



## Next Wave Commemorative Chess Board Piece “The Hammerhead Shark King”

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 Hammerhead Shark King. 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 piece, The Hammerhead Shark King.

### Next Wave Automation 10<sup>th</sup> Anniversary Chess Board Piece “Hammerhead Shark King”



For this month’s project we will be building a Next Wave Automation Commemorative chess piece the Hammerhead Shark King. This Chess Board Piece is a two sided highly detailed Shark. You will need to make a maple and walnut piece for your set. I usually make two of each and choose the best for the set. As usual,

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:

- 1 Walnut Blank (2” x 2 3/4”x 8”)
- 1 Hard Maple Blank (2” x 2 3/4”x 8”)
- 5/16” dowel rod
- 1” Bristle radial disks (100,120 and 240 grit)
- Sanding Cord 120 grit
- 1” Rotary Scotchbrite disks (brown)
- Various rotary tools
- Polyurethane Clear

#### Project Tool List:

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



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## Project CNC Files:

Hammerhead King\_1.crv

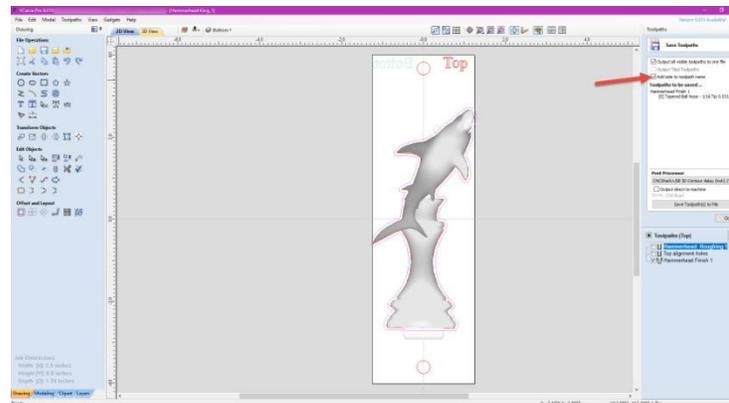
## Video Files:

Creating Tap files

Hammerhead Shark King Roughing and Finishing

Hammerhead Shark King Sanding and Finishing

## Step 1: Creating Tap Files:



The first step in creating a tap file is to open the Hammerhead King\_1.crv. Carefully review all the toolpaths and make necessary changes to suit your tools and machine. When everything is suitable for your machine, go over to the tool path menu and save each of the following tool paths.

Top Hammerhead Roughing 1

Top Hammerhead Finish 1

Bottom Hammerhead Roughing 2

Bottom Hammerhead Finish 2

Use your corresponding post processor to save the tap files. For this project you should create 4 tap files. Make sure to retain the tool path names for your tap file. Make sure you click the radio button, in the upper left corner of the Save Tool Paths menu box “**add side to tool paths name**” 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 1 pieces of walnut,  
1.78”x 2 1/2”x 8”

You will need 1 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.



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### Step 3: Machining the Top of the Hammerhead Shark King.

#### Top Rough Cut



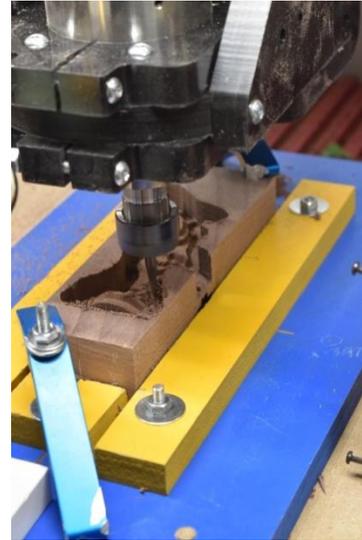
Mount the material with the centerline of the material to the centerline of the fixture. Secure in the corners with clamps as in the [figure above](#). This is so the clamps do not get hit by the bit during machining.

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 Hammerhead Roughing 1.tap”**.

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

#### Top Finish Cut



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 Hammerhead Finish 1 .tap”**. Run the tap file with a router speed at 12,000 to 16,000 RPM.



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Step 4: Flipping and machining the bottom of the Hammerhead Shark King.



Rough Cut 1

Clean the fixture of all debris. Install the 5/16” dowels in the alignment holes on the blank. Flip 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” (blue part of fixture), 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 Hammerhead Roughing 2 . tap.” Run the tap file with a router speed at 12,000 to 16,000 RPM.

Finish cut 1



Vacuum the top of the fixture. Install the 1/16” tapered ball nose bit. Touch off on the “Fixture base” (blue part of fixture); remember the fixture base is on the same level as the top of the blank. Load the bottom finish program. “Bottom Hammerhead Finish 2.tap”. Run the tap file with a router speed at 12,000 to 16,000 RPM.



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### Step 5: Sanding and finishing the Hammerhead Shark King:

#### Cut off block



Cut the Hammerhead Shark King free from the blank but leave one end to hold for Sanding and finishing. [See Reference video: Hammerhead Shark King sanding and finishing.](#)



One of the operations that need to be done is separating the fins. You do this with a rotary tool saw wheel for your rotary tool. You cut out the center carefully and then massage it with a rotary rasp. Don't overdo you will make the fins

fragile. Using the rotary tool bits and one-inch bristle disk, sand and remove any unwanted material from the completed Hammerhead Shark King. Be careful not to overdo, it will take away features away on your Hammerhead Shark King. Sand everything down to with 240 grit bristle disk and sandpaper. Once you are satisfied with the Sanding and detailing of your Hammerhead Shark King we are ready for finishing.

### Step 6: Finishing the Hammerhead Shark King:

Take all the Hammerhead Shark Kings clean and prep with alcohol for finish. I chose to Dip and brush on satin polyurethane. Lightly sand between coats, I use three coats. It gives it that satiny sheen and good protection. Install felt on the bottoms if you wish.



This is the Hammerhead Shark King Chess pieces. For a completed chess set it is necessary to have 1 hard Maple and 1 Walnut King. Enjoy the creation of your “Hammerhead Shark Kings”. Happy Carving!



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Hope you had fun making the chess set pieces and help you understand the two side machining method. Thank-you for participating in the completion your own Next Wave Automation 10<sup>th</sup> Anniversary Chess Set.

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Here is the completed Set.

