3D Digitizing Probe Manual

NEXT WAVE CNC

Revision #1

Information in this manual and all subsequent versions are subject to change without notice. For the most up-to-date instructional materials and manuals, please visit our support page at nextwavecnc.com/support

A Note to Our Customers

Thank you for purchasing the 3D Digitizing Probe accessory! We hope you enjoy this versatile tool for your Next Wave CNC machine.

This manual provides you with the necessary information to get your brand-new accessory up and running. Please read through the entire manual carefully. Proper installation and setup are the key to getting the best results.

Disclaimer

This manual has been written with the expectation that the operator has a basic understanding of their CNC machine and are familiar with the safe operation of woodworking power tools. Information in this manual is subject to change without notice. For more information, please refer to the support page on our website: https://www.nextwavecnc.com/support

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Warranty

Next Wave CNC warrants to the original retail purchaser of a 3D Digitizing Probe Accessory and purchased from an authorized CNC Shark distributor will be free from defects in material and workmanship for ONE YEAR from the date of purchase. This warranty is for parts and labor to correct the defect, and does not cover the cost of shipping the defective item(s) to Next Wave CNC for repair or replacement.

This warranty does not apply to defects arising from normal wear and tear, misuse, abuse, negligence, accidents, unauthorized repair or alteration, or lack of maintenance. This warranty is void if the 3D Digitizing Probe Accessory is modified without the prior written permission of Next Wave CNC, LLC, or if the 3D Digitizing Probe Accessory is located or has been used outside the country of residence of the authorized CNC Shark distributor.

Please contact Next Wave CNC to take advantage of this warranty. If Next Wave CNC determines the 3D Digitizing Probe Accessory is defective in material or workmanship, and not due to normal wear and tear, misuse, abuse, negligence, accidents, unauthorized repair or alteration, or lack of maintenance, then Next Wave CNC will, at its expense and upon proof of purchase, send replacement parts to the original retail purchaser necessary to cure the defect.

Table of Contents

What's Included

Image 1: What's Included

In the box you will find the 3D Digitizing Probe with 1 probe tip installed, two adhesive-backed cable management loops, and this manual. Additional cable loops and replacement probe tips can be found on our website at nextwavecnc.com/shop/CNC-Accessories by typing the SKU number into the search bar (SKU# 200715 – 2PK Digitizer Cable Clips and SKU# 200706 – Digitizer Probe Tip).

For additional support or replacement parts, please reach out to support@nextwavecnc.com or 419-318-4822.

Product Overview

The 3D Digitizing Probe is a simple yet effective tool for digitally duplicating physical designs into a 3D file. This file can then be used in VCarve to create toolpaths for your machine. The probe uses a pressure sensitive mechanism to detect and record the design. It is designed for seamless operation with the current product line of Next Wave CNC machines and legacy machines with a 3.5mm accessory port.

Installation

The 3D Digitizing Probe is designed to be secured to your machine utilizing the existing collet in your router or spindle. Before installing the probe, make sure that your router is turned off and unplugged. The 3D Digitizing Probe is not designed to be spun up with the router and it will cause damage to itself and its surroundings if it does. To install the 3D Digitizing Probe, remove the bit from your router or spindle and insert the ¼" shaft on the top of the digitizer into the collet. Secure it to your machine by tightening the collet as you would with a normal bit.

Image 2: Probe in Collet

Please note that the scan will always start from the bottom left corner of the scan area. This is discussed in further detail in the "Starting A Scan" section on page 11.

The 10ft integrated cable allows for the full range of motion for most applications. If additional length is needed, we sell extensions separate on our website at https://www.nextwavecnc.com/shop/Parts-c31027749.

To prevent the cable from catching or interfering with the probe movement, two adhesive-back cable management loops are included. We suggest attaching one loop near the Z-axis motor on the top of the xbox and the other on the left leg of the gantry.

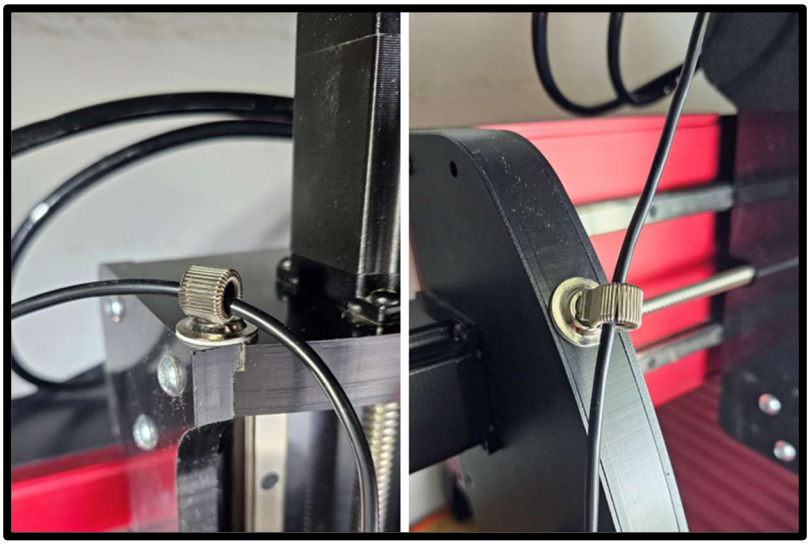

Image 3: Recommended Cable Management

The 3D Digitizing Probe connects to the 3.5mm round port on either the front of the controller or on the left side of the pendant. Do not plug the 3D Digitizing Probe into the 3.5mm round port until after the machine is powered up. Plugging it in before powering it up will cause the system to go into boot/update mode.

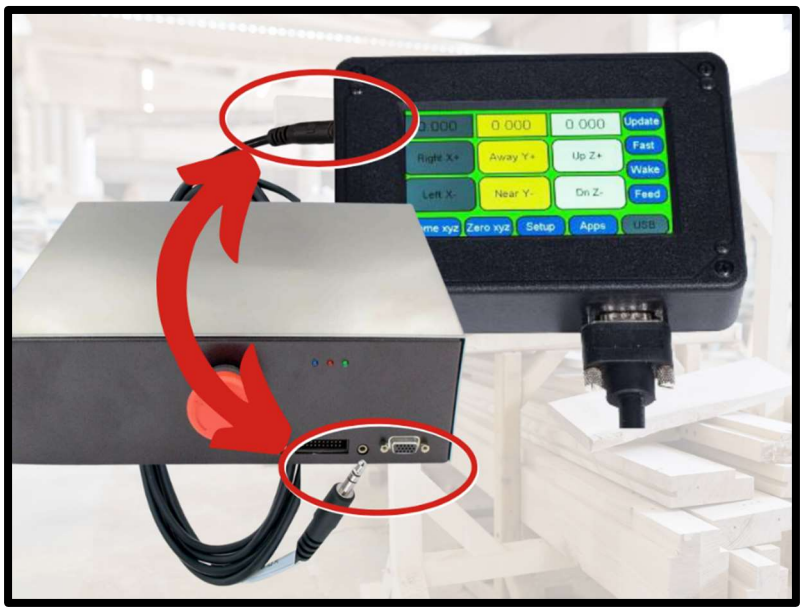

Image 4: Probe Connection

CNC Pendant Digitizer App

Once the 3D Digitizing Probe is installed, turn on the machine, plug in the cable to the 3.5mm round port, and set the job parameters in the pendant. These settings will save between power cycles. For the best experience with the 3D Digitizing Probe, check that the firmware on the controller and pendant are up-to-date before using it for the first time.

- Once at the main screen, press the “Apps” button in the lower right corner of the LCD pendant.

Image 5: Main Screen

- In the Apps Menu, press the “Digitizer” button in the list on the right, and then press the “Press to Open” button to open the Digitizer Menu.

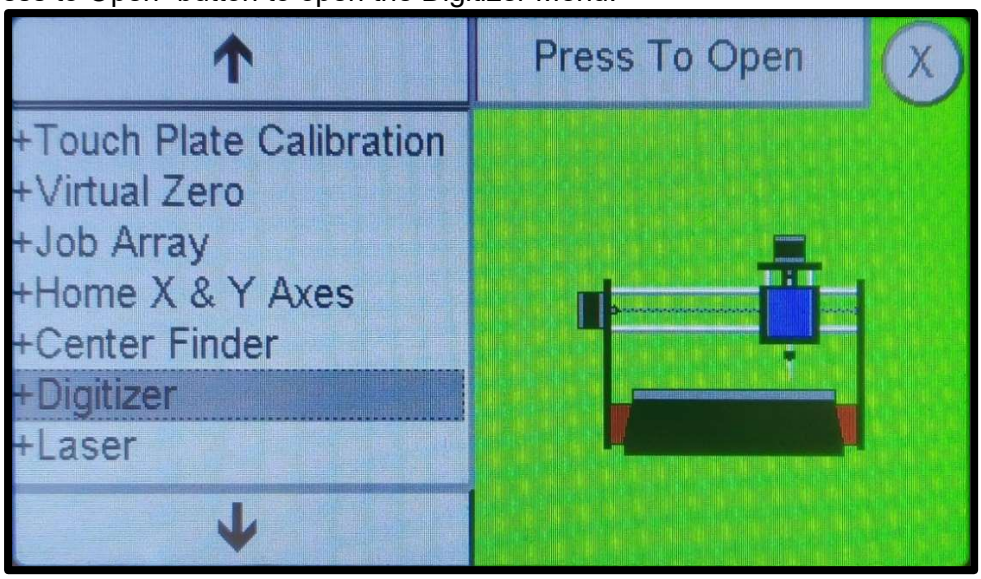

Image 6: Apps Menu, Digitizer Selected

- In the Digitizer Menu you will see the list of settings related to the digitizing function. Tapping through each will display an image depicting what the setting is for and the value it is currently set to.

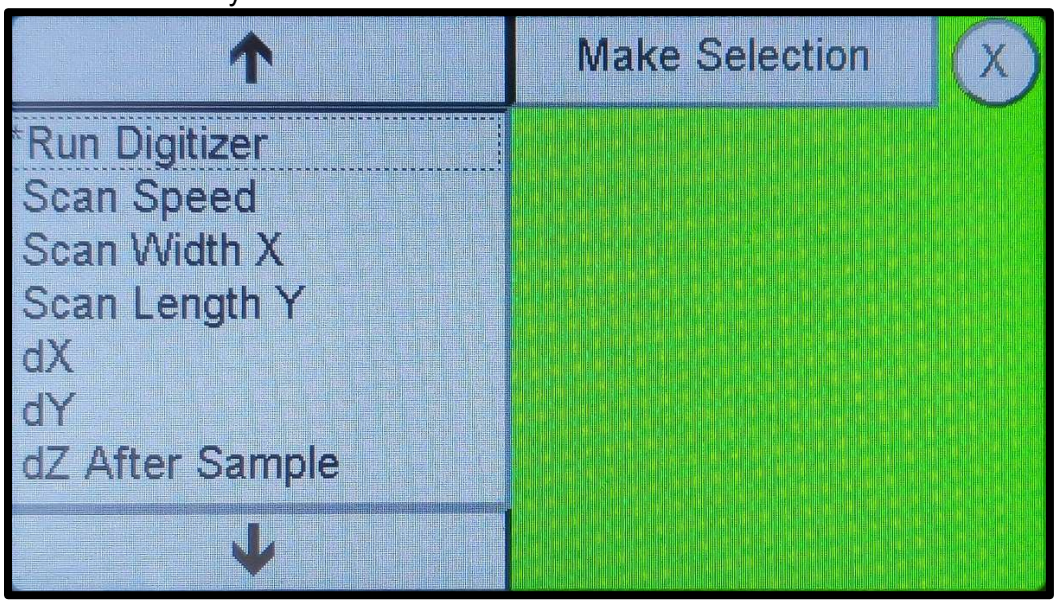

Image 7: Digitizer Menu

- To change the value of a setting, press the box where the value is displayed. A number pad will appear for you to type in the value you desire. Make sure to press “OK” after inputting the value in order to save it.

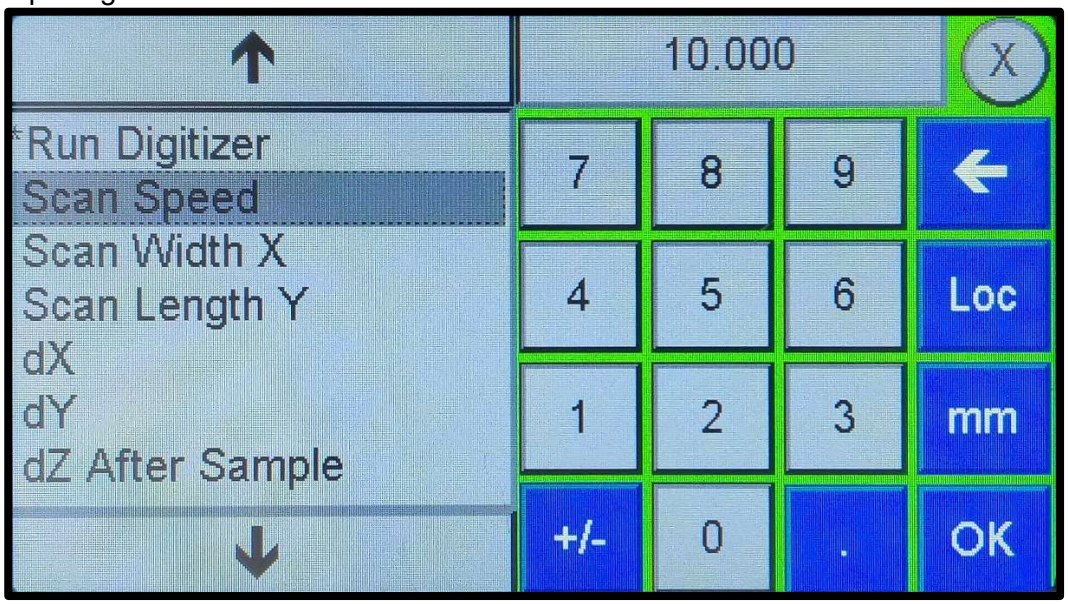

Image 8: Numpad

- Scan Speed controls the vertical speed of the probe when capturing a point. For a smoother scan, try lowering this number.

- Scan Width X determines how far to the right along the X-axis the probe will scan from the start point.

- Scan Length Y determines how far to the back along the Y-axis the probe will scan from the start point.

- dX determines the offset between each sample taken by the probe along the X-axis.

- dY determines the offset between each sample taken by the probe along the Y-axis.

- dZ After Sample determines the distance the probe will move up away from the material after each sample point is taken.

- Max Z Height is the furthest distance above the Z-axis zero point that the probe will travel before throwing an error. Make sure that this value is not less than the maximum height on your material or else the scan will fail.

- Max Z Depth is the furthest distance below the Z-axis zero point that the probe will travel. This will not throw an error; however, it will simply glide above the material at that maximum Z depth not collecting accurate data sample points.

Recommended Settings

Below are the recommended values for the settings that are not job dependent for the 3D Digitizing Probe:

- Scan Speed: 10in/min
- dX: 0.010 – 0.05 inches
    - Make this match with dY for a consistent grid
    - The probe is capable of very small stepovers but below 0.010 inches there are diminishing returns compared to the increase in job time
- dY: 0.010-0.05 inches
    - Make this match with dX for a consistent grid
    - The probe is capable of very small stepovers but below 0.010 inches there are diminishing returns compared to the increase in job time
- dZ After Sample: 0.010-0.015 inches
    - The best value we found in testing was 0.013 inches but your mileage may vary slightly depending on the material and variation in heights across the design you're scanning

Examples

When determining the X and Y stepovers for a scan, it's important to consider the amount of time a scan will take to run compared to the quality of the scan. Below are two examples for your reference:

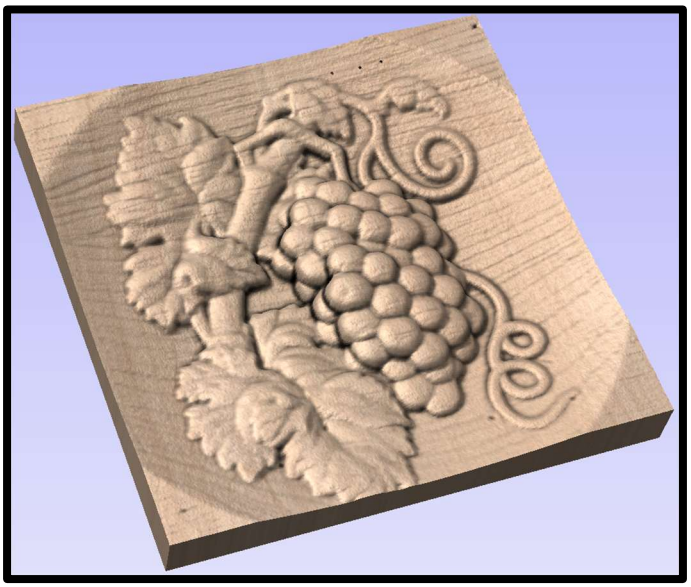

Image 9: 0.010" Stepover

For highly detailed or intricate scans, a large number of points will be helpful in capturing the full detail of a piece, however this will greatly increase the amount of time the scan takes. Decreasing the dX and dY values will increase the number of points taken. This example is a 6.5" x 5" scan with the dX and dY set to 0.010" and took 15 hours to complete.

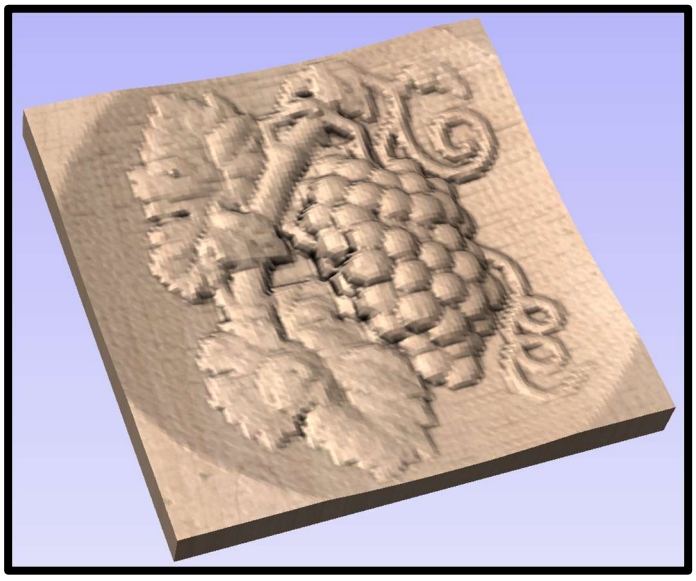

Image 10: 0.050" Stepover

For simple scans, it is recommended to increase the X and Y stepovers. This will result in less detail but will take only a fraction of the time to complete the scan. This example is the same 6.5” x 5” scan, but with the dX and dY set to 0.050” and took less than an hour to complete.

Starting A Scan

The digitizing process starts in the bottom left corner of the scan area and will run back and forth across the X axis, progressing toward the back of the Y axis, to make a rectangular scan. Follow the steps below to start your scan:

1. When positioning your material for digitizing, make sure that the planned scan area is clear of obstructions including cables and clamps.

2. Position your probe in the bottom left corner of the material to scan and set the X and Y zero position by selecting the “Zero XY” button at the bottom of the pendant screen.

3. Lower the probe until it is just above the highest point on the material and zero the Z axis to by pressing the “Zero Z” button located in the right column of the main screen of the pendant.

4. Insert a flash drive into the USB Type A port on the right side of the pendant. The flash drive must be 16GB or less in size and formatted as FAT32. This is used for recording the information from the scan. Do not remove this drive during the digitizing process.

5. Set the “Max Z Depth” to just beneath the lowest point of your material. (Example: If you are scanning an object that is 1” tall, press “Zero Z” with the probe tip just above the highest point on the object. Then set your “Max Z Depth” to -1.125”)

6. Go into the Digitizer app and press the “Run Digitizer” button. This will bring up the following message:

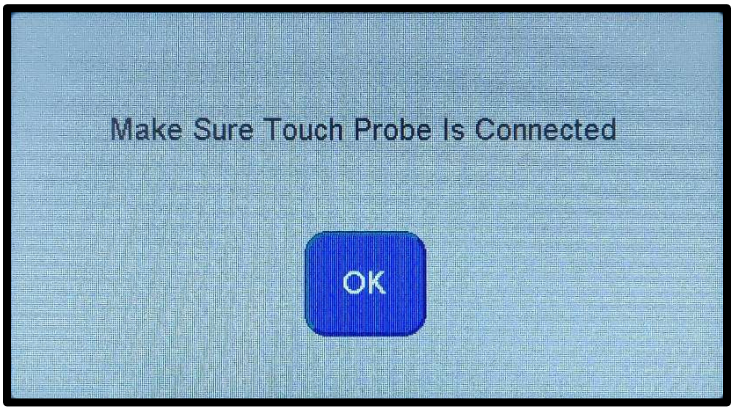

Image 11: Verify Connection

7. Confirm the 3D Digitizing Probe is connected to either the controller or the pendant, and press OK. The following screen will appear:

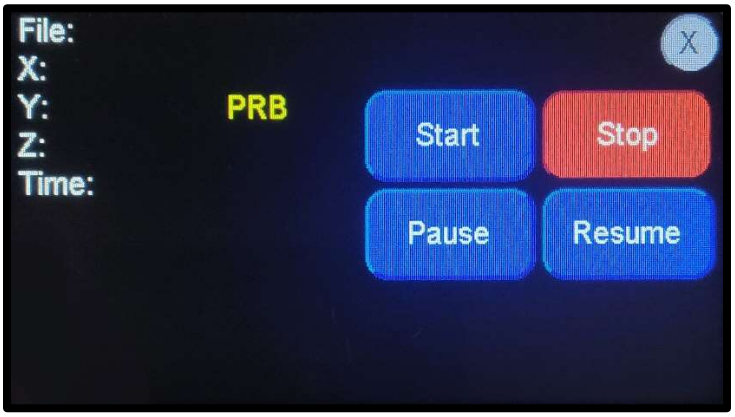

Image 12: Run Screen

8. Pressing start will pop up the message below. Trigger the 3D Digitizing Probe by gently pressing on the probe tip with a pencil or stylus to begin the digitizing process.

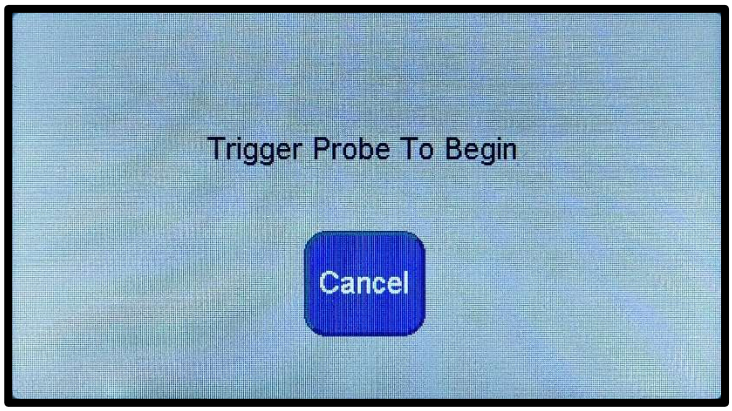

Image 13: Final Screen Before Job Start

Converting the Completed File

Once the scan is finished, the completed file will be saved on the flash drive as a .dnw file. This file needs to be converted into a .stl file to be imported into design software such as VCarve.

- Remove the flash drive from the pendant and plug it into your computer
- Head to the DNW to STL file converter we have on our website at this address: https://portal.nextwaveautomation.com/Portal/ConvertDNW
- Clicking on “Choose File” will make a file explorer window pop up. Navigate to the flash drive, select the .dnw file you want to convert and click “Open”.
- Click “Upload” on the site and you should now have a converted STL file

Troubleshooting

1. Pendant will not go past the continue screen

   Having the 3D Digitizing Probe plugged in when turning on your machine will place the controller into boot/update mode. You will also notice that the controller's lights will not behave the same as normal when this happens. Simply turning off the machine, unplug the 3D Digitizing Probe, and powering the machine up again will fix this issue. In the future, make sure to keep the probe unplugged until after the machine is powered on.

2. Bent or broken probe tip

   The probe tip is an essential part of the proper operation of the 3D Digitizing Probe. If the probe tip is bent or broken off, replacements are available on our website at nextwavecnc.com/shop/CNC-Accessories.

3. Probe repeatedly getting stuck at the max Z height

   If the 3D Digitizing Probe is repeatedly stopping its movement in X and Y axes and raises above the material to the maximum Z height you have set, you may need a replacement internal mechanism. Please contact Next Wave CNC support at support@nextwavecnc.com.

4. Probe scan speed is erratic or changing

   The most common cause of this issue is either the probe or material is not secured fully. Make sure that all corners of the material are secured to the bed of the machine with clamps. Check that the probe is secured in the collet and that the router or spindle is secured in the clamp. If the issue persists try increasing the "dZ After Sample" by 0.001' at a time.

Legacy Machines

The 3D Digitizing Probe is compatible with the legacy Next Wave CNC Shark HD3 machine and the accompanying CNC Shark Control Panel computer software. The installation and steps to run the probe are similar and the explanations of the set-up options are still applicable. For more information on the CNC Shark Control Panel please visit our support page at:

https://nextwaveautomation.zendesk.com/hc/en-us/search?utf8=%E2%9C%93&query=control+panel

QC	Date