

# CNC Shark<sup>™</sup> Shark Control Panel 2.1



## **USER'S MANUAL**

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Updates of this manual may be available at <u>www.nextwaveautomation.com</u>.

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## **To Our Customers**

Thank you for purchasing the CNC Shark Control Panel 2.1! Your CNC Shark Control Panel 2.1 brings enhanced CNC machining capabilities to your CNC Shark system.

This manual tells you how to install and use your CNC Shark Control Panel 2.1. Please read the manual carefully. The manual also includes our warranty and important safety information.

This manual has been written with the assumption that the owner is familiar with the basic operation of a computer as well as the basic aspects of techniques for the safe operation of woodworking power tools. Information in this manual is subject to change without notice.

Again, thank you for purchasing the CNC Shark Control Panel 2.1. If you ever have any questions or comments, feel free to contact us at the address below.

Next Wave Automation, LLC 7235 Progress Street Holland, OH 43528 www.nextwaveautomation.com

Email – <u>info@nextwaveautomation.com</u> Support Email – <u>support@nextwaveautomation.com</u> Support Phone – (419) 491-4520

## **CNC Shark Registration Information**

Record your CNC Shark Control Panel 2.1 and other Shark accessory registration codes here for safe keeping and central record keeping.

Shark Control Panel 2.1 :
Shark Touch Plate:
Shark Touch Probe:
Shark 4 <sup>th</sup> Axis Table Top Kit:
Control Box Serial Number:
VCarve Pro User Name:
VCarve Pro License Code:
Cut3D User Name:
Cut3D License Code:

Note: Depending on the Shark model and accessories you have purchased, you may not have one or more of the items listed above at this time.

Note: You can click on a page number in the contents and quickly navigate to that section.

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## Safety

The CNC Shark, along with a router or other power tool, is a computer-numerically-controlled (CNC) routing system. As such, it is a powerful system that can reduce your woodworking risks by providing a method of cutting wood and other materials without having to interact with the cutting tool(s) or material during the fabrication process. As with all power tools, your care and attention are required to ensure that you use your CNC Shark safely. Next Wave Automation assumes you will use your CNC Shark safely and follow accepted safety precautions and practices for woodworking and machining.

You should read and practice the safety recommendations found in the Shark Family Owner's Manual while using the Shark Control Panel 2.1.

[Contents] [Software Installation] [SCP2 Registration] [CNC SCP2] [Virtual Zero] [Appendices]

## **Software Installation**

[Contents] [Safety] [SCP2 Registration] [CNC SCP2] [Virtual Zero] [Appendices]

The Shark Control Panel 2.1 (SCP2) must be installed before you can connect to the Shark Control Box using a USB cable and complete the system setup. This section outlines the steps necessary to complete this installation.

The SCP2 is a separate program and can 'co-exist' on the same computer with the Shark Control Panel 1.6.x. You do not need to uninstall the SCP 1.6.x before installing the SCP2.

The SCP2 supports use on a Windows XP with Service Pack (SP) 3, Windows Vista, Windows 7 and Windows 8. Installing the SCP2 on a Windows XP SP3 or Vista machine has one additional step than an installation on Windows 7 and Windows 8. This additional step is explained in detail in a section at the end of the manual – <u>Installing on Windows XP and Windows Vista</u>.

You can also choose to install the VCarve Pro and other Vectric software products that you may have purchased on the same computer you are going to use with the Shark Control Box, or a separate computer. These software packages come with their own installation instructions. If you have any difficulty installing the Vectric products, please contact Vectric support for resolution.

## **Getting the Latest Software**

You will receive a download link for the SCP 2.x software via email. Updates are announced to registered users via email as well. The SCP 2.x software is not available for download from the Next Wave Automation web site.

## **Installing the Software**

The CNC SCP2 and the USB driver are installed using the CNCSharkControlPanel-2.x.x.exe file. If you are not familiar with installing software on your computer, or run into problems during your first attempt, you may want to go to the <u>SCP Installation Step by Step</u> appendix. If at any point in the installation process described below, you make a mistake, you can always repeat the steps. For example, you may not install the USB driver because you inadvertently cleared the check mark and then hit finish at the end of the CNC SCP2 installation. At that point, you can 'start over' and successfully install both components.

Don't be confused if the file name for the Shark Control Panel 2.x you download is different than that listed in this manual. A difference in name only indicates to you that a new version of the Shark Control Panel is available to you. If you are using Norton's 360 anti-virus, you should disable the antivirus auto-protect while installing the Shark Control Panel and USB driver. You can turn it back on after the installation is complete.

If you have connected the Shark Control Box (SCB) to the computer via the USB cable, ensure that the SCB is 'off'. Double click on the installCNCSharkCP\_v2.1.exe. This will start the installation. You will see several prompts during this process. Click 'Run', 'Yes' or 'Next' to continue the installation.

The CNC SCP2 Setup then indicates that the installation is finished. There are check boxes that are already selected to enable the installation of the USB driver, updating the Shark Control Box firmware, and installing the Direct Output files after clicking on Finish. If this is your first installation, ensure that these boxes are checked, and click on Finish. If you are updating the SCP 2.1, you may choose to uncheck any or all of these. There is no harm in leaving them all checked.



Figure 1 - CNC SCP2 Installation Complete

After clicking on 'Finish', you will be presented with several popup windows as the USB drivers are installed, when to connect the SCB and turn it on, as well as during the firmware update process. Click 'Run', 'Yes', 'Finish', 'OK', or 'Next' to continue the installation.

If this is a first time installation, after you connect and turn on the SCB – at the prompt from the installation process – you may notice a 'Found New Hardware' message in the task bar. If the 'Found New Hardware Wizard' opens, be sure to select 'No, not at this time' for searching Windows Update and

then select 'Install the software automatically' on the next panel. If you receive any warnings, select 'Continue Anyway'. If you are not familiar with adding new USB hardware to your computer, you may want to review the <u>Shark Control Box/USB Driver First Time Installation</u> appendix.

The CNC SCP2 installation is now complete.

If you disabled Norton's 360 anti-virus, you can now enable it.

You will find the CNC Shark by NextWave group from the Start (programs) button, All Programs toggle. You can expand this to see the contents and access the manual along with the firmware updater at any time. With this release, the SCP 2.0 program group and software is not overwritten – a new program group is created. You can always open the CNC Shark Control Panel 2.0 program group and run the uninstall program for the SCP 2.0.



Figure 2 - CNC SCP2 Program Group

The SCP 2.1 installer also automatically creates a desktop icon.

## After Software Installation

If this is your first installation of the SCP, you are encouraged to review the <u>Computer Settings</u> appendix and make changes to your computer settings as appropriate to minimize SCP errors caused by incompatible computer settings.

If this is the first time you have used the SCP and you are not sure how to perform a quick system check and run a test cut, please review the <u>SCP System Check and Test File</u> appendix.

You can also update the controller firmware from the 'CNC Shark Controller Firmware' program in the CNC Shark Control Panel 2.0 program group. With the SCB connected to the computer and turned on, simply run this program and click through the panels. Step by step instructions can be found in the <u>Update the Firmware</u> appendix.

[Contents] [Safety] [Software Installation] [SCP2 Registration] [CNC SCP2] [Virtual Zero] [Appendices]

## **SCP2 Registration**

#### [Contents] [Safety] [Software Installation] [CNC SCP2] [Virtual Zero] [Appendices]

At this point you have connected the computer to the Shark Control Box via a USB cable, and the Shark Control Box is turned on. Start the CNC SCP2 – from the Start, Programs, CNC SCP2 programs group by clicking on the CNC SCP2 shortcut; or by double clicking on the CNC SCP2 shortcut you created on the desktop.

The SCP2 must be registered within 15 days of first use. A single SCP2 software license supports use with up to 3 different Shark Control Boxes (SCB) – 3 different CNC Shark systems.

The SCP2 registration requires you to enter the serial number for the SCP2 and any CNC Shark accessories you are registering. You do not have to register the accessories at the same time as you register the SCP2.

When you start the SCP2 for the first time, you will see a panel pop up about the registration status. You can choose to register the SCP2 at this time by selecting 'No'. If you have already received your registration key, select 'Yes'.





If you select 'Yes', you will be prompted to enter the registration key. If you select 'No', you will be taken to the registration wizard. Fill in the items as required and on the last panel either submit the registration over the internet, or follow either of the 2 other methods. Both of these require you to submit the generated registration file as an email attachment to <u>register@nextwaveautomation.com</u>.

If you submitted via the internet, you should receive your registration key(s) immediately and they will automatically be installed for you. If you submitted via email, once you receive the registration keys from NWA in a separate email, you can then select 'Yes' and enter each of the registration keys received.

Ensure there are no spaces between any of the alphanumeric values when entering the registration key. If copying and pasting from an email, double check that there are no spaces in what you received from the NWA registration system.

For a step by step guide to registering your CNC Shark, SCP2 and Shark Accessories, please see the <u>CNC</u> <u>Shark, Software and Accessories Registration</u> appendix.

[Contents] [Safety] [Software Installation] [SCP2 Registration] [CNC SCP2] [Virtual Zero] [Appendices]

## **CNC Shark Control Panel 2**

#### [Contents] [Safety] [Software Installation] [SCP2 Registration] [Virtual Zero] [Appendices]

The CNC SCP2 is used to control the CNC Shark. It does this by sending instructions to the Shark Control Box via the USB cable. These instructions include a toolpath, commands to move or jog the gantry, set the cutter tool X, Y and Z zero, running a toolpath (job), pausing the job, continuing the job, and stopping the job.

## **Quick Navigation**

You can click on a link below to quickly navigate to the desired topic in this section of the manual.

- [Control Panel Layout] [Load G Code] [Preferences – Virtual] [View Virtual GCode] [Info Tools] [Move to 0,0,0] [Enable] [Run Tasks] [Jog Functions Panel] [Virtual Zero Summary] [Point Collector Panel]
- [E-Stop} [Preferences – General] [Preferences – A|4<sup>th</sup> Axis] [View AAxis GCode] [Part Coordinate Panel] [Detect Touch Plate] [Control Box Status] [Indicators] [Jog – 3 Axis Mode] [Setup Virtual Workflow]
- [File Tools] [Preferences – Hot Keys] [Grid Lines Tool] [Help Tools] [FRO – Feed Rate Override] [Move to Offset] [2D Display Area] [Function Panel Docking] [Jog – 4<sup>th</sup> Axis Mode] [Use Existing Virtual Setup]

## **Control Panel Layout**

The CNC SCP2's layout has 12 distinct areas:





1. A toolbar in the upper left corner

- 2. A Part Coordinates panel on the left side of the user interface (UI)
- Common Tasks before running the job section on the left side below the Tool Coordinates panel. The 'Detect Touch Plate' and 'Run Virtual Setup' are only present if the Shark Touch Plate accessory is registered.
- Enable Virtual Setup and A-Axis controls (only present if the Shark Touch Plate and/or the CNC Shark 4<sup>th</sup> Axis Table Top accessories are registered) below the Common Tasks area on the left side of the UI.
- 5. NWA announcements (functions if the computer is in network) in the center, and above the Total Time indicator.
- 6. A Control Box status indication in the lower left hand corner of the UI.
- 7. A 2D display of the toolpaths loaded.
- 8. Run Tasks buttons that are used to start the job and while the job is running. Immediately underneath the 2D Display area of the UI.
- 9. Total Time indicator along the bottom of the UI.
- 10. Units in use indicator along the bottom of the UI.
- 11. Probe port status along the bottom of the UI.
- 12. Functions panel on the right side of the UI. The GCode and Jog functions are always present. The Scan function is present if the Shark touch probe accessory is registered. The Virtual function is present if the Shark touch plate accessory is registered.

#### [SCP2 Quick Navigation] [Control Panel Layout]

## **E-Stop**

The E-STOP control (Emergency Stop) is one of 2 methods to shut down any gantry movements. The first method is to use SCP2 - from the E-Stop buttons found in the SCP2 UI or using the default Hot Key <CTRL> + E. With the SCP2, there are 2 E-Stop software buttons – one in the Run tasks section of the UI and a second one that can be displayed by selecting View, Button Panel from the toolbar.

In the case of the CNC Shark Pro Plus, CNC Shark Pro Plus HD and newer models where the router is also plugged into the Shark Control Box, clicking the E-STOP will also shut off the router.

EMERGENCY STOP – 2<sup>nd</sup> Method – The other method you have available to quickly stop the Shark from running is:

- CNC Shark and Shark Pro Stopping power by switching off the power strip that the Shark Power Supply and router are plugged into.
- CNC Shark Pro Plus and Shark Pro Plus HD Engaging the red E-STOP button on the enhanced Shark Control Box.

Whenever you use the E-STOP, you should ensure that you use the Jog Panel to raise the cutter tool Z to a positive value before using the 'Move to 0, 0, 0' control button in the File Control panel to move the cutter tool back to the XYZO position. This will ensure that the tool doesn't drag itself over the material or into a clamp while moving back to XYZO.

#### [SCP2 Quick Navigation]

#### Toolbar

The toolbar as four components – File, View, Help and Info.

#### **File Tools**

The File tools enable you to load g code (a tap file), set Preferences, initiate the virtual setup (if touch plate accessory is registered, and exit the SCP2.





#### Load G Code

When you select this tool, a file open panel appears. Navigate to the location of the tap file on disk, select it and press the 'Open' button.

You may be presented with an option to setup this file using virtual zero (even if the 'Enable Virtual Zero' flag is unchecked). If you select 'Yes', you will immediately proceed through the virtual zero setup. This requires that your material already be positioned and clamped on the table.

If you already have performed a virtual setup prior to opening the tap file, you will be presented with an option to use an existing file preferences virtual settings. If you select 'Yes', you will immediately proceed to establish the zero at X=0, Y=0. The exception to this is if you have changed the Virtual Preferences and changed the Collection Points method. If that happened, you will not be prompted to use an existing file preferences virtual settings.

The tap file is loaded into the SCP at this point, but not the SCB. This is a change from the long standing behavior of the SCP. The gcode is not loaded on the SCB until you start the job by tapping on 'Run File'.

Once the tap file is loaded, the gcode is displayed in the GCode Functions panel on the right side of the UI. You can also load a tap file using the 'Load G Code' button from the Common Tasks area of the UI.





## [SCP2 Quick Navigation] [Common Tasks] [Load G Code] [File Tools]

#### **Preferences Tool**

The Preferences tool enables you to establish some default parameters in the SCP2. Selecting the Preferences tool opens the Preferences panel. You will find 2 to 4 tabs – General, Hot Keys, and Virtual. This depends on whether the Shark Touch Plate and/or 4<sup>th</sup> Axis Table Top accessories are registered.

Preferences				
General Hot Keys A 4t	h Axis Virtual			
Default Step Value	Default Unit Size			
INCH MM	Inches			
0.01 1	Millimeters			
Arc Color 📕 clOliv	e 🗸			
Line Color 🔳 dMaroon 🔹				
Touch Plate Thickness	0.374			
Safe Height Up	0.75			
Prompt to load last file on startup Second Click to material [Move To (0,0,0)/Offset] Allow Hot Keys for Pause to Continue Paused Run Multiform Docking I				
Check for control panel updates on startup				
Reset Display	Ok Cancel			

Figure 7 - Preferences Panel

Along the bottom of the Preferences Tool you see:

- Reset Display you can tap this to reset the SCP2 UI to its default configuration. This is useful if you've 'lost' a dockable window, or just want the UI to return to its default configuration.
- Ok tap on this after making changes in any of the preferences tabs.
- Cancel tap on this to exit the preferences tool without making any changes.

You can also access the Preferences Tool from the Functions Panel area of the UI.

#### Preferences – General Tab

The General tab has several parameters that you can set to control certain behaviors of the SCP2.

- Default Step Value you can set a value that you want the Step function in the Jog panel to start out with first use.
- Default Unit Size you can choose either Inches or Millimeters as the default unit of measurement used by the SCP2. This will be over ridden if the tap file you load is using a different unit of measurement.
- Arc Color this sets the color of the arc drawn in the 2D Display.
- Line Color this sets the color of the line drawn in the 2D Display.
- Safe Height Up this sets the height at which the SCP2 will raise the tool prior to making any lateral moves when responding to SCP2 commands Detect Touch Plate and Move to 0, 0, 0.
- Touch Plate Thickness Enter the touch plate thickness the default value is 0.374.
- Prompt to load last file on startup if checked (ie 'on'), when you start the SCP2, it will prompt you to load the last used tap file at startup.
- Second Click to material [Move to (0,0,0)/Offset] checked by default. When you tap on the Move to (0,0,0), or Move to Offset (when in 4<sup>th</sup> axis mode), and either or both X and Y are not at 0.000, the gantry will move to X=0, Y=0, but will remain at the height in Z that it started at (unless that height is less than the Safe Height Up). It will take a second tap on the Move to (0,0,0) to position the tool at Z=0. If this is unchecked, the tool will immediately move to 0,0,0.
- Allow Hot Keys for Pause to Continue Paused Run unchecked by default. Some computers
  take the default hotkey setting of <CTL C> as something other than an SCP hot key command. If
  that is the case on your computer, you can change the Hot Key setting for Continue, and then
  enable this preference.
- Multiform Docking checked by default. This enables you to drag any of the Functions panels 'outside' the SCP UI and position them on your screen as a separate window. If you do not want to be able to do this, uncheck this preference.
- Check for control panel updates on start on startup if checked, the SCP2 will check to see if a new version of the SCP2 software is available. This function requires a network connection.

Make the desired entries and hit 'Ok' to set the preferences and close the panel.

#### [SCP2 Quick Navigation] [Preferences – General] [Preferences – Virtual] [Preferences – A|4<sup>th</sup> Axis]

#### Preferences - Hot Keys Tab

The SCP2 provides a large number of Hot Keys, and also gives you the ability to change them. The Hot Keys available and the default setting are shown in the table below.

SCP2 Function	Default Setting (Key Set 1)
Jog X+	Num 6

Jog X-	Num 4
Jog Y+	Num 8
Jog Y-	Num 2
Jog Z+	Num 9
Jog Z-	Num 3
Jog A+	Num 9
Jog A-	Num 3
Jog Speed +	Num 7
Jog Speed -	Num 1
Step +	Num +
Step -	Num -
Move to 0, 0, 0	Num 5
Load G Code	Ctrl + L
Detect Touch Plate	Ctrl + D
Run File	Ctrl + R
Pause	Ctrl + P
Continue	Ctrl + C
E-Stop	Ctrl + E
Increase FRO	None
Decrease FRO	None
Zero X	None
Zero Y	None
Zero Z	None
Set XYZ as 0,0,0	None

#### Figure 8 - Hot Key Functions and Default Settings

Make any changes by entering in the desired value in the Key Set 2 column. Place the cursor over the box you want to make the entry in and left click. At that point:

- Press and hold the <CTRL> key and then tap the letter or number you want to use to create a shortcut using the <CTRL> key.
- Press and hold the <ALT> key and then tap the letter or number you want to use to create a shortcut using the <ALT> key.
- With the number lock 'off', press any key on the keypad to establish a shortcut using the numeric keypad on your keyboard (Num 5 for example)
- Press the backspace key to set the entry to 'None'

Make the desired entries and hit 'Ok' to set the preferences and close the panel.

[SCP2 Quick Navigation] [Preferences – Hot Keys] [Preferences – A|4<sup>th</sup> Axis] [Preferences – General] [Preferences – Hot Keys]

#### Preferences – Virtual Tab

The Virtual tab has several parameters that control the behavior of the SCP2 virtual setup.

- When you run the setup virtual operation, the readings are saved as a preference. Every time you run the setup virtual operation, the existing readings are cleared and the new ones are stored. If a set of readings are recorded, when you run the setup virtual operation, you can choose to use the existing readings. From the Virtual tab you can clear the readings. The 'Load Readings' button only refreshes the display of the current readings stored.
- Collection Points
  - Material Edge the collection points will be taken along the edges of the material as defined in the tap file. The 'Border Size from material edge' setting also plays a role in this behavior.
  - Image Cutting Area if this mode is selected, the SCP2 will calculate a rectangle based on the largest cutting extents in the tap file, and collect the points based on this calculated rectangle.
- Virtual Cut Depth Offset you can set a value here that will result in a global change of depth in the calculated cut when using the virtual setup. For example, if with your particular system you are always finding the depth of cut is consistently 0.03 too deep (low), you can set a value of 0.03 in this preference and save it.
- Prompt to use virtual when loading a file you can choose to immediately proceed to run the virtual setup after loading a tap file. If you don't want to do this immediately after loading a tap file every time you load a tap file, uncheck this flag. You can always run the virtual setup at any time from the 'Run Virtual Setup' button in the Common Tasks area of the UI, as well as from the Virtual tab in the Function Panel area of the UI.

Make the desired entries and hit 'Ok' to set the preferences and close the panel.

#### [SCP2 Quick Navigation] [Setup Virtual Workflow] [Preferences – General] [Preferences – Hot Keys] [Preferences – Virtual]

#### Preferences – A|4<sup>th</sup> Axis

The A|4<sup>th</sup> Axis tab has several parameters that control the behavior of the SCP2 4<sup>th</sup> Axis.

- Default Step Value A Axis set the default value for jogging the A Axis when in the Step mode.
- A Axis Safe Height this sets the height at which the SCP2 will raise the tool prior to making any lateral moves when responding to SCP2 commands Detect Touch Plate and Move Offset.
- Lathe Front/Left (Motor End) Chuck Radius this sets the diameter of the lathe chuck along the circumference line that the tool is touched off of.
- Distance from Motor tap off to cut position this is the distance from the location on the chuck that you use to touch off of to a safe position to cut into the material without engaging any of the chuck components with the tool.
- Lathe Rear/Right (tailstock) Chuck Radius this sets the diameter of the lathe tailstock along the circumference line that the tool is touched off of.
- Lathe Cut Depth Offset you can set a value here that will result in a global change of depth in the calculated cut when using the 4<sup>th</sup> axis setup. For example, if with your particular system you

are always finding the depth of cut is consistently 0.03 too deep (low), you can set a value of 0.03 in this preference and save it.

- Router Mount Position
  - Vertical (Top-Down) the correct setting when using the Shark 4<sup>th</sup> Axis Table Top Kit.
  - Horizontal (Sideways) future capability when support for using a mini-lathe as the 4<sup>th</sup> axis is fielded.
- Lathe alignment choose one of two settings
  - Front to Back (along Y) if you have setup the Shark 4<sup>th</sup> Axis Table Top Kit oriented along the Y axis.
  - Left to Right (along X) if you have setup the Shark 4<sup>th</sup> Axis Table Top Kit oriented along the X axis.
- Mirror Image (Reverse Cut A) you can check this flag if you find your carving coming out in a reverse image. There is no need to adjust the post processor in this case just set or unset the flag as appropriate for use in your setup.

Make the desired entries and hit 'Ok' to set the preferences and close the panel.

#### Exit Tool

You can use this tool to exit the SCP2. The Close Control Panel will be presented. Press 'Yes' to close the SCP2.

[SCP2 Quick Navigation] [Preferences – A | 4<sup>th</sup> Axis] [Preferences – General] [Preferences – Hot Keys] [Preferences – Virtual]

#### **View Tools**

The View tools influence different display aspects of the SCP2.



#### Figure 9 - View Tools

#### **Grid Lines Tool**

You can turn on and off the display of grid lines on the 2D display. Select this tool to turn them on. Select it again to turn the grid line display off.



#### Figure 10 - Grid Lines Turned on in 2D Display

#### [SCP2 Quick Navigation] [View AAxis G Code]

#### View Virtual GCode

This tool opens a separate window that displays the Virtual GCode. This code is generated by the SCP2 as the last step in a setup virtual operation. This panel can be positioned as desired on the screen, and will refresh when a new tap file and the virtual setup for that file is completed. Click on the 'Close' button or the 'X' in the upper right hand corner of the panel to close the Virtual GCode panel.



Figure 11 - Virtual GCode Panel Displayed

#### View AAxis GCode

This tool opens a separate window that displays the AAxis GCode. This code is generated by the SCP2 as the last step in a setup A Axis operation. This panel can be positioned as desired on the screen, and will refresh when a new tap file and the A Axis setup for that file is completed. Click on the 'Close' button or the 'X' in the upper right hand corner of the panel to close the AAxis GCode panel.

#### [SCP2 Quick Navigation] [View Virtual GCode]

#### **Help Tools**

The Help tool enables you to check the version of the CNC SCP2 you are using, open the SCP2 manual, and to Register your CNC Shark product with Next Wave Automation.





#### About Tool

When you click on the About button, a window pops up with information about the version of the CNC SCP2, the identification number and model number of the Shark Control Box you are using, and has URLs that you can click on that will open a web browser to the Next Wave Automation site, and the Next Wave Automation Store. The window will also indicate if the software has been registered or not.



Figure 13 - CNC SCP2 About Screen – Registered

#### **Control Panel Help Tool**

This tool will open the SCP2 Manual that was installed on your computer in pdf format in the pdf viewer you have installed on the computer. If no pdf viewer software is installed, this will fail and an error message about not finding an application to open the file will be posted on the screen.

#### Check for Software Updates Tool

You can select the 'Check for Software Updates' tool to see if a new version of software is available. This requires that the computer is connected to a network (has internet access).

A message box will appear indicating whether your software is current or not. If it is not current, a link will be provided that you can click on. This will open your default web browser at the Next Wave Automation Downloads page. Click 'Ok' to close the message box.

#### **Register your Nextwave Automation Product**

This task is the same as described in the CNC Shark Software and Accessories Registration appendix, Products section.

#### Enter Registration Key

This task is the same as described in the CNC Shark Software and Accessories Registration appendix, First Registration Keys section.

#### [SCP2 Quick Navigation] [Help Tools]

#### **Info Tools**

The Info Tools provide access while using the SCP2 to release notes, NWA announcements, and Shark CNC machine, SCP2 and Shark accessory registration information.



#### Figure 14 - Info Tool Tasks

#### View Release Notes Tool

The Release Notes panel is displayed when this tool is selected. These release notes contain an abbreviated set of information on the changes associated with each release of the SCP2.

#### Next Wave Announcements Tool

The Next Wave Announcements panel is displayed when this tool is selected.

#### **Registration Information Tool**

The Registration Information Panel is displayed when this tool is selected. The registration keys for the Shark Control Box, SCP2 software, and all Shark accessories that have been registered is displayed in this panel.

[SCP2 Quick Navigation] [Info Tools]

## **Part Coordinates Panel**

The Part Coordinates panel indicates the location of the cutter tool from the Shark Control Box perspective. It is also used to set the axis zero.



Figure 15 - Part Coordinates Panel

As the gantry moves around, the values for the X, Y and Z axis report their location with regard to the X0, Y0 and Z0. It also indicates the unit of measure the part coordinates are in. The units of measure are either Inches or Millimeters. You can change the units of measure the part coordinates are displayed in from the File, Preferences tool, in the General tab.

The units of measure setting does not control the settings in the toolpath file (tap file). The units in the tap file are set by the post processor chosen when creating the tap file in VCarve Pro.

As part of the process to machine a part, you will set the X0, Y0, Z0 of the tool with regard to the material before you start the job (Run File). This X0,Y0, Z0 location with regard to the material is defined in the VCarve project. For CNC Shark users, the Z0 is always the top of the material. The default setting for X0 and Y0 in VCarve is the lower left hand corner of the material. You can choose any corner, or the center of the material as well. It is recommended that you use the lower left hand corner for X0 and Y0 as it is the most common, easiest to understand, and easiest to remember.

Whatever location relative to the material you choose to use, you must know what it is for the toolpath you are about to load and run.

You do not need to have the cutter tool positioned at all three axes zero position to set the zero for an individual axis. For example, you may need to reset the ZO for the next job as the material is a different thickness, and you're using a jig to position the material in the same spot from job to job – and after

checking, the XO and YO remain true. Using the Jog panel, you move the cutter tool to the desired position in Z. When it is set in the ZO location, click on the ZO button to set the ZO position in the Part Coordinates panel.

In some instances – particularly working with irregularly shaped material, you will move the cutter to a known location on the material. You will then use the 'Set' tool to establish the part coordinate(s) for that location. After jogging the cutter to the desired location, left click on Set to open the Set Coordinates Panel. Enter in the appropriate values and hit the 'Set' button to set these values as the part coordinates.

🂐 CNC Shark Control Panel	
File View Help Info	
Part Coordinates	
Set XYZ0 X0 Y0 Z0	X 3.000 inches
	Y 1.500 inches
Y 0.000	Z 0.000 inches
<b>Z</b> 0.000	Set Cancel
INCHES	

Figure 16 - Set Coordinates Panel

#### [SCP2 Quick Navigation] [Part Coordinates Panel]

## **Common Tasks**

The Common Tasks area of the UI changes states, depending on whether you are in 3 axis or 4 axis mode. In either state, the FRO and Load G Code buttons are present.

#### [SCP2 Quick Navigation] [Move to 0,0,0] [Detect Touchplate] [Move to Offset]

#### FRO (Feed Rate Over-ride)

The Feed Rate Over-ride (FRO) slider controls the Shark Control Box's handling of the feed rate that is set in the toolpath (tap) file. For example, if the feed rate in the toolpath is 100 ipm, and you need to slow that down as you are now working with a different material that requires a slower feed rate, you can use the FRO slider to run at 75% - which would result in the toolpath feed rate of 75 imp. This would enable you to use the existing toolpath (tap) file for cutting different material types and densities without going back to VCarve Pro, changing settings, and regenerating a new toolpath (tap) file. You can also adjust the FRO while a job is running.

The FRO setting does not influence the speeds selected from the Jog function panel while jogging the gantry.

#### Load G Code

This button enables you to load a tap file. This is exactly the same as covered in the File tools, <u>Load G</u> <u>Code</u> section of this manual. It is important to note that with the current version of the SCP, the gcode is not loaded onto the SCB until the job is started – 'Run' is tapped.

#### **Common Tasks – 3 Axis**

The 'Move to 0,0,0' and 'Run Virtual Setup' are present when in 3 axis mode.



Figure 17 - Common Tasks - 3 Axis Mode

#### *Move to 0,0,0*

This control is used to move the cutter tool to the current X0, Y0, Z0 position. This control is disabled (grayed out) when a toolpath (tap) file is loaded, and when a job is running. If the General Preference – 'Second Click to material' is checked (default setting) - when you tap on 'Move to 0,0,0', it will take a second tap on the 'Move to 0,0,0' to position the tool at Z=0. The first tap will move the tool to 0,0,Z= last position or safe height as a minimum. If this is unchecked, the tool will immediately move to 0,0,0.

Be mindful that when you use this command, the gantry will move in a direct line to the XYZO after rising to the established safe height. If you've stopped the job at a spot where the tool is lower than the top of the material, you may find that the tool is running into the material during this move. In this case, you should use the Jog command to raise the tool to a reasonable distance above the material before using the Move to 0, 0, 0 command. Likewise, you may find that from the current position of the tool, this direct line will run the tool into a clamp or jig component that otherwise would not have been run into while running the job.

[SCP2 Quick Navigation] [Move to Offset] [Load G Code] [FRO – Feed Rate Override]

#### **Detect Touch Plate**

This is the function you use in conjunction with the Shark touch plate accessory to determine the Z0 for the top of the material. This button will only be present in the SCP2 if the touch plate accessory is registered.

After installing the desired cutter in the router, position the gantry over the material at the location you want to use to determine the position of the top of the material (ZO). The cutter should be high enough above the material to enable you to position the touch plate under the cutter. Place the touch plate below the cutter on the material, and attach the magnet component of the touch plate accessory to the router collet. Tap on the 'Detect Touchplate' and the Point Collector panel opens.



Figure 18 - Point Collector Panel

There are five user inputs on the Point Collector panel:

- Raise Router you can tap on this to move the router 'up' in Z without having to exit the tool and start over after jogging.
- Test the touch plate when you touch the touchplate to the bit to test the connection, the Point Collection panel will display 'Success! Touch Circuit Complete' in green text.

Be mindful that you can continue the touchplate/point collection operation without performing this test. You are strongly encouraged to perform this test with each use, and to cancel if you do not get a 'Success' message.

- Cancel tapping this will exit the tool and stop the process.
- Yes indicates that the touchplate will be used between the router bit and the material. In this case the SCP will calculate the position of the top of the material based on the Touch Plate Thickness General Preference setting.
- No Indicates that the touchplate will not be positioned between the router bit and the material. In this case the SCP will calculate the position of the top of the material based on the bit touching the grounded material.

[SCP2 Quick Navigation] [Jog Panel – 4<sup>th</sup> Axis Mode] [Detect Touchplate] [Move to 0,0,0] [Move to Offset] [Load G Code] [FRO – Feed Rate Override]

#### **Common Tasks – 4 Axis**

The 'Move to Offset' is present when in 4 axis mode. This mode is toggled by clicking the AAxis checkbox in the Enable section of the UI. This option is present only if the CNC Shark 4<sup>th</sup> Axis Table Top Kit is registered.

INCHES	
FRO (	+
100 %	
	Cat Offeet
	Set Offset
Mo	ve to Offset
Lo	ad G Code
Enable	🛛 🗛 Axis

Figure 19 - Common Tasks - 4th Axis Mode

#### Move to Offset

This control is used to move the cutter tool to the current A axis offset position. This control is disabled (grayed out) when a toolpath (tap) file is loaded, and when a job is running. If the General Preference – 'Second Click to material' is checked (default setting) - when you tap on 'Move to Offset', it will take a second tap on the 'Move to Offset' to position the tool at Z=0. The first tap will move the tool to 0,0,Z= last position or safe height as a minimum. If this is unchecked, the tool will immediately move to 0,0,0.

Be mindful that when you use this command, the gantry will move in a direct line to the A axis offset position after rising to the established A axis safe height. If you've stopped the job at a spot where the tool is lower than the top of the material, you may find that the tool is running into the material during this move. In this case, you should use the Jog command to raise the tool to a reasonable distance above the material before using the Move to 0, 0, 0 command. Likewise, you may find that from the current position of the tool, this direct line will run the tool into a clamp or jig component that otherwise would not have been run into while running the job.

[SCP2 Quick Navigation] [Detect Touchplate] [Move to 0,0,0] [Load GCode] [FRO – Feed Rate Override]

## Enable

This section of the UI has 2 choices. They are each independent of the other, and only one can be in use at a time.

- Enable Virtual by checking this you are establishing that every toolpath you are going to work with in a given session will be using the Virtual capabilities of the software. Enabling this will result in the Virtual Panel being displayed as well. This will only be available if the Touch Plate accessory is registered.
- Enable AAxis by checking this you are establishing that you are running the toolpath on the CNC Shark 4<sup>th</sup> Axis Table Top accessory. Enabling this will result in the Jog Panel being displayed as well. It will also toggle the Jog Panel display to A axis mode. This will only be available if the CNC Shark 4<sup>th</sup> Axis Table Top accessory is registered.

#### [SCP2 Quick Navigation]

#### **Next Wave Automation Announcements**

Announcements from Next Wave Automation are displayed in the lower center of the SCP2 UI, immediately above the Total Time status indication. The display of these announcements requires a network connection. If there is no network connection, the 'last known' announcements will be displayed in this area – or the area will be blank.

## **Control Box Status**

The Control Box Status indicates the state of the Shark Control Box, and is located in the lower left hand corner of the SCP2 UI. There are 6 messages presented in the Status:

- Please check CNC Shark power and USB cable Indicates no communication with the Shark Control Box. Ensure that the Shark Control Box power is on and the USB cable is plugged into both the computer and the Shark Control Box.
- **Please Load File** Present upon opening the CNC SCP2. Indicates good communication with the Shark Control Box and that the Shark Control Box is ready for a toolpath file to be loaded.
- Compiling line [number] ([number]% of [total number of lines in the tap file]) hh:mm:ss [estimated total run time at that point in the compiling process] – Appears after a toolpath (tap file) has been loaded and while the Shark Control Box is compiling the code for use. This message clears when the tap file is compiled. Provides the status of which line in the tap file is currently being compiled, a percentage of the compilation complete based on the total number of lines in the tap file, and the estimated time it will take to run the toolpath up to that point in the compilation.

Compiling Test Toolpath File.tap line 7110 (35% of 20550 lines) 25:00

#### Figure 20 - Status Box - Compiling Line Example

• **CNC Shark is connected and operational** – Present after loading a toolpath (tap file) the first time, and every time thereafter in a given session after a toolpath (tap file) has been successfully loaded and is ready for use. Indicates good communication with the Shark Control Box, and that a toolpath is loaded and ready to run.

• Running line [number] of [total number of lines in the tap file] ([number]% complete) – Present while job is running. Provides the status of which line in the tap file is being executed, how many total lines of g-code are in the tap file, and a percentage of lines completed.

Running 5 - Pocket 0\_125 EM After Lettering.tap line 515 of 5119 lines (10% complete)

#### Figure 21 - Status Box - Running Line Example

 Compiling vTemp.tap line [number] ([number]% of [total number of lines in the tap file]) hh:mm:ss [estimated total run time at that point of the compiling process] – Present at the end of the virtual setup

#### [SCP2 Quick Navigation] [Control Box Status]

#### **2D Display Area**

The 2D Display Area displays the toolpath currently loaded in the SCP2. The display area will resize to enable the entire project area to be displayed. There is currently no zoom or pan functionality available – however that is a planned for future enhancement.

The green lines represent the current location of the gantry in X and Y in relation to the tap file – as long as the X0 and Y0 locations were properly set with regard to the material and the project's origin.

You can also turn on the display of a grid from the View, Grid Lines tool in the toolbar.

Note: When the A-Axis is enabled, you will currently see gantry movement in the 2D window. However, the 2D window will not size for the extent of the rotary setup, and no toolpaths will be rendered. For all intents and purposes, the 2D Display currently has no useful information when in A-Axis mode.

#### [SCP2 Quick Navigation]

#### **Run Tasks**

The Run Tasks consist of Run File, Pause, Continue, and E-Stop. These controls are located immediately underneath the 2D Display Area of the SCP2 UI.

	Run File	Continue	Pause	E-Stop		
Release1311-07 Quote: Joseph, I think you got it! Virtual zero setup - flawless						
CNC Shark is connected and operation	al		Tota	Time: 00:00:00	INCHES	Probe Activated

Figure 22 - Run Tasks Area of the SCP2 UI

The 'Run File' starts the job. Prior to this, you should have established the correct XYZO location for you material and based on the project origin. Click on the 'Run File' control button to start the job. If you have the Virtual enabled, and you have not yet performed the Virtual setup, you will be prompted to do so at this time.

**One change in how the SCP interacts with the SCB is when the gcode is sent to the SCB.** With this version, the gcode is sent to the SCB after you tap the 'Run File'. Once the gcode is loaded on the SCB, you will be prompted to confirm you want to begin. Press 'OK' to start the job. At this point the router will turn on and the job will begin. If you are not ready to run the job, select 'Cancel'.

While the job is running, all of the Common Tasks, Virtual Setup, and Run Tasks buttons but the Pause, FRO and E-Stop are disabled (grayed out). **The E-Stop button is always available for use.** You can adjust the FRO at any time while the job is running. Click on the Pause button to momentarily stop the job from running. The router will continue to run. Note that the Control Box Status is presenting information on the current tap file line and job completion percentage. The Total Time indicator is now calculating the total time the Shark has been running a job this session. Also note that the cutter tool's position relative to XYZO is posted in the Part Coordinates panel as the job runs.

When the job is paused, the only Run Tasks buttons enabled (not grayed out) are the Continue and FRO. Click on the Continue button when you are ready to proceed with the job from the point that you paused it.

When a job is finished, the Shark returns the cutter tool to a position set by the VCarve Pro project, and thus incorporated into the toolpath (tap) file. The default job end position is X0, Y0, Z0.8.

#### [SCP2 Quick Navigation] [Run Tasks]

#### **Total Time Indicator**

The Total Time Indicator indicates the total amount of time that has occurred since the job was began (Run File). It is located in the center along the bottom of the SCP2 UI.

## **Units in Use Indicator**

The Units in Use Indicator indicates whether inches or millimeters are currently the units of measurement in use for the Part Coordinates. Again, if you load a tap file that is using a different unit of measurement, the SCP2 will notify you of that, and set the units of measurement to match that of the tap file. The Units in Use Indicator is located to the right of the Total Time Indicator along the bottom of the SCP2 UI.

## **Probe Port Status**

The Probe Port Status indicates whether the SCP2 is 'looking' at the input from the 1/8" jack on the back of the Shark Control Box. Either the Shark Touch Plate or Scan Probe can be plugged into this port. If the touch plate accessory is registered, this will always indicate 'Probe Activated'. If only the scan probe

accessory is registered, this will indicate 'Probe Active' only when the Scan Function panel is open, and the scan probe is in contact with the item being scanned.

#### [SCP2 Quick Navigation]

#### **Functions Panel**

The functions available for use from the Functions Panel are the GCode, Jog, Virtual and Scan. You display the desired function by left clicking on the function name. The Virtual function is displayed if the Shark touch plate accessory is registered. The Scan function is displayed if the Shark scan probe accessory is registered.

If a tap file is loaded, the name of the tap file and the material size will be displayed about the Function selection buttons.

#### **Functions Panel Docking and Sizing**

You can have a maximum of 2 function panels open within the Functions Panel area of the UI at a time. You can also undock any of the function panels and place them outside the SCP UI area as a separate window. You do this by grabbing the top bar and dragging the panel outside the SCP UI and releasing it. At that point it is a window, you can move it to any point on the screen. Likewise, you can close it by tapping on the red 'x' in the upper right hand corner. While you can 're-dock' the window in the SCP UI, you may find that it is easier to close the dockable window, and open a new one from the Functions Panel.

You can also resize the width of the Function Panels when 2 are open, as well as the 2D display, by placing the cursor along the edge. The icon will change states and at that point you can click and hold, and drag the panel width as desired.



Figure 23 - Undocked Function Panel - Width Adjusting and Undocking Grab Locations

[SCP2 Quick Navigation] [Function Panel Docking]

#### **GCode Function Panel**

The GCode Function Panel displays the g code from the tap file. As the job runs, the display will scroll down the file contents. You can also use the sliders along the side and bottom to change the display of the panel.

#### **Jog Functions Panel**

The Jog panel enables you to move -jog - the gantry along any of the axes. The Jog panel has 2 modes -3 axis and AAxis.

In either mode, the speed of movement is influenced by the jog speed settings along the top side of the Jog Functions Panel – Fast, Medium, and Slow.

If you need large movements of the gantry to be performed quickly, select Medium or Fast. The amount of gantry movement for each click on the axis button will increase. If you need very small amounts of movement, select Slow. The FRO has no impact on these 3 speed settings.

To perform very controlled moves of the gantry, select Step, and set the distance in the box immediately underneath the Step control. Use the '+' and '-' buttons to change the step increments.

The step increment size is influenced by the units of measurement currently selected.

The default Step value that will be displayed in the Jog functions panel at the start of a given SCP2 session is set from the File, Preferences tool, in the General tab. Regardless of the Step value you may have entered prior to exiting the SCP2, the default Step value will be set when you next open the SCP2.

You can use the Step value that is set by using the '+/-' buttons, or you can enter a specific value by clicking on the box to the left of the '+/-' buttons. The value you type in must be within the largest and smallest allowable value (for the units you are using). For example, if you've set the measurement units to inches, you can enter a value of 0.018 and the gantry will move 0.018 inches in the direction you select.

As you are able to manually enter a numeric value in the Step function, you can easily enter a value that may result in an undesirable outcome. For example, if you entered 50, and then jogged along any axis, you would exceed the limit of gantry movement. Entering a very small value is also possible, but with no possible undesirable outcome beyond a sore finger.

When you are in Step mode, the only function available while the gantry is executing the Step move is E-STOP. You must wait until the Step move is completed until you can send another Step move to the Shark.

### [SCP2 Quick Navigation] [Jog – 4<sup>th</sup> Axis Mode] [Jog Functions Panel]

#### JogPanel – 3 Axis Mode

You typically use the Jog Controls to move the gantry to:

- Move the cutter tool to the toolpath's X0, Y0, Z0 and set the XYZ0.
- Move the gantry to a position on the table to enable material placement and clamping or removal from the table.

☉ Fast
⊙ Step - 0.01 +
Y + X - X + Y - Z + Z -

Figure 24 - Jog Panel – 3 Axis Mode

Click on any of the X, Y or Z plus or minus buttons to move the gantry along the desired axis and direction.

The upper and lower increment step sizes in 3 axis mode are shown in the table below.

Units of Measure	Step Range Limit		
	Largest Increment	Smallest Increment	
Inches	1	0.001	
Millimeters	100	0.1	

#### Figure 25 - Step Increment Size Range

#### [SCP2 Quick Navigation] [Jog – 3 Axis Mode] [Jog Functions Panel]

#### JogPanel – 4th Axis Mode

When the AAxis is enabled, the Jog panel is configured to support the use with a rotary setup. You typically use the Jog Controls to move the gantry to:

- Position the tool at the head or tailstock to touch off and establish the zero point at each end of the rotary.
- Move the cutter tool to the offset.
- Move the gantry to a position on the table to enable material placement and chucking or removal from the rotary axis.



Figure 26 - Jog Panel - AAxis Mode

You will note that in addition to the ability to jog the XYZ axes, the A (rotary) axis jog is now available. The A Axis Step default value is defined in the Preferences, A | Axis tab.

To the right of the axes jog buttons is a layout of the rotary axis. Each end of the rotary has 2 buttons – 'Move to' and 'Set'. You must establish the zero at both the Motor (chuck) end of the rotary and the Rear (tailstock) end of the rotary. Once these are set, you will see a green gumball, and when you tap the 'Move to' button, the gantry will move to that position. Until you 'Set' an end, there will be no response to a 'Move to' command.

Position the tool above the chuck, at the centerline of the Motor (chuck) End of the rotary, along the circumference line of the chuck (this is the centerline you are using as a reference for the 'Distance from Motor tap off to cut position' A|4<sup>th</sup> Axis preference setting). Tap on 'Set Front'. The <u>Point Collector</u> panel will appear on the screen. Once you have set one end, you can repeat the steps on the other end.

Just as you do in 3 axis use, you will have to perform a 'Set' task with any tool change.

[SCP2 Quick Navigation] [Jog – 4<sup>th</sup> Axis Mode] [Jog – 3 Axis Mode] [Jog Functions Panel]
## **Virtual Functions Panel**

#### Summary of Virtual Zero Functionality

The VZ functionality of the SCP2 enables you to account for inconsistencies in material thickness and slight warping of the material. The VZ functionality can also help account for some inaccuracies in Shark machine setup (setting on a surface that is not flat for example).

The VZ workflow consists of:

- Loading the G Code (tap file)
- Choosing to setup the Virtual
- Determining the z values at the 5 points (using the touch plate)
- SCP generates the Virtual GCode

The Virtual Zero assesses the Z (height) values at each of the 5 locations, and creates a linear grid representing the virtual surface of the material based on the 5 Z values. It then examines the X,Y,Z values found in the toolpath (tap) file, assesses the virtual surface, calculates a new Z value for that point, and creates the Virtual GCode file that will be used by the Shark Control Box when the job is run.

The Z assessment always considers the Z value found in the VCarve/Aspire project's origin (X/Y Datum) of the material as the Z0 for the virtual surface. The process assesses the Z value in the virtual surface, and adjusts the Z height from the toolpath – placing the new values in the Virtual GCode file.

A detailed discussion and supporting illustrations can be found in the Virtual Zero section of this manual.

#### [SCP2 Quick Navigation] [Use Existing Virtual Setup]

#### Setup Virtual Workflow

You must first establish the VZ (the top of the material surface). This can be triggered by:

- Clicking on the 'Enable Virtual' checkbox in the Virtual Setup Controls area of the SCP2 UI prior to loading a tap file.
- Left clicking on the 'Setup Virtual' button in the Virtual Setup Controls area of the SCP2 UI after loading a tap file.
- Left clicking on 'Start' in the Virtual Functions Panel.

Regardless of the tap file's project origin, the detect touch plate process for each of the five points begins –

- If the Collection Points <u>Virtual preference</u> is set to 'Material Edge', in the lower left hand corner of the material at the Virtual preference 'Border Size from material edge' distance. Once you start the virtual setup, the gantry will move to the first collection point and display the <u>Point</u> <u>Collector panel</u>. Test the touchplate connection, and then position the touchplate on the material under the bit prior to hitting 'Yes' (or 'No').
- If the Collection Points <u>Virtual preference</u> is set to Image Cutting Area, in the lower left corner of the toolpath bounding box. Once you start the virtual setup, the gantry will move to the first

collection point and display the <u>Point Collector panel</u>. Test the touchplate connection, and then position the touchplate on the material under the bit prior to hitting 'Yes' (or 'No').



There is no requirement to establish Z0 of the material prior to running the virtual setup.

Figure 27 - Virtual Function Panel

Regardless of which of the 3 different methods you can use to trigger the start of the Virtual Setup function, the gantry will move to the first collection point, and the <u>Point Collection panel</u> will open.

At any point during the virtual setup, you can use any of the E-Stop buttons/methods to stop the gantry movement.

Collect the point, and repeat this for the remaining points.

When the virtual setup has collected the Z value for each of the 5 points, it will return the gantry to the tap file's project origin X0/Y0, with a Z value corresponding to the SCP2's Safe Height Up. The last step the virtual setup will perform is to generate the Virtual GCode file. After the last point is collected, you will see an indication that the Virtual GCode file is being generated in the Control Box Status area of the SCP2 UI (along the bottom in the lower left corner).

	L	
		Run File
Compiling vTemp.tap line 4446 (96% of 4643 lines) 0	6:00	

Figure 28 - Control Box Status - Compiling the Virtual GCode File

The Virtual panel displays the outcome in 3 modes – Collected Points with Adjustment, Points without Border, and a 'blank slate'. You can toggle this display by left clicking on the 'material' displayed in the Virtual panel.



Figure 29 - Virtual Function Panel - Collected Points with Adjustment Mode

You can also choose to display the Virtual GCode panel (View, Virtual GCode tool). The SCP2 will scroll through the Virtual GCode file while the job is running.

[SCP2 Quick Navigation] [Virtual Zero Summary] [Setup Virtual Workflow]

#### **Use Existing Virtual Setup Readings**

The SCP2 supports the use of the existing virtual readings for a second run of a given tap file, or even a new tap file.

When you load a tap file after performing the virtual setup, or select Setup Virtual from the Virtual Controls area of the SCP2 UI, or 'Start' from the Virtual Functions Panel, you will be prompted (as before) with a confirmation panel.



Figure 30 - Setup Virtual Confirmation Panel

Because a set of virtual readings exist and are saved for a given SCP2 session, you will next be asked if you want to use the existing virtual settings. If you select 'Yes', the existing virtual readings will be used to generate the Virtual GCode file.



Figure 31 - Use Existing Virtual Readings Panel

If you select 'No', the setup virtual function will run in the same manner, with the Point Collection panel appearing as if it was the first setup virtual performed (<u>Setup Virtual Workflow</u>).

[SCP2 Quick Navigation] [Virtual Zero Summary] [Setup Virtual Workflow]

[Contents] [Safety] [Software Installation] [SCP2 Registration] [CNC SCP2] [Virtual Zero] [Appendices]

## Virtual Zero

### [Contents] [Safety] [Software Installation] [SCP2 Registration] [CNC SCP2] [Appendices]

The Virtual Zero (VZ) functionality of the SCP2 enables you to account for inconsistencies in material thickness and slight warping of the material. The VZ functionality can also help account for some inaccuracies in Shark machine setup (setting on a surface that is not flat for example). The VZ functionality is also used with the 4<sup>th</sup> axis workflow. The 'source' tapfile is never loaded onto the SCB in the 4<sup>th</sup> axis workflow. There is no choice other than to load the virtual gcode file in the 4<sup>th</sup> axis workflow.

The VZ workflow consists of:

- Loading the G Code (tap file)
- Choosing to setup the Virtual
- Determining the z values at the 5 points (using the touch plate)
- SCP generates the Virtual GCode

The Virtual Zero assesses the Z (height) values at each of the 5 locations, and creates a linear grid representing the virtual surface of the material based on the 5 Z values. It then examines the X,Y,Z values found in the toolpath (tap) file, assesses the virtual surface, calculates a new Z value for that point, and creates the Virtual GCode file that will be used by the Shark Control Box when the job is run.

The Z assessment always considers the Z value found in the VCarve/Aspire project's origin (X/Y Datum) of the material as the Z0 for the virtual surface. The process assesses the Z value in the virtual surface, and adjusts the Z height from the toolpath – placing the new values in the Virtual GCode file.

To illustrate this, imagine an  $8'' \times 8'' \times 1''$  material piece. This material piece is deliberately malformed in a manner that one edge has a thickness of 0.25", the opposite edge has a thickness of 0.5", and in the exact center the thickness is 1". The project origin is the lower left corner of the material.

The cutter was set to the project origin prior to starting the setup virtual process. This makes the resulting Z values easier to understand while reading through the following discussion.

While this is an extreme example, it will help illustrate how the VZ performs the calculations and generates the resulting Virtual GCode file.

The material would look something like this:



Figure 32 - Virtual Zero Illustration Material

After performing a virtual setup, the SCP2 would have recorded values at each of the 4 corners and the center of the material.

Material Size: $X = 8.000 Y =$	8.000
GCode Jog	Virtual
Postion the router in the locorner of the material than the start button.	ower left n click
•	•
0.000,8.000,0.000 8.00	0,8.000,0.250
•	
4.000,4.000,0.7	750
Start Here ->	0
0.000,0.000,0.000 8.000	<mark>,0.000</mark> ,0.250
Start	



Recall that the Z assessment always considers the Z value found in the project origin of the material as the Z0 for the virtual surface. Because for this discussion we established the cutter Z0 prior to running the virtual setup, the two Z values found for the lower and upper left hand side of the material are 0.000". The two Z values found for the lower and upper right hand side of the material are 0.250" higher (positive direction). The z value for the center of the material is 0.750" higher.

Each case's outcome figure is computer generated. As the top of material surface was exaggerated to assist in a quicker understanding of the Virtual Zero functionality and behavior – and the picture used is much clearer – Aspire was used to generate the figures used in the following discussion.

## Virtual Zero - Case 1

In this case, a simple square vector is created along the exact edge of the material. A profile toolpath, set to 'on' the vector and a depth of cut of 0.1 is created.



Figure 34 - Case 1 Vector - 4 Vertices

Note that the vector has a total of 4 vertices. The lower left corner point has a top of material height z = 0.000". So the virtual surface Z0 is 0.000". The cut depth on the toolpath is -0.100".

Virtual Z (material surface height)	Difference from Virtual Z0	Virtual GCode Z (height of cutter)			
0.000"	0.000"	-0.100"			
0.250″	0.250″	0.150″			
0.250″	0.250″	0.150″			
0.000"	0.000″	-0.100"			
Figure 35 – Case 1 Virtual Zero Calculations					

igure 35 –	Case 1	Virtual	Zero	Calcu	lation
------------	--------	---------	------	-------	--------

The Virtual GCode results in the tool cutting to the depth of 0.100 in the material, despite the irregular surface of the material.



Figure 36 - Case 1 Toolpath Run on Irregular Material Surface

From the SCP2 interface, with the Virtual GCode displayed, you can see the outcome.



Figure 37 - Case 1 Virtual GCode and Original Tapfile

## Virtual Zero – Case 2

In this case, a simple linear vector is created along from one corner to the 'cross' corner of the material. A profile toolpath, set to 'on' the vector and a depth of cut of 0.1 is created.



#### Figure 38 - Case 2 Vector - 2 Vertices

Note that the vector has a total of 2 vertices. The lower left corner point has a top of material height  $z = 0.000^{\circ}$ . So the virtual surface Z0 is 0.000°. The cut depth on the toolpath is -0.100°.

Virtual Z (material surface height)	Difference from Virtual Z0	Virtual GCode Z (height of cutter)
0.000"	0.000"	-0.100"
0.250"	0.250"	0.150"

#### Figure 39 - Case 2 Virtual Zero Calculations

The Virtual GCode results in a cut at a depth of 0.100" with regard to the height of the material at the two corners along a straight line. Because there were no additional vertices along the line, there was no opportunity for the process to account for the height of the material in the center being higher than the height along the left or right edges of the material. The actual depth of the cut is much deeper into the material surface along much of the vector than 0.100".



Figure 40 - Case 2 Toolpath Run on Irregular Material Surface

From the SCP2 interface, with the Virtual GCode displayed, you can see the outcome.



Figure 41 - Case 2 Virtual GCode and Original Tapfile

## Virtual Zero - Case 3

In this case, a simple linear vector is created along from one corner to the 'cross' corner of the material, and a second linear vector is created from the opposite corners. The second linear vector also has a vertex at the mid-point – the center of the material. A profile toolpath, set to 'on' the vector and a depth of cut of 0.1 is created.



Figure 42 - Case 3 Vectors - 5 Vertices

Note that there are a total of 5 vertices between the 2 vectors. The lower left corner point has a top of material height  $z = 0.000^{\circ}$ . So the virtual surface Z0 is 0.000°. The cut depth on the toolpath is -0.100°.

Virtual Z (material surface	Difference from Virtual Z0	Virtual GCode Z (height of
height)		cutter)
0.000″	0.000"	-0.100"
0.250″	0.250″	0.150″
0.000″	0.000"	-0.100"
0.750″	0.750″	0.650″
0.250″	0.250″	0.150″

Figure 43 - Case 3 Virtual Zero Calculations



Figure 44 – Case 3 Toolpath Run on Irregular Material Surface

The Virtual GCode results in a cut at a depth of 0.100" with regard to the height of the material at the two corners along a straight line. Because there were no additional vertices along the top left to bottom right corner line, there was no opportunity for the process to account for the height of the material in the center being higher than the height along the left or right edges of the material. The actual depth of the cut is much deeper into the material surface along much of the vector than 0.100".

The bottom left to the top right corner line had a vertex at the middle of the line. This vertex was processed by the virtual setup, along with the other 4 vertices found in the 2 lines. The result is a consistent depth of cut of 0.100" along the length of this vector.



Figure 45 - Case 3 Virtual GCode and Original Tapfile

## Virtual Zero - Case 4

In this case, some text is generated using a v-carve toolpath. An underline and a box frame are generated using the profile toolpath to a depth of 0.100". The Virtual GCode file is generated with the results below.



Figure 46 - Case 4 Toolpath Run on Irregular Material Surface

### Virtual Zero – Summary

This illustration provides a very straight forward example of the Virtual Zero (VZ) functionality and behavior. The VZ functionality of the SCP2 enables you to account for inconsistencies in material thickness and slight warping of the material. The VZ functionality can also help account for some inaccuracies in Shark machine setup (setting on a surface that is not flat for example).

The VZ workflow consists of:

- Loading the G Code (tap file)
- Choosing to setup the Virtual
- Determining the z values at the 5 points (using the touch plate)
- SCP generates the Virtual GCode

The Virtual Zero assesses the Z (height) values at each of the 5 locations, and creates a linear grid representing the virtual surface of the material based on the 5 Z values. It then examines the X,Y,Z values found in the toolpath (tap) file, assesses the virtual surface, calculates a new Z value for that point, and creates the Virtual GCode file that will be used by the Shark Control Box when the job is run.

The Z assessment always considers the Z value found in the VCarve/Aspire project's origin (X/Y Datum) of the material as the Z0 for the virtual surface. The process assesses the Z value in the virtual surface, and adjusts the Z height from the toolpath – placing the new values in the Virtual GCode file.

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# Appendices

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[Installing the SCP on Windows XP and Vista]	[Computer Settings]
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## **Computer Requirements**

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The VCarve Pro software from Vectric is more computationally and graphically (video card) intensive than the CNC SCP2 software. The current minimum system requirements for running both VCarve Pro and the CNC SCP2 on the same computer are:

- 2 GHz multi Core CPU
- 300 Mb Disk Space (Program)
  - 7.7Gb additional disk space required if you wish to store the tutorials and clipart supplied on your hard drive
- 2 Gb RAM
- 1024x768 graphics display (Note the SCP2 will 'work' on displays with smaller sized resolution. However, you may find that some areas of the SCP2 will require resizing, with resulting poor display of other areas of the SCP2 UI. The use of the View, Button Panel tool may help work around this condition.)
- DVD ROM drive
- USB 2.x
- Operating system: Windows XP with SP3, Windows Vista, Windows 7 or Windows 8
- Other: a PDF reader program (such as Adobe PDF Reader) is required to read the documentation.

VCarve Pro will run faster with a better processor and more memory than listed in the minimum system requirements. While loading a tap file to the Control Box may be slightly faster in the same case, the operating speed of the CNC Shark machine is not affected by the 'power' of the computer used to connect to the Control Box.

Other operating systems, for example iOS (Apple) and Linux, are not currently supported.

The computer used to connect to the Control Box must have a USB 2.x port. If a USB hub is used between the PC and the Control Box, it must be a 'powered' USB 2.x hub. The Control Box will not work with a computer connected with a USB 1.0 or 1.1 port, or a USB hub that is not powered.

There is no requirement to run VCarve Pro on the same computer as you use in the shop to connect to the Shark Control Box.

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## **SCP Installation Step by Step**

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## **Administrator Privileges**

Regardless of the operating system you are using, you must be logged in as an Administrator in order to install the software. You can check to confirm the account you are using is considered an Administrator by going to Start, Control Panel, Users – and selecting your account. It should state this account's role – Administrator, Power User, User. If your account is not an administrator, you will need to either change the permissions for this account, or create a new account with Administrator privileges.



## **Run as Administrator**

If you are not sure or cannot determine if you have Administrator user privileges, you can use the 'Run as Administrator' option for each of the executables. From Windows Explorer, right click on the exe file and select 'Run as Administrator'. You will be prompted to confirm that you want to make these changes. In some operating systems, you may be asked to enter username and password credentials as well.

		account w	Elizabeth	E		Shark Control Panel 2 x Comments 14 Oct 13.docx
		Open	_			- Sark Control Panel 2 X Comments 14 Oct 15, docx
	۲	Run as administrator				CNCSharkControlPanel20-2-0 beta 2013-1013-02.exe
Τ		Browse with 3D Photo B	rowser 11.04			CNC Shark Control Panel 2.0 User's Manual.docx
		Troubleshoot compatibi	lity			Thumbs.db
	3	Carbonite		1	۱.	Shark Control Panel 2.x Comments 13 Oct 13.docx

Figure 48 - Installing the Software Using Run As Administrator

### **Install the SCP2 and USB Driver**

The CNC SCP2 and the USB driver are installed using the CNCSharkControlPanel-2.x.x.exe file. If at any point in the installation process described below, you make a mistake, you can always repeat the steps. For example, you may not install the USB driver because you inadvertently cleared the check mark and

then hit finish at the end of the CNC SCP2 installation. At that point, you can 'start over' and successfully install both components.

Don't be confused if the file name for the Shark Control Panel 2.x you download is different than that listed in this manual. A difference in name only indicates to you that a new version of the Shark Control Panel is available to you.

If you are using Norton's 360 anti-virus, you should disable the antivirus auto-protect while installing the Shark Control Panel and USB driver. You can turn it back on after the installation is complete.

Double click on the CNCSharkControlPanel\_v2.x.x\_Release.exe. This will start the installation. On many systems, you will immediately see the screen shown in the figure below. Click yes to allow the installation.



#### Figure 49 - SCP2 Allow Installation

Depending on the operating system version and how it is configured, you may also receive a User Account Control message. Click 'Yes' to continue the installation.



Figure 50 - User Account Control Panel

The CNC SCP2 Setup Wizard will appear – click on Next to start the installation.



Figure 51 - CNC SCP2 Setup Wizard

You will next see a panel that gives you the opportunity to install this on the computer only for the user running the installation, or for all users of that computer to have access to. Even if you only have one user setup on this computer, you typically will choose 'All Users' unless you want to specifically limit access to the program by other users.



Figure 52 - CNC SCP2 Setup Wizard - User Selection

You will next see the Setup – Select Destination Location. While you can change the installation location, in most cases there is no need to do that. Click 'Next' to proceed with the installation.



Figure 53 - Setup - Select Destination Panel

You will next see the Setup – CNC SCP2 indicating Ready to Install – click Install.



Figure 54 - CNC SCP2 - Ready to Install

The CNC SCP2 Setup panel will show the progress of the installation. The CNC SCP2 Setup then indicates that the installation is finished. There are check boxes that are already selected to enable the installation of the USB driver, updating the Shark Control Box firmware, and installing the Direct Output files after clicking on Finish. If this is your first installation, ensure that these boxes are checked, and click on Finish.



Figure 55 - CNC SCP2 Installation Complete

After clicking on finish, you may be presented with a pop up asking if you want to allow the program from an unknown publisher to make changes to this computer – click on yes.

🛞 Usei	😌 User Account Control 🛛 🛛 🛛					
$\bigcirc$	Do you want to allow the following program from an unknown publisher to make changes to this computer?					
Program name: dpinst.exe Publisher: <b>Unknown</b> File origin: Hard drive on this computer						
•	Show details	Yes No				
		Unange when these notifications appear				

Figure 56 - Shark USB Driver Allow Installation

On Windows Vista, Windows 7 and Windows 8 you may not see anything on your screen at this point. But, if you look along the task bar at the bottom of your screen, you'll see an icon flashing. Click on that icon to enable the system to show the panel in the figure above.



Figure 57 - USB Driver Allow Installation in Task Bar

The Device Driver Installation Wizard will appear – click Next.



Figure 58 - Device Driver Installation Wizard

If you have the Shark Control Box connected to the computer using the USB cable, and turned on, you will see the 'Drivers are now installing' panel. Turn off the Shark Control Box.

The Device Driver Installation Wizard reports success. The USB driver that was installed is shown on the panel. Click on Finish to close the panel.

Device Driver Installation Wizar	d 📃	
	Completing the De Installation Wizard	vice Driver 1
	The drivers were successfully in:	stalled on this computer.
	Driver Name	Status
	✓ OEMTECH (WinUSB) n	Device Updated
	< Back	Finish Cancel

Figure 59 - Device Driver Installation Complete

After the USB drivers are installed, you will be prompted to connect the CNC Shark Control Box via USB cable to the computer. After you have connected it and turned it on, click the 'OK' button. You may want to review the 'Computer/Shark Control Box' section in the manual below if you run into any unique prompts or challenges with first connecting the computer to the CNC Shark Control Box.



Figure 60 - Connect and Turn On Shark Control Box Prompt

At this point, the Firmware Updater will run. Tap on the acknowledgement bar in the dialogue panel to start the firmware update.



Figure 61 - Firmware Update Prompt

You will see a progress bar that provides the status of the firmware update. Once the firmware update is complete, a 'success' panel will open. Click on the 'OK' button to close this panel.



Figure 62 - Firmware Update Successful

You may have noticed a Windows command window opening, some indication of files running and then the command window closing. This was the installation of the files required to enable the direct output of the tap file from VCarve Pro or Aspire to the SCP.

The CNC SCP2 installation is now complete.

If you disabled Norton's 360 anti-virus, you can now enable it.

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## Installing the SCP on Windows XP and Windows Vista

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If you are using the Windows XP or Windows Vista operating system, you must install the vcredist\_x86 package prior to installing the SCP 2.x for the first time. If you have already installed the Shark Control Panel 1.x, or a previous version of the SCP 2.x, you do not need to repeat this step.

You can find a link to the vcredist\_x86 package here - <u>http://register.nextwaveautomation.com/</u> - in point number 1. You can also directly download it from this link - <u>http://nextwaveautomation.com/Downloads/vcredist\_x86.exe</u>.

### Install vcredist\_x86

Double click on the vcredist\_x86.exe file. This will start the installation. On many systems, the first thing that will pop up is a window that asks if you want to allow the following program to make changes to the computer – click yes.

🎯 User Accou	🌍 User Account Control 🛛 🛛 🗙				
👔 Do ya comp	Do you want to allow the following program to make changes to this computer?				
9	Program name: vcredist_x86.exe Verified publisher: <b>Microsoft Corporation</b> File origin: Downloaded from the Internet				
Show o	etails Yes No Change when these notifications appear				

Figure 63 - vcredist\_x86 Allow Installation

You will then be presented with the Microsoft Visual C++ 2008 Redistributable Setup panel – click Next.

🚰 Microsoft Visual C++ 2008 Redistributable Setup	
Welcome to Microsoft Visual C++ 2008 Redistributable Setup	
This wizard will guide you through the installation process.	
Next > C	ancel

Figure 64 - Microsoft Visual C++2008 Redistributable Setup Panel

Next you will be presented with the License Terms for the Microsoft Visual C++2008 Runtime Libraries. After reviewing these, click on the check box indicating that you have read and accepted these license terms, and then click on install.

🖟 Microsoft Visual C++ 2008 Redistributable Setup	X
License Terms	
Be sure to carefully read and understand all the rights and restrictions described in the license terms. You must accept the license terms before you can install the software.	
MICROSOFT SOFTWARE LICENSE TERMS	
MICROSOFT VISUAL C++ 2008 RUNTIME LIBRARIES (X86, IA64 AND X64)	
These license terms are an agreement between Microsoft Corporation (or based on where you live, one of its affiliates) and you. Please read them. They apply to the software named above, which includes the media on which you received it, if any. The terms also apply to any Microsoft	
Print	
Press the Page Down key to see more text.	
For The interval and accept the license terms.       < Back     Install >     Cancel	

Figure 65 - Microsoft Visual C++2008 Runtime Libraries License Agreement

The installation begins, and a Setup window shows the progress of the installation.

Microcoft Viewal	C L L 2009 Rodictvibutable Setup	
LICENSE TERMS		
Be sure to carefully license terms. You	read and understand all the rights and restrictions des must accept the license terms before you can install the	cribed in the software.
MICROSOFT SOFT	WARE LICENSE TERMS	
MICROSOFT VISU	Setup	
These license term where you live, or software named a terms also apply to	Setup is configuring the install. This may take a minute or two.	sed on to the any. The
Press the Page Dov	vn key to see more text.	Print
🔽 I have read a	and accept the license terms,	

Figure 66 - Microsoft Visual C++2008 Runtime Libraries Installation Running

After the installation is complete, a status window appears to indicate success. Click Finish to close the window.

륡Microsoft Visual C++ 2008 Redistributable Setup	
Setup Complete	
Microsoft Visual C++ 2008 Redistributable has been successfully installed.	
It is highly recommended that you download and install the latest service packs and security updates for this product.	
For more information, visit the following Web site:	
Product Support Center	
× .	
<b>X</b>	
Finis	h



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## Shark Control Box/USB Driver First Time Installation

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With the computer turned on, the user logged in, but without first running the CNC SCP2, and the Shark Control Box turned off, connect the USB cable to the Shark Control Box and the computer.

Once the USB cable is plugged into the computer and the Shark Control Box, turn on the power to the Shark Control Box. You may see a message appear in the lower right corner of the screen in the task bar about finding new hardware.



Figure 68 - Found New Hardware Message

If you do, a Found New Hardware Wizard will open. Select 'No, not at this time' to the choice about connecting to Windows Update to search for the software, and click on Next.



Figure 69 - New Hardware Wizard - Do Not Connect to Windows Update

You are then given a choice on how the Wizard will install the driver. Select 'Install the software automatically' and click on Next.



Figure 70 - New Hardware Wizard - Install the software automatically

During the driver installation you will receive a warning dialogue – click on 'Continue Anyway'.

Hardwa	re Installation
1	The software you are installing for this hardware: ncPod has not passed Windows Logo testing to verify its compatibility with Windows XP. (Tell me why this testing is important.) Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.
	Continue Anyway STOP Installation

Figure 71 - Hardware Installation Warning - Continue Anyway

The system will report a successful installation of the driver. Click on Finish to close the window.

Found New Hardware Wizard				
	Completing the Found New Hardware Wizard The wizard has finished installing the software for:			
and the second second	Click Finish to close the wizard.			
	< Back Finish Cancel			

Figure 72 - New Hardware Wizard – Success

After closing this window, a message will appear in the lower right hand corner of the screen in the task bar indicating that the new hardware was successfully installed and it is ready for use.



Figure 73 - New Hardware Installed and Ready for Use

You will only see these messages and have to go through these steps once on this computer. Again, you may not have to go through any of these steps – neither case is better or worse.

You'll also notice that once the computer and Shark Control Box are connected via the USB cable and the Shark Control Box power is turned on, the Safely Remove Hardware icon is present in the task bar in the lower right hand corner.



Figure 74 - Safely Remove Hardware Icon - Windows XP SP3

You may need to expose this by clicking on the up arrows in the lower right hand corner on a Windows 7 system.



Figure 75 - Safely Remove Hardware Icon - Windows 7

Double clicking on the Safely Remove Hardware icon will open the Safely Remove Hardware panel. Click on Properties to open the ncPod Properties Panel. You can see that the driver is working properly. Click on Ok in the ncPod Properties panel and Close in the Safely Remove Hardware panel to close them.

💈 Safely Remove Hardware 🔹 🎅 🗙	ncPod Properties	? 🔀
Select the device you want to unplug or eject, and then click Stop. When Windows notifies you that it is safe to do so unplug the device from your computer. Hardware devices:	General Driver	
िङ्च ncPod	Device type: DEMTech CNC Controllers Manufacturer: DEMTech Location: Location 0 (ncP0D Controller) Device status This device is working property.	
ncPod at Location 0 Properties Stop	If you are having problems with this device, click Troubleshoot to start the troubleshooter.	
Display device components	Device usage: Use this device (enable)	ancel

Figure 76 - Safely Remove Hardware and ncPod Properties Panels

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## **CNC Shark, Software and Accessories Registration**

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### **First Registration**

With your first use of the SCP software, you will be prompted to register the machine, software and any CNC Shark accessories you have purchased. At this point you have connected the computer to the Shark Control Box via a USB cable, and the Shark Control Box is turned on. Start the CNC SCP – from the Start, Programs, CNC SCP programs group by clicking on the CNC SCP shortcut; or by double clicking on the CNC SCP shortcut you created on the desktop.

The SCP must be registered within 15 days of first use. A single SCP software license supports use with up to 3 different Shark Control Boxes (SCB) – 3 different CNC Shark systems.

The SCP registration requires you to enter the serial number for the SCP and any CNC Shark accessories you are registering. You do not have to register the accessories at the same time as you register the SCP.

When you start the SCP for the first time, you will see a panel pop up about the registration status. You can choose to register the SCP at this time by selecting 'No'.



Figure 77 - CNC SCP Registration Reminder

When you select 'No', the CNC Shark Registration wizard will open. This consists of 3 panels:

- Products
- Customer Owner
- Get Registered

## **Products**

From this panel you will enter the software serial number, choose the CNC Model you have purchased, and enter in the serial number and type of accessory for any CNC Shark accessories you are registering. The Shark Control Box id is captured for you by the CNC Shark Registration wizard. Once you have made the appropriate entries, tap on the 'Next' button to proceed to the Customer Owner panel.

CNC Shark Registra	ation				×
Products Custome	er Owner 🛛 Get Regi	stered			
Which produ	ucts would y	ou like to	register?	ould rather ente	er my registration key
Controller ID:	5538 Model Numbe	r: 1008 Firmwar	e Version: 2083		
Software Serial #	47DFECA5CDEA	*	Softw	are Order #	
		CNC Model:	Shark 13x24 🔷 👻	* Order #	
Accessory Serial #		Type:	•	Order #	
Accessory Serial #		Type:	-	Order #	
Accessory Serial #		Type:	•	Order #	
Please tell ( Education, hobby, )	us what you professional woodw	will use t	his CNC for		
* Required Field			Next>	Close	]

Figure 78 - Registration - Products Panel



Figure 79 - CNC Model Pulldown

Accessory Serial #	Type:	-	C
Accessory Serial #	Scan Probe Type: Touch Plate		C
Accessory Serial #	A Axis (4th Axis)		C



#### **Customer Owner**

From this panel you will enter in information about yourself/your company. Note that every entry marked with a red asterisk is a required entry. The email address associated with this registration is entered two times to ensure it is accurate. Once you have made the appropriate entries, tap 'Next'. You will be prompted to fill in any 'missing' required information and not be able to proceed to the 'Get Registration' panel.
CNC Shark Re	gistration						×
Products Cu	stomer Owner	Get Registered					
Please t	ell us abo	ut yourse	lf				
Company				Phone	#		*
First Name		*	Last Name		*		
Country	United States	•	ŧ.				
Province	None						
Address				*			
Address 2							
City		* State	*	Zipcode		*	
Pleas	Please enter your email information.						
	Email address					*	
re enter Email address *							
* Required F	Field	< Previous	Next	>	Close		

Figure 81 - Registration - Customer Owner Panel

# **Get Registered**

There are two ways to submit the registration:

- Via the internet
- Via email

On the 'Get Registered' panel you will see 3 buttons

CNC Shark Registration	
Products Customer Own	er Get Registered
How would y	you like to submit your registration?
	Submit (Must be connected to the Internet)
1	
	Email Registration to Next Wave
	Save Registration Info to Local File
(	
* Required Field	< Previous



## **Submitting Via the Internet**

If the computer you have installed the SCP is connected to the internet, this method is by far the easiest as it not only submits the registration serial numbers automatically, but returns the registration keys and installs them for immediate use for you. If your computer is 'out in the shop' and not connected to the internet, it may be worth the trouble to bring it to a location where it can be connected to the internet to perform this step.

Tap on the 'Submit' button. You will next see a panel that informs you of what registration keys were received from the NWA registration server.



Figure 83 - Registration Keys Received

After tapping on the 'OK' button, you will next be presented with an information panel as each of the registration keys are installed on your setup. Click 'OK' to acknowledge the message. Again, you have to acknowledge one information panel for each component registered.

CNC Shark Control Panel	×
Successfully Registered Cnc!	
	ОК

Figure 84 - Successful Registration Notice

After closing that last information panel, the SCP will open.

### **Submitting via Email**

The other 2 choices on the 'Get Registered' panel result in submitting the registration information via email.

If you tap on 'Email Registration to Next Wave', your email client will start and a new email message will be created with the 'To' line filled out and the registration file attached. Send the email message. This method may not work with every email configuration. However you will see a message telling you where the registration file was saved on your computer. If your email client does not open, simply create a new email message, attach the file, and send the email to <u>register@nextwaveautomation.com</u>.

If you tap on 'Save Registration Info to Local File', you will be prompted to define where on your computer the registration file will be saved. After you hit 'Save', you will see a message telling you where the registration file was saved on your computer. Create an email message, attach the file, and send the email to register@nextwaveautomation.com.

CNC Shark Control Panel	X
Your registration file was successfully saved. to C:\Users\kbfarms\Documents\CNC Shark Please email the saved file to register@nextwaveautomation.com	Your file was saved 2.0\regSave0.nwa
	ОК

Figure 85 - Saved Registration File Information Panel

In both cases, you will receive an email with the registration keys associated with your request. You will then have to enter the registration key(s).

After acknowledging the information panel, the SCP will start to open. You will be reminded about how many days you have remaining to register. If you have not yet received the registration keys via email from NWA, select 'No' and the SCP will open.



Figure 86 - Registration Status and Reminder

# **First Registration Keys**

If you did not register via the internet, you will receive an email from NWA with registration keys for each component registered via email. From the registration reminder, select 'Yes' (I have a controller registration key). The 'Enter Registration Key' panel will open. Enter the registration key for the CNC Shark machine and tap the 'Set' button.

Enter Registration Key
Enter in Registration Key provided to you by Next Wave Automation
Set Cancel
I would rather submit a serial number

Figure 87 - Enter Registration Key

You will next see a panel letting you know that you've successfully registered your CNC machine and the SCP will open.

Ensure there are no spaces between any of the alphanumeric values when entering the registration key. If copying and pasting from an email, double check that there are no spaces in what you received from the NWA registration system.

You will enter the other registration keys associated with your system from the SCP. This can include the registration key associated with the CNC machine (if you 'skipped' entering it while starting the SCP).

## **Registering from the SCP**

You can also register and enter registration keys from the SCP. Tap on the 'Help' menu and choose -

- Register your Next Wave Product to enter registration information and submit it to NWA. The steps are the same as described in the <u>First Registration</u> section.
- Enter Registration Key to enter a registration key received from NWA via email. The steps are the same as described in the <u>First Registration Keys</u> section.



Figure 88 - Help Tools from SCP Toolbar

You would register and enter the registration key for any new accessory purchased in the future from these tools in the SCP.

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# **Update the Firmware**

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Ensure that the CNC SCP is closed, but the Shark Control Box is powered on and connected to your computer via the USB cable. Start the CNC Shark Controller Firmware – from the Start, Programs, CNC SCP programs group by clicking on the CNC Shark Controller Firmware. The CNC Shark Firmware Updater displays on the screen.

@ Firmware Updater	Contactor is an addation for your.	
	ncPOD Firmware Updater 2083. Click here to install.	
		łł.

#### Figure 89 - CNC Shark Firmware Updater

Click on the 'Click here to Start Firmware 2082 Update' button to start the firmware update. The CNC Shark Firmware Updater displays a status bar to indicate the progress of the firmware update.

💮 Firmware Upd	ater	
	Updating Serial No 5538. Do not disconnect!	
8 - 0		

#### Figure 90 - CNC Shark Firmware Updater - Progress of Update

A new window opens to indicate success. Also note that the status of the firmware update is now present in the lower left corner of the CNC Shark Firmware Updater. Click Ok on the notification window. The notification window and the CNC Shark Firmware Updater will close.

irmware Updater		3
	Updating Serial No 5538. Do not disconnect!	
Update Successful	Update Successful.	
	ОК	

Figure 91 - CNC Shark Firmware Updater – Success

Don't be confused if the file name or version number of the Firmware Updater on the Documents web page is different than that listed in this manual. A difference in name or version number only indicates to you that a new version of the Firmware Updater is available to you.

You have now successfully updated the firmware in your Shark Control Box. [Return to After Software Installation] [Appendices] [Contents]

# SCP System Check and Test File

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## **System Check**

The SCP2 displays on the screen as shown in the figure below.



Figure 92 - SCP2 at Startup

If the SCB is not connected and powered on, you will see the message below informing you of the condition. You can connect the SCB, turn it on, and hit 'OK' and the SCP2 will open. If you hit 'Abort', the SCP2 will close.



Figure 93 - SCB Not Connected or Powered On at Startup of SCP2

If you turn off the Shark Control Box or disconnect the USB cable after the SCP2 is open, the controls will gray out and become inactive. In the lower left hand corner you'll see a message – Please check CNC

Shark power and USB cable. This is indicating that the CNC SCP2 is currently not able to communicate to the Shark Control Box.

	Run File	Continu		
Please check CNC Shark power and USB cable				

Figure 94 - SCB Not Connected or Powered On After Opening the SCP2

Note the message in the lower left corner – 'Please load file'. This indicates that the CNC SCP2 is successfully communicating with the Shark Control Box.

	Run File	Contin
Please Load File		

Figure 95 - SCP Communicating with the SCB

A comprehensive description of each of all of the CNC SCP2's functions is found in the CNC SCP2 section of this manual. For purposes of completing the systems check, click on the Jog tab. The Jog portion of the CNC SCP2 is now displayed. You may have to drag the edges of the SCP2 panel to make it larger on the screen and fully expose this panel.

3 CNC Shark Control Panel				
File View Help Info				
Part Coordinates Set				<file name=""></file>
XYZ0 X0 Y0 Z0				GCode Jog Virtual Scan Preferences
<b>X</b> 0 000				1 ^ ○ Fast ○ Medium ● Slow
<b>X</b> 0.000				C Stop - 0.01 +
70.000				Step in the internet
INCHES FRO				Y + X - X +
Detect Touch Plate				
Move to 0.0.0				Ζ+
Load G Code				Ζ-
Run Virtual Setup				
Enable 🛛 Virtual 🖾 AAxis				
	Run File Continue	Pause E-Stop		· · · · · · · · · · · · · · · · · · ·
		Control Panel 2.0: jump into Virtual-2	<u>.</u>	
Please Load File			INCHES Probe Act	vated

Figure 96 - CNC SCP2 - Jog and GCode Panels Active

Recalling the orientation of the X, Y and Z axis -



#### Figure 97 – CNC Shark Axis Orientation

Tap a direction of your choice and familiarize yourself with the movement of the Shark gantry. Confirm that the gantry moves in the desired axis direction based on the button selected. If the Shark is moving along an axis that is different than that selected, check the cabling connection at the Shark Control Box to ensure that the stepper motor cable connection is plugged into the Shark Control Box connector with the same axis label.

## **Run the Test File**

Jog the gantry to position it about 2" from the left side of the table (X), 2" from the front edge of the table (Y), and 2" above the table (Z). The Jog panel may look something like the figure below. Don't worry if the X, Y and Z numbers don't match – they won't match as the gantry will start out in a slightly different position from Shark to Shark out of the box. There is no need to be exactly precise with this before running the test toolpath – as long as you are within 1" of these physical locations of the gantry, the test toolpath will run fine.

CNC Shark Control Panel	
File View Help Info	
Part Coordinates	<file name=""></file>
XYZ0 X0 Y0 Z0	Goode Jug Viitual Scall Preferences
<b>X</b> 1.701	
¥1.039	• Step - 0.01 +
<b>Z</b> 1.663	
INCHES	Y+
FRO ( , ,	X - X +
Detect Touch Plate	
Move to 0,0,0	Z +
Load G Code	7
Bun Victual Solum	Ζ-
Run Virtual Setup	
Enable Virtual AAxis	
Run File Continue Pause E-Stop	· · · ·
Shark Online Store	
Please Load File INCHES Probe Activate	d and a second sec

Figure 98 - Jog Panel for Test Toolpath

Click on the XYZO button. This will set the XO, YO and ZO to the current position of the gantry.

File View Help Info
Part Coordinates Set
XYZ0 X0 Y0 Z0
<b>X</b> 0.000
<b>Y</b> 0.000
<b>7</b> 0 000
20.000
INCHES
FRO
100%

Figure 99 - Set the X0, Y0 and Z0 of the Gantry

Click on the 'Load G Code' button. An Open File dialogue box appears on the screen. Navigate to the My Documents, CNC Shark 2.0 folder, Samples folder, and select the square-1in.tap file. Click Open to complete the selection and close the Open File dialogue box. You can also double click the file to open it as well.

र्थे, Open		
🚱 🔵 💌 📕 🕨 Libraries 🕨 Documents 🕨 My D	ocuments + CNC Shark 2.0 + Samples +	<ul> <li>✓</li> <li>✓</li></ul>
Organize 🔻 New folder		III 🕶 🗔 🔞
^	Documents library Samples	Arrange by: Folder 🔻
	Name	Date modified Type Siz
=	🕌 Virtual	3/29/2015 1:26 PM File folder
CNC Shark	1in Test.tap	11/21/2014 11:11 GCode File (
i CNC Shark 2.0 CNC Shark 2.0 Samples Startup	25mm Test.tap	11/21/2014 11:11 GCode File (
-	< III.	4
File name: 1in Test.tap		

Figure 100 - Toolpath Open Dialogue Box

You will be asked if you want to setup this file for using virtual zero. Select 'No'.

At this point, the CNC SCP2 looks as shown in the figure below. If it doesn't, press on the GCode button in the Functions area of the SCP2 UI. This test toolpath will move the gantry down (-) 0.1 inch in Z, then move along 4 sides of a square, and return the gantry to X0, Y0, and Z0. Note that the 'Run File' button is now enabled (not grayed out), and that the Pause and Continue buttons remained disabled (grayed out).

CNC Shark Control Panel			
File View Help Info			
Part Coordinates Set	Material Size: X=10 Y=10	Router Location: x= 0 y= 0	File: 1in Test.tap 00:26 GCode Jog Virtual Scan Perferences
XY20 X0 Y0 20 X0.000 Y0.000 Z0.000		/	(
FRO , , , , , , , , , , , , , , , , , , ,			iii (sec = second r - secon
Move to 0,0,0 Load G Code Run Virtual Setup			30 078 11 076 8 10 076 8
and and an			1 0 0 0 0 1 0 0 0 0 4.44 0 V.442 0 0.040 1 1 0 0 0 4.44 0 V.442 0 0.040 1 1 0 0 0 4.44 0 V.442 0 0.040 1 1 0 0 0 0 4.44 0 V.440 0 0.000 1 1 0 0 0 0 4.44 0 V.440 0 0.000 1 1 0 0 0 0 4.44 0 V.440 0 0.000 1 1 0 0 0 0 4.44 0 V.440 0 0.000 1 1 0 0 0 0 0 0 0 0 0 V.44 0 V.440 0 0 0 000 1 1 0 0 0 0 0 0 0 V.44 0 V.440 0 0 0 000 1 1 0 0 0 0 0 0 0 V.44 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	Run File Continue	Pause E-Stop	as 001 X5.4575 Y5.4575 X-0.0500 * 001 X4.5475 Y5.4575 X-0.0500 *
	his	t Wave Automation	
ease Load File		Total Time: 00:00:25 INCE	ES Probe Activated

Figure 101 - Toolpath Ready to Run

The router is not needed to be turned on for this test as you can watch it trace the square. You can of course run the router – but ensure that any cutter tool you have mounted is at 2" above the table when you set the ZO.

Remember: You can always select the E-Stop on the CNC Shark Control Panel and stop all movement of the gantry.

Click on the 'Run File' button and the toolpath will be run on the Shark. You will be asked again if you want to setup this file using virtual zero. Select 'No'. The SCP then sends the gcode to the SCB. Once this is completed, you will be prompted to 'Press OK to Begin the Program'. Press 'OK'. If the router is on and plugged into the SCB, it will now begin to run as well. The router does not run while the gcode is being sent to the SCP. If you are not ready to run the program, select Cancel.

The program is set to a slow feed rate, so you can watch not only the gantry moving around, but you can see the X, Y and Z locations as reported in the CNC SCP2. Also note that after hitting the 'Run File' button, only the Pause button is enabled. If you select the Pause button, it becomes disabled and the Continue but is enabled.



Figure 102 - Pause Button Enabled



Figure 103 - Job Paused - Continue Button Enabled

When the toolpath is complete, the gantry stops moving, and the 'Load G Code', 'Run File', and 'Move to 0, 0, 0' buttons are once again enabled. The gantry is not at 0.00, but at the z = safe height at the end of the job.





You can exit the CNC SCP2.

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