To Our Customers

Thank you for purchasing a CNC Piranha! Your Piranha brings the speed and precision of computer-controlled machinery to your shop with the top value CNC system.

This manual tells you more about your CNC Piranha system and how to operate and maintain it. 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 a CNC Piranha. We are confident you will be pleased with the performance, and its ability to carve and machine a wide variety of signs, doors, and other projects. If you ever have any questions or comments, feel free to contact us at the address below.

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Serial Number and Software License Information
Record your CNC Piranha Controller Interface and Vectric software user name and license codes here for safe keeping. Your software may vary depending on the CNC Piranha model purchased.

Interface Serial Number: ________________________________

Cut 2D User Name: ________________________________________

Cut 2D License Code: ________________________________________
Table of Contents
To Our Customers .................................................................................................................. 1
Serial Number and Software License Information ............................................................... 2
Warranty ............................................................................................................................... 4
Safety .................................................................................................................................. 4
  Emergency Stop .................................................................................................................. 4
CNC Piranha Operations Safety Instructions ....................................................................... 5
CNC Piranha Hardware and Project Safety Instructions ....................................................... 6
Overview ............................................................................................................................ 8
  General – The CNC Piranha .............................................................................................. 8
  General .............................................................................................................................. 8
CNC Piranha Controller Interface ....................................................................................... 9
CNC Piranha Assembly Instructions ................................................................................... 10
Registering your Piranha ...................................................................................................... 12
Getting the Latest Software Updates ................................................................................. 13
Workflow Overview ............................................................................................................. 14
  Create the Design and Toolpath(s) ................................................................................ 14
  Machining the Part ........................................................................................................... 15
Operating your CNC Piranha .............................................................................................. 15
To Toggle the CNC Piranha ................................................................................................. 16
Using the Touch Plate .......................................................................................................... 17
Running a Program ............................................................................................................... 19
Optional Products ............................................................................................................... 22
CNC Shark Touch Probe .................................................................................................... 22
Tooling Suppliers .................................................................................................................. 24
CNC Piranha Specifications ............................................................................................... 25
  CNC Piranha .................................................................................................................... 25
    General ......................................................................................................................... 25
    Rates and Accuracy ....................................................................................................... 25
Computer Requirements ..................................................................................................... 25
Installing the CNC Piranha Post Processors in Vectric Products ....................................... 26
  Cut 2D ........................................................................................................................... 26
Warranty
Next Wave Automation warrants to the original retail purchaser of a CNC Piranha machine and purchased from an authorized CNC Piranha machine distributor that the CNC Piranha and any Piranha accessories purchased with the CNC Piranha machine 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 Automation for repair.

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 CNC Piranha machine or any portion of the CNC Piranha machine is modified without the prior written permission of Next Wave Automation, LLC, or if the CNC Piranha machine is located or has been used outside the country of residence of the authorized CNC Piranha machine distributor from whom the CNC Piranha machine was purchased.

Please contact Next Wave Automation to take advantage of this warranty. If Next Wave Automation determines the CNC Piranha machine or CNC Piranha 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 Automation will, at its expense and upon proof of purchase, send replacement parts to the original retail purchaser necessary to cure the defect. Next Wave Automation will repair the CNC Piranha machine or CNC Piranha accessory provided the necessary CNC Piranha machine component is returned to Next Wave Automation, shipping prepaid, with proof of purchase and within the warranty period.

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

Safety
The CNC Piranha, 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 Piranha safely. Next Wave Automation assumes you will use your CNC Piranha safely and follow accepted safety precautions and practices for woodworking and machining.

Emergency Stop
There are 3 ways you can immediately stop your CNC Piranha. CNC Piranha users should use a surge suppress power strip with an on/off switch.
The first is Stop Now! button on the CNC Piranha Pendant when the unit is running.

![Pause or Stop on the Piranha](image)

The second is either the on/off switch on the CNC Piranha

![Emergency Stop Button on Enhanced Controller Interface](image)

Hitting either will immediately stop the CNC Piranha movement. This will also stop the router if it is plugged into the Controller Interface.

Third is turning off power to the recommended power strip, the power strip’s on/off switch serves the same purpose as the E-Stop button on the Piranha Enhanced Controller Interface.

![Power Strip On/Off Switch](image)

**CNC Piranha Operations Safety Instructions**
1. Read and follow all safety and operating instructions before using the CNC Piranha. This includes reading the manual for the router that will be mounted on your CNC Piranha. Take the time to orient yourself to the Piranha and the workflow steps.
2. Take small steps early in use – this will enable you to use the Piranha safely and effectively. Practice each step a few times early on without running the router for example. Again, this orientation process will help you to use the Piranha safely and effectively.

3. Let the machine and spindle come to a complete stop before touching parts, CNC Piranha, or router. Ensure that you have a positive system in place to make sure that power is not applied to the router or the CNC Piranha while positioning a work piece, adjusting the position of the tool, changing a bit, or setting up clamps, hold downs, or jigs.

4. Ensure that the material or work piece is firmly secured to the table. This includes accounting for the attachment and hold down of any pieces that will become cutouts or cutoffs during the machining process. Also be sure that all clamps, hold downs, and jigs are not in the path of the cutter – and do not interfere with the movement of the gantry.

5. Always wear eye and ear protection while operating your CNC Piranha.

6. Keep miscellaneous equipment off of the CNC Piranha table and gantry. This includes areas alongside the table where the gantry travels.

7. Never leave the CNC Piranha unattended while it is running. A work piece slippage, unexpected cutting error or other unexpected event might occur. This could result in injury as well as damage to the CNC Piranha.

8. Never attempt to remove chips, dust or debris from the machine while it is running with your hands or fingers, or by placing a vacuum device into the field of operation – near the cutter.

9. Position the computer keyboard and or the Pendant Controller Interface (with E-Stop button) in a place that is easy for you to quickly reach, and out of the path and travel direction of the tool. Chips and debris can travel a good distance, and cutters can break during use.

10. Never attempt to manually adjust the work piece while the CNC Piranha and router are running. Do not attempt to manually feed a work piece ‘into’ a running cutter – this is not a router table.

11. Keep the CNC Piranha lubricated and clean. Clean the CNC Piranha and area after each use.

**CNC Piranha Hardware and Project Safety Instructions**

Your CNC Piranha is comprised of a system – the CNC Piranha, the Piranha Controller Interface, a computer, the software that prepares your design project and the software that controls the Piranha during operation.

The Piranha has 3 stepper motors, a Controller Interface, a Control Pendent and/or a optional computer connected to it. These are all precision electronic devices and are susceptible to
damage from power surges, static discharges, inappropriate power supply, and other unexpected electrical events. It is recommended that the Controller Interface and your computer be plugged into a surge protector to minimize the opportunity for damage to occur as a result of a power surge. You may also want to use a dedicated electrical circuit for the CNC Piranha. Turning on a shopvac or other power tool on the same leg may cause a momentary change in the power supplied to the CNC Piranha. If you know that the power you receive fluctuates significantly, you may also want to use a power conditioner and battery backup device. This will ensure the longest life of your CNC Piranha electronic components. A minimal battery backup will enable you to gracefully stop the job in progress at the time of the power loss, thus minimizing the possibility of damage to the CNC Piranha, electronics and router.

CNC Piranha users are strongly encouraged to use a power strip with an on/off switch to provide power to the Controller Interface and power supply. This provides a second means of an emergency stop if needed.

The CNC Piranha machine is not designed to work with fluids. The router is a ‘dry’ router. Do not cut with any misting, cutter lubrication, or wet material as it may cause a fire.

Keep the pendant and the controller vents clear of dust, dirt, shavings and other material.

Keep your CNC Piranha away from any moisture and in a temperature range from 50°F to 80°F.

Lightly vacuum the pendant and controller interface occasionally to remove any particulate from the electronics. This will help to prevent additional heating inside the box that could result in damage.

Do not expose the system to high humidity – this may cause condensation on the electronics and result in abnormal behavior or even a short in the electronics.

You should not operate your CNC Piranha machine during a thunderstorm unless you have an appropriate surge protector in place to prevent circuits from being damaged by excessive line voltage.

Keep static charges from discharging into the motors. If you think this may become an issue, a grounding wire can be added to one bolt head of each of the motors.

It is also strongly recommended that you keep backup copies of all important computer data, files and programs. These should be separate copies – stored on a different device than the computer you are using to create the projects and run them on the CNC Piranha.
Overview

General – The CNC Piranha
Bringing the speed and precision of computer-numerically-controlled machinery to your shop, the CNC Piranha is designed for routing all types of wood, routing or engraving plastics, etching metal, and even etching or cutting tile. The CNC Piranha has impressive power, speed, accuracy and ease of use. The CNC Piranha has a quality design and its parts have been manufactured using CNC machines to ensure the highest accuracy. The CNC Piranha is constructed of steel, aluminum, and high-density polyethylene for a robust, long lasting and high tolerance machine.

The CNC Piranha comes with Vectric’s Cut2D, and can interface with other cnc programs in the industry as well. The differences across the different models are the work piece size capacity, work table structure, x/y/z axis movement speeds, and accuracy of cut. The CNC Piranha has a Controller Interface and integrated power supply.

General
The core components of the CNC Piranha are shown in the figure below.

![CNC Piranha Core Components](image)
### CNC Piranha Specifications

**CNC Piranha Controller Interface**

The CNC Piranha Controller Interface stores the project’s tap file (instructions) on an SD card and controls the movement of the X, Y, and Z axis. The Controller Interface is connected to your computer using a USB cable and is plugged into a USB 2.0 capable plug. The Piranha Control Panel software is used to communicate to the Controller Interface. Using this interface, you can jog (position) the gantry and router, load a project (tap) file, and run the project.

The CNC Piranha has an enhanced Controller Interface with the power supply integrated into a single unit.

<table>
<thead>
<tr>
<th>CNC Piranha</th>
<th>Overall Machine Dimensions</th>
<th>Work Table Dimensions</th>
<th>Maximum Cutter Travel</th>
<th>Work Table Construction</th>
<th>Maximum Travel Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>W: 19” L” 20.5”</td>
<td>H: 3”</td>
<td>12” x 18”</td>
<td>X:12”</td>
<td>Y: 13”</td>
<td>Z: 3”</td>
</tr>
</tbody>
</table>

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CNC Piranha Assembly Instructions

Unpack the CNC Piranha machine and verify that all items are present.

- CNC Piranha
- CNC Controller
- 15 pin Pendant Cable
- Touch Screen Pendant
- Power Supply
- Power Cord
- 2 Hold Down Clamps

Make sure when removing the CNC Piranha from its box that you lift it from the base, lifting it by the gantry or table can cause misalignment.

**WARNING:** The axis cable connectors should never be disconnected or re-connected while there is power to the Controller Interface. Doing so can damage the stepper driver board inside the Controller Interface.

Install Router into Router Base by loosening hold down clamp and sliding Router in until the motor protrudes about 1 ½” below the clamp.

Tighten all clamping bolts securely.
Place the Controller Interface in a comfortable easy to access location and connect it to the CNC Piranha using the serial cable provided. See image below.

![CNC Piranha Cable Connections](image)

Applying power to the Controller Interface.

- Re-verify that all three axis drive cables are connected to their respective Controller Interface leads.
- You should arrange the drive motor cables, power cables, and USB cable in a manner that minimizes overlap, even amongst cables of the same purpose. This will reduce any opportunity for signal interference as a result of cables ‘laying on top of each other’.
- Plug the Piranha Power Supply into a 120V AC wall outlet, power strip, or surge protector.
- You will also hear a slight bumping or clicking noise coming from each of the motors when power is initially supplied. This noise is momentary, and will occur every time power is applied to the Controller Interface.

The CNC Piranha machine’s hardware is now completely setup and is ready for basic operation testing. You must setup the CNC Piranha software before you are able to completely test your CNC Piranha machine.
Registering your Piranha
Once you power up your CNC Piranha, you will see a screen like below. Hit continue.

CNC Piranha Welcome Screen

Next you will see your CNC Piranha’s serial number, and firmware information. Record this serial number into your manual on Page 2 then press OK.

CNC Piranha Serial Number

Go to www.NextWaveAutomation.com and register your Piranha
Getting the Latest Software Updates
As we are continually updating the CNC Piranha’s software, be sure you visit our website www.NextWaveAutomation.com and download the latest version. Click on the ‘Downloads’ section located on the top of the page.

Save this file to a thumb drive (not included) and load it into the CNC Piranha Controller Interface.

Plugging the Thumb Drive into the CNC Piranha Controller Interface
Press the Update Screen on main Menu

Updating the CNC Piranha Controller Interface

Workflow Overview

It is important to recognize that unlike other wood working and machining tools, you just don’t walk up to the CNC Piranha with your material, hit the power button, and start carving or engraving your project. It is easiest to think of the workflow in two distinct components:

1. Create the design and toolpath - using Cut 2D, create and edit your design, and generate a toolpath file.

2. Machining the part - using the Piranha Control Panel – set the X0, Y0, Z0 using the jog command, load the toolpath file to the Piranha, and run the project (create your carving).

Create the Design and Toolpath(s)

Cut 2D is used to create the design of the part you want. You can also edit this design in the future, copy individual components to other Cut 2D projects, etc. The Cut 2D project is saved on disk with the file extension ‘.crv’. This is not the file you will load onto the Piranha to carve your design. Cut 2D does not directly control or operate the Piranha. This is sometimes referred to as your ‘project file’ on the forum, and can be opened by Cut 2D at any time if you want to make changes.

Once your design is prepared to your satisfaction, you will use Cut 2D to generate one or more toolpaths. You select the design component, the cutter tool you want to use on the Piranha to carve that component, and then generate the toolpath. You can preview the outcome of that toolpath in Cut 2D. If it is to your satisfaction, you then use Cut 2D to save that toolpath to a
file that will be loaded onto the Piranha using the Piranha Control Panel software or directly using a usb flash drive. During this process, you select the CNC Piranha or CNC Shark post processor – this ensures that the toolpath file will work properly on your Piranha – and the resulting file will have a ‘.tap’ file extension. This ‘tap’ file is the file you will load onto the Piranha using the Control Panel software. The tap file contains the G-code instructions that will tell the Piranha where to move in X, Y, Z to make the appropriate cuts using the cutter tool selected. [G-code is the common name for the computer numerical control (CNC) language used by the Piranha.]

It is important to also note that you can do all of the tasks associated with Cut 2D on a separate computer – i.e. you may choose to use a computer in your office or home to create your designs and generate the toolpath files and then download them to a thumb drive and plug this into the Piranha.

**Machining the Part**
The material to be machined is placed on the Piranha work table and properly secured – typically by using clamps. The proper cutter tool is placed in the router. Using the Piranha Touch Screen, the tool is moved (jogged) to X0, Y0, Z0 – this is typically on the very top of the material, and the lower left corner.

The tap file is loaded onto the Thumb Drive in the Controller Interface using the Control Panel interface. Select the ‘Load G-Code’ button, and select the appropriate tap file. At this point, all the steps necessary to run the toolpath have been taken. The ‘Run’ button is selected, and the Piranha starts to machine the part.

**Operating your CNC Piranha**
From your Home Screen you will be able to:
To Toggle the CNC Piranha

Press the +/- keys to move in the appropriate direction.

Toggling Y axis on CNC Piranha

You can also type a measurement directly into the current location screen. Pressing the location area will display the screen below.

Enter the desired location here

Then press the Move Button
Using the Touch Plate

The Touch Plate is an optional accessory that can be used to obtain faster, more accurate setups. Just plug it into the CNC Piranha. This same Touch Plate is used with the CNC Shark offered by Next Wave Automation through a network of authorized distributors and web store.

Press the App button and go to the Touch Plate setup App.

Attach the magnet to the router bit collar and place the plate on top of the material you’re working with. Then Tap Press to Run and the CNC Piranha will ask to perform a test as below.
Raise the touch plate to enough to make momentary contact with the bit, the screen will turn red and you may proceed. If the screen does not turn red, try repositioning the magnet and repeat procedure. Once you make the proper connect press ok to begin movement.

The CNC Piranha will establish the zero/home position the instant the bit makes contact with the touch plate. You can ABORT the process at any time by pressing the Abort Key.

Press OK to accept the results.
Running a Program

Load your TAP file that was created using V-Carve 2D by inserting the USB into the Controller Interface.

Go to main screen on the CNC Piranha, the USB button will now be Blue.
After selecting the USB button your file will appear in the screen as below. (Select the file name, in this example we are using a file called CALIBA-1.TAP (NOTE: File names are limited to 8.3 characters)

Your file will display and begin to load as shown below, check to make sure your clamps are set and that you have positioned your bit.
Running your TAP file.

Once your file has loaded, Press the RUN button. Your CNC Piranha will begin cutting your file. You may interrupt the cutting process at anytime by pressing the Pause Button. This is particularly handy when dealing with items where you may need to change clamping positions. To continue the cutting process press the Resume button.

Monitoring your TAP file.
Optional Products

**CNC Shark Touch Probe**
The CNC Shark Touch Probe is an optional accessory that can be used with the CNC Piranha. The probe attaches to the router, and can trace objects down to 0.001” step resolution. The resulting scan file can be used to replicate objects, shapes and patterns. This process does require more sophisticated software such as Cut3D or Aspire to be used with the CNC Piranha. The CNC Shark Touch Probe works well for replicating basic shapes in carvings or reproducing damaged areas on antiques or other irreplaceable items. Available online at [www.NextWaveAutomation.com](http://www.NextWaveAutomation.com)
Information Resources

Next Wave Automation
www.nextwaveautomation.com or www.cncPiranha.com
Manufacturer of the CNC Piranhas. The website has software and documentation downloads as well as other general product information.

CNC Shark Talk User Forum
www.cncsharktalk.com
A user group of the CNC users geared around CNC Shark owners. The website has projects, ideas, showcase, and valuable support from users of all levels.

Vectric
www.vectric.com
Producers of the Cut 2D software package. The Vectric website has product information, FAQs, on-line tutorials, and an excellent user forum. Keep in mind that Vectric supports Vectric software, not the CNC Piranha; although there are some Piranha-specific threads in their Forum.

Vector Art 3D
www.vectorart3d.com
Vendors of CNC-ready, Cut 2D compatible three-dimensional clip-art models. Use their powerful FREE software to create toolpaths of the models, which can then be imported into Cut 2D. Purchase models individually or in collections; a huge number of models is available. They also provide custom modeling services for customers requiring specific parts created from their own artwork.

CNC Zone
www.cnczone.com
All kinds of CNC information. Includes a “Woodworking Machines” forum with some Piranha-specific threads and many other interesting discussions – including how to build your own CNC routing system (or why it might be a better idea to just buy one).

Router Forums
www.routerforums.com
A discussion board site; check out their “CNC Routing” router category for both general and Piranha-specific threads.

CNC Information
www.cncinformation.com
A general CNC information website that includes a forum, articles, a free e-learning course about CNC and a free G-code Quick Guide.
VectorClip2D
http://www.vectric.com/products/cut2d.html

Vendors of CNC-ready, Cut 2D compatible two-dimensional clip-art models.

Tooling Suppliers
This is not a comprehensive list.

- PreciseBits: www.precisebits.com
- Onsrud: www.onsrud.com
- VTC: www.vanguardtool.com
- MLCS: www.mlcswoodworking.com
- American Carbide: www.american-carbide.com
- 2L Inc: www.2linc.com
- Bits & Bits: www.bitsbits.net
- Amana Tool: www.amanatool.com
- Centurion Tools: www.centuriontools.com
- Toolstoday Router Bits: www.toolstoday.com
CNC Piranha Specifications

CNC Piranha

General
- Overall Machine Dimensions: X: 19” Y: 20” Z: 18”
- Work Table Dimensions: 12.” x 18”
- Maximum Cutter Travel: X: 12” Y: 13” Z: 3”
- Precision linear bearing guides that maximize rigidity
- High power hybrid stepper motors
- USB interface thumb drives or direct computer interface
- Precision lead screws with anti-backlash on all axis
- Rockler item number 54111

Rates and Accuracy
- Resolution: ~ +/- 0.001 inch;
- Reproduction accuracy depends on the precision of the setup and alignment – but is in the same range or better.
- High Speed Positioning (jogging) Rate: 200 ipm

Computer Requirements
The current minimum system requirements for running Cut 2D:

- 2 GHz Pentium 4
- 60 Mb Disk Space
- 2 Gb RAM
- 1024x768 graphics display
- DVD ROM drive (to load software)
- USB 2.0
- Operating system: Windows XP with SP3, Windows Vista, or Windows 7,8.1

Cut 2D will run faster with a better processor and more memory than listed in the minimum system requirements.
Other operating systems, for example iOS (Apple) and Linux, are not currently supported.

The computer used to connect to the Controller Interface must have a USB 2.0 port. The Controller Interface 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 Cut 2D on the same computer that is connected to the Piranha Controller Interface.
Installing the CNC Piranha Post Processors in Vectric Products

 Vectric’s Cut 2D, Vcarve and Aspire should have the CNC Piranha post processors installed. However, Next Wave Automation periodically updates these, and you may want to install the latest CNC Piranha post processors. Additionally, older Vectric products may not have the CNC Piranha post processors installed so using the CNC Shark one will work as well.

Currently, there are 2 sets of post processor files:
- One set is used with Cut 2D, Cut 3D, Vcarve and Aspire
- One set is unique and used only with Photo VCarve

You can update the post processor used by any Vectric product by downloading the latest version from the Downloads page and copying it to the Vectric product’s post processor folder. The folder locations for each Vectric application are discussed below. In no case should you attempt to download the post processor file directly from the Downloads page to the final destination folder. You should copy the post processor file(s) to a known location – typically somewhere in /My Documents – and then copy that file to its final destination.

Cut 2D

Since Cut 2D, Vcarve and Aspire, the respective program’s post processors are stored on disk in the C:\ProgramData\Vectric folder. From there –
- Cut 2D’s folder is C:\ProgramData\Vectric\Cut 2D\V6.0\PostP
- The “Vx.y” number in the folder names above will change as newer versions are released.