Building a Resonator Guitar: The Process

By

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Reso-Nation.org

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Introduction

I was recently asked if I'd be interested in participating in a *Builder's Forum*, which would address the process of building a resonator guitar. I thought this project was one of great merit and would benefit anyone who has a desire to grain knowledge of how a resonator guitar is constructed.

During the course of this project several well known and noted luthiers will participate and detail how they make their guitars, offer helpful tips and ideas, and generally share their years of hard-earned knowledge.

This article, ***Building a Resonator Guitar: The Process***, is my first contribution to this ongoing project. It's focus has changed somewhat since it was originally discussed, and has evolved into a step-by-step walk-thru, detailing how I go about building a resonator guitar. It is itself an ongoing project, which is being presented in several instalments over an extended period of time. I hope you'll find it useful.

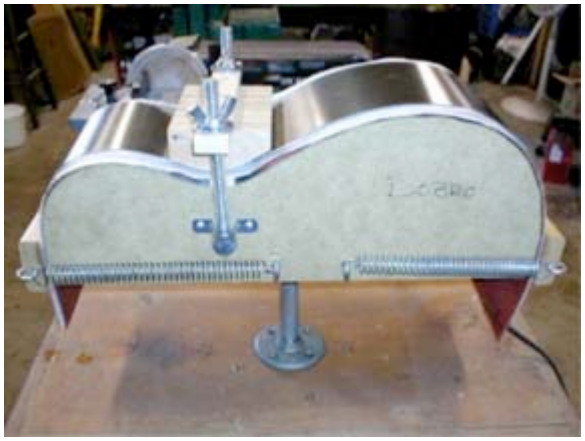
As you read it, questions will arise. I'll be happy to answer them and provide whatever information I can. However, please post your questions and comments directly to **Reso-Nation.org**, where the answers can be posted in a public forum where the information answers can be shared with--and benefit--everyone.!

Part One: The Sides

1. Before starting any guitar project, I select the wood to be used. For this guitar it's going to be Myrtle for the back and sides. The sides are bookmatched and sanded to a uniform .100" thickness. A centre line is then drawn in pencil where the waist bend is going to be.

2. The "top" of the sides is trimmed to be level. The "backs" of the sides have a taper to them as my guitars have an arched back. I bandsaw the sides as close as possible to the marked out taper line and clean them up with a hand plane.

3. To bend my sides I use a bending mould made out of mdf and hardboard. I use a heated silicone blanket for my heating source. It is 6" wide and 36" long, 875 watts and can get up to 500 degrees in less then a minute. I use a rheostat made from a 1000 watt dimmer switch to control the heat. This blanket can be purchased from Luthier's Mercantile.

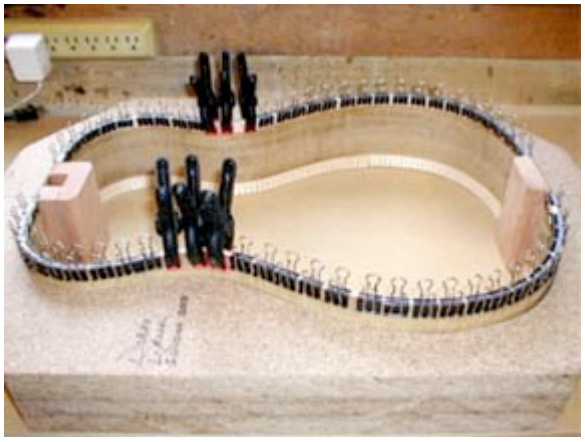


4. I wet my wood just prior to bending. I use a spray bottle and completely wet the wood. Parchment paper is then placed on both sides of the wetted wood. This is done to help the wood from drying out too quickly and it also absorbs some stains the wood may give off during the bending process. The wood is then laid down on top of the heat blanket and the "waist" pencil mark is matched with the waist of the bending mould. I use a piece of .015" stainless steel shim stock 6" wide and 40" long to cover the wood. The stainless steel slat acts as a cover and support backing for the wood during bending. The blanket is now getting hot and the "waist caul" slowly gets screwed down. It take only a minute or two. Once the waist is bent into position, I clamp on my two spring loaded maple cauls and use them to press the wood to the heated blanket. The cauls are slowly moved over the bending mould and the side is completely bent. I leave the heat on for another minute and then unplug the blanket. A note of caution. Never leave a hot bending mould unattended and always have a fire extinguisher nearby.

5. Once the side is cool and dry, it's removed from the bending mould and clamped into an outside mould.

6. Both sides are trimmed at each end and placed into the mould.

7. The tail block and headblock are glued in the same way. I use a flat board covered with waxed paper and a straight piece of corian which acts as a stop. Glue is applied to the block and the upper or "top" of the guitar sides are pressed up against the corian and the block is glued down with 4 clamps. After 20 minutes or so, the excess glue is removed.



8. Kerfing is what is added to all guitar sides to help give it more gluing surface for the top and back. I use basswood kerfing and glue them in by using the small folding paper clips. They work great and can be purchased at any office supply store.

9. Side reinforcement is made from extra pieces of the side wood material and glued to the sides.

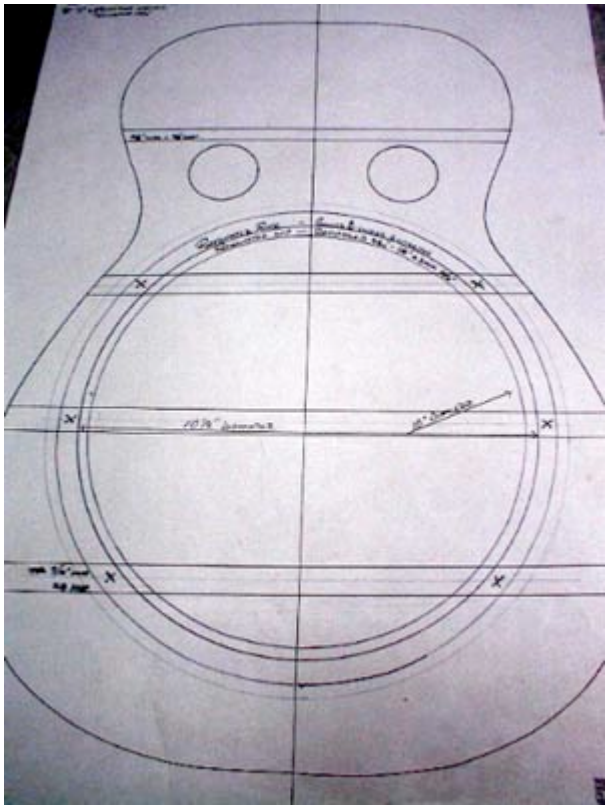
10. Photo of the side reinforcement glued in place.

Part Two: The Back

The back bracing for a solid wood resonator guitar using a soundpost system must be made strong, as a fair amount of downward presser is placed on the braces. By making the braces out of Sitka spruce 5/8" wide and 3/8" tall, I believe it helps distribute the downward force to the entire back and not just to where the soundpost comes to rest on the brace. Note: I'm not going to show the actual brace clamping procedure as that's rather academic.

1. Thickness sanding the back to a uniform .110" using 120 grit paper. Before the braces are glued on, the back surface will be sanded with 220 and 320 grit paper.

2. Drawing the centreline. The centreline is critical as all the bracing is keyed off of it.



3. I always check and double check my plans for the brace placement. Measurements are taken and transferred to the back.

4. I'm not sure what this "gizmo" is called, but I use it to lay out a straight line for the braces. Again, keyed off the centreline.

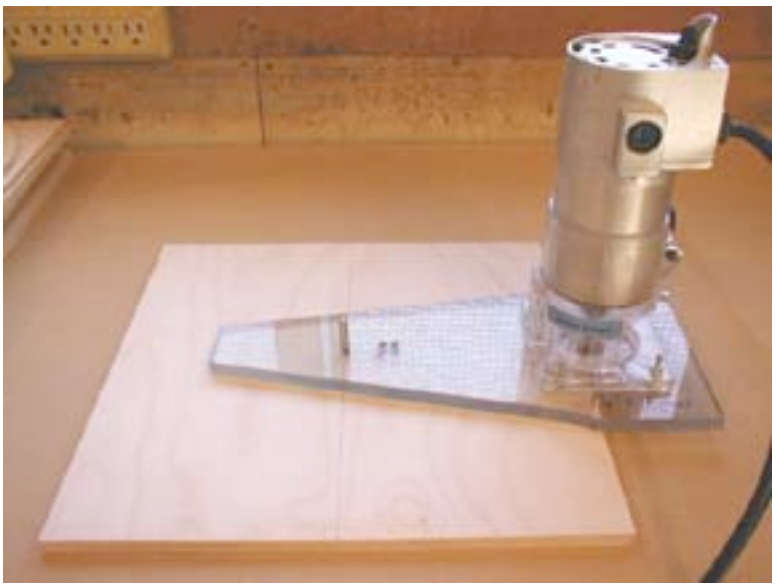
5. The back braces glued in place and the ends shaped to contour. All of the braces are curved to a 25' radius and are glued in while laying on a radius dish. The dish also has the same 25' radius cut into it. The reason I use a radius is because it makes a stronger back and I believe aides in sound projection.

6. I'm just laying the tone ring template on top of the braces to show the relative location of the soundpost to the braces.

Part Three: The Tone Ring

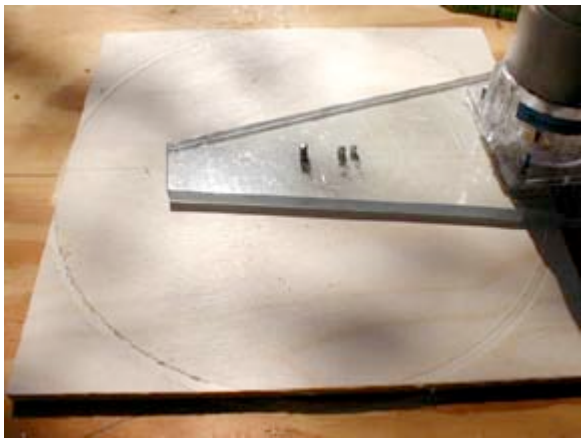
Simply put, the tone ring is what the resonator cone sits on. It is not that difficult to build, but it must be done correctly as the cone needs to sit flat and level. I've decided to try a new and hopefully easier way to make the tone ring. I'll be using one piece of Baltic birch plywood 3/8" thick x 11 ¾" square and one piece 1/8" thick x 11 ¾" square. After both pieces are routed to final shape, they will be glued together to make a finished ½" thick tone ring. The 3/8" thick part of the tone ring will have an outside diameter of 11 ¾" and a inside diameter of 10". The 1/8" piece (the top part of the tone ring) will have an outside diameter of 11 ¾" and a inside diameter of 10 ½". When the pieces are glued together a lip ¼ inches wide will be left for the resonator cone to rest on. The 1/8" rise combined with the top wood thickness will leave a ¼" to 5/16" recess needed for the cone and spider bridge to fit without hitting the coverplate.

1. 3/8" x 11 ¾" square Baltic birch plywood with a 3/16" centre hole for the router set pin.



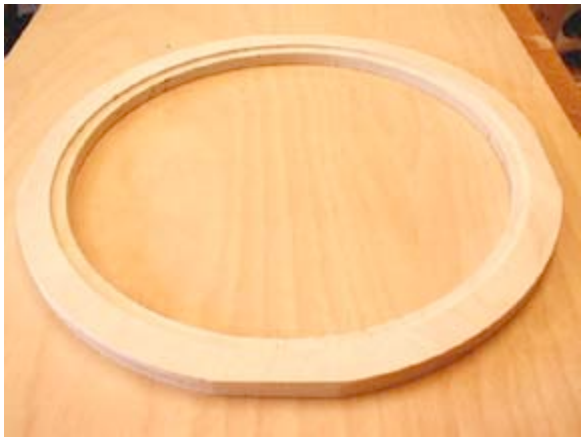
2. I use a laminate trimmer mounted to a 3/8" thick piece of Plexiglas to cut out all of the necessary holes for the tone ring and guitar top. The base has 3 holes that allow me to cut a 11 7/8", 10 ½" and a 10" diameter. I

use a ¼" diameter up-cut spiral router bit for cutting the holes.



3. Making the first cut with the laminate trimmer. It takes several passes with the router to cut out the final diameter.

4. The two rings being glued together using a clamping caul and a lot of clamps. You can never have enough clamps.



5. The tone ring glued together. A 1/8" rise and a ¼" lip for the resonator cone to rest on.

6. A Quarterman cone with a National Guitar Co. spider bridge resting in the tone ring.

The next instalment (Part 4) will be cutting out the resonator cone and soundscreen holes and gluing the tone ring to the top.

Part Four: The Top

The top on this guitar is Sitka Spruce. Spruce is a traditional wood used for acoustic guitar tops and is now gaining popularity with resonator guitar makers. The top is .150" thick, because I wanted a slightly thicker top for this guitar. The tone ring is ½" thick and the two top braces are 3/8" wide and ½" tall. The "patch" between the soundscreens is 2 3/8" wide and 2" long and .150" thick. Between the tone ring, two arched braces and the patch, you have a very strong top that is strong enough to keep the guitar from collapsing inward from the downward pressure of the strings, neck and tailpiece, but you still need the soundpost. These are installed after the guitar back and top are glued onto the sides.

1. Laying out the top template and marking out the soundscreens and resonator hole locations.

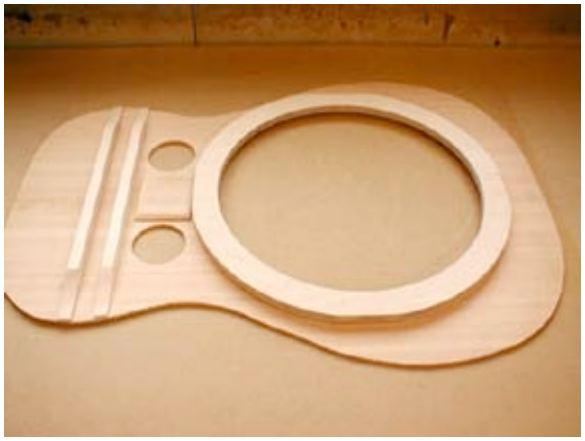
2. I use a 1 7/8" forstner bit. The bit is mounted to a drill press and the holes are cut out before I thickness sand the top.

3. The soundscreen holes cut out.

4. Cutting out the 10 ½" resonator hole using the same tool that was used to make the tone ring. The resonator hole was cut out after the top was thickness sanded.

5. The top holes completely cut out.

6. Gluing the tone ring to the top.



7. Braces and tone ring glued to the top.

8. A closer view of the top bracing.

9. It's hard to see, but the ¼" to 5/16" recess needed for the cone and spider bridge to have so they don't touch the coverplate.

Part Five: Tools, Jigs and Plans

1. Some of the saws used during the construction of this guitar. L to R Back, fret, coping and x-acto saws.

2. Clamps used: R to L, Cam, "C", Spring and 2 styles of Bar clamps.

3. L to R, Fretting hammer (one end is hard rubber and the other is a hard resin), square, cabinet scrapers and medium and small block planes.

4. A series of different files used.

5. A assortment of different sized rules. 36", 18", 12", 6" and a IBEX rule.

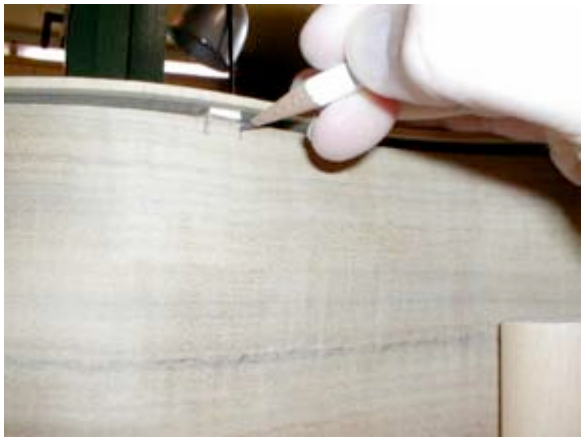
6. !/4" thick hardboard template of my R model with the correct size and location of the resonator and soundscreen holes. A template can be made from paper, poster board, hardboard or plywood.

7. An "outside" mould used throughout the construction of a guitar. The mould will hold the sides in the correct position while gluing in the headblock and tail block and the top and back. The mould can be made from plywood, hardboard, MDF or particle board. This mould is made out of high density particle board.

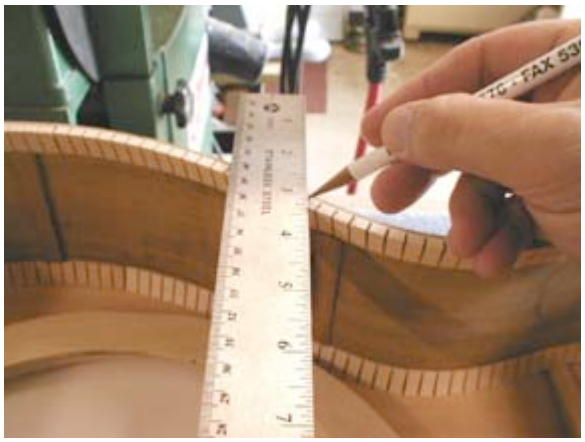
Part Six: Gluing on the Top and Back

1. The back braces are trimmed, shaped and sanded.

2. This is where that ever important centre line comes into play. Line up the centre line of the back with the centre of the headblock and tail block. After centring the back, use a few pieces of tape to temperately hold it in position

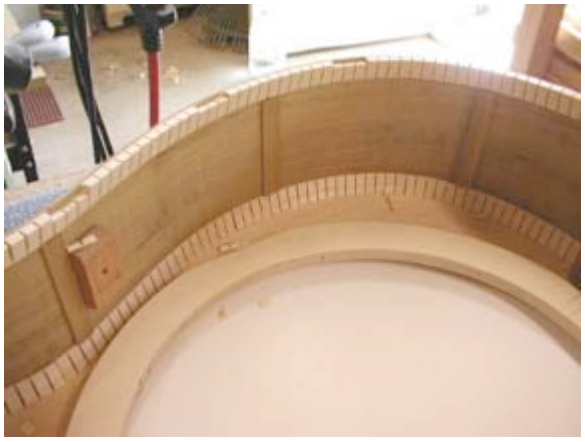


3. Using a shape pencil, mark the location on the guitar side where the braces will be notched into the kerfing.

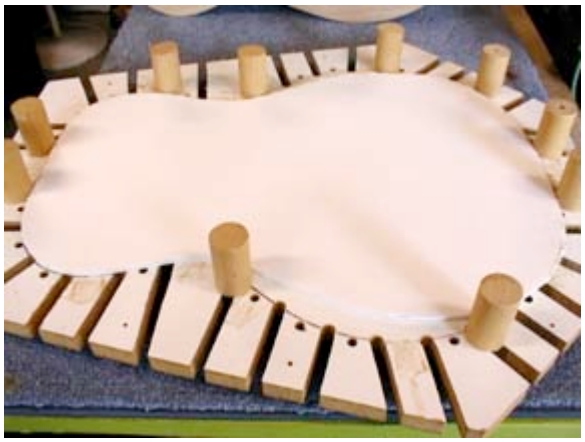


4. Transfer the pencil marks on the sides to the top of the kerfing by using a straight edge. This will tell you where you'll need to notch out the kerfing.

5. Notching out the kerfing to accept the braces. I use a 1/4" chisel and a piece of scrap wood that is held against the outside of the guitar side for added support. This protects the side from any damage.



6. Picture of the notched out kerfing, now ready to accept the back.



7. This is my workboard. It's built to accept several different sizes of guitars. When I glue on the back I protect the top wood by placing a 1/4" piece of artist foam board on the bottom . The foam board is cut to the exact shape of the guitar body.

8. Yellow glue (Titebond or Elmers) has now been applied to the top of the kerfing and the back is placed on the sides. I make sure the centre line of the back matches the centre line of the head and tail blocks and apply a few pieces of the blue painters tape to the back and side to secure them from slipping while I apply clamps to the back.

9.), I use a very simple caul for gluing on the tops and backs. It's nothing more then a piece of ¼" plywood cut to a ½" diameter in the shape of the guitar. It protects the surface from any scaring from the clamps and it adds downward pressure to the back surface while the glue is curing. The piece of mahogany is used as the caul in the headblock area. It's a larger gluing area that needs the larger caul.

10.), I use a lot of bar and cam clamps to secure the back. If the top and back are properly notched and fitted to the sides, you really don't need a lot of clamping pressure. Let this stay clamped for 12 to 24 hours.

Part Seven: The Binding

Other then bending the sides and applying the finish, binding a guitar is the one aspect that most new builders fear. It's a very simple procedure if you follow a few easy rules. #1. Don't rush. #2. Always test your cuts on scrap wood first. #3. Use the correct tools for the job. If you do these three simple things, everything will come out fine.

1. I selected a black boltaron (Martin Co.) binding for this guitar. The guitar is myrtle and spruce and by using the dark binding I'm able to make a nice contrast to the light coloured wood.

2. I sand the guitar body down with 220 grit sandpaper before I cut the binding channels. Sanding the guitar will give me a smooth level surface to work with. My sander of choice is a Porter Cable Speed Bloc #330.

3. My weapon of choice for cutting the binding is a Ryobi ¾ hp. laminate trimmer with a 5/8" straight cutting router bit made by Freud.

4. I always rout the outer binding channel first, then the channel for the purflings. The first cut is to the correct height and approx. ½ the thickness of the binding. By taking a shallow first cut you reduce the possibility of chipping out small pieces of the top or side wood. The second cut will be to the correct thickness of the binding.

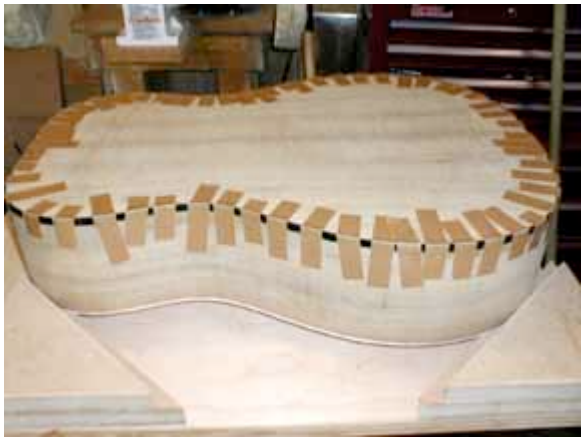
5. A completed channel. It should be clean and crisp. If not, then clean it up with a file, chisel or sanding stick.

6. I do a dry test fit of the binding prior to gluing them on. A few pieces of masking tape is used to hold the binding in position.

7. Holding the binding in the channel, I use my fingernail to feel any high or low spots. Any areas that need to be fixed are done at this time.

8. For gluing on the plastic binding I use the Weld-On #16 acrylic cement and the brown binding tape. Both items are sold by Stew-Mac and LMI. A word of caution: The Weld-On is toxic and flammable and should be used in a well ventilated area.

9. I start gluing on the binding at the centre seam of the guitar. (Remember that all important centre seam?) Make sure the binding has a true 90 degree cut when you starting gluing it on at the centre seam. After the first few pieces of tape are installed you can complete the gluing process in a few minutes. Just remember to do a short run at a time. Approx. 10 inches. Apply glue to the channel and tape and repeat until your done. Once you get within a few inches of the end, carefully mark the end of the binding and cut it at a 90 degrees to match the starting piece of binding. If you measured correctly, your two end pieces will match up and look like one continuos piece.



10. Leave the binding tape on for 12 hours. Remove the tape at a 45 degree angle. This will help reduce any tearing out of the wood fibres.

11. Here I am using a single edged razorblade to level the binding flush with the surface. I leave the binding about 1/64" proud of the surface so I get a nice clean top edge.

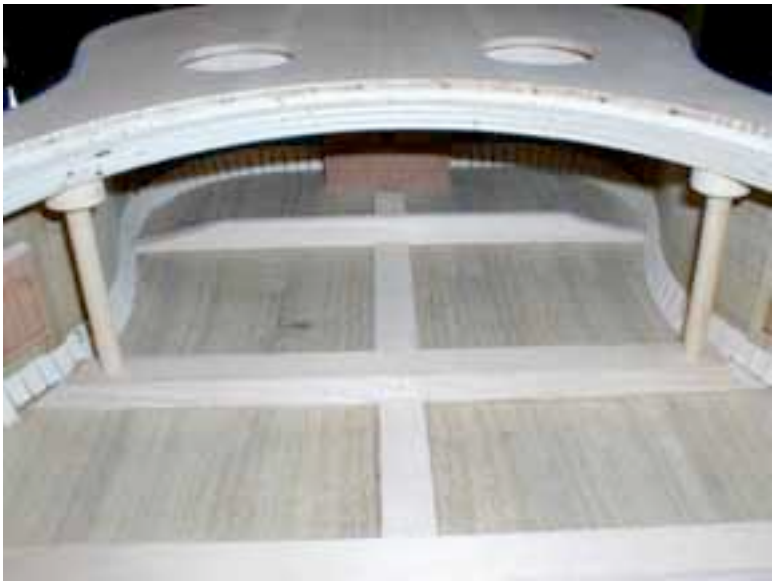
12. Close up of the finished purfling and binding.

Part Eight: The Soundposts and Baffle

I've changed my soundpost installation method for this article to show the new luthier an easier way of installing them to the tone ring and brace. My old method involved recessing them into the tone ring and that method took a lot of time and precision.

My baffle is made from 1/16" polycarbonate (lexan) and is flat (up and down). It's 3" tall, 14 ½" long and attached to the guitar by two screws that are mounted to two wood blocks glued to the sides just behind the forward soundpost. At the present I am working on a bending form that will allow me to make a convex and/or concave oval shaped baffle. It's all about airflow and the changing of airflow and that is why my baffle system is ever changing.

1. The soundposts are constructed in two pieces. A 5/16" birch dowel and a ¾" wide cap. The cap is 3/8" thick and has a 5/16" hole drilled in the centre approx. ½ it's depth. I use a forstner bit in a drill press to give me a clean straight hole.



2. Always cut the dowels a little long. Take the soundpost and hold it in the guitar and flush it up under the tone ring. With a pencil, mark the soundpost where it meets the top of the back brace. Make your cut and sand the bottom of the soundpost until the post slides under the tone ring and on top of the back brace. It should fit snugly, but not forced. Apply glue to the top of the cap and slide it into position under the tone ring and allow to dry.

3. My "Guitar Cam" shot from inside the guitar. This gives you a good idea how the tone ring and soundpost work together as a unit.

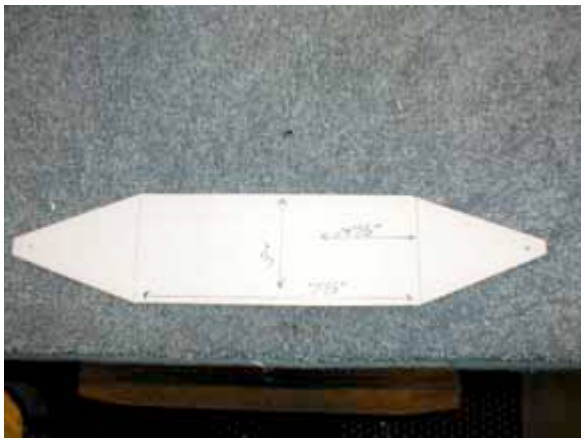
4. To secure the bottom of the soundpost to the back brace I use thick Gel-CA glue (super glue). A thin bead

of glue around the post is enough.

5. Using a template I draw the outline of the polycarbonate baffle on the outer protective covering.

6. Cutting the baffle to shape on a bandsaw.

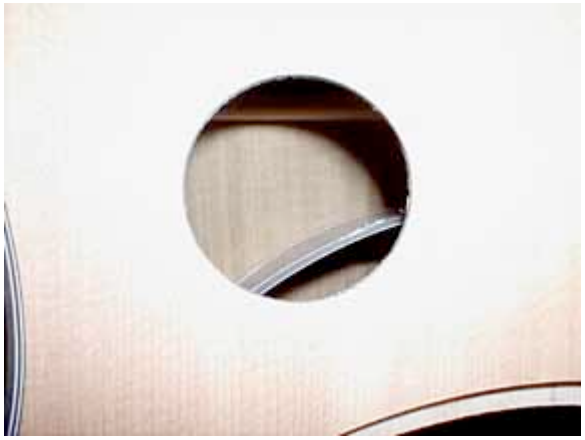
7. Using the belt sander to true up all the edges of the baffle. You can also us a sanding block with 150 grit sandpaper.



8. Completed baffle.

9. Test fitting the baffle. Any adjustments are done at this time. Note: I always leave the protective covering

on the polycarbonate baffle until I'm ready to install it. This helps keep the baffle clean and scratch-free.



10. My baffle is more of an oval rather than half circle and extends to just under the sound screens.

Part Nine: The Fretboard

Making a fretboard is a simple task if you have the correct tools and a little time. If you don't have the tools, you can purchase pre-slotted and tapered fretboards from various suppliers.

For this guitar, I'm using a beautiful piece of Ziricote. A South American hardwood with similar characteristics to ebony. I'm using a 24.9" scale and the neck/body joint with be at the 12th fret. The fretboard has been sanded to a uniform thickness of 1/4" prior to cutting the fret slots.

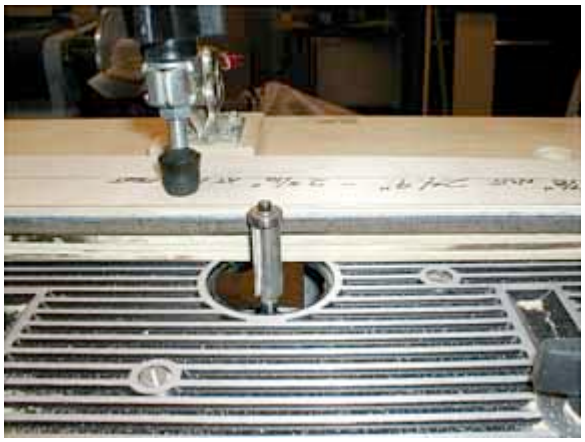
1. Close up of the grain of the Ziricote fretboard.

2. I use the fret slotting jig available from Stew-Mac. The design is simple and completely adjustable. The notched polycarbonate template is keyed off a 1/16" index pin and it gives you built in accuracy. I double sided tape the template to the bottom of the fretboard to keep it from moving. Turn the board over, place it into the jig and start cutting the slots. For this guitar I using a 24.9" scale and cutting 19 fret slots and the fretsaw has a .022" kerf.

3. Cutting the slots is easy with the jig. Before I cut a slot I give the saw blade a very light coating of wax. This makes cutting into the hardwood easier. I also added two clamps to this jig to hold the wood down.

4. A photo showing a slotted fretboard. With this jig a fretboard can be slotted in 5 to 7 minutes.

5. My taper template is made from ¼" thick Baltic birch plywood and is
1 7/8" at the nut and 2 5/16" at the 12th fret. I cover the fretboard with masking tape and locate the centre of the board and draw a centreline. I match the centreline on my template to that of the fretboard the draw the taper lines on the tape. I now cut out the taper of the fretboard on the bandsaw, leaving approx. 1/16" of the line showing.



6. Using a router table with a flush trim bearing bit and the fretboard and template locked into a hold down jig, I trim off the 1/16" overhang and true up the taper of the fretboard. After two passes I have a completely tapered and true fretboard.

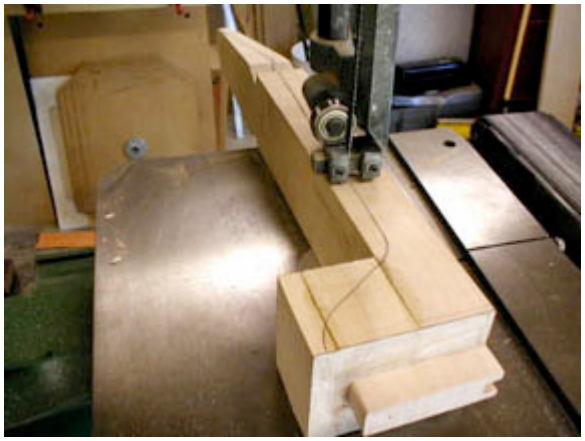
7. A tapered and slotted fretboard.

8. I'm using a simple 1/4" traditional pearl dot pattern for this fretboard inlay. Single centre dots at the 5th, 7th, 9th 12th and 17th fret positions and double outer dots at the 15th and 19th frets. I use a 1/4" forstner bit in a drill press to make the holes. I glue the inlays in with a gel superglue and level them flush with the surface using a sanding block and 180 grit paper. The frets get installed after the fretboard is glued to the neck.

Part Ten A: The Neck

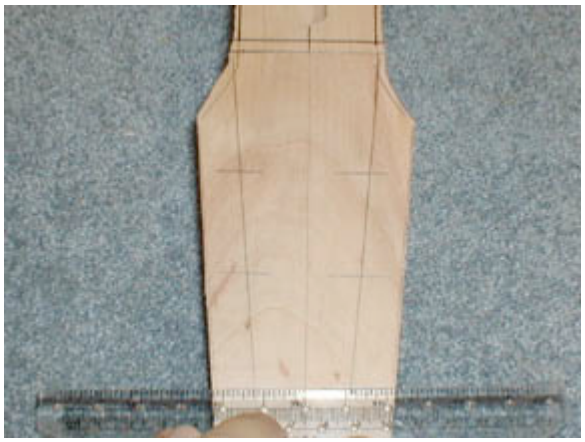
Making the neck can be a little intimidating, as you must look at it as a 3D piece of work. You have markings on the top, sides and back and a few places in between. I'm using 8/4 maple for this project and needed to glue on an extra piece to makeup the heel. My stock wood is 8/4 thick, 3" wide and 24" long. I use a mortise and tenon joint with barrel nuts to attach the neck to the body as used by luthier William Cumpiano, and use a tenon jig that I copied from the Stewart MacDonald site to make the tenon.

For neck reinforcement I'm using a 3/8" square non-adjustable piece of steel tube. Prior to any cutting the entire layout of cuts and routs were drawn on the neck.

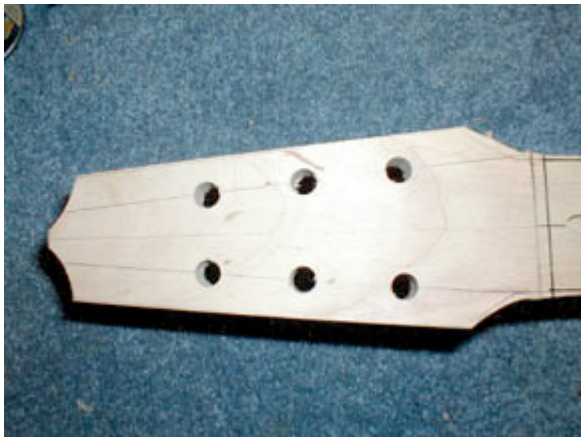


1. Using a template I drew the outline of the neck side profile unto the neck and cut it approx. 1/16 outside the line using a bandsaw. The neck was now taken to the router table and a 3/8"x3/8" square channel was routed down the centre of the neck for the reinforcement rod.

2. Rough cutting the headstock and neck profile 1/16" oversized.



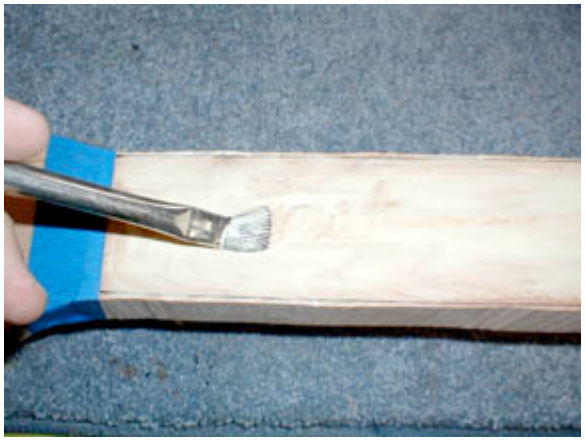
3. On a roughed out headstock I work off my centreline and mark out the locations of where the tuning gears will go.



4. I drill the holes for the tuning gears prior to gluing on the headstock overlay. I find it easier to do at this way.

5. Prior to gluing on the fretboard, I'll lay the fretboard in position and temporarily clamp it down. I take a drill with a 1/16" drill bit and drill two holes in the fret slot approx. 3/8" deep. I'll also do this at the 10th fret. These holes are for "locating pins" that will help hold the fretboard into position while it's being glued to the neck. The pins are removed after the glue is dry and the frets will cover the holes.

6. Two small nails are used for the locating pins.



7. I apply Titebond glue to the entire surface of the neck and fretboard (up to the 12th fret), place them together, match up my locating pins and lightly tap them down and use a series of wood cauls to protect all surfaces and to distribute the clamping pressure evenly, I clamp everything together and allow it to dry for 24 hours.

Part Ten B: The Neck

8. The fretboard and neck being clamped together. It's not pretty, but it works.

9. CAUTION: The following photo shows how I flush-trim the neck to the fretboard. It's a very dangerous way to do it. I must warn you if you try this method, please be careful and wear eye and ear protection and know where your fingers are at all times.----On my router table I use a pattern makers bit with a bearing on top that acts as a guide for the fretboard. The bearing runs along the fretboard and trims away the neck making it flush with the fretboard. Again, be careful...

10. The heel area doesn't get trimmed by the router bit, so I take my random orbit sander with 120 grit paper and sand it flush and level with the routed surface.

11. The completed neck. Note: The headstock on this guitar was finished and cut by hand for the purpose of this article. Normally I use a template and a router to cut it out to shape. I also didn't show the fretting procedure as it doesn't need any real explanation.

Part Eleven: Finishing

Finishing a guitar can amount to as much as 40% of the total building time. This is one process that can't be rushed or shortcuts taken. I'm going to explain the way I do it, the materials I use and hopefully you'll have a better understanding of the finishing process. I don't have a lot of pictures for this segment as it's rather difficult to show someone how to spray on a finish by only using photo's. Let's get started.

Wood preparation: Sand all the wood surfaces with a good quality sandpaper. Start with 150 grit, then progress to 220 and finish off with 320 grit. Wipe the guitar down with a tack rag or a paper towel with a little naphtha on it.

Some people like to raise the grain of the wood prior to putting on a finish and some don't. I live in a very dry area during the summer months so I do the grain raising. With a lightly damp rag, wipe down the surfaces on the guitar and allow it to dry. Sand lightly with 320 paper and tack rag off the dust. Repeat this procedure another 3 or 4 times or until the grain refuses to rise. After you're done, allow to dry completely for 24 hours.

Finishing Materials: I use the McFadden's nitrocellulose lacquer for my guitars. It can be obtained from LMI for $38.30 a gallon plus shipping. They also sell a vinyl sealer and I recommend getting that also. For my thinner I use the Sunnyside or any other quality brand.

Spray Finishing: To obtain a flat smooth finish it's almost a necessity to use spray equipment. I use an HVLP system and highly recommend them.

Applying the finish: Day one. My first coat of finish is a 10/90 mix. That's 10% lacquer and 90% thinner. This thin coat of finish is applied lightly so it can soak into the grain of the wood and set hard. I allow this to gas off and cure for 24 hours. Day two I spray on a series of three coats (50/50 mix) waiting approx. one hour between coats. Day three I'll do a light "scuff" sanding just to knock off and high spots, dips or runs. Wipe the guitar down with a tack rag and apply three more coats. Day four I'll sand back with 320 3M Gold paper and a Porter Cable Speed Bloc sander. I'll try and get the surface to 90% flat and level. Tack off and apply another 3 coats. Day five I sand back to 100% level and apply two coats of a 70/30 mix. This is known as a "flow coat". If I'm satisfied with all of the surfaces, I'll hang the guitar in a warm place to dry and cure. I always allow two full week for curing before I'll do the final wet sanding and buffing.

Conclusion: Applying a good finish isn't difficult, but it does take time and practice to prefect it, Always us a respirator approved for lacquer and eye protection. Be aware of the fire dangers associated with lacquer and above all, take you're time and don't rush.

Part Twelve: Wet Sanding and Buffing

After a finish as been applied to a guitars surface, it needs to cure and harden. Depending on the type of finish, humidity. temperature etc., this is anywhere from two weeks to a full month. The finish may look good but it still needs to be wet sanded and buffed to give it that professional look. It's a simple but labour intensive activity, but the final outcome is worth all the work. Lets get started.

Materials Needed: Wet/Dry sandpaper in 800, 1000,1200,1500 and 2000 grits. Most of these grits can be purchased at a paint store that carries automotive paint supplies. Your also going to need paper towels, a small bowl and some liquid dish soap,. polishing creams or buffing arbour and bar compounds.

Fill the bowl with warm water and add a few drops of the liquid dish soap. The soap acts as a lubricate and helps the sandpaper glide over the lacquered surface. Cut a section of the 800 paper, dip it into the water and start sanding with the grain. Work in a small area and sand until all of the shinny surface is gone and you have a dull patina. Rise the sandpaper any time it becomes clogged or other debris gets on it and wipe off the surface often with paper towels. You don't what to leave water sitting on the surface. Do the entire guitar then switch to the 1000 grit paper and repeat each grit until you're done. It's going to take a couple of hours and your arms and shoulders will be talking to you the next day.

By wet sanding you're polishing the surface, thus bring up the gloss. If you don't have a buffing arbour, you can polish out the surface with the cream polish's Stew-Mac sells (#1202 and 1203). I've used them in the past and recommend them. I like to use a buffing wheel and bar compounds (#3168 and # 3167) to polish out my guitars. It saves time and does a professional job, but does have some inherent problems. You can get the surface too hot and burn through it, or the wheel can grab the guitar and send it straight to the floor. Done that…

The first polishing is done with a medium compound and done at medium speed. Work from side to side and never leave the wheel on one area for more then a few seconds at a time. After a few minutes the guitar will start to show its gloss. Do the entire guitar until you have a uniform medium gloss. Let the guitar rest for a day. On day two use a fine compound and repeat the buffing procedure until you have a very high bright and uniformed deep gloss. Wipe the guitar down with a cotton cloth (old diapers work great) and remove any compound that is left behind. Let the guitar rest so the finish can cool. Once the finish is cool you can use a good quality guitar polish to finish things off. I recommend the Preservation Polish #3006 from Stew Mac.

Note: I understand you can polish a lacquered surface to a high gloss by only using the Micro-Mesh Cushioned Finishing Abrasive papers. The kit contains 1500, 1800, 2400, 3200, 3600, 4000, 6000, 8000 and 12000 grit papers. The Micro-Mesh will last you years and is well worth the price (#3706). I'm testing a similar product made by 3M and so far I'm finding it to be a good product. I'll give a full product review at a later time.

1. Wet sanding with a 2000 grit sanding pad.

2. The finish after the final wet sanding of 2000 grit. Not the completely dull patina and the slight gloss.

3. After buffing with a medium compound the guitar starts to show it's gloss.

4. This is my Shop Fox Buffing Arbour. I use 12" buffing wheels from Stew-Mac and the bar Menzerna bar compounds. It's been a great investment and a real time saver.

5. A picture of me doing the final gloss buffing on the guitar. Note the high gloss of the McFadden's lacquer.

Part Thirteen: Setup

1. For a proper fit of the resonator cone, make sure the tone ring surface is flat, smooth and level.

2. Drop in the cone and check the fit. You want a little side to side movement. Not a lot, maybe 1/16” or less. Make sure the cone sits completely flat on the tone ring. If it doesn’t, locate the trouble spots on the cone and straighten them out.

3. Make sure the bottom of the spider bridge is level and makes contact at all points on the cone. Level the spider on a flat surface using 150 grit sandpaper if necessary. Spider bridge being used here is one of Kent Schoonover‘s outstanding spiders.

4. Fit the bridge inserts into the slot and make sure they a snug and don’t move. Inserts used here are hard eastern maple with ebony caps.

5. P1010048: String up the guitar and bring it up to string tension . Slowly turn the bridge/cone screw clockwise until you begin to feel resistance. STOP! Slowly turn the screw until you get the tone you like. Never turn it more then 1 ½ turns, you could cause damage to the cone. NOTE: This is just my way of doing things and other builders my differ. Check the string height by placing a ruler on top of the frets and measure the height from the top of the fret to the bottom of the string. I prefer 3/8" from the 1st fret to the 12th fret. Adjust the nut and insert height as needed.

6. String up the guitar and bring it up to string tension . Slowly turn the bridge/cone screw clockwise until you begin to feel resistance. STOP! Slowly turn the screw until you get the tone you like. Never turn it more then 1 ½ turns, you could cause damage to the cone. NOTE: This is just my way of doing things and other builders my differ. Check the string height by placing a ruler on top of the frets and measure the height from the top of the fret to the bottom of the string. I prefer 3/8" from the 1st fret to the 12th fret. Adjust the nut and insert height as needed.

Conclusion: I know there's a lot more to doing a final set up on the reso guitar and I hope you understand the general concepts I was trying to express. I've attached a few photo's of the completed project guitar for you to look at. I've also been asked to make a list of the materials used in it's construction. They are as follows.

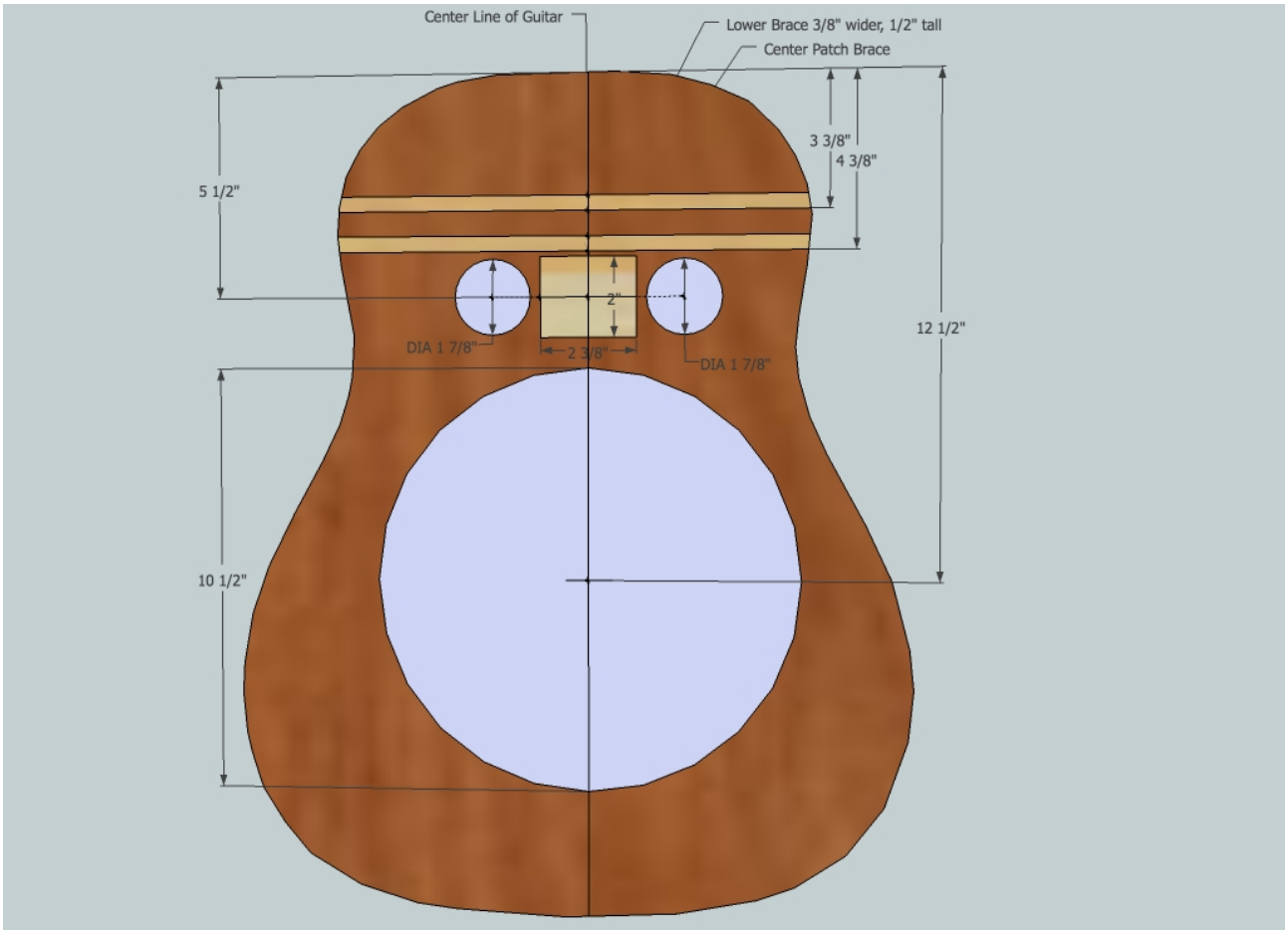
Sitka spruce top.. Myrtle back and sides. Zirocote fretboard. Gaboon ebony headstock overlay. Grover tuning gears. Quarterman cone. National spider bridge. Maple/Ebony wood inserts. Pearl dot inlays. Lacquer gloss finish (McFaddens brand). Coverplate, tailpiece and sound screens are all top of the line products. Interior construction: Spruce braces, polycarbonate baffle and Finnish birch plywood tone ring and birch sound post.

This now concludes my series on building a resonator guitar. I'd like to thank Matt for having the trust in me for doing this series. I'd like also like to thank all of you for having the same trust and patience's in me. I feel very honoured It's been a long journey and a wonderful one at that. Thank you all.

Gary Dusina

Appendix (added by Kenneth Jeffs)

Resonator Top Plate Bracing Schematic



Resonator Back Bracing Schematic