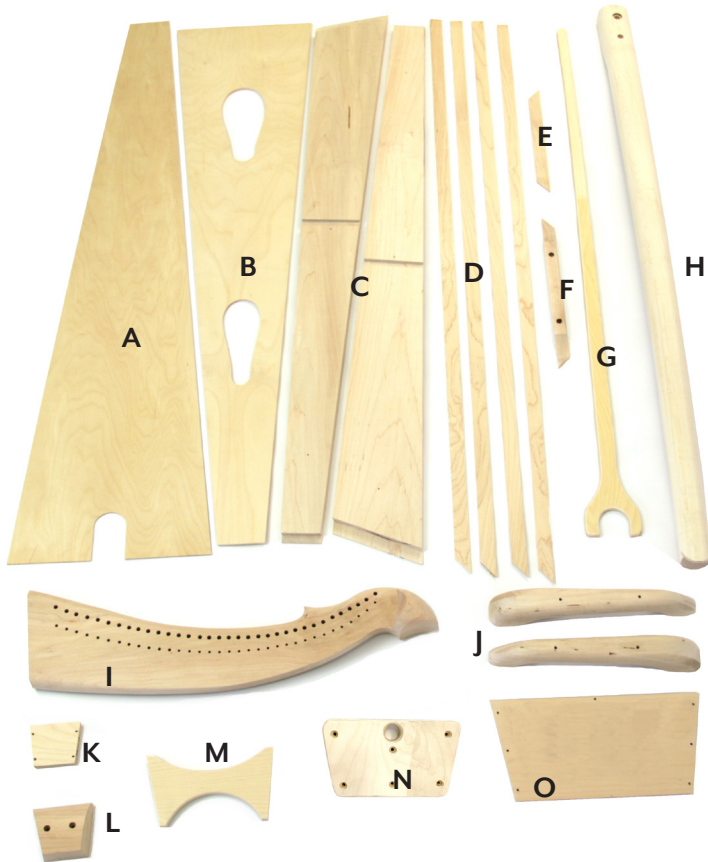




BALLAD HARP KIT

Assembly Instructions

Updated December 2021



WOOD PARTS

- ☐ ☐ A. Soundboard, Aircraft Birch
- ☐ ☐ B. Back Panel
- ☐ ☐ C. (2) Sides
- ☐ ☐ D. (4) Long Trim Strips, Sides
- ☐ ☐ E. Short Trim Strip, Back
- ☐ ☐ F. Short Trim Strip, Front (Drilled)
- ☐ ☐ G. Inner Reinforcement Bar
- ☐ ☐ H. Pillar
- ☐ ☐ I. Pre-drilled Neck
- ☐ ☐ J. (2) Feet
- ☐ ☐ K. Top Block
- ☐ ☐ L. Arched Cap Block
- ☐ ☐ M. Inner Brace
- ☐ ☐ N. Base Reinforcement
- ☐ ☐ O. Base Block

HARDWARE

- ☐ ☐ Scrap Soundboard Piece
- ☐ ☐ (34) Threaded Harp Tuning Pins
- ☐ ☐ Brass Driver for Tuning Pins
- ☐ ☐ (10) Threaded Bridge Pins, Large
- ☐ ☐ Allen wrench, 3/32"
- ☐ ☐ (24) Threaded Bridge Pins, medium
- ☐ ☐ Allen Wrench, 5/64"
- ☐ ☐ (24) Medium Brass Eyelets, 1/8"
- ☐ ☐ (10) Jumbo Brass Eyelets, 3/16"
- ☐ ☐ (2) #14 X 2" Wood Screws, Square Drive
- ☐ ☐ #3 Square Drive Bit
- ☐ ☐ (8) Wood Screws, 1-1/4"
- ☐ ☐ (14) Wood Screws, 1-5/8"
- ☐ ☐ (3) Wood Screw, 2"
- ☐ ☐ Wood Dowel, 3/8" x 2"
- ☐ ☐ (2) Maple Wood Plugs, 3/8" dia.
- ☐ ☐ Maple Wood Plug, 1/2" dia.
- ☐ ☐ Harp Medallion, 3/4" dia.
- ☐ ☐ (3) Drill bits (1/8", 7/64", 3/16")
- ☐ ☐ (2 oz) Wire Nails, 17 gauge, 3/4" long
- ☐ ☐ (4) Rubber Bumpers
- ☐ ☐ (4) Screws for Bumpers, #6 x 3/4"
- ☐ ☐ Tuning Wrench
- ☐ ☐ Set of 34 Harp Strings
- ☐ ☐ Spacing Guide for Bridge Pins
- ☐ ☐ Assembly Instructions

TIPS TO MAKE THIS A SUCCESSFUL PROJECT

- ___A. Inventory and inspect all your parts carefully. If anything is missing or defective, please call or email us right away.
- ___B. Read through the entire assembly instructions before you start, just to get an overview of the project. This will also help give you an idea of what tools you will want handy to complete the project. We highly recommend having an orbital sander to complete this project. It will help cut down on a lot of sanding time.
- ___C. We also recommend checking off each step in the directions as you finish it. You might be skipping forward to another part of the assembly while waiting for something to dry, and it helps to keep track of where you left off.

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Pay special attention to notes in these boxes. These notes highlight crucial aspects of the build or steps that, done incorrectly, can really mess up your project.

Take your time and enjoy the process. Building a musical instrument is an experience to be savored, not a race to be won.

If you make a mistake somewhere along the way - **please don't worry about it.** Every mistake can be fixed and the majority of mistakes won't be noticeable by anybody but you.

A NOTE ABOUT GLUE

We strongly recommend that you use a common woodworking glue like Elmer's Carpenter's Wood Glue or Titebond because they hold the parts more securely than most other adhesives, and they are inexpensive and easy to use. DO NOT assemble the wood parts of this project with 5-minute epoxy or super-glue or hot melt glue. The yellow colored Elmer's or Titebond is best.

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. 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 prominent places.

ASSEMBLE THE FRAME

1. Clamp the harp sides to your bench. This will help prevent the sides from sliding around during the assembly process. (fig. 1)

(This may seem like an odd way to start, but it really helps to hold both side pieces firmly when drilling pilot holes for the screws. We suggest reading through step 5 to understand how the parts will go together.)



FIG. 1

2. Dry fit the base block and inner top block to each side ensure a good fit. (fig. 2) You'll need to check the fit on one side and then flip the part over to check the other side.

If the pieces aren't perfect, you can adjust them with a hand plane or sanding block. It's easier to remove the excess BEFORE the parts are glued in place. You can remove the excess by using a sanding block, hand plane, or power sander. (fig. 3)



FIG. 2

3. Drill three, 7/64" pilot holes in both sides for the base block screws, as well as 2 pilot holes in both sides for the top block screws. (fig 4)

Be sure to tilt the drill bit to drill parallel to the plane of the sides. If you drill the holes straight down, you might split the wood of the sides.



FIG. 3



FIG. 4

- ___4. Apply glue to the sides where the base block connects, as well as where the top block connects. (figs. 5, 6)

Insert 1-5/8" wood screws to connect one side to the base block. (fig. 7) Make sure to clean up the excess glue as you connect the sides to the both the top and bottom blocks. Insert screws to connect the top block on the same side as you did the base block.



FIG. 5

- ___5. Flip the harp over so that the glued side is on top. Use the top block to help balance the sides together. Align the base block, and insert the screws for the remaining side. (fig. 8) After the base block is attached, insert the remaining screws for the top block. Make sure to clean up any excess glue.



FIG. 6

- ___6. Place the frame on your bench so that the front is facing up. (fig. 9) The front is both longer and wider than the back.

Find and check the fit of the inner brace. Orient the brace so that the taper matches the taper of the sides. Be sure that the ends of the brace set flush with the edges of both the front and back.



FIG. 7

NOTE: Sometimes the brace is not the correct length to fit between the sides. This can be caused by poor 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 brace 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 changing the angle or rounding the end. If the brace is too thick to slide into the dado, you can sand it a little at a time with an orbital sander.

This brace serves two purposes:

- 1.) to straighten the sides during assembly and
- 2.) to keep the body of the harp from deforming later under string tension.



FIG. 8



FIG. 9

- ___7. Apply glue and clamps. Please note the various methods of clamping. Taping scrapwood to the outside will make it easier to apply the bungee cord. Choose the method that works the best for you. Orient the clamp where the brace is located. Be sure to clean up excess glue drips that might interfere with installation of the front and back panels. Practice fitting pieces together without glue. (figs. 10, 11)

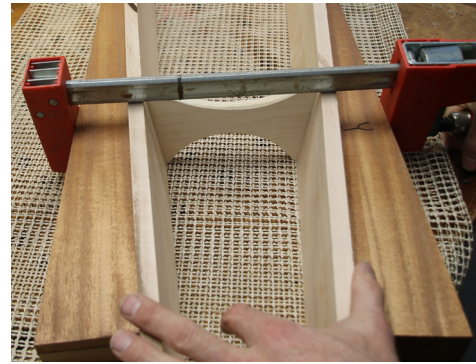


FIG. 10

Fig. 10 shows the use of f-clamps (aka. bar or pipe clamps) and scrap wood (e.g., 2x4s) to help distribute pressure along the length of the sides.

Fig. 11 shows the use of elastic/bungee cord, along with 2x4s.

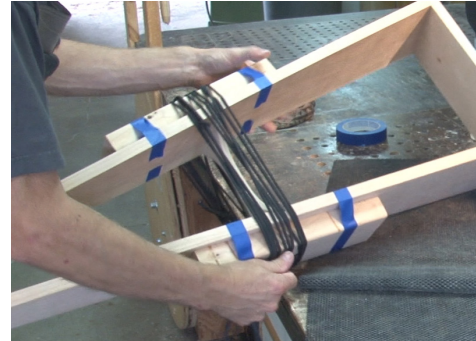


FIG. 11

PREPARING THE SOUNDBOARD

- ___8. Take note that the soundboard is punch marked on the outside surface (front) of the board.

Using a hand drill or drill press, drill the lowest and highest punch marks with a 1/8" drill bit. These holes will act as a guide for the reinforcement strip. Perform the drilling on a workboard to prevent the wood from tearing out on the soundboard. Be sure to hold the drill perpendicular to the soundboard. (fig. 12)



FIG. 12

- ___9. **Flip the soundboard so the inside faces up.** Connect the holes with a straight edge and mark with a pencil. This line will act as a reference for gluing the reinforcement bar. Dry fit the reinforcement bar and trace around each end with a pencil on the inside of the soundboard. Be sure that the reinforcement bar covers the highest hole. (figs. 13, 14 - next page)

- ___10. Gather weights and clamps for pressing the reinforcement bar and dry fit the reinforcement bar with the clamps as well.

Apply glue along the length of the reinforcement bar and tape on both ends to prevent slippage once the weights or clamps are added. (fig. 15)



CAUTION: Double check that you are not gluing the reinforcement bar over the punch holes!!

Then you can add the weights or clamps. Make sure that you are continuing to utilize your workboard, as it helps keep the soundboard and reinforcement bar flat during the clamping process. (figs. 16, 17)



This is a great time to sign and date the inside of the soundboard. Your name and skills as a luthier will live on in infamy!

- ___11. Once the glue is dry, flip the panel over, and drill the remaining holes. Drill through the front panel as well as the reinforcement bar. (fig. 18)

___Drill bottom 10 holes with 3/16" drill bit.

___Drill remaining 24 holes with 1/8" drill bit.

Don't forget to redrill the top and bottom hole through the reinforcement bar.



FIG. 13



FIG. 14

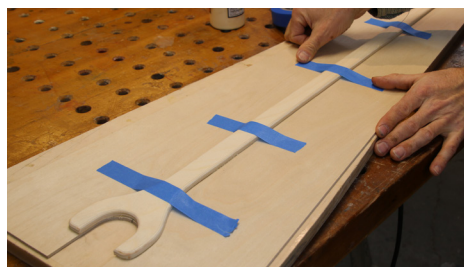


FIG. 15



FIG. 16



FIG. 17



FIG. 18

INSTALL THE BACK AND SOUNDBOARD

- ___12. While you are waiting for the glue to dry on the soundboard reinforcement strip, you can work on sanding the sides/frame of the soundbox.

Make a large sanding block to level the edges of the sides. This will make for a better gluing surface. Use double stick tape or spray adhesive to apply 60-grit sandpaper to a flat block of wood for a sanding block. Make sure that the block is flat and not bowed. (fig. 19)



FIG. 19

Check to make sure the base block, braces, and top block are all flush with the sides. Use a file, chisel, or sanding block to remove any spots that are too high. You will want to clamp down your project so it doesn't move around while you are sanding. (fig. 20) Make sure to sand both the front and the back of the frame. This creates a better glue surface as well as preventing gaps from appearing under the soundboard.

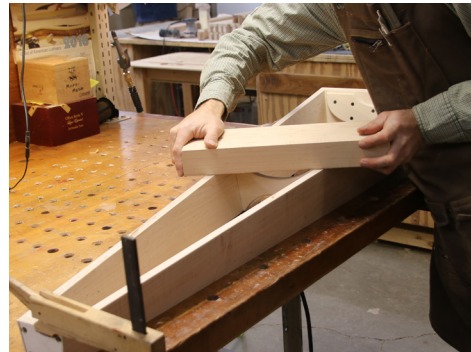


FIG. 20



NOTE: It is very important you make sure there are no gaps where the soundboard contacts the frame. Gaps here create the potential of the soundboard coming off the frame.

- ___13. Dry fit the back to the frame. The back and soundboard panels are cut slightly large to ensure a bit of overhang that can be removed after gluing.

Once the back is fitting nicely, remove excess overhang from the top and bottom. This step can be done after gluing, but you may find it easier to do before you glue it to the frame. You can do this by using a pencil to mark along the underside of the back against both the top and bottom block. Then use a saw to cut off the excess. Make sure to leave your line mark when making the cuts, to ensure that you don't take too much material off of the back. The rest can be cleaned up with sanding later on.

- ___14. Mark the location of the frame on your back panel to help locate the where to install the nails.

Mark centerlines on the top of the frame, and extend the lines to both the bottom and top blocks, as well as the sides. (fig. 21) Put the back panel back in place and extend the lines to the side edge of the back panel. Use a straight edge to connect all of your centerlines on the back panel. These will be your guidelines for where to put your nails.



FIG. 21

- ___15. Apply glue to the frame and nail the back panel in place. (fig. 22)

Start by installing one nail at each end of the panel to keep it aligned as you add more nails down each side and across the bottom. (fig. 23) Place your nails about 1-1/2" to 2" apart.

Make sure to match the angle of the nail to the angle of the sides of the soundbox, so that it does not go through the side.

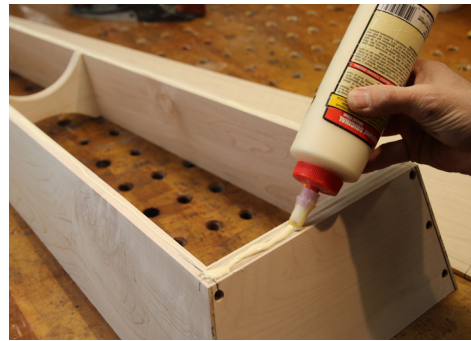


FIG. 22



FIG. 23



Do NOT nail along the top block, as there is no trim to cover this area. (fig. 24) You will need to clamp the back to the top block to be sure that it gets held down.

- ___16. Fit the soundboard using the same techniques as you used to fit the back panel. There will be a couple slight differences that you will need to pay attention to. There is a greater risk of driving a nail through the outside face of the side when you are installing the soundboard. There are two things you can do to help avoid this from happening.

1) Pay attention to the angle that you are installing the nails - be sure to match the angle of the sides of the frame. (fig. 25)

2) Instead of marking centerlines for the nail guidelines; mark your guidelines about 1/3 of the way from the inside edge.

It is very difficult to make a seamless repair when you punch through the sides. If you pay attention to these two steps, it should prevent any issues.

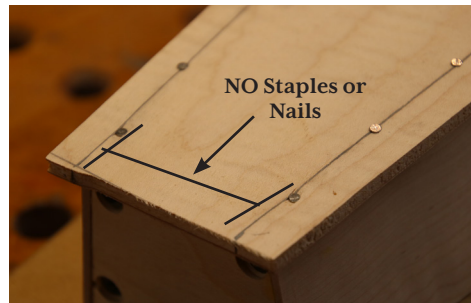


FIG. 24

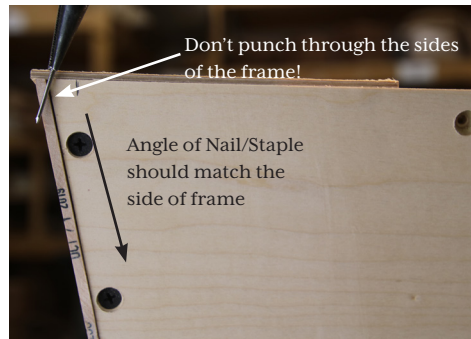


FIG. 25

- ___17. Test the bottom front trim strip in place and mark holes where screws will be. Do NOT nail within 1/4" of these marks. (fig. 26)

- ___18. Attach the soundboard scrap. Put a nail on each side of the soundboard scrap. Avoid nailing in the middle of the scrap as that is where the pillar screw will come in. (fig. 26)



FIG. 26

- ___19. Apply glue to the front of the frame and nail the soundboard to the frame using your guidelines. Remember to pay attention to the angle you are installing the nails. Space the nails about 1" apart.

Remember, do NOT nail along the top block (same as the back panel) as there will not be trim here.



FIG. 27

- ___20. Use a hammer and nail set or flat screwdriver to sink the nails/staples just below the surface. This will keep them from interfering with the trim strips. Don't drive the nails too deep. High humidity could cause the wood to swell over the heads of the nails in the future. (fig. 27)

WHY NAILS? WHY A LAMINATED SOUNDBOARD?

1) Nails are necessary for the soundboard because wood glue alone is not sufficient to withstand all the string tension.

2) Many people ask why we use laminated wood instead of solid wood 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.

INSTALL THE TRIM

- ___21. If you haven't already done so, this is the time to remove the overhang from the top and bottom of the back and soundboard. (fig. 28)



FIG. 28

Also use this time to double check that all the nails/staples are driven down slightly below the surface of the back and soundboard.

- ___22. Remove the excess overhang from along the sides of the frame as well. There are several options for removing the excess. You can use a fine tooth hand saw, a hand plane, a palm belt sander, or a sanding block. (figs. 29, 30)



FIG. 29



FIG. 30

- ___23. Sand the access holes in the back panel first using 120 grit, and then again with 180 grit sandpaper. Be sure to clean up the entire perimeter of each hole. This will make for more comfortable handling once the harp is finished. (fig. 31)

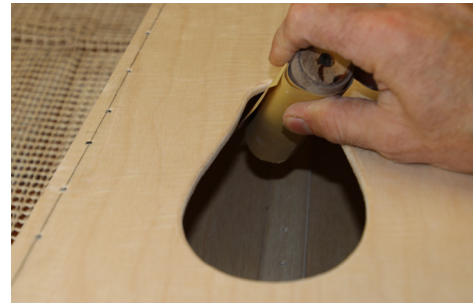


FIG. 31

- ___24. Use an orbital sander to **lightly** sand the entirety of the back, soundboard, and sides using 220 grit sandpaper. Make sure to take extra care to hold the sander flat. (fig. 32)



FIG. 32



NOTE: Be careful when you are sanding the back panel. It is very easy to sand through the thin hardwood veneer.

- ___25. Test fit the trim strips to the soundbox. Be sure that you know which strip is going where.

Sand along the entire inside edge of the trim strips. Do NOT sand the side of the trim that will be glued down. It is easier to sand this inside edge now, before it is glued down. Rounding the edge will ensure that no one will get a splinter from handling the finished harp near the trim. Ouch! (fig. 33)

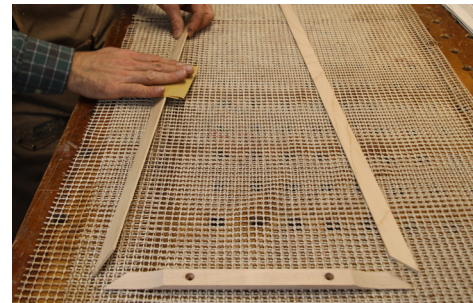


FIG. 33

- ___26. Test fit the bottom trim strip with the pre-drilled holes. Check that the mitered edges fit properly without leaving a gap anywhere. (fig. 34)

If the miters on the bottom trim strip need to be adjusted, you can use a sanding block or disk sander. (fig. 35)

The width of this strip should match the width of the harp's soundboard at the bottom. You may need to adjust one side more than the other to get the width and miters to match. If you run out of wood to remove from the bottom trim. The long side trim strips can also be adjusted for miter angle.

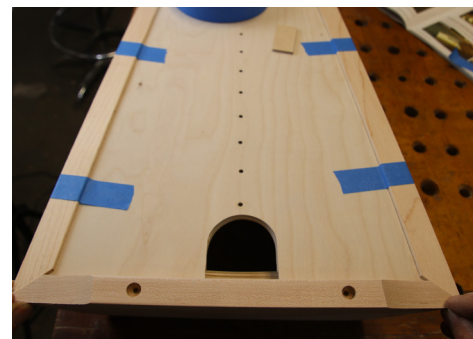


FIG. 34

- ___27. When you are satisfied with the fit of the bottom trim, use a 7/64" drill bit to bore pilot holes into the base block.

Apply glue and use 1-1/4" screws to attach the bottom trim strip to the frame. Be sure to clean up any excess glue right away.



FIG. 35

___27. Once the bottom trim is installed, make sure the top of the trim strip is flush with the inside top of the base board. File or sand the trim flush with the base if needed. (fig. 36)



FIG. 36

___28. Position the side trim pieces and double check the miter angles. Sometimes a gap can occur once the bottom trim has been attached. (fig. 37) One more dry fit should correct any problems. Make any adjustments to the trim to correct any gaps using a sanding block.

Sometimes when you fix the angle of the trim to correct the gap, it will cause the inside corner of the miter to not line up correctly. Should this happen, taper a line in the trim to match the inside corners and sand to the line. (fig. 38)



FIG. 37

___29. Now use a pencil to mark the overhang of the trim strips at the top of the frame. Cut the excess off with any type of saw. Be sure to keep this top surface flat so the arched cap will fit well.



FIG. 38

___30. Apply a bead of glue to the side of the body where the trim will be. Then smooth out the glue with your finger to ensure a nice even glue surface along the entire trim strip. You want enough glue to make sure you have a solid bond, but not too much where you will have a lot of excess squeeze out.

Lay the trim on the body and use masking tape to secure it down. Space the tape about every inch. Use a scrap block to push the tape against the inside edge of the trim strips. (fig. 39) When using the tape, think of applying each piece like a bandage where you are pulling tightly and ensuring the gap closes. Loose tape holds nothing well.



FIG. 39

___31. Repeat this process to install the second trim strip on the opposite side of the body. You will also want to put a piece of tape diagonally across the bottom end of each side trim piece over to the bottom trim piece. This will keep the corners together as the glue dries.

- ___32. Allow 30-60 minutes for the glue to dry. Then remove all of the tape, and excess glue with a purposefully dulled chisel. We're trying to remove glue, not wood. (fig. 40)



FIG. 40

- ___33. Repeat the trim process for the back of the soundbox. Except you will be using tape to secure the bottom trim.

- ___34. Cover the 2 screws on the front bottom trim with 3/8" wood plugs. Put a small dollop of glue into the hole. Use a hammer to tap the plug into the hole. The plugs are tapered and will only fit one way and will not sit flush with the trim. Allow 30 minutes for the glue to dry, then use a small hand saw or sander to remove the excess plug material. Just be careful to not make a divot in the trim. (fig. 41)



FIG. 41

INSTALL THE ARCHED CAP BLOCK

- ___35. Use an 80 grit sanding block or disc sander to flatten the top of the assembled box. (fig. 42)

Check the surface with a straight edge to make sure that it's flat across the entire top. This will eliminate any gaps when fitting/installing the arched cap.



FIG. 42

- ___36. Orient the arched cap block on the top block and check for the best fit. Use two 2" wood screws and a hammer to make punch marks into the top block for guiding your pilot holes. (fig. 43)

Then use a 7/64" drill bit to bore two pilot holes, using the punch marks you just made with the screws as a guide.



FIG. 43

___37. Apply a liberal amount of glue and screw the arched cap block into the top block with the same 2" screws you used as punches. (fig. 44) Be sure to clean off the excess glue.

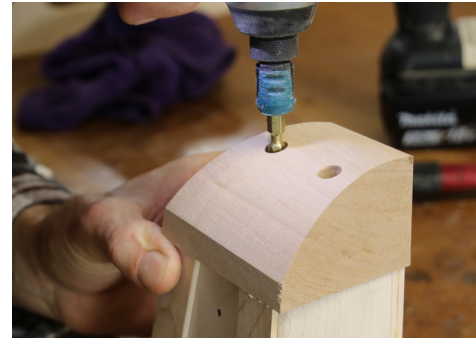


FIG. 44

___38. Sand the top block to be flush with the sides of the harp. Then sand the front and back of the top block to be flush with the trim strips. You can use either a portable belt sander, sanding block, or orbital sander to do this. (fig. 45) **Do not sand the top of the block where the screws are, as this is where the neck will attach to the body of the harp.**



FIG. 45

___39. Sand the sides of the harp with a hand sander using 180 grit. Then create a 1/4" roundover along the entire length of the body, on all 4 corner edges. (fig. 46)



FIG. 46

REINFORCE THE BASE

___40. The tension from the strings causes the pillar to exert a tremendous amount of concentrated force on the base. The base reinforcement piece is added to the bottom of the base to provide extra support.

Position the base reinforcement on the bottom of the base lining up the hole to allow access to the pre-drilled hole where you will attach the pillar. (fig. 47)

Apply wood glue to the base reinforcement and screw it to the base using six 1-1/4" screws. (fig. 48)

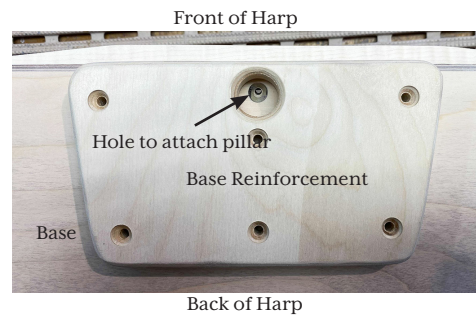


FIG. 47



FIG. 48

NECK AND PILLAR ASSEMBLY

___41. The neck and pillar have been pre-fitted at our shop, but you should test these parts without glue to make sure the wood has not swollen from humidity. The neck should fit easily into the large slot at the top of the pillar. Lightly sand the area if the joint is tight. Be sure to avoid sanding too much in the area that fits into the pillar, as you want to keep a nice fit.



FIG. 49

___42. Sand the neck and pillar. It is much easier to sand the neck and pillar before they have been assembled. Start with 120 grit sandpaper, and work up to 180 grit. Do the majority of your sanding before you put these parts together. (figs. 49,50)

Make sure that you sand off all of the scratches in the wood. Having good lighting will help you see the scratches. When you are sanding by hand you want to make sure you sand with the grain, so you are not adding scratches.

Do NOT sand the top side of the pillar where it connects to the neck. (fig. 51) You will do this later once the neck and pillar are assembled together.



FIG. 50

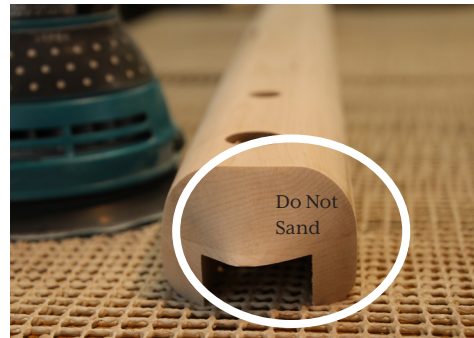


FIG. 51



Sanding scratches will be more visible once you have applied finish. So taking time to do a good job sanding, will leave you with a better final product.

___43. It is crucial to be able to draw the neck and pillar firmly together when you glue them, so test your screwdriver/drill to make sure it has enough torque to turn the large #14 screws all the way in. Do a dry run before adding the glue. This will help you prepare for the task and give one more opportunity to sand the parts if needed.



HINT: It helps to clamp the neck in a vise (with padding) or to your work surface so you only need to hold the pillar in position as you install the screws.

___44. Apply glue to the inside cavity of the pillar where the neck will be attached. (fig. 52)

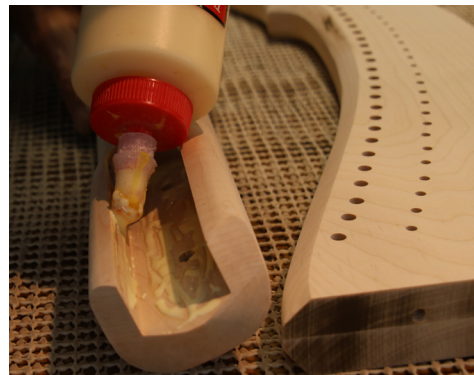


FIG. 52

- ___45. Use the provided #14 x 2" wood screws along with the #3 size square drive bit to draw the neck and pillar together firmly. (fig. 53) Make sure to clean up all the excess glue that squeezes out. It will be very difficult to clean up the excess glue if you allow it to dry.

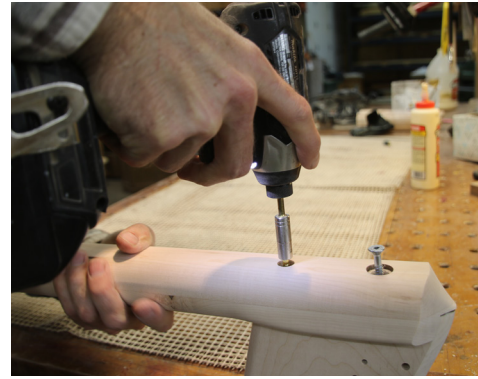


FIG. 53

INSTALL THE CONNECTING DOWEL

- ___46. Stand the harp up, leaning it against your work table, so you can check the fit of the back of the neck on top of the soundchamber.

Make a mark at about the center of the top block. (fig. 5)

Use a straight edge to make a long angled diagonal mark connecting the shoulder to the arched cap block. (fig. 55) This mark will serve as a guide as you drill holes for the connecting dowel.



FIG. 54

Make a similar mark on the other side of the shoulder and arched cap block

- ___47. Connect the marks across the arched cap using a straight edge. (fig. 55)

Now mark the center of the line you just made. (fig. 55)



FIG. 55

- ___48. Repeat this process on the under side of the neck. (fig. 56)



FIG. 56

- ___49. Use masking tape to mark a depth stop on a 3/8" drill bit, at a 1-1/4" depth. (fig. 57) This drill bit is not included in your hardware pack. However, it's a common size in most drill bit sets.



FIG. 57



The 3/8" drill bit will tend to wander as you are drilling. If you first drill the hole with a 1/8" drill bit, it will help stop the bit from wandering.

- ___50. Use an awl to tap a starting hole at the centerpoints on the lines you just marked. This will act like a pilot hole to help keep the drill bit from wandering. (fig. 58)

Now drill a hole to the depth of your tape where you made your awl mark on both the arched cap block and the neck. Rock the drill front to back about 10° to give the dowel potential for a little movement. (fig. 58) (This movement will help when attaching the bottom of the pillar.) DO NOT ROCK THE DRILL BIT LEFT/RIGHT.

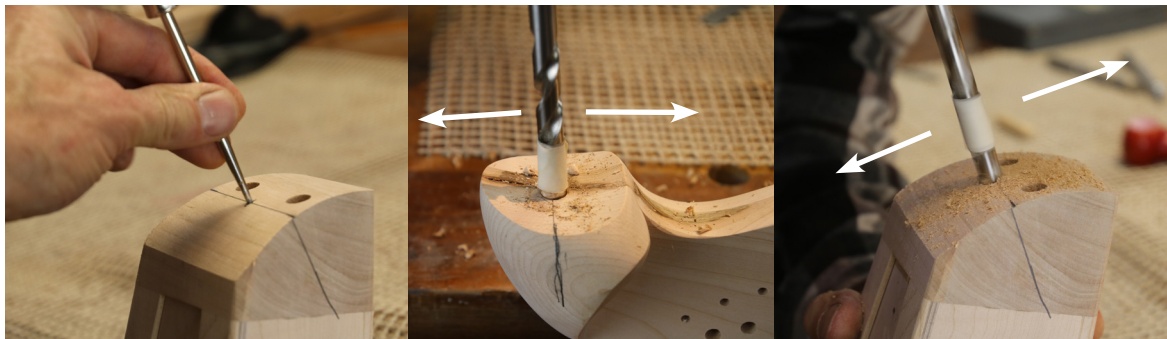


FIG. 58



Secure the neck in a padded vise before drilling the hole for the dowel.

- ___51. Insert the dowel in the arched top block (WITHOUT GLUE) and then fit the neck over the other end of the dowel. (fig. 59) Hopefully your hash lines match up pretty well:)



FIG. 59

Now trace the footprint of the shoulder on the arched cap block. (fig. 60)

This will serve as a sanding guideline. (Before you outline the shoulder, make sure that the bottom of the pillar is in the right location where it will attach to the soundbox.



FIG. 60

___52. Use a hand sander to take off the excess bulk on the arched cap block, as well as to soften the edges. Do not sand inside the circle guideline you have made. Sand the top shoulder of the harp, so there are soft edges. (figs. 61,62)



FIG. 61

___53. Cover the screw holes in the front of the pillar. You can put the neck in a padded vise to help keep the pillar stable. (fig. 63)

First, put a dollop of super glue in the bottom hole. Then tap the 1/2" plug into the hole with a hammer.

Next put a dollop of glue in the top hole, and cover it with the medallion provided. You can lightly sand the top of the medallion before installing to clean off the smoke residue left by the laser machine.



FIG. 62

___54. Once the plug and medallion have been installed, allow at least 30 minutes for the glue to dry. Use a hand saw, power sander, or sanding block to remove the excess plug material. Follow up with medium and fine sand paper to remove scratches left by the coarse sander.

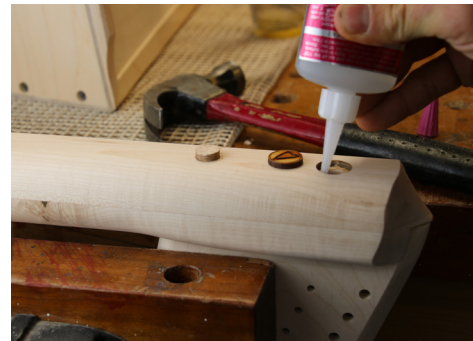


FIG. 63

___55. Sand the rest of the pillar and soften the edges on the top of the pillar. Make sure the joint where the pillar and neck come together are flush with each other. (fig. 64)

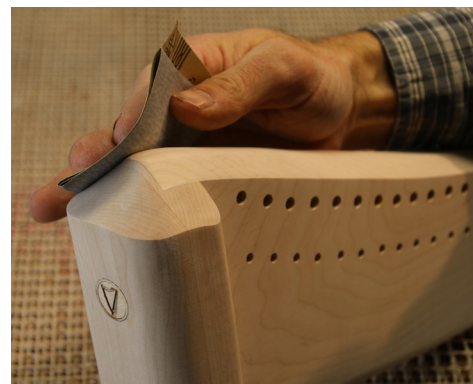


FIG. 64

FIT THE NECK AND PILLAR TO THE BODY

We do our best to ensure the neck and pillar will fit the body of your harp, before it leaves our shop. However, as a result of the building process, sometimes slight variations can occur that will require you to adjust the final fitting at the end of the building process.



The joint between the back of 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 screws 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.

- 56. Place the body of the harp on its back on your workbench. Hold the neck and pillar assembly in place on the body. Check the fit at the back of the neck where it slides into the arched cap block, then check how the bottom of the pillar meets the base block. Follow the photos and make minor adjustments as needed to achieve a good fit.

Fig. 65 shows a perfect fit. If yours looks like this, then proceed to the next step.

Fig. 66 shows a small gap between the pillar and the base block. If the gap is less than 1/8" the screw that you install, along with the string tension, will draw the pillar down, and close the gap. If the gap is wider than 1/8", however, you will want to fit and glue a shim under the pillar to fill the gap.

Fig. 67 shows a pillar that is too long and needs to have some wood removed at the bottom. In some cases, you may need to remove a significant amount of wood using a hand saw. Then following up with a sanding block or flat file, as needed.

- 57. Drill a 7/64" pilot hole into the bottom of the pillar to make it easier to install the screw. (fig. 68) You may need to ask someone to help hold the parts in place for this step. Be sure to follow the angle of the hole that is already drilled in the base block. You want the screw to match the angle of the pillar.

Then, insert the 2" wood screw to hold the pillar in place. If you did have a slight gap at the pillar body joint, the screw will help close that gap here. The 1,200 pounds of string tension on this harp will also help close this gap.



FIG. 65



FIG. 66



FIG. 67



FIG. 68

You might notice some wiggle room in the neck and pillar once you've inserted the wood screw into the pillar. This movement is natural and will cease once the strings are installed. **Do not glue** the top block or the base block. These joints must be left dry to allow for some movement as the harp is put under tension. It is also necessary so that the harp can be easily dismantled again for applying finish, adding decorations, or making future repairs.

PREPARING THE HARP FOR FINISH

- ___58. Any minor cracks and blemishes 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 epoxy, wood glue, or super glue mixed to the consistency of putty (wood glue can be thinned 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. You want to fill the cracks, and let it dry, before sanding smooth. (fig. 69)



FIG. 69

- ___59. You are ready for your final sanding before you apply finish. If you haven't done so already, use a sander or plane to create a 1/4" roundover on the entire length of the body.

The quality of your sanding makes the difference between a professional looking instrument and something that the general population can easily identify as a 'home-built harp.' Give special attention to this portion of the project. You won't regret the extra time you took when you see the difference it makes in the finished product!

Some general sanding guidelines:

Use 80 or 100 grit sandpaper for shaping and rounding over corners.

Use 150 grit sandpaper for removing machine marks.

Start at 180 grit to smooth the surface and work your way up to finer grits until you are satisfied. Then maybe do a little more:)

With the body separated from the neck/pillar, take time to smooth all corners and remove any machining marks from the entire harp. Start with 120 grit sandpaper, sanding with the grain direction. Then 150 to 180 grit for the upper shoulder area to create a smoother surface on the most frequently touched parts of the harp.

Don't forget to sand the feet! This is a part you don't touch as often, but it's still important to get every part of the instrument smooth and ready for finish. (fig. 70)



FIG. 70

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.

APPLY A FINISH

- ___60. Apply the finish of your choice, sanding lightly between coats with very fine sandpaper (600 grit) or steel wool (#0000). Don't forget to sand and finish the feet too!

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

GENERAL FINISHING GUIDELINES

STAINS or DYES -- These are coloring agents and should only be used if you want to change 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 best with a clear finish. But, if you want to color the wood, your staining should be accomplished before applying a surface finish such as oil, varnish, or lacquer.

OIL or WAX -- Be very cautious about using an oil or wax finish. If this type of finish gets into the tuning pin holes, it will act as a lubricant, and you may have trouble keeping the instrument in tune. Oil finishes 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. Some people are fond of a beeswax finish for a natural look, but it can show water spots if it gets wet, so you may end up needing to re-wax or touch up the surface in the future.

POLYURETHANE VARNISH -- Any regular varnish will work fine on this project, but we think a clear, semi-gloss polyurethane is the easiest to apply. Just wipe on a thin coat and wipe off the excess. The advantages of this finish are its simple application, minimal odor, good durability, and deep, soft luster.

LACQUER -- Many professional instrument makers 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.

INSTALLING THE HARDWARE

- ___61. Keep the neck/pillar separate from the sound-chamber for the majority of the hardware installation.
- ___62. Locate the brass eyelets in your hardware pack. Install the eyelets in the soundboard. The 10 large eyelets will go in the bass (wider end) of the soundboard, near the bottom. The 24 medium eyelets get placed in the middle and top end of the soundboard. Notice we use an awl for pushing the eyelets fully into the holes. (fig. 71)



FIG. 71

- ___63. Orient the feet on the bottom of the harp with the larger portion of the foot in the front. The feet should be nearly flush with the sides of the body of the harp. (fig. 72)

Using an awl, mark where your screws will be located. Bore pilot holes into the base using a 7/64" drill bit. Attach the feet using the 1-5/8" wood screws that are provided.

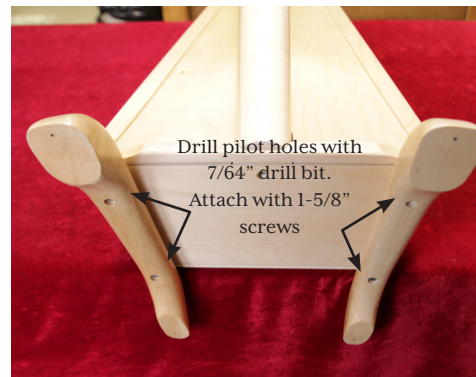


FIG. 72

- ___64. Install a rubber bumper under each end of each foot, being careful with placement. Make sure that the rubber at the back end of the feet will stay in contact with the floor when you tip the harp back on your shoulder to play.

Mark the placement with an awl. The pilot hole should be 3/4" away from the outside edge of the pad of the foot. Use a 7/64" bit to drill a pilot hole. Use a piece of tape to mark the depth of 1/2" on the drill bit. (fig. 73)



FIG. 73



Be very careful not to drill through the top side of the foot when you are drilling the pilot hole as well installing the screw.

- ___65. Use the 3/4" long round head screws provided, and attach the bumpers to the feet. (fig. 75) Sometimes after the bumpers are installed, the harp doesn't sit quite level. You can use washers to help shim up the bumper giving you trouble.



FIG. 74

- ___66. Install the 10 large threaded bridge pins into the lower row of holes drilled in the neck in the 10 bass end holes. Tap them partially in with a hammer and then turn them in with a 3/32" allen wrench until the top is about 5/8" above the surface of the wood. Use the 5/8" spacing guide to check the pin height. (fig. 76)



FIG. 75

Install the remaining 24 medium bridge pins into the smaller holes on the lower row. Use the 5/64" allen wrench to adjust the height to 5/8" above the harp neck.



FIG. 76

- ___67. 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 34 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 the 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 hole in the tuning pin lines up with the groove in the bridge pin. (fig. 77)

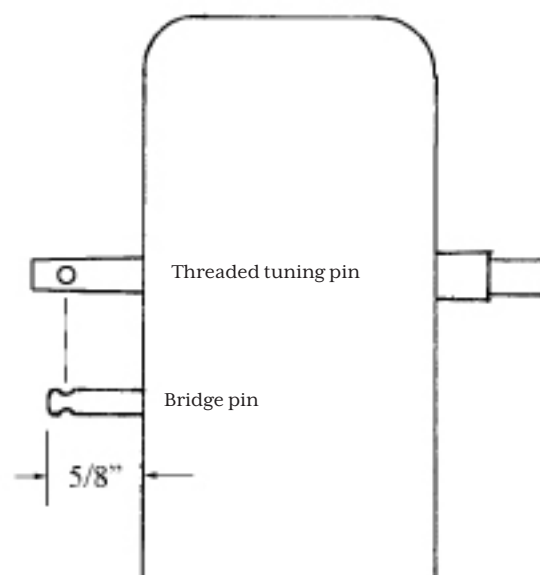


FIG. 77

INSTALLING STRINGS

- ___68. Finally you can install the strings! You will need a pair of scissors, a wire cutter, and your tuning wrench for this last operation, however, the messy part is over. So grab your favorite beverage and move to a comfortable spot in the house where you will turn this project into a musical instrument!

WWW.HARPKIT.COM/BLOG/HOW-TO-STRING-A-HARP

- ___69. ***Celebrate!! You did it!! You built a harp. Congratulations!!***

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 taken apart and removed from the soundchamber to facilitate repair work. Simply loosen the strings and unhook them from the tuning pins. Then remove the screw at the base of the harp to allow the neck/pillar to come free of the harp body.

SCRATCHES AND 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.

HUMIDITY

All acoustic instruments are susceptible to humidity. Moisture in the air can make the wood of an instrument shrink and swell. Over time, the shrinking and swelling can cause the wood to crack. The general rule for keeping an instrument from cracking is: If the weather is comfortable for a person, then it's also comfortable for wood.

ACCESSORIES

When you are ready for some accessories, we've got you covered:) Visit our website to find a gig bag, sharpening levers, harp wheels, harp lights, our harp desk, books and more.

WWW.HARPKIT.COM/HARP-ACCESSORIES



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