

Voyageur Harp KIT

Wood Parts:

- A - Soundboard, Aircraft Birch
- B - Back Panel, Plywood
- C - 2 Sides, Solid Cherry
- D - 1 Pre-drilled Neck, Solid Cherry
- E - 1 Pillar, Solid Cherry
- F - 1 Top Block, Walnut
- G - 2 Inner Braces, Hardwood
- H - 1 Base, Hardwood
- I - 1 Inner Reinforcement Bar
- J - Stiffener Brace
- K - 2 Feet, Solid Walnut
- L - 1 Short Trim Strip, Back
- M - 1 Short Trim Strip, Front (Drilled)
- N - 4 Long Trim Strips, Sides

Hardware:

- 34 Threaded Tuning Pins
- 1 Brass Driver for Tuning Pins
- 12 Large Brass Eyelets
- 22 Medium Brass Eyelets
- 22 Threaded Bridge Pins, Small
- 12 Threaded Bridge Pins, Large
- 2 Allen Wrenches, 5/64" & 3/32"
- 2 Wood Screws, 1"
- 11 Wood Screws, 1-5/8"
- 2 Wood Plugs, 3/8" dia
- 1 Tapered Wood Plug, 1/2" dia
- 1 Musicmakers Medallion
- 1 Dowel, 3/8" X 2"
- 1 #20 Wood Biscuit
- 3 Drill Bits, 1/8", 5/32" & 7/64"
- 2 oz Wire Nails, 3/4" X 18
- 4 Rubber Bumpers for Feet
- 4 Round Head Black Screws, #8 X 3/4"
- 1 Allen Wrench, 5/16"
- 1 Tuning Wrench
- 1 Set of 34 Harp Strings w/ dowels
- 1 Spacing Guide for Bridge Pins
- 1 Scrap Soundboard Piece
- 1 Assembly Instructions

Voyageur Harp Kit

BEFORE YOU BEGIN

Please take the time to check over the parts of our kit now, to make sure everything is there. If you discover a problem, call us right away so we can rectify it quickly without causing you much delay in your project. 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.

A NOTE ABOUT GLUE

DO NOT ASSEMBLE THIS PROJECT WITH CHEAP EPOXY, SUPERGLUE, OR HOT MELT GLUE!

Find a good woodworking glue. Many luthiers (guitar & violin makers) still use the natural hide glues that have been around for centuries, carrying on a fine old tradition, but that does not mean that you should do the same. Animal glues require lots of experience for successful use. WE BUILD THIS INSTRUMENT WITH MODERN WOODWORKING ADHESIVE, SUCH AS ELMER'S CARPENTER'S WOOD GLUE OR TITEBOND (yellow aliphatic resins), because they hold the parts even more securely than the old hide glues. The few advantages that some people claim with hide glue are more than offset by the strength, durability, ease of application, and availability of the modern woodworking adhesives.

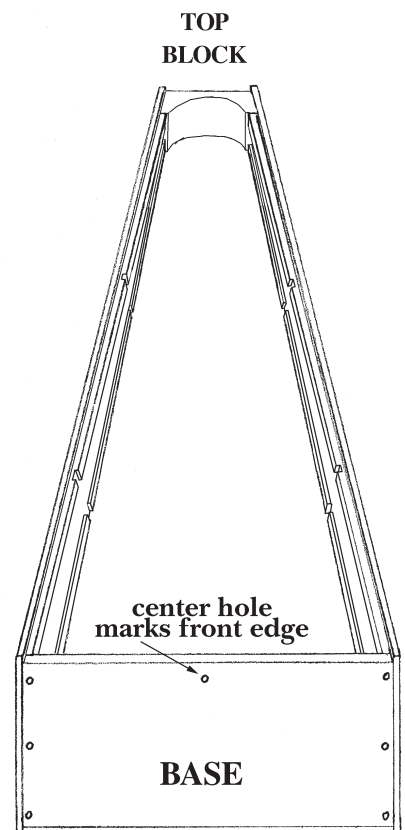
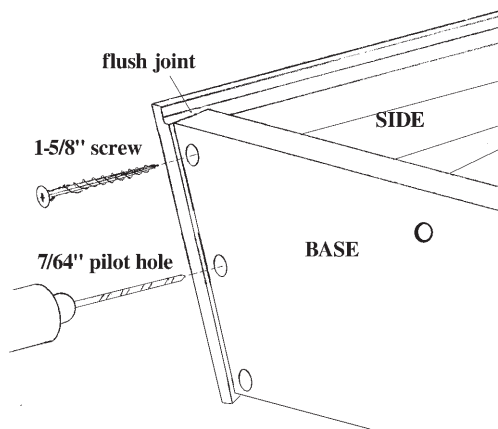
When gluing parts together, be sure to put enough glue on the joint to wet the entire surfaces to be joined. A good sign of proper gluing is that a little excess will squeeze out around the joint when clamping pressure is applied. Too little glue may cause the parts to separate later, whereas too much 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. Most wood-working adhesives "set" sufficiently after 30 minutes of clamping to allow you to proceed. Check your dispenser for recommended drying times.

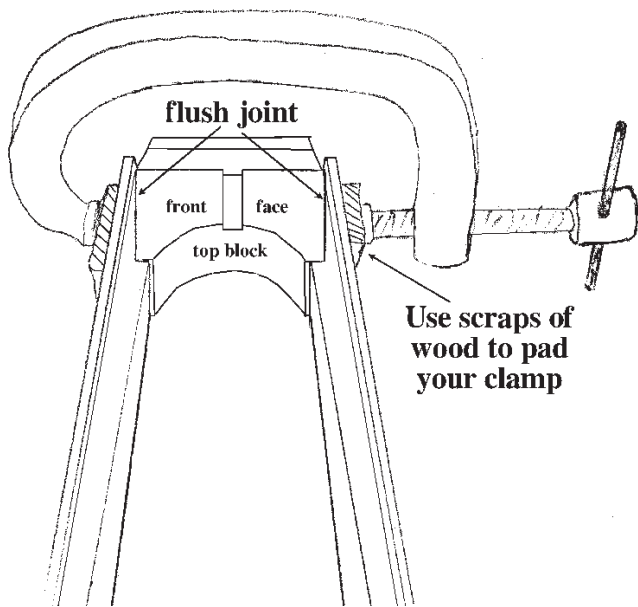
THE SOUNDCHAMBER FRAME

___ **1.** Check all parts of your kit against the parts list. Note that we have written the letter **"F"** on certain pieces to indicate **"FRONT"**.

___ **2.** Find the two **SIDES**, the **BASE**, and the **TOP BLOCK** for the soundchamber frame. Hold them together dry to check the fit of each joint. These parts must be oriented properly with the front facing forward on the box.

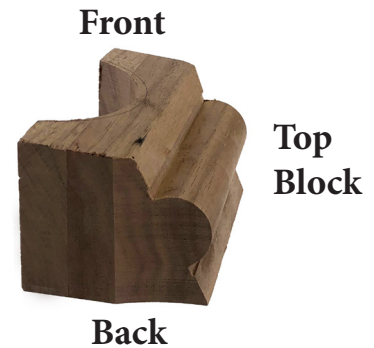
___ **3.** This illustration shows the parts arranged with the front facing up, but you may want to turn them all over to make it easier to assemble them. Drill pilot holes for wood screws at each end of the **BASE**, as follows: Hold the **BASE** in position at the bottom of the **SIDE** pieces with all edges flush and tight. Drill through the **BASE** into the **SIDE** pieces with a $7/64$ " bit.





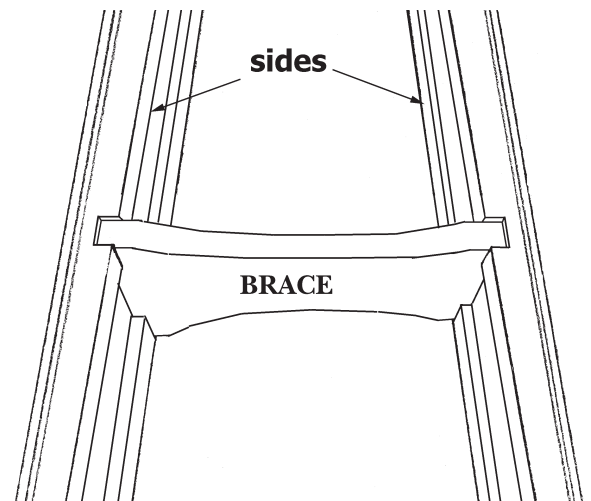
___ **4.** When ready to assemble the frame, apply glue to the joints at the **BASE** first, holding the pieces together while you insert the screws to draw the **SIDES** tightly onto the **BASE**.

___ **5.** Test fit the **TOP BLOCK** between the **SIDES** at the other end of the frame. It must be oriented correctly! See photo below. Apply glue to the contacting surfaces, place the parts together and clamp them, making sure all edges are flush.



___ **6.** Find and check the fit of the two inner **BRACES**. The braces do not need to make contact with the front or back panels. We deliberately trim them a little narrower than the sides, so you should have a little gap at the front and back, as shown.

NOTE: Sometimes the braces are not the correct length to fit between the sides. This can be caused by sloppy cutting on our part, but more likely the sides have bowed a little from humidity changes after we prepared them. You can check that with a straight-edge and push or pull the sides into alignment as you glue the braces in place. If a brace is simply too short, however, you can shim the space with a thin scrap of wood. If too long, use a disk sander to remove a small amount without rounding the end.

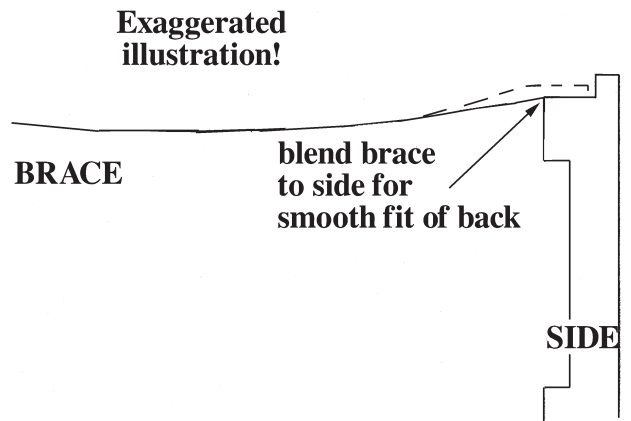


When satisfied with the fit of each **BRACE**, glue them in place and apply pressure (clamps or tape) to pull the **SIDES** together against the **BRACES** until dry.

___ **7.** Be sure to clean up excess glue drips that might interfere with installation of the front or back panels.

THE BACK

___ **8.** Check over the back edges of the harp frame. If any of the **BRACES** stand above the ledge on the **SIDES**, sand the excess material down flush with the ledge.



___ **9.** Test fit the **BACK** panel to the frame. It should seat into the ledges of each **SIDE**. Our parts are often generously sized. You will have excess plywood extending beyond the **TOP BLOCK** and **BASE** of the frame which must be sanded flush later.

If necessary, you may sand or plane along the edges of the **BACK** to adjust the fit against the **SIDES**. We use a hand plane to accomplish such fitting. No need for perfection, as slight gaps will be covered over later when you add **TRIM PIECES**. It would be nice to get a tight fit at the top, though, because a gap there will show at the end.

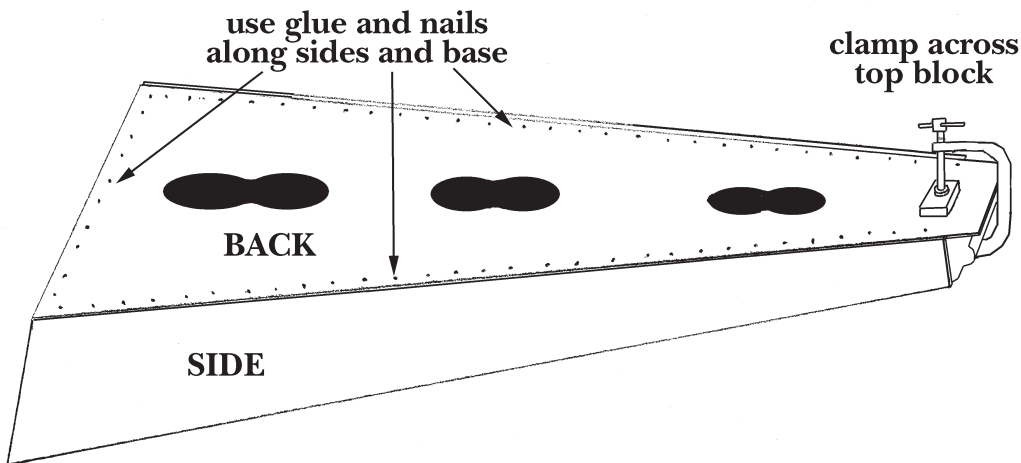
HINT: It would save you time and effort to trace and trim off the majority of the excess overhang at each end of the **BACK** before installing it. Leave just enough excess that will be easy to sand off later.

___ **10.** Clean off all sawdust from the frame and the back panel before gluing.

GOOD SUGGESTION

Every time you do some gluing on your project, we advise having a clean damp rag handy for cleaning up the excess glue that squeezes out of the joints. Keep your fingers clean too. Rinse the rag frequently to avoid spreading glue around as you wipe. Make sure all glue residue is removed. This will help save you lots of time toward the end of the project when you are preparing to apply the finish.

Apply a thick bead of glue to the backside of the entire frame where it contacts the **BACK** panel, including the **BRACES**, **TOP BLOCK**, and **BASE**.



Place the **BACK** in position with one clamp at the **TOP BLOCK** to prevent it from sliding downward on the frame. Make sure the panel fits into the ledges of each side.

Tack the plywood **BACK** to the frame using the nails provided. If you have a power tacker or stapler, that will be fine too. Place the nails about 1" apart and about 1/2" from the outside edge of the harp frame. This hardware will be covered over later by the **TRIM STRIPS** which are about 3/4" wide. Do not place tacks across the top of the harp where they would show on the finished instrument.

GO EASY WITH YOUR HAMMER! TRY NOT TO DENT THE SIDES OF THE HARP.

Try to work quickly, before the glue becomes too thick.

Clean off excess glue with your damp rags right away, making a thorough job of it.

POINT OF INTEREST

We use nails here because most people do not have enough clamps to hold the entire back in place at once. The nails do a nice job of holding the parts together until the glue dries. If you prefer to clamp the back in place, you may do so, as there is not much stress on this part of the instrument. You would, however, need a good number of clamps to span the entire perimeter of the harp.

THE SOUNDBOARD

POINT OF INTEREST

Many people ask why we use laminated wood instead of solid for the soundboard. The reason is that we get much more strength from laminated material than from solid, and virtually no breakage. The superior strength of this material allows us to use a thinner soundboard than if we were to use solid wood, so we also get better sound with a laminated front than we would with a solid front.

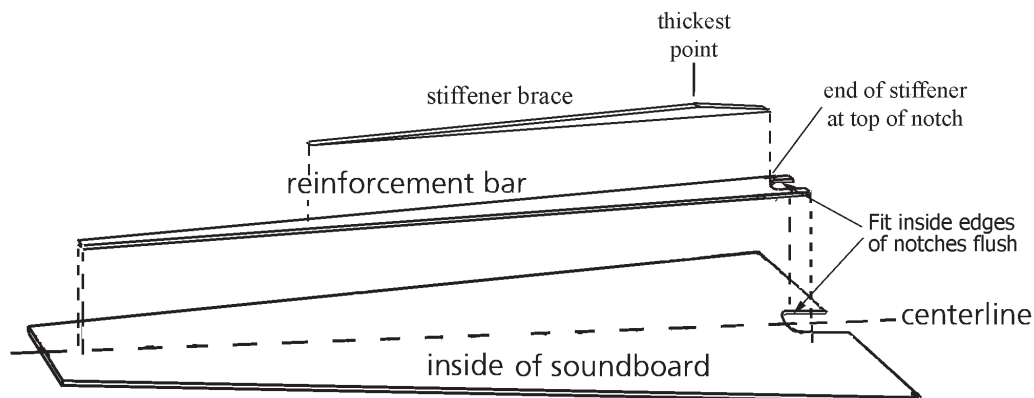
Some people ask if they can customize this project with a solid wood soundboard of their own making, such as solid spruce. To do that successfully, you'd have to alter the way the pillar attaches to the bottom of the harp, so as to avoid cutting a notch in the soundboard. Any hole in a solid wood soundboard would weaken the front panel so that it will break under the 1,000 pounds of string tension. We recommend consulting the book *Folk Harp Design and Construction*, by Jerry Brown, if you want to experiment with the way this harp is built.

____ **11.** Find the **SOUNDBOARD** and note which face has the punch-marks down the center. Put the **SOUNDBOARD** on your table with those punch-marks facing down, so the inside of the panel is facing up (if you like the plain face better, you may drill through at each punch mark and reverse the board). Draw a centerline down the length of the **SOUNDBOARD**, on the inside face only.

____ **12.** Orient the **INNER REINFORCEMENT BAR** and **STIFFENER BRACE** as shown on the centerline of the soundboard. Note that these parts should fit flush with the “notch” at the bottom, reinforcing the corners of that hole. Trace around these pieces so you can make sure they do not drift out of alignment as you glue them.

Glue the **REINFORCEMENT BAR** first so the notches line up, and the narrow top end is centered. Note that this piece is tapered as it proceeds up the harp. Use weights and/or clamps to hold it while the glue sets.

Then glue the **STIFFENER BRACE** on top of the **REINFORCEMENT BAR**. Note that the thickest point of this part should be oriented near the bottom of the soundboard.



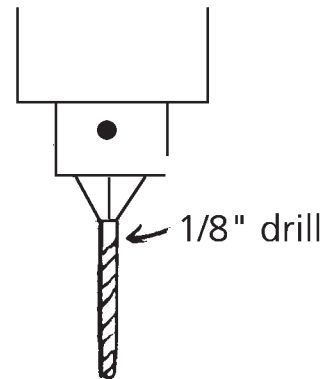
IMPORTANT: Make sure the parts do not slide out of alignment under pressure. This would be a good time to sign and date your harp, on the inside of the **SOUNDBOARD**, where it can be seen through one of the access holes in the **BACK**.

POINT OF INTEREST

Some people ask about finishing the inside of the soundchamber. We do not recommend it. Guitars and violins are not finished on the inside, so this instrument need not be sealed on the inside either. We understand the concern about the effects of humidity on the wood, but this instrument box is glued firmly all around, so there is no chance of warping from humidity. Besides, varnish cannot seal the wood from humidity (water vapor). It can only prevent liquids from soaking in, and even then only for a limited time.

____ **13.** When dry, turn the **SOUNDBOARD** over and look carefully for the punch marks on the front face of the panel. Use the 1/8" drill bit provided to bore the top 22 holes through all the layers of wood in the **SOUNDBOARD** assembly. Use a 5/32" drill bit to bore holes for the bottom (lowest pitched) 12 strings.

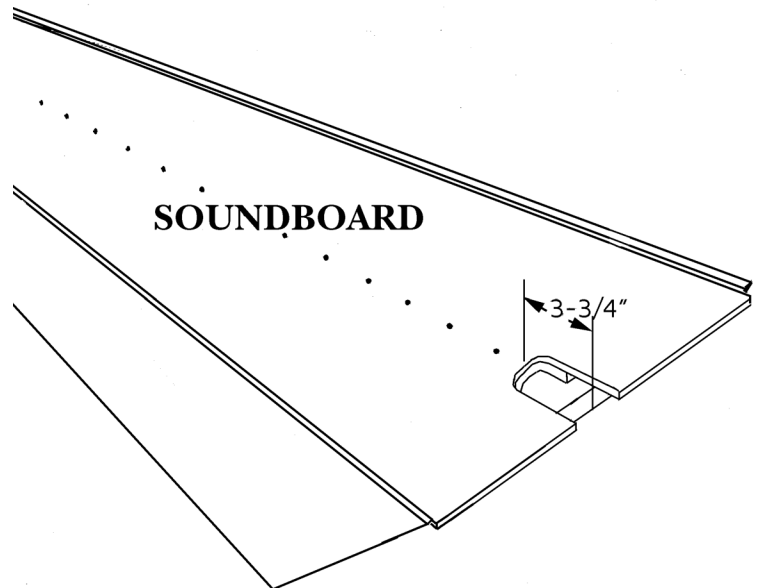
NOTE: These holes should be vertical (perpendicular to the soundboard)



INSTALLING THE SOUNDBOARD

____ **14.** Test fit the **SOUNDBOARD** to the front of the frame so the **NOTCH** at the bottom extends approx. 3-3/4" above the bottom of the **BASE**, as shown.

You may need to shave a little off each side of the **SOUNDBOARD** to make this piece fit further up into the ledges of the **SIDES**. We use a small hand plane for this fitting. You don't need a perfect fit along the sides, however. Slight gaps will be covered over later when you add the **TRIM STRIPS**, but we recommend trying to get a tight fit at the top of the frame, as a gap there will show at the end.



To save time later, trace & trim off the excess at each end before installing the **SOUNDBOARD**.

____ **15.** Apply a thick bead of glue around the four edges of the frame that will contact the soundboard. Quickly place the **SOUNDBOARD** in position and nail it in place along the bottom and sides, just as you did the **BACK** panel, using clamps at the **TOP BLOCK**.

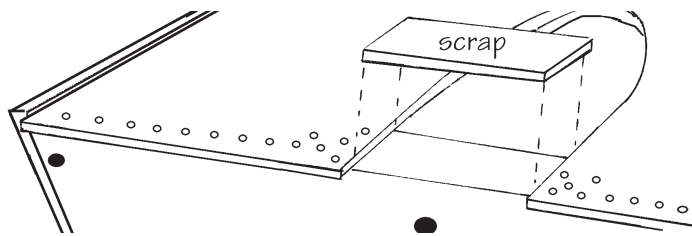
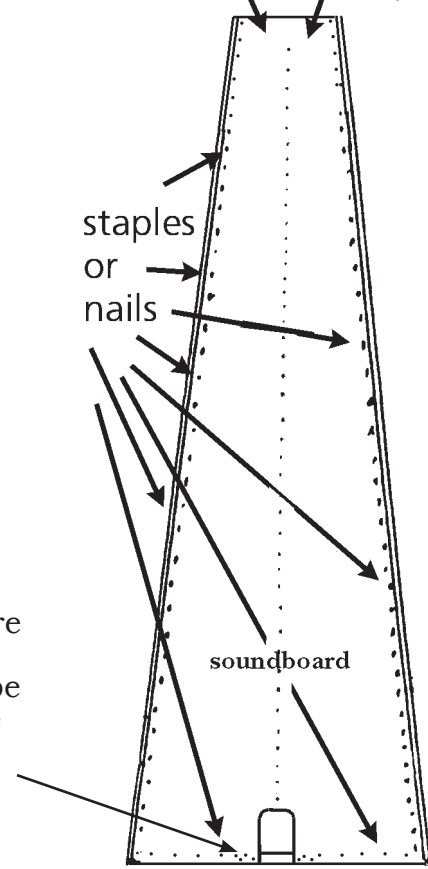
Clean off excess glue with your damp rags right away, making a thorough job of it.

CAUTION: BE SURE TO USE NAILS OR STAPLES FOR ADDED SECURITY.

Some woodworkers ask if they can simply clamp the soundboard in place, but we have found that mechanical fasteners, such as nails, staples, or screws, are necessary to avoid having the strings gradually pull the SOUNDBOARD off the frame. Yes, most glues are stronger than the wood itself, but we have found that high humidity can cause even the best glues to soften enough to allow the parts to creep slowly out of position under the high tension of the strings. If you omit the nails, don't complain to us if the SOUNDBOARD comes loose!

Add extra nails on either side of the notch -- this is where all the string tension will push the pillar downward. But it would be smart to look at where the bottom trim will be screwed over the nail heads (Step 21). Mark where those screws will be installed through the soundboard -- don't put nails in the way of those four screws.

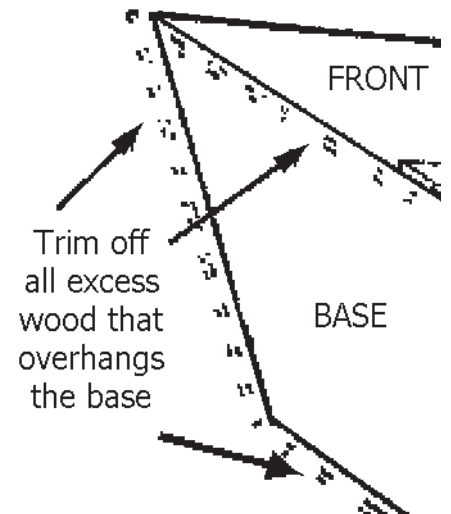
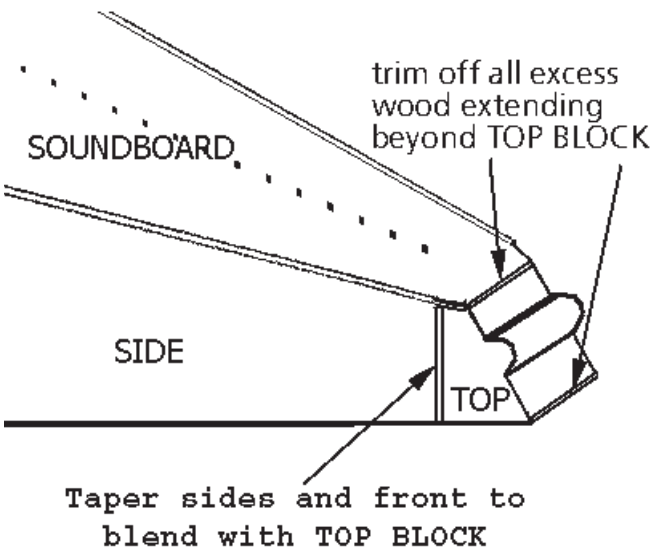
Use clamps instead of nails across the top



____ **16.** Add a scrap of soundboard material across the gap in the **BASE** that is exposed in the notch, as shown. Glue and nail it in place.

____ **17.** When the glue is dry, sand off all excess wood that hangs over the top and bottom of the harp. **THIS IS IMPORTANT** to ensure that the **FEET** will fit flat against the **BASE**.

Take the time to do a nice job with this. An electric hand sander with 50 grit paper does this job quickly, but you can do it by hand with coarse sandpaper wrapped around a scrap 2 X 4 block of wood.



ADDING TRIM STRIPS

___ **18.** Check to see if any nail heads along the **SOUNDBOARD** or **BACK** panel are raised up above the surface of the wood. If so, tap them deeper with a nail set and hammer.

___ **19.** Note that the **TRIM STRIPS** have an angle cut at one end. Take care to orient them correctly so the miters fit nicely at the bottom corners.

___ **20.** Begin with the back of the instrument.

a) Use masking tape to hold the pieces in place **WITHOUT GLUE** on the frame of the harp, flush with the outer edge, until you are happy with how they all fit together. 0

b) Trace and trim the excess length of the side trim pieces.

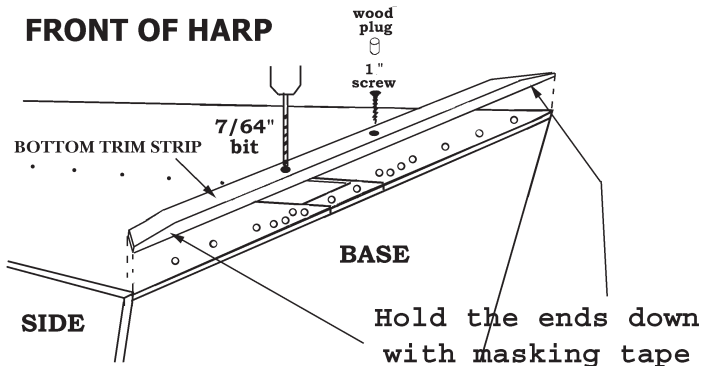
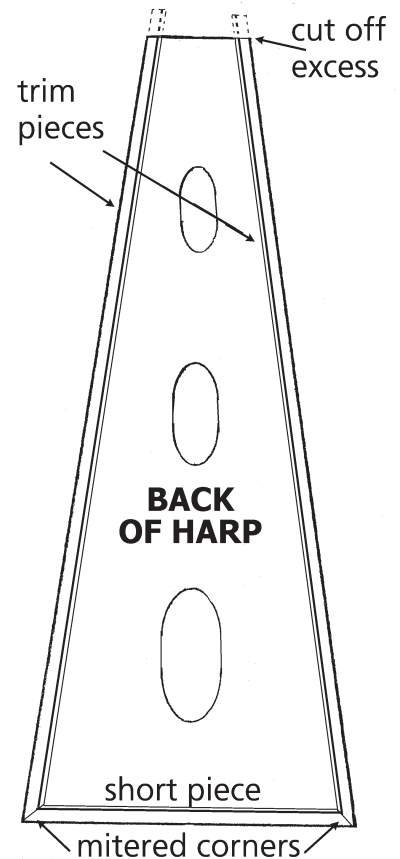
c) When satisfied with the fit, remove one piece at a time, apply glue to the underside, and then install it again permanently, using masking tape to hold it in position.

d) Proceed the same way with the other two trim strips.

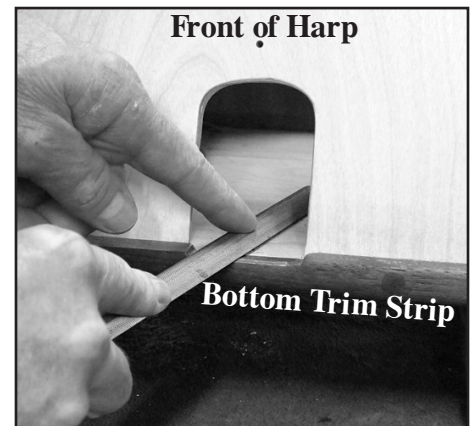
e) Allow at least an hour for drying before you turn the body over and install trim on the front.

___ **21.** On the front of the harp, the bottom **TRIM STRIP** needs to be glued and screwed in place. Install the bottom **TRIM STRIP** in this sequence:

- 1) Drill pilot holes into **BASE**
- 2) Insert short wood screws (1")
- 3) Glue wood plugs over screws (If the plugs are too tall, you can chop them in half with a chisel or razor knife before installing)
- 4) Sand plugs flush with surface of **TRIM STRIP**
- 5) Install side trim pieces in the same way you did on the back.

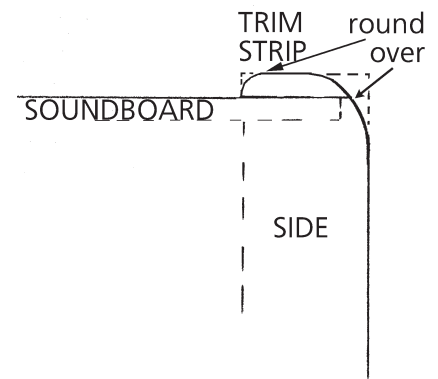


NOTE: IF THE BOTTOM FRONT TRIM INTERFERES WITH THE PILLAR RESTING ON THE BASE OF SOUNDCHAMBER, USE A CHISEL OR FILE TO CUT THE CENTER PORTION DOWN LEVEL WITH THE BASE.



SANDING THE SOUNDCHAMBER

___ **22.** We like to round over the sharp corners along the **SIDES** of the harp quite dramatically to soften the look and feel of the harp. If you have a router, you can use up to a 1/4" radius round-over bit to make quick work of this step (be sure to make your router cuts in shallow steps, gradually lowering the bit with each pass to prevent chip-out). If you don't have a router, we recommend using **80-100 GRIT** sandpaper on an electric sander or a sanding block to round over the sharp edges.



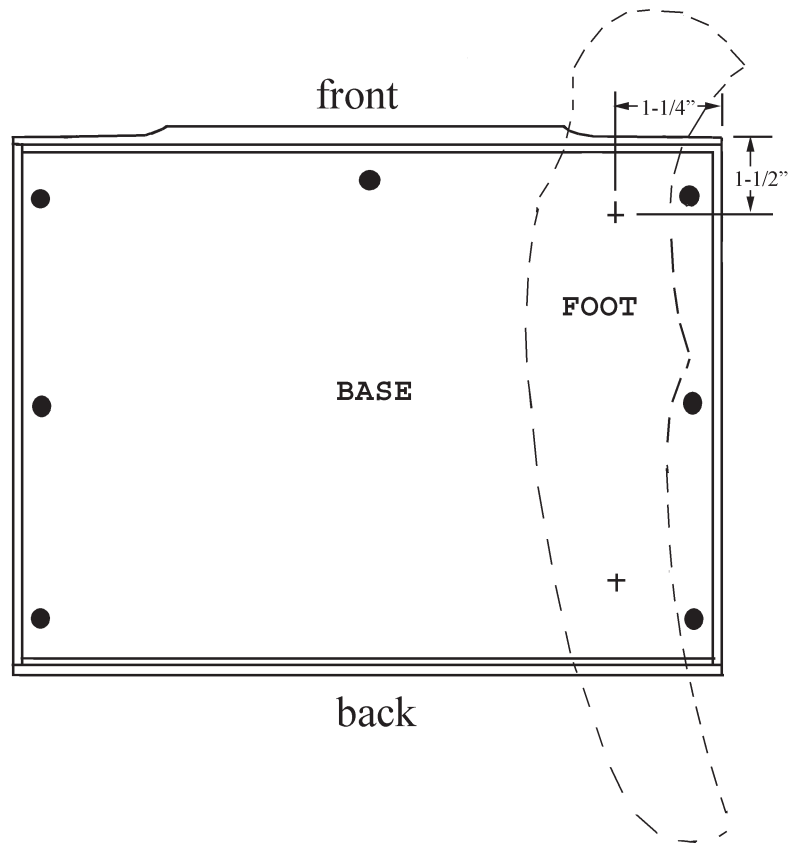
Remember that your forearms will make frequent contact with these corners of the soundchamber as you play, so make them feel comfortable. A sure sign of amateur woodworking is sharp corners. Your harp will look and feel like a professionally built instrument if the corners are softened this way.

Blend the **SIDES**, **SOUNDBOARD**, and **BACK** to the **TOP BLOCK** to remove sharp edges and corners.

23. BE CAREFUL NOT TO SAND THROUGH THE THIN VENEER ON THE BACK! Smooth off the scratches made by the coarse paper with finer sandpaper, working by hand, not with a power sander. Try to sand with the grain of the wood so you don't add more scratches. The goal is to achieve a smooth surface with about 180-220 grit paper. No need for finer sanding until after you apply the first coat of finish.

INSTALLING THE FEET

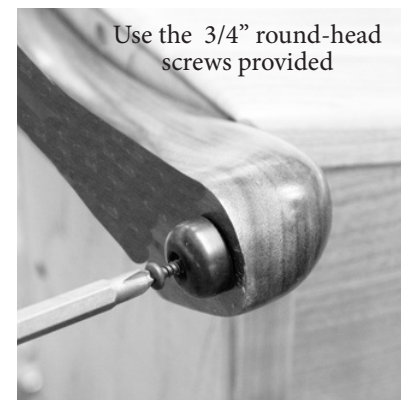
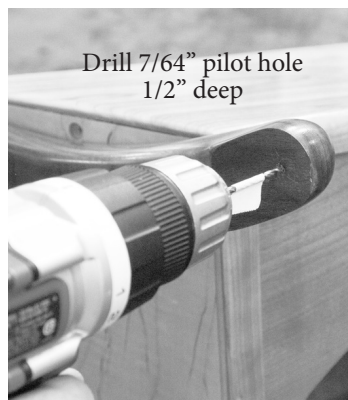
24. Stand the sound-chamber upside down on something soft on the floor and lean it against your work table with the bottom of the **BASE** showing up. Position the two **FEET** on the base, as shown, so you can just see the three screws along the edges. We have measured the location of the forward hole, but not the one toward the heel of the foot. We recommend installing the forward screw in each leg and then rotating the heel end of the legs however you like before installing those rear screws.



25. Use a 7/64" bit to make pilot holes for the wood screws, and then install 1-5/8" screws through the **FEET** into the **BASE** of the harp. No need for glue on this step, as you'll want to remove the feet later.

Now the harp body will stand up on its own two **FEET!**

But before you stand it up and scratch the bottom of the heels and toes, we suggest adding the four Rubber Bumpers included with your kit, as shown below:



ASSEMBLING THE NECK AND PILLAR

26. Fit the **NECK** and **PILLAR** together **WITHOUT GLUE FIRST** in order to test-fit the parts.

a) Place the **BISCUIT** into the hole in the **PILLAR**, and align the **NECK** and **PILLAR** on a table so the **BOLT** enters the center hole in the top of the **PILLAR**. If the **BISCUIT** is too tight to push in easily by hand, you may need to sand it slightly.

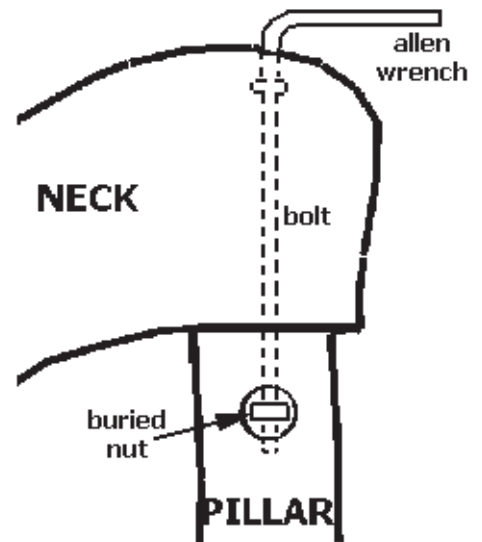
b) Insert the large **ALLEN WRENCH** provided into the small hole in the top of the **NECK**, and use it to turn the **BOLT** clockwise to draw the **NECK** and **PILLAR** together completely. The biscuit keeps the **PILLAR** from rotating.

c) You can draw the parts together by tightening the bolt. Then lift the assembly off the table and test-fit it to the body of the harp. Rest the back of the **NECK** on top of the harp body, and the **PILLAR** into the opening at the bottom of the soundboard, to make sure it all fits in place nicely.

d) Sand and shape the parts as needed. When satisfied with the fit, place the **NECK/PILLAR** back on your table so you can unscrew the parts and apply glue to the biscuit and the joining surfaces of the parts, and draw everything together again permanently. Be sure to tighten the bolt securely -- don't be too gentle! You want this joint to withstand a lot of torque from strings all pulling on one side of the **NECK**.

e) We have provided a decorative wooden **COVER** to fit in the shallow hole over the buried **NUT** in the **PILLAR**. You may glue that in place at this time also.

f) We have also provided a tapered wood plug to fill the hole where the Allen wrench fits to tighten the bolt. Use it to plug that hole, using a little glue. When dry, you can sand this plug level with the surrounding wood. If you should ever need to tighten the bolt further in the future, you will need to dig (or drill) this plug out again.



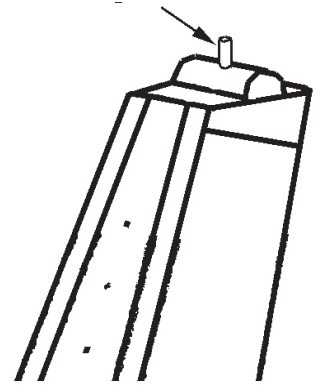
NOTE: These parts should all fit together nicely already, as we machine them to fit a sample harp body in our factory. If there is any major problem, be sure to contact us before proceeding with the project.

Point of Interest

This is our first harp kit to use this bolt-on NECK/PILLAR joint. We hope you have no difficulty assembling these parts. Some of our earlier harps utilized external reinforcement OVERLAYS across this joint to counteract the torque of having all the strings pull on one side of the NECK, giving a kind of "I-beam" strength to the joint. This bolt system has been working better, as it prevents "cold creep" of the glued joint in the future.

____ **28. (OPTIONAL)** The 1/2" **DOWEL** shown here is an optional piece that you can hide inside the back **NECK** and the **TOP** of the body. It might help hold the parts in alignment as you string the instrument, but this dowel is **NOT** structurally necessary. Normal string tension will hold the neck in place after the harp is strung. If you decide not to use the dowel, just be sure to center the **NECK** on the top of the **BODY** as you install the strings.

3/8" dowel



If you would like to use the **DOWEL**, here is how to install it: Find the center point on each part and drill the holes slightly larger than the dowel. You can accomplish this by using a 3/8" drill and "wobbling" it a little in the hole to insure a comfortable fit.

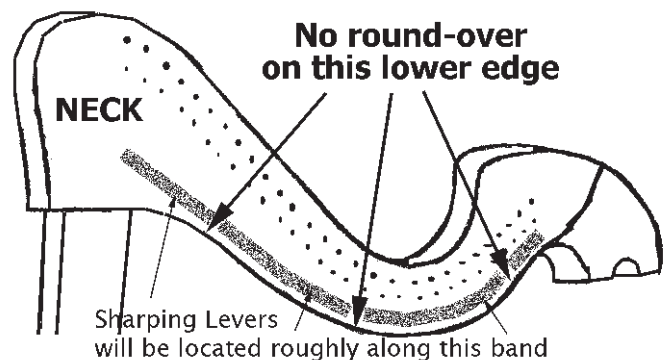
Point of Interest

This joint between the **NECK** and the **TOP** of the body will remain dry – no glue. The reason is to create a sort of "knuckle" that allows the harp to flex slightly under string tension over time. It also allows you to take the **NECK/PILLAR** assembly off the body of the harp in the future, by simply removing the strings and the screw at the bottom of the **PILLAR**. That permits you to make repairs, add decorations, or refinish the harp easily, as necessary, down the road. It is one of the best features we have incorporated into our harp designs, saving much time and consternation in some cases.

____ **29.** This is the best time to do final sanding and shaping of the **NECK/PILLAR** assembly. Here are some guidelines

Sand all the edges to remove machining marks, scratches, and glue residue. Medium sandpaper (150 grit) should suffice for this. Hold the parts in different lighting to check for scratches and glue spots. They can be elusive!

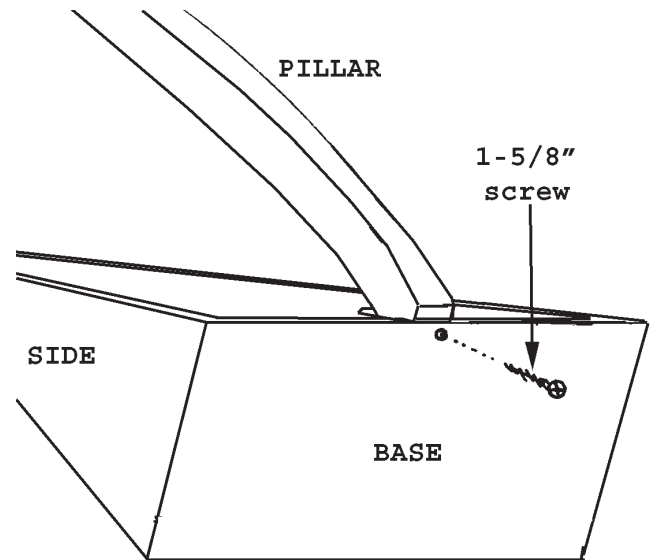
Note that we have rounded over all edges of the **NECK** except one. This lower edge should be left square so you have room for mounting sharpening levers later.



Any minor cracks can be filled with your favorite wood putty. If you have trouble finding a paste filler that will match this wood, make up your own out of fine sawdust (from sanding the harp) and Elmer's glue mixed to a consistency of putty (thin it with a drop or two of water). Another option is to use filler that is light in color and then darken it later with wood-tone touch-up pens.

____ **33.** Do your final sanding with #220 grit sandpaper, always working with the grain so as not to scratch the wood. Dust the instrument well with a clean rag or tack cloth before applying the finish.

____ **33a** Install the **NECK/PILLAR** assembly to the body of the harp with one screw through the **BASE** into the bottom of the **PILLAR**, as shown, use a 7/64" bit to drill a pilot hole first.



FINISHING

Here are some finishing options, along with a few hints from our experiences with finishing materials.

STAINS--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 disadvantages of oil are 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 often recommend a wipe-on polyurethane with a semi-gloss sheen. This type of finish is readily available at your local hardware store or big box home improvement center. The advantages of this finish are its simple application, durability, and deep, soft luster.

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.**

OPTIONAL DECORATING

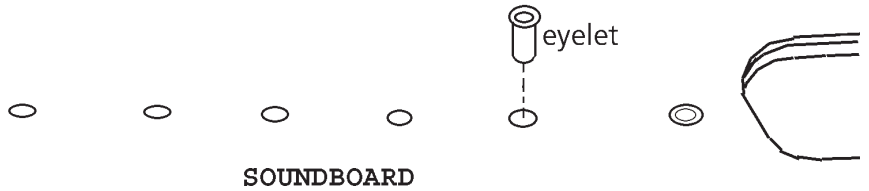
Hand painting or woodburning are fun ways to decorate your instrument. Light painting can be applied between coats of varnish or lacquer very nicely and will not harm the sound of the harp. Some people use acrylic paints, and others decorate with colored pencils or pastels. This is a great way to personalize your harp.

____ **34.** Apply the finish of your choice, sanding lightly between coats with very fine sandpaper (600 grit) or steel wool (#0000).

HINT: You will find it easier to apply the finish if you disassemble the harp.

ATTACHING HARDWARE

____ **35.** Find the **BRASS EYELETS** and push them into the holes in the front of the **SOUNDBOARD**.

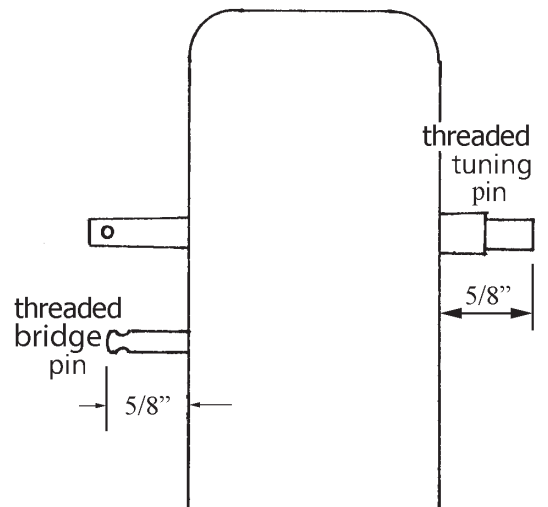


We also like to adhere round felt pads under the feet (at heel and toe ends) to protect from scratches when sliding the harp on the floor.

____ **36.** You can install all the **THREADED BRIDGE PINS** into the lower row of holes drilled in the **NECK**. We like to lubricate them first by scraping the threads across some candle wax. Then you can tap them partway in with a hammer and then turn them in with a $5/64$ " Allen Wrench until the top is about $5/8$ " above the surface of the wood. Use the **$5/8$ " SPACING GUIDE** to double-check the pin height.

NOTE: Our **THREADED BRIDGE PINS** are adjustable in depth, allowing you to change the space between the harp string and the wood surface of the neck, using a $5/64$ " Allen Wrench. This will be important later when you want to install sharpening levers.

____ **37.** Turn the **NECK/PILLAR** assembly over so the **BRIDGE PINS** are hanging over the edge of your work table, but the **NECK** is still firmly supported. Use the **BRASS DRIVER** in your hand drill to push and turn the **33 THREADED BLACK TUNING PINS** into the upper row of holes in the **NECK**, from the opposite side of the **BRIDGE PINS**. **DO NOT LUBRICATE THE THREADS OF THESE TUNING PINS!** When you push firmly as you turn them, they will drive in quite quickly, skipping threads. Don't rely on the microthreads to seat these pins – that takes too long and it heats up the pins to extreme temperature. Push hard and turn slowly until the square end stands about $5/8$ " above the wood.

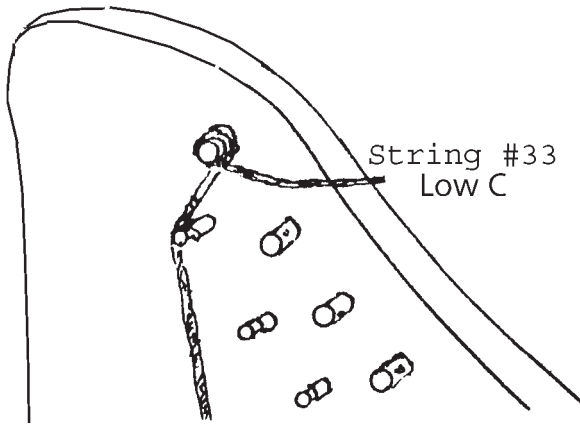


STRINGING & TUNING

____ **38.** Assemble the harp back together again, tightening the screw securely into the base of the **PILLAR** so you can stand the harp back up. Stringing a harp is somewhat of an art. We recommend that you read through these last pages of directions completely before beginning, so you know what to expect.

Occasionally, people to call us in a panic because their harp either **a)** won't stay in tune, or **b)** keeps breaking its strings. Careful installation will do much to eliminate these problems. We string this model harp regularly and tune it up to concert pitch right away with rarely a broken string, but it takes a little patience and concentration.

Find the String Chart packed with the strings. Notice that the strings are numbered from 1 (for the smallest) to 33 (for the longest), and they are color-coded to help guide you as you play. “C” strings are all red, and “F” strings are blue. **HINT:** If the color on the strings should happen to fade, you can restore it with permanent marker.



___**39.** Start at the bass (longest) end of the harp with string C2, a long red string that is very thick. Push the string through the lowest hole in the **SOUNDBOARD** from back (inside) to front. Pull it all the way until the knotted end contacts the **REINFORCEMENT BAR** inside the harp.

___**40.** Thread the other end of the string through the last **TUNING PIN** near the point of the **NECK**, pulling it through the pin, but leaving enough slack below the pin to allow several windings before coming taut.

___**41.** Use the **TUNING WRENCH** to turn the pin clockwise (from the viewpoint of the tuning wrench on the backside of the **NECK**) and guide the windings neatly around the **TUNING PIN**.

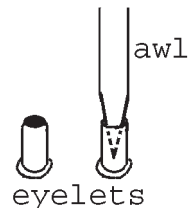
___**42.** As the string begins to tighten, place it in the groove of the **BRIDGE PIN** as shown.

___**43.** Thread the next 4 wound strings in the same way, taking care to keep them in the correct order.

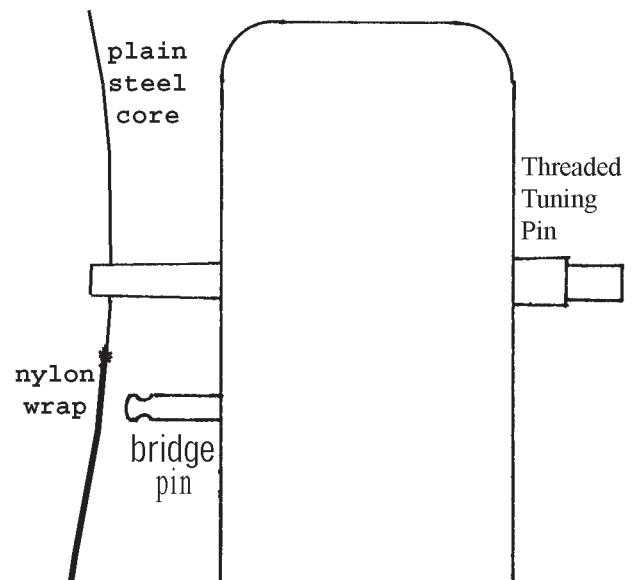
CAUTION!

These WOUND STRINGS are very fragile and expensive to replace. Some people break the first one they install by over-tightening. They don't expect it to come up to pitch so quickly. Take care to avoid that costly mistake. It is very helpful to pluck the string as you tighten it, so you can hear the pitch go up as you increase the tension.

___**44.** The next two strings, A2 and B2, have a steel core with nylon wrapping. The nylon wrapping is purposely tied off shorter than the steel core strand. If you have trouble threading these strings through the brass eyelets, it is because the bulky knot is a bit large and the eyelets are pursed a little at the end. Use an awl to flare the eyelet slightly, as shown:



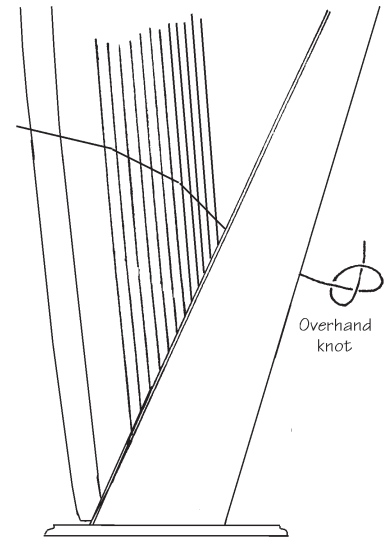
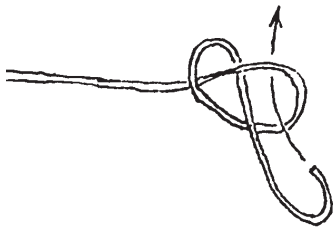
For these two strings, the plain steel core is plenty long enough to go through the tuning pin, but the nylon wrap may not quite reach the tuning pin. That's OK. Leave some slack below and wind up the steel core on the pin. When you are satisfied with installation of these strings, use a wire cutter to clip off the excess wire, close to the **TUNING PINS**. These sharp ends are dangerous! Cut them short so they won't poke you or catch on your clothing. **CAUTION: DO NOT CLIP THE STRING BELOW THE NYLON WRAP.** The nylon is tightly wound around the core and will unravel if it is cut.



____**45.** The next 5 strings have nylon wrapping on a nylon core. Again, the wrapping is not supposed to reach the tuning pin because it is too bulky for winding around the pin.

____**46.** From here on, the strings are plain (mono-filament) nylon that has no knots tied in them yet. You may insert these strings from the front of the harp, if that is easier, and then reach inside the back to find the end. Take care to put the colored strings in the proper positions.

For the .055" and .050" strings, tie a simple overhand knot at the end, as shown. Then thread the tail end of the string back into the knot to make it fatter, so it can't get pulled through the hole in the soundboard.



HINT: Tighten this knot against the soundboard by pulling the string straight out from the front of the harp, not at an angle, to avoid scratching the nylon against the brass eyelet.

Thread the other end of the string through the next **TUNING PIN**, pulling it through the hole until there is only a little slack in the string below the **PIN**. How much slack? About 3-4 inches. You'll catch on—too much slack makes for bulky accumulations of string around the **TUNING PIN**, and too little means you won't have enough to even wrap once around the **PIN**. Ideally, you'll have 3 to 4 wraps of string around each **TUNING PIN** for security.

Turn the **PIN** clockwise with the tuning wrench as you take up the slack with the other hand, guiding the string as it winds around the pin. As the string begins to tighten, place it in the groove of the **BRIDGE PIN**.

Once the string is satisfactorily installed, you may clip off the excess nylon close to the pin (leave ¼" stub), and tune the string up to its proper pitch (no, it won't stay in tune yet, but it helps to begin stretching it right away).

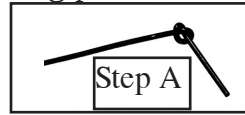
Helpful Hint

Do not accumulate a lot of windings of string around the TUNING PINS, especially with the thick strings. They become bulky and cumbersome. If you have that problem, turn the TUNING PIN backwards to unwind the string, then pull more of the string through the hole and tighten again.

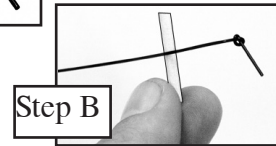
Another thing to keep in mind is that you can guide the windings of string either in toward the wood or out toward the end of the TUNING PIN as you turn the pin. The goal is to have the strings proceed from the TUNING PINS to the the grooves of the BRIDGE PINS at approximately the same "height" off the wood. A 20 degree angle is no problem, but a steeper angle might cause the string to jump out of the groove in the BRIDGE PIN when you play or when you engage sharpening levers.

____ **47.** All the rest of the strings (sizes .045” .040”, .036”, .032”, .028” and .025”) will need to be tied to a short dowel to prevent the knots from being pulled through the holes in the soundboard. Here’s how to tie them:

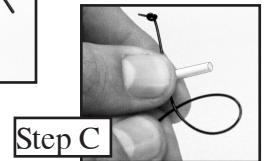
Step A. Begin with the same overhand knot near the end.



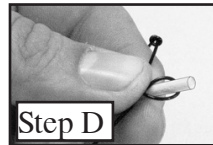
Step B. Hold the dowel perpendicular to the string, forming a “T”.



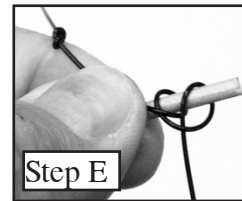
Step C. Make a loop in the string with the knotted portion on top.



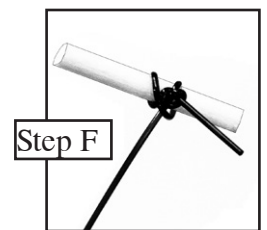
Step D. Slip the loop over the end of the dowel.



Step E. Form a second loop in the same way, and slip that over the dowel.

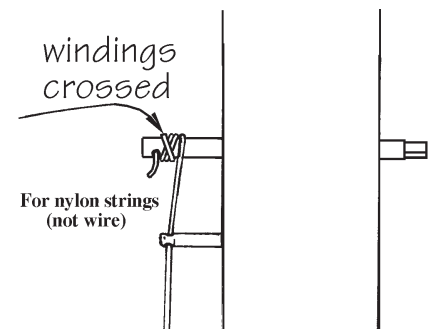


Step F. When both loops are on the dowel, pull the knot tightly against the middle of the dowel. If you hold the dowel and pull on the string, the overhand knot will slide up against the dowel and stop. Then the knot is secure.



IMPORTANT: It is necessary to also anchor the tops of these nylon strings securely to the tuning pins, as follows:

Guide one or two windings of string on the **TUNING PIN**, then guide the next winding over the others so the string helps “pinch” itself tightly to the **PIN** as you tune it up to pitch. If you don’t do this, you will surely experience string slippage and breakage, especially in the upper half of the instrument.



____ **48.** When all the strings are installed, tune the entire harp up to pitch so the instrument begins to adjust itself to the tension.

The strings should all be tuned to the natural C major scale (white keys on the piano). All the red strings will be C notes and the blue ones F notes. Middle C is string number 20 from the top. The lowest note is two octaves below middle C.

Many people are not certain if they are tuning their harp strings to the correct octave. Tuning the strings an octave too low will result in flabby harp strings that don’t provide much volume. Tuning the strings too high will cause strings to break. To make sure you are tuning your harp strings to the correct octave, you can double-check the pitch on our website with our “online tuner” at www.harokit.com

NOTE: Expect it to take 50 tunings before the harp will fully stabilize. That means if you only tune the harp once a week, it will take a year for it to settle in! So we recommend tuning it two or three times a day. Persevere, and be patient! It should get better each day. If you find that it does not get better each day, then something else may be wrong. Take a good look at the “Care and Feeding” page at the end of these instructions. There is no reason for this harp to be unstable in tuning.

CONGRATULATIONS! We hope you have enjoyed building this harp and that you enjoy many years of musical pleasure from playing it. We stock a good number of teaching materials and accessories to help you get started playing music. Don’t hesitate to call us for more information or for help if you encounter difficulties with your instrument.

SHARPING LEVERS

Sharping levers are used on folk harps to facilitate key changes. Installing a lever over a string allows you to raise the pitch of that string one-half step by engaging the cam against the string. Thus an F-string can be raised to F# by a simple flick of the lever. Similarly, a B-string may be tuned to Bb so that the lever will raise it to B-natural and release it back to B-flat, as needed.

Most folk harp players set the key signature (sharps or flats) on the harp before starting each piece of music. For the key of G, you would engage the levers on all the F strings to produce the F# notes needed for that key (making sure all other notes on the harp are natural). If the following piece were then to be played in the key of F, you would then release the levers on all the F strings to produce F-natural, and also release all the B-string levers to produce Bb.

You may install a lever over every string on the harp, or, if you think you won't use all of them, you can save money by installing only the levers necessary for the keys you are likely to play in.

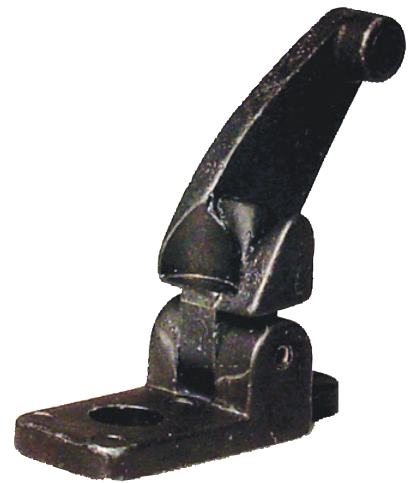
KEY OF E:	requires F# and C# and G# and D#
KEY OF A:	requires F# and C# and G#
KEY OF D:	requires F# and C#
KEY OF G:	requires F#
KEY OF C:	requires no sharps or flats
KEY OF F:	requires Bb
KEY OF Bb:	requires Bb and Eb
KEY OF Eb:	requires Bb and Eb and Ab

Check our website or current catalog for prices

Loveland Lever



Universal Lever



**Musicmakers
PO BOX 2117
STILLWATER, MN 55082-3117
651-439-9120
www.harppkit.com**

CARE AND FEEDING OF THE VOYAGEUR HARP

TUNING TIPS: It is best to tune the harp with all sharpening levers flipped down (disengaged), so there will be no interference from the levers. Please note that this means you may be tuning some strings to flats instead of natural notes. If you have levers on the B strings, for example, you should tune those strings to B-flat when the lever is disengaged. You will then flip these levers up when playing in the key of C (and the keys of G, D, and A).

Note that the **TUNING PINS** drive themselves a little deeper as you turn them clockwise to tighten the strings. If you find that they go deeper than you want, you can turn them counter-clockwise to raise the square ends back to a good starting level, and then install the string to the pin and tune it back up to pitch. When you change strings in the future, you should turn these pins 3-4 complete revolutions counter-clockwise before installing the new strings.

BUZZING STRINGS: Your harp need not suffer the problem of rattling or buzzing sounds when you play. If you hear such noises, you can correct them. Here are some troubleshooting hints:

If the buzzing sound occurs only when the **SHARPING LEVER** is flipped up (engaged), and you have **UNIVERSAL LEVERS**, there are two possible solutions: **1)** Look carefully at the **NECK/PILLAR** joint on the opposite side from the strings. If you see a gap in this joint, you need to tighten it back up using the big 5/16" Allen wrench provided with the harp. **2)** If the **NECK/PILLAR** joint looks good, then you need to screw the small brass **BRIDGE PINS** a little deeper into the wood. This lowers the string height so the strings make more firm contact with the sharpening lever.

If the buzzing occurs when the **LEVER** is flipped down (disengaged), the string may be vibrating against some part of the **SHARPING LEVER**. If you have Loveland brand levers, look very closely at the position of the string as it passes through the **LEVER** bracket. It may be rattling against the plastic cam (the part that you flip up & down), or against the small "fretpost" (the part that the cam pinches the string against when engaged.) You can change the position of the string by raising or lowering the brass **BRIDGE PIN** on which the string rests above the **SHARPING LEVER**. (Make sure the string is resting in the groove of that **PIN**.) Use a small (5/64") Allen wrench to turn the **BRIDGE PIN** in or out, watching how that moves the string in relation to the **SHARPING LEVER**.

If the problem is not located around the **SHARPING LEVER**, you may have a loose end of string that is rattling inside the soundchamber. Put your hand inside the harp and touch the knotted ends while plucking the harp to see where the problem is located. Oftentimes you can solve it by simply trimming off a loose end of string or by twisting the knotted end in a different direction.

Occasionally we hear of a buzz caused by a loose piece of wood, such as a decorative rosette or inlay strip. Test these things by pressing on the part while you pluck the string to see if the noise stops. When you find the loose part, you'll need to add some glue to hold it firmly in place.

HARP REPAIRS: If you ever need to repair the wood parts of your harp, you will be glad to know that the **NECK/PILLAR** assembly can be removed from the soundchamber to facilitate repair work. Simply loosen the strings and unhook them from the **TUNING PINS**. Then remove the screw that holds the bottom of the **PILLAR** to the **BASE** of the harp to allow the **NECK/PILLAR** to come free of the harp body.

SCRATCHES & DENTS: You can restore the luster to the finish of your harp with a furniture polish like Old English with lemon oil. This will help hide scratches too. We avoid using polishes with wax because the wax will interfere with future refinishing or touch-up work.



**Musicmakers
PO Box 2117
Stillwater, MN 55082
651-439-9120
www.harpkit.com**