

Ribbon Controller Project

Part 3

Typically, I am not known for my good luck-or good looks, or good behavior, etc. So when Dad came back with the first pieces of suitably dry black walnut from the barn, you can imagine how lucky I felt. We were given (heck, we were begged to remove) a twenty foot black walnut trunk from my neighbor's yard. It was a mature tree without disease, very straight and undamaged. Why it was cut down is beyond me! Now, two years later, the first fruits of our labor were ready to pick.

This report will deal with the woodworking portion of the ribbon controller-the housing. Certainly, some of the tools used will not be available to the average would-be wood butcher. Therefore, you are asked to focus on the work that can be accomplished with common tools, such as a jig saw, a drill, a chisel and hammer, clamps, files, and sandpaper. Also, keep in mind that the author is, in addition to unlucky, non-aesthetically correct, and ill behaved, a rank amateur as far as woodworking skills are concerned. Your mantra should be, "if Chub can, ANYBODY can!" Let us begin:



1. Pick your boards and cut to size. These were board ends that my dad cut from the stock still drying in the barn. After planing to $\frac{3}{4}$ " thickness, the boards were ripped to a 5" width and crosscut to a 36" length. You'll notice that these have some knots-big deal! Look at the color and grain! This is going to be a fun piece.



2. Now it's time to cut out the openings for the ribbon elements and electronics. It should be apparent to you why I choose to use two $\frac{3}{4}$ " boards rather than a single $1\frac{1}{2}$ " board-these openings can be made with a drill (to make the inside-corner radii and starting holes) and a jig saw, instead of a router. An added benefit is the dimensional stability afforded by gluing boards together.

The jigsaw blade used should be of good quality and have a high tooth count. In fact, the recommendations given by the manufacturer will be a good guide. Craftsman touted the blade I choose as the best for "clean, smooth cutting" of hardwood and metals. The saw should be double-checked for alignment. Make sure the blade is at an exact 90-degree angle.



3. Here, the boards are shown after all the rough cutting was finished. There is lots of room for improvement! The board on the right is the bottom. It has a cutout for the electronics. Also notice the ends of both boards. One is radiused and the other end has a cutout for the jack/switch plate to be mounted on that end. Now it's time for the tricky stuff...



4. This is a poor man's routing job, done with a $\frac{3}{8}$ " drill bit and a $\frac{1}{2}$ " chisel. I chucked the $\frac{3}{8}$ " bit into a drill and bored a row of holes into the edge of the boards; inside the $\frac{1}{2}$ "X $2\frac{1}{4}$ " space for the jacks and switch. Then another row of holes was drilled into the back edge, perpendicular to the lengthwise holes. Then the excess wood was GENTLY removed with the chisel. A hammer was used sparingly; otherwise the chisel was simply pushed by hand. Yes, the results are a bit crude, but nobody will ever see this when the two halves are glued together and the jack/switch plate is installed. The grooves chiseled above the jack "rout" and the electronics cutout are for the element wires. That's the end of the cutting.



5. Before gluing, the inside cut outs get some final shaping. First with a rough file, then with coarse sandpaper-usually 60 or 80 grit-wrapped around a sanding block. Hand sanding with a block is an efficient tool-watch your work closely.

My co-worker, Jenny Balge, took this picture. You'd think she could have avoided getting my belly and second chin into the frame! I get a lot of stuff done by using my lunch break to work on projects. This is more relaxing to me than listening to my bosses complain about their golf games. An added benefit-I think the wood dust triggers their allergies!



6. Q. -How many clamps are needed in one's workshop? A. -About ten more than you've got!

This was a bit more involved than I would have liked, but the glue-up is an important part of this project. Before you start, you'll want to prepare and procure the following:

A clean, flat work space. This should be bigger than the work and FLAT. Did I mention that it should be flat?

A length of wax paper at least a foot longer than your longest glue edge.

A square. I used a combination square set up to stand flat on the workbench for a 90 degree reference.

Every C-clamp within a thirty mile radius of your home. Also, you'll need small, flat wood scraps to protect the wood surface from the clamps. I made good use of a pistol grip style bar clamp as well. A couple of these would be handy!

Plain old wood glue. Don't go out and buy some fancy-schmancy, wiz-bang NASA development project! This is wood we're working with.

A damp cloth rag. You'll want this to clean glue from your hands, work surface, or whatever. Keep the mess to a minimum!

A work partner who is not frightened by your worst language or behavior under stress. Honestly, I don't know what my wife sees in me...

Got all of that? Have you found enough clamps? Good-get at least five more! Here we go...

Cover the work surface with the wax paper. You may even want to tape it down. Then lay down the boards and start spreading a thin, even layer of glue on both surfaces to be joined. Don't put any glue where there will be a cut out. It might be a good idea to trace these areas beforehand. Don't use too much glue as this will impede the actual joining of the surfaces as well as making a mess when you start clamping. Too little glue, on the other hand will prevent your achieving a good bond.

Once the glue is spread, stand the boards on edge on the flat, wax paper-covered work surface and mate the glued surfaces. Check for square-the boards must be parallel and your edges for the jack/switch plate should be flush now. Many of the other edges won't be right now and that's okay. It is critical that this one pair of edges are flush, however.

When the rear edges are flush, have your partner put a clamp near that edge, using the scrap wood between the clamp jaws and the wood. You will make sure everything stays still while she or he gets the clamp snug-don't squeeze too much just yet. Check for square again. Check the flush edges. Look everything over. Now put another clamp on the opposite edge. Check everything again. See the pattern here? Clamp, check, clamp, check, clamp...

When I cut the center out of the top board, it spread out by over 1/8" from the original 5" width. Now is the time to bring it back. This is where a "quick clamp" comes in handy. Those pistol grip bar clamps are great! Though they can't put much pressure on a joint, they are easily operated with one hand and usually are capable of applying just enough force where it's really needed. I used mine to squeeze the side edges flush, then clamped with C-clamps. I worked about a 6" length at a time. Squeeze flush, apply two C-clamps, move up six inches, repeat.

Once all of your C-clamps are in place (let me assure you that even now, you'll wish you had four or five more clamps! Refer back to the above photo-I wished I had more clamps!) set it aside for 24 hours. **Do NOT wipe off any excess glue!!!** Doing so will only work the glue into the wood and prevent you from getting your finish to stick! Wait until the glue is completely dry and then simply break off any drips. Better yet, just leave them for the next step to remove them-the final shaping.



7. Like a true dork, I forgot to take my camera to my parent's house for pictures of the final shaping work. Let me assure you, however, that the results of that effort could be done with hand tools. It would take days and days, though. See those nice flat side edges? That was achieved by running the edge through the jointer. The rounded ends were made flush and square with another useful tool—an oscillating drum sander. This is a table with a sanding drum sticking out perpendicularly. The drum moves up and down as it spins to prevent gouging and burning. It took me about twenty minutes to get the end edges square and flat, even with such cool equipment.

Next, Dad put a nice radius on the edges with a router. He used a 3/8" radius bit with a roller bearing on the end that followed the nice square, flat edges we had shaped. The end closest to you in the photo required shaping by hand as no nifty tool could fit into that space. I used a very coarse sanding sponge to rough it in, followed by a lot of finer grit sanding to make it smooth. The trick to round edges (and flat stuff too!) is to keep moving with as long a stroke as possible.

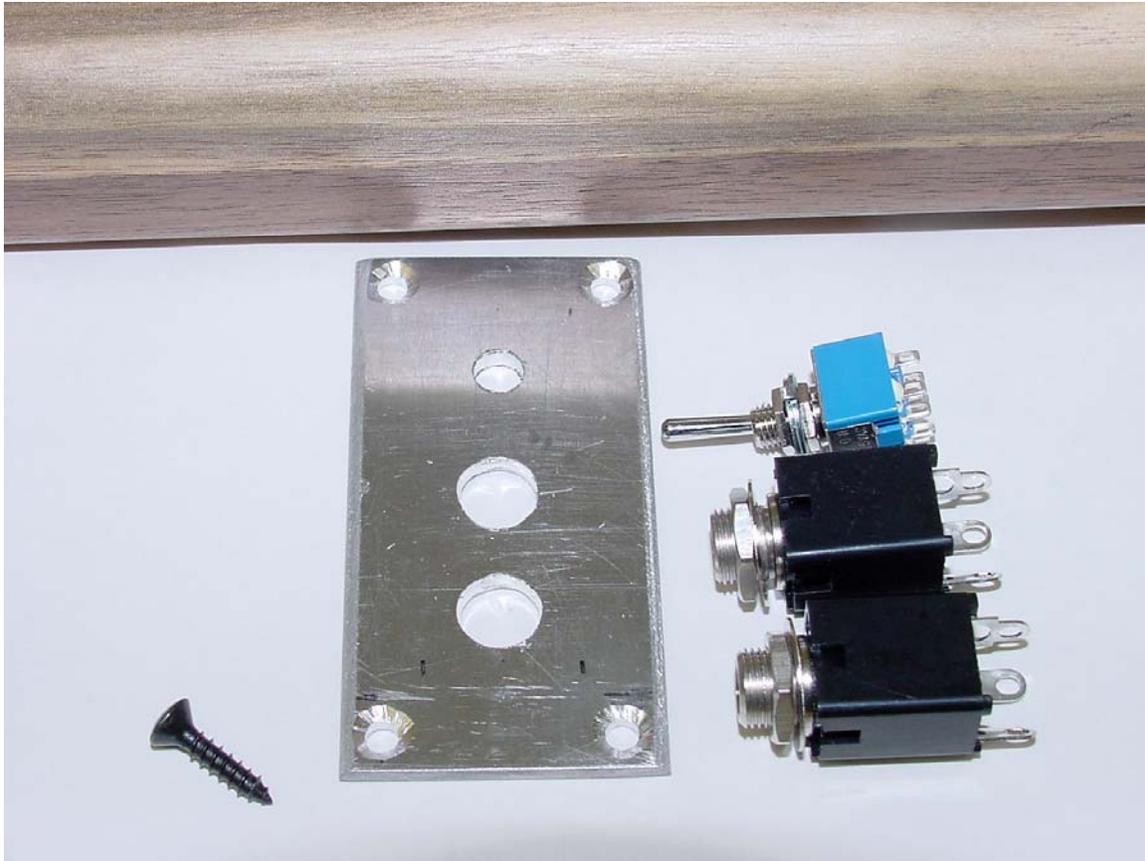


8. It took a couple of hours, but I got the finish sanding finished. For the flat surfaces, I used a random-orbital pad sander. The edges were done with sanding sponges and sandpaper wrapped around a block. The sanding is done when the wood is glass-smooth and you're working with 240 grit paper. My dad said, "just keep sanding 'til you get to 220!" I'm hoping he meant 220 grit and not 220 pounds...

After sanding, I drilled the holes for mounting the ribbon elements. These were made slightly oversize so the screw threads would only be attached to the elements. Because I will be using flat head screws, these holes needed to be countersunk. After drilling the countersinking was "cleaned out" with a wad of old sandpaper, roughly cone shaped, jammed into the hole and twisted around.



9. This is the finished piece! 5 coats of satin urethane, an hour of careful hand buffing and now it's time to annoy my family and friends with my pretty piece of wood! Photos just don't do this walnut justice...



10. With the wood finished (though still in the picture-wow!) it's time to make the jack/switch plate. This is the rough piece. 1/8" thick aluminum scrap cut to fit into the 1 1/2" x 3" space in the end of the controller body. The 3" edges were gently radiused by hand, and the short edges were left square because they fit flush against the wood. The screw holes have a countersink to match the screws. This was done with a 7/16" bit and will be cleaned up with a conical rotary stone chucked into the Dremel tool. The holes for the switch and jacks will be deburred with a deburring tool. Not familiar with a deburring tool? Time to hang out at a hardware store, my friend! Once cleaned and smooth, this item will receive a shot of wrinkle-finish paint, for the electronic version of the "black tie and tails" look.





11. These two photos show the completed body assembly. The jack/switch plate is painted and screwed into place, as are the elements. This isn't too bad for an amateur.

Next we'll work out the design of the (simple as dirt, hopefully) electronics, the pcb layout and the final wiring and assembly. At that time, the cover for the electronics cavity will be complete, as well.