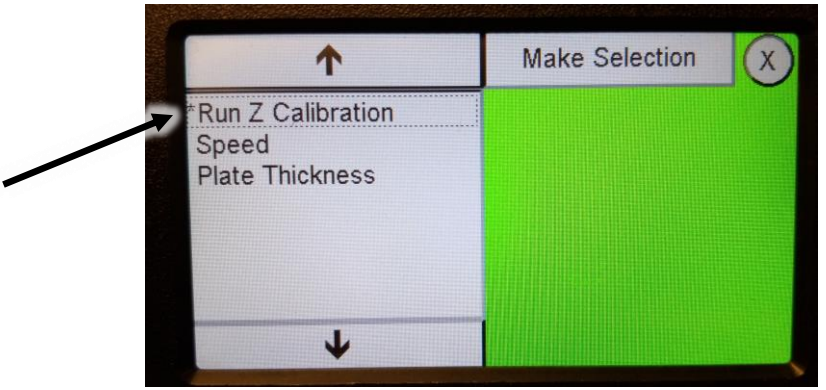
See page 60

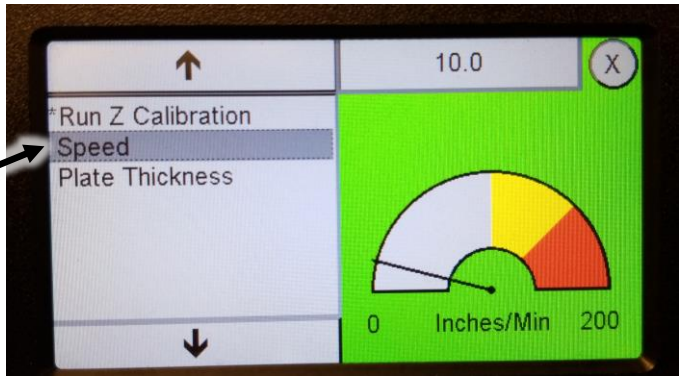
The **Apps** submenu contains special functions for calibrating operating your tool, and when using optional accessories. Press a submenu item to open the settings screen for that option. **Press X** to return to the Main Control Screen.



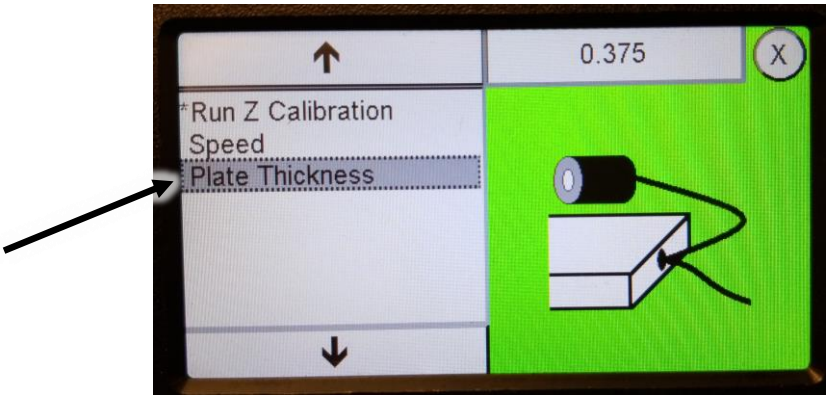
Press **Press To Open** to open the submenu



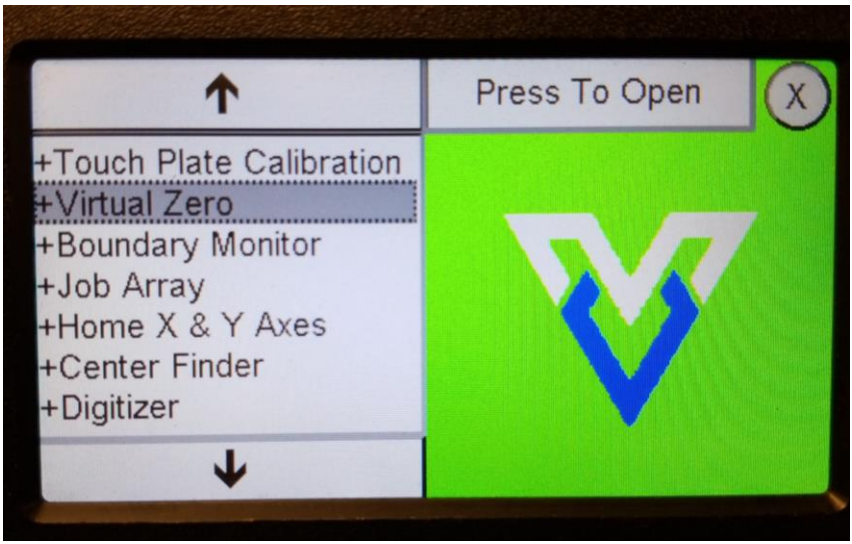
Pressing **Run Z Calibration to** initiate the Z touch plate routine. This function is the same as pressing the **Plate** button on the main screen.



The **Speed** setting controls the Z axis plunge rate during Z Calibration. Press the field in the top right to change the setting. The default setting of 10 works well for most situations.



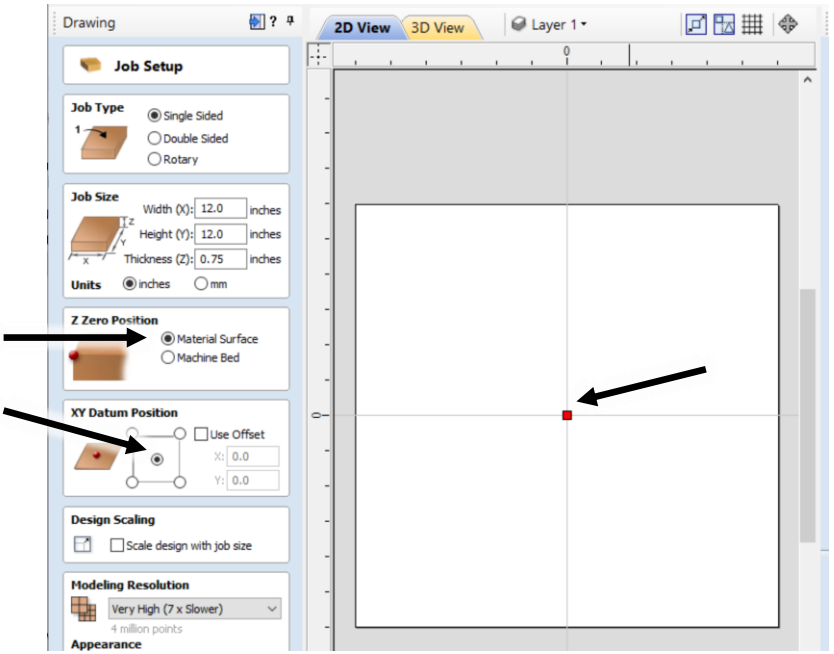
The default **Plate Thickness** setting of .375 corresponds to the standard thickness of Next Wave touch plates. This setting can be changed if you use a tough plate with a different thickness or if you want the Z Calibrations routine to calibrate a little thicker or thinner than the actual plate thickness.



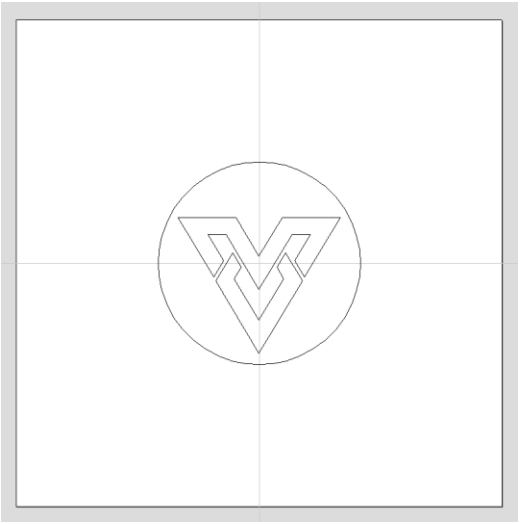
The **Virtual Zero** app is used to adjust your .tap cutting file to conform to a slightly warped, curved or out of level project material or machine table. The Virtual Zero app maps the uneven surface of your project board and adjusts the g-code in the .tap cutting file to match the Z height variations caused the uneven board or machine table.

The Virtual Zero map is automatically saved and can be used multiple times on the same part when different router bits are needed to complete the project. The Virtual Zero map is saved until you redo it or turn of the control box.

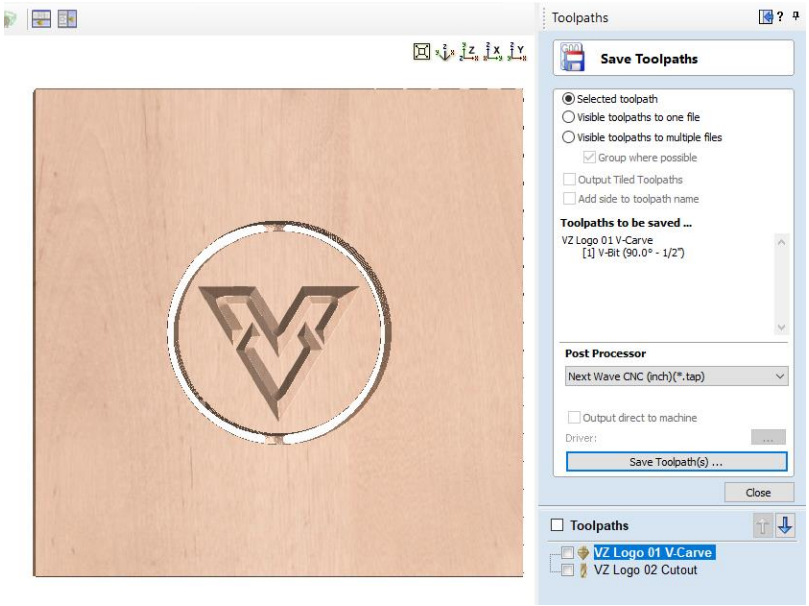
Mapping the surfaced of your material with Virtual Zero involves several steps, so it's recommended that you read through on the steps on the following pages and then practice it a few times before cutting your project.



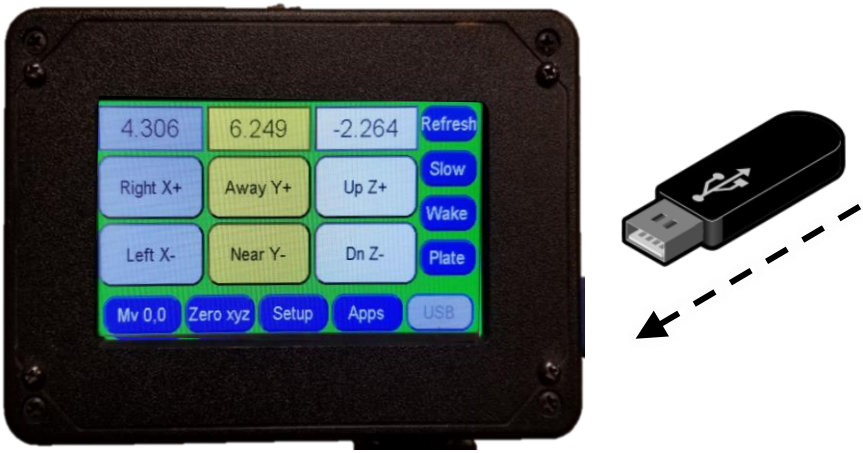
Step 1
In VCarve, set the **Z Zero Position** to the **Material Surface** and the **XY Datum Position** to the **center** of your project.



Step 2
Create your project design.

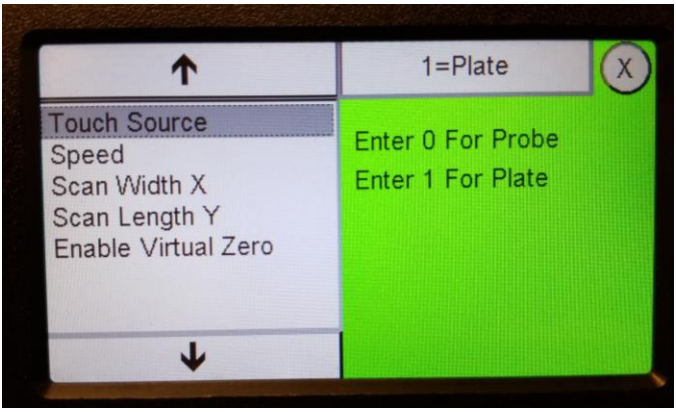


Step 3
Create and **Save Toolpaths** to your USB drive. In this example, we need two toolpaths to complete the project.

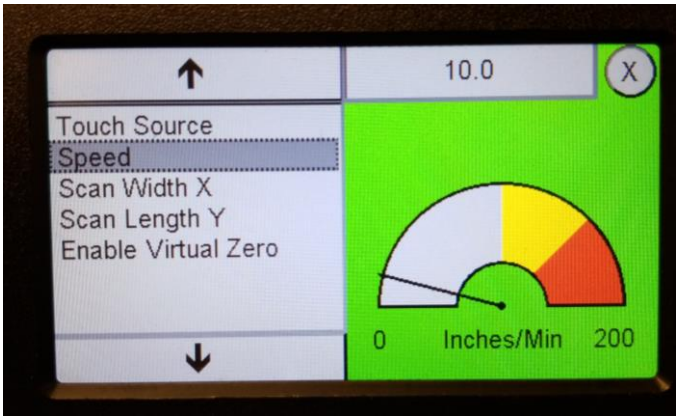


Step 4
Insert USB drive into Pendant

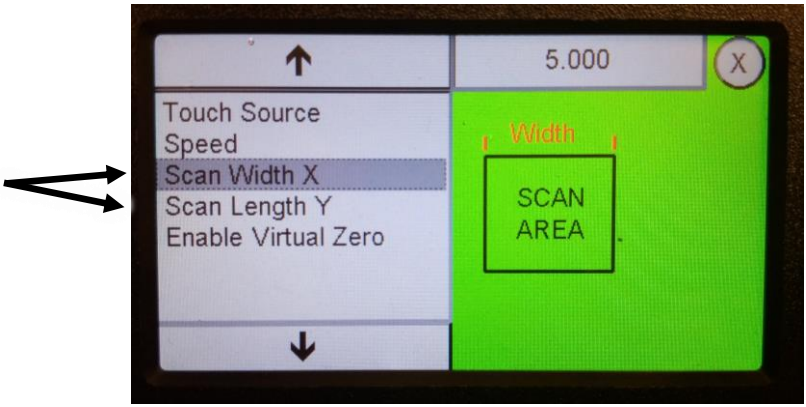
Step 5
Open the **Virtual Zero** app on the Pendant and touch **Press To Open** to open the **Virtual Zero** settings screen.



Step 6
Select your **Touch Source.** The **Plate** (touch plate) option is commonly used because most SHARK owners already own the touch plate, but the **Probe** (digital probe) also works well. Press the field at the upper right to change the selection.

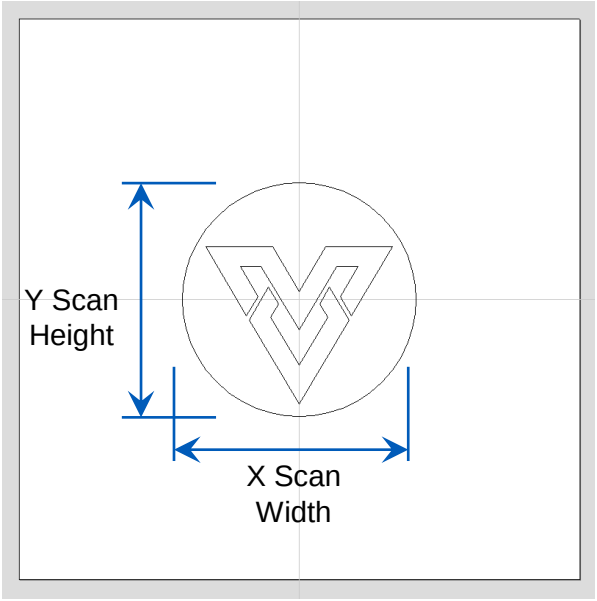


Step 7
Set the **Speed** setting. This controls the Z-axis plunge rate during the Touch Plate process. The default setting of 10 works well for most situations. To change the setting, press on the settings field in the top right.

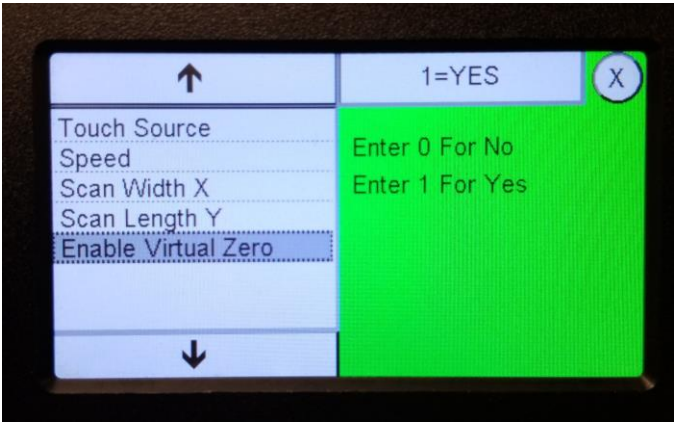


Step 8
Set the **Scan Width X** and **Scan Length Y** for the area you want to scan. This is typically the size of your cutting area (see next page).

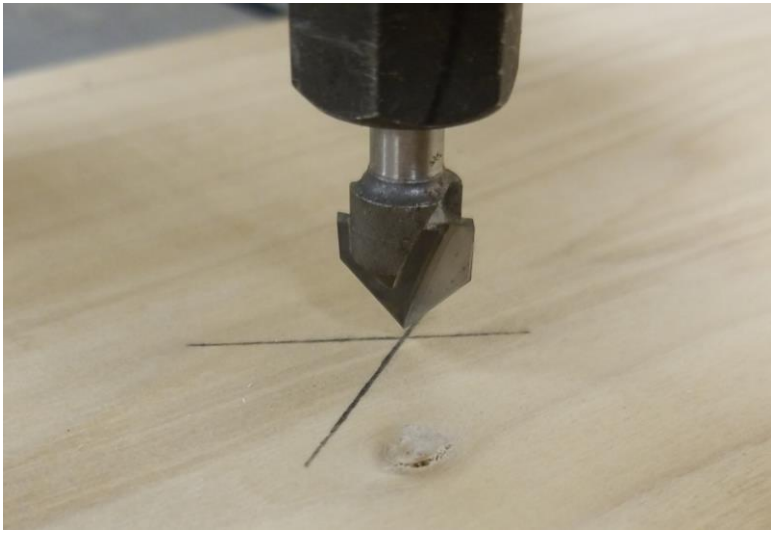
Note: Setting the Scan area is not required, since you can also use the VCarve file size as the scan area. This is covered on pages 39 and 40



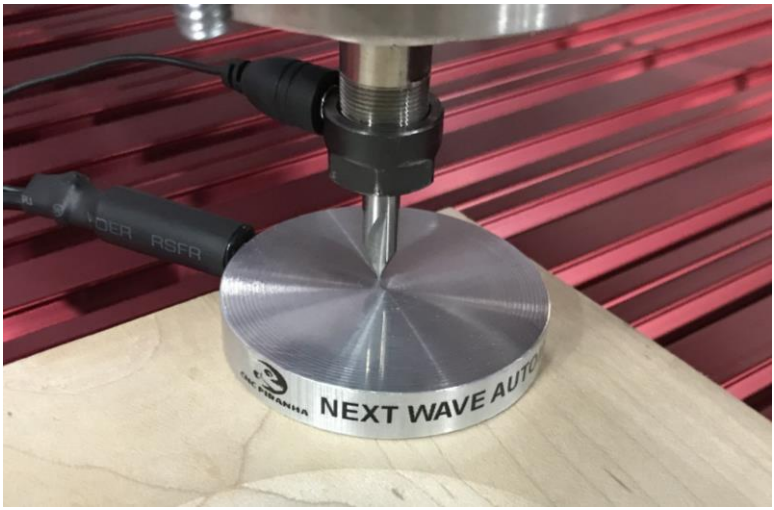
The **XY Scan Area** can be set to any size, but it's usually most useful to limit it to approximately the cutting area for your design.

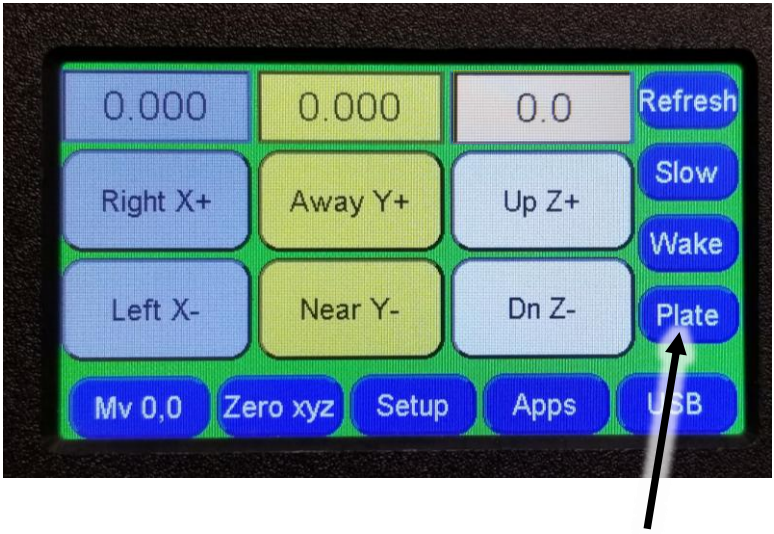


Step 9
To **Enable Virtual Zero** press the settings field in the upper right and entering **1 for YES**. Press **X** to exist this screen and return to the main screen

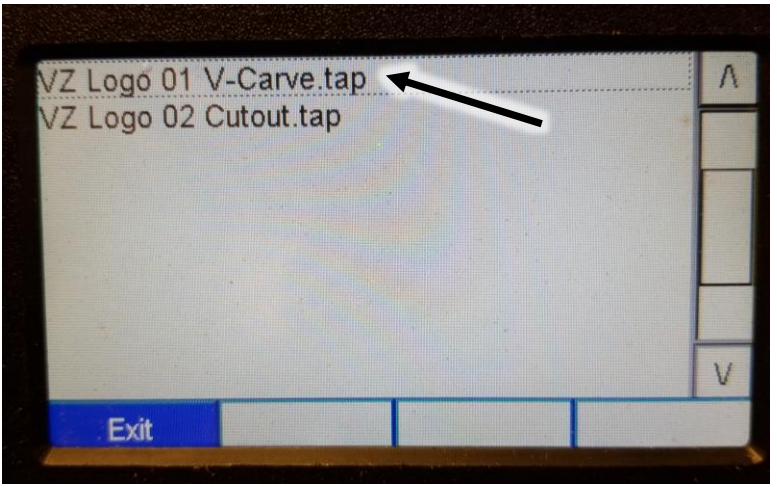


Step 10
Install the router bit. Move the router bit to the center of the pencil mark. Press **Zero xyz** to zero the X and Y axes (tip of router bit) to the center of the material.

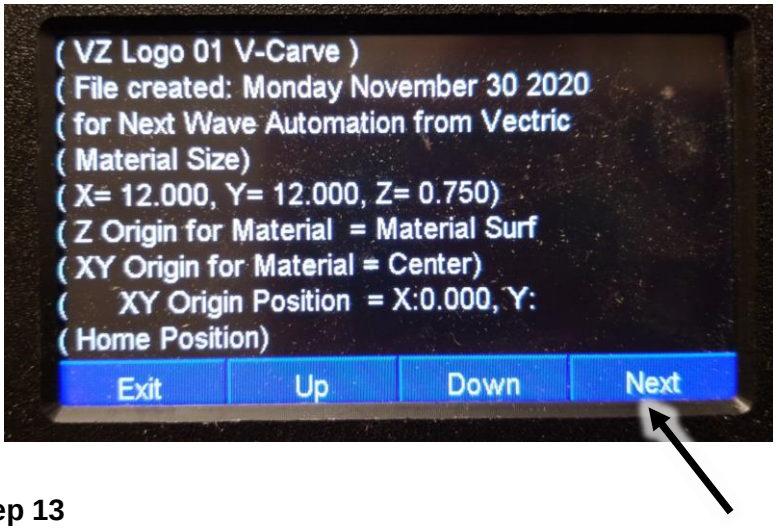




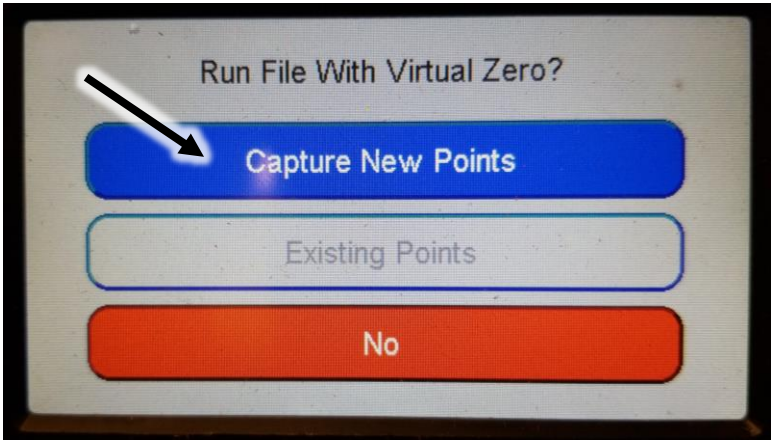
Step 11
Use the **Plate** function to zero the Z axis to the top of material.



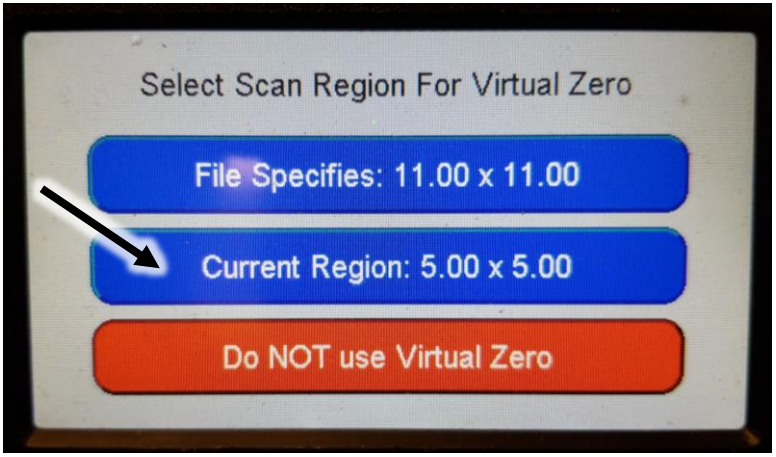
Step 12
Select the toolpath file that you want to cut. In this example, we're starting with **VZ Logo 01 V-Carve.tap.**



Step 13
Review the header information screen, if it looks OK, press the **Next** button to continue.

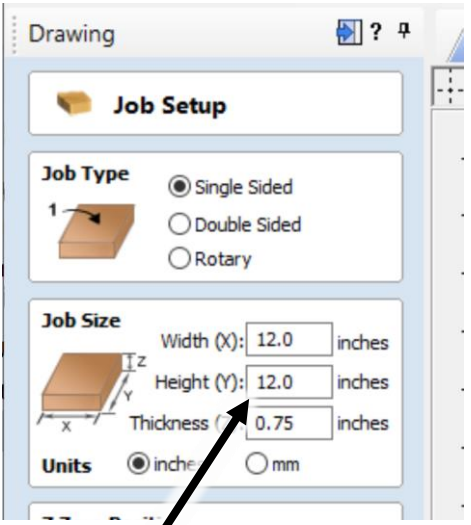


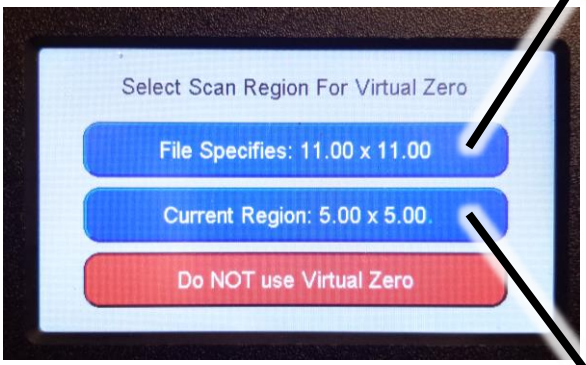
Step 14
Press **Capture New Points** to start the Virtual Zero scan routine. Press **No** if you don't wish to use Virtual Zero for this .tap file. The **Existing Points** button is greyed out because no points have yet been captured.

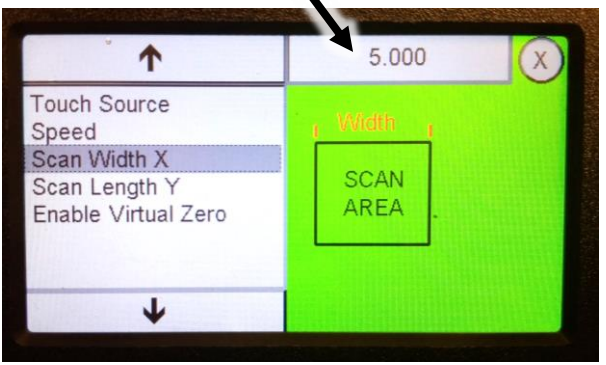


Step 15
Select the **Scan Region**. See the next page for information on the differences between **File Specifies** and **Current Region.**

The **File Specifies** region equals the Job setup less 1 inch. This provides a half inch of clearance around the material to assure the scan area stays within the boundary of the material and to allow some room from clamps.

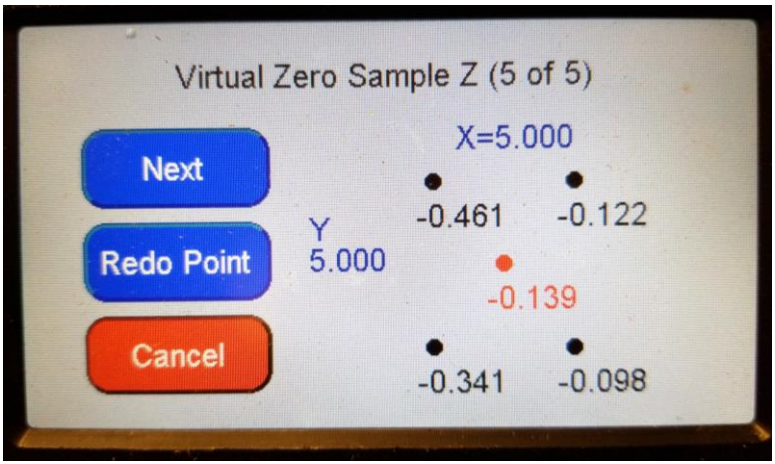




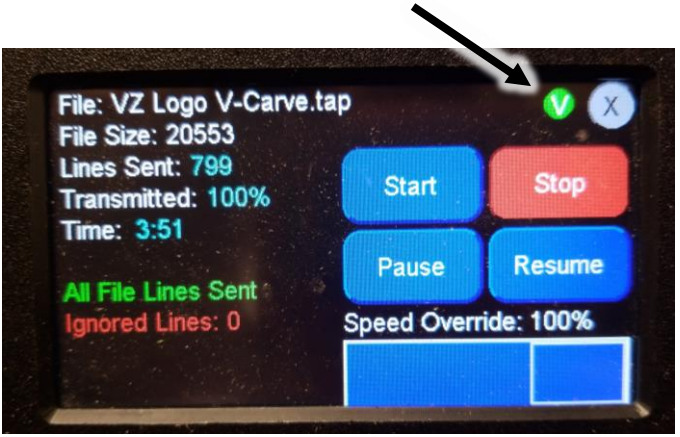


The **Current Region** uses the Scan Area specified in the Virtual Zero app

Step 16
Once activated, Virtual Zero uses the Touch Plate routine to capture the scan points. It repeats the routine five times in order to capture the four corners and center point of the scan area. (See below).



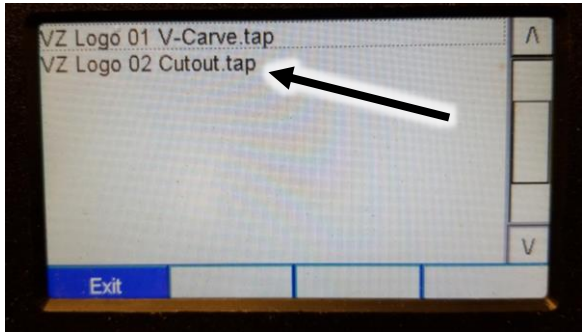
Step 17
The amount that the captured point varies original Z zero position appears next to each point. After scanning a point you can **Redo Point** or press **Next** to continue.



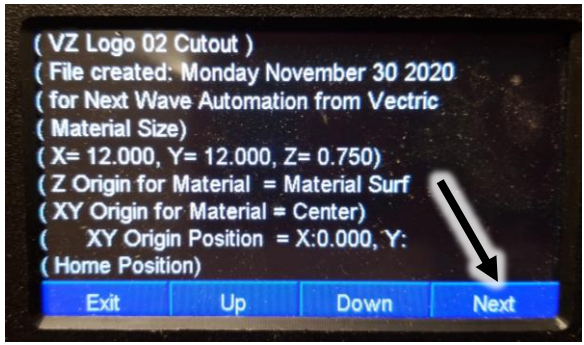
Step 18
When the **Start** screen appears, run the file as usual. Notice that a small green V appears in the top right corner of the screen. This signifies that the file is using Virtual Zero.
After the first file is done running, press the **X** to return to main screen.

Step 19
The first toolpath is now complete.

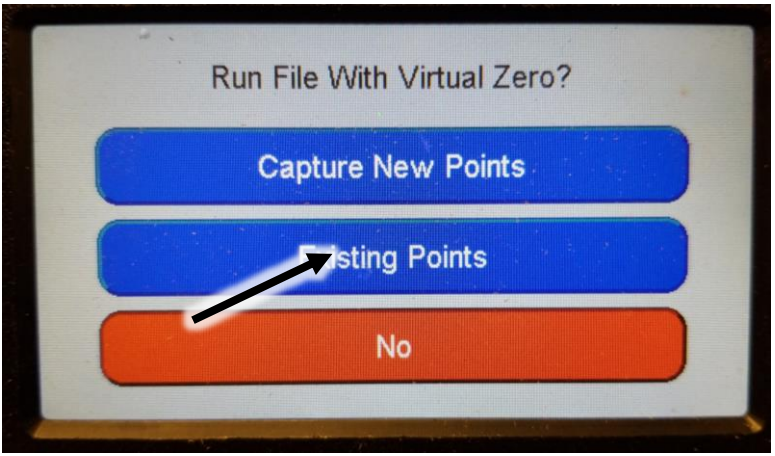
Step 20
Use the move buttons on the main screen as needed and install the next bit. In this example we're using a 0.25-inch endmill bit for the next toolpath.



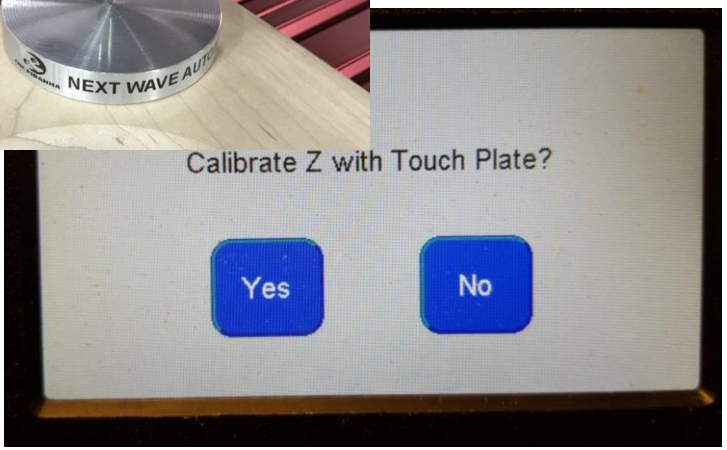
Step 21
Select the next .tap file that you want to run for your project. In this example, we're using the **VZ Logo 02 Cutout.tap** file.



Step 22
Review the file information screen and click **Next**.



Step 23
Since we've already captured the points for this project, press the **Existing Points** button on this screen.



Step 24
Selecting **Yes** launches the Touch Plate Z calibration routine for the new bit.

Step 25
Run the next tap cutting file in the normal way. The green **V** appears at the top confirming that this file is using the Virtual Zero points.

Step 26
This completes the **Virtual Zero** routing for this project, but you the **Virtual Zero** map can be reused as many times as you need to for this setup until all your toolpaths have been run. If you install a new piece of material, you need to redo all the **Virtual Zero** points, because no two boards are the same.

Explore and expand your creativity with these accessories from Next Wave CNC.

Available from your local Next Wave CNC distributor or online at www.NextWaveCNC.com

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Router bits – Find the right bit for your project. Bits are available in a variety of sizes and shapes and as singles or sets. V-Bits, straight bits, upcut spirals, carving bits, small diameter bits and coated long lasting bits.

Starter sets

General purpose sets

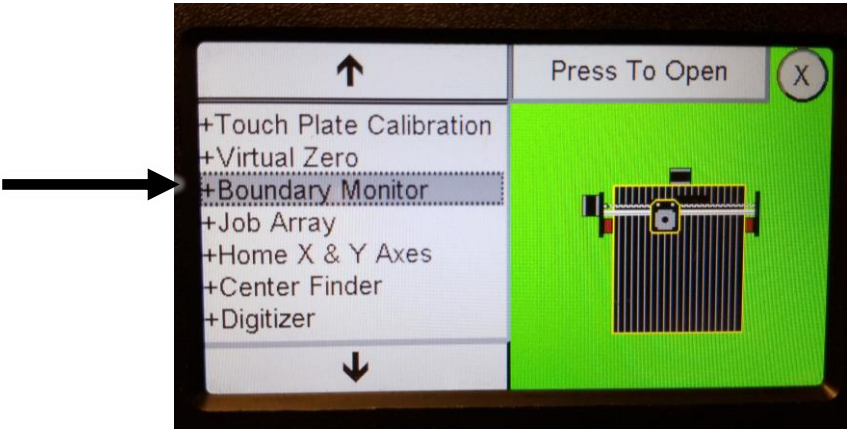
1/8 dia. tapered ball nose

1/4 dia. Spiral Upcut

1/2 dia. 90 deg. V-bit

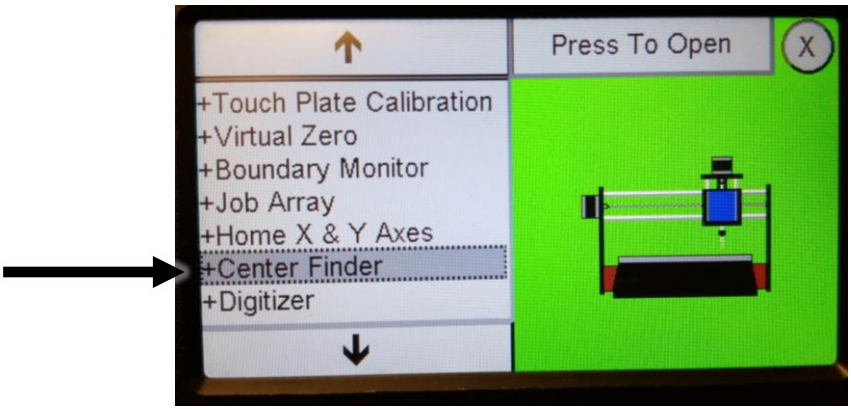
1/4 dia. 60 deg. V-bit

Boundary Monitor



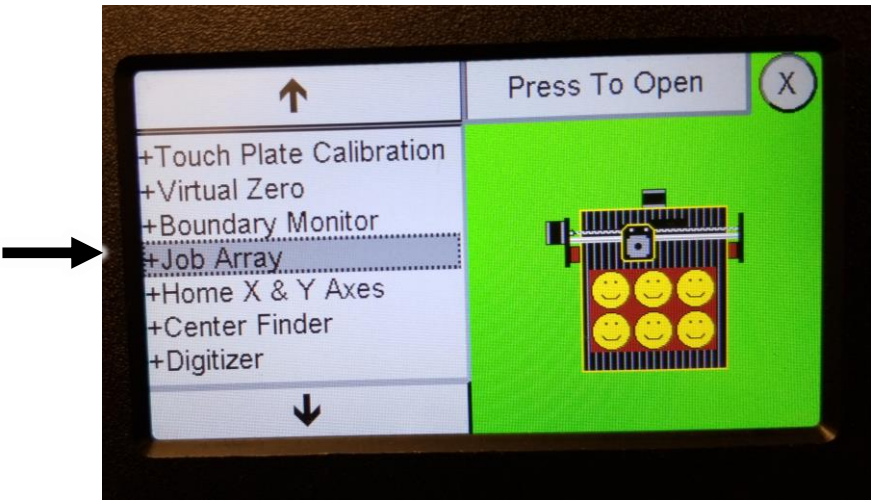
The **Boundary Monitor** is still being developed and will eventually operate similar soft stops.

Center Finder

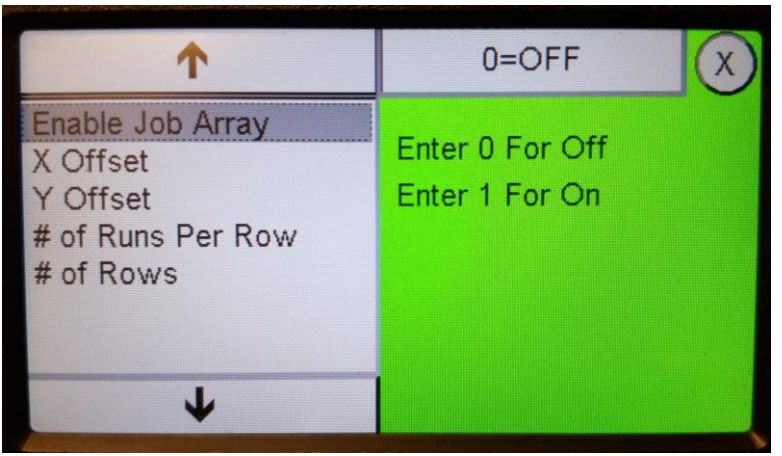


The **Center Finder** is a discontinued feature.

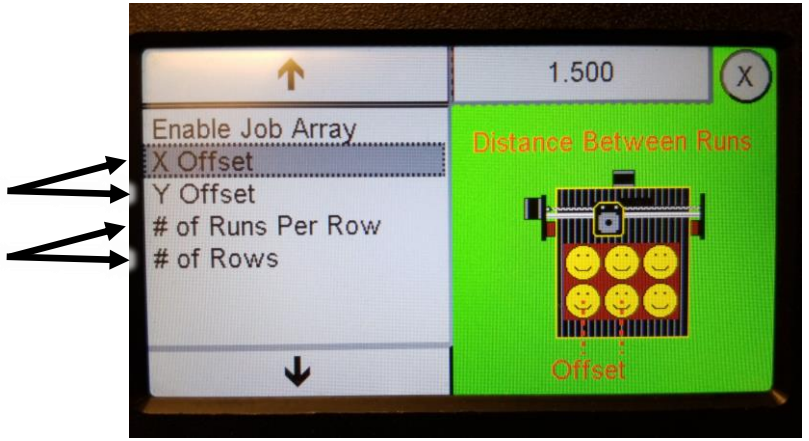
Job Array



The **Job Arra**y app allows you to create duplicate parts from a single design.



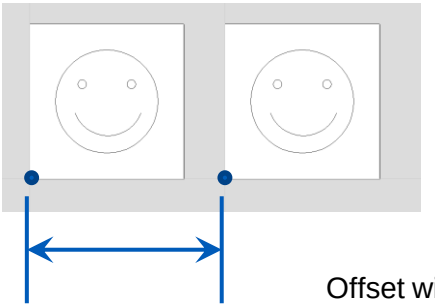
Use the **Enable Job Array** setting to toggle the app **ON** an **OFF**.



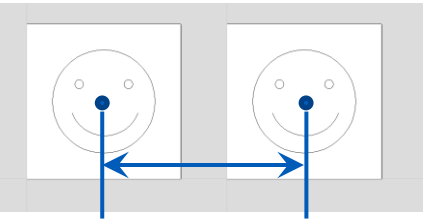
The **X and Y Offset** equals the distance between X-Y datum points for each part. Also see the details below.

The **# of Runs and Rows** controls the number of copies in the X and Y direction.

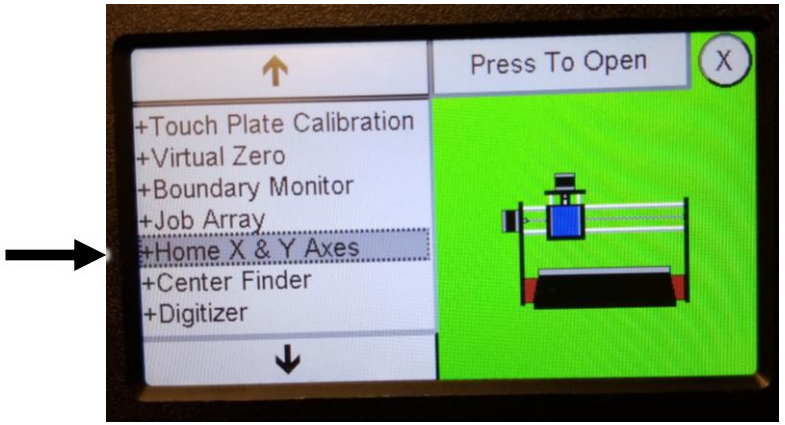
Offset with Lower Left XY datum



Offset with Center XY datum

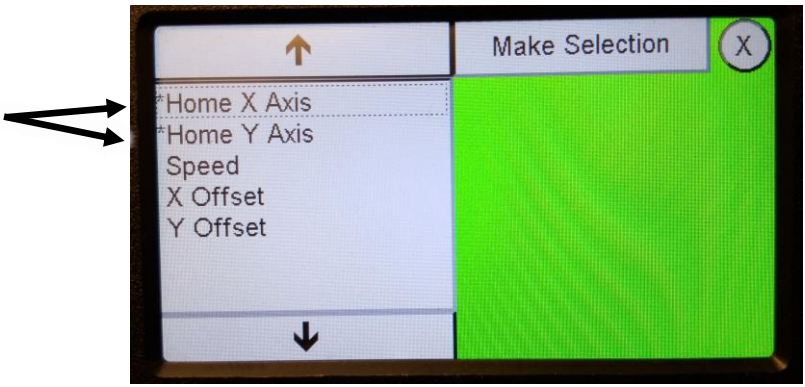


Home X & Y Axes

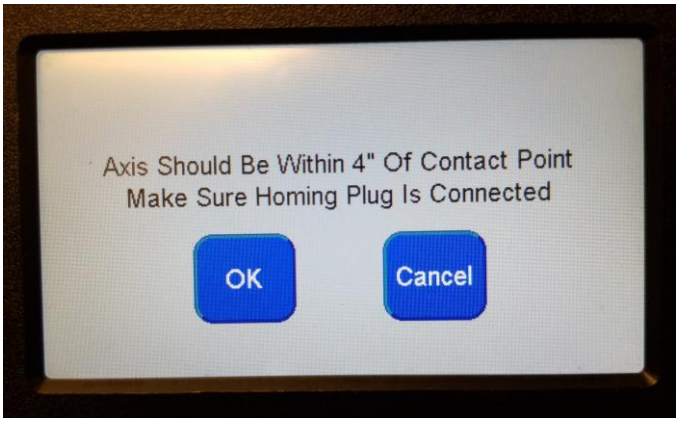


The **Home X&Y Axis** app calibrates and zero's out the X and Y axes to the "machine home" location in the lower left corner of the table. X-Y Home can be calibrated each time you power up your SHARK or at anytime during before you run a file. It provides a repeatable reference point that is particularly useful when using jigs or when you need to run a cutting file from a precise, repeatable location.

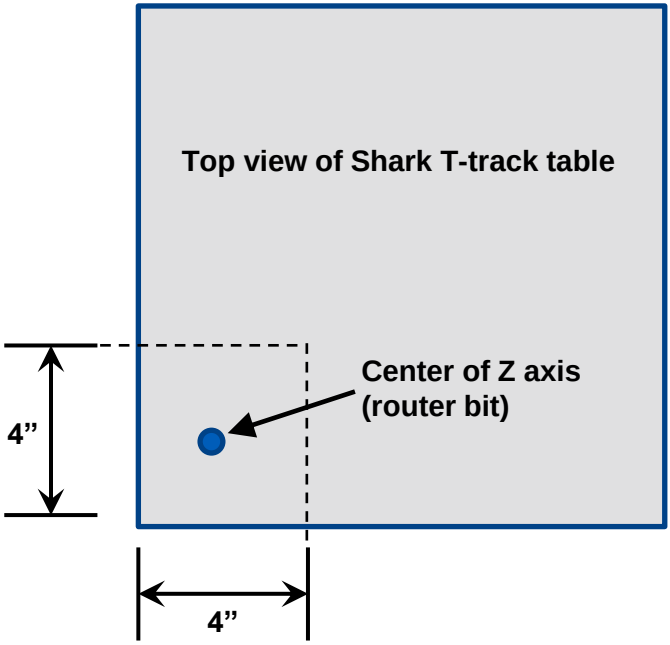
NOTE: The Home X&Y Axis app only works with the SD120, HD500, HD510, HD520 machines. The SD100 and SD110 do not have the required sensors, nor can the sensor be added to the SD100 or SD120.

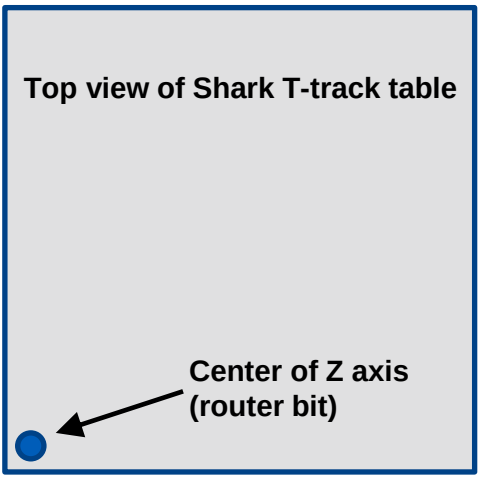


Selecting either **Home X Axis** or the **Home Y Axis** starts the homing route for that axis.



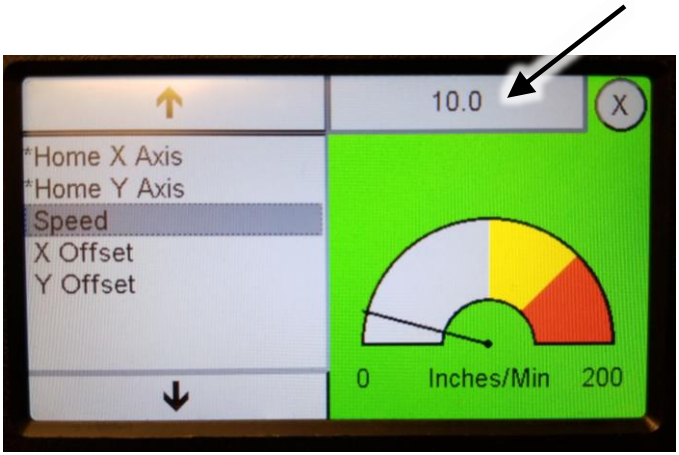
You must be within 4 inch of the left side and the front of the machine when you run the routine





X0 , Y 0

When the Homing routine completes, the Z axis (router bit) will be centered over the Machine Home location and the Pendant will read X0,Y0.



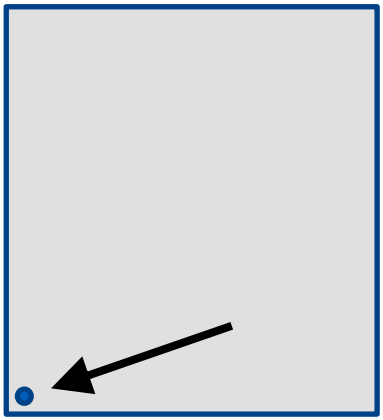
The default **Speed** setting of 10 works well, but it can be adjusted by pressing the settings field at the top and entering a different number.

XY Offset option

The **X offset** and **Y offset** options allow you to set the X-Y zero location a precise distance from the machine's Home position. This new location can be referred to as project zero because it matches the XY datum location in your VCarve Job Setup.

NOTE: The **Offset** number must be a negative number.

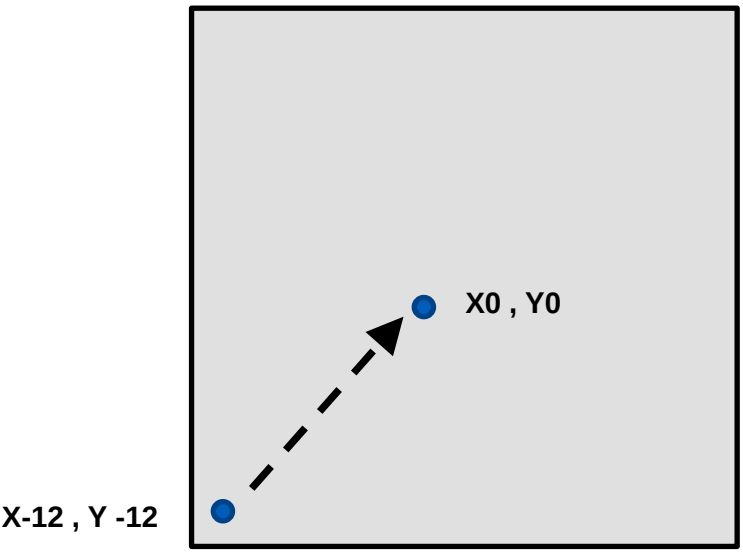
After setting the **Offset** amount run the **Home X Y Axis** routines. When the homing routines finish running, the X-Y axis will be positioned at the Machine Home location (see below) but the X and Y position fields on the main screen will reflect the negative offset amount (see next page).



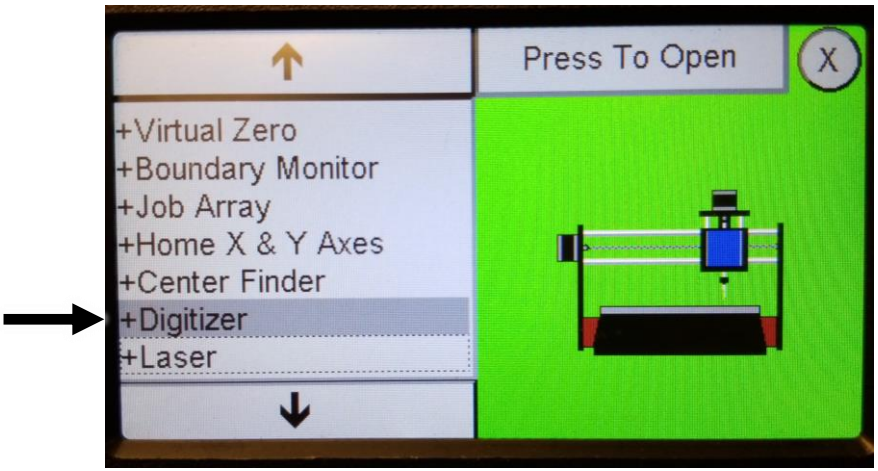
X -12 , Y -12

XY Offset option (cont.)

After the Offset calibration completes, press **Mv 0,0** to move the X-Y axes to the new “project” zero location (see below).



Digitizer

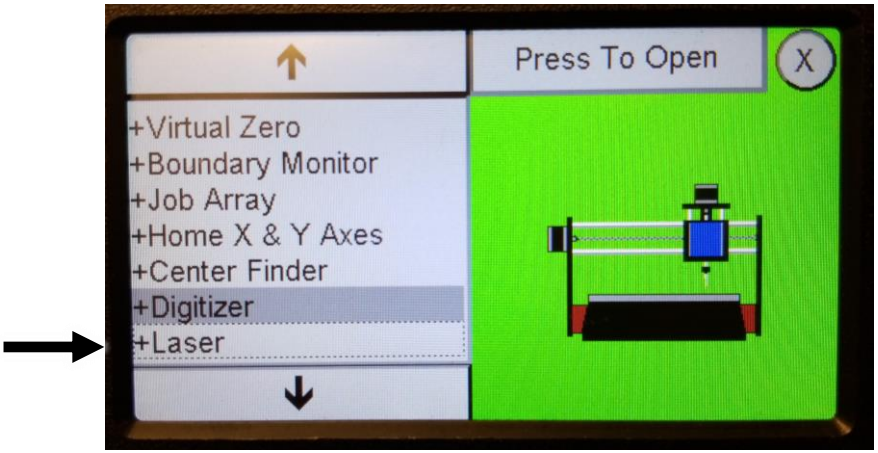


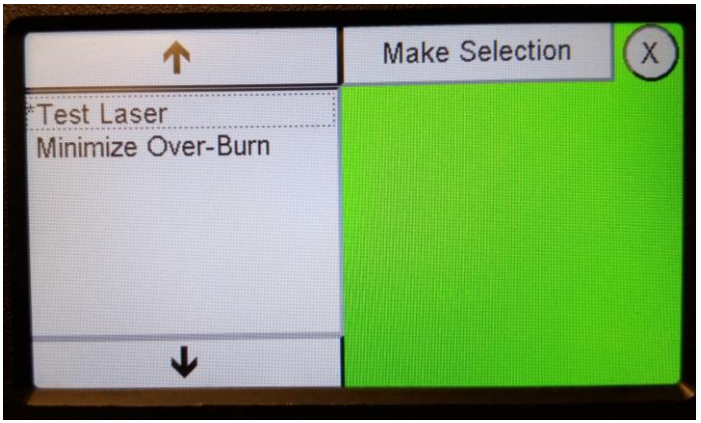
The **Digitizer** accessory is used to map the shape of your project. The scan is used to create a copy of an existing carving or in conjunction the Virtual Zero app (page 30). See the Digitizer Owner's Manual for complete use and operating information.

Explore and expand your creative and capabilities with the Laser Module accessory from Next Wave CNC.

Available from your local Next Wave CNC distributor or online at www.NextWaveCNC.com

Laser Module– Available in 2- or 7-watt power. The Laser Module enables you to create detailed laser engraved photographic engravings, images and lettering.





Test Laser is used to manually fire the laser at very low power. This allows you to verify the position of the laser without burning the material.

Minimize Over-Burn reduce the laser intensity when the machine slows down around corners. (Does not apply when burning raster files.)

See the Laser Owner's Manual for complete use and operating information.

Explore and expand your creativity with these accessories from Next Wave CNC.

Available from your local Next Wave CNC distributor or online at www.NextWaveCNC.com

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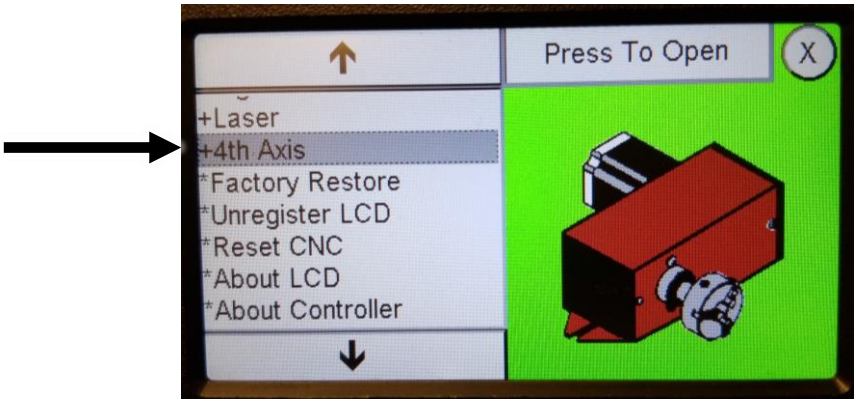
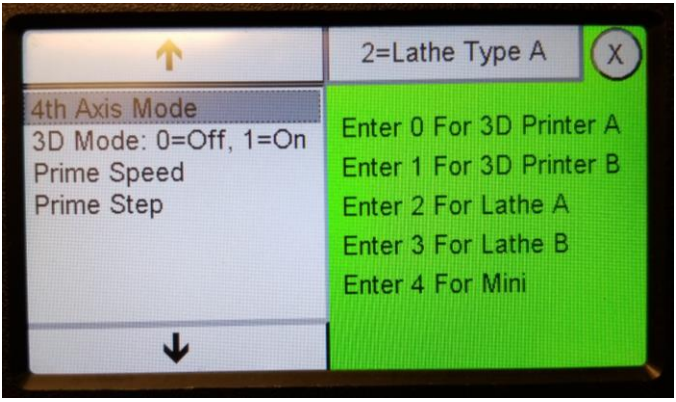
Mini Rotary 4th Axis – Works like a wood lathe but can also carve intricate patterns and designs in your CNC project. Excels at turning pens and tool handles.

4th Axis



The **4th Axis** app provides setup options for the various rotary **4th** axis accessories available from Next Wave CNC.



4th Axis Mode - opens 4th axis accessory selection screen

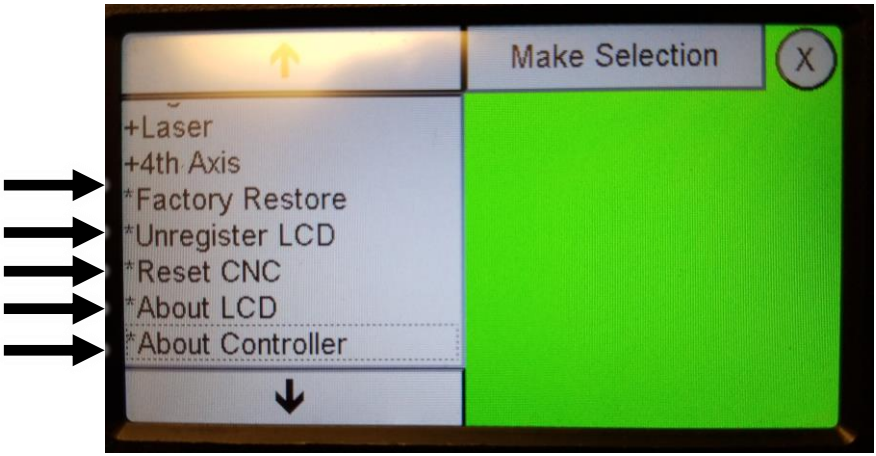
3D Printer – discontinued

Lathe A – use this setting for the current standard rotary 4ht axis accessory

Lathe B – use this setting for 4th axis accessories manufactured before 2015

Mini – use this setting for the current Mini rotary 4ht axis accessory

3D Mode, Prime Speed, Prime Step – associated with the 3-D printer and no longer used.



Factory Restore restores the defaults settings in the Settings and App screens.

Unregister LCD removes the Access Code from the Pendant and the next time it is powered up you will need enter the Access Code to unlock the Pendant

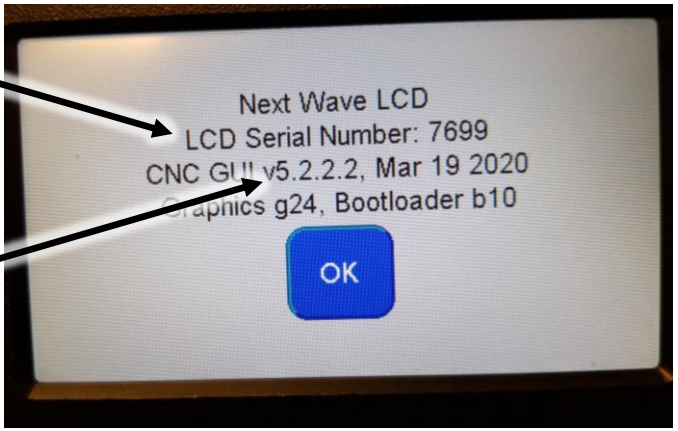
Reset CNC functions like the Refresh button the main screen (page 13)

About LCD displays Pendant serial number and firmware information (see next page)

About Controller displays Controller (control box) serial number and firmware information (see next page)

LCD Serial Number

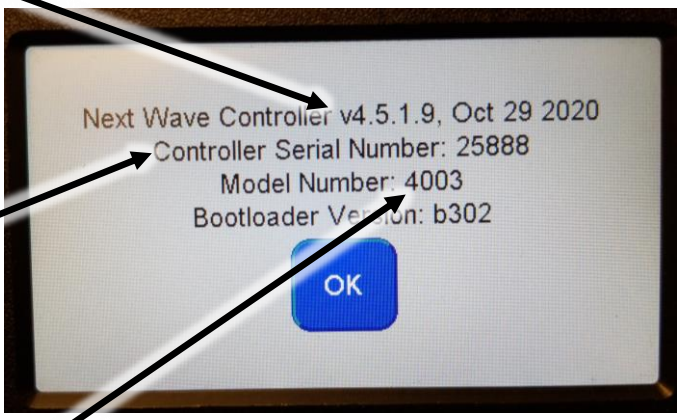
LCD Firmware Version



Controller Firmware Version

Controller Serial Number

Controller Model Number



Maintenance

Daily

- Check for damaged wires or components. Repair or replace as needed.
- Check for loose parts. Tighten or adjust as needed.

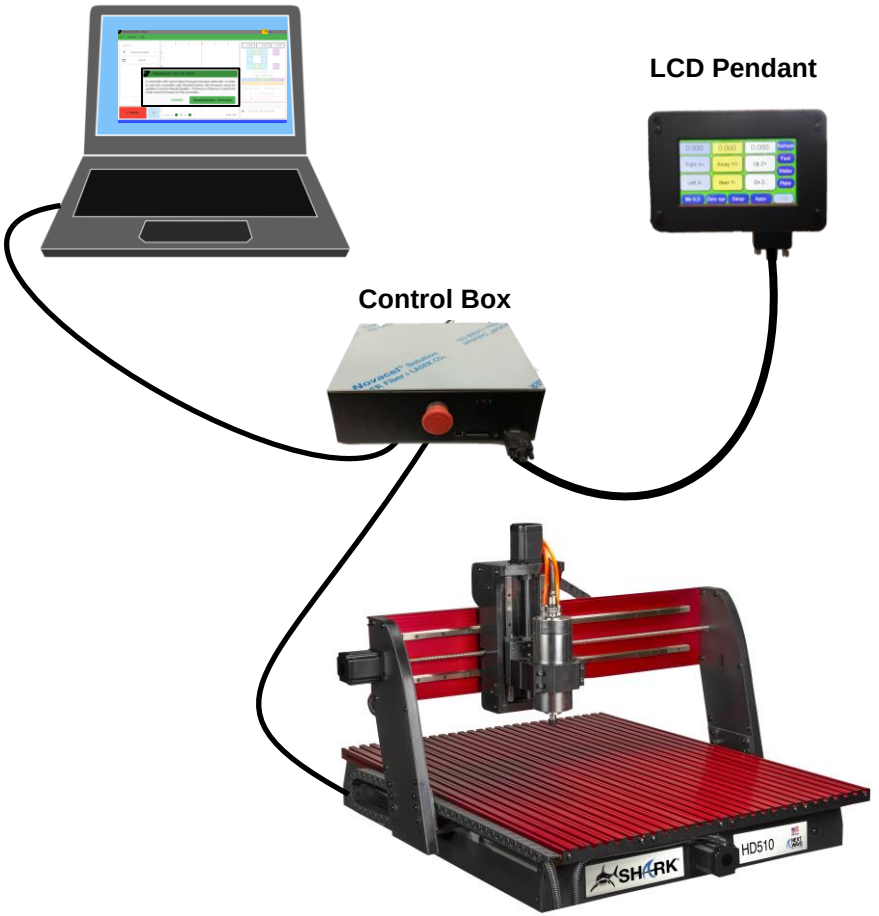
As Needed

- Dust-off
- Remove fingerprints with a soft cloth and computer screen cleaner or camera lens cleaner.
- Use canned air to clear the dust out of the USB port and around the edge of the screen.
- Use a folded piece of paper to clear wood chips from the edge of the screen.

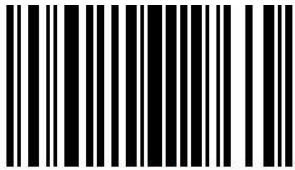
Firmware updates

For information on how to update the firmware on your Pendant and Control Box visit:
https://www.nextwavecnc.com/frequentlyaskedquestions

Ready2Control
(controls your SHARK from your computer)



Ready2Control software provides another method to control your SHARK CNC. It has a few more functions and screen visuals than the LCD Pendant. Controlling your SHARK using the Ready2Control does, however, requires you to connect your computer directly to your SHARK Control Box. Ready2Control can be connect at the same time as the LCD Pendant, and you can toggle between the two as needed. More information about Ready2Control can be found at www.NextWaveCNC.com.



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SHARK LCD Pendant Control
Owner's Manual
12/01/20