Cheyenne - 36 string Harp Kit

MUSICMAKERS

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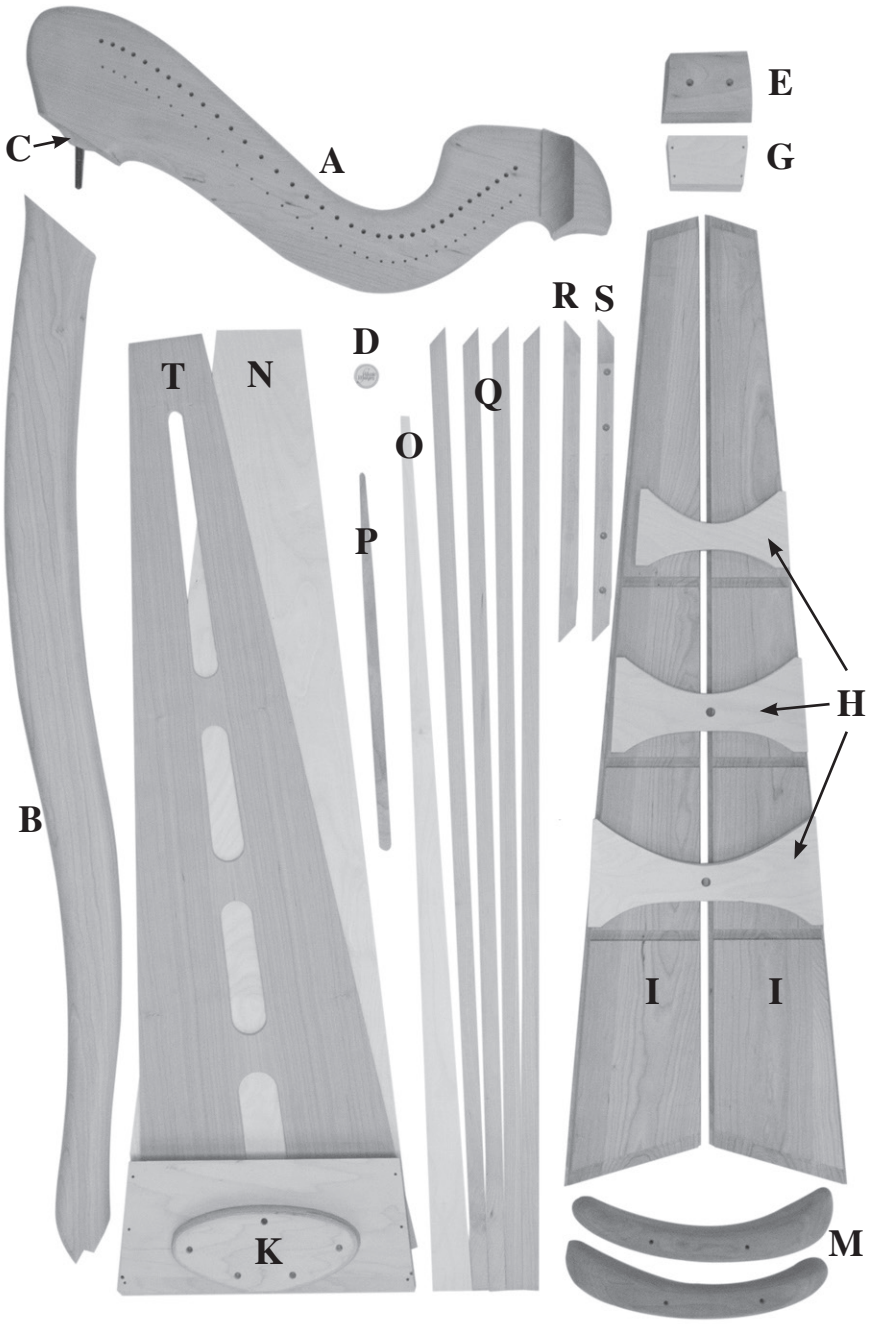
Cheyenne Harp Kit

WOOD PARTS:

☐ ☐ A - 1 pre-drilled neck, solid hardwood
☐ ☐ B - 1 pillar, solid hardood
☐ ☐ C - 1 wood "biscuit" for neck
☐ ☐ D - 1 Musicmakers cover disc
☐ ☐ E - 1 arch piece, hardwood
☐ ☐ G - 1 top block, laminated maple
☐ ☐ H - 3 inner braces, laminated
☐ ☐ I - 2 sides, solid hardwood
☐ ☐ K - 1 base, laminated maple
☐ ☐ M- 2 feet, hardwood
☐ ☐ N - 1 soundboard, aircraft birch
☐ ☐ O - 1 inner reinforcement bar
☐ ☐ P - 1 stiffener brace
☐ ☐ Q - 4 long trim strips, hardwood
☐ ☐ R - 1 short trim strip, back
☐ ☐ S - 1 short trim strip, front (drilled)
☐ ☐ T – 1 back panel, plywood



HARDWARE:

☐ ☐ 36 Threaded Tuning Pins
☐ ☐ 1 Brass Driver
☐ ☐ 1 Tuning Wrench for threaded pins
☐ ☐ 36 Brass Eyelets, medium
☐ ☐ 36 Threaded Bridge Pins
☐ ☐ 1 Allen Wrench 5/64" for bridge pins
☐ ☐ 1 Allen Wrench, 5/16" for neck bolt
☐ ☐ 1 Lag Bolt, 1/4" X 3" stainless steel
☐ ☐ 1 Washer, 1/4"
☐ ☐ 2 oz Wire Nails, 3/4" X 18
☐ ☐ 4 Wood Screws, 1-1/4" drywall
☐ ☐ 14 Wood Screws, 1-5/8" drywall
☐ ☐ 2 Wood Screws, 2" drywall
☐ ☐ 4 Drill Bits, 1/8", 7/64", 3/16" & 1/4"
☐ ☐ 1 Small Dowel Pin, 3/8" X 2"
☐ ☐ 4 Rubber Bumpers for feet
☐ ☐ 4 Black Screws, Round-head, #8 X 3/4"
☐ ☐ 1 Spacing Guide
☐ ☐ 4 Wood Plugs, 3/8" dia for bottom trim
☐ ☐ 1 Tapered Plug, 7/16" for top of neck
☐ ☐ 1 set of 36 Harp Strings
☐ ☐ 1 set Assembly Instructions

BEFORE YOU BEGIN

_____1. 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

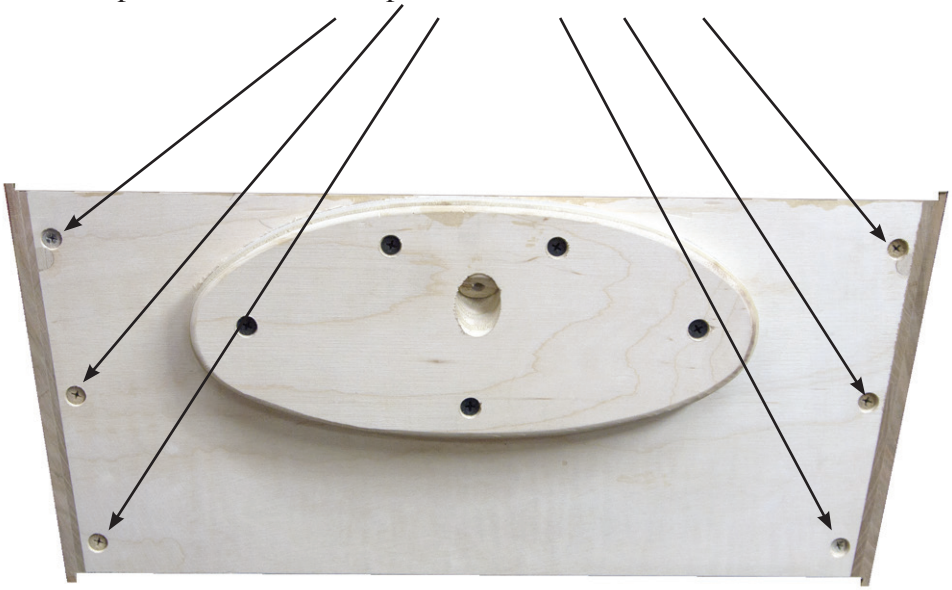
DO NOT ASSEMBLE THIS PROJECT WITH SUPERGLUE OR HOT MELT GLUE! Find a good woodworking glue. If you live in a hot humid climate, you might use a good quality 8-hour epoxy or a plastic resin like DAP Weldwood. Many luthiers (guitar & violin makers) still use the natural hide glues that have been around for centuries, carrying on a fine old tradition, but that does not mean that you should do the same. Animal glues like that require lots of experience for successful use. We build this instrument with the yellow aliphatic resin such as ELMER'S CARPENTER'S WOOD GLUE or TITEBOND WOOD GLUE 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.

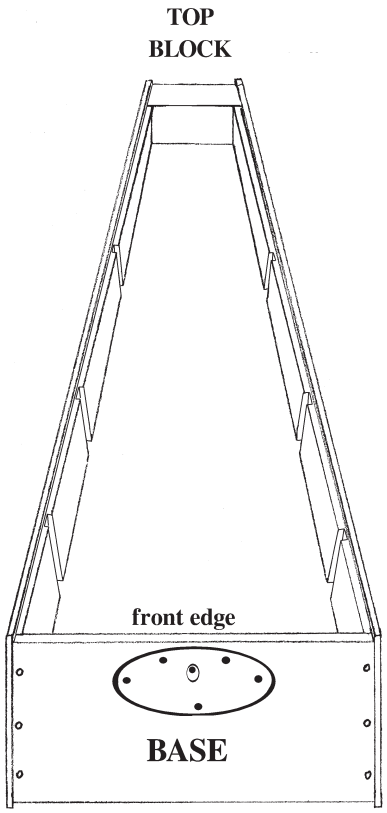
When gluing parts together, be sure to put enough glue on the joint to wet the entire surfaces to be joined. A good sign of proper gluing is that a little excess will squeeze out around the joint when clamping pressure is applied. Too little glue may cause the parts to separate later, whereas too much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

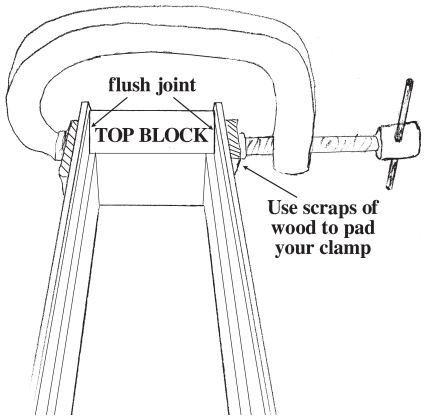
THE SOUNDCHAMBER FRAME

_____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 will only fit properly one way!

_____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 at each corner position with a 7/64" bit.





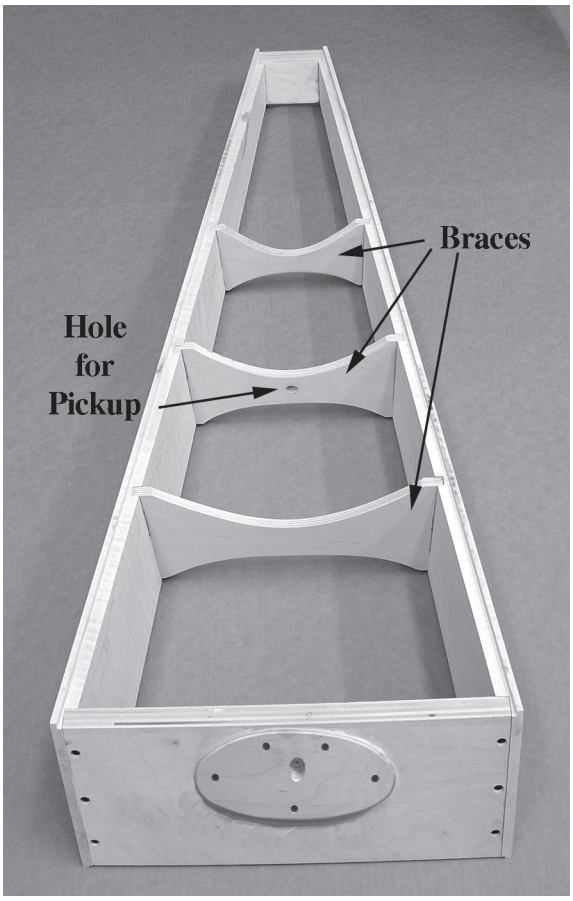


_____4. Clean all surfaces of the SIDES, BASE and TOP BLOCK. Apply glue to the joints at the BASE first, holding the pieces together while you insert the 1-5/8" screws to draw the SIDES tightly onto the BASE.

_____5. Apply glue to the edges of the TOP BLOCK that contact the SIDE pieces. Place the parts together and clamp them, making sure all edges are flush. Then drill 7/64" pilot holes for the screws and install the 1-5/8" screws for total stability.

_____6. Turn the frame (if necessary) so the front faces up on your work surface.

Find and check the fit of BRACES #1, #2. and #3. They should fit between the SIDES, sliding into the notches. Please orient them with the shallow arc facing down toward the back of the harp, as shown.



NOTE

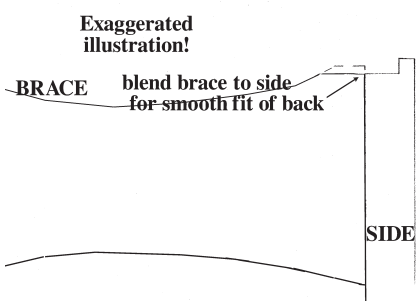
Sometimes the BRACES do not fit perfectly between the SIDES. This could be caused by sloppy cutting on our part, or it might be that the SIDES have bowed a little on their own. We recommend checking the outer face of each SIDE with a straight-edge and fitting the BRACES so as to push or pull the SIDES into alignment. If a BRACE is too short, you may shim it with a scrap of thin wood. If too long, use a disk sander to remove a small amount of material without changing the angle or rounding the end.

The width of the BRACES is not so critical. They do not need to reach all the way from front to back of the slot. In fact, we don't want the BRACES to interfere with either the SOUNDBOARD or the BACK panels.

When satisfied with the fit of each BRACE, glue them in place and apply pressure (clamps, bungee cords, or strong tape) to pull the sides of the frame inward until dry.

Another Note: The small hole in the center brace is for installing an electric pickup in your harp, in case you ever want to do that in the future. This central location allows you to place one sensor down in the bass range, and another up in the treble range.

THE BACK



_____8. Turn the frame over so the back faces up. Check over the back edges of the frame. If any of the BRACES stand taller than the SIDES, sand them down flush with the ledge.

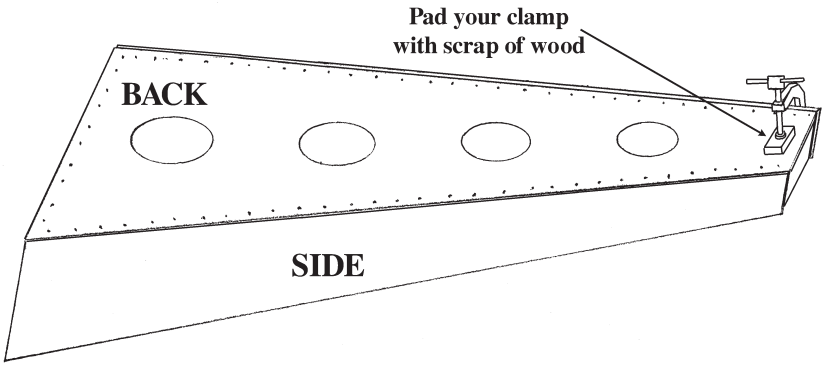
_____9. Test fit the BACK panel to the frame. It should seat into the ledges of each SIDE. You will have excess plywood extending beyond the TOP BLOCK and BASE of the frame which will be trimmed off later.

If necessary, you may sand or plane along the edges of the BACK panel to adjust the fit. Our parts are often generously sized. We use a hand plane to accomplish such fitting. Don't be concerned about a perfect fit, however. Slight gaps will be covered over later when you add TRIM PIECES. Clean off all sawdust from the frame and the back panel.

HELPFUL HINT

Every time you do some gluing on your project, we advise having a clean damp rag handy for cleaning up 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 this project when you are preparing to apply the finish.

_____10. Apply a thick bead of glue to the backside of the entire frame where it contacts the BACK panel, including the 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, but don't worry if there are small gaps -- they'll be covered by trim pieces later.

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.

HINT: Try to work quickly, before the glue becomes too thick. **Go easy with your hammer, and try not to dent the sides of the harp.** Clean off excess glue with your damp rags right away, making a thorough job of it.

POINT OF INTEREST

We recommend 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.

THE SOUNDBOARD

_____11. Test-fit the SOUNDBOARD to the frame of your harp. Please note that we have left this panel a little long, just in case the edges get damaged in shipment, so you can plane down the edges if necessary and still get a good fit.

POINT OF INTEREST

Many people ask why we use laminated wood instead of solid for the soundboard. The reason for this is that we get much more strength from laminated material than from solid, and virtually no trouble with cracking because of the cross-grain layers. The superior strength allows us to use a thinner soundboard than if we were to use solid wood, so you get remarkable sound with minimal risk of cracking or breakage, regardless of your climate.

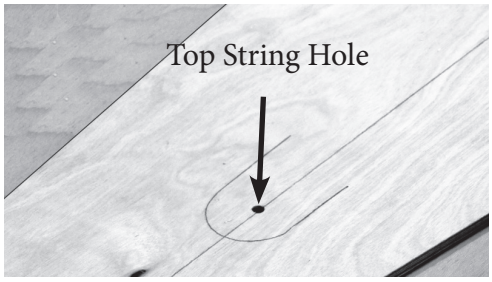
If you wish to substitute a solid soundboard of your own making (say, solid spruce), you may do so at your own expense and risk. For such customization, we recommend that you orient the grain horizontally (from side to side) for strength, and that you taper the thickness from about 1/4" in the middle to about 1/8" at the edges. We also recommend that a solid wood soundboard be installed in the driest of weather conditions to reduce the possibility of cracking due to shrinkage from further drying. Our warranty, of course, does not cover custom soundboards.

_____12. The REINFORCEMENT BAR needs to be glued to the backside of the SOUNDBOARD, centered on the string holes. Please note, however, that the string holes are off-center at the top of the range. Here is the best sequence for installation:

a) Find the 36 punch-marks on one face of the soundboard and drill through at the first and last marks using the 1/8" drill bit in your hardware package.

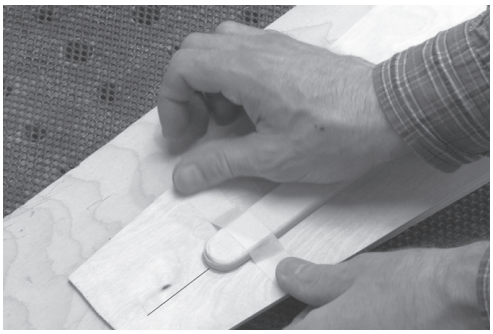
b) If you are satisfied with the grain on the punched face of the soundboard, you may designate that face as the outside. If you prefer the un-marked face to show outward, however, you will need to drill all 36 holes with the 1/8" bit so you don't end up covering over the punch-marks in the next step.

c) Turn the soundboard over so the inside face shows upwards on your work table (good side facing down), and draw a centerline connecting the first and last string holes.



d) Lay the Reinforcement Bar on the centerline so it extends a little beyond the top hole and trace around the end with a pencil, as shown.

e) The wider end of the reinforcement bar should extend about 3" beyond the bottom string hole. This helps distribute the string tension over a wider area of the soundboard where the bass strings are located.



f) Center the length of the reinforcement bar on your pencil line that connects the top and bottom string holes and trace around the bottom end with a pencil so you can easily re-position it in the next step.

g) You might want to sand the exposed edges of this reinforcement strip just to round over the sharp corners a bit. It is not necessary, but it will feel smoother when you are installing strings.

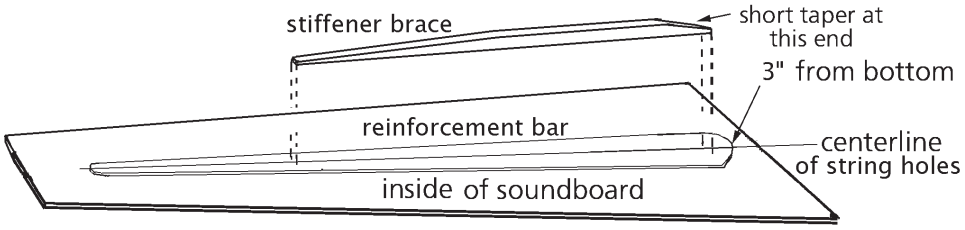
h) Apply glue to the underside of the reinforcement strip and use masking tape to hold each end in place so the strip does not slide around under clamping pressure.

i) Use clamps or weights to press the reinforcement bar against the inside of the soundboard until dry.

POINT OF INTEREST

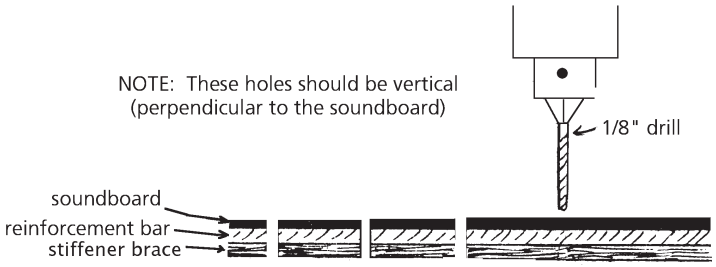
Some people ask about finishing the inside of the soundchamber. We do not recommend it. Guitars and violins are not finished on the inside, so this instrument need not be sealed on the inside either. We understand the concern about the effects of humidity on the wood, but this instrument box is glued 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 limited time.

_____13. The Stiffener Brace needs to be glued down the center of the Reinforcement Bar beginning about 2" from the bottom end of the reinforcement bar. It should cover the lowest 13 string holes (you could drill through the 13th hole from the front side of the soundboard just to make sure to get this brace centered nicely over the two end holes).



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.

_____14. 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 all 36 holes through all the layers of wood in the SOUNDBOARD assembly.

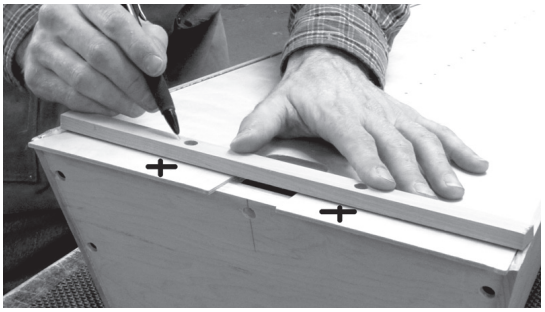


INSTALLING THE SOUNDBOARD

_____15. Test fit the SOUNDBOARD to the front of the frame.

Make sure the SOUNDBOARD fully covers the TOP BLOCK and the BASE. Again, you may need to shave a little off each side to make this piece fit into the ledges of the SIDES. You don't need a perfect fit, however. Slight gaps will be covered over later when you add the TRIM STRIPS.

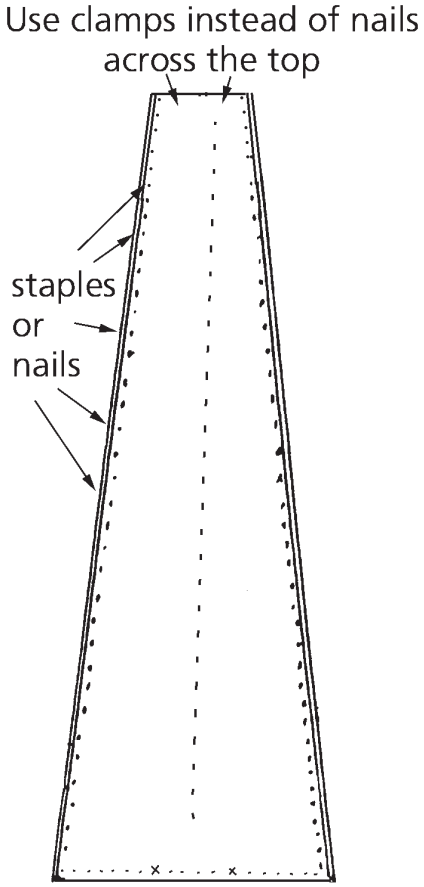
Before gluing, check where the screw holes for the Bottom Trim piece will be located on the soundboard. Mark them on the front and avoid placing nails within 1/4" of those marks.



_____15. When ready, apply a thick bead of glue around the four edges of the frame that will contact the soundboard.

_____16. 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. It is helpful to have a second person working with you for this step, just to get the nails in before the glue starts to harden.

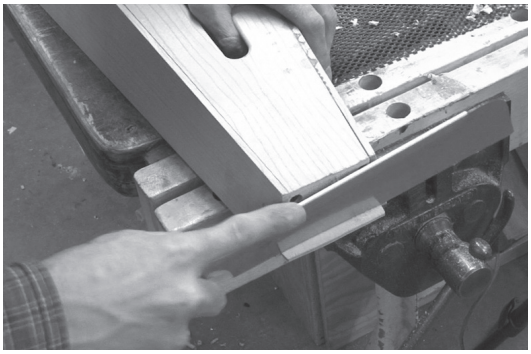
Clean off excess glue with a damp rag right away, making a thorough job of it.



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!

_____17. When the glue is dry, trim off all excess wood that hangs over the top and bottom of the harp. THIS IS IMPORTANT to ensure a good fit of the Arch and Feet pieces. Take the time to do a nice job with this. A belt or disk sander does this job quickly, but you can do it by hand with coarse sandpaper glued to a scrap 2 X 4 block of wood.

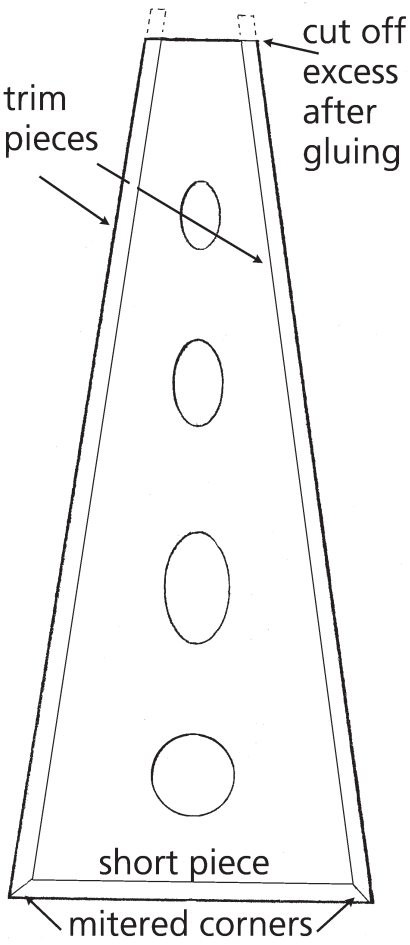


CAUTION: Take care to keep the top and bottom of the harp nice and flat. If you are not careful, you may end up rounding the surface that must make good contact with other flat parts (Arched Cap and Feet).

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.

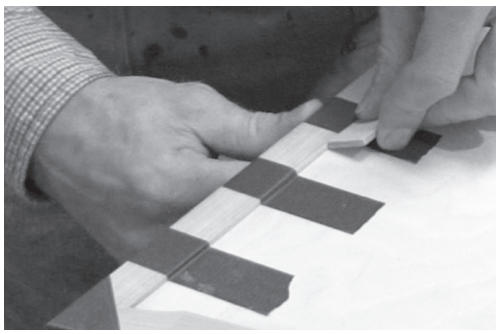
_____19. The four long trim pieces will work on either the back or front. Pay attention to the grain on the trim strips. We like to pack them as matching pairs for the front and back if possible. HINT: it is smart to lightly round over the long inside edge of the trim (scuff with sandpaper) to take away sharpness. It is easier to do this now rather than after the trim is glued on.



_____20. Begin with the short bottom trim piece on the back of the instrument. Tape the Bottom Trim carefully and check the miters of the long side strips at the corners. We have already cut these angles for you, but you may need to make minor adjustments using a flat sanding block or disk sander. The pieces are long enough to allow for trial and error.

Take your time to do a nice job of fitting. When satisfied with the fit, glue the TRIM STRIPS to the BACK, taking care to align them flush along the sides and bottom. Use masking tape to hold the parts in place until dry. If you have clamps, you can also clamp the trim down, but watch out for slippage under the pressure of the clamps. Tape works very well for this step, and it is quick to apply.

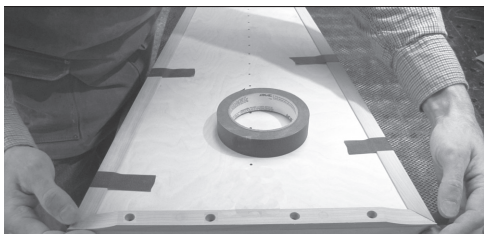
HINT: Be sure to pull the tape a little as you install it -- loose tape holds nothing well. We use a scrap block of wood to help tighten the inside corners, as shown below.



When dry, remove all tape and cut off excess length at the top, sanding flush carefully with a flat sanding block.

_____21. Turn the harp over on its back to install the front trim. The BOTTOM FRONT TRIM STRIP needs to be both glued and screwed in place because it helps prevent the bottom of the SOUNDBOARD from pulling away from the frame.

1) Carefully center the BOTTOM TRIM STRIP flush with the bottom of the SOUNDBOARD, and use masking tape to hold it temporarily.



2) Drill pilot holes into BASE using 7/64" drill bit.

3) Add glue under the Front Trim Strip and use short wood screws (1-1/4") to fasten it snugly against the harp.

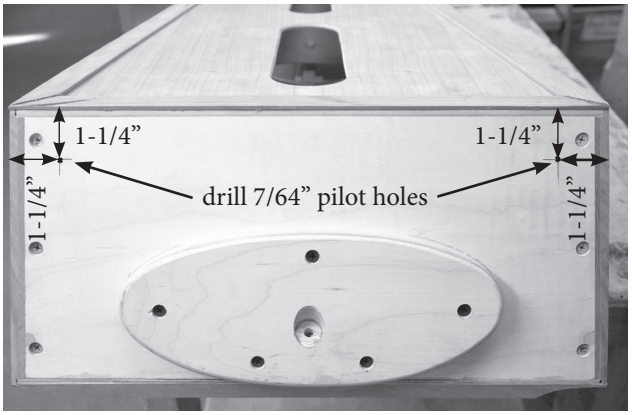
4) Dry fit the two Side Trim pieces and check the miter joints. Make adjustments to the ends of the long Side Trim pieces only -- it will be too hard to change the ends of the Bottom Strip.

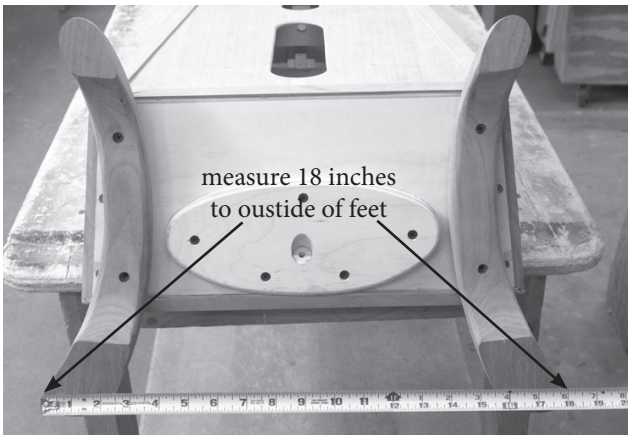
5) When satisfied with the fit, glue and tape the Side Trim pieces in place just as you did on the back of the harp.

6) As the glue is drying under the side pieces, you can glue wood plugs over the screws in the bottom strip.

5) Allow the plugs to dry before trimming and sanding them flush with surface of the strip. A small hand saw works well to remove the majority of the excess plug material. Then switch to a sanding block to wear away the rest until flush with the surrounding wood.

INSTALLING FEET





_____25. The FEET can be screwed in place now WITHOUT GLUE. Lay the harp on its front and measure 1-1/4" from the sides and back to show where the screw will be located near the back of each foot, as shown. Use a 7/64" bit to drill pilot holes for these two wood screws, and then install 1-5/8" screws through each foot into those holes to fasten the back end of each foot.

Then you can rotate the feet a little until they are symmetrically aligned on the BASE of the harp, with the outside of the front ends no more than 18" apart, as shown. Drill pilot holes for the other two mounting screws. USE NO GLUE here! You want to be able to remove the feet for finishing, but it is nice to have them installed temporarily now so the harp will stand up.

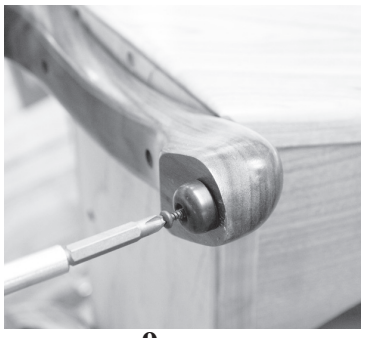
Install 1-5/8" screws to hold them firmly to the base. When you stand the harp up, it will want to tip backwards, so be careful to lean it against something to prevent a fall. Adding the neck and pillar will make the harp balance properly.

You can add rubber bumpers to feet now, or wait until the finish is applied. You'll want to locate the back bumpers near enough to the "heel" of each foot so the rubber maintains contact with the floor when you tip the harp back on your shoulder to play, but not so close to the end that the screw pokes through the top of the foot.

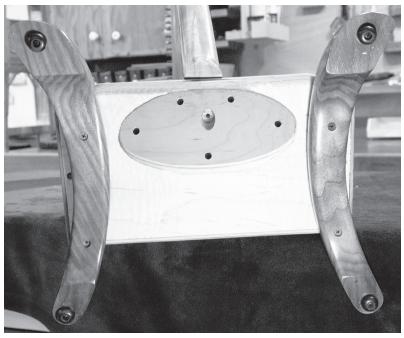
Here's how we install the bumbers:

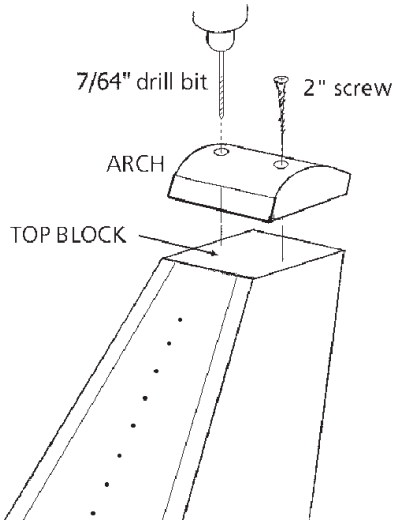
a) Locate the screw holes at least 3/4" from the end of the foot, and use the 7/64" bit to drill pilot holes just 1/2" deep into the wood.

b) Use the black round-head screws provided for fastening the bumpers in place under the feet.



c) Bumpers should look like this under the harp.





_____26. Fit the ARCH piece to the top of the harp, making sure to orient the angled front and back to match the body of the harp. Align the corners of the ARCH over the TRIM pieces as well as possible. Drill two 7/64" pilot holes through the CAP and into the TOP BLOCK for screws.

Then glue and screw the ARCH to the top of the harp, using 2" screws to fasten them tightly to the TOP BLOCK. You may need to sand off a little overhang to get it all flush -- we use an orbital sander to blend and round over the parts nicely after the ARCH is firmly fastened.

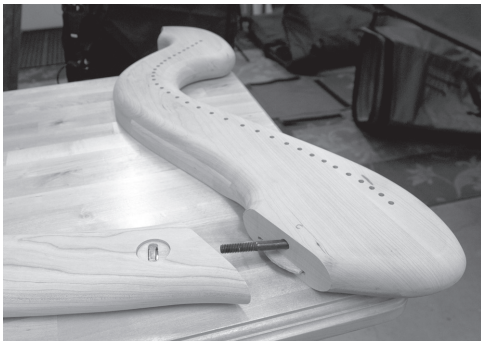
ASSEMBLING THE NECK AND PILLAR

_____27. Fit the Neck and Pillar together on a flat table, as shown below. Orient them so the Biscuit will slide into the slots in both pieces as the bolt draws the parts together. You can test this without glue first, just to make sure everything fits properly. When satisfied with the fit. follow these steps for permanent assembly:

a) Get some damp rags ready for quick cleanup.

b) Take the NECK and PILLAR apart and pull out the Biscuit.

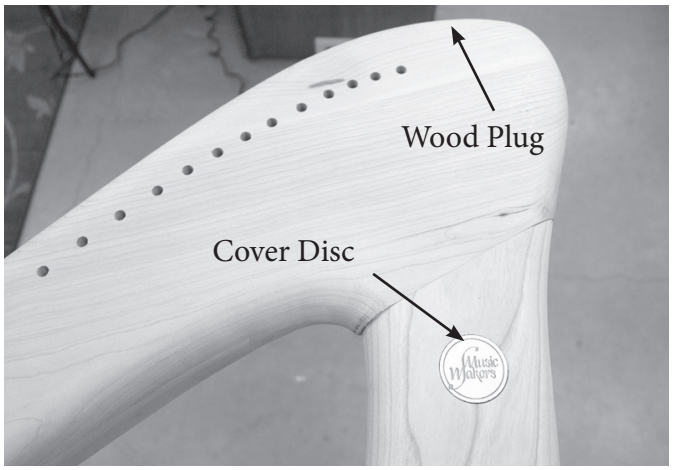
c) Apply glue to all contacting surfaces, including the entire Biscuit and slots, BUT NO GLUE IN THE BOLT HOLE.



d) Re-assemble the parts and push them together until the Bolt catches in the nut. Then use the large Allen Wrench to draw the parts fully together. TIGHTEN THE BOLT VERY FIRMLY! THE BOLT IS YOUR MAIN STRUCTURAL REINFORCEMENT FOR THIS NECK/PILLAR JOINT. Give the bolt an extra test to make sure the joint is tight -- sometimes the excess glue takes a minute to fully squeeze out as pressure is applied.

e) Clean up all excess glue that squeezes out. Rinse your rag and scrub a second and third time to make sure you have no thin glue residue left on the outside surfaces. You can set the Neck on the floor with the pillar leaning against a wall to allow 8 hours drying time for this joint.

_____28. There are two holes to plug in this assembly: Test fit the MUSICMAKERS COVER DISC into the shallow hole in the side of the PILLAR. This will cover the opening where we have buried the nut. You may show either the plain side or the inscribed side outward on the harp. If the lettering shows outward, make sure it will be oriented right-side up when the harp is standing. Sand the edges of the disc, if necessary, to get it to fit the hole. Then you can go ahead and glue it in place.



The TAPERED CHERRY PLUG is used for filling the hole at the top of the NECK. Apply glue and tap it firmly into place. When dry, you can carefully trim & sand it flush.

Fitting the NECK AND PILLAR to the HARP

Test-fit the NECK/PILLAR assembly to the harp body. Don't worry if there is a small gap (1/8" or so) between the back of the NECK and the ARCH -- the string tension will pull that gap closed easily. The same is true of a small gap under the bottom of the PILLAR where it meets the BOTTOM TRIM of the SOUNDBOARD.

Center the NECK on the ARCH piece on top of the harp body. You'll notice that the stringing side of the NECK is offest to one side to help keep the strings fairly close to vertical coming up from the SOUNDBOARD.

POINT OF INTEREST

The joint between the NECK and ARCH is meant to be a kind of knuckle joint that allows for some movement in the future. If we were to attempt to glue the NECK to the body permanently here, the string tension would eventually cause a crack to open as the harp frame flexes in response to the strings. So we simply create a joint that allows for slight movement. Another benefit of this type of joint is that you will always have the option of taking your harp apart for future repair or refinishing. Just removing the strings and a bolt at the bottom of the PILLAR will allow you to lift the NECK/PILLAR assembly off the body of the harp.

_____29. The 3/8" DOWEL PIN is an optional piece that you can hide inside the NECK and the ARCH. It helps hold the parts in alignment as you string the instrument, before the string tension pulls everything down tightly. This dowel pin also prevents the back of the NECK from shifting off-center on the harp body, in case the harp falls on its side. The trick is to drill centered holes in both the ARCH and NECK so they line up. Here is how to install it:

Rest the NECK/PILLAR assembly carefully on the harp and mark a pencil line on each side of the NECK and the ARCH (Image A). Lift the NECK/PILLAR assembly off the harp and connect the pencil lines across the top of the ARCH and the underside of the NECK. Find the center of these lines and mark it for drilling. Drill the holes slightly larger than the dowel for a loose fit. If you use a 3/8" drill bit, you can rock the drill forward and back to enlarge the holes. This will allow a small amount of movement, so the neck can shift slightly when the strings are brought up to full tension. These holes should be a little more than 1 inch deep (just over half the length of the dowel).

<u>This dowel does not get glued in place</u>. It needs to remain free to allow you to dis-assemble the instrument in the future.


Image A

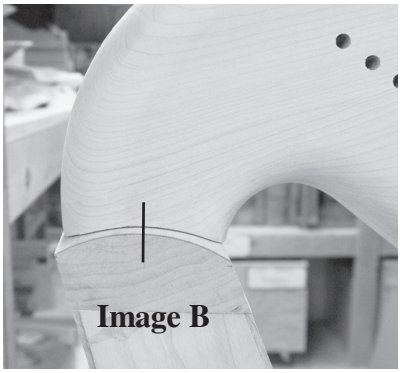


Image B

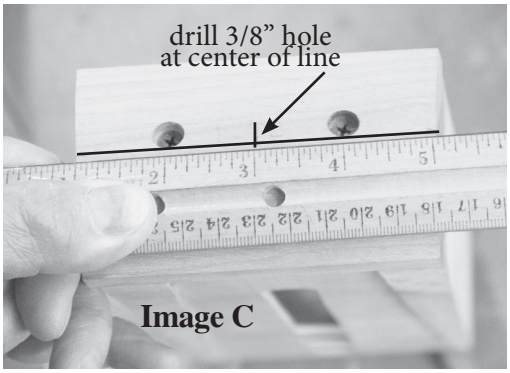


Image C

DO NOT GLUE THE DOWEL PIN IN PLACE.

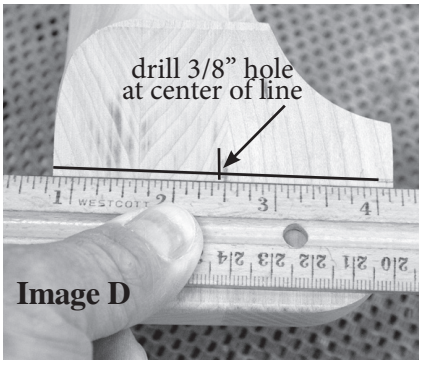


Image D

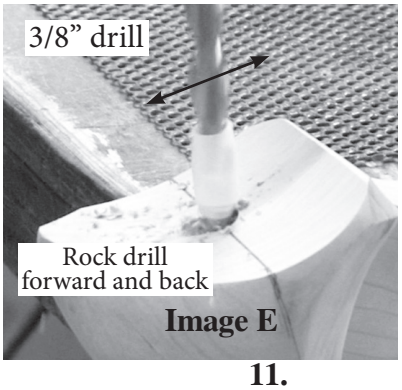


Image E

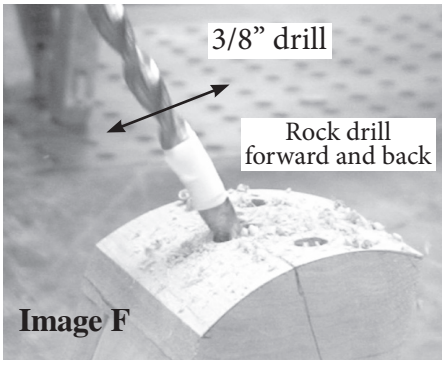
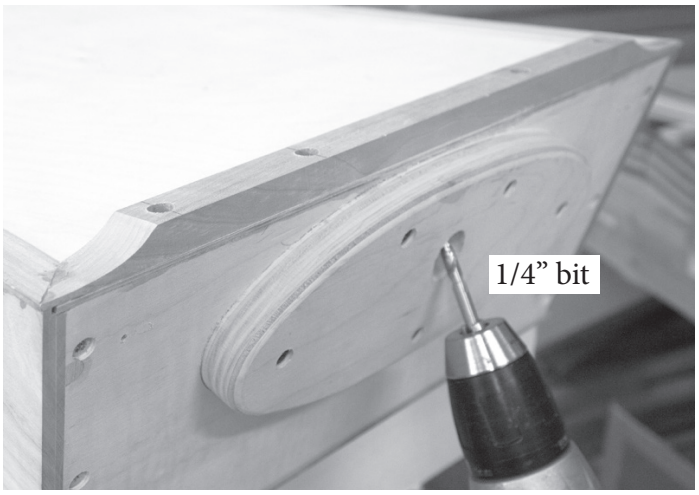


Image F

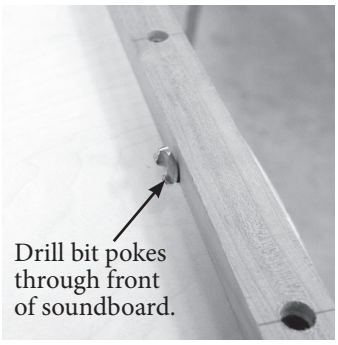
FINAL ASSEMBLY

_____37. Now you can install the lag bolt that holds the PILLAR to the bottom of the SOUNDBOARD. Don't use any glue here -- just the lag screw provided. Lay the harp on its back on a padded table or carpeted floor. and use the 1/4" drill bit provided for drilling the hole up from under the Base through the Soundboard, as shown here. The hole has been started already, so let the hole guide your bit at the same angle until it pokes through the soundboard.

Then change bits to the smaller 3/16" size. You'll need a second person to hold the Neck/Pillar assembly in place on the harp so you can drill a pilot hole into the bottom of the PILLAR. Keep the Pillar centered on the harp as you drill. The bit is not long enough to make more than a shallow hole to mark the place, so you'll need to remove the Neck/Pillar assembly to finish drilling about an inch deep at approximately the correct angle for the lag bolt.

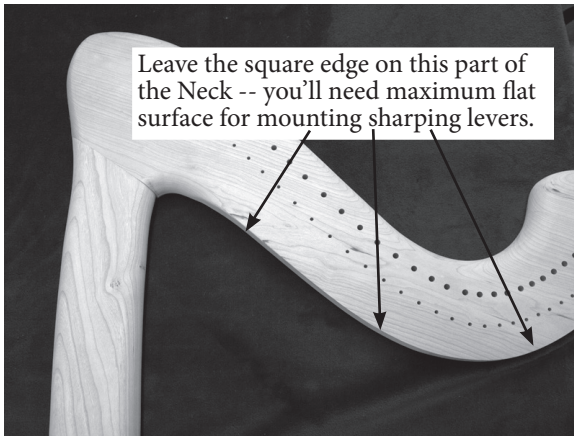


Test everything by bolting the harp together now, though you will take it apart again for the major sanding. Find the 1/4" lag bolt & washer provided, and use a 7/16" socket wrench to draw the bottom of the pillar firmly against the front of the soundboard. Don't forget to put the dowel pin under the back of the neck too.



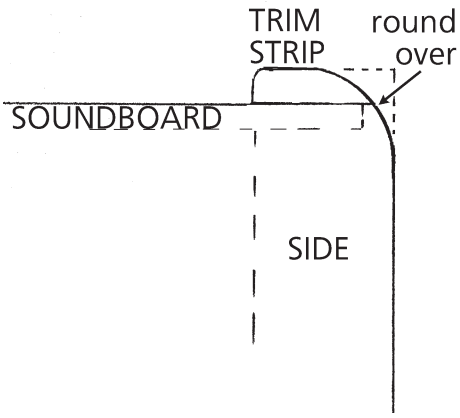
Don't worry about a small gap under the back of the neck. The string tension will draw that joint tightly together.

SANDING THE HARP



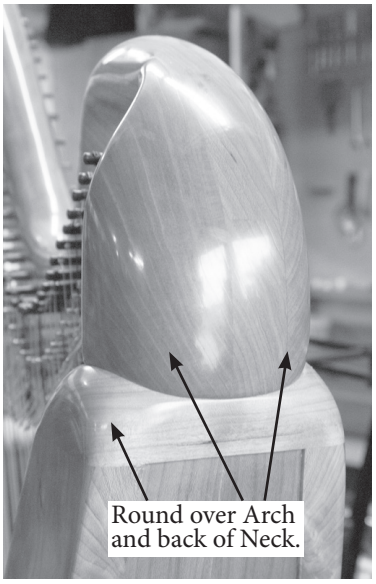
_____30. This is the best time to do final sanding and shaping of your project. Please don't get into a hurry with this part of the project -- you'll regret it if you don't smooth the wood nicely! Here are some guidelines:

Begin with coarse (80 grit) sandpaper for major shaping and rounding certain parts. DON'T SAND ALL SURFACES WITH COARSE SANDPAPER -- JUST THE AREAS THAT NEED ROUGH SHAPING. Check over the Neck/Pillar joint, for example, and blend the joint with 80 grit sandpaper. Note that we have rounded over all edges of the NECK except one. This lower edge on the string side of the NECK should be left square so you have room for mounting sharping levers later.



Sand all the corners of the body to round over these 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.

Look at the back of the Neck and how it rests on the top Arch of the body. These parts can be rounded quite a bit to make them look less "boxy".



_____31. Switch to a medium grit (120 - 150 grit) sandpaper to smooth off the scratches made by the coarse paper. This time, be sure to sand with the grain of the wood so you don't add more scratches. Check all corners and edges for machine marks and glue residue. Shine a light on the wood at a low angle to highlight irregularities -- they can be elusive!

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 few drops of water). Another option is to use filler that is light in color and then darken it later with touch-up pens.

_____32. Do your final sanding with about 220 grit sandpaper, working with the grain if possible, to avoid scratching the wood. Some people use even finer sandpaper, and that is OK, but we wait until the harp is sealed with a first coat of finish before switching to ultra-fine sanding. Dust the instrument well with a clean rag or tack cloth before applying the finish.

APPLYING THE FINISH

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

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 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 satin or semi-gloss polyurethane varnish will work fine on this project, but we recommend our wipe-on satin gel urethane called MUSICMAKER'S INSTRUMENT FINISH. Our complete finishing kit includes instructions, sandpaper sheets, and a half-pint can of satin gel urethane varnish. The advantages of 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.

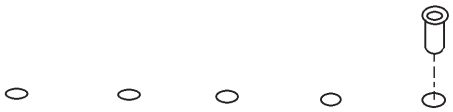
_____33. So, go ahead and apply the finish of your choice, sanding lightly between coats with very fine (400-600 grit) sandpaper or steel wool. It is easiest to do the finishing when the harp is dis-assembled. Don't forget to finish the feet!

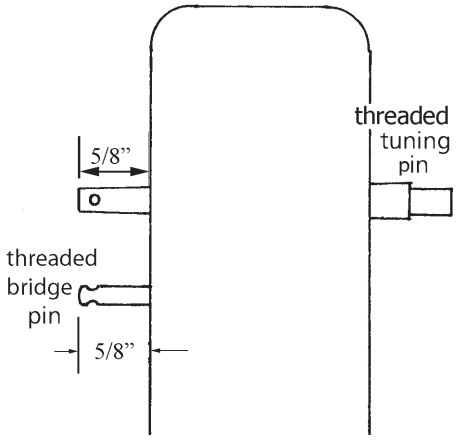
OPTIONAL DECORATING

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. We've also seen some very attractive carvings and woodburning patterns used on harps. These would be more ambitious additions to your project, and might require some further research for patterns and techniques.

INSTALLING HARDWARE

_____34. It is easiest to install the hardware before assembling the finished harp. Find the BRASS EYELETS and push them into the holes in the front of the SOUNDBOARD.





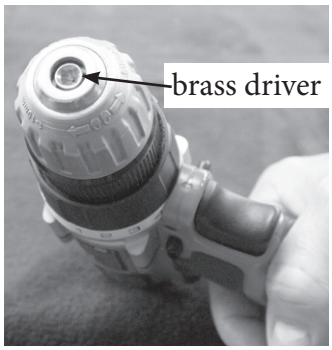
_____35. Install the THREADED BRIDGE PINS into the lower row of holes drilled in the NECK. Just tap them part way in with a hammer and turn them the rest of the way with a 5/64" Allen wrench, until the top of the pin stands about 5/8" above the surface of the wood. Use the 5/8" SPACING GUIDE to double-check the pin height.

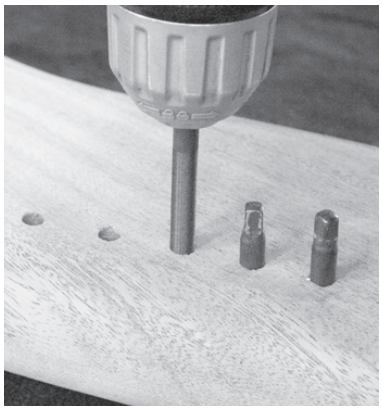
NOTE: Our THREADED BRIDGE PINS are adjustable in depth, allowing you to change the space between the harp string and the wood surface of the neck, using the Allen wrench supplied. This will be important later when you install sharping levers.

_____36. Turn the NECK/PILLAR assembly over and support the end of the NECK so the BRIDGE PINS are off your work table, but the NECK is still firmly supported. Install the BRASS DRIVER deep into your hand drill, as shown, so the chuck holds the soft brass from breaking apart from the twisting force. Push and turn the BLACK TUNING PINS into the row of holes in the NECK, from the opposite side of the BRIDGE PINS.

DO NOT LUBRICATE THE TUNING PINS!

When you push down hard as you turn them slowly, you can push them in quite quickly, and that is good. Don't just rely on the microthreads to seat these pins – that takes too long and it might overheat the pins and burn the holes. Push hard and turn slowly, skipping threads, until the narrow end pokes through about 5/8" below the underside of the Neck. The idea is to have the small hole in the Tuning Pin about even with the groove of the Bridge Pin, but perfection is not necessary here....





STRINGING & TUNING

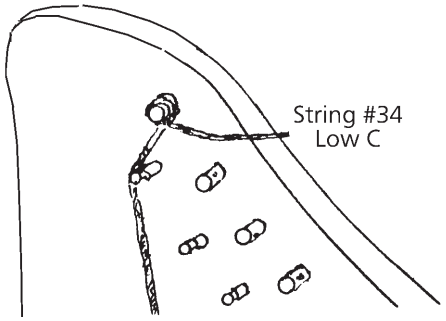
_____38. Stringing a harp is somewhat of an art. We recommend that you read through these last pages of directions completely before beginning, so you know what to expect.

It is not uncommon for 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.

The strings are numbered from 1 (for the smallest) to 36 (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.

_____39. Start at the bass (longest) end of the harp with string #36, a long red string that is very thick. Push the plain end of the string through the lowest hole in the SOUNDBOARD from back 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.

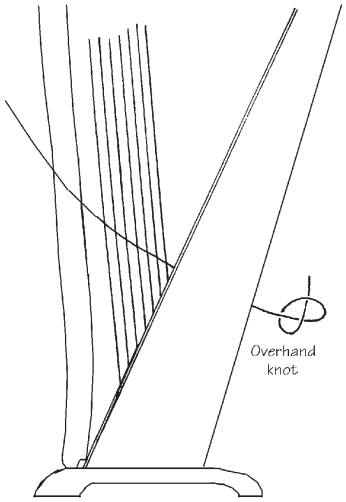


_____41. Use the TUNING WRENCH to turn the pin clockwise (from the viewpoint of the tuning wrench on the backside of the NECK) and guide the windings neatly around the TUNING PIN.

_____42. As the string begins to tighten, place it in the groove of the BRIDGE PIN as shown.

CAUTION!
These WOUND STRINGS can break if you over-tighten them. Some people break the first one they install because 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.

_____43. Thread the other 11 wound strings in the same way, taking care to keep them in the correct order. When you are satisfied with installation of these strings, use a wire cutter to clip off the excess tails, close to the TUNING PINS. These sharp ends can be hazardous! Cut them short so they won't poke you or catch on your clothing.



_____44. The remaining 24 strings are plain (monofilament) nylon that have no knots tied in them yet. Begin with the thickest string (A3 -- .055" diameter). You may insert these nylon strings from the front of the harp, if that is easier, and then reach inside the back to find the end. Tie a simple overhand knot at the end, as shown.

NOTE: Pull straight through the hole, 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 2-4 inches.

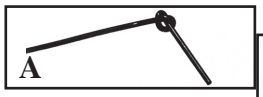
You'll catch on—too much slack makes for bulky accumulations on the tuning pin. Too little slack means you won't have enough to even wrap once around the pin. Ideally, you want to have 3 to 4 wraps of string around each tuning pin for security.

Helpful Hint: Do not accumulate a lot of windings of string around the tuning pins, especially with the thicker (low) strings. They become bulky and cumbersome. If you have that problem, turn the pin backwards to unwind the string, then pull more of the string through the hole and tighten it up again.

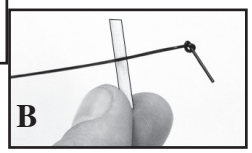
_____45. Once the string is satisfactorily installed, you may clip off the excess nylon close to the pin (leave ¼" stub of nylon), and tune the string up to its proper pitch (no, it won't stay in tune yet, but it helps to begin stretching it right away).

_____46. The three .050" strings require a bulkier overhand knot. Just push the short end back into the knot to make it bulkier, or you could accomplish the same thing by pushing a scrap of .060" string into the overhand knot before pulling it tight.

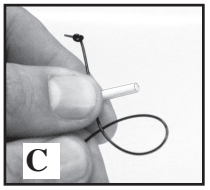
_____47. All the rest of the strings (sizes .045" .040", .036", .032", .028" and .025") will need to be tied to a short dowel to keep them from pulling through the holes in the soundboard. Here's how to tie them:



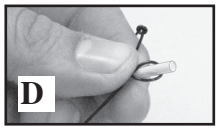
Step A. Begin with the same overhand knot near the end.



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



Step C. Form a loop in the string.

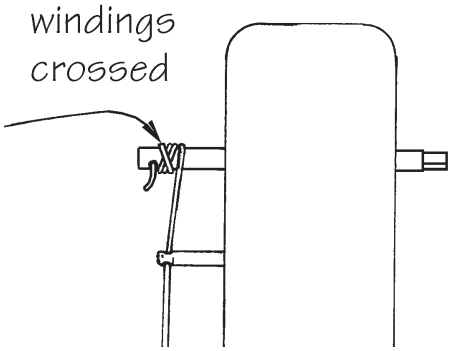


Step D. Slip the loop over the end of the dowel.

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 strings (and all the lighter ones) 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.

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 can 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 22 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 don't sound good. Tuning the strings too high will cause strings to break. To make sure you are tuning your harp strings to the correct octave, check it against a piano, or use our "online tuner" at: www.harpkit.com/freetuner

NOTE: Expect it to take 50 tunings before the harp will stay in tune well 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.

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

Loveland
Sharping Lever

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.

Check our website or current catalog for prices.

MUSICMAKERS
PO Box 2117
Stillwater, MN 55082

(651) 439-9120

www.harpkit.com

Universal
Sharping Lever

CARE AND FEEDING OF THE CHEYENNE HARP

TUNING TIPS: It is best to tune the harp with all sharping 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 flipped down. You will then flip these levers up when playing in the key of C.

If your harp does not stay in tune well, your strings may be slowly slipping around the tuning pins on the NECK, or else the knots inside the soundboard may be slowly untying themselves under the string tension. Refer to steps #44-47, paying close attention to the knots, and the crossing of the windings around the tuning pins.

If you have a loose tuning pin, and it is our threaded tuning pin, you may need to drip a little "Pin Tite" on the wood around the pin to restore its grip in the wood.

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:

Please keep the two allen wrenches with your harp so you can make adjustments, as needed.

If the buzzing sound occurs only when the SHARPING LEVER is flipped up (engaged), then you may need to either tighten the LEVER more firmly against the NECK of the harp, or you may need to adjust the BRIDGE PIN to get the string to press more firmly onto the SHARPING LEVER. Try screwing the BRIDGE PIN a little deeper into the wood (one or two turns) to move the string closer toward the NECK.

If the buzzing occurs when the LEVER is flipped down (disengaged), the string may be vibrating against some part of the SHARPING LEVER itself. If you have Camac or Loveland brand levers, look very closely at the position of the string as it passes through the LEVER mechanism. You can change the position of the string by raising or lowering the BRIDGE PIN on which the string rests above the SHARPING LEVER. (Make sure the string is resting in the groove of that PIN.) Use the 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 you have Universal Levers, and a string buzzes when the lever is engaged, the neck of the harp may be tipping slightly toward the strings. This deflection can move the strings further away from the side of the NECK. Use the large 5/16" Allen wrench to tighten the bolt at the top of the NECK more firmly.

If the problem is not located around the SHARPING LEVER, you may have a loose end of string or other loose material 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.

HARP REPAIRS:

If you ever need to repair or refinish 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 LAG BOLT under the BASE of the harp to allow the NECK/PILLAR to come free from the harp body. Don't hesitate to contact us if you have questions or problems.

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