

# CAM Path Process and Directions for Fly Guitar Neck and Fretboard Jig

Parker Fly Guitar Neck Group  
CAM Path

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When it comes to programming a CAM tool path for anything, I always turn to the “manufacture” tab in Autodesk’s Fusion 360. It’s meant to be an educational or hobbyist type of software, so it’s very easy to use as well as producing a more reliable toolpath without having to know every detail about the cutter you are using. This choice I believe will make the project easier to progress as not only will someone be able to quickly pick up the program quickly and be effective at using it but also with it being cloud based they won’t have to have a powerful computer to run it. Not to mention that also since it is a cloud based program, the addition of the Fusion 360 Project Team created by Prof. Manzo makes the file transfer even easier.

### **Operation 1 Neck Toolpath**

Operation one completes the fingerboard side of the neck and drills mounting holes for fixturing during operation 2. The first operation takes a total of 1 hour and 10 minutes to complete with 7 individual toolpaths within and uses a total of 5 different tools requiring different amounts of exposed tool which will be listed below.

- T1: 0.750” 2 flute flat bottom end mill or router bit requiring 2.125” of stick out
- T2: 0.250” 2 flute flat bottom end mill or router bit requiring 1.500” of stick out
- T3: 0.375” Standard drill mill/spot drill with a non critical stick out
- T4: 0.250” 4 flute or 2 flute ball end mill requiring 1.500” of stick out
- T6: 0.250” drill bit with 1.00” of stick out

For this operation, either repost the Fusion 360, or open the NC files in the GIT repository and match the tool lists. See the file titled “Fusion Cam File Acquisition” to see more detailed instructions on the location of work offsets and other directions. Essentially it is either 6001.nc or 6002.nc and it will list the tools at the top of the code. This uses a 27”x5”x2” (glue boards of a common size together to achieve this size) piece of tone wood with the origin in the middle of the block in the top.

### **Operation 2 Neck Toolpath**

Operation two completes the backside of the neck and the neck joint. I will add the Fusion file appears to have many crashes within it but they are into material that doesn’t actually exist. The second operation takes a total of 4 hour and 40 minutes to complete with 6 individual toolpaths within and uses a total of 3 different tools requiring different amounts of exposed tool which will be listed below.

- T1: 0.750” 2 flute flat bottom end mill or router bit requiring 2.125” of stick out
- T4: 0.250” 4 flute or 2 flute ball end mill requiring 1.500” of stick out

- T5: 0.125" 2 flute flat bottom end mill or router bit requiring 1.125" of stick out

For this operation, once again either repost the Fusion 360, or open the NC files in the GIT repository and match the tool lists. As well once again, see the file titled "Fusion Cam File Acquisition" to see more detailed instructions on the location of work offsets and other directions. Essentially it is either 6001.nc or 6002.nc and it will list the tools at the top of the code just like the first operation. This is because the files in GIT have the names backwards to a corruption of the post processor at some point, but the tool paths are still fine. This operation requires a fixture plate with dowels at the same spacing as the drilled holes in the fretboard side and should be hammered down on these dowels to machine this operation. The WCS origin is in the low E string tuner bore and the z surface is the stock top. Also this tool path requires the neck joint to be chiseled square as it's impossible to cut a square inside corner.

### **Operation 1 Jig Toolpath**

Operation one completes the fingerboard surface side of the jig. The first operation takes a total of 2 hour and 15 minutes to complete with 9 individual toolpaths within and uses a total of 6 different tools requiring different amounts of exposed tool which will be listed below.

- T1: 0.375" 3 flute flat bottom end mill or router bit requiring 1.500" of stick out
- T2: 0.125" 4 flute or 2 flute ball end mill requiring 1.00" of stick out
- T3: 0.125" 3 flute flat bottom end mill or router bit requiring 1.125" of stick out
- T4: 0.375" Standard drill mill/spot drill with a non critical stick out
- T5: 0.2187" drill bit with 1.500" of stick out
- T6: 3.00" face mill

For this operation, use the file 6003.nc in the GIT Repository. 6003.nc is the first operation for the fretboard to neck jig using a 24x3x1.25 inch piece of aluminum. The WCS origin is in the middle on the top.

### **Operation 2 Jig Toolpath**

Operation 2 completes the backside side of the jig. The first operation takes a total of 0 hours and 3 minutes to complete with 1 individual toolpath within and uses a total of 1 tool since its very simple and just faces the backside to thickness.

- T6: 3.00" facemill

For this operation, use the file 6004.nc in the GIT Repository. 6004.nc is the second operation for this component. The WCS origin is in the middle on the top.

Once all of these files are obtained and are ready to be machined there are a few important details which are reiterated on the read me in the GIT Repository. The file simply states: “All of the tools necessary for the completion of these parts is listed at the beginning of the .nc file itself and can be viewed on any school computer using NCedit or opened with the wordpad. These .nc files can be loaded onto any of the machines using a USB flash drive, contact the Washburn staff to learn how to if you are not already familiar with this process. Also it is imperative that you contact the Washburn staff before machining any wooden parts. This is because they require a special setup to trap the saw dust that occurs so it does not ruin the spindle bearings of the machine.