

## CNC Basecamp Stepstool Project

This stepstool is a wonderful addition to any house. The CNC carving on the ends adds charm and interest, while the heavy, solid construction makes this stool a great helper for reaching the top shelf in the pantry or giving a boost to kids at the bathroom sink. This project requires material that is a full 1" thick for the top and ends and ½" thick for the sides. If you have trouble locating ready to cut 1" thick lumber, one source is stair treads sold at home centers and lumberyards. They come in different grades and are available in Pine and Oak. All of the cutting was done with a ¼" upcut bit.

1. Download the DXF files for the top, ends and sides.
2. Let's start setting up the cutting files beginning with the top. The top is made from 1" thick stock and has four mortises to accept the tenons on the top of the ends. These mortises need to be cut .75" deep, plus a bit more for clearance. I cut the mortises on my stool to a depth of .77".
3. The top also has two grooves for the sides to nest into. The grooves are cut .25" deep.
4. Now set up the profile cut using tabs to keep the part centered and attached to the parent stock.
5. The sides are a simple profile cut in ½" stock. Use tabs as you did with the top.
6. The ends are cut on both sides. There are two mortises cut on the inside face of the ends to accept the sides. Set these to be cut at .375" deep.
7. Next, set up a profile cut to shape the outer perimeter of the end.
8. The outside face of the end has a decorative carving. We need to be able to register the end when we flip it over after cutting the mortises. There are a number of ways to register a workpiece for two-sided cutting. An easy way is to cut the perimeter before the part is flipped over, then you can flip the part over and line it up with the kerf left in your spoilboard.
9. The carving work is the fun part of the build. You'll need to purchase a carving file and import it into your software. There are many sources and all sorts of choices for the carving, but for my bench I chose a Honeybee from [www.designandmake.com](http://www.designandmake.com). Use the perimeter in the DXF file as the boundary for the cutting the carving.
10. With the set up done, it's time to cut and carve parts with your CNC router.
11. With the cutting completed, clean up the tabs and give everything a good sanding. The carving can be cleaned up by "scubbing" it with a nylon or Palmera bristle scrub brush to remove any "fuzzies".
12. To soften the edges of the stool, and to allow the sharp edged tenons to fit in the radiused mortises, I used a solid pilot 1/8" radius router bit to apply a roundover on all of the exposed edges and those of the tenons.



13. Assembly of the bench is straightforward. As always, do a “dry run” before applying glue. Begin by gluing the sides into the ends.
14. Now glue the tenons of the ends into the mortices of the top, and the top of the sides into the grooves on the top.
15. Clamp everything up and clean the shop while the glue dries.
16. Sand and apply your favorite finish, and enjoy a sturdy, little stool with beautiful carving that you made on your CNC router.