



This Free Next Wave CNC project is a Connect 4 Table top Game. With 2 glue ups, and 8 machining operations.

The samples were made using cherry, Baltic birch and PVC sheet however, you might use any material of your own choosing. This is a nice project to give as a gift or make for yourself.

The Instructions, crv.files and videos are found on Next wave Automation Website [nextwaveautomation.com](http://nextwaveautomation.com)

This project is aimed at the woodworker with moderate skills. You will need access to the current version of V-Carve with updates, the tools are listed below.

### The main topics today are:

- Project Materials
- Designing
- Machining
- Finishing and Assembly

### Project material list for Connect 4 Game:

- 2 - 22"x16"x1/8" Baltic Birch Plywood
- 1 - 22"x16"x1/4" Baltic Birch Plywood
- 1 - 16"x18"x3/4" Cherry
- 2 - 22"x16"x1/4" PVC Sheet

### Project Tool List:

**Tools** that you will need for this project are:

1. 1/4"compression bit
2. 60-degree V-Bit
3. 1/8" compression bit
4. 1/4"upcut spiral bit

### Project CNC Files:

- Connect 4 Shark Addition.crv
- Connect 4 Shark stand.crv

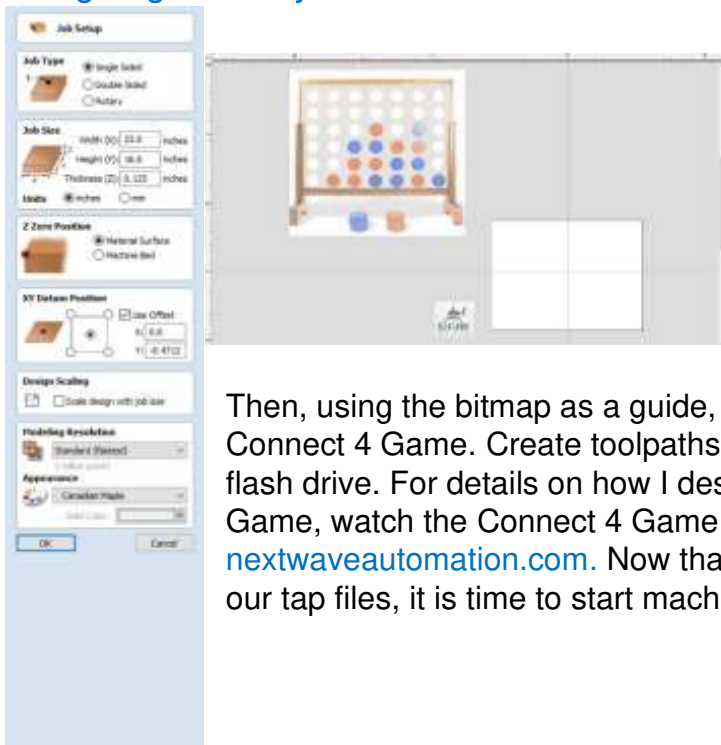


### Creating the Tap Files:

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. Be sure to review them for your

machine. Edit the tools and change the settings to fit you own machine and requirements. It is especially important to recalculate all toolpaths after making any changes. Once having made the necessary recalculations for your own machine and tools, reset the preview, and then preview all toolpaths, again, to visually verify the project outcome. Create the tap files for your machine by using the correct post processor. Once satisfied with your settings, save the tool paths using the appropriate post processor for your machine. Check tool paths by air cutting the project or use rigid foam board to run a sample tool path. Now you're ready to make your own **Connect 4 Game!**

### Designing the Project:



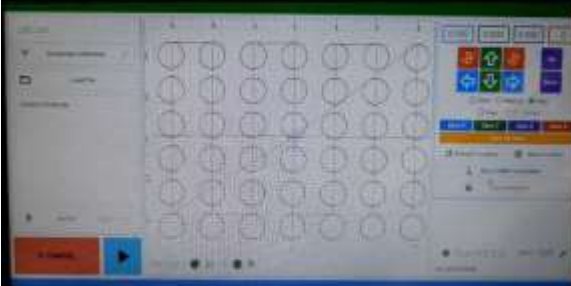
This month's project is a Connect 4 Table Top Game. Create a new file 22"x16"x1/8" thick, Single-sided job.

After a little research and I found some pictures of a Connect 4 game to get an idea of how to place the openings and pieces.

First, bring in a bitmap of the Connect 4 Game.

Then, using the bitmap as a guide, using circles, boxes and lines design your Connect 4 Game. Create toolpaths for your machine and save your tap files to a flash drive. For details on how I designed and created tap files for my Connect 4 Game, watch the Connect 4 Game Designing and Machining Video on [nextwaveautomation.com](http://nextwaveautomation.com). Now that we are done designing our board, have made our tap files, it is time to start machining.

## Step 2: Machining the Connect4 Game



Now that we have a 22"x16"x1/8" Baltic Birch blank it is time to machine out all the holes and our playing field. The 1<sup>st</sup> bit, we use is a 1/8-inch compression bit this particular bit is used to cut out the holes in the field. Being a compression bit, it should cut clean on the top and the bottom of the 1/8" Baltic Birch. Make sure that you have Set the XY datum position and set the Z height. Use the tap file for your specific machine and run your design. You will have to run this file twice because we need a front and a back that match.



The next operation is to cut out the spacer out of 22"x16"x1/4" Baltic Birch again using a 1/8-inch compression bit.

Being a compression bit, it should cut clean on the top and the bottom of the 1/4" Baltic Birch. Make sure that you have Set the XY datum position and set the Z height. Use the tap file for your specific machine and run your design. You will have to run this file twice because we need a front and a back that match.



Our next operation is to cut out the legs and trim pieces out of 16"x18"x3/4" cherry. This will be two operations, both operations are done with a quarter inch up cut spiral bit. First operation is to cut the pockets second operation is the cut the profile. Set the XY datum position and set the Z height. Use the pocket tap file, then the profile tap file, for your specific machine and run your design.







The last machining operation to do is to cut out the little plastic discs or chips. These are cut out of a piece of 22 by 16 by quarter inch PVC sheet. Prep the PVC sheet before machining, paint both sides with the colors that you want the chips to be. You will have 2 separate operations. The first operation is with V carve bit and we will cut the design out. Set the XY datum position and set the Z height. Use the tap file for your specific machine and run your design. The second operation will be with a quarter inch upcut bit spiral up cut bit and it will be used to cut out the profile. As in all of our other operations set the XY datum position and set the Z height. Use the tap file for your specific machine and run your design.



For details on how I machined my Connect4 Game, make sure you watch the Connect4 Game Machining Video on [nextwaveautomation.com](http://nextwaveautomation.com).



### Step 3: Assembly, Sanding and Finishing

Assemble the spacer/front and back, this is the quarter inch thick spacer. We need to locate the spacer correctly and create enough clearance for our chips to go down the slot. The way to do that is take the chips and to line them up to get the height for our spacer.

Measure the thickness of the chips, you may have to shim the spacer to give enough clearance for the chips to slide down. My chips were about .020" thicker than my spacer, so I had to put in some shims that I made out of veneer in order to give me about I would say anywhere from .020" to .040" clearance. Once you determined what you need take your Titebond3 glue the spacer in place and then glue the other half of the playing field to the spacers. Sand the playing field ,frame and legs.



Take the legs and frame pieces stain and put one coat of finish on them.

The assembly of the Connects4 game is pretty straightforward we glue the frame pieces onto the playing field.



Put down three coats of Crystalak Topcoat allowing it to cure 4 hours between coats. Drill holes, thread the holes, for the legs and install a nylon threaded rod and an Acorn nut to hold the legs in place.

For details on how I finished and assembled my Connect4 Game, watch the Connect 4 Game Finish and Assembly Video on [nextwaveautomation.com](http://nextwaveautomation.com). Now you are done with your Connect4 Game and you're ready to use your Connect4 Game.

I hope you enjoyed this project. I hope that I have created an interest in doing these kinds of projects. Until next time keep on carving

Rick Frazier

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