

IRISH BOUZOUKI (OCTAVE MANDOLIN)



MUSICMAKER'S KITS

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Irish Bouzouki

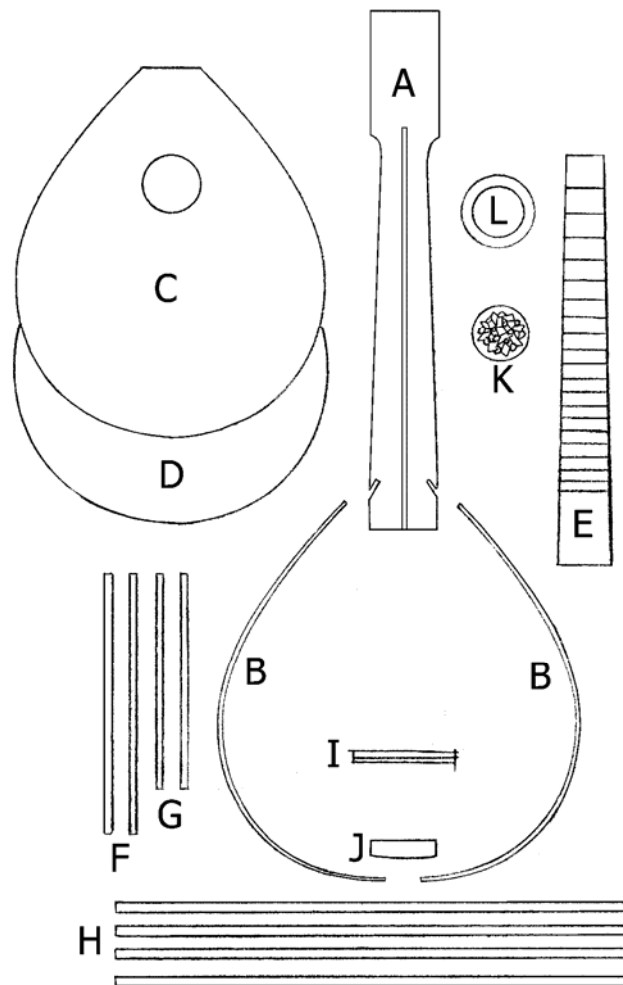
(Octave Mandolin)

Wood parts:

- a) 1 Neck/peghead
- b) 2 Pre-bent sides (ribs)
- c) 1 Soundboard (top) with hole
- d) 1 Back piece
- e) 1 Fretboard, slotted (padauk)
- f) 2 Long Braces for soundboard
- g) 2 Short Braces for back
- h) 4 Inner lining strips
- i) 1 Bridge (padauk)
- j) 1 Tailblock
- k) 1 large Celtic Knot Rosette
- l) 1 "Donut" ring for rosette

Hardware

- 8 individual geared tuners
- 16 tiny screws for tuners
- 1 plastic nut, 1/4" x 1/2" x 1-3/4"
- 8 copper tail pins
- 1 Leather scrap, 1" X 2"
- Allen wrench for truss rod, 1/8"
- Cover plate for truss rod w/ 3 screws
- 48" fretwire
- 1 set bouzouki strings
- Adjustable Truss Rod (in neck)
- 1 set assembly instructions



A NOTE ABOUT GLUE

We strongly recommend that you use modern woodworking glue for this project. Aliphatic resins (such as Elmer's Carpenter's Wood Glue or Titebond I) are best because they hold the parts more securely than the old animal glues of yore. DO NOT assemble the wood parts of this project with epoxy or superglue or hot melt glue. The yellow colored Elmer's or Titebond is best.

Yes, many luthiers (instrument makers) still use the natural hide glues that have been around for centuries, carrying on a fine old tradition, but that does not mean you should do the same. The experts who use hide glue effectively are careful to cook up each batch to their own specifications from a high grade of granules. We have found the prepared liquid hide glues on the market to be inferior by comparison.

When gluing parts together, be sure to put enough glue on the joint to wet the entire surfaces to be joined. A good sign of proper gluing is that a little excess will squeeze out around the joint when clamping pressure is applied. Too little glue may cause the parts to separate later, whereas too much glue makes things messy. We always keep a damp rag handy for quick cleanup, as necessary. It is especially helpful to keep your fingers clean while gluing, because gluey fingerprints have the embarrassing tendency to appear on the finished product in places you never expected....

ASSEMBLY INSTRUCTIONS

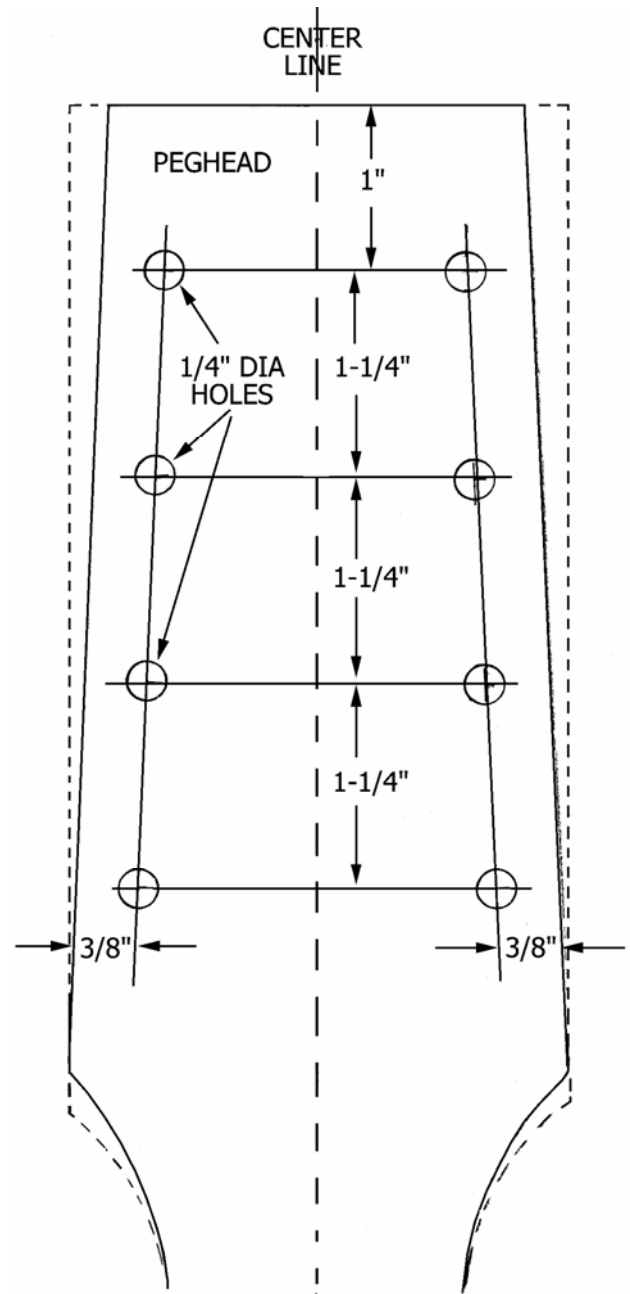
____1. Please check over the parts in your kit to make sure nothing is missing. Call us right away if you find a problem so we can correct it without causing a delay in your progress. We also suggest skimming through the entire directions before beginning, just to get an overview of the project. You may decide that you need to gather more tools or purchase a few optional decorations or accessories to enhance the finished instrument. Now is a good time to decide so you can avoid delays when you reach those steps of construction.

PREPARING NECK/PEGHEAD

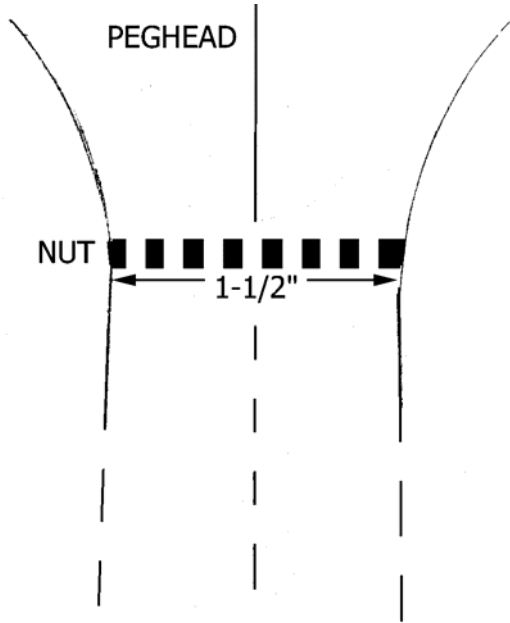
____2. Find the center point of the NECK/PEGHEAD piece at several points down the backside, and then connect those points using a short flexible straightedge to draw one continuous center line down the back of the entire NECK.

____3. You may shape the PEGHEAD portion of this piece in a variety of ways. We show only the most basic tapered shape here, but you have an opportunity to be creative.

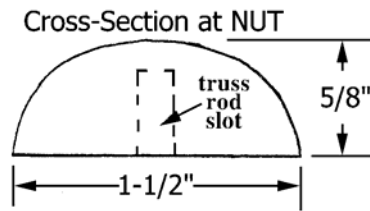
Some people decorate the front side with inlays, embossed carvings, or other decorations. You may want to plan the shape of the PEGHEAD or the placement of the geared tuners to accommodate such a decoration.



HINT: If you make a significant change to the shape of the PEGHEAD, we recommend that you draw it on paper first, and draw in the strings, to make sure they won't cross or interfere with one another. Please note that the geared tuners should be spaced at least 1" apart (we like 1-1/4" spacing better to give more room to turn the buttons).



4. Draw a grid on the backside of the PEGHEAD to locate the proper positions for geared tuner holes, as shown. Drill these holes to fit your geared tuner posts (1/4" diameter for our standard geared tuners).

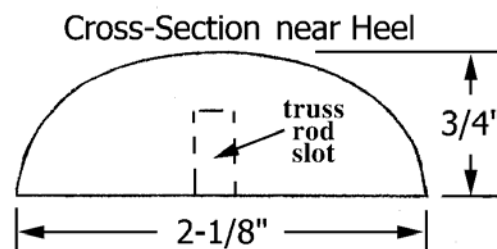
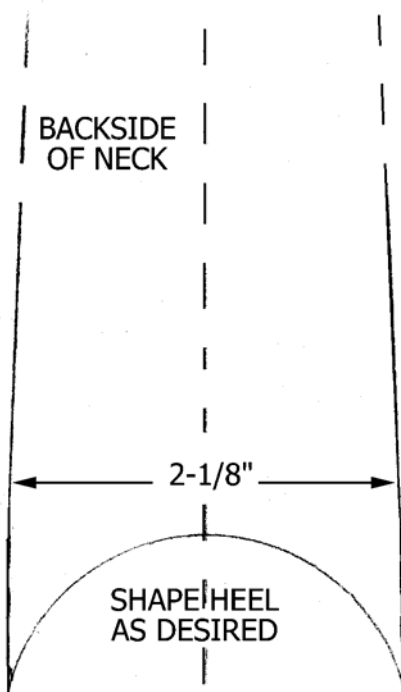


5. Round over the backside of the NECK and shape the HEEL to your liking. We have deliberately left this section slightly oversize to accommodate people with large hands who might like wider than normal string spacing. The standard width at the NUT is 1-1/2" for a Bouzouki, but you may make yours wider or narrower, if you prefer.

A belt sander makes quick work of this step. If you have a hand-held model, you might try clamping it upside down on your workbench so you can hold the wood piece in your hands while sanding the shape. Follow up with a palm sander to smooth it out nicely.

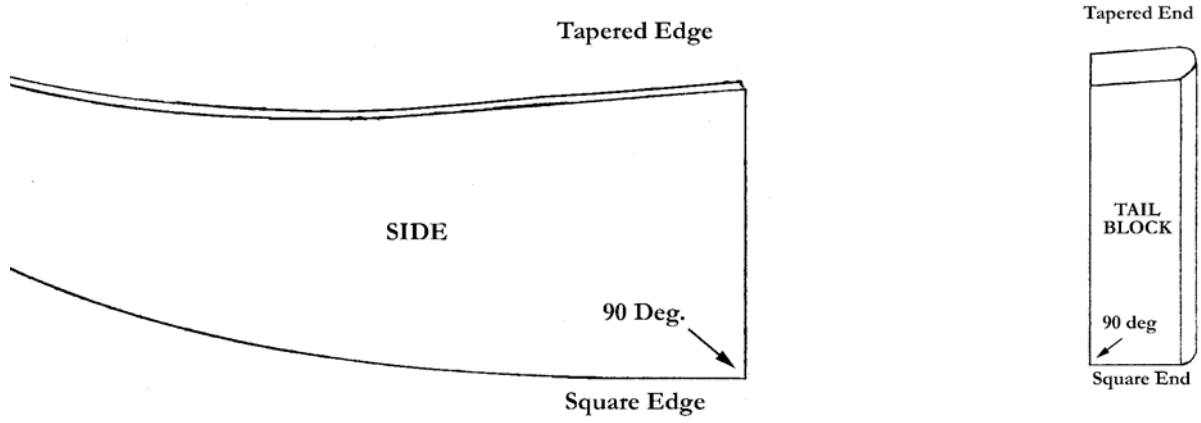
If you have no power sanders, you'll need to use a coarse file, rasp, or spoke-shave to round over the backside of the NECK. Finish by sanding with a block of wood and 80-100 grit sandpaper.

CAUTION: Take care to avoid cutting so deeply as to expose the TRUSS ROD slot!



GLUING SIDES TO NECK

___6. The SIDES and TAIL BLOCK are square on the front edge and tapered on the back. These parts will fit together best if you orient them correctly. Check them with a square if necessary to determine which corners are 90 degrees.

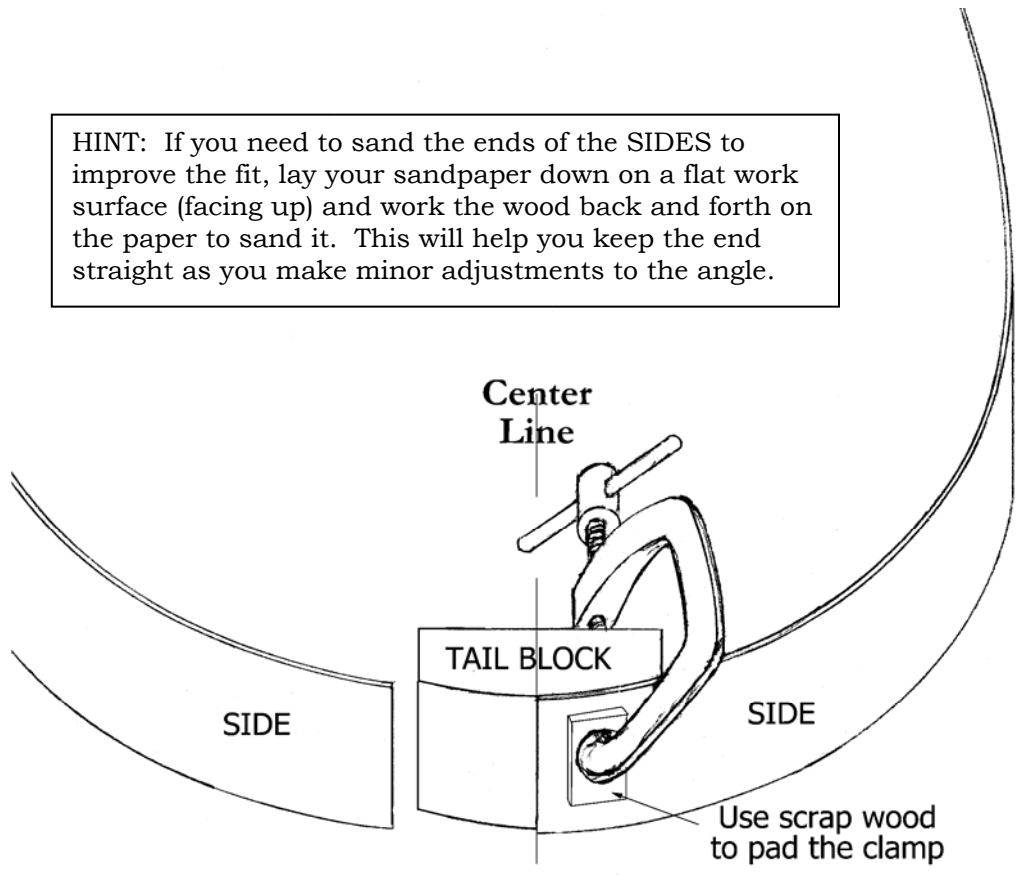


___7. Place both SIDES and the TAIL BLOCK on a flat work surface with the square edges (front) facing down. Test-fit the two SIDES together with the TAIL BLOCK, as shown.

When satisfied with the fit, keep the parts on a flat table while you glue and clamp one SIDE to the TAIL BLOCK first, on the center line.

HINT: If you need to sand the ends of the SIDES to improve the fit, lay your sandpaper down on a flat work surface (facing up) and work the wood back and forth on the paper to sand it. This will help you keep the end straight as you make minor adjustments to the angle.

Then glue the other SIDE up against the first with a tight seam.



8. Place the NECK/PEGHEAD piece on your flat table, front side down. Slide the SOUNDBOARD under the end of the NECK, and test fit the ends of the SIDES into the slots in the NECK. If they don't slide easily into the slots, sand the ends of the SIDES thinner on the inside.

IMPORTANT: Make sure to hold this assembly down against a flat surface while gluing. Otherwise you may have trouble adjusting the instrument for easy playing.

Parts facing down

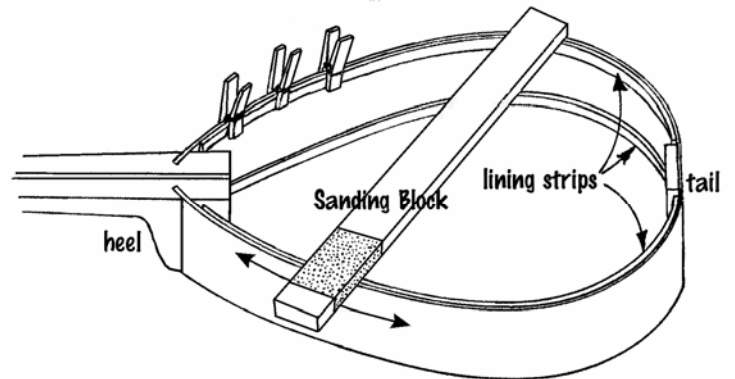


Flat work surface

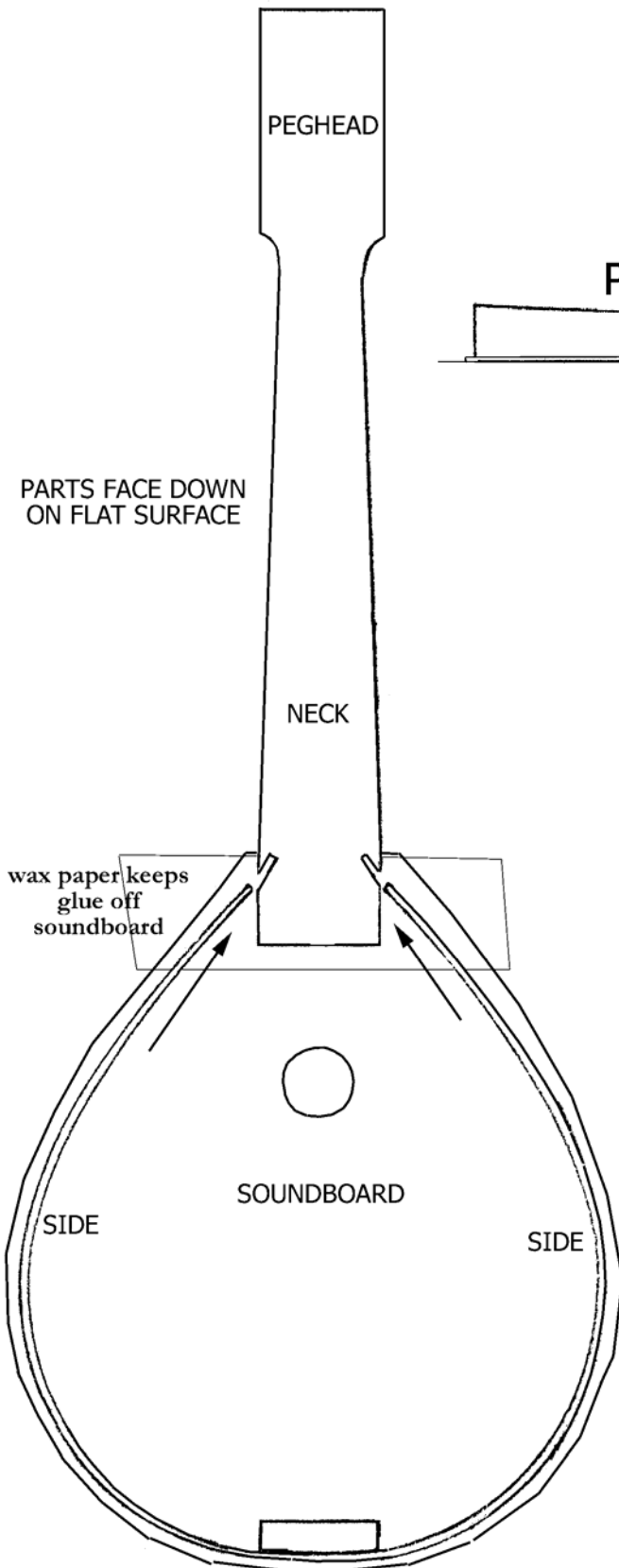
Double-check to make sure that the square edge (front) of the side assembly is facing down. When satisfied with the fit, glue the SIDES into the slots. HINT: Cover the SOUNDBOARD with wax paper or a plastic baggie to protect it from excess glue.

9. Glue the four LINING STRIPS to the inside of the SIDES, as follows:

a) Use clothes pins to clamp them so the edges are flush, as shown.



b) Carefully sand all four edges so they are flat and smooth, ready for gluing the SOUNDBOARD and BACK. We like to wrap sandpaper around the end of a long stick, and then rest the stick across the instrument while sanding. This ensures a flat sanding action.



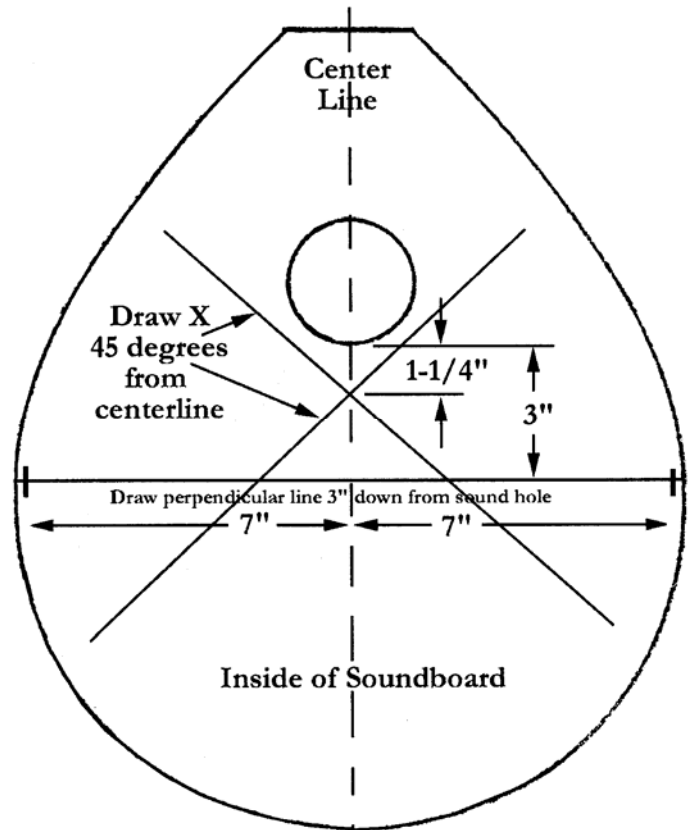
THE SOUNDBOARD (TOP)

POINT OF INTEREST

Many people ask why we use a *laminated* top instead of solid. The reason for this is that you will get much more strength from laminated wood than from solid, and much less trouble with cracking. The added strength also allows us to use lighter bracing, allowing the soundboard to vibrate more freely, so you will get remarkable sound from your finished instrument.

____10. Draw a centerline down the inside face of the Soundboard, and then draw a perpendicular line 3" below the sound hole, as shown. Make two marks near the ends of that perpendicular line, each one 7" from the center.

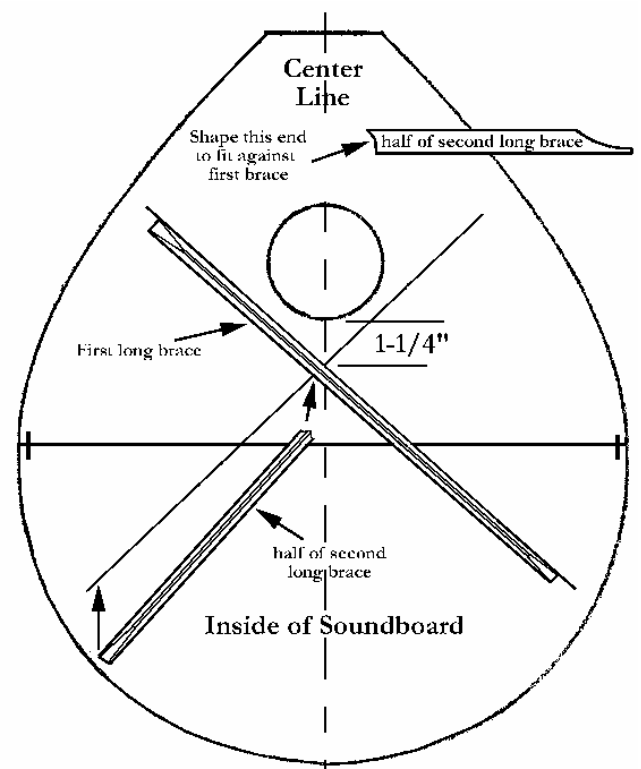
____11. Draw two lines at 45 degrees to the center line, so they form an X that crosses the center line 1-1/4" from the sound hole.



NOTE: Occasionally we hear from a customer who finds the SOUNDBOARD warped in the kit. This can occur from humidity changes because the three layers of spruce may swell or shrink at different rates, but it is simple to correct. Lay a damp cloth over the concave (hollow) side of the panel until the material flattens out. Then proceed to glue the BRACES in place before it dries enough to warp again. Once braced, it will stay flat.

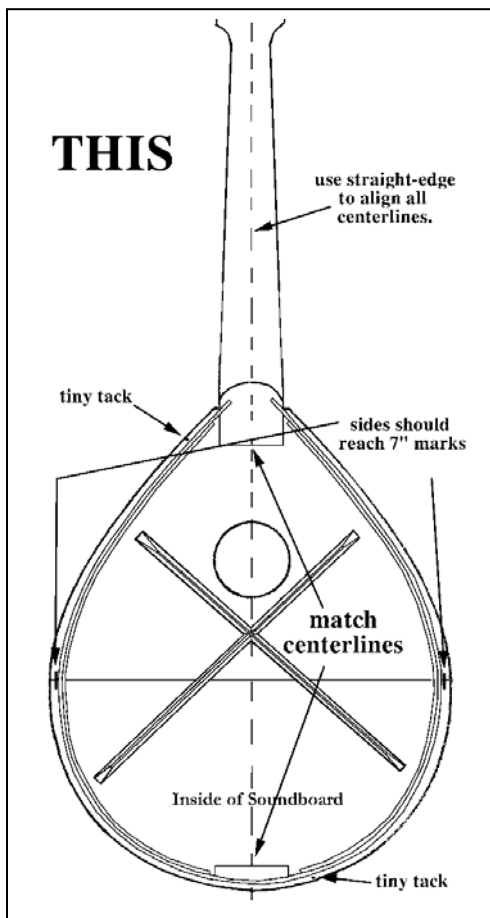
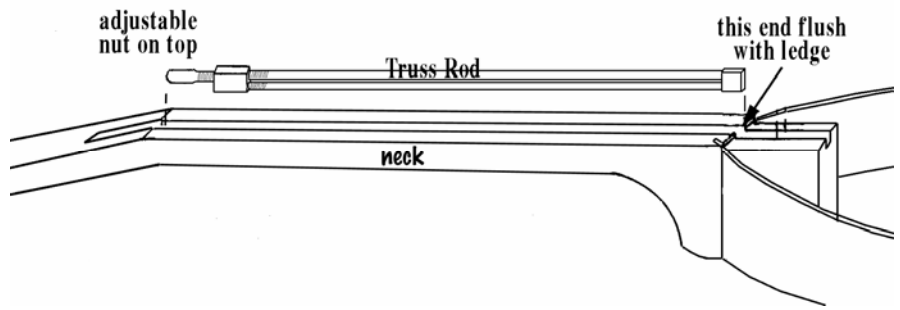
____12. Find the two LONG BRACES. The first BRACE can be glued and clamped as one piece. Place it below the pencil line, as shown, and equidistant from the edges of the SOUNDBOARD. Use clamps and/or weights to hold it firmly until dry.

____13. You will need to cut the other LONG BRACE in half (unequally) to finish the X formation. Shape the raw ends carefully to fit up against the first brace. This redwood is soft and easy to sand or carve. We recommend wrapping sandpaper around a broomstick to help you sand the concave ends.

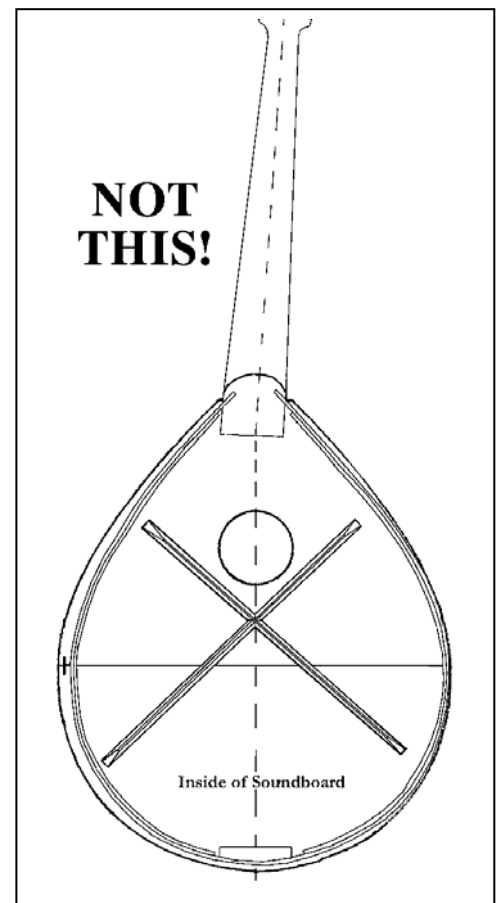


____ 14. When the X-bracing is installed, you can glue the top to the body of the instrument, as follows:

- a) Insert the TRUSS ROD into the slot in the NECK with the adjustment nut in the upper position near the PEGHEAD.
- b) The other end of the TRUSS ROD should line up with the ledge where the soundboard will fit.
- c) You'll notice that the SOUNDBOARD is slightly oversize. We like to hold the SOUNDBOARD firmly in place on a flat work surface, either with double-stick tape or with tacks in a couple places on the outermost perimeter, where the excess will be trimmed off later.
- d) TAKE YOUR TIME to align all the parts! If you have not marked the centerlines of every part yet, do it now so you can be sure to assemble the parts in proper alignment. Use a long straightedge to align everything as shown.
- e) Push the NECK firmly against the end of the SOUNDBOARD and hold it in place with a clamp or weight. Then check the alignment of the centerlines, making adjustments as necessary.



- f) Finally, push the TAIL end of the body toward the NECK to spring the SIDES out to the 7" marks you placed on the SOUNDBOARD.
- g) When satisfied with the fit and alignment, trace around the parts with a pencil so you can lift off the body.
- h) Put glue on the SIDES, the TAIL BLOCK, and the base of the NECK, and clamp everything in proper position to glue the body to the SOUNDBOARD.
- i) Double-check the alignment after the clamps are in place. Wet glue has the tendency to let the parts slip around!
- j) Use weights or clamps to hold the body in place until

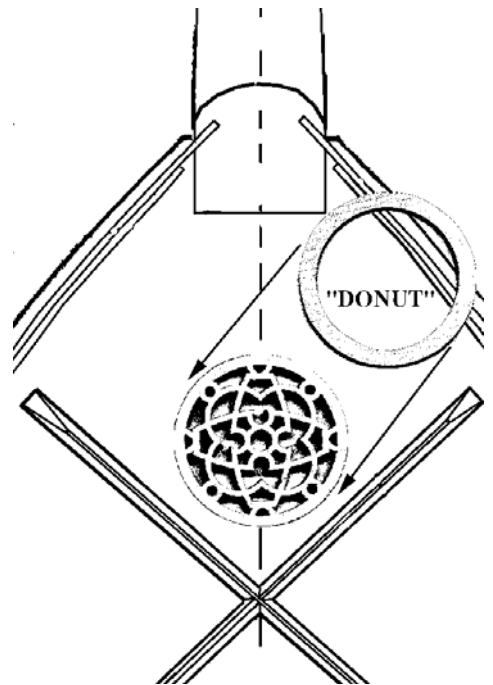


the glue dries.

OPTIONAL ACCESSORIES

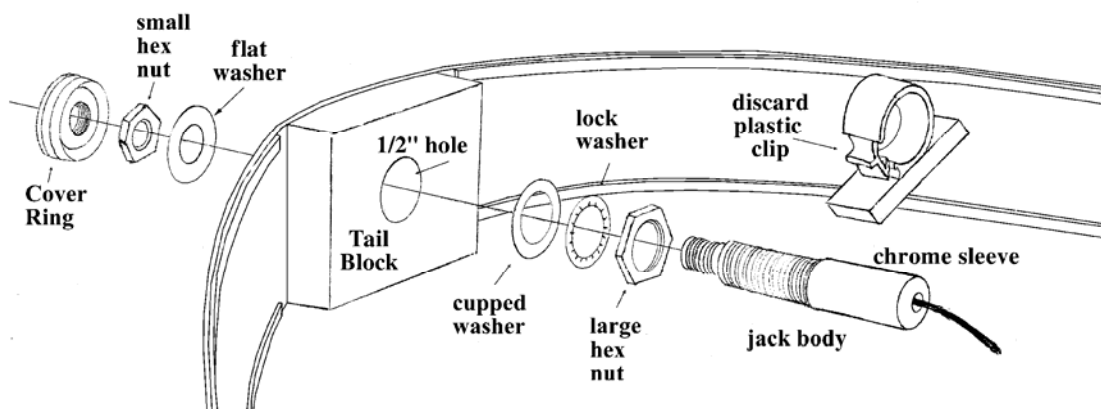
___ **15. ROSETTE:** We find that a ROSETTE does not harm the sound of the Bouzouki, so we include our Celtic Knot pattern to decorate the instrument. You may exchange it for a different pattern (see MUSICMAKER'S catalog) if you wish. Here's how to install it:

- a) Lightly sand the front of the ROSETTE to remove any smoke residue left by the laser beam.
- b) Test fit the ROSETTE into the hole in the SOUNDBOARD. Sand the edges of either the ROSETTE or the hole to achieve a nice fit.
- c) Glue the ROSETTE into the hole, with the front flush with the soundboard, orienting the pattern the way you like.
- d) Glue the wooden "DONUT" ring to the inside for added support.



___ **16. PICKUP:** If you are interested in amplifying this instrument, it would be best to install the pickup at this point. MUSICMAKER'S offers a top quality transducer pickup that can be installed as follows:

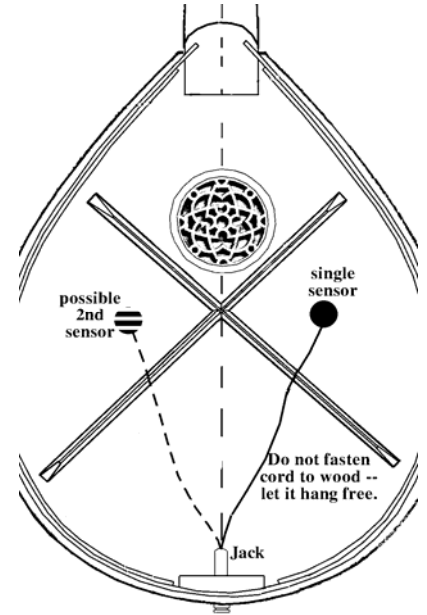
- a) Drill a 1/2" hole through the tail end of the instrument, on the center line, where you would normally install a strap button (our cover ring serves as a strap button).



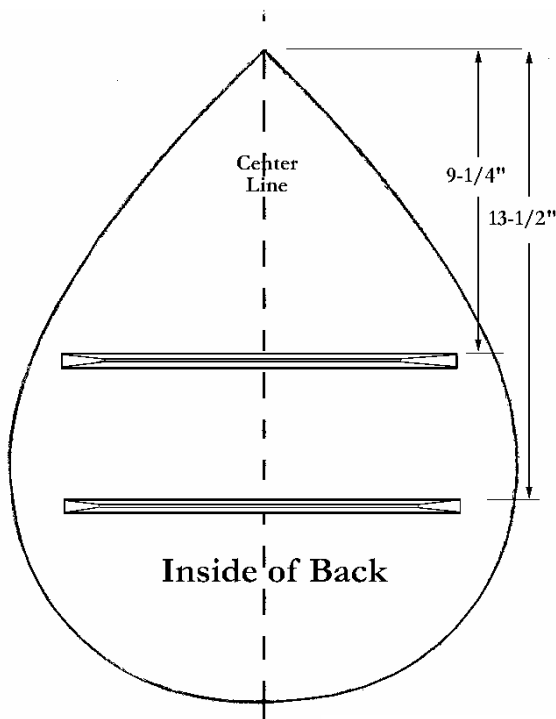
- b) Unscrew the cover ring and small hex nut at the front of the pickup jack, noting the proper sequence of parts.
- c) Discard the black plastic mounting clip. That is used only for temporary external mounting.

- d) Adjust the threaded chrome sleeve and large hex nut to allow just the right amount of threads for the jack to poke through the hole. Test the cover ring to make sure. The smaller threaded portion of the jack should come out flush with the surface of the cover ring. When satisfied with the fit, tighten the jack in place.
- e) Use the adhesive film included with the pickup to adhere the sensor(s) to the inside of the **SOUNDBOARD**, placing as shown here.

NOTE: A single transducer pickup is sufficient for this size instrument, but serious performers may want the stronger signal of a double pickup.



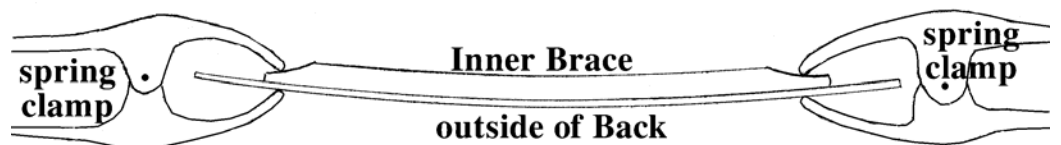
GLUING THE BACK



___ 17. Select which face of the back you wish to show outward. One side is cherry and the other is walnut, so you can determine the type of wood you want to display on the back of your Bouzouki. Even though the sides and neck are mahogany, you can show either cherry or walnut on the back.

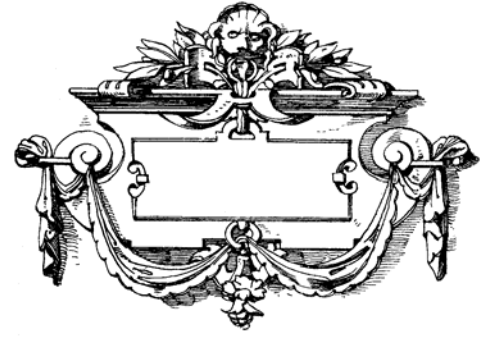
___ 18. Draw a centerline down the inside of the **BACK**, and then draw perpendicular lines at the distances shown.

___ 19. Notice that the two **SHORT BRACES** are curved on the bottom. This is intended to give the **BACK** a slight arch when they are glued in place. Spring clamps work well to hold the ends of the **BRACES** in place while the glue dries. If necessary, you could add some weight to the center, but do not try to clamp the **BACK** down against a flat surface!



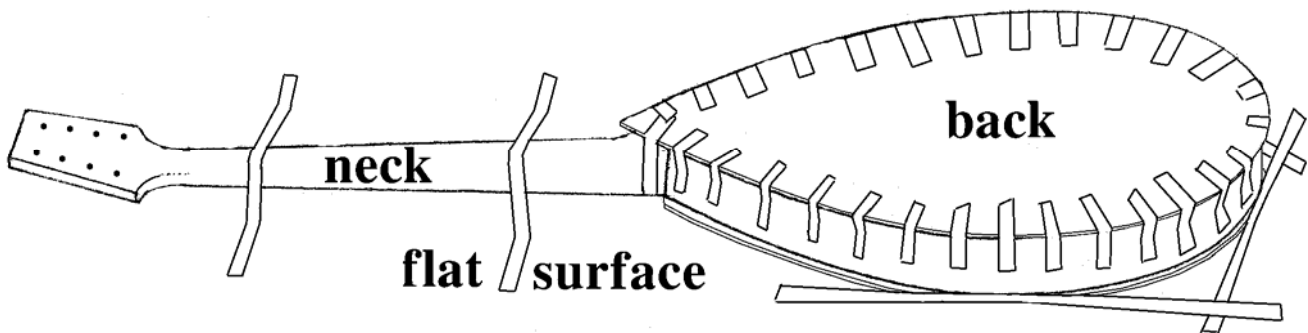
____20. Now is a good time to sign and date your project inside the back before gluing it in place, so your signature will be visible through the soundhole when the instrument is assembled.

Some people enjoy adding a decorative frame around their name, or creating a special label with a message to the recipient, if the instrument is being made as a gift.. You can photocopy a fancy frame onto some nice paper to make a label.



____21. Test-fit the BACK to the body of the instrument.

CAUTION: It is possible to "flex" the instrument before the BACK is fastened in place. Be very careful to make sure the front of the instrument stays flat when you glue the BACK on. We recommend clamping or taping the neck and soundboard to a flat surface while gluing the BACK.



When satisfied with the fit, put glue all around the body and use tape, weights, or clamps to hold the back firmly in place. Check to make sure it overhangs the sides all around the body.

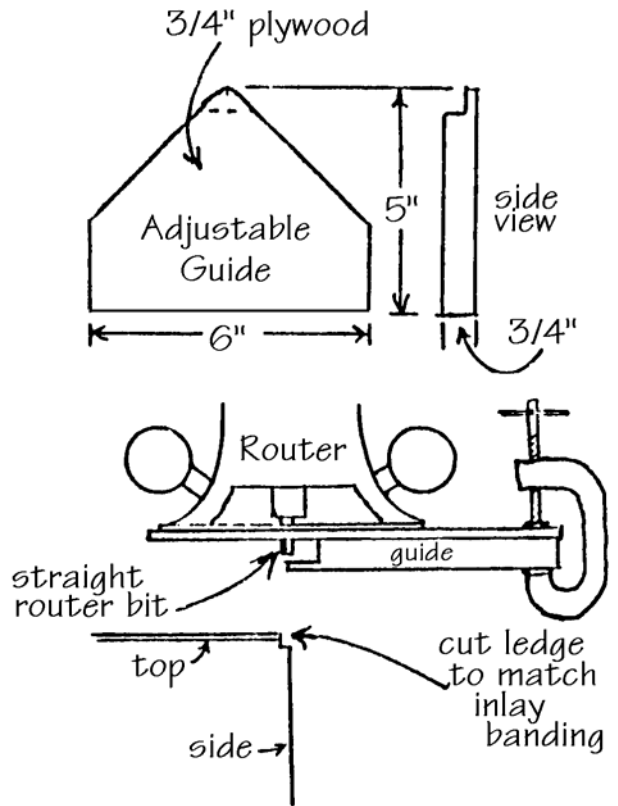
____22. When the glue is dry, you may remove the excess overhang of both the **SOUNDBOARD** and the **BACK**. We use a router for this job, equipped with a flush cutting bit, but you may accomplish the task with a power sander, or by hand with a coarse sanding block or file. Trim all edges flush with the sides of the body, and shape the junction with the **NECK** into a nice curve.

OPTIONAL INLAY BANDING

____23. One nice option, if you have a router, is to inlay some decorative banding around the circumference of the **SOUNDBOARD** and/or **BACK**. We offer wood inlay banding strips for this purpose, shown in our **MUSICMAKER'S** catalog. You'll need about 48" of banding material to reach once around the circumference of the instrument. It is easy to splice shorter pieces of this material together as you install it. All you need for tools is a router with a straight bit of any size (good and sharp), a razor knife, and some masking tape.

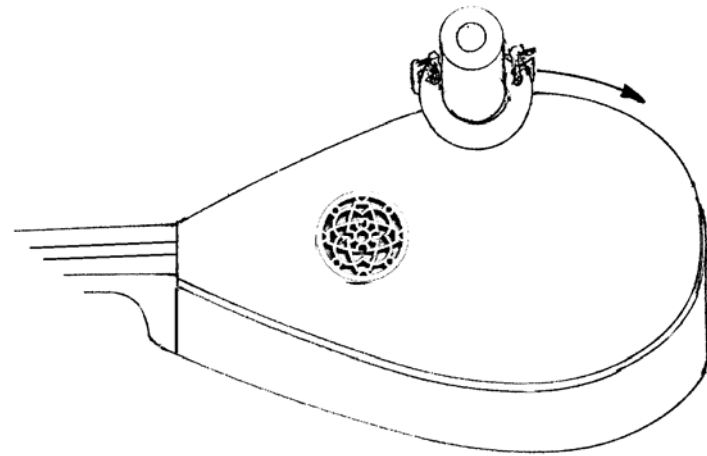
Here is how to set up your router and install inlays:

- Make an adjustable guide board to clamp to the base of your router. This is simply a triangular shaped scrap of plywood with one point hanging over the router bit, as shown.
- Adjust the depth of the cut by sliding the guide board over the top of the router bit.
- Adjust the height of the cut by raising or lowering the router bit.
- Make a sample cut in a scrap of wood and check your inlay banding to see how it fits.
- When satisfied with the adjustment of the cut, rout a ledge all the way around the circumference of the soundchamber. It may take two or three passes to make sure you have cut to full depth all the way around.
- Use a razor knife or sharp chisel to clean up the ends of the cut near the NECK, and to trim the inlay bands for splicing and fitting.

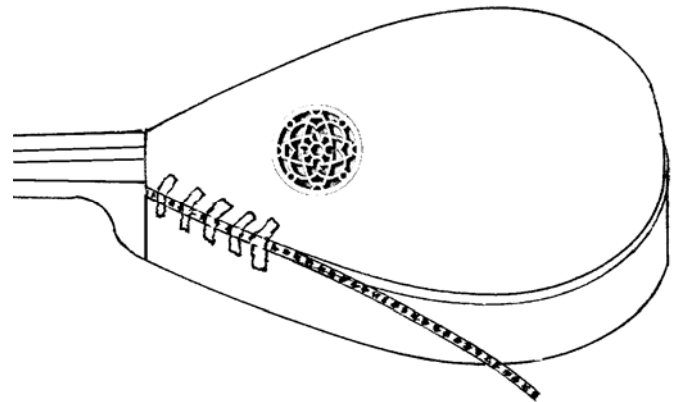


HINT: Your guide board will prevent you from cutting too deeply, but it will not ensure that you cut the full depth. We usually make several passes around the instrument to make sure we have cut the slot to its full size.

Glue the inlay banding into the slot with woodworking glue, and use masking tape to hold it in place until dry.



- When dry, remove masking tape and use a sanding block (medium grit) to clean up glue residue and to smooth out the inlay bands.

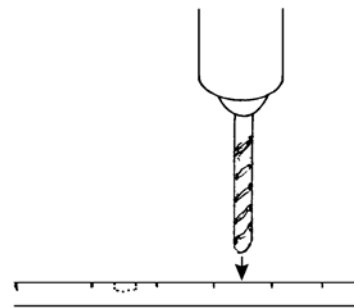
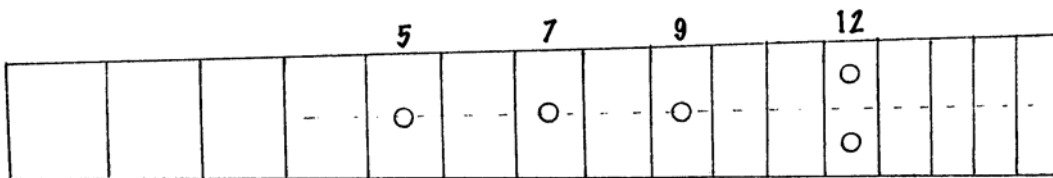


THE FRETBOARD

____24. Test fit the FRETBOARD onto the neck, but don't glue it in place yet. Make sure that the NECK and the FRETBOARD are the same width up to the point where the SIDES meet the NECK. Sand or file them to match, as necessary.

You may also customize your FRETBOARD if you like. Some people cut a curve or fancy shape at the end near the soundhole. Some also like to sand a crown into the top surface, as often found on steel-string guitars. If you do this, be careful to make sure the fret slots are left deep enough to allow the fretwire to seat fully down.

____25. (OPTIONAL) Another decorative option is to inlay marking dots at certain positions of the FRETBOARD. This is a simple and attractive detail, requiring only an electric drill.

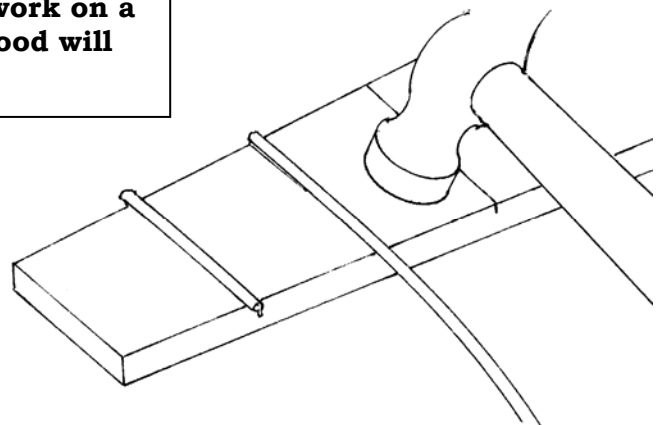


- Place scraps of masking tape on the FRETBOARD at the positions shown, so you can clearly draw some pencil marks.
- Mark the center of each space in pencil, and then use an awl or sharp nail to punch a depression at each point.
- Drill shallow holes of the size that matches your marking dots (1/4" diameter is normal). The depth of the holes is not too critical, as you will see next.
- Mix up some "5-Minute Epoxy" and use a nail to put some into a hole, nearly filling the cavity. Push a marking dot into the hole until it comes nearly flush with the wood surface, but still stands slightly above the surrounding wood. The dots may "float" on the epoxy.
- When the epoxy is hard, sand the dots flush with the surface of the FRETBOARD.

____26. It is best to install the frets into the FRETBOARD before gluing this piece onto the instrument.

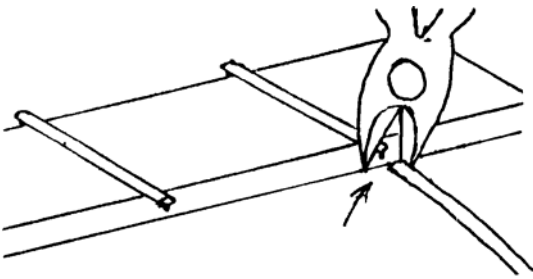
Place your FRETBOARD on a good firm surface for this operation. A flimsy table top will not do. Better to work on a concrete floor or a cement block. Otherwise, your wood will just bounce around as you try to put in the frets.

- Begin by placing the long length of fretwire over one of the slots cut in the fretboard, so the end hangs over the edge of the wood just 1/16" or so.
- Position the fretwire so that the "tang" will be driven down into the fret slots.
- Use a hammer to lightly tap the fretwire into the slot, until the "crown" of the fret contacts the wood surface.



HINT: Tap one end of the wire in first, then work toward the middle, and finally the other end.

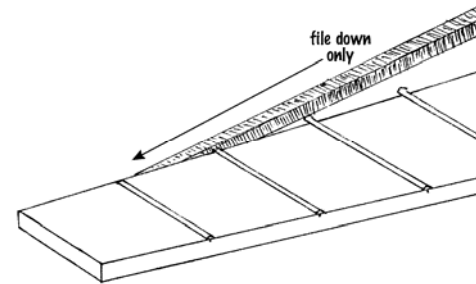
- d) When the fretwire is securely held by the wood, use a wire cutter to clip off the excess, as close to the wood as possible.
- e) Proceed to the next fret slot in the same way, and so on, until all frets are installed.



HINT: Some experts prefer to glue the frets in place, using 5-minute epoxy. This can be especially helpful if you have trouble with one or two pieces and end up enlarging the slot so it no longer holds the wire firmly. Use a c-clamp and a scrap of wood to hold the errant fret in place while the epoxy sets. Then clean off excess adhesive with a sharp knife.

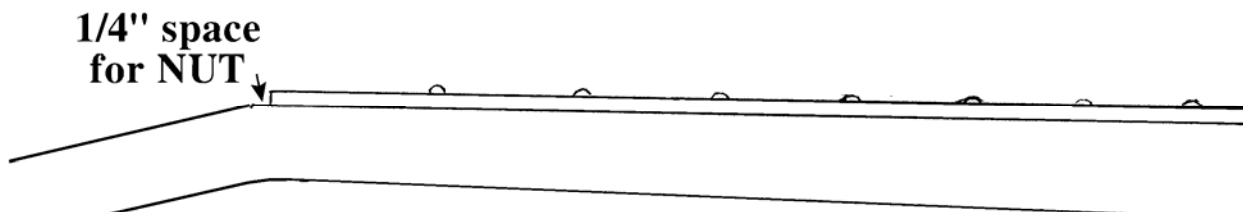
____27. After the frets are all installed, we like to look them over very carefully to make sure each one fits all the way down against the wood. If one fret stands higher than another, it may cause buzzing problems later when playing the instrument. Try to tap it down fully into the slot. The shorter instruments like mandolin and ukulele are the most critical, so do your best to get them all held down firmly. After the FRETBOARD is glued down, you'll have one more opportunity to level the tops of the frets with a file.

____28. File (or sand) the ragged ends of the frets down until they are smooth and flush with the sides of the FRETBOARD. If you happen to have access to a belt sander, you'll find that to be a very helpful tool for this part of the project. The fretwire is soft enough metal to work very easily with a sanding belt, and an otherwise lengthy task can be completed in minutes.



____29. File (or sand) a 45 degree bevel at the ends of the frets, as shown, working the file in a downward motion only, to avoid lifting the frets up.

____30. Test fit the FRETBOARD to the instrument again, making sure you can clamp it firmly to the NECK along its entire length. Leave 1/4" space at the end for fitting the NUT. Do any final leveling or flattening that might be necessary.



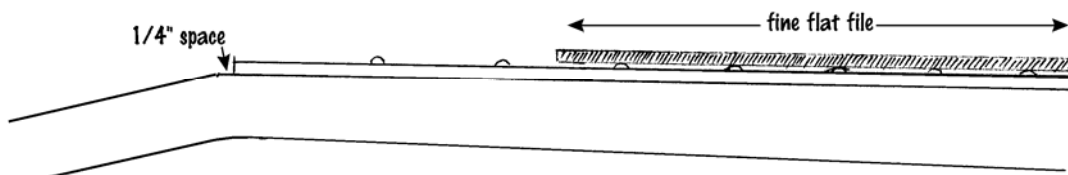
____31. Now you may glue the FRETBOARD to the instrument, being careful to line up the parts as planned.

CAUTION: DON'T LET THE FRETBOARD SLIDE OUT OF POSITION AS YOU TIGHTEN THE CLAMPS. Some resourceful customers embed a tiny nail at each end of the NECK to "poke" the FRETBOARD as it is clamped. Then it cannot slide around.

___32. When dry, remove the clamps and sand the edges of the NECK and FRETBOARD to remove dried glue and to smooth off the playing surface.

Also, clean up any excess glue that shows on the soundboard at either side of the fretboard. We use a sharp chisel or knife for that.

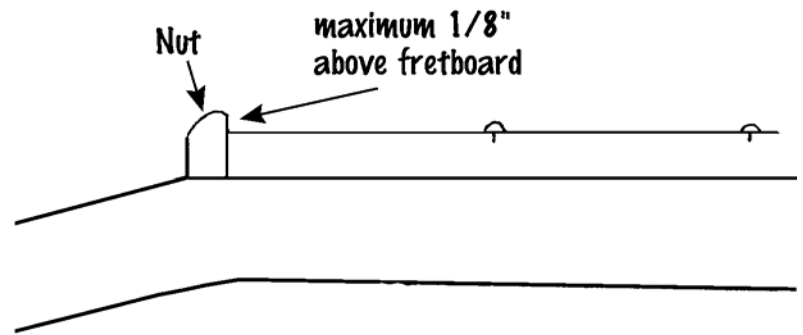
___33. Now is a good time to "level" the tops of all the frets. Use a large flat mill file, resting on the FRETS, to wear down any that are too high. Check your progress frequently to see which frets are being cut and which ones are not. As soon as each fret has been scratched lightly with the file, you may consider them all level.



___34. Test-fit the plastic NUT to the end of the FRETBOARD. We use a disk sander or belt sander to trim the length so the ends are flush with the NECK. We also like to sand down the height and round over one edge of the NUT, as shown.

___35. When trimmed to size, the plastic NUT can be glued to the end of the FRETBOARD. Use Superglue or epoxy for this piece.

WA-LA! All the gluing is done. Sit back and relax as you ponder further possible embellishments and decide what type of finish to apply to your musical creation.



MORE OPTIONAL DECORATIONS

___36. Now is a good time to decorate the PEGHEAD and/or the SOUNDBOARD to further customize your beautiful creation. Here are a few fun ideas you could research and learn about:

***PEARL INLAY WORK** (can be difficult and expensive, but very beautiful. Use a Dremel Moto-Tool for the fine routing.)

HAND PAINTING (Acrylics work great -- seal the wood first with varnish or lacquer so you can easily clean up your mistakes if necessary. Then put a final clear coat over the paint.)

***WOOD-BURNING** (Buy a small woodburning pen! (avoid the big clumsy woodburners, and find something for detail work). Try adding subtle color between the lines of the pattern with good quality colored pencils.)

***WOOD MARQUETRY** (You can find many beautiful wood inlay veneer patterns to fit the peghead.)

***EMBOSSSED CARVINGS** (These are very simple to stain and glue in place on the peghead or soundboard.)

***A good source of tools and materials for decorations is:**

**Constantine's
2050 Eastchester Rd
Bronx, NY 10461
phone 800-223-8087**

APPLYING THE FINISH

____37. Your instrument is now ready for final sanding and finishing. Use a medium (180 grit) sandpaper to go over the entire instrument, rounding over all sharp edges, removing any glue residue, and smoothing out all scratches and machining marks. Be sure to work the sandpaper IN THE DIRECTION OF THE GRAIN, or you will just add more scratches. Sand until the whole thing feels good in your hands.

____38. In order to prevent the FRETBOARD from becoming sticky from excess finish, we recommend masking off the top surface (unless you are just planning to finish the whole instrument with oil). It is best to avoid putting varnish or lacquer on the frets. We just oil it lightly after varnishing the rest of the instrument.

____39. Read through the following comments about finishes before you go out and purchase anything. Here are some guidelines that we find helpful:

STAIN -- Stains are coloring agents and should only be used if you dislike the natural color of the wood. We usually do not apply stains to our projects, especially when they are made with naturally beautiful hardwoods such as cherry or walnut. These woods look very nice with just a clear finish. But, if you want to color the wood differently, your staining should be accomplished before applying a surface finish such as oil, varnish, or lacquer. We like ANILINE DYES for darkening the wood without obscuring the grain. Our 3-color powdered dyes (code *FINI-40*) can be mixed with denatured alcohol to the desired shade. The advantage of these dyes are quick drying time, deep colors, even penetration, and the opportunity to create a "sunburst" shading effect.

OIL -- An oil finish will give your wood a low luster appearance, bringing out the natural color of the grain, but it tends to soak into the wood and appear dry and "thirsty" after awhile. The principal advantage of an oil finish is that it can be applied and wiped dry immediately, so you can proceed to installing hardware (and strings) right away. The disadvantage of oil is that it usually does not give much surface protection or sheen, although there are some brands that include waxes and/or varnishes to give more surface build-up and luster.

VARNISH -- Any regular varnish will work fine on this project, but we recommend our wipe-on polyurethane called MUSICMAKER'S INSTRUMENT FINISH. Our complete finishing kit (code *FINI-20*) includes detailed instructions, sandpaper sheets, tack cloth, foam applicator, and lint-free wiping cloth, along with a pint can of semi-gloss polyurethane varnish. The advantages of this finish are its simple application, durability, and deep, soft luster. It also works well for protecting Heat Transfer decorations.

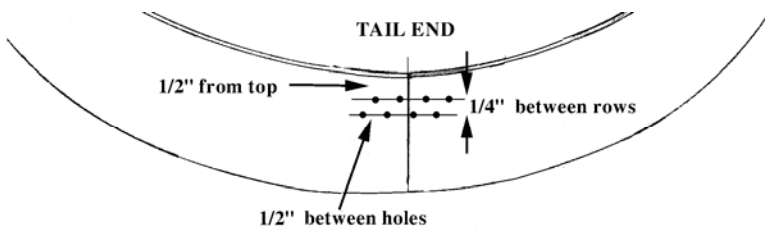
LACQUER -- Many professional instrument makers still use lacquer for their finish. The most readily available lacquer is called Deft Clear Wood Finish. It is best to purchase a can of liquid to brush on as a sealer coat first, and then use an aerosol can of the same product to spray on the final coats. The advantage of this finish is its quick drying time, but the disadvantage is the strong odor of the toxic lacquer fumes. CAUTION: Lacquer finish will not work over Heat Transfer decorations -- it dissolves the toner.

___40. So, "choose your weapon", follow the instructions on the can, and apply the finish of your choice. Don't forget to put finish on the bridge also. This is always our favorite step, watching the color of the wood as we apply the finish.

INSTALLING HARDWARE & STRINGS

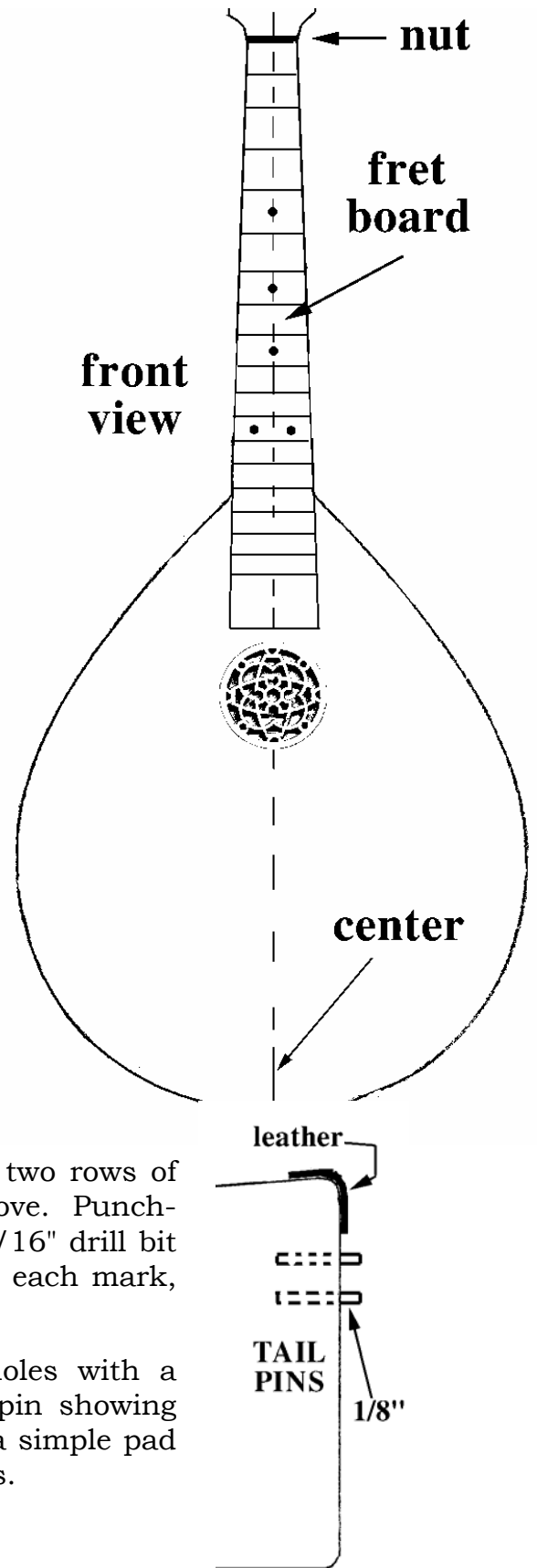
___41. When the final coat of finish is dry, check it over to see how you like it. There are simple ways to enhance the look of the instrument at this point if you are unhappy with it. A finish that is too shiny can be rubbed with very fine steel wool to soften its appearance. A finish that seems too dull can be shined up with some paste wax (yes, regular Johnson's paste wax for wood floors will do). Sometimes we use both treatments (steel wool followed by paste wax) to achieve the appearance we want.

___42. Before removing the masking tape from the FRETBOARD, draw a centerline down its length. Put a short strip of masking tape near the tail end of the instrument so you can also mark the center of the body at that end. Hold a straight edge on the centerline of the FRETBOARD and mark where it rests over the masking tape at the tail. This will help you position the eight TAIL PINS accurately.

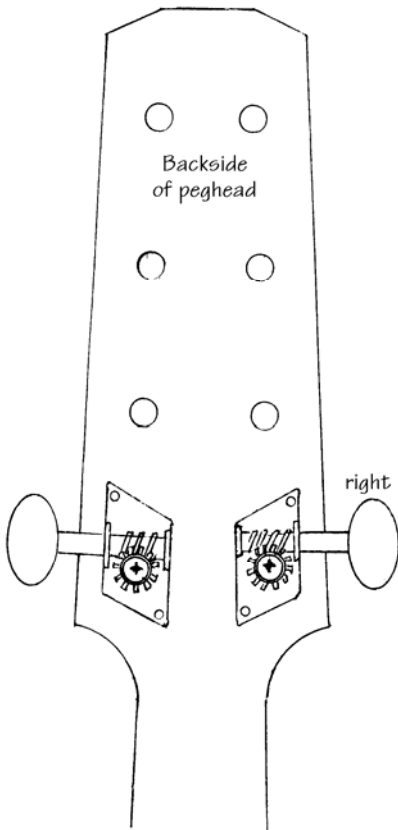


___43. Put another piece of masking tape across the seam at the tail end of the instrument and use a square to transfer your centerline down to it. Mark two rows of four positions, staggering the placement as shown above. Punch-mark these eight positions into the wood, then use 1/16" drill bit to drill straight into the tail end of the instrument at each mark, about 5/8" deep.

___44. Install the eight TAIL PINS into these holes with a hammer, making sure to leave about 1/8" of each pin showing above the wood. Cut the LEATHER SCRAP to make a simple pad to protect the corner of the instrument from the strings.



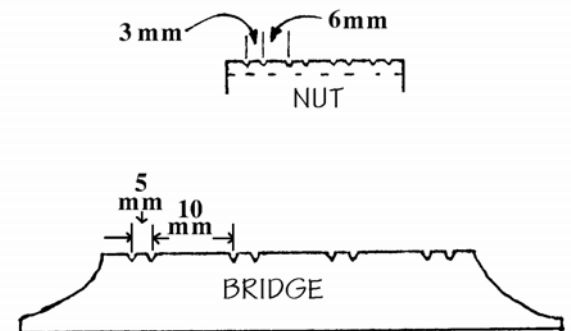
___45. Now you can remove the masking tape from the FRETBOARD and wipe a light coat of linseed oil or Tung oil on the frets and the walnut playing surface.



___46. Note that four of the geared tuners are oriented for the LEFT side and four for the RIGHT side. Check the drawing to see how we recommend installing them.

- Place the geared tuners in position, as shown, on the backside of the PEGHEAD taking care to arrange them so that all the LEFT-HAND gears are together on one side and the RIGHT-HAND gears are on the other.
- Use an awl or nail to punch the location of each hole for the screws that will fasten the tuners to the wood, taking care to line them up so the buttons will be easy to turn and will not interfere with each other.
- Drill a hole for each tiny screw, using a 1/16" drill bit, to a depth of about 3/8" .
- Install the geared tuners using the tiny screws provided.

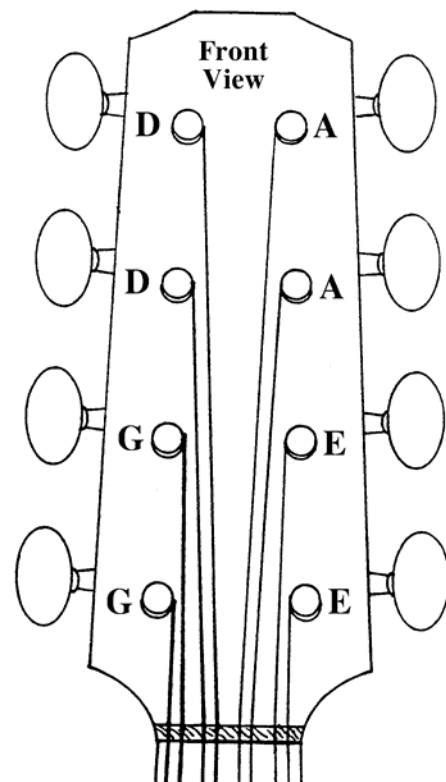
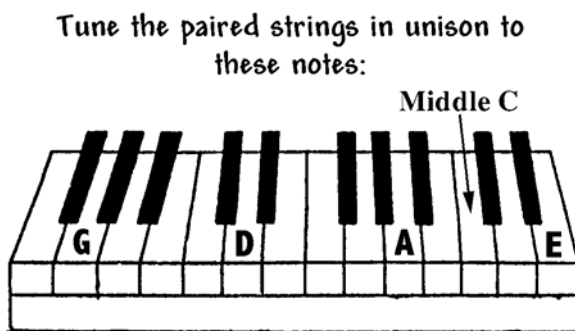
___47. Use a triangle file or fingernail file to cut small notches in the NUT and BRIDGE to hold the strings in the proper place, as shown. You may be cutting the notches deeper later, but just put a shallow cut in the



proper place for now.

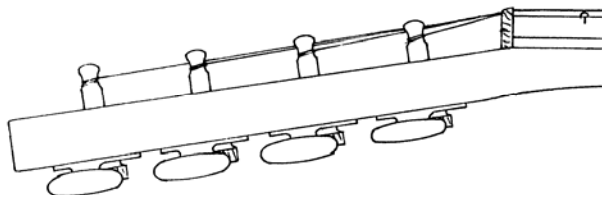
___48. Use masking tape to hold the bridge in position temporarily, 25-1/2" inches from the nut. (You can remove the tape after the strings are installed.)

___49. Install the strings in the order shown. (Note: You can make this a left-handed instrument by reversing the stringing order.)



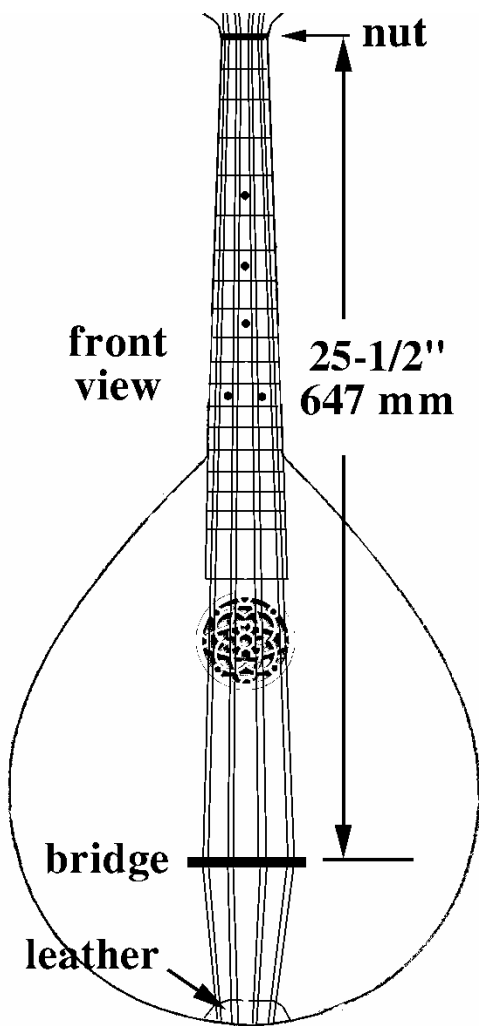
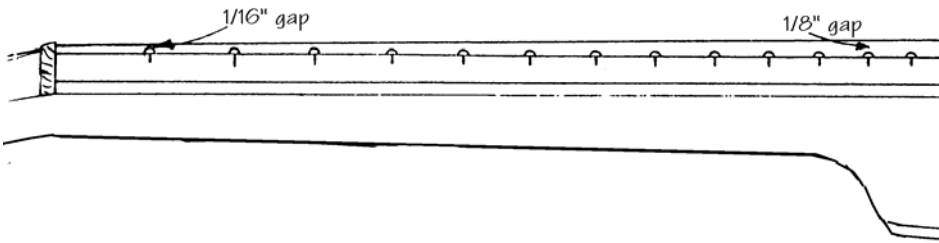
FINAL ADJUSTING & TUNING

____50. The depth of the notches in the NUT and BRIDGE will determine the “action” of your instrument, that is, the height of the strings above the frets. A low action makes the strings easy to hold down to the frets, but it can cause some annoying buzzing if too low.



Ideally, the strings should be about 1/16” above the first fret (near the PEGHEAD), and about 1/8” above the 14th fret (where the body joins the NECK).

File the notches deeper, as needed, to put the strings at the proper height above the frets. Yes, this is a fussy operation, but it is well worth the effort. As you begin playing the instrument, you may want to make even further changes to place the strings at a comfortable height for your playing style.



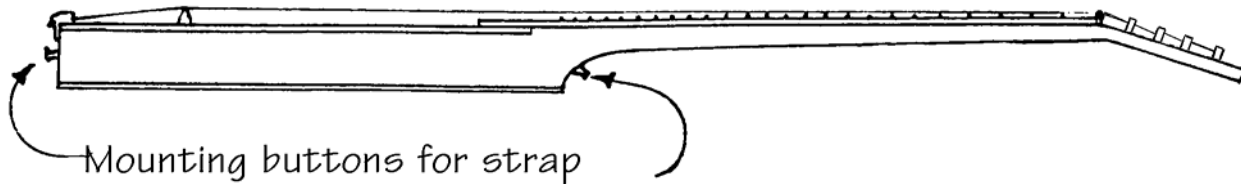
____51. The bridge is held in place only by the tension of the strings, so it can be moved, if necessary, to correct for any intonation (tuning) problems that might occur. The Bouzouki will not play perfectly in tune throughout the entire scale unless the bridge is placed correctly. The 25-1/2” measurement is the best *theoretical* placement, but it does not take into consideration the distortion caused by stretching the strings down to the frets. If you have a very good musical ear, or an electronic tuner, you can make fine adjustments as follows:

- Pluck a string in “open” position (when not being held against a fret)
- Pluck the same string while holding it down to the twelfth fret. This should produce an exact octave above the first note.
- If the octave sounds sharp, slide the bridge slightly toward the tail of the instrument and try again.
- If the octave sounds flat, slide the bridge slightly toward the soundhole.
- Repeat this procedure on several strings. You may find that the best position for the bridge will be slightly off a perpendicular line to the strings—that is OK.

___52. The TRUSS ROD may also require adjustment in order to keep the string action the way you like it. Turning the TRUSS ROD nut *clockwise* will exert upward pressure against the middle of the fretboard, causing the neck to bend backward, against the string tension. Conversely, turning the TRUSS ROD nut *counter-clockwise* will bend the neck forward, toward the strings. Use the ALLEN WRENCH enclosed for such adjustments.

You may find that seasonal changes in humidity will cause the neck to bend one way or the other. Or you may find that the constant string tension will bow the neck over time. The TRUSS ROD is your insurance policy that allows you to compensate for such changes.

___53. If you wish to attach a strap to your bouzouki, you can install mounting buttons in the locations shown here. Use a 3/32" drill bit for pilot holes for the mounting screws.



CONGRATULATIONS: You have made a beautiful instrument. Those who successfully complete a Bouzouki kit have demonstrated a high patience level and can easily build any of our other projects. We hope you enjoyed the process, and that you will get many years' musical pleasure from the finished instrument. Please let us know if you have any hints or suggestions that could help a future builder. We appreciate your participation in spreading the fun of musicmaking.

ACCESSORIES AVAILABLE FOR BOUZOUKI

BOUZSTRG	Spare set of 8 strings
BOUZBAG	Padded gig bag for Bouzouki
STRAP-2	Strap with 2 buttons
BOUZBK-03	Book, The Irish Bouzouki
BOUZBKCD-01	Guide to Octave Mand/Bouzouki

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