



## Next Wave Commemorative Chess Board Piece “The Piranha Pawn”

Design by Rick Frazier

Next Wave Automation is celebrating the 10<sup>th</sup> Anniversary of their “CNC Shark” by building a unique chess set. This unique set will be revealed one project each month, starting with a chess board, followed by individual pieces. This month’s project is the Piranha Pawn. This project is aimed at the woodworker with moderate to intermediate skills. You will need access to V-Carve 9.0 with updates, and the tools listed below. With the V-Carve software, open the project CNC files. Carefully review all the toolpaths and make necessary changes to suit your tools and machine. The toolpaths are currently set with tool, feeds and speeds that were used in designing the original project. Don’t use them directly until you review them for your machine. You can edit the tools and change the settings to fit you own machine and requirements. It is very important to recalculate all toolpaths after making any changes. Once you have recalculated for your own machine and tools, reset the preview, and then preview all toolpaths again to visually verify the project outcome. Then create the tap file for your machine using the correct post processor. Now you’re ready to make your own Next Wave Automation 10<sup>th</sup> Anniversary Chess Set, The Piranha Pawn.

### Next Wave Automation 10<sup>th</sup> Anniversary Chess Board Piece “Piranha Pawn”



For this project we will be building a Next Wave Automation Commemorative chess piece the Piranha Pawn. You will find a material list, tool list, videos and the V-Carve files on Next Wave Automation’s Website to complete the project.

#### Project material list:

- 6 bdft Walnut (2 inch thick)
- 6 bdft Hard Maple (2 inch thick)
- 5/16” dowel rod
- 1” Bristle radial disks (120 and 240 grit)
- Sanding Cord 120 grit
- 1” Rotary Scotchbrite disks (brown)
- Polyurethane Clear

#### Project Tool List:

- 1/4” up cut Spiral straight bit
- 1/16” dia. Tapered ball nose bit

#### Project CNC Files:

Piranha Pawn6.crv

#### Video Files:

- Creating Tap files
- Topside Machining



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Bottom side Machining

Sanding and Detailing

Finishing

### Step 1: Creating Tap Files:

The first step in creating a tap file is to open the Piranha pawn6.CRV. After opening the Piranha pawn6.crv go over to the tool path menu and save each individual tool path using your corresponding post processor file. For this project you should create four tap files. Retain the tool path names for your tap file with top and bottom attached so they match the tap files that are in the instructions. For more information please watch the video on Creation of Tap Files.

### Step 2: Machining the materials:

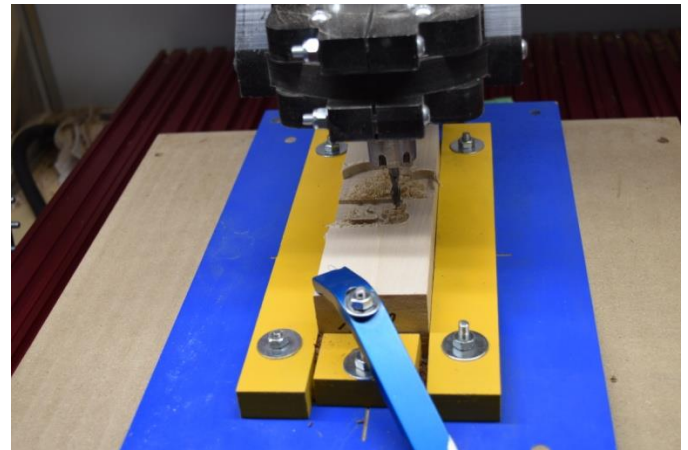
You will need 8 pieces of walnut,  
1.78”x 2 1/2”x 8”

You will need 8 pieces hard maple,  
1.78”x 2 1/2”x 8”



Plane down the material to 1.78”thick. Take care to make this as exact as you can. Cut the

material to a width of 2.5 “. Take care to make this as exact as you can. Cut all of the material in to pieces with the length of 8”. Now that all of the pieces are machined to size mark the center of the ends and the top.



### Step 3: Machining the Top of the Pawn.

Remove the clamps and threaded rods from the fixture. Install a 1/4” spiral up cut bit. Load and run the “**Spoil board alignment holes.tap**” file. Reinstall Treaded Rod and clamps.

Mount the material to the centerline of the fixture. Secure in the corners with clamps as in the [figure above](#). This is so the clamps do not get hit by the bit during machining.

Install a 1/4” spiral up cut bit. Touch off the Z-axis on the “**TOP of the Material**” see [Reference Video](#).

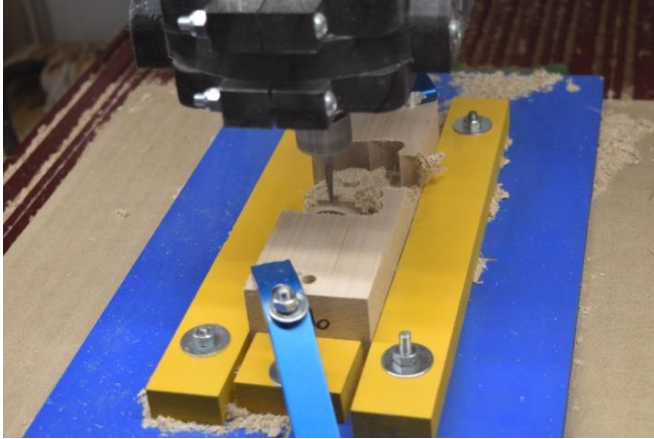
Load the Top Roughing tap file. “**Top Piranha Pawn 3D Roughing2.tap**”.

Run the tap file with a router speed at 12,000 to 16,000 RPM.



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and install the blank in the fixture with the bottom side up, securing with the clamps. Make sure that the centerline of the blank is lined up with the centerline on the fixture.

Touch off on the fixture base, in order to assure all of our dimensions are measured off the top side of the blank which is now at the level of the fixture base. Load the bottom roughing tap file. **“Bottom Piranha pawn 3D Roughing1. tap.”** Run the tap file with a router speed at 12,000 to 16,000 RPM.

Remove all burrs from the top material. Install a 1/16” dia. Tapered ball nose bit. Touch off the Z-axis on the **“TOP of the Material”** see [Reference Video](#)

Load the Top Finish tap file. **“Top Piranha Pawn 3D Finish2 .tap”**.

Run the tap file with a router speed at 12,000 to 16,000 RPM.

**Step 4: Flipping and machining the bottom of the Pawn.**



Vacuum the top of the fixture. Install the 1/16” tapered ball nose bit. Touch off on the fixture base; remember the fixture base is on the same level as the top of the blank. Load the bottom finish program. **“Bottom Piranha pawn 3D Finish1.tap”**. Run the tap file with a router speed at 12,000 to 16,000 RPM.



Clean the fixture of all debris. Install the 5/16” dowels in the alignment holes on the blank. Flip





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### Step 5: Sanding and detailing the Pawn:



Cut the pawn free from the blank but leave one end to hold for Sanding and detailing. [See Reference video.](#)

Using the one-inch bristle disk, sand and debris the complete pawn. Get rid of all the fuzzies. Be careful not to overdo, it will take away features away on your pawn Sand everything down to with 240 grit bristle disk and sandpaper. Once you are satisfied with the Sanding and detailing of your pawn we are ready for finishing.

### Step 6: Finishing the Pawn:

Take all the pawns clean and prep for finish. I chose to put on three coats of hand rub polyurethane. It gives it that satiny sheen and good protection. You could finish them with glaze to bring out the highlights or in any creative way you desire. [See Reference video.](#)



This is the Piranha pawn chess pieces. For a completed chess set it is necessary to have eight hard Maple and eight Walnut pawns.

Enjoy the creation of your “Piranha Pawns”

Next month we will add another piece to the chess set.