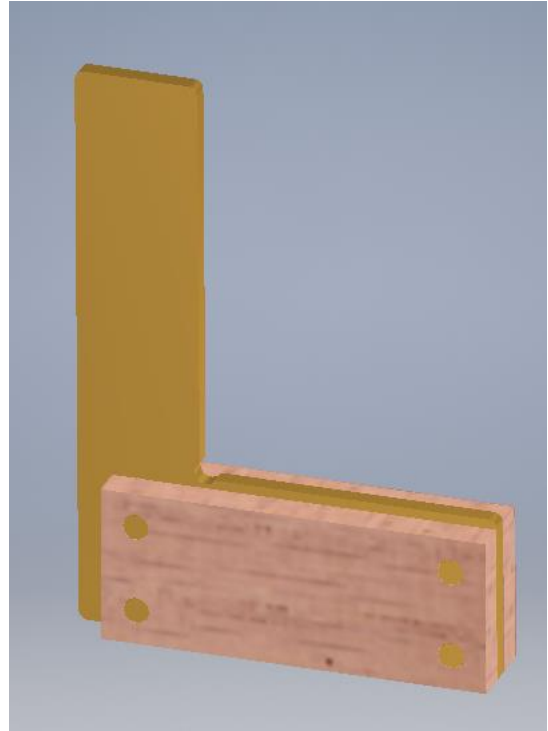


CNC Basecamp Brass Projects

Square

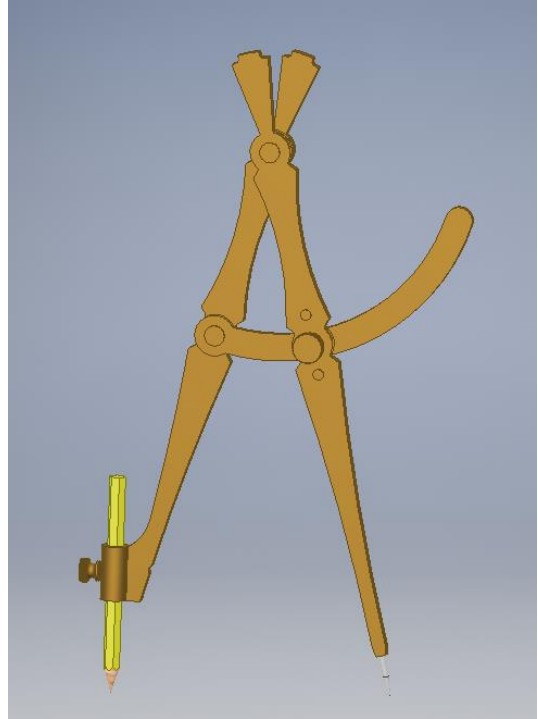
1. First, download the DXF files for the square.
2. The blade of the square is made in two cuts.
Our strategy is to have a finished part come off the CNC table that does need to have tabs ground and filed off. To accomplish this we are going to use two separate cuts. The first cut creates the holes for the rivets and additional holes for screws that will keep the waste stock securely in place for the final profile cut.
3. The brass stock is .125" thick, so set up a pocket cut for the holes at .128" deep using your CAM program.
4. Set up the second cut for the profile at the same depth, .128".
5. Secure the brass stock to your spoilboard using hold downs and proceed to cut the holes for the rivets and the additional screw holes. Drilling a pilot hole and using #6 x 3/4" screws secure the brass to the spoilboard for the second cut.
6. Now, run the profile cut completing the brass blade, back out the screws and remove the part from the CNC machine.
7. Back at your computer, set up the cuts required for the scales. Have some fun and set up a V-carving of your name or your workshop's name on the scales, if you like.
8. Next, set up the machining path for the rivet head counterbore at .05" and the through hole for the rivet barrel.
9. Last set up the perimeter cut, with tabs, for the scales.
10. With all the parts made, let's move onto final finishing and assembly. Polish the blade of the square using a buffing wheel or vibratory tumbler.
11. Clean up and sand the scales. Apply finish the finish of your choice.



12. Attach the scales using cutlery rivets on a hard metal surface. When setting rivets it's important that the hammer head hit the rivet straight up and down – not angled, so hammer with your shoulder and not your wrist and elbow.
13. Admire your custom brass square!

Compass

1. The compass is made from alloy 360 brass, 3/16" thick stock for the legs and retainer, as well as 1/8" stock for the wing and spacer. Use an 1/8" end mill for all of the parts.
2. The toolpaths for the retainer start with a pocket cut for the clearance slot. The pocket should be laid out larger than the part, otherwise the radius of the router bit will leave metal in the corners of the cut.
3. Next the rivet holes for the retainer can be set up, also a pocket cut.
4. A profile cut with tabs on the ends of the retainer will finish the part.
5. The legs of the compass have holes to cut for rivets, so set up a pocket cut for these.
6. Next up, create a profile cut for the legs. Use (4) tabs per leg to secure the part, as they are long and thin and will flex causing a rough cut if not held in place.
7. The compass wing and spacer are made from 1/8" brass. Begin by cutting the holes for the rivets using a pocket cut.
8. A profile cut with tabs is used to finish up the wing and spacer.
9. Separate the parts from the parent stock with a small cold chisel and use a file or belt grinder to remove the remnants of the tabs.
10. Tap the hole in the leg of the compass that secures the wing in the retainer using a ¼-24 tap.
11. The compass uses a solid, not sintered, bronze bearing as a barrel to hold the pencil. The barrel needs to be drilled and tapped for a 10-24 thumb screw used to secure the pencil. Drill the tap



clearance hole all the way through the bearing and tap all the way through as well – this avoids having to use a plug tap.

12. The leg of the compass on which the barrel will be soldered needs to be prepped by filing a v-shaped channel at the point of attachment. The v-shaped channel cradles the barrel, keeping it steady during soldering and adding strength to the joint.
13. The barrel can be held in place by wrapping a piece of steel wire around the barrel and in the notch of the leg. Twist the wire with pliers to tighten it.
14. Soldering is not hard if you prepare the parts and follow a few rules. Make sure that the parts fit well and tightly - solder is not gap filling glue. Make sure that the parts are clean and not oxidized. Coat the surfaces with a fluxing agent. Evenly heat both parts and be patient, allowing the parts to come to a temperature to easily melt the solder. Let the parts melt the solder – not the flame.
15. Now let's deal with the steel point on the end of the compass leg. Drill a 3/32" hole in the bottom of the compass leg.
16. Prepare the point by using a piece of high carbon 3/32" rod or an old drill bit. Grind a point on the end. Insert the blunt end into the compass leg with a little CA glue to secure it.
17. The final step of preparing the parts for assembly is to polish them. Finishing always begins by smoothing out any flaws with a file, followed by finer and finer grits of sandpaper. The magic of brass is brought out by using a buffing wheel. I like to use white Tripoli buffing compound for brass.
18. Assembly begins by using cutlery rivets to attach the wing retainer to the compass leg. Use firm and accurate hammer blows.
19. Now rivet the wing into place.
20. Insert the compass wing into the retainer, place the spacer in between the compass legs and rivet the two legs together. The rivet should be set tight enough to hold things securely but still allow free movement.
21. Now insert the thumb screw into the pencil barrel and the thumb screw into the compass leg to bear against the wing.
22. Whew, you're done! Put a pencil in your compass and enjoy a beautiful brass tool for your shop!