

Stoney End Harp Kit Instructions

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Parts list: check over the contents of your kit and identify each part.

Wooden parts:

- 4 corner pieces with slots (each numbered at lower end)
- Soundboard with pillar notch and heart soundhole made and string holes drilled
- Back with access hole(s) marked
- Sides paired left and right
- Base with slots cut; metal threaded inserts installed (on floor harps)
- Top with slots cut
- Pinblock drilled for pins, holes for dowels drilled or mortise drilled
- Pillar drilled for dowels or mortised
- Removable base parts for floor harps

Hardware parts:

- A. For Eve or Brittany lap harp: sufficient for 22 strings
- B. For Esabelle cross-strung harp: sufficient for 37 strings
- C. For Anne harp: sufficient for 26 strings
- D. For Lorraine or Sara harp sufficient for 29 strings
- E. For Braunwen or Briar Rose harp: sufficient for 29 strings
- F. For Marion harp: sufficient for 34 strings
- Tuning pins: A, B, use zither pins; C, D, E, F use tapered or through pins
- Bridge pins: A, B, use nickel; C, D, E, F use brass
- Eyelets: regular size for unwound strings, large for wound strings, see the string chart
- Set of strings with extras of each smooth string, correct model
- Tuning wrench appropriate for tuning pins used on harp
- 4 dowels (lap harps) or loose tenon (floor harps)
- Glue blocks, internal brace (floor harp)
- One 2 ½ " screw, Two hanger bolts with washers and nuts
- Two large studded knobs on harps equipped with a base
- Package of 4 black rubber feet for base
- Sharping levers if ordered, 3/32 bit, Ball end driver, 1/4 wrench, lever instructions

Other

- How-to-Play book, Trouble Shooting Book
- This set of instructions with pictures
- String chart
- Folk Harp Journal

STONEY END USE

Date _____

Harp model _____

Packed by _____

Serial number _____

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Tools and supplies needed:

Power drill (with 5/32" drill bit if you are installing levers)
Power sander with sandpaper of 80, 120, 180 grit, 220 and 320 for hand sanding
Drum sander to put into drill.
Glue and varnish or other finish.
Clamps various sizes,
Wedge support made of plywood to support harp body for clamping.
Small wooden wedges
Hammer

Getting started

It is important that you first identify all parts of your kit and then read through all of the instructions before beginning. Then, before beginning each individual step, again read through the pertinent section and lay out your parts as if you were actually assembling them. This allows you to foresee any problems and work out how to handle them.

You will need some good glue such as Franklin Titebond or Elmer's Carpenter's Wood Glue. We do not recommend white glue or liquid hide glue. A word about gluing: you want to find a happy balance between using too much or too little. You do want to force a little glue out of each joint, but not too much, or cleanup becomes a real chore. Still, if you force out too little or none at all you can have a glue-starved or weak joint. One useful tip that may help in finding that happy balance is to try to apply the glue to the sides of the slot, not the bottom. Incidentally, large rubber bands cut from old inner tubes make good clamps on this project, if you can find them.

You will build the harp in two main assemblies: first, you make the box, which consists of the soundboard, sides, back, top and bottom; second, you will glue together the pinblock and the pillar. Once those two main assemblies are dry, you will fit the pinblock-pillar assembly to the soundbox. Since this last step is critical, you must be mindful of it as you do the preliminary steps and check ahead as to how it will all fit together in the end.

Step 1: Preparing the soundboard

First, we have cut out the soundhole on the soundboard; and fitted the reinforcing bar on the back of the soundboard, but you may need to sand it smoother.

The holes should already be drilled in the soundboard but if not here is the procedure. When the soundboard assembly is completely dry, drill the string holes through the soundboard and the reinforcing bar. Most of the strings are mono-filament tempered nylon and use the smaller eyelet; use a number 43 wire-size drill bit, available through a good auto parts shop. The longest bass strings on the floor harps are a larger diameter with a nylon or steel core with nylon wrapping; these require the larger eyelet and a hole drilled with a 5/32" bit. The various harps require different number of larger eyelets, as follows: the Anne, 6; the Lorraine, 4; the Sara 8; the Braunwen, 12 Briar Rose, 13; and the Marion, 13.

Step 2: Preparing the back

First, cut out and smooth the edges of the marked access hole(s) in the back, so that you will be able to reach inside for installing the strings. (You'll have two holes marked on the larger harps.) If you wish, prepare a label or write your name and the date directly on the back of the soundboard so it is visible through this hole.

Step 3: Assembling the soundbox

Your first step is to DRY assemble the soundbox so that you are familiar with how things fit, so without using glue, assemble the box according to the gluing instructions found below.

You will notice that the bottoms of the sides are cut at an angle so that the harp box tilts back at an angle. This angle is very important; if you do not glue the box up at this angle, you will have a great deal of trouble fitting the pinblock-pillar later. You can tell that you have the correct angle when the sides fit snugly to the bottom of each slot in the base. The joints where the soundboard and sides meet the base are the only joints that are under tension in the completed instrument, so you need maximum glue strength here.

Hint: Put some masking tape on the side parallel to the base when you have it correct. Use this tape as a reference line. When the tape is not parallel to the base, you know that the box has shifted and your angle is off. Rock the box backward or forward to get the tape parallel to the base again, while checking to see that the sides and soundboard still fit snugly into the base.

You will need to prepare to apply clamping pressure from top to bottom and around the waist. Since the harp leans backward, it wants to tip backward. We recommend that you make a wedge-style clamping base to fit under the harp bottom so that the harp box stands straight up. You can clamp from top to bottom using the wedge to balance the pressure.

Hint: Before gluing, we emphasize, decide how you are going to clamp the box. Rubber strips or tight strings may be used if clamps are not available. Be sure to actually test your clamping scheme during the dry run, as you don't want to find out your clamps won't work after the glue is applied.

While the box is clamped during the dry run, check the fit of the sticks around the top; if the fit is not to your satisfaction, double check to make sure your angle is still correct. Very careful sanding on the tops of the sticks can be done to improve the fit if need be, but don't take too much off the sticks or they will be too short.

You can make some small wooden wedges to insert into the slots inside the base to force the sides and back tight to the outsides of the slot. This makes for a neater looking joint when finished. **DO NOT** do this step in the dry run; small wedges are hard to pry out so only insert them during the actual gluing process.

When laying beads of glue into the joints of all the parts, make sure to get glue on both inside edges of the slots. This is where the most gluing surface is, not in the bottom of the slot.

IMPORTANT: The following steps must be done quickly or the glue will harden before you are finished. Be sure you understand the procedure before starting and, if possible, have a second person present during the glue-up.

- a. Lay out the parts for the box according to figure 1 and have your clamping devices nearby.
- b. Lay a bead of glue into the edges of the back and two side slots of the base.
- c. Slide back into back slot on the base, making sure it is centered.
- d. Put glue into slots in stick number 4 and press it onto back in its corresponding corner.
- e. Repeat step # d for stick number 3.
- f. Press right side into right slot of the base while at the same time pushing it into the slot of stick 4.
- g. Repeat step # f for the left side. **Important note. Here is the time to say it again, push the side as far to the back into the slot in the rear corner sticks as possible and make sure it is all the way down into the slot in the base.** This determines the angle tilt of the harp body. It is not necessary but if you feel that you have time, insert and break off the wedges, forcing the plywood sides out tight to the outside of the base slots. This will make a neater joint between the base and the sides.
- h. Run a bead of glue into the front slot on the base.
- i. Press the soundboard into the slot, making sure it is centered and all the way down into the slot.
- j. Run glue into stick number one. Using one hand to tilt the soundboard somewhat forward towards yourself and press the stick into the right corner between the soundboard and the right side. Make sure the bottom of the stick contacts the base. The side and soundboard should not yet be fitted tight into the slots in this corner stick.
- k. Follow step # j for stick number 2 on the left side. Now tilt the soundboard and the two sticks back to the correct angle, at the same time bringing both front corners together so all parts come together correctly and all parts slip fully into the slots. If you have trouble here, the cause is not following the earlier **important note**
- l. Run glue into all slots on the top piece and press the top piece onto the top of the box. All four corner sticks should contact the top.
- m. Clamp up the box, using pressure top to bottom and around the waist. You might try twisting the top of the box clockwise and counter clockwise while it is under clamping pressure so all the parts can come together and to improve the fit of the corners.
- n. Sight down the back to make sure the top block is square with the base. Correct any twist.
- o. Apply ample glue to the two tapered glue blocks and stick them inside the box, at the joint between the base and the soundboard. Glue the small glueblocks at the joints between the back and the top and, on floor harps, also between the sides and the top.
- p. When the box is dry, drill for and install 6 small nails from the front through the soundboard into the base. This reinforces the joint with the most stress in the entire harp.

4. Assembling the pinblock

You will notice that the pinblock has two rows of holes in it: the top row is for the tuning pins that adjust string tension and control pitch; the lower row is for the bridge pins that control the spacing of the strings and the height away from the wood. You need to be sure the pins are set at the same depth, so that all the strings will be in the same plane. This setting is critical when sharpening levers are used, so that the levers will engage the strings properly.

With the harp in playing position on the right shoulder, the strings come off the left side. In order for the strings to be close to vertical, we offset the pinblock to the right where it attaches to the body. In turn, this offset causes a slight angle to the joint between the pinblock and the pillar. This angle is prefitted at this joint. Do not "correct" this slight built in angle in this joint.

- a. Glue the pinblock to the pillar using the four ½” wood dowels (lap harps) or the loose tenon (floor harps).
- b. Do not use so much glue that tapping the dowel into the pinblock forces out too much glue, as this could cause the joint to crack. It helps to cut a saw kerf about 1/8” deep into the side of the dowels (*running vertically*) to relieve some of the hydraulic pressure created by the glue.
- c. The loose mortise and tenon joint used on the floor harps can be made stronger by using epoxy or polyurethane glue for this joint. We use “Gorilla” or “Excel One” brands of glue.
- d. Make sure that the joint is tight, as this is a point of high stress in the completed instrument.
- e. When this assembly is dry, test how it fits with the harp box. The pillar should fit neatly onto the base in the notch in the soundboard, but it should not actually touch the soundboard (or you might get some buzzing sound). Enlarge the notch if necessary, so that there is about 1/8” on the sides and about 3/16” on the top.

5. Assembling the harp

You now have a harp body and a pillar-pinblock. The next task, that of fitting these two sub-assemblies together, is probably the most challenging of the whole project.

In order to fit the pinblock to the top of the soundbox, you may have to remove some wood from the pinblock, or from the bottom of the pillar. This is done on the square bottom part of the pinblock or from the bottom of the pillar, which are left somewhat rough when you get them. You want the fit to be flat and snug at the top of the soundbox, while also getting a good joint between the base and pillar. We use sidewalk chalk in the joint to help find the contact points (where to remove material).

REMEMBER that you do not want the pillar to touch the soundboard. Take a little off one place, test your fit and keep trying until it fits.

When you are satisfied that everything is right, proceed with the following steps:

- a. Drill two holes in the top of the soundbox for the hanger bolts. (If you have a set of dowel centers, it is easy to transfer the hole marking to the pinblock. Otherwise, set the pinblock in the correct location and reach inside with a pencil and mark the bottom of the pinblock.)
- b. Drill corresponding holes at the marks in the bottom of the pinblock.
- c. Screw in the hanger bolts by putting both nuts on one bolt and tightening them together, then use a wrench to screw the bolt in and remove the nuts.
- d. Do this for both the hanger bolts, leaving about one inch of threads exposed.
- e. NOTE: you may need to enlarge the holes in the top of the soundbox so that the pinblock fits down tight when you put the parts together.

- f. Glue the pinblock to the soundbox and put the washers and nuts on the bolts.
- g. Tighten the nuts using a ratchet with an extension to reach in through the access hole.
- h. Turn the harp over and drill and countersink a hole through the base into the pillar.
- i. Put in the 2 ½" screw.
- j. Now finish shaping the knee area of the pinblock, using the photos as a guide. (This is probably the most laborious part of the job.) We use a right angle grinder for some of the rougher work. Using a sanding drum on a power drill might give you the good results on the inside curved areas.

6. Finishing the harp

- a. Sand the solid wood parts of the harp, starting with 80 grit sandpaper and ending with about 220 grit. *This will go faster with a power sander such as a palm sander, but it is possible to do it all by hand, if necessary.*
- b. **Always** sand with the grain.
- c. Don't change to a finer paper until all the marks from the previous paper are out.
- d. NOTE: The finish will not cover any flaws, and, in fact, it will bring out flaws you didn't think were there. The finish is what people will see, so do a good job. We wet the harp with a damp rag to raise the grain before the last sanding. This will make a smoother finish. *You might take two or three times longer to sand than you initially thought you might.*
- e. The plywood parts of the harp should not be sanded with grits coarser than about 180, since the veneer is very thin and can be sanded through.
- f. We do not stain the harps in our shop, but you may if you like. If any glue or flaws show up as you stain, sand them out right then and reapply the stain.
- g. We use three coats of a sprayed lacquer finish; we recommend you buy semi-gloss DEFT Clear Wood Finish in an aerosol can (1 can for a 22-string harp, 2 cans for a floor harp should be adequate). Sand lightly with a 320 grit sandpaper between the 2nd and 3rd coats. Wipe the harp with a tack cloth between coats to remove dust
. Make sure you have adequate ventilation for this step
- h. You may also use a varnish if you prefer, following the instructions on the product.

7. Stringing

- a. When the harp is dry, you are ready to start stringing, beginning with installing the hardware.
- b. The lower row of holes is for the smooth bridge pins with the groove in them, which come in two types. You'll need to determine which type is used on your harp.
 - I. The first type is the nickel bridge pin: for Eve, Brittany or Esabelle lap harps
 - II. The second type is the brass bridge pin, which requires that the holes in the wood be enlarged and deepened. They should already be drilled but in not, re-drill the holes

with a 3/16" drill bit to 1" deep. For either type of bridge pins, tap them in until the groove is 7/16" from the wood. This will determine the string height from the harmonic curve, which will be important when you get to installing sharpening levers.

- c. Next, install the tuning pins in the top row of holes
 - I. For harps that use zither tuning pins (nickel), drill out the tuning pin holes with a # 11 drill or a 3/16" drill to enlarge them and remove any sawdust or finish that got into the hole.
 - II. Tap the zither tuning pins into the holes you have just enlarged until the threads catch and screw them in with the tuning wrench until approximately 5/16" of threads show.
 - III. Harps that use the tapered pins (black) have the holes pre-fitted. Due to variations in the size of the tapered pins and variations in the reaming, you will need to test fit the tapered pins to the holes and swap them around to get a satisfactory fit for all.
 - IV. Once you are satisfied with the fit, tap them in gently with a hammer. Test *each* one for tightness with the tuning wrench as you seat it. It's easy to get them too tight.
- d. Next, press the eyelets into the holes in the soundboard. NOTE: The Lorraine harp has 5 large eyelets for the largest strings; Anne harp has 6 large eyelets; the Braunwen has 12 large eyelets; the Sara has 8; The Briar Rose has 13, and the Marion has 13.
- e. Now move onto the actual stringing, beginning with the largest strings in the individually labeled bags. NOTE: Save some of the cut-off ends of the large size strings to use for toggles (see below).
- f. When stringing floor harps, the wound strings must be inserted from the back because the knots are pre-tied.
- g. For all smooth strings (on floor or lap harps), the strings are poked through the eyelet from the front of the soundboard and out the access hole in the back.
- h. For the smooth strings, tie a harp knot in the string as shown in the diagram at the end of the instructions. If the *string is smaller than .036*, put a short piece (*about 1"*) of cut-off larger string (or toggle) through the harp knot to prevent the knot from pulling through the soundboard.
- i. For tied smooth strings or wound strings, pull the knot up to the reinforcing bar that runs vertically inside the harp, then poke the other end of the string through the hole in the tuning pin.
- j. On harps with the zither pins (nickel), the tuning wrench should turn clockwise as the string tightens, causing the pin to screw into the pinblock as the string is tightened. Consequently, the string needs to go up the left side of the bridge pin and up the left side of the zither tuning pin.
- k. On harps with tapered pins, the tuning wrench is also turned clockwise to tighten the strings. However, since the tuning is done from the other side of the harmonic curve, the string actually needs to be wound the opposite direction on the pin. Consequently, the string must go up the left side of the bridge pin and up the right side of the tapered tuning pin.

- l. If the string is metal, give it some slack before tightening. It will not stretch much. You want at least 4 complete wraps before it is tight. If the Nylon string is .040 or larger it will stretch a lot so do not leave much slack and just tighten.
- m. If the string is smaller than .040, first pull it tight, then pull about 1 ¼” back through the tuning pin hole for slack. (NOTE: In the case of wire strings, push it back a little and do not let it overlap itself.) Then wind the slack on the tuning pin and tighten the string, making sure that the string overlaps itself so it won’t slip or pull back through. You want to have about three or four complete wraps when you have the string up to pitch.
- n. It is not necessary to overlap the larger strings. Try to align the string so that it comes off the tuning pin and goes to the bridge pin at a right angle.
- o. Tune the harp to pitch, referring to your string chart. The red strings are Cs and the blue strings are Fs. The lowest C on the Eve, Esabelle and Brittany lap harps is middle C, while the second lowest C on the Anne, Lorraine, Sara, Braunwen, or Briar Rose is middle C. The third lowest C on the Marion harp is middle C.
- p. The strings will initially stretch a great deal, so keep tuning for a week or so until they hold pitch. If a string stretches to the point that there is no more room on the tuning pin, back out the tuning pin and put the string back with fewer windings.
- q. If you built a floor harp, fit the soundboard brace after the harp has been strung for a few days. The purpose of the brace is to prevent the sides from moving in as the soundboard pulls up. It also limits the amount of arch that the soundboard develops.
 - I. The brace runs across the back of the soundboard inside the harp body but is NOT glued to the soundboard. It is glued only on each end where it fits against the corner pieces.
 - II. The brace should fit between a pair of strings so you can still replace a string in the future.
 - III. You may have to cut or sand the ends of the brace to get the correct fit.

8. Final steps

- a. You should have received a medallion with your kit with a serial number in it to identify your harp in the future.
 - I. Dry fit the medallion in the pre-drilled hole in the harp to be sure it will be flush with the surrounding harp.
 - II. Place some thick glue (tub & tile caulk, or construction adhesive) in the medallion hole, then stand the harp on its base and insert the medallion so it can be read when it is in an upright position.
 - III. Let dry without moving medallion.
- b. If the harp has a base, install the 4 bumpers on the bottom. Drill a 1/16” hole close to each corner, but not so close that the bumper hangs over the edge. Tap bumpers in place.

SPECIAL INSTRUCTIONS FOR SPECIAL HARPS

Double harps only

- a. Assembly is the same as the single strung harp, but be aware there is no slight angle at the top of the pillar, the harmonic curve and pillar are in the same plane.
- b. We have done some grinding away of excess stock at the factory, but final contours must be sanded into the harmonic curve. During the sanding phase, check for string clearance between the harmonic curve and the strings, as follows:
 - I. Put a string in the hole in the soundboard and pull it up to a bridge pin position that you either estimate or temporarily install.
 - II. Note whether the string maintains a constant distance to all points it spans on the harmonic curve. Mark high spots.
 - III. Repeat for second side of harmonic curve, again marking high spots.
 - IV. Sand the high spots away so you have consistent string-to-harmonic-curve distances throughout. This is not only for string clearance, but for lever installation clearances as well. Failure to do this step properly will make installation of levers very difficult.
- c. You will, obviously, have to install hardware and strings on both sides of the harp.

Cross-strung harps only

- a. Assembly is the same as the single-strung harp, but be aware there is no angle at the top of the pillar and 2) the harmonic curve and the pillar are in a single plane.
- b. During the sanding phase, use a straight edge to check for string clearance between the harmonic curve and pillar, as follows.
 - I. Place the straight edge such that one end is at the string hole in the soundboard and the edge passes by the *opposite side* of the harmonic curve and/or pillar at the height and position of the bridge pin groove.
 - II. There must be at least 3/8" clearance at the bass strings to allow for a full arc of vibration without buzzing. The treble end can be a little closer. As an alternative, you may temporarily install a string to do the above test.
 - III. Since a cross-strung harp needs no sharpening levers, only string clearance to the wood parts need be considered. The line where the strings should cross approximately in the middle of the strings
 - IV. Notice that the back edge of the pillar will have to be thinned where it joins the harmonic curve. Remove only enough material to provide the necessary clearance while preserving as much strength as possible. The pillar will end up having a somewhat triangular shape as viewed from the end at the top.
 - V. The strings need to start on one side of the soundboard and cross to the bridge pins and tuning pins on the other side of the harmonic curve.
 - VI. NOTE: All the sharp note side uses black strings (grouped in twos and threes as on a piano) and the diatonic side is strung as any other harp with clear, red and blue strings. Consult your string chart and use the individually labeled strings.