DELTA

RESOMASTER

Resonator Guitar Kit

Assembly Instructions

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Getting started

Welcome to guitar building! You are about to build a great resonator guitar, patterned in many respects after the metal-bodied National guitar introduced in 1934 which had 14 frets clear of the body.

We designed this kit with the small shop builder and a modest tool budget in mind. For power tools, we used a small laminate router and an electric hand drill. With the exception of a few specialty guitarmaking tools, such as several nut-slotting files, we used standard woodshop hand tools. These included a chisel, rasp, half-round bastard file, small razor saw, a sharp knife, C-clamps, cam clamps or small bar clamps, a couple of rulers, and a long straightedge.

Please read these instructions before building your guitar. It's important for you to "dry run" the fitting, gluing, clamping and finishing operations before trying them for real.

Be safe when using tools, glues, and chemicals. Wear eye protection and gloves when needed, and always use proper ventilation.

Kit parts list

1. Coverplate, and screws (12)
2. Cone
3. Truss rod cover, and screws (2)
4. Metal guitar body
5. Tailpiece
6. Rosewood overlay
7. Biscuit bridge
8. Rubber band
9. Neck block
10. Tailblock
11. Hot-Rod truss rod
12. Rosewood fingerboard
13. Mahogany neck
14. Fingerboard supports (2 parts)
15. Truss rod filler block
16. Instructions
17. Pearl dots (10)
18. Bone nut
19. Side dot material
20. Strap button and screw
21. Fretwire (3)

Installing the truss rod

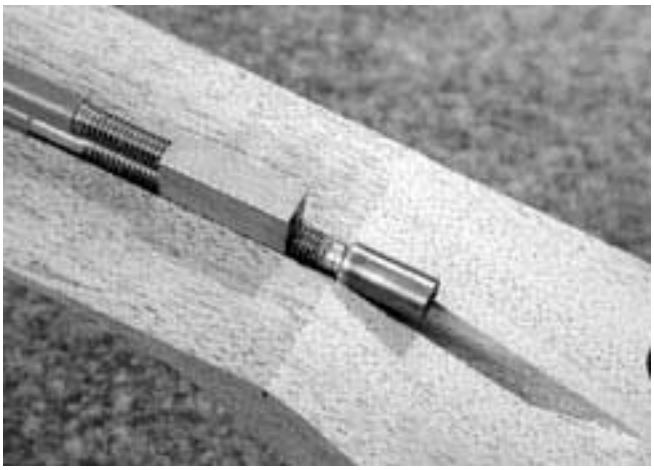
The truss rod is installed so that it adjusts at the peghead end of the neck. This makes it easy to adjust the truss rod under string tension.

Roll the rods simultaneously between your thumb and fingers to adjust them, until the thread in the upper half of the brass lug (the rod without the adjusting nut welded to it) is flush with the face of the lug, and not protruding excessively.

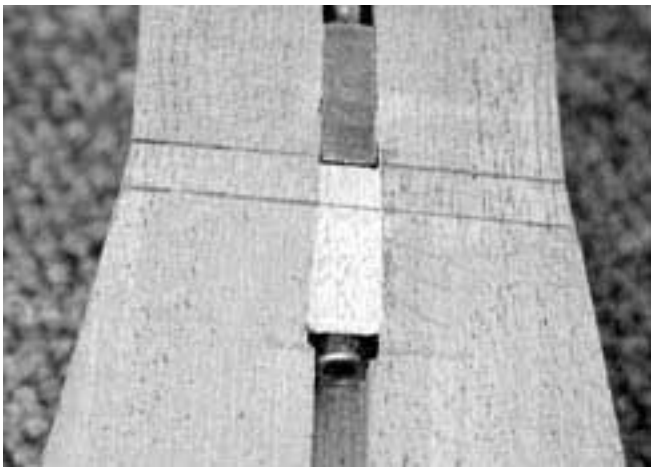
Align the back edge of the adjusting nut with the break line of the peghead angle **(1)**. This locates the front edge of the truss rod's brass lug just under the end of the fretboard. A flat area of approximately 7/32" will remain between the end of the fretboard and the break angle of the peghead — this is where the bone string nut will be installed.

The adjusting nut is slightly wider than the slot machined into the neck. Chisel a slight clearance in the slot walls until the adjusting nut fits to the bottom of the channel.

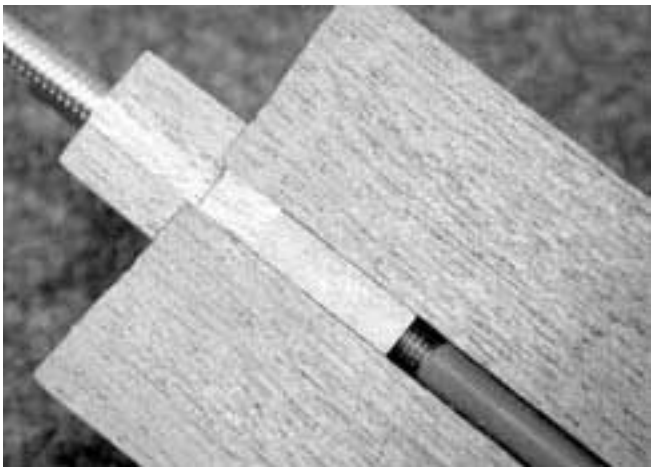
Install the rod, adjusting nut facing down. Glue in a piece of the supplied filler strip over the adjusting nut **(2)** and the exposed truss rod threads, between the brass lug and the rear of the adjusting nut. The filler strip will support the bone string nut which will be installed later. Of course, keep glue off the truss rod threads. When the glue is dry, chisel the filler strip flush with the surface of the neck. Glue a filler strip at the opposite end of the rod too, to fill the remaining empty channel, and trim it flush **(3)**.



1. Align the back edge of the adjusting nut with the break line of the peghead angle.



2. The filler strip will support the bone nut, which will be installed later.



3. Glue a filler strip at the opposite end of the rod too, to fill the remaining empty channel, and trim it flush.

Shaping the fingerboard

The fingerboard has 24 fret slots, more than are needed for a resonator guitar. Trim off the fingerboard at the 20th fret slot.

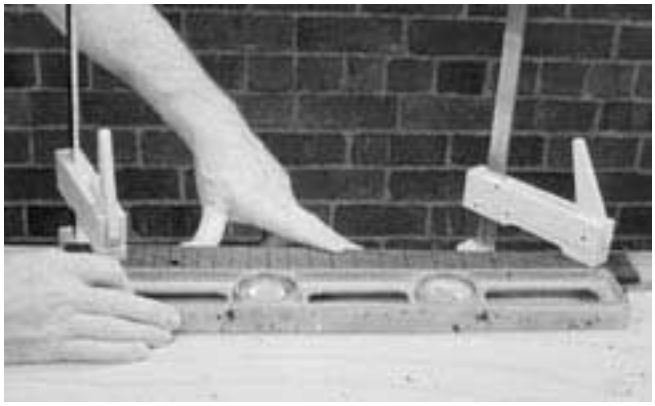
Draw a pencil line across the back of the fingerboard to mark the location of the 14th fret slot. The end of the neck's fingerboard gluing surface, at the top of the heel, will line up with this mark when the fingerboard is glued on. Align the heel with the mark, center the neck on the fingerboard, and draw the profile of the neck onto the fingerboard **(4)**. Extend the lines using a straightedge and white or yellow-lead pencil.

Trim the fingerboard profile close to the pencil lines using a band saw, coping saw, or a hand plane.

The edges of the fingerboard must be smoothed after they're trimmed. On your flat work surface, rest the fingerboard, backside down, on a spacer block approximately 1/4" thick and as long and wide as the fingerboard. Slide the fingerboard slightly off the edge of the spacer block so that one long edge overhangs.

With a long flat sanding block, sand the overhanging fretboard edge lengthwise to remove any trimming marks. We used a carpenter's level with 100-grit sandpaper double-stick taped to its thin edge. Clamped and sanded in this fashion, the fretboard will not only be straight end-to-end, but the edge will be sanded at 90° to the work surface. **(5)**. Reverse the procedure for the other edge of the fingerboard.

4. Draw the profile of the neck's taper onto the fingerboard using a white pencil.



5. Clamped and sanded in this fashion, the fretboard will not only be straight end-to-end, but the edge will be sanded at 90°.

Inlaying the fingerboard

Traditionally, single dot inlays are installed behind frets 5, 7, 9, 12, 15, 17, and 19. Frets 15 and 19 get two inlays each. These will cover the four mounting screws that hold the fingerboard to the top. You won't inlay frets 15 and 19 until later, after the guitar is finished.

Lightly draw a centerline down the fingerboard in pencil. Use an awl to mark for drilling along this centerline, measuring halfway between the appropriate frets.

Drill 1/4" holes for each inlay, using a brad-point drill bit. Go *slightly* deeper than the thickness of the dots. Be extremely careful to keep the drill bit from "hogging" into the wood and accidentally drilling completely through the fingerboard (practice on scrap)!

As mentioned, frets 15 and 19 are drilled for double inlays. They're spaced 1-3/8" apart (11/16" to each side of the centerline), and should be centered between the frets.

Within the four 1/4" holes, just barely start a secondary hole with a 7/32" twist drill (not a brad-point) **(6)**. These secondary holes bevel the bottom of the 1/4" holes to form the right shape for the fingerboard mounting screws. These holes are difficult to drill without overdoing it, so practice on scrap! This chamfering is very delicate; the slightest turn of the drill bit will produce the desired shape.

6. Create chamfers within the four 1/4" holes using a 7/32" twist drill.

Next, drill 1/8" holes through these chamfered holes at frets 15 and 19 for the four mounting screws to pass through the fingerboard during final assembly after finishing.

Put on your protective safety glasses! Then, one at a time, place a drop of medium-viscosity superglue in each drilled hole, and set the dot inlay in place. By using a piece of lightly waxed clear acrylic as a caul, you can apply pressure without sticking to the superglue, and still be able to see when the inlay is flush. Remember not to inlay at frets 15 and 19! You may need to tap gently on the caul with a hammer to seat the dot inlays. Don't overdo the superglue, and you won't have a messy fretboard to clean up. Flush the inlays to the fingerboard using a smooth mill file and a sanding block. Sand equally from end to end so you don't change the flat surface of the fretboard.

Installing side dots

A 1/16"-diameter plastic dowel is included with your kit for making side dot fret position markers along the bass edge of the fingerboard (for right-handed players, that is). Install them now at frets 5, 7, 9, 12, 15, 17, and 19. The 12th fret often gets two dots, spaced evenly between the 11th and 12th frets; however some makers use only one. Often, side dots are not used past the 12th fret — the choice is yours.

Clamp the fretboard on edge, mark the centers of each hole with an awl, and carefully drill the holes with a sharp 1/16" drill bit. Drill square to the fingerboard edge at all times. Nip short lengths from the plastic inlay dowel and superglue them into the drilled holes. They should extend slightly above the surface. When dry, file and sand the dots smooth.

> **TIP:** Clamp the fingerboard back on the spacer block used earlier for truing the edge of the fingerboard, and re-sand the edges lightly with the carpenter's level and 220-grit sandpaper.

Fretting the fingerboard

A scrap piece of slotted fretboard has been included with your kit, as well as enough fretwire to practice fretting on this piece. Measure out the frets you will actually use on your fretboard, and use the leftover fretwire to test your skills on scrap.

Drill 19 holes in a block of scrap wood to keep the frets in order as you cut them to length. Using flush-cutting fret nippers, cut the pre-radiused fretwire to length, allowing an overhang of 1/8" on each side of the fingerboard.

Clamp the fretboard flat to a solid surface. We fretted on a flat, 1-1/4" thick chunk of marble. A piece of plywood resting on a cement floor would work well, too. Set the fretwire on the slot; since it's curved, only the ends will enter the slot. With your finger, balance the wire to keep it from tipping and

7. Keep the wire from tipping and prying up a chunk of wood as you tap the two ends into the fret slot with a hammer.

8. Use a smooth mill file, held at an angle, to bevel the fret ends.

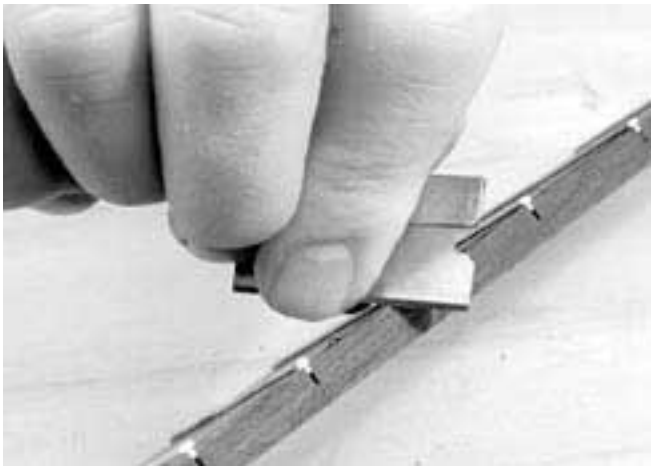
prying up a chunk of wood as you tap the two ends into the fret slot with a hammer **(7)**. Once the two fret ends are embedded in the fret slot, the fret is unlikely to tip as you hammer it home.

Hammer back and forth across the fretboard in short, sharp blows. Use the face of the hammer, not an edge, and try not to hit the fretboard on either side of a fret. The fret tang, with its diamond-shaped barbs, embeds itself into the fingerboard as the fret straightens end-to-end from the hammer blows.

To see that the frets are seated, use your fingernail to tug at their overhanging ends. Loose frets can be firmed up with superglue run into one end of the fret slot. Keep the fretboard tilted at an angle to keep the glue from getting onto the fretboard. Or, you can tape off the fretboard on each side of a slot and run a bead of Titebond into the slot before hammering in the fret. If you use Titebond, let the frets dry overnight before nipping and filing their ends.

When the frets are firm and the glue is dry, nip them almost flush with the fingerboard edge. Do not nip right up to the edge, or the nippers will pull into the fingerboard and possibly unseat a fret end.

Use a smooth mill file to flush the fret ends to the edge of the fingerboard. Then use the same file, held at an angle, to file the fret end bevels **(8)**. Choose a bevel that suits you — perhaps between 45° and 60°. Stop when the file hits the wood.

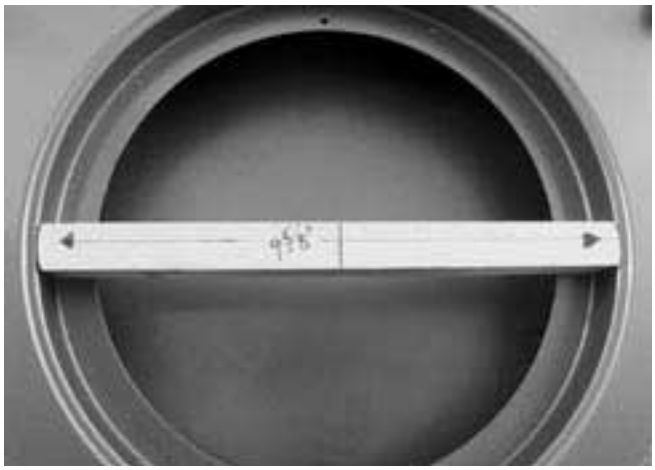


9. Blunt the top edges of the fingerboard on the bass and treble sides with a single-edge razor blade.

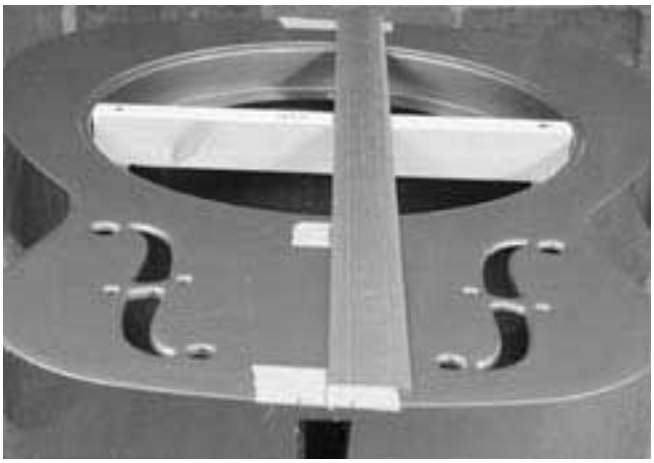
Blunt the top edges of the fingerboard on the bass and treble sides with a single-edge razor blade **(9)**. Later, when you glue on the fingerboard with a rubber band clamp, there will be no sharp edge to break the rubber band.

The fingerboard is now ready to be glued to the neck. However, you must first prepare the body to accept the neck, since you will be fitting the neck to the body before the fingerboard is glued on.

Preparing the body for the neck



10. From scrap wood make a "centering stick" 9-5/8" x 1-1/16".



11. With a straightedge, mark the centerline on masking tape.

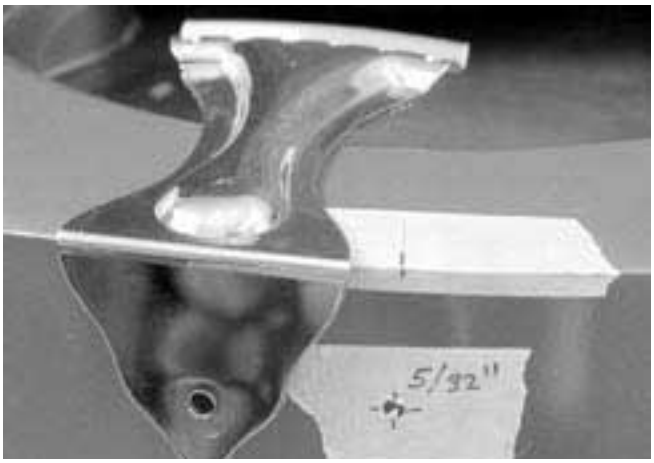
Before you can bolt the neck on to check its fit, you must prepare the metal body. First, find the centerline of the body. From scrap wood make a "centering stick" measuring 9-5/8" long and 1-1/16" tall. Round the ends so that the stick drops into the soundwell flush with the top, and centered in the well **(10)**. Once you mark its center, you will have an important reference point to find the top's centerline.

To mark the centerline at various points on the metal body, put masking tape on the guitar. This will provide a temporary surface to mark on. Place the masking tape at three points on the guitar top: 1) above the neck opening in the sides at the front shoulders; 2) between the large circles of the F-holes closest to the soundwell; 3) the "centering stick" in the soundwell. Lay a straightedge along these points **(11)**, and mark the centerline on the masking tape.

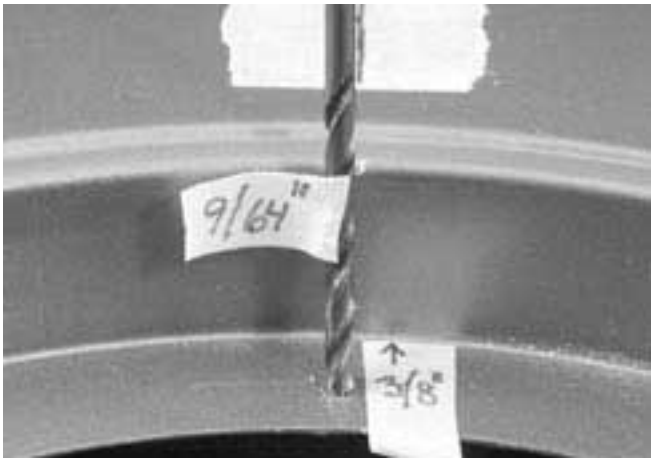
Put masking tape on the metal sides at the tail block end of the body and transfer the centerline onto the tape there **(12)**. Using the tailpiece as a template, mark its mounting hole on the tape — then centerpunch and drill a 5/32" hole through the metal.

Also on the centerline, mark, centerpunch, and drill two 9/64" holes in the soundwell lip for the screws which fasten the fretboard extension support stick. These holes should be 3/8" away from the soundwell side wall **(13)** to guarantee that the outer edge of the cone will not come into contact with them.

Bevel and radius the ends of the tail block so that it fits into the radiused corners of the body, and snugs up tight to the metal. Locate the tail block in the body (it will be snug), mark it through the 5/32" clearance hole, and drill a 1/16" hole into



12. Place a piece of masking tape on the sides at the tail block end of the body and transfer the centerline onto the metal sides there.



13. Drill screw holes for fastening the fretboard extension support stick 3/8" away from the soundwell side wall.

the tail block for the strap button mounting screw that holds the tailpiece. If the tail block is quite snug, leave it installed from now on. If it is on the loose side, which is OK, it might rattle around. In that case remove it until you mount the tailpiece.

The neck block also must be radiused at the front top and bottom edges so that it fits exactly into the rolled corners where the sides meet the top and back. It must have a 1/4" tall, 3/32" deep channel cut into the top front edge to allow it to rest over the folded solder joint of the top and sides.

The body tapers slightly, getting narrower at the neck end. To fit the neck block, stand it upright at the soundwell and push it into place.

Fitting the neck to the body

The neck joint is a bolt-on mortise-and-tenon joint. The tenon is the precision-cut extension on the end of the neck, and the mortise is the neck block recess which fits it. The neck's tenon needs to be trimmed to fit into the neck opening in the metal body. It's a simple task:

Along the sides of the tenon, mark down from the top edge approximately 5/16" and draw a pencil line square to the cheeks **(the "cheeks" are described below)**. Measure the lip of metal in the body's neck-mounting hole and give a little extra for clearance). Also make a pencil line about 3/8" up from the bottom (again, match the hole plus a bit extra for clearance).

Saw in from the back of the tenon on each penciled line **(14)**. Avoid touching the cheeks with the saw — stop short, and clean up later with a sharp chisel. Then saw squarely down from the top, and up from the bottom, to each sawed line and the piece will break out. The tenon is now shaped **(15)** and will fit through the rectangular hole in the body.

14. Saw in from the back of the tenon on each penciled line.

15. The tenon will now fit through the rectangular hole in the body.

Check the fit

Before gluing the fingerboard onto the neck, it's best to check the fit of the neck to the body, for two reasons: 1) It's easier to fit the heel without the fretboard getting in the way; 2) The fretboard can be placed most accurately, with regard to correct intonation, *after* any slight adjustments of the heel have been made.

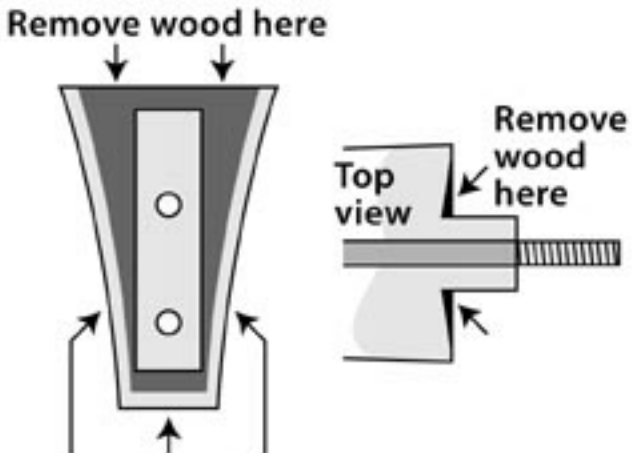
The neck is machined with the correct "set," or angle to the body, but as with any guitar — wood or metal — some hand fitting may be required. Also, when you shape the heel of the neck, we suggest that you leave it "chunky" — almost as it comes out of the box. Just round off the hard edges. This provides plenty of wood for the neck bolts to hold into, and adds strength to the neck/body joint. (It's also the vintage look.)

The neck heel sets the neck angle

The neck angle is controlled by the shape of the neck heel as it contacts the sides of the body. It is not determined by the fit of the mortise-and-tenon joint. Removing wood from the top or bottom of the neck heel tips the neck forward or back. Removing wood from either the bass or treble side changes the neck's angle in relation to the center of the bridge.

Shaping the neck "cheeks"

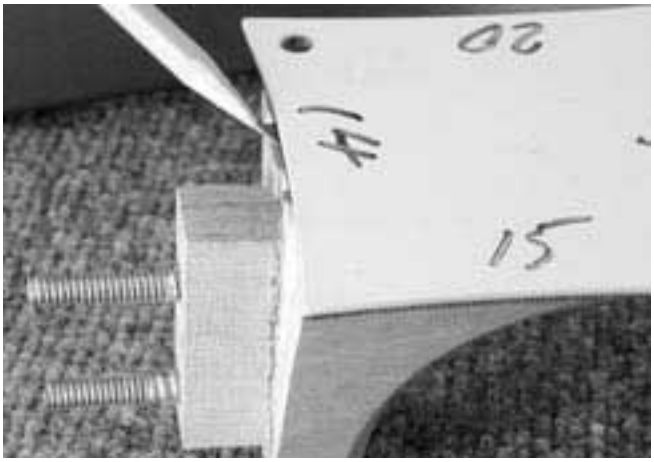
16. Use a sharp chisel to remove wood from the inner area of the neck heel cheeks.



17. Leave the outer edges of the cheeks intact.

The two roughly triangular surfaces on either side of the tenon are called the "cheeks" of the neck heel. The top edge of the cheeks is the pivot point between the neck and body. This controls the neck angle as viewed from the side. These cheeks are machined flat, but the guitar sides they contact are not flat: the guitar has a 14" radius at the neck block. Most of the handwork in fitting a neck is cutting away the inner part of these cheeks to fit this curvature **(16)**. Only the outer edges of the heel make contact with the body, and these edges set the neck angle **(17)**. A precise and convenient way to mark the curved shape to be carved away is with a radius gauge **(18)**, but you can also do this by eye.

The contact area of the heel is an area about 1/8" to 3/16" wide around the outer edges of the bass side, treble side, and bottom of the cheeks. Mark this area on the heel with a pencil. Using a sharp chisel, remove wood from the remaining inner area up to the tenon. After undercutting the cheeks this way, you should have a neck fit that is very close. Still, you may need to remove a little wood from the outer contact edges to adjust the neck alignment. Removing wood from the upper part of the neck cheek edges will raise the neck,



18. Mark the 14" radius in pencil — this is the wood to be trimmed away. A radius gauge is handy for this.

removing wood from the bottom will lower it. Taking wood from either side will move the neck in that direction.

It's important to note that removing wood from the upper part of the neck cheek edges will not only raise the neck, but move the neck toward the bridge slightly. If the 12th fret moves toward the bridge the intonation will be sharp: this is the reason for checking the neck's fit before installing the fingerboard.

TIP: Chisel carefully near the two neck bolts — don't push your best chisel toward the bolts! Remove the last bit of wood around the bolts using a throw-away item such as a razor knife blade (or sharpen an old screwdriver to use as a temporary chisel).

Neck angle check

Up until now you have only removed wood from the cheeks up to the 1/8" remaining "factory edge." Therefore the neck fit will be quite close, or even perfect, during this check. Place the neck into the body with the two mounting bolts through the neck block holes and press the heel against the body. Hold the neck in place as you install the two hex nuts; tighten them just snug enough to hold the neck. You may need to move the neck a little.

Don't use a socket wrench with a right angle drive to tighten the nuts onto the neck bolts — you could get too much torque and possibly crack the heel, or pull a bolt out of the heel!

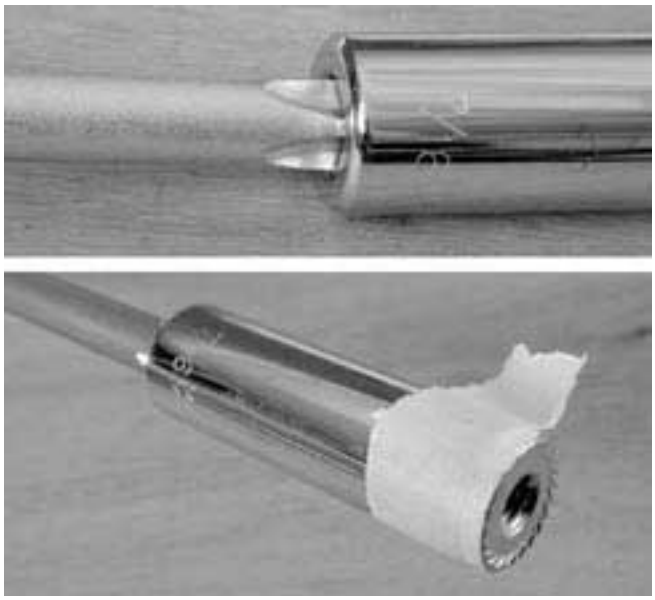
Instead, make your own nut driver as we did. We made a long-handled nut driver from a deep-well, square-drive 7/16" socket, and a #3 Phillips screwdriver which fit the 1/4" drive perfectly **(19)**. Use a small piece of tape to hold the hex nut into the socket as you reach into the body to start the nut onto the bolt. Don't over-tighten the nuts — the pressure you can apply with your thumb and fingers should be plenty.

The top surface of the neck (and later, the bottom surface of the fretboard) will be even with the guitar top when the neck is bolted on. However don't look for a flush edge between the neck and the top because the shaped edge of the metal rolls off there. Check for flushness about 1/4" back from the edge instead.

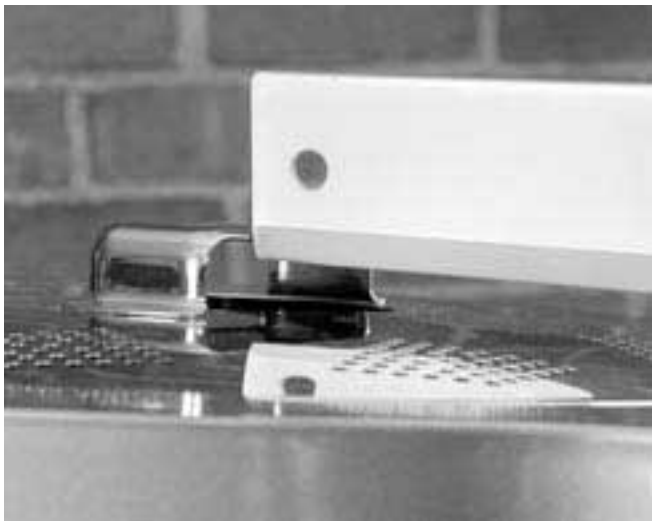
Also, ignore the "dip" in the top in the shoulder area. This will flatten when it is pulled up to support the fingerboard extension, which is installed later.

Rest the body, with the neck bolted to it, face up on your benchtop. The peghead should not contact the table top (so as not to influence the angle of the neck). Place the coverplate into the slightly indented lip around the soundwell hole and tape it down temporarily.

Use two strong, padded spring clamps to hold the fretted fingerboard in place on the neck. Place two spacers on the



19. A #3 Phillips screwdriver fits the 1/4" square-drive. Use tape to hold the hex nut into the socket.



20. A long straightedge is laid on two drill bits which approximate string height: a 5/64" bit at the nut, and an 11/64" bit at the 12th fret. The straightedge should indicate a point just above center in the coverplate's hand rest opening.

fingerboard to hold a long accurate straightedge up off the fingerboard, simulating string height. For these two spacers we used drill bits: a 5/64" bit at the nut, and an 11/64" bit at the 12th fret. This gave a very close approximation to the final action.

When laid on these string height spacers, the bottom edge of the straightedge should point to a spot just above center in the coverplate's hand rest opening **(20)**. If it doesn't, a small amount of wood must be removed from either the top or bottom of the cheeks to adjust the neck angle. Wood removed at the bottom of the heel tips the neck down and raises the straightedge; wood removed at the top tips the neck up and lowers the straightedge.

Neck adjustment: side-to-side

The first area that may need to have a small amount of wood removed is the treble or bass cheek. Wood removed here controls the side-to-side alignment of the neck to the centerline. If the neck is misaligned side-to-side, one of the outside strings will be too close to the edge of the fretboard. The removal of a tiny amount of wood is all it takes to make an adjustment here. Remove this bit of wood uniformly across the contact area on one cheek to tip the neck in the proper direction (this won't change the neck angle when viewed from the side of the body). Use a straightedge laid against both the treble and bass sides of the fretboard **(21)** to check the alignment: it should extend the same distance from center on either side at the centering stick in the soundwell.

You may not need to make an adjustment at this stage. If the neck is off-center by only 1/32" or less, don't try to correct it. Remember that a tiny bit of wood removal makes a big difference in the neck's relationship to the centerline!

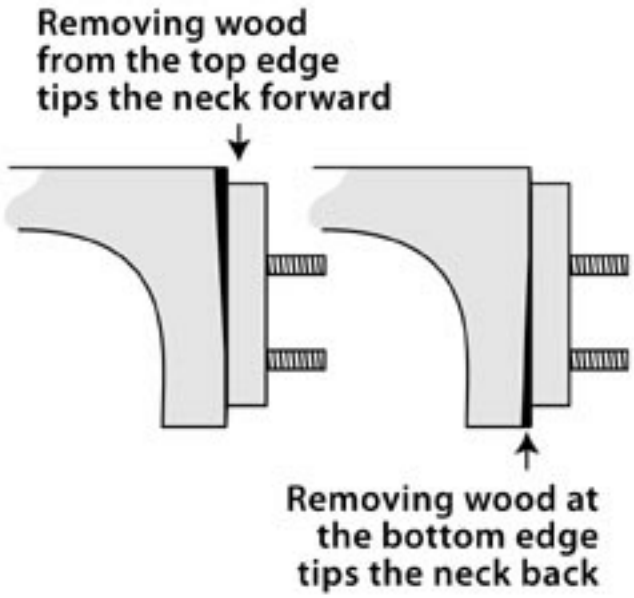
21. Use a straightedge laid against both the treble and bass sides of the fretboard to check neck alignment to the body centerline.

Neck adjustment: tilting the neck back

Removing wood from the bottom of the heel on both the treble and bass sides equally will tip the neck back **(22)**. This is the most common adjustment. Remove the wood in a wedge shape which tapers to zero at the top edge of the cheeks.

Use the formula in "Understanding neck angle geometry" to determine how much wood to remove. With a sharp pencil and a straightedge, mark the area to be chiseled away in a straight line from the bottom of the heel to the zero point at the top. Continue this line across the heel cap and up the opposite side. These lines may be tricky to draw, because they must taper away to nothing — to the zero point at the top of the heel.

With a sharp chisel, remove about half of the measured amount of wood. Don't overdo it: bolt the neck into the body and check the fit. The fit will change rapidly, so check your progress frequently.



22. Remove wood from the top or bottom to tip the neck forward or back.

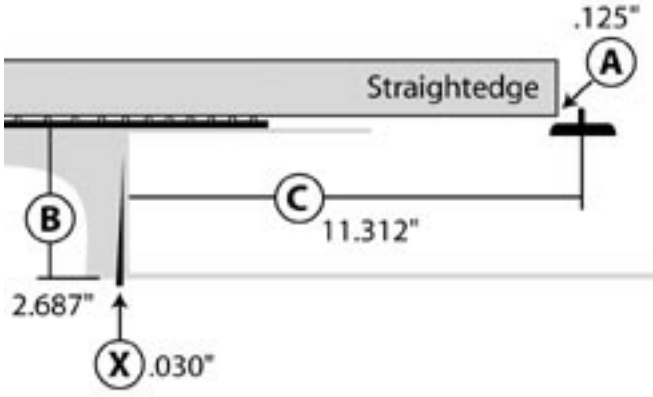
Neck adjustment: tilting the neck up

It's unlikely that wood will need to be removed from the top of the heel, but depending upon the weld of the top and side at the neck block, it's possible for a neck to be "overset" too far away from the body. In this case, the bottom edge of the straightedge would end up far above center in the opening of the coverplate's hand rest. Removing wood from the top of the heel on both the treble and bass sides equally will bring the neck up so the straightedge comes down to "just above center" in the hand rest, which is where it should be.

Use the formula in "Understanding neck angle geometry" to determine how much wood to remove. With a sharp pencil and a straightedge, mark the area to be chiseled away in a straight line from the top of the heel to the zero point at the bottom. Repeat this line on the opposite side.

Understanding neck angle geometry

Here's the way to determine how much wood must be removed from the bottom of the heel for the correct neck angle at the bridge. Always remove wood gradually and check your progress frequently. A little adjustment goes a long way! Our example measurements below are based on the scale length of this guitar: 25 inches.



The measurement we want is **X** — the amount of wood to remove from the heel to change the neck angle so that a straightedge laid on the frets will be flush with the top of the bridge. Must install the cone and biscuit bridge here first.

A = How far the straightedge falls below the top of the bridge. In this example: 1/8" (.125").

B = The height from the bottom of the fretboard to the bottom of the heel. In this example: 2-11/16" (2.687").

C = The distance from the neck/body joint to the saddle. In this example, that's at the 14th fret, and **C** = 11-5/16" (11.312").

X = **A** x **B** (÷) **C**

In this case, those numbers are .125" x 2.687" ÷ 11.312" = .030". So in our example, **X** = .030" which is almost 1/32". This is the amount to remove at the bottom of the heel.

Intonation check

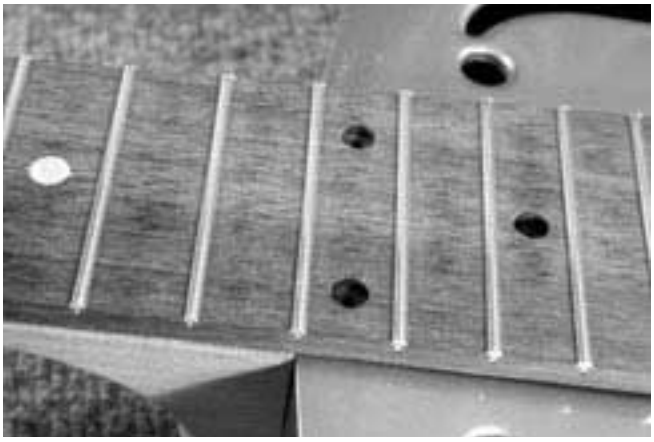
When you build a standard acoustic guitar the bridge is glued on last, so you can move it to position the saddle for good intonation. Resonator guitars are different because the saddle position is determined by the fixed location of the cone resting in the soundwell. The cone — and saddle with it — can be moved forward or backward about 1/16" within the soundwell, but that's it. You can guarantee good intonation, however, by careful placement of the fingerboard.

When the neck angle passes inspection, leave the neck bolted into the body to check the lengthwise placement of the fingerboard — specifically the location of the 12th (octave) fret in relation to the saddle. This relationship makes for good or bad intonation.

Since you haven't glued the fingerboard on yet, you can slide it forward or backward a little, to control the distance between the 12th fret and the saddle. (You also have a little adjustment at the saddle, since the cone will slide forward or back about 1/16".)

If you slide the fingerboard, the flat area where the string nut is located will become wider or narrower, and you'll need to fit the nut accordingly. Also, the fingerboard edges may no longer be perfectly flush with the sides of the neck. (Simply shape the edges of the fingerboard and neck to match, using a file and sandpaper.)

If minimal wood was removed at the cheeks, locate the fingerboard so that the 12th fret lines up with the point where the neck cheeks join the body **(24)**. At the peghead end there should be approximately 3/16" of flat area left between the end of the fingerboard and the break angle of the peghead. This is where the bone nut will rest. It may be as large as 1/4" or as small as 1/8", if the fingerboard is moved forward or backward for intonation adjustment.



24. Locate the fingerboard so that the 14th fret lines up with the outer top edges of the cheeks where they join the body.

To get accurate intonation, the distance from the 12th fret to the saddle should be approximately 1/8" longer than the distance from the 12th fret to the nut. Since your guitar's scale length is 25", the distance from the 12th fret to the nut is 12-1/2". Add 1/8" to get the desired distance from the 12th fret to the saddle: 12-5/8".

This extra 1/8" compensation makes up for the slightly longer string length caused by the strings as they rise up to the saddle, and for the fact that strings tend to go sharp when they are pressed down to the fret. If you located the saddle at the uncompensated distance from the 12th fret, the intonation would be sharp.

Center the cone in the soundwell. Locate the 12th fret by loosening the spring clamps, and slide the fingerboard forward or backward until the 12th fret measures the compensated 12-5/8" distance from the center of the saddle. This will probably produce perfect intonation when the string height is set. It is possible that you will need to move the saddle backward, and you can do that by sliding the cone backward. When the 12th fret is where you want it, and with the spring clamps holding the fingerboard on, place a piece of masking tape on the neck surface at the nut end of the fingerboard — use this tape as an index for fingerboard placement when you glue it on.

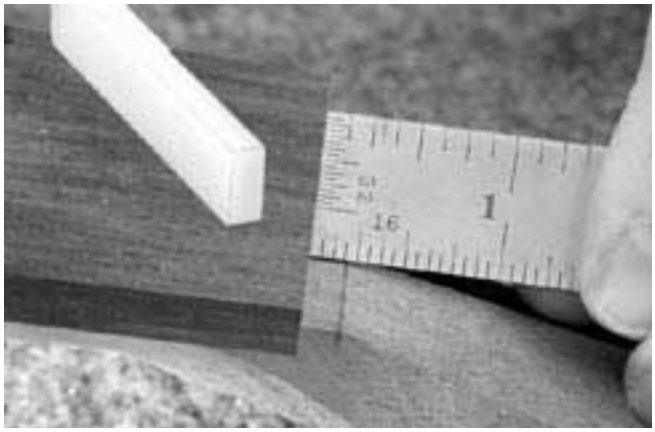
When all the neck fitting and fingerboard-locating tasks are complete, unbolt the neck from the body and glue on the fingerboard.

Installing the fingerboard

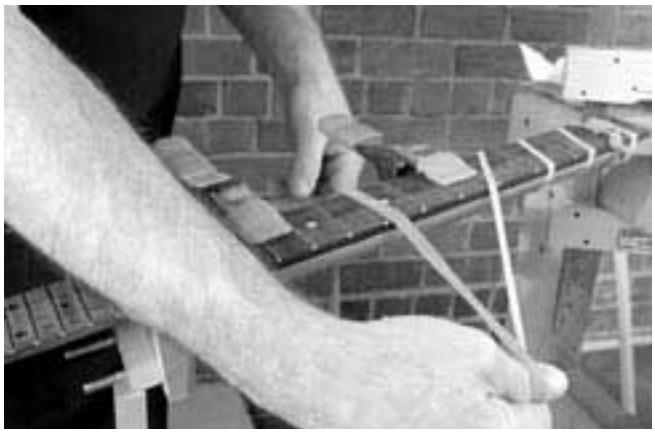
Clamp the peghead to your workbench with the neck hanging out over the floor. Butt the nut end of the fingerboard up to the indexing tape that you placed on the neck's gluing surface earlier.

There should be a flat area approximately 3/16" to 7/32" wide left between the end of the fingerboard and the break angle of the peghead. This is where the bone nut will rest **(25)**.

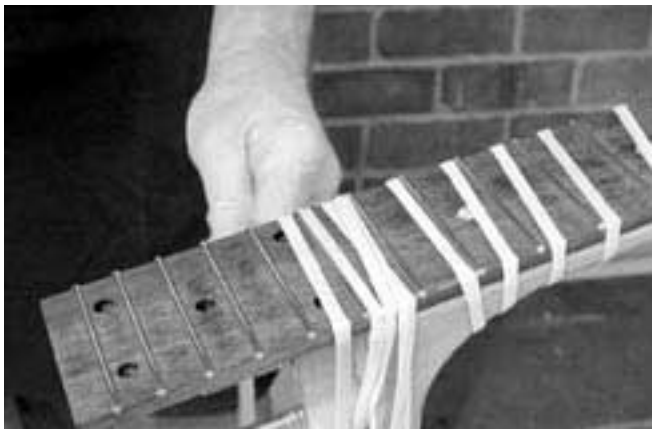
Install the fingerboard with Titebond glue. To get just the right glue coverage, spread it with a flux brush. Inexpensive acid-flux brushes are available at hardware stores, and they make great glue spreaders. Spread glue up to the edge of the truss rod channel, and then draw it away from the edge with the flux brush to keep glue squeeze-out from getting into the channel.



25. The bone nut will rest on the flat area approximately 3/16" to 7/32" wide, left between the end of the fingerboard and the break angle of the peghead.



26. Hold the fingerboard in place with a spring clamp as you start to wrap with the rubber bands.



27. Get plenty of wraps on the heel.

Place the fingerboard onto the evenly-glued neck surface and center the 14th fret slot directly over the edge of the neck heel. Hold the fingerboard in place temporarily with a spring clamp **(26)** as you start to wrap with the rubber bands supplied with your kit. Tie the rubber band at the peghead and wrap from end-to-end and back again. Get plenty of wraps on the heel **(27)**. You may find that one rubber band is all that's needed for the job. You can shift the fingerboard slightly from side-to-side as you wrap, but usually the board will center itself nicely.

TIP: Prop the heel of the neck with anything handy **(28)** to force a slight upbow into the neck (here we have .012" of upbow). The upbow matches the .012" of backbow which the fret compression created in the fingerboard, and the two bows cancel each other out, producing a perfectly straight neck when dry. Later, the string tension will pull the neck into some amount of upbow and the truss rod can be engaged to straighten the neck. It's good to have some tension on the truss rod like this in order to be able to loosen the rod slightly to introduce "relief," (controlled upbow in the fretboard). Relief is needed for players with a heavy attack that causes buzzing. The relief offers clearance for the elliptical motion of plucked strings as they vibrate. Not all players want or need relief, though.

28. Prop the heel of the neck to force a slight upbow into the neck.

Installing the peghead overlay

When the fingerboard's dry, remove the rubber band clamp.

The bone nut blank should be smooth-walled, square-bottomed, and of uniform thickness. If it needs smoothing or thicknessing, sand it with 100- and 220-grit sandpaper, double-stick taped to a flat surface.

Place the nut blank on the flat ledge between the end of the fingerboard and the break angle of the peghead. File or sand a 14° angle on one end of the peghead overlay so that it butts flush to the back edge of the nut **(29)**. When the overlay is glued on, the space between the overlay and the fingerboard will be a perfectly-sized channel for the nut.

Dry-clamp the overlay in place. With a pencil, mark a point 1-9/16" from the back edge of the nut, centered on the

29. File or sand a 14° angle on one end of the overlay so that it fits flush to the nut.

peghead's width. Drill a 1/4" hole at that point. This is the access hole for the truss rod.

Remove the clamps from the overlay. Hold the overlay in one hand and elongate the hole by slowly tilting the overlay against a running drill bit **(30)**. You may want to practice this on a piece of scrap (there's plenty of excess overlay that gets trimmed away, so practice on that). You'll end up with an elongated access hole for the 1/8" Allen wrench that adjusts the peghead.

Mark the peghead shape on the overlay. Trim away most of the excess, to within 1/8" all around the peghead. Use cauls on the face and rear of the peghead (notice the V-shaped caul on the rear, to clear the diamond shape on the neck), and glue on the overlay. Keep the overlay pressed tightly against the nut during alignment.

Carve and file away the overhanging peghead overlay, and then sand the peghead face and sides smooth with 150-grit Fre-Cut® sandpaper.

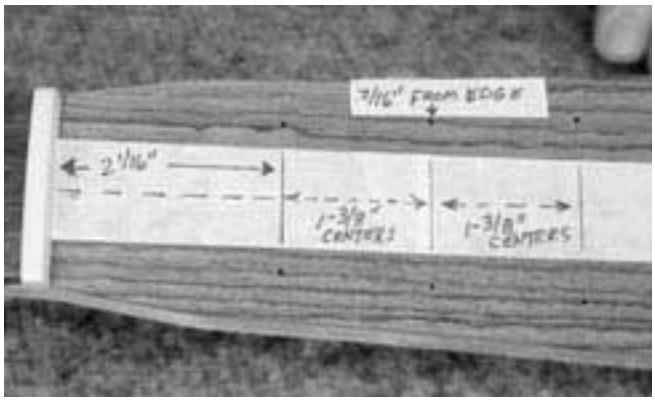
30. Hold the overlay in one hand and elongate the hole by slowly tilting the overlay against the running drill bit.

Drilling the tuning machine holes

Next, layout the tuning machine holes as shown **(31).** Locate the two E-tuners 2-1/16" from the rear edge of the nut. The other holes are located 1-3/8" apart, on centers, from the first line. All the tuning machine holes are spaced 7/16" in from the peghead edge. For the '3-on-plate' tuners that we used, a 7/32" bit was the right size for the bushing. When drilling, use a backer board on the rear of the peghead to avoid splintering the wood, and keep the drill bit square. A drill press is handy for this job, if you have one.

Press the bushings into the holes in the peghead overlay, using a clamp to apply firm, even pressure **(32)**. Use a protective caul on the rear of the peghead to avoid clamp marks. The bushings will center the tuning machine posts in their respective holes while you lay out and drill the tuning machine mounting screws.

The mounting screw holes in the tuning machine plate are 3/32" in diameter. Use them as a drill guide. Use a 3/32" diameter drill bit to create shallow chamfered centers (the drill bit will self-align in the plate's holes). Run the drill in reverse to create the chamfer, and don't drill into the peghead. Remove the tuners and use a 1/16" bit, centered on the chamfered holes, to drill the actual mounting screw holes. A piece of masking tape on the drill bit will provide a depth guide so you won't drill through the peghead.



31. Laying out the tuning machine holes.

32. Press the bushings into the holes in the peghead overlay using a clamp to apply firm, even pressure.

Shaping the neck

The neck has been machined to the basic shape, but left oversize for custom shaping. Any sharp edges left by the machining process will be removed as you shape the neck to suit your tastes. Eliminate the "diamond" on the rear of the peghead, if you wish to do so, with a chisel, a half-round bastard file, and sandpaper.

A great way to bring the neck to shape quickly and accurately is to "strap sand" it — like shining shoes — using a length of 2"-wide 80- to 100-grit sandpaper with a strong backing. Use emery cloth, Mylar-backed sandpaper, or even regular sandpaper with a reinforcing backing double-stick taped to it. This sanding technique follows the machined shape of the neck, and if you work smoothly from end-to-end, you can round the neck perfectly. Don't stop in any one place, and check your progress often.

Use the half-round bastard file to shape the heel, then cut your "strap sander" to a narrower width, and "shoe shine" the heel to shape as well. When the neck has taken a round shape, switch to hand sanding, using a flexible rubber sanding pad and finer grit sandpapers, and remove the harsher 80-grit marks. Be sure when you shape or sand on the heel that you don't alter the 1/8" areas that control the neck angle!

Use the same half-round bastard file and sandpaper to shape the rear of the peghead and to smooth the area near the nut where the neck contour meets the peghead. Lay out a peghead shape that pleases you, then cut, file, and sand it to shape.

Mounting the coverplate

Remove the tailpiece, and set the coverplate into the indentation around the soundwell with the hand rest perpendicular to the centerline. The double set of perforated diamond-shaped holes should face toward the tailpiece end of the guitar. Place several pieces of masking tape around the edge of the coverplate to hold it in place while you drill the screw holes in the soundwell.

When drilling metal, it's hard to keep the drill bit on center without walking. Don't try to drill all the holes at once. If you get off-center to the screw clearance holes, mounting the coverplate will be tough. Start with one hole, and make it exactly concentric with the hole in the coverplate. Install that one screw, then count four holes to either side and drill a second hole. Install that screw, then count four holes from that, and install the third screw. You'll end up with three screws mounted and spaced equally around the coverplate. Now the coverplate will hold fast while you work on the remaining holes.

Mark each one by pressing an awl or other sharp tool into the metal exactly on center. You can give the awl a slight tap to create a slight centerpunch mark, but don't hit hard enough to dent the metal.

Next, drill a 1/16" hole directly on the mark made with the awl. First, run the drill in reverse to help center the drill bit, and then go forward at a slow drill speed. Place a piece of protective material around the hole to be drilled, because when the bit punches through the thin metal, the chuck may bang into the coverplate if you are not prepared.

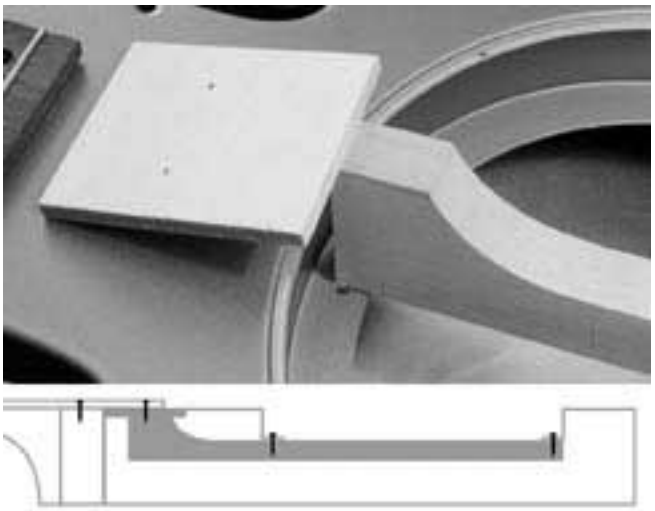
The indented lip that the coverplate rests in may slant downward slightly. If so, tilt the drill bit slightly as shown in the photo, **(33)** to remain square to the lip and to ensure that you drill into solid metal. There's not much metal to drill into, so it's important to be accurate.

When you install the screws for the first time, they'll cut their own threads into the soundwell. Use the proper size screwdriver, and install them squarely and firmly. When all the screws have been tapped, remove the coverplate.

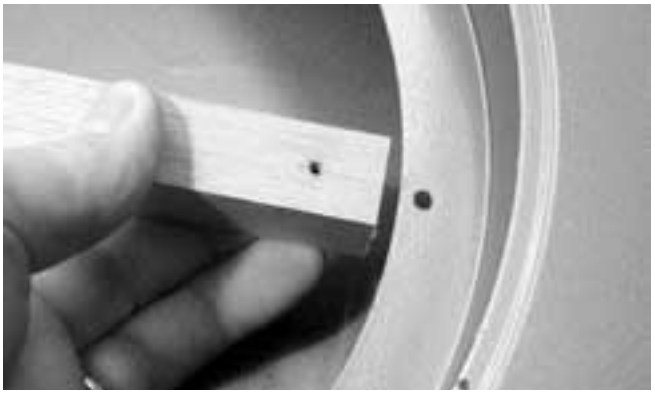
33. Tilt the drill bit slightly to remain square to the lip and to ensure that you drill into solid metal.

Mounting the fingerboard support

We chose the modern bolt-on method of fastening the neck to the body because it works well, is relatively easy to fit, and sounds great. Another equally important reason is that it offers easy neck angle adjustment over the years. (Vintage resonator guitars, with their fixed banjo style neck stick construction, are notorious for developing high action over the years. Resetting these old necks to a proper action is not a "user friendly" situation!



34. The support is turned with the leg of the L facing upward to support the rectangular piece of plywood under the fingerboard extension.



35. Remove the support and drill two mounting holes.

The L-shaped fingerboard extension support supplies support for the top in the upper front shoulders. This L-shaped support must be turned flat on its side to slide through the soundwell. Then the support is turned so the leg of the L faces up, to support the rectangular piece of plywood it will be fastened to with four wood screws **(34)**.

Install the L-support so that the tail block end of the support is flush with the back edge of the soundwell — giving the soundwell lip full support. Center the support to the centerline of the body and hold it in place while you mark the two holes for the support mounting screws. Remove the support and drill those two holes **(35)**.

Replace the support and install the mounting screws. Don't tighten the screws completely. Instead, draw the support upwards within 1/8" of the well, then slide the plywood block in between the L and the underside of the top beneath the fingerboard extension. Use a mirror to center the plywood block, and then slowly tighten the two screws. The L-support will push the spacer block snug against the top, and lift the metal in that area. The L-support is supplied slightly oversize, so you may need to remove it and use a file to remove wood where the support contacts the soundwell, at both contact points, to allow the support to pull upward.

Expect to remove the L-support several times — filing notches to clear the soundwell accordingly — until the fingerboard extension has solid support and doesn't show too much dropoff when you sight down the neck. Some amount of dropoff is expected. You will not have a dead-flat fretboard where it meets the body because of the relationship of the neck to the cone. Also, the fingerboard extension should not run uphill — that would cause fret/string buzzing in the upper register.

Install the tailpiece

Fasten the tailpiece to the tailpiece block using the strap button and mounting screw provided.

Mount the biscuit to the cone

Use the supplied small screw and washer to fasten the biscuit to the cone. First, be sure to thread the hole in the biscuit with the screw before actually connecting the cone to the biscuit.

Mark a concentric ring around the screw hole in the underside of the cone; this will help you be certain that the screw and washer are centered on the hole as you tighten the cone to the biscuit. Gently tighten the biscuit until snug. (You should still be able to turn the biscuit on the cone at this point.)

Rough-shape the nut height

Round the backside (peghead side) of the nut with a file, and shape it to a "rough-in" height that's tall enough to accommodate filing and fitting later. Set the nut in the slot with a little extra length over-hanging each side, and the top of the blank measuring a little over 1/8" from the fingerboard.

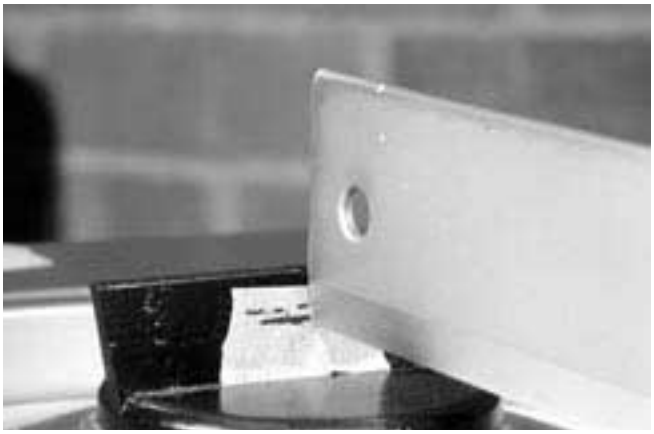
Find the cone's "sweet spot"

Place the cone in the soundwell and tap on the outer bottom edges where the cone seats. Rotate the cone in the well and tap until you find the sweet spot, or area where the cone rocks the least and seems to seat firmly all around. Then put a little downward pressure on the cone by pressing on the biscuit and double checking the fit. You'll always have a little rocking — the slight pressure will tell you if the cone is seating well. With a dark marker, mark the cone with an arrow pointing at the peghead, so you can locate the cone in this sweet spot in the future. Rotate the biscuit until the saddle is perpendicular to the arrow on the cone, and then remove the cone and tighten the biscuit snugly. Only tighten the biscuit until it stops moving on the cone. Too much tightening can dimple the cone.

Rough-in the saddle height

Repeat the process you did earlier during the initial neck alignment. This time the fingerboard is glued on, not just spring-clamped in place. Measure to the cone and saddle — not to the handrest clearance of the coverplate. This will be a more accurate measurement toward final setup.

Rest a long, accurate straightedge on the two drill bit "action simulators" you used earlier (a 5/64" bit at the nut, and an 11/64" bit at the 12th fret), and project the end of the straightedge to the face of the saddle. If the loose fretboard extension over the body gets in the way of the straightedge, tape it to the top. The bottom of our straightedge was 3/8" off the face of the biscuit **(36)**. On masking tape we made a mark at 3/8", then a second mark 1/16" above it. The second mark will be the approximate final height of the saddle, and the 3/8" mark will be the approximate bottom of the V-shaped string slots you'll cut into the saddle. Remove the biscuit from the cone, and saw off the saddle material above the top line.



36. On our guitar, the bottom of our straightedge was 3/8" off the face of the biscuit.

Double-check the neck alignment

At this stage, install the two outside strings to check two things: that the neck is well aligned to the tailpiece; and to determine the approximate string height at the nut and saddle.

Install the two outside strings in the tailpiece (use medium-gauge bronze strings), run them across the saddle and to their respective tuning machines. Tighten them enough so that they aren't slack, but not to pitch, and will hold their position when spread apart at the nut and saddle.

Center the two strings 2-3/16" apart on the saddle, and cut slight starter notches for them.

Space the two outside strings approximately 1-17/64" apart at the nut, put pencil marks on each side of the strings, and cut starter nut slots. The two outside strings will now hold in place at both the nut and saddle when the strings are brought to a higher tension.

Align the neck to the cone

The cone has a little more than 1/16" of movement for adjustment within the well, both side-to-side and front-to-back. The front-to-back adjustment is important for intonation, and the side-to-side allows for slight alignment of the saddle to the neck and tailpiece.

The cone should be centered in the soundwell when the two outside strings are spaced correctly at the nut and on the saddle. As for side-to-side cone location, if the cone sits slightly more toward one side than another — 1/32" or less — that isn't a great problem.

When the two outside strings are lightly tensioned, if the saddle is slightly off center with the neck and tailpiece — pulling too far toward the bass or treble side — you have several options for minor alignment of 1/32" or less:

• Loosen the neck mounting bolts and force the neck in the proper direction to bring the strings in line when the cone is centered.

• Further enlarge the two holes in the neck block to move the neck more than the holes would normally allow. The neck block holes are factory-drilled 1/32" oversize to allow for slight adjustment.

• Move the tailpiece slightly to either side, if that will bring the cone, strings, and tailpiece into alignment.

To move the tailpiece, first pencil a locating mark on the top or side of the guitar outlining the shape of the tailpiece. Remove the screw and endpin from the tailpiece (the slight string pressure will keep it snug, but you will need to hold the tailpiece against the body), and slide the tailpiece to one side or another. It's doubtful that you would ever need to move the tailpiece more than 1/16". Plug the tailpiece screw hole with a small dowel and glue, and then drill a new hole.

None of these minor adjustments should be necessary if all the neck-fitting procedures described earlier are performed accurately.

A quick action check

With starter notches cut at both the nut and saddle, you can now lower the strings at each end, until you reach the correct action height.

First eliminate the string height at the nut as a factor, so you can deal only with the saddle height. Do this by installing a capo at the first fret and tightening it just enough to pull the strings down to a virtually correct string clearance at the first fret. Look for a clearance between the bottom of the strings and the top of the first fret of 1/32" under the treble string, and 3/64" under the bass string. This is a relatively stiff action at the nut end, and it will be lowered more after the saddle is close to the correct height.

With the capo on, measure the clearance between the bottom of the two outside strings and the top of the 12th fret. Our strings measured almost 3/16" at the 12th fret, which was approximately 1/16" more than we wanted. We were looking for a 12th fret action clearance of 1/8" to 5/32".

To lower the strings 1/16" at the 12th fret, you must remove **twice** that amount at the saddle. Our saddle measured 7/16". We needed to lower the strings until the *bottom* of the strings dropped 1/8" (not the top of the saddle). The top of the saddle must remain approximately 1/16" higher than the string bottom, to provide a deep notch to hold the strings in place. Do *not* lower the strings the full 1/8" at this stage, however, because all the strings are not installed and tuned to pitch. Err on the high side, and reach your final depth in several stages: a rough-in stage now with two strings installed, then two more stages with all the strings installed. Drop 3/32" right now instead 1/8".

Thanks to the capo trick, you can lower the two outside strings the required amount quickly at the saddle using razor saws or nut files, and return to the nut end.

At the nut end, remove the capo, and lower the outside strings to what feels like a proper action by measuring the clearance between the bottom of the strings and the top of the first fret. We ended up with a clearance of .014" under the high treble string, and .025" under the low bass string.

Install the remaining strings

Install the remaining strings and repeat the above nut/capo/saddle operation. Rough-in the strings at the nut so they'll hold their place under tension. A good starting point for string spacing at the nut is to divide the space between the centers of the two outside strings by 5 and pencil that measurement four times across the top of the nut. These four lines are the rough locations of the four middle strings.

This is just a starting point, so make slight starter cuts on these four marks — just enough to hold the strings in place temporarily. You can position the string slots from side-to-side (as you move them downward as well) by using razor saws and nut files held at an angle or on their sides to move the slots around until you get a spacing that looks right to you. We prefer to spread the wound strings a little further from each other to make up for their thicker diameter, and to squeeze the unwound strings a little closer together. The end product is a proportional spacing that takes into account the diameters of the strings, and has a uniform look. As you work, create plenty of notch to hold the strings, but don't lower them to their final depth yet.

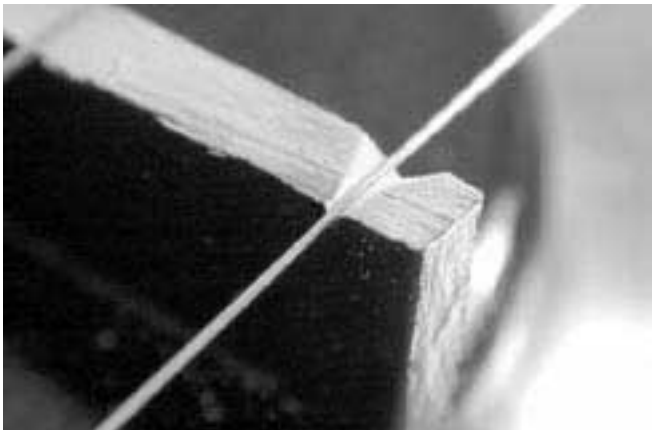
Cut the saddle notches

Tune the strings to pitch, and then put the capo back on to simulate a realistic action at the first fret. Go to the saddle and space the strings as you did at the nut (divide by five, mark out four lines, cut starter slots, then move the slots around until the spacing looks right). Lower all the strings at the saddle to match the depth of the two outside strings. Since you are tuned to pitch, you will need to de-tune each string to lift it free so you can work.

A small sharp triangle file is good for cutting the correct notch in the saddle, but we prefer to finish the job with a sharp knife.

Lower the strings at the saddle until they all measure 1/8" over the 12th fret, and shape the saddle slots to look like the photo. You can lower the strings more, or leave them higher, if you choose. Notice that the string contacts the saddle at

the rear edge, leaving a distinct V-groove dropping away from the strings in front of the contact point **(37)**. This moves the intonation point toward the back edge (which is usually needed), but more importantly it offers a clear, bright tone to the "speaking length" of the string, unimpeded by more saddle than is necessary to hold the string in place. (This is a trademark setup for this style of guitar.)



37. The string contacts the saddle at the rear edge, leaving a distinct V-groove.

When we reached our final action of 1/8", the top of the saddle was a little over 11/32" tall, and the bottoms of the string slots were approximately 9/32" from the top of the biscuit. This is a normal final string height at the saddle for a biscuit-style resonator guitar. Each of those measurements left room for going even lower later on after the guitar had settled in for a couple of weeks.

TIP: Feeling that the black paint on the biscuit and saddle might rob some brightness from our guitar, we used paint stripper to remove the paint from the saddle and biscuit. The tone did seem to jump out afterwards, and we didn't mind the vintage look — with the paint removed, it was also easier to cut really clean notches in the saddle. When the guitar was complete, we colored the bare wood with black marker pen and sprayed one thin coat of aerosol lacquer on the biscuit.

Finish the nut slots

When the saddle slots are cut, producing 1/8" clearance at the 12th fret under all the strings, remove the capo and lower the nut slots to a comfortable action. Leave the string depths with a clearance of .025" under the 6th (low) string, and .014" under the 1st (treble) string. The rest of the string clearances should graduate between these two across the width of the nut. You may wish to lower the strings more than this after a settling in period.

When the nut slots are finished, and the strings are holding the nut centered in its slot, use a sharp pencil to mark the overhang on each end of the nut for trimming. Remove the strings, remove the nut from its slot, and file off the excess. Shape the ends round, and then sand the nut smooth to remove any file marks. The ends of the nut should be flush with the fingerboard and neck on both the bass and treble sides. Replace the nut, but don't glue it in yet (you'll need to remove it during fret leveling). When approximately 1/2 to 2/3 of each string's diameter rests in the slot, the depths are correct.

When you are satisfied with your final action, let the guitar settle in for a few days. Try not to play it, to keep the neck clean for finishing — it will get dirty fast! You may notice that when tuned to pitch, the cone will compress downward a small amount (that is why we leave the action slightly on the high side during the settling-in period). At pitch, the saddle may lower from 1/64" to 1/32".

Drilling for fingerboard mounting screws

With the guitar settled in and tuned to pitch (to create full tension on the neck and fingerboard extension over the top), the L-support firmly in place, and the plywood fingerboard support located snugly and accurately, drill the four holes needed for fastening the fingerboard extension to the fingerboard support. Two of these holes are drilled into the top of the neck block, and the other two into the plywood support block.

First, use a 1/8" drill bit through the holes you drilled earlier at the centers of the four inlay holes in the fingerboard, in which the mounting screws are inserted. The holes are just to guide the bit for accuracy. Run the drill in reverse to start a center point in the metal, then stop. Don't drill through the metal yet.

Switch to a 1/16" bit and, centering on the point just created, drill through the top and into the plywood support block and the neck block. These are the holes for the mounting screws. Remove the strings, the L-support, and the neck.

Remove the neck and fingerboard and enlarge the four holes in the metal top with the 1/8" bit. De-burr the inside and outside of the holes drilled in the metal, and also de-burr the underside of the fingerboard extension, so that all the pieces screw together firmly without gaps. Install the four fingerboard mounting screws. Don't install the dot inlays over the screws yet.

Note: Depending upon how deep you drilled the flat bottom 1/4" holes for the dot inlays, and depending upon the hardness of the fingerboard, you may need to drill a smaller secondary hole — using a standard twist drill bit with a beveled face — as a slight countersink for the screw head. A 7/32" drill bit works well. **Be careful!** Drilling these holes in the fingerboard with a hand drill is tricky. It's easy to drill through the fingerboard by mistake. Practice on scrap, and be alert.

Reinstalling the neck and leveling the frets

Re-install the neck and all the other parts, and then string the guitar to pitch. Under string tension, fasten the fingerboard extension to the top using the four screws and plywood fingerboard support on the inside. Remove the strings so you can level the frets.

With masking tape and heavy paper, tape off the top around the fretboard to protect it from your fret leveling tools. With the peghead resting on the tabletop for gentle support, adjust the neck perfectly straight **(38)**, until a straightedge rests on all the frets (don't expect it to rest on the fingerboard extension over the body, because it will fall away slightly).

If you happen to find a high fret, tap it down before leveling. Support the back of the neck under the fret that you are hammering on.

> **TIP:** You can use masking tape on each side of the frets to protect the fretboard from sanding. Use a wide tip blue felt marker to color the tops of all the frets. This allows you to follow your leveling progress and know when the sandpaper has hit the tops of all the frets evenly.

Use 320-grit sandpaper double-stick taped to the narrow edge of a long flat surface **(39)** (we used a carpenter's level). You'll need to lightly sand the fingerboard extension separately with a smaller sanding block, since it falls away from the level plane of the main fingerboard.

When all of the tops have been dulled by sanding (the blue marks will disappear), round the tops of the frets. As a sanding tool, find a 1/2"-thick foam rubber sanding pad, or other piece of resilient material and round over one edge with a rasp. Wrap 320-grit sandpaper around the edge and work the sandpaper lengthwise from along the fingerboard, with even pressure. Hold the sander on edge to shape the fret ends and smooth the edges of the fretboard.

Change grits, working up to at least 800. You will end up with round fret tops that are nicely polished. Vacuum off the metal dust.

The neck is ready to be removed, final-sanded, and finished. Glue in the nut now.

38. Adjust the neck perfectly straight, until a straightedge rests on all the frets.

39. Use 240-grit or finer sandpaper double-stick taped to the narrow edge of a long flat surface.

Finishing the neck

At this point you should apply the neck finish of your choice. We present two recipes — the first produces a more "professional" high gloss finish, and the second produces an easier satin finish.

The quality of your finish work is certainly important to the appearance of your guitar. A thin "non-professional" finish won't necessarily harm the sound of your guitar, however. If the following instructions seem beyond your skills (they're probably not), or if they seem to be more work than you'd like, you can simply apply a low-gloss wipe-on finish by hand, consisting of a couple of coats of waterbase lacquer or freshly-mixed shellac. This will seal the wood and protect it from the elements, and you'll be playing your new guitar a lot sooner.

The following instructions, for spraying an aerosol nitrocellulose lacquer finish, are pretty close to foolproof and don't involve an investment in shop spraying equipment.

For your convenience, we have included wood scraps that match the wood your guitar is built with, so you can practice staining and pore-filling. You can practice applying your clear coats on these scraps as well.

There's a lot of finishing information in our book, *Guitar Finishing Step-By-Step*, and many customers are glad they studied the book before finishing their first guitar. In brief though, here are some pointers and a finishing schedule to follow.

Dos and don'ts

Do practice on scrap wood until your finishing technique has been perfected. If you'd like your guitar to look as good as it sounds, don't rush!

Do use a backing block or pad when sanding flat surfaces. It helps maintain a level surface. On round surfaces, use a flexible rubber backing pad, a thick piece of felt or leather, or fold the sandpaper three or four times to give it firmness with flexibility.

Don't apply more than three coats of lacquer per day. Spray an initial light misting or "tack" coat, followed several minutes later by a heavier wet coat. The tack coat gives the wet coat better adherence and lessens the chance of a run or sag in the finish.

Do let the finish cure for 10-14 days or longer prior to final sanding and buffing.

Do have thinner around for cleanup. Aerosol lacquers require no thinner, of course, but it's nice to have it on hand. If you decide to use spray equipment, always thin nitrocellulose lacquers with nitrocellulose thinner only.

Do wipe the aerosol tip often. Aerosol lacquers have a tendency to spit if the tip gets clogged. Also, you can clean the tip by turning the can upside down and spraying until the spray stream stops. It's recommended that you do this each time you are done spraying.

Do buy a can of aerosol blush eraser for lifting the bluish haze which can occur when moisture is trapped in the lacquer finish. Blushing can result from humid conditions, or if the coat is sprayed too heavily.

Do let the surface dry for 24 hours if you get a run in the finish. Then level-sand the problem area. If you touch wet lacquer, you'll leave a deep impression which will be much more difficult to fix.

Filling fret ends and sanding the neck

Before sanding the neck, "drop-fill" the small fret slot spaces under the ends of the frets. Use fine rosewood sawdust mixed in either Titebond or superglue. We used a toothpick to apply the mixture, and filed the small mounds of dried glue flush before sanding the neck. If you don't fill the ends of the fret slots, holes will remain which the lacquer finish won't fill.

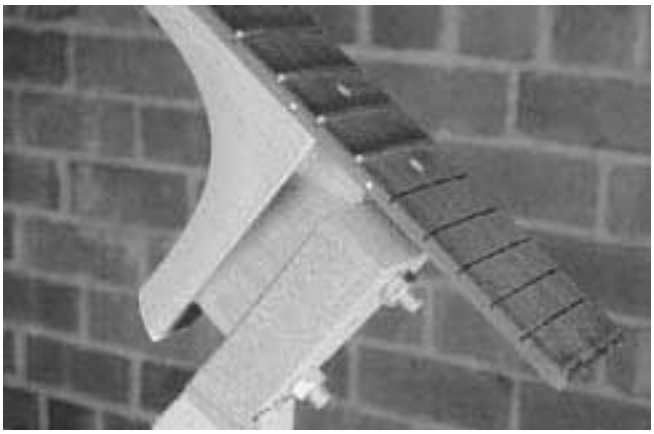
The neck needs extra sanding and grain-raising in the end grain areas of the heel, and the "ears" and the end of the peghead. Sand up to 320-grit, dampening to raise the grain. Do this several times, so the end grain pores will absorb stain more uniformly for a better appearance.

Finish the wood preparation by wiping the neck with a rag, dampened (not soaked) with naphtha, to degrease all the surfaces to be finished. Handle the unfinished wood parts with clean gloves from now on.

Making hangers and masking the neck

To fasten a spraying handle to the bolt-on neck, drill two holes in a scrap wood handle to match the bolt spacing (40). Tape over the exposed nuts to protect them from lacquer. Or, as an alternative, simply hold the neck at the center, spray the peghead, the heel, and a good portion of the neck up to where you are holding it. Loop an S-shaped wire hanger through a tuner hole and hang the neck for spraying the center area. You can also rest the neck fretboard-down on a riser block and spray it in the horizontal position.

Apply masking tape to cover the areas that won't be stained or finished: the fretboard playing surface, the sides of the fretboard (to be unmasked after staining), the nut, the neck joint surfaces of the cheeks, and the underside of the fretboard extension.



40. Scrap wood handle to hold the neck while spraying.

Staining

Wear plastic gloves when handling stains. The mahogany neck (and the rosewood peghead overlay, if you wish) should be stained. We recommend our ColorTone liquid stains in an equal mix of tobacco brown and red mahogany. Add 25 drops of each color to each ounce of water to produce a warm dark stain. For a lighter, redder color, you can use just the red mahogany at 50 drops per ounce of water. Test these stains on sanded scrap mahogany first.

> **TIP:** You can also use waterbase paste filler to color the bare mahogany while filling the pores, and skip the stain entirely. Test this on scrap mahogany and see if you like the somewhat lighter appearance.

One or two ounces of mixed stain is plenty for a neck. Pour the stain into a shallow bowl. Wet a soft clean cloth with stain and apply it in long uniform strokes in the direction of the wood grain. It shouldn't take more than a minute to stain the neck. Stain the peghead veneer, too: it's easier than trying to mask it.

Let the stain dry for half a day, and then unmask the sides of the fretboard. The fretboard's playing surface, neck joint areas, the nut, and the underside of the fretboard extension should remain masked.

Applying a wash coat sealer

Remember to wear clean cotton gloves whenever you touch the wood. Lacquer is highly flammable, so always work in a dry, well-ventilated area, away from open flames or sparks. Be sure to wear an appropriate respirator while spraying.

Spray one uniform "wash coat" of clear lacquer on the neck. A wash coat is a very light coat, so it won't cause runs. The wash coat seals the stain or the natural color in the wood, and keeps the upcoming coat of paste filler from producing a smudged look. Sealed in this fashion, only the open pores of the wood accept the filler. Let the wash coat dry overnight.

Filling the wood grain

We recommend our ColorTone waterbase brown paste filler for filling and leveling the open grain pores of the rosewood peghead overlay and the mahogany neck. Because it dries fast, you won't be able to fill all the neck's surfaces at once, so work in stages. Practice on scrap pieces before starting on the guitar. The wet filler should be packed into the pores with a rubber squeegee held at a 45° angle across the grain (an old credit card makes a great squeegee). Within minutes the filler will start to harden and look hazy. Wipe off the excess, working across the grain, with a clean lint-free cloth. At any time during the grain-filling process, you can use a rag lightly dampened with water to soften any filler that's hardening too quickly. When the wood pores have been filled and wiped level, a bit of blotchy, hazy residue will probably remain on the surface. Let the wood dry overnight. Light sanding with 320-grit Fre-Cut® may be required to remove any remaining buildup of filler on the wood surface. Try to avoid sanding through the wash coat into the stained mahogany. If you do sand through an area, wipe a little stain on it and wipe off the excess.

Lacquer spraying schedule

Day One: Spray three wet (not runny!) clear coats on the neck, an hour between coats, and let them dry overnight.

Day Two: Lightly "scuff-sand" the neck with 320-grit Fre-Cut® paper to knock off the high spots in the finish (on flat areas, be sure to use a backing pad on the sandpaper). Sand just enough to "open" the finish; don't try to sand out every shiny spot or sunken area in the lacquer. Clean off all the sanding residue. Now spray the neck with three uniform coats of clear lacquer, one hour between coats. You now have six coats. Let the neck dry overnight.

Day Three: Lightly scuff-sand the finish with 320-grit paper again, and clean off all the residue. You can be slightly more aggressive in flattening the sprayed surface now, but be careful on the curves of the neck, and on any of the edges of the neck and peghead (it's easy to sand through the edges). Don't try to sand out all the shiny spots yet. This sanding will release solvent from the finish and help it to cure. Let the finish dry for two more days.

Day Six: Once again, spray three wet clear coats, one hour apart, on the neck and peghead. The neck now has nine coats. Let the finish dry overnight.

Day Seven: Scuff-sand the finish with 320-grit again. This time most of the shiny spots will disappear, leaving a uniformly dull look. Spray three more clear coats, one hour apart. You now have twelve coats. Allow overnight drying.

Day Eight: Lightly scuff-sand the finish with 600-grit Fre-Cut® paper, to help the solvent escape. The neck should now be left in a warm dry location for two weeks to let the finish harden and shrink.

Wet-sanding and rubbing-out the finish

Dry-sand the neck and body to a flat, dull sheen using 800-grit Fre-Cut® sandpaper. Clean the residue off the sandpaper **often** by rubbing it against a scrap of carpet. Any "orange-peel" texture (caused by lacquer shrinkage as the solvents cure out of the finish) should be removed, but don't over-sand. When all the little shiny low spots in the lacquer have been removed, you're ready to go to the next step.

Wet-sand using 1200-grit micro-finishing paper and water. This will create a smooth satin surface that's ready for final polishing. Excess water and residue should be wiped off the finish with a clean dry soft cloth as you work. Rinse the sandpaper in soapy water often, to remove hard specks that can scratch the finish. (Note: Soak the micro-finishing paper in water overnight before use. It will scratch less and last longer.)

Using soft cloths, or an electric hand drill with foam polishing pads (a separate pad for each compound), rub out the fine wet-sanding scratches to a final gloss with medium and fine polishing compounds. You can follow this with swirl remover if desired. Clean off the residue left by the polishes, remove the remaining masking tape from the neck, and remove the soundhole masking materials from the body.

Quick, easy finish

If the above finishing schedule seems to be too much work, you can apply a much simpler finish, as follows.

1) Sand the neck and peghead with 220-grit Fre-Cut® sandpaper.

2) Tape off as above.

3) Fill the neck and peghead with the waterbase paste wood filler, and the technique mentioned above. It will color and fill in one process.

4) Spray as described above, but quit after the sixth day (9 coats).

5) Let the finish dry one week, and wet-sand with 800-grit Unigrit sandpaper to remove the majority of shiny spots.

6) Skip the rub-out. Instead, use 0000 steel-wool to produce a simple, flat, satin sheen.

Final assembly

When the neck is finished, put the guitar together, but leave the coverplate off for final adjustment of the setup. Tune the guitar to pitch, and then fasten the screws through the fingerboard extension but don't put the inlays in yet. After the guitar has settled in for a week or two, remove the strings, install the coverplate, and install the dot inlays in the fingerboard extension.

If you compare the thickness of the pearl dots to the depth of the holes down to the heads of the mounting screws — then thickness the pearl dots accordingly — you will be able to press the dots in dry (making it easier to remove them should you ever need to). (The lone center dot inlay at the 17th fret in the fingerboard extension can be glued in). You can glue all the dots if you prefer.

Restring with new strings and enjoy your new Delta Resomaster! The old blues guys from the Mississippi Delta would've loved a kit like this, to be sure!

> **TIP:** You may find yourself removing and re-installing the coverplate and strings often during setup. To save time, you can slacken the strings until just taut, hold the tailpiece against the body, and remove the tailpiece mounting screw. Then lift the tailpiece free and thread it — with strings intact — through the coverplate hand rest.