

IRISH BOUZOUKI (OCTAVE MANDOLIN) Kit



MUSICMAKER'S KITS

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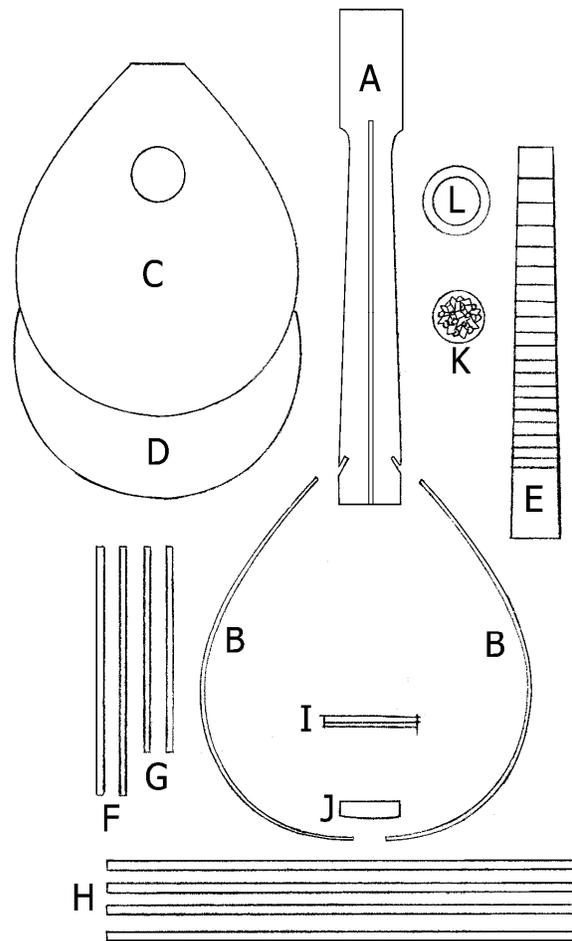
Irish Bouzouki (Octave Mandolin)

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
- f) 2 Long Braces for soundboard
- g) 2 Short Braces for back
- h) 4 Inner lining strips
- i) 1 Bridge
- j) 1 Tailblock
- k) 1 large Rosette
- l) 1 "Donut" ring for rosette

Hardware

- 8 individual black sealed gears
- 8 screws, Sleeves & Washers for tuners
- 1 set bouzouki strings
- 1 plastic nut, 1/4" x 1/2" x 1-3/4"
- Adjustable Truss Rod (in neck)
- Chrome Tailpiece w/3 screws
- Allen wrench for truss rod, 4mm
- Cover plate for truss rod w/ 3 screws
- 48" fretwire
- 5 Mother of Pearl marking dots, 1/4"
- 1 Set of Assembly Instructions



A NOTE ABOUT GLUE

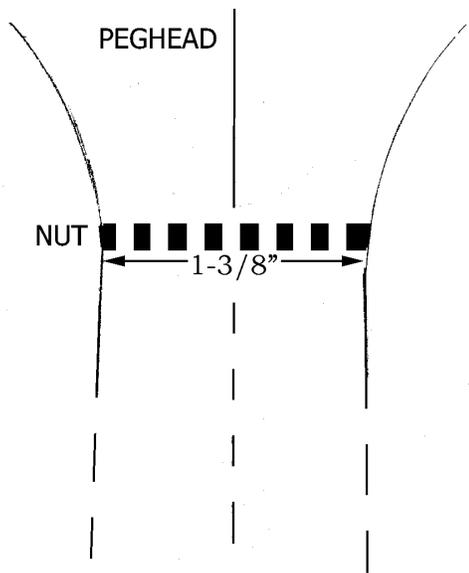
We strongly recommend that you use modern woodworking glue for this project. Aliphatic resins (such as Elmer's Carpenter's Wood Glue or Titebond I) are best because they hold the parts more securely than the old animal glues of yore. DO NOT assemble the wood parts of this project with epoxy or superglue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

If you have any questions about the assembly of your kit - please visit our online Builder's Forum
www.harpkits.com/forum

ASSEMBLY INSTRUCTIONS

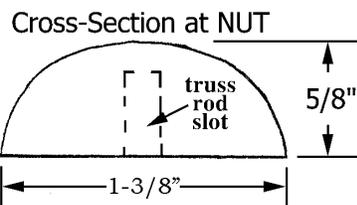
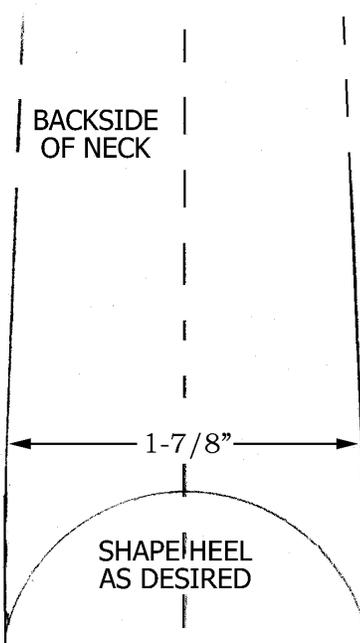


___ **1.** Please check over the parts in your kit to make sure nothing is missing. Call us right away if you find a problem so we can correct it without causing a delay in your progress. We also suggest skimming through the entire directions before beginning, just to get an overview of the project. 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.

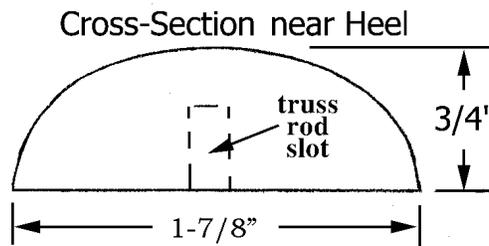
PREPARING NECK/PEGHEAD

___ **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 change the shape of the top end of the **PEGHEAD** if you wish. You can leave it square, or make a gentle curve – there should be enough wood to allow for some customization there, but just make sure you don't cut away so much wood that you interfere with mounting the geared tuners.



___ **4.** Round over the backside of the **NECK** and shape the **HEEL** to your liking. The standard width at the **NUT** is $1-3/8"$ for a Bouzouki.



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!

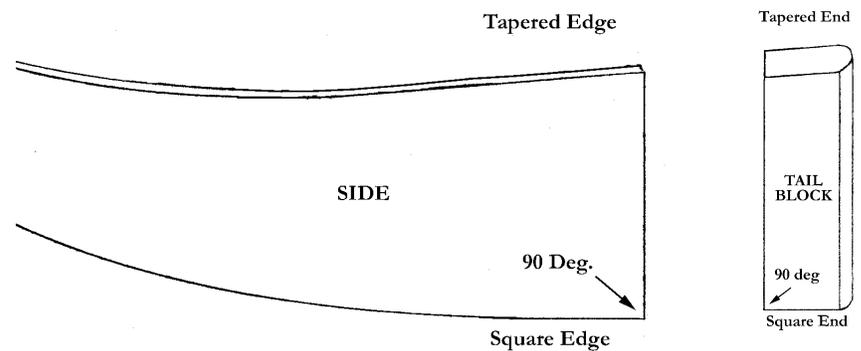
GLUING SIDES TO NECK

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.

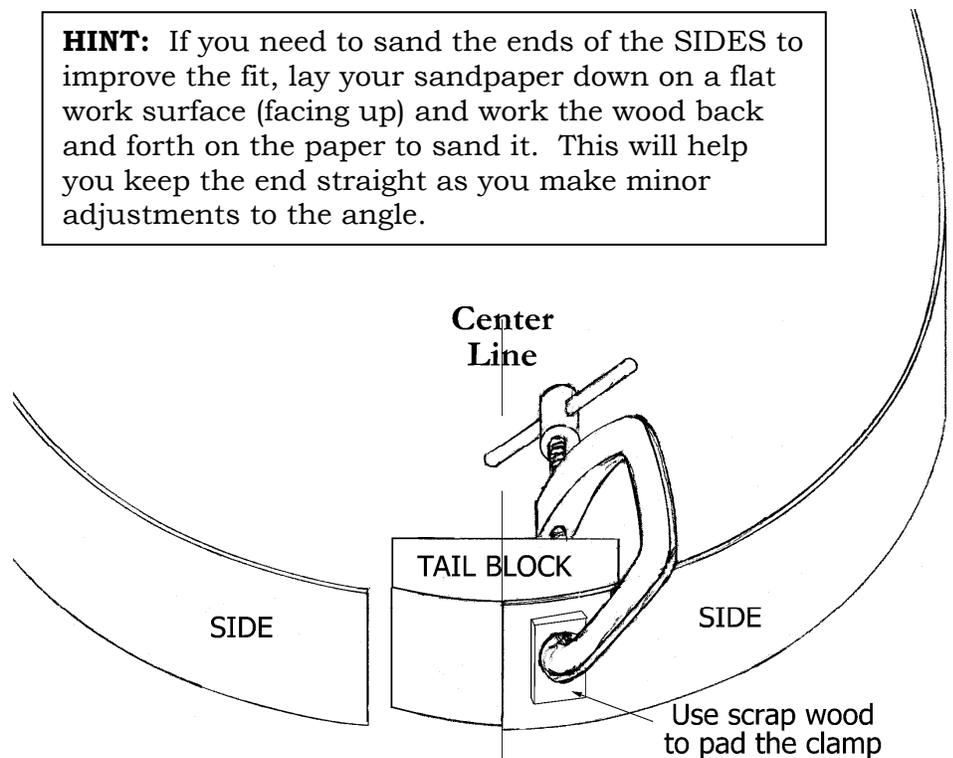
7. Place both **SIDES** and the **TAIL BLOCK** on a flat work surface with the square edges (front) facing down. Test-fit the two **SIDES** together with the **TAIL BLOCK**, as shown.

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.

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



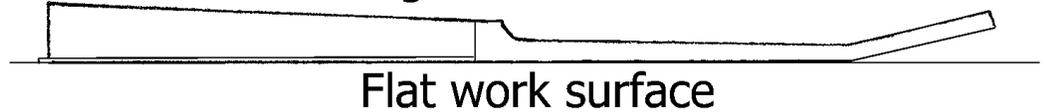
HINT: If you need to sand the ends of the **SIDES** to improve the fit, lay your sandpaper down on a flat work surface (facing up) and work the wood back and forth on the paper to sand it. This will help you keep the end straight as you make minor adjustments to the angle.



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

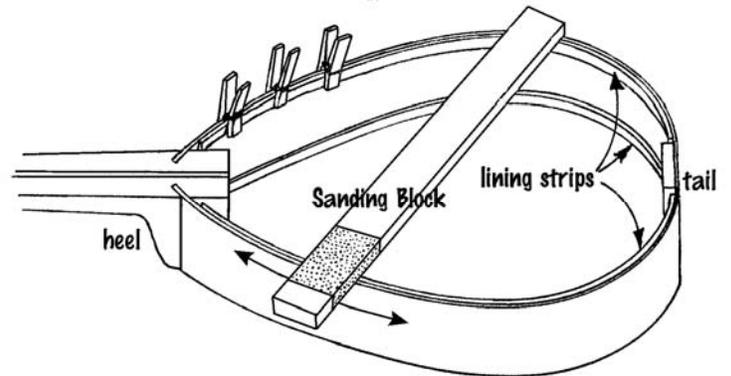


Flat work surface

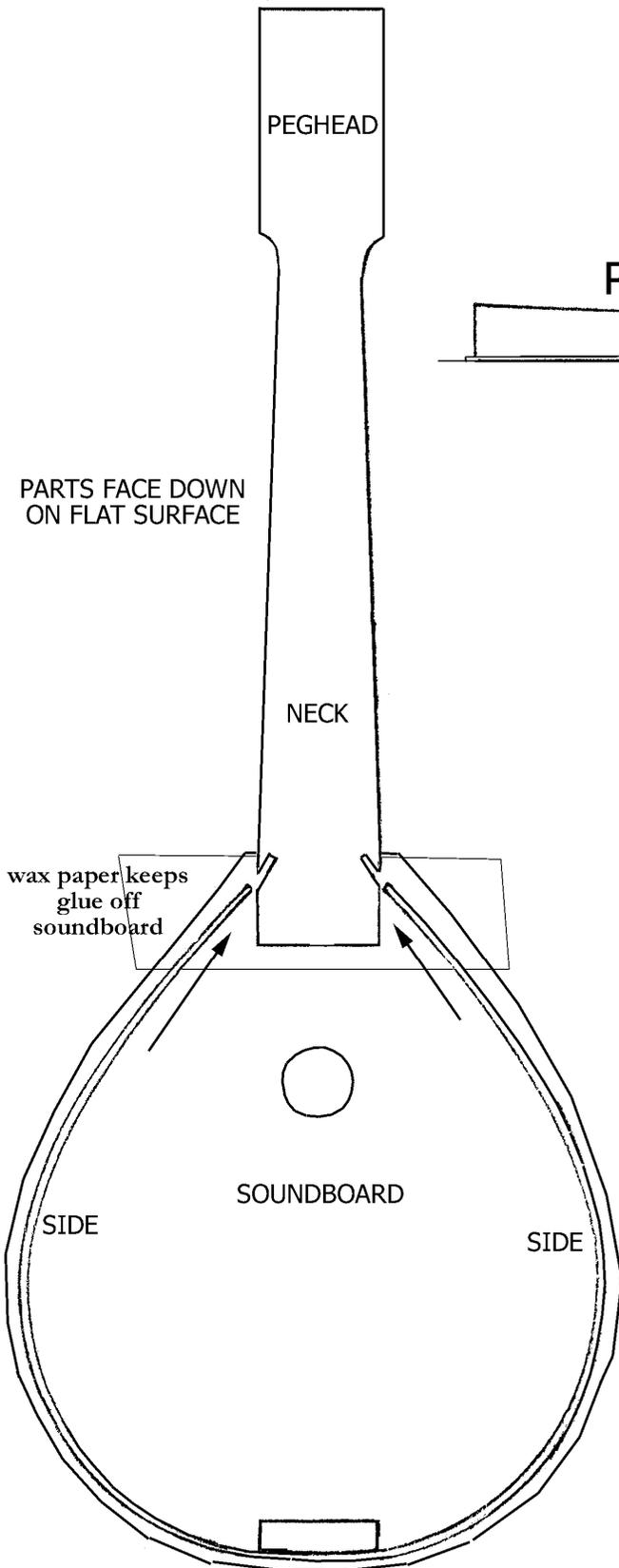
Double-check to make sure that the square edge (front) of the side assembly is facing down. When satisfied with the fit, glue the **SIDES** into the slots. **HINT:** Cover the **SOUNDBOARD** with wax paper or a plastic baggie to protect it from excess glue.

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.

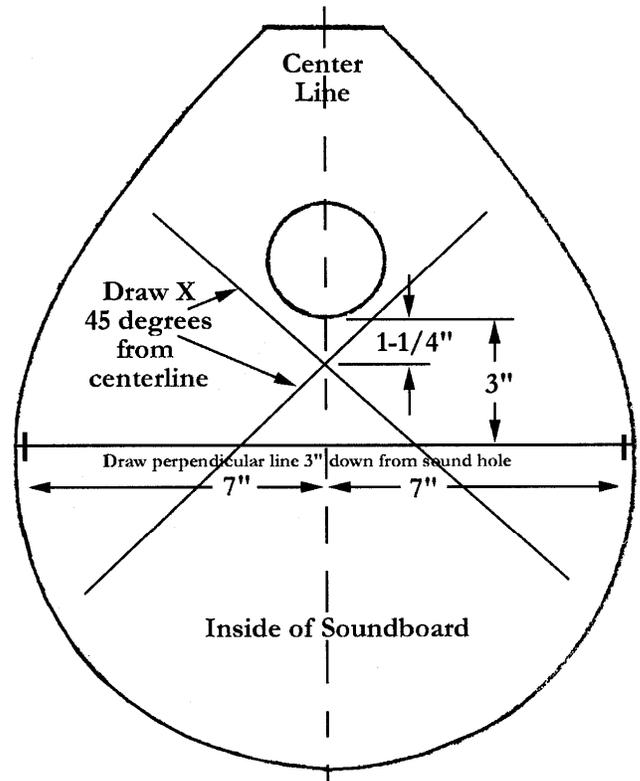


THE SOUNDBOARD (TOP)

____ **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, 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**. They are notched to fit together to form an "X". Glue them together at the notches, and set them aside to dry.

When dry, you can round over and shape the tops of the braces to match the shape of the shorter braces, like the cross-section illustration at right.



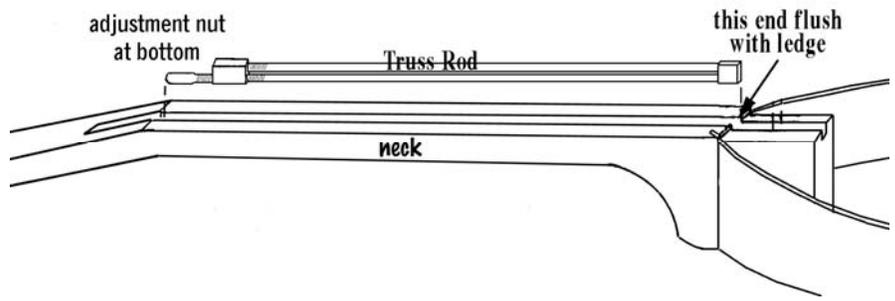
Cross-Section of Brace

____ **13.** Then you can glue the X-brace assembly to the soundboard with the **longer arms aiming down** toward the tail end of the soundboard. Place the braces below the pencil lines drawn in Step 11, and centered on your centerline. Use clamps and/or weights to hold the assembly firmly until dry.

Trim the ends of these braces, if necessary, so they will fit inside the frame of the instrument. A sharp chisel or razor knife should suffice for whittling off a little excess length of the braces if necessary.

____ **14.** When the X-bracing is installed and trimmed, 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 lower position near the **PEGHEAD**.

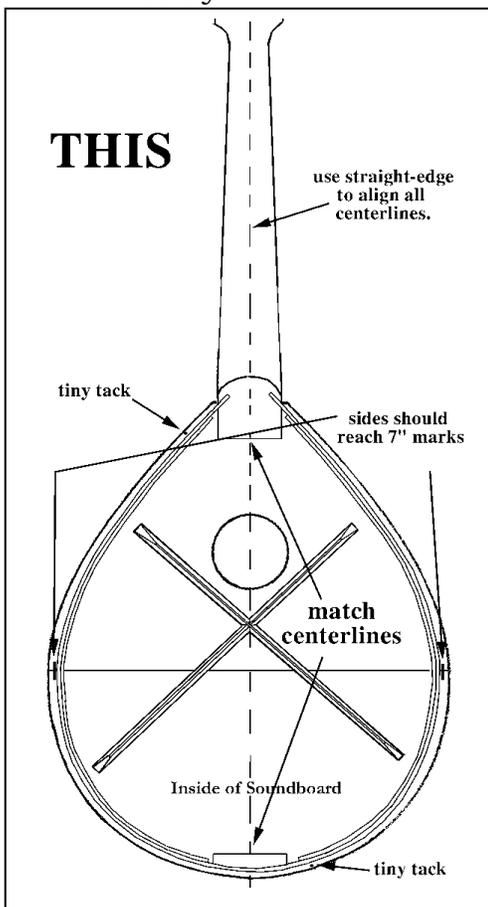


b) The other end of the **TRUSS ROD** should line up with the ledge where the soundboard will fit.

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.



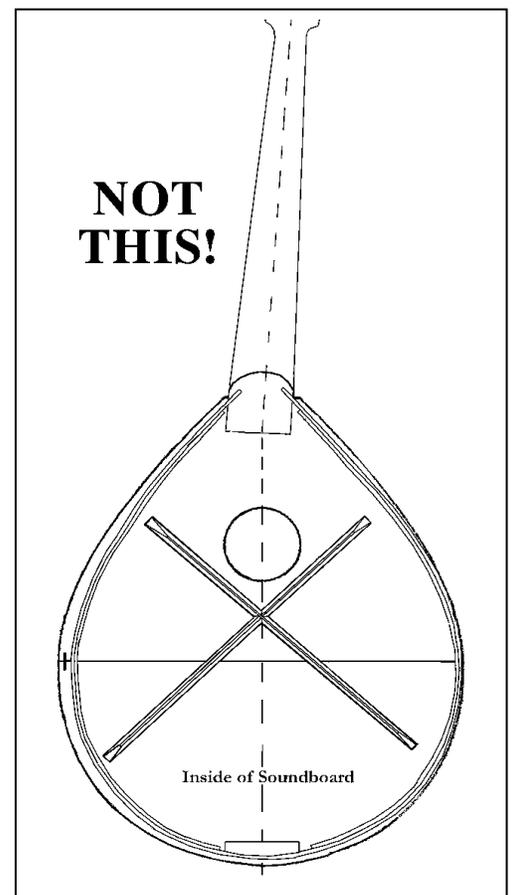
f) Finally, push the **TAIL** end of the body toward the **NECK** to spring the **SIDES** out to the 7" marks you placed on the **SOUNDBOARD**.

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!

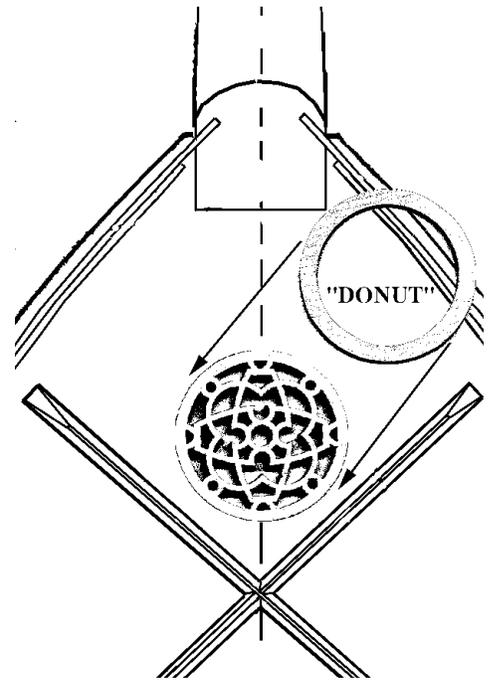
j) Use weights or clamps to hold the body in place until the glue dries.



OPTIONAL ACCESSORIES

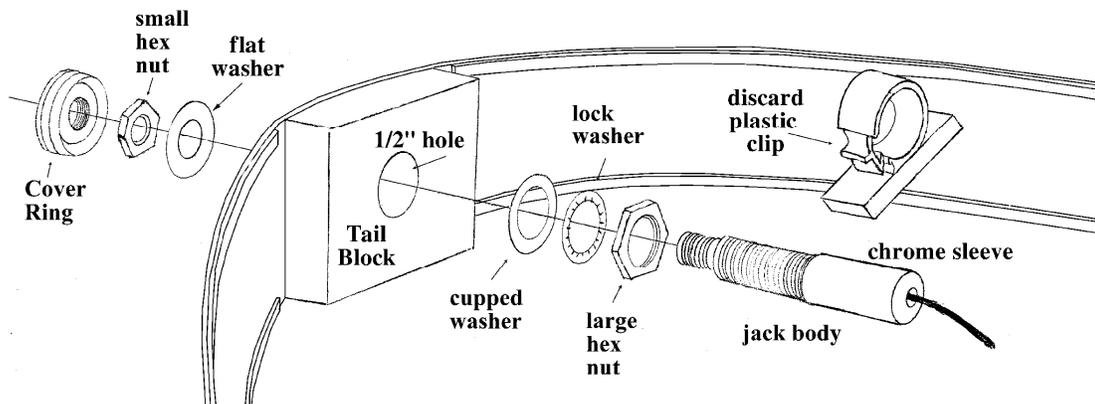
_____ **15. ROSETTE:** We find that a **ROSETTE** does not harm the sound of the Bouzouki, so we include our Celtic Knot pattern to decorate the instrument. You may exchange it for a different pattern (see MUSICMAKER'S catalog) if you wish. Here's how to install it:

- 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).

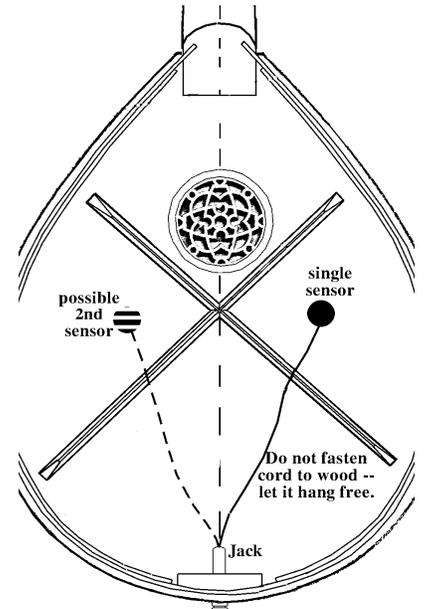


- b) Unscrew the cover ring and small hex nut at the front of the pickup jack, noting the proper sequence of parts.
- c) Discard the black plastic mounting clip. That is used only for temporary external mounting.

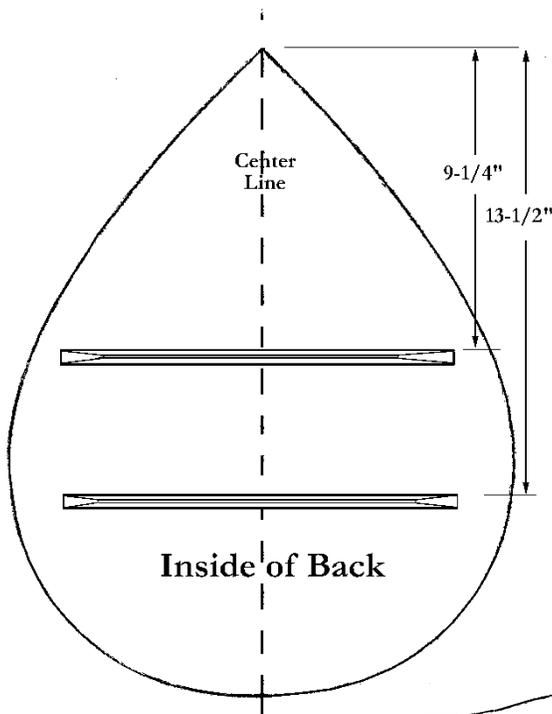
d) Adjust the threaded chrome sleeve and large hex nut to allow just the right amount of threads for the jack to poke through the hole. Test the cover ring to make sure. The smaller threaded portion of the jack should come out flush with the surface of the cover ring. When satisfied with the fit, tighten 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.



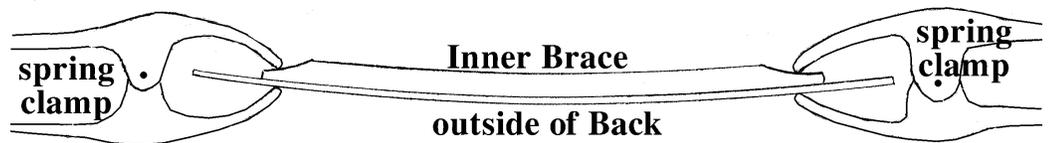
GLUING THE BACK



___ **17.** Select which face of the back you wish to show outward. Both surfaces are cherry veneer, but one face might have nicer grain than the other.

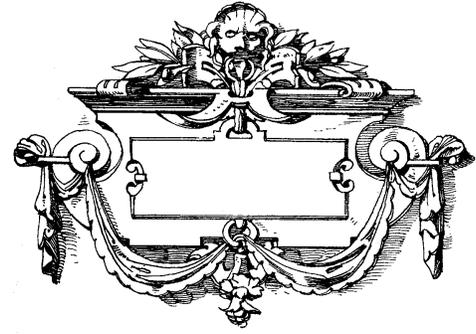
___ **18.** Draw a centerline down the inside of the **BACK**, and then draw perpendicular lines at the distances shown.

___ **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!



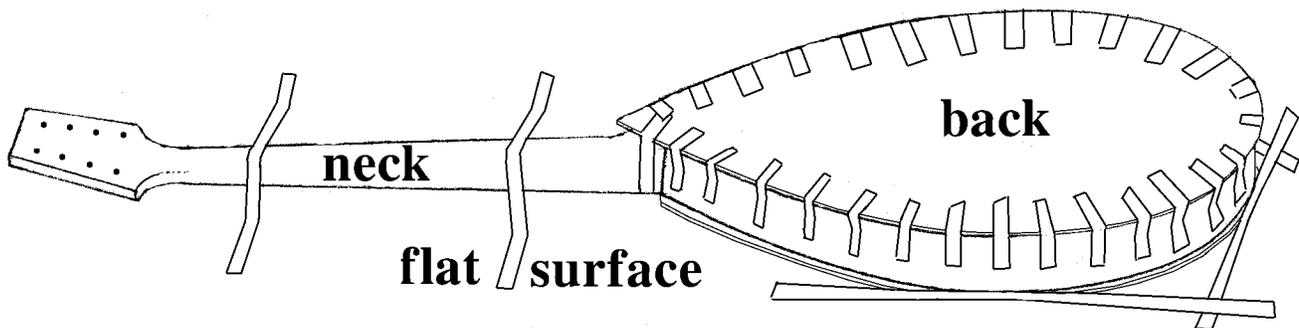
____ **20.** Now is a good time to sign and date your project inside the back before gluing it in place, so your signature will be visible through the soundhole when the instrument is assembled.

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.

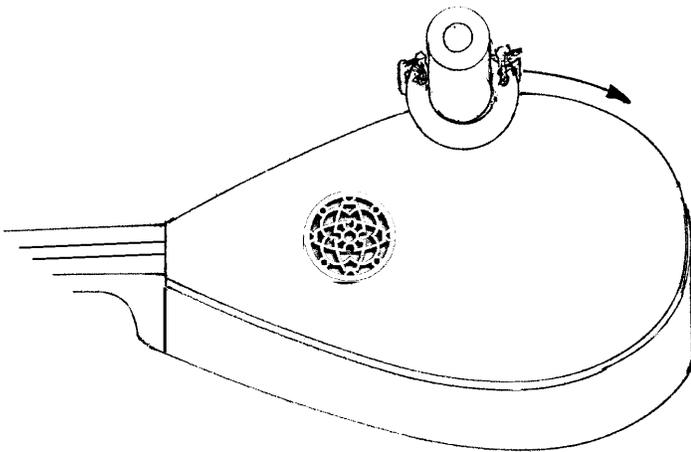
____ **22.** When the glue is dry, you may remove the excess overhang of both the **SOUNDBOARD** and the **BACK**. We use a router for this job, equipped with a flush cutting bit, but you may accomplish the task with a power sander, or by hand with a coarse sanding block or file. Trim all edges flush with the sides of the body, and shape the junction with the **NECK** into a nice curve.

OPTIONAL INLAY BANDING

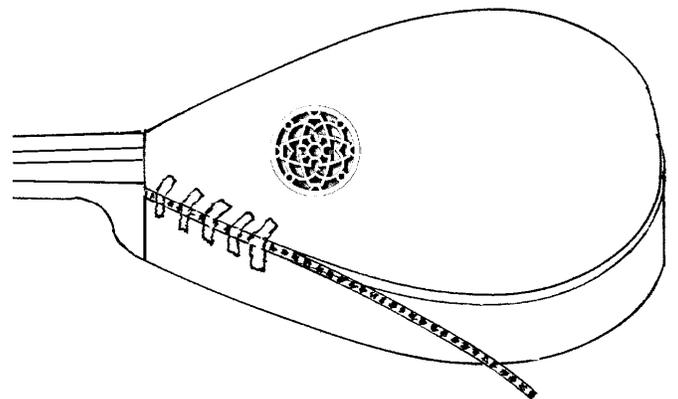
____ **23.** One nice option, if you have a router, is to inlay some decorative banding around the circumference of the **SOUNDBOARD** and/or **BACK**. We offer wood inlay banding strips for this purpose, shown in our MUSICMAKER'S catalog. You'll need about 48" of banding material to reach once around 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:

- a) We offer a Flush Trim Router Bit with a second smaller roller bearing that allows you to cut the right size ledge around the perimeter of the instrument using the smaller bearing (find it at www.harppkit.com/inlays).
- b) Use the bit with the larger roller bearing for trimming off the excess soundboard and back material first.
- c) Switch to the smaller bearing, as shown at right, for installing inlay banding.
- d) Adjust the height of the cut by raising or lowering the router bit.
- e) Make a sample cut in a scrap of wood and check your inlay banding to see how it fits.
- f) 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.
- g) 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.



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



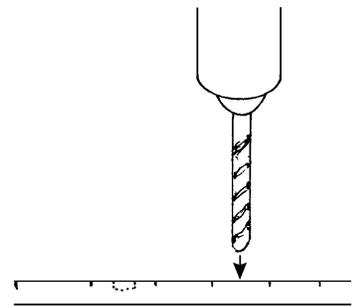
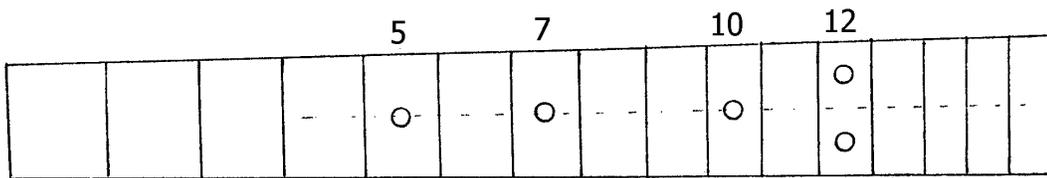
- h) When dry, remove masking tape and use a sanding block (medium grit) to clean up glue residue and to smooth out the inlay bands.

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.

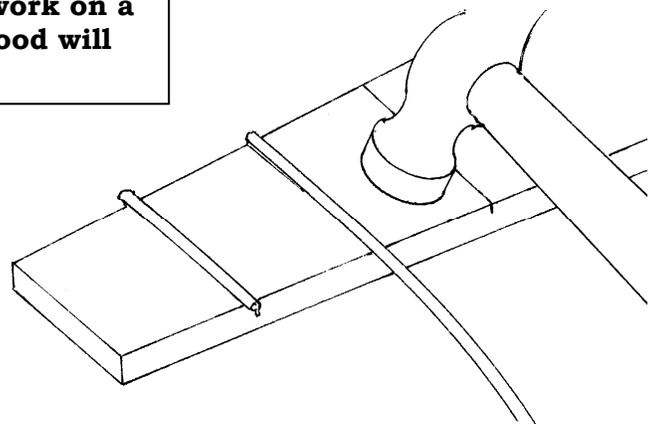


- Place scraps of masking tape on the **FRETBOARD** at the positions shown, so you can clearly draw some pencil marks.
- Mark the center of each space in pencil, and then use an awl or sharp nail to punch a depression at each point.
- Drill shallow holes of the size that matches your marking dots (1/4" 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.

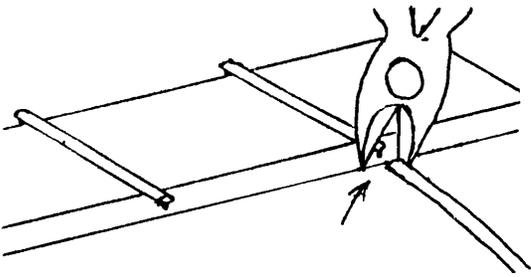
Place your FRETBOARD on a good firm surface for this operation. A flimsy table top will not do. Better to work on a concrete floor or a cement block. Otherwise, your wood will just bounce around as you try to put in the frets.

- 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.

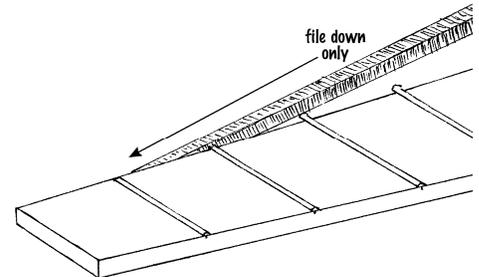
- d) When the fretwire is securely held by the wood, use a wire cutter to clip off the excess, as close to the wood as possible.
- e) Proceed to the next fret slot in the same way, and so on, until all frets are installed.



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.

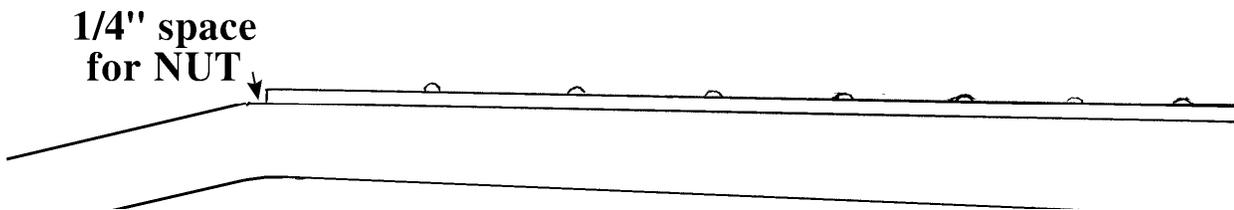
____ **27.** After the frets are all installed, we like to look them over very carefully to make sure each one fits all the way down against the wood. If one fret stands higher than another, it may cause buzzing problems later when playing the instrument. Try to tap it down fully into the slot. The shorter 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.



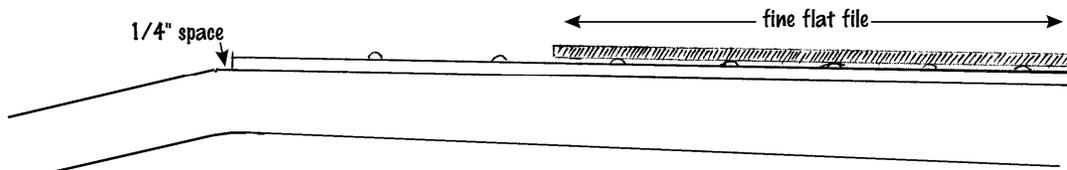
____ **31.** Now you may glue the **FRETBOARD** to the instrument, being careful to line up the parts as planned.

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.

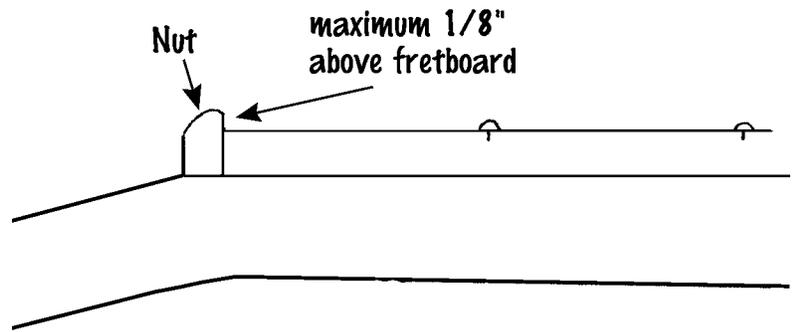
___ **33.** Now is a good time to "level" the tops of all the frets. Use a large flat mill file, resting on the **FRETS**, to wear down any that are too high. Check your progress frequently to see which frets are being cut and which ones are not. As soon as each fret has been scratched lightly with the 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:**

Rockler
www.rockler.com
phone 800-279-4441

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.

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 MUSICMAKER'S INSTRUMENT FINISH KIT. Our complete finishing kit (code *FINISHKIT*) includes detailed instructions, sandpaper sheets, and a half-pint can of wipe-on gel urethane 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.

____ **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.

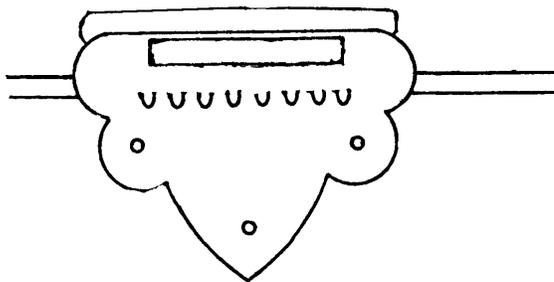
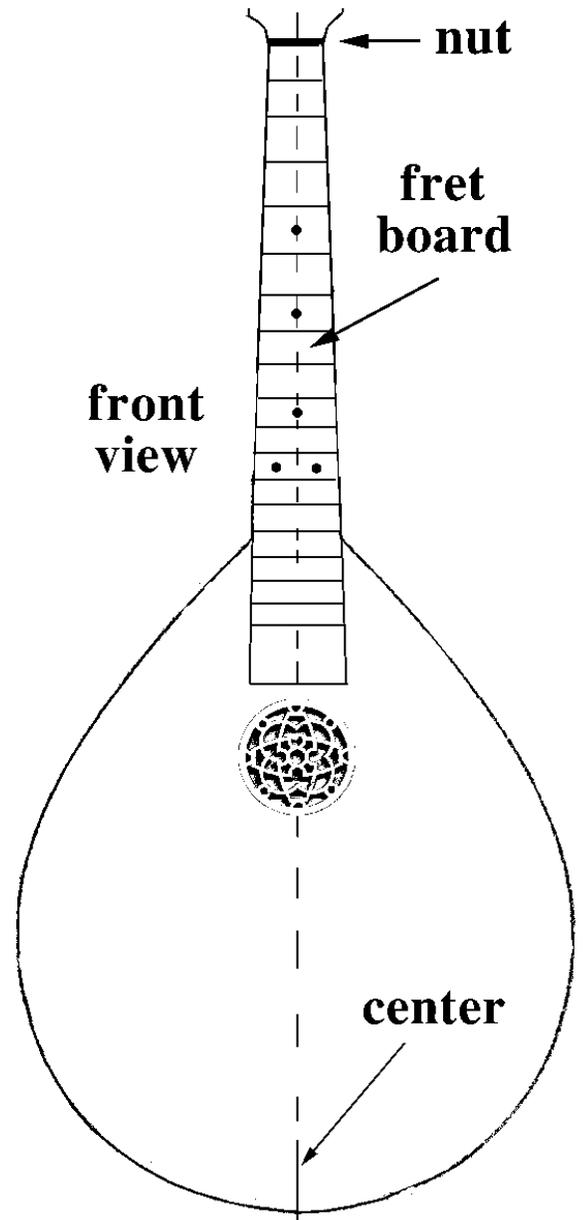
INSTALLING HARDWARE & STRINGS

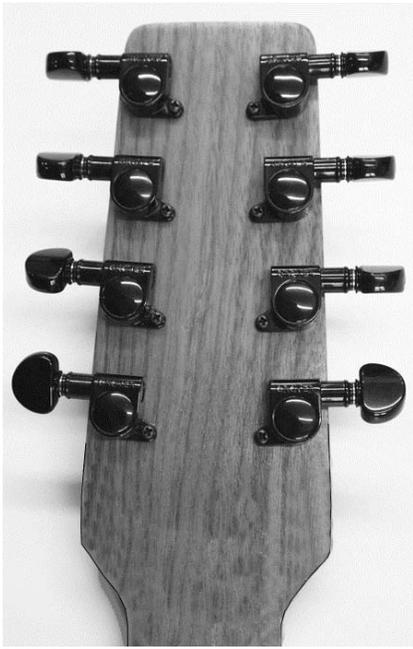
___ **41.** When the final coat of finish is dry, check it over to see how you like it. There are simple ways to enhance the look of the instrument at this point if you are unhappy with it. A finish that is too shiny can be rubbed with very fine steel wool to soften its appearance. A finish that seems 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 chrome **TAILPIECE** accurately.

___ **43.** 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.

___ **44.** Install the **TAILPIECE** with the screws provided, centering it on your mark, as shown. Use 1/16" drill bit to put pilot holes into the wood for the screws.

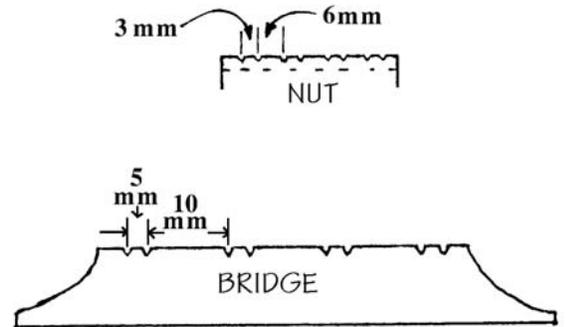




___ **45.** Note that four of the geared tuners are oriented for the **LEFT** side and four for the **RIGHT** side. Check the drawing to see how we recommend installing them.

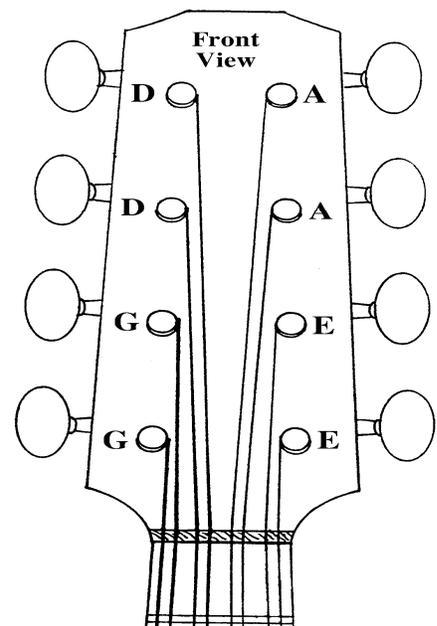
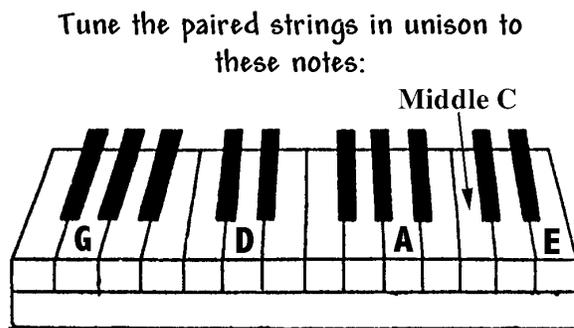
- a) Place the geared tuners in position, as shown, on the **backside of the PEGHEAD** taking care to arrange them so that all the **LEFT-HAND** gears are together on one side and the **RIGHT-HAND** gears are on the other.
- b) Use an awl or nail to punch the location of each hole for the screws that 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.
- c) Drill a hole for each tiny screw, using a 1/16" drill bit, to a depth of about 3/8" .
- d) Install the geared tuners using the tiny screws provided.

___ **46.** 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.



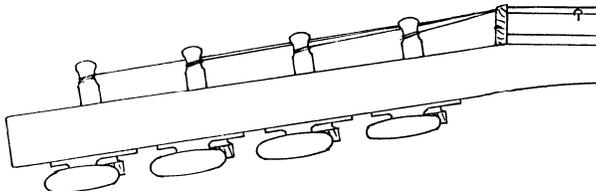
___ **47.** Use masking tape to hold the bridge in position temporarily, 25-1/2" inches from the nut. (You can remove the tape after the strings are installed.)

___ **48.** Install the strings in the order shown. (Note: You can make this a left-handed instrument by reversing the stringing order.)



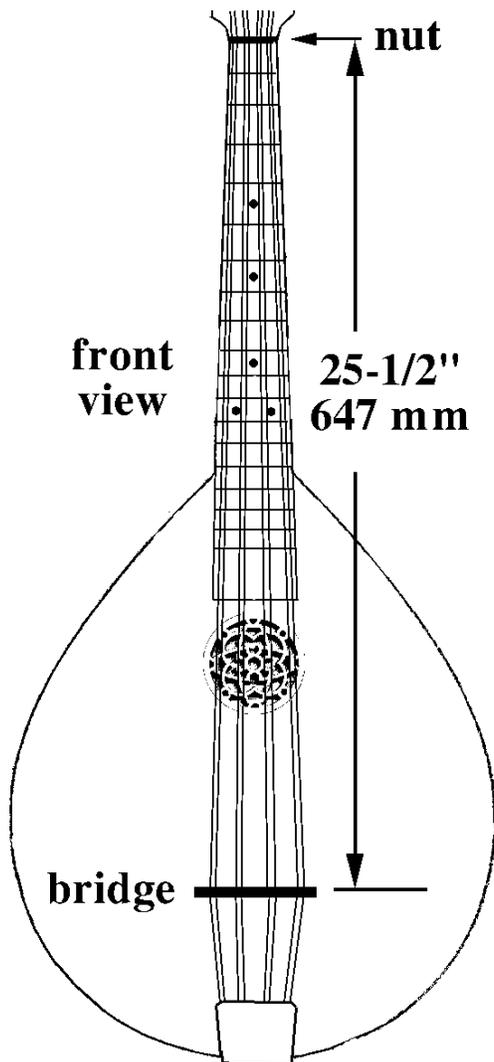
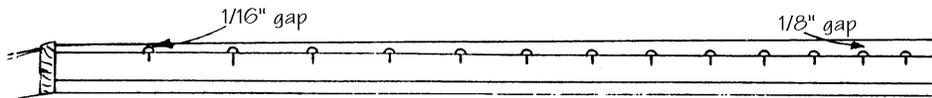
FINAL ADJUSTING & TUNING

___ **49.** 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.



___ **50.** 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.



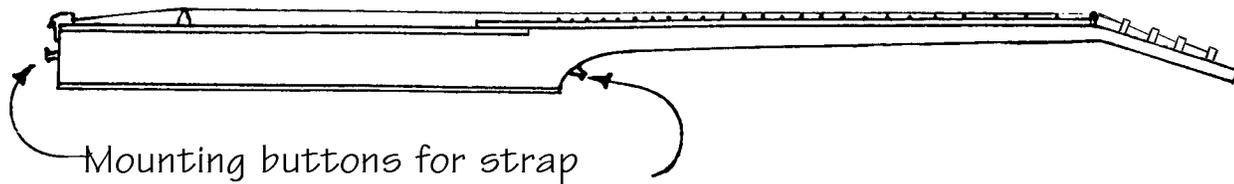
___ **51.** The bridge is held in place only by the tension of the strings, so it can be moved, if necessary, to correct for any intonation (tuning) problems that might occur. The Bouzouki will not play perfectly in tune throughout the entire scale unless the bridge is placed correctly. The $25\text{-}1/2$ " 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:

- a) Pluck a string in “open” position (when not being held against a fret)
- b) Pluck the same string while holding it down to the twelfth fret. This should produce an exact octave above the first note.
- c) If the octave sounds sharp, slide the bridge slightly toward the tail of the instrument and try again.
- d) If the octave sounds flat, slide the bridge slightly toward the soundhole.
- e) 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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