

## Drum Trigger Project Part 2: Electric Bongo Case

When I started this project, it seemed that the best implementation of Ray Wilson's drum trigger circuit would be as a sort of hand drum. Since I've got a set of bongos, that design seemed to be the ideal. Of course, making round drums would involve a lot of cutting and waste and since these aren't acoustic instruments, shape isn't important. Also, there were some small walnut pieces left from my last synth cabinet project. The design presented here is an attempt to use up scrap wood while making a drum set that would fit in a standard bongo stand.



As you can see, the rough drum form is composed of scraps of wood. The standard crosspiece of a set of bongos is  $2\frac{3}{4}$ " high and  $1\frac{1}{2}$ " thick. That height dimension was used for all of the wood pieces. The outside dimensions of each "drum" is  $4\frac{1}{2}$ " square and  $2\frac{3}{4}$ " high. The "drums" are 2" apart. Aside from the 3" long X  $\frac{3}{4}$ " wide X  $\frac{5}{16}$ " thick scrap pieces glued to the inside of each drum to hold the bottom covers and the trigger modules, the wood is  $\frac{3}{4}$ " thick. The numbers required and dimensions for the various pieces are:

4 -  $2\frac{3}{4}$ " X  $4\frac{1}{2}$ "

2 -  $2\frac{3}{4}$ " X  $3\frac{1}{2}$ " (for the cross piece)

2 – 2  $\frac{3}{4}$ " X 3"

4 –  $\frac{3}{4}$ " X 2  $\frac{3}{4}$ "

After cutting all the pieces to size, a  $\frac{1}{4}$ " X  $\frac{1}{4}$ " groove was cut along the 3  $\frac{1}{2}$ " dimension of one of the crosspiece boards. This would allow wiring between the two modules. The cross piece was then glued together with the groove inside. The two pieces were clamped and then stapled together. Next, the four  $\frac{3}{4}$ " X 2  $\frac{3}{4}$ " pieces were glued and stapled to the ends. The four 2  $\frac{3}{4}$ " X 4  $\frac{1}{2}$ " pieces were attached to these and finally, the two 2  $\frac{3}{4}$ " X 3" were fitted into the ends. While we could have simply glued and clamped all of this, using the pneumatic staple gun made short work of this assembly.



The above photo provides another view of how the pieces were assembled. The  $\frac{5}{16}$ " pieces were mounted so that two provided a stop for the drum trigger modules. These are glued  $1 \frac{9}{16}$ " from the top edge of each drum. The second two were glued  $\frac{1}{16}$ " from the bottom edge of each drum to provide a mounting point for the bottom covers. The  $\frac{1}{4}$ " X  $\frac{1}{4}$ " groove is clearly visible in this shot.

After the assembly was completed, the glue was allowed to dry overnight. The next job was to drill holes for the jacks and power switch. I used a  $\frac{3}{4}$ " hole saw for the four jack holes and a  $\frac{1}{2}$ " bit for the switch. The holes were centered about  $\frac{7}{8}$ " from the bottom edge of each drum. The jacks and switch were then centered within the 2  $\frac{1}{4}$ " space left inside the drum and  $\frac{7}{8}$ " apart from one another. Only the drum that would be holding the batteries had need for the switch. The other drum had the jacks placed in the same location as the first, just for uniformity. After drilling, I used a jigsaw to square the holes to match the Switchcraft jacks. Pictured below is the end result. Fortunately this bit of bodgering gets covered up with the jack/switch plates.



Finally, it was time to make this rough object look pretty. I did the rough sanding while my dad set up his router table. Dad's shop has any tool needed for making cool wooden and/or metal things. That's why he is usually quite

involved with my electronic and electro-acoustic projects. That's a good thing, because rotating blades make me very nervous! Once Dad got the router table set up for a 1/4" round-over bit, he put a nice rounded edge on the outside corners.



After this process was finished, the case looked a lot better as you can see in the photo below. I continued to sand with fine grit sandpaper. Then the four (barely) visible staple holes received some filler putty and I did the final sanding with 220-grit paper.





The batteries needed to be isolated from the pcb and jack terminals. I formed this simple holder from fish paper (a stiff paperboard with good dielectric properties) and glued it to the plastic cover for the bottom of the drum with contact cement. Scrap paperboard – think cereal box- would work just as well. Some foam was added to the inside of this holder with silicone cement. This will keep the batteries from rattling around.

The bottom covers and jack plates were drilled. The bottom covers were made from scrap 1/16" thick plastic, cut 3" square. The jack plates were fashioned from 1/16" thick aluminum. The jack plate with the power switch was cut 1 1/8" X 3 3/8" and the other was made 1 1/8" X 2 1/2". The mounting screw holes were given a countersink for use with flat head screws. The jack plates got a coat of black wrinkle finish paint after drilling. Once drilled, the jack plates are

lined up on their respective drums that were then punched for drilling the mounting screw holes. After drilling the screw holes the case was then cleaned and prepped for a glossy tung oil finish. Usually I use a satin polyurethane finish, but drums tend to be glossy so I went for that look.



Tung oil is fairly easy to work with and provides a durable finish. I bought Formby's High Gloss Tung oil because it is a good product and it comes in small bottles. You won't need more than a cupful for this project.

The first coat should be fairly light. The wood will soak much of it in. Let this dry for at least 24 hours, sand down any runs or drips and apply a second coat. If this dries without running, you're done. If you just like doing finish work, you can lightly sand the piece and apply a third coat.

Final assembly was a breeze! It should have been, as I made adjustments to compensate for all my errors as I went along. The bottom covers were installed with #4 X 5/8" flathead wood screws and the jack plates with #4 X 1/2" flathead wood screws. The trigger modules simply push into the top openings until seated. Don't get over eager and assemble too soon. Let the finish sit and cure for a few days. If you built the drum triggers like mine, you can power them up and play with them right away without the case.

Once you've got the project finished, though, be prepared for lots of "ooohs" and "aaahs" from people who are normally bored to tears with your synth endeavors. They may not understand hard syncing or cutoff frequency, but they'll enjoy tapping away on your cool electric bongos!

