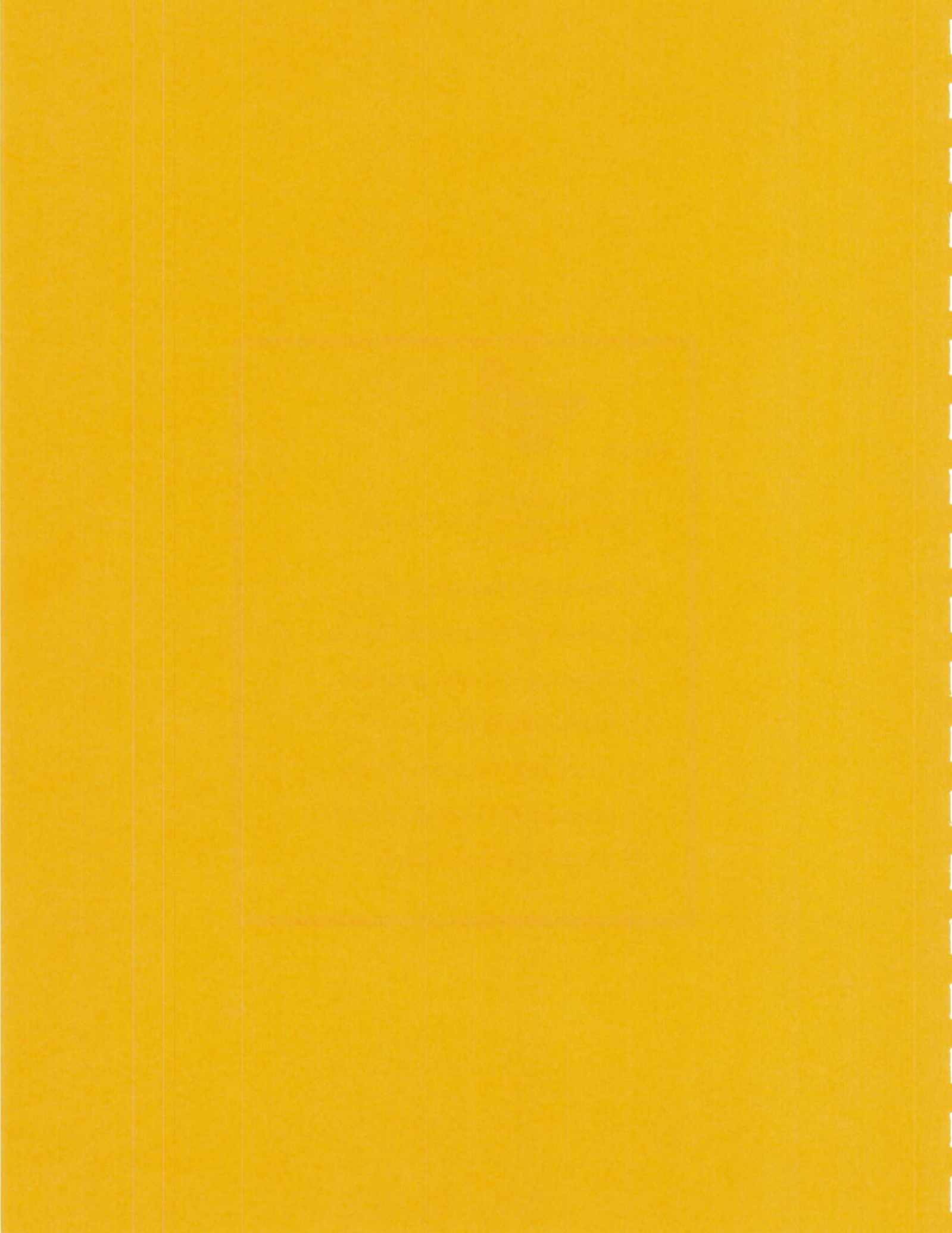




## **Part I.**

1. Getting Started  
Getting acquainted & building side  
support fixture
2. Building & Installing Braces
8. Installing 3 Strap Button Braces
9. Preparing & Installing the Top
11. Cutting Wheel Hole
12. Sound Hole Cutouts & Pattern
13. Preparing & Installing the Back
15. Routing The Body Edges



## Part I.

# Getting Started Monarch Kit



### 1. □ Before you begin:

- Check parts using inventory check list to be sure all parts are there and to familiarize you with the parts & plan set. Any missing parts will be replaced within 3 weeks of shipping. After that we will replace them at cost.
- Check tool list and assemble needed tools
- When using epoxy with- in a taped surface, tape must come off before the epoxy hardens
- We use Blue Painters tape or a similar product to mark these areas and the drill bit when depth of cut is crucial. It is also good for protecting a surface to be finished from glue. More on this on Page 20 in Section II.

Our goal is to help you build your instrument with as little difficulty as possible. The Hurdy-gurdy is not a simple instrument to build, but if you follow the instructions carefully, we can assure you of a successful building experience. The instructions are in two parts: the **plan set** and the **written manual including additional information in each of these boxes**. Paying careful attention can save many errors and give you a great sounding instrument. You may notice the pictures show steps done that you have not gotten to yet. Each picture is accurate for the step being demonstrated. Any additional steps will be discussed later, but may be done earlier. Gurdy building is a very individual process.

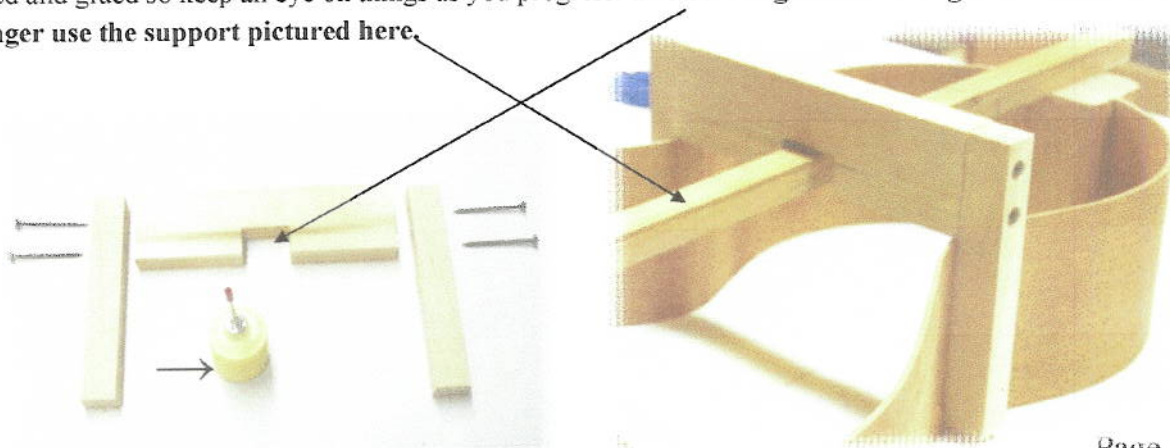
### 2. □ Build side support fixture using screws and glue and when dry slide it over the waist of the body.

Fixture is shown in use with center line alignment stick which you do not need now.

We use yellow glue to build this fixture. (Pictured below in a small accordion needle nose glue bottle)

Bracing is done with the fixture installed. The body should align closely to the drawing while the bracing is

being fitted and glued so keep an eye on things as you progress. **The building brace no longer has a notch as we no longer use the support pictured here.**





## Building and Installing the Braces

**The brace system** is the backbone and skeleton system of your instrument. It gives your instrument its shape, stability, and even affects the quality of its sound. Careful attention must be paid to each step in building and installing the brace system. The contour of the top and back, the fit of the key chest, and bridges all depend on following the plans and manual directions.

**Please Read this entire section** of the manual before beginning work.

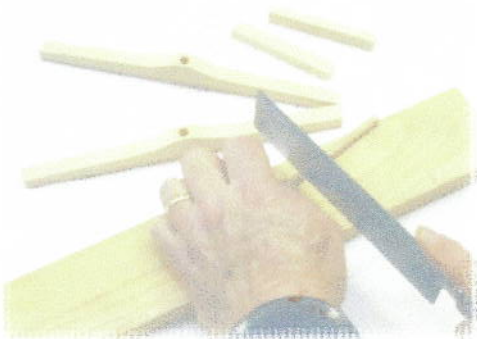
Questions are often clarified later in instructions.

**Preliminary step;** Read section of manual on braces. Take out brace parts and packets.  
Compare to plan and familiarize yourself with the parts.

1. ? **Mark and cut** brace ends to correct angle according to the plan set.



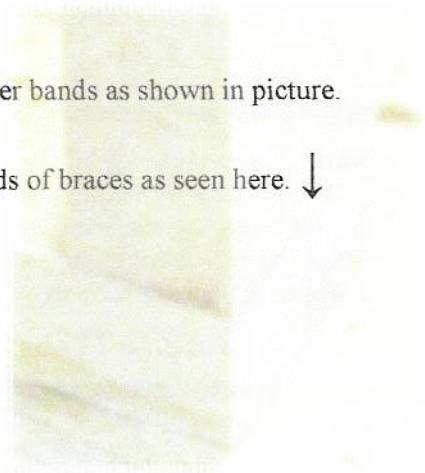
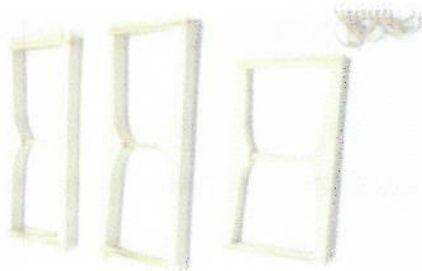
2. ? **Cut brace sides & 1/4" dowels** for center of braces to correct length. Dowels should touch bottom of holes when properly sized and fitted together with brace sides. Each brace unit should measure about 4" tall when assembled. Unit should be dry fit before gluing with all joints tight fitting.



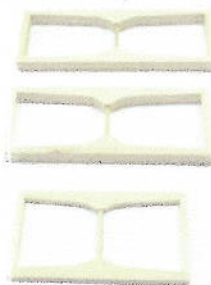
The 2 larger braces may already have the 1/2-20 threaded hole and the clearance hole already cut.

### 3. □ Gluing the brace assembly

- Take apart brace assembly
- When everything is ready, mix 12 minute epoxy.
- Gluing generously one brace at a time, clamp with rubber bands as shown in picture.
- Wipe off excess glue while still wet.
- Be sure that brace sides match the angles you cut on ends of braces as seen here. ↓



### 4. □ Use sanding block to sand sides flush with the face of the brace. This will remove excess glue.



To identify braces for positioning, lay out on the plans. The middle brace, in both position and size is also the bearing brace.

### 5. □ Pining the braces.

- Cut the 1/8" dowel rod into (12) 3/4" lengths.
- Round over one end for easy insertion.
- Drill 1/8" hole 3/4" deep through tops and bottoms of brace
- into center of brace sides.
- Using a needle nose glue bottle filled with yellow glue,
- put small amount of glue at bottom of hole using glue needle
- to spread around inside of hole.
- Put light coat of glue on dowel and pound dowel into hole
- being careful not to pound beyond its stop point!



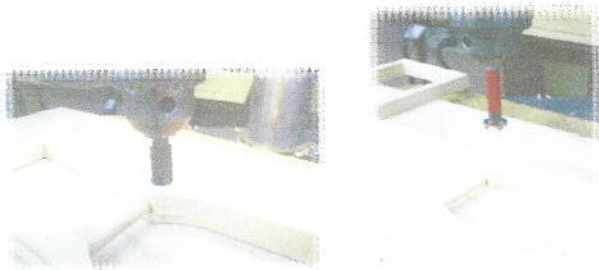
- Too much glue may cause brace to split with hydraulic pressure.



## 6. □ Lay out bridge brace (middle size) for drilling clearance hole.

**This step will be done for you in the kit including installation of the bearing in the middle brace.**

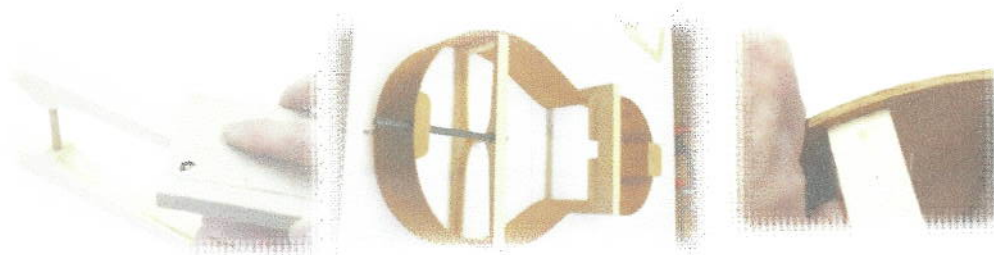
There is no bearing in this hole. It is just for passing the shaft through.  
Use the centerline on the plans not the dowel position for marking the hole.  
Drill the bridge brace clearance hole with a 5/8" clean cutting forstner or brad point bit.



If you do not use our kit, you will also need to drill and tap the bearing hole in the middle brace.

## 7. □ Brace tops and bottoms must be arched if you are arching the sides by taking about 1/16" off of each end of the bridge and bearing braces and about 3/64" off the ends of the small brace

8. □ **With plan on building board** (See step 11 on next page) and sides in place, position and fit bridge brace (closest to end block) by sanding ends as needed. Check alignment of holes by using the bearing tool and centerline of the plan, we want to keep this as close as possible.



Notice position of braces. Arch and holes are at the top not the bottom of the body. Check with the axel hole in the end block!

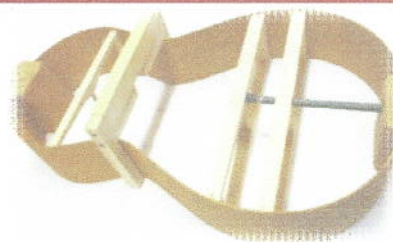
Check shaft, bearings, etc for good fit.

9. ☐ **Position and fit** the bearing brace and the short brace. Try to maintain good end contact with sides as well as brace position on plan and side position. This is asking a lot, so, if it is off a little bit it is OK!

Your Hurdygurdycrafters bearing adjustment system will take care of a little error. Check for alignment of holes with the bearing insertion tool\* as pictured (we want it to be as close to the center line as possible when the sides are in correct position) Sides do not have to conform exactly to the plan set. Expect some variation. End block position should be as close to the plan as possible.

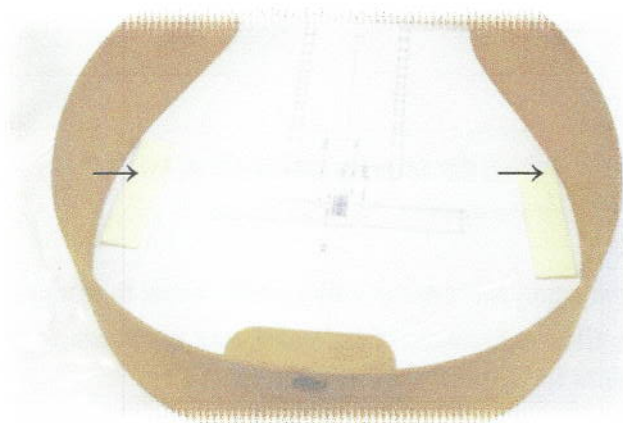
\*The bearing insertion tool is a pronged tube with a "T" handle used to adjust the bearings in and out before and after final assembly.

Every piece you glue into place here will define the shape of your instrument soooo lets keep it looking like the plan!



10. ☐ **Sand braces** smooth and round over all edges **that don't get glued** to the top, back and sides.

11. ☐ **Put plastic wrap** over plans to protect from glue. Set body in place on plans with the top up. Place 1/16" spacers under brace end positions as shown by arrows in picture below. Position and square the braces then mark the position. These marks are crucial in keeping the braces in place while gluing other wise you may have binding on the shaft and wheel later. These spacers hold the braces 1/16" up from the bottom edge of body and will allow you to sand the body to help form the arc on both top and bottom.



12. ☐ **Starting with the bridge brace** try your clamping method without glue first. **If the fit is good**, remove the brace, glue it with yellow glue and clamp it in place.



- 13.□ Fit, mark, glue and clamp smallest brace in position**  
**Fit, mark, glue, and clamp middle brace in position**  
Reminder, if braces are not kept perfectly perpendicular,  
it will distort your shaft angle later.



**14.□ Gluing in kerfing & reinforcement strips**

Sand cut edges of 2 large triangle pieces smooth

(These will need to be cut if you are only using the plans)

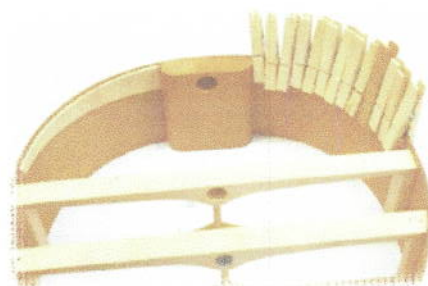
Dry fit spruce reinforcement strips **at top** on either side of the tail block as pictured. Make sure all fit properly.

Using yellow glue, glue strips flush with top edge next to the tail block, as

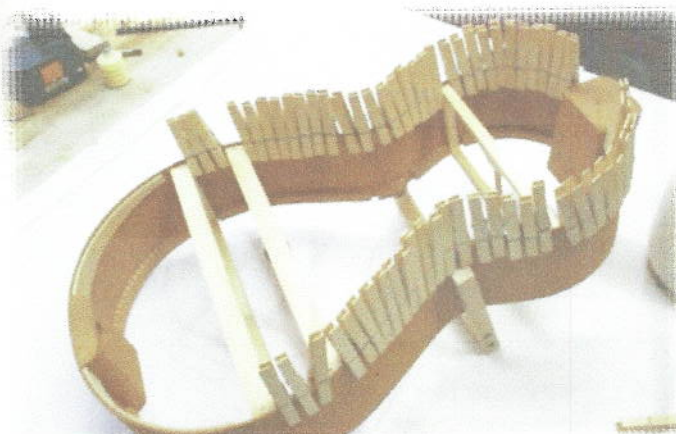
Pictured. Strong wooden spring clothes pins work well for clamping

Cut and fit kerfing according to print

Using yellow glue, glue flush with top edge. Glue equal opposite parts at one time, do not glue up complete left side and then complete right side as this can deform the body. Work in small opposing sections as pictured.



**Kerfing goes smooth side away from body!**

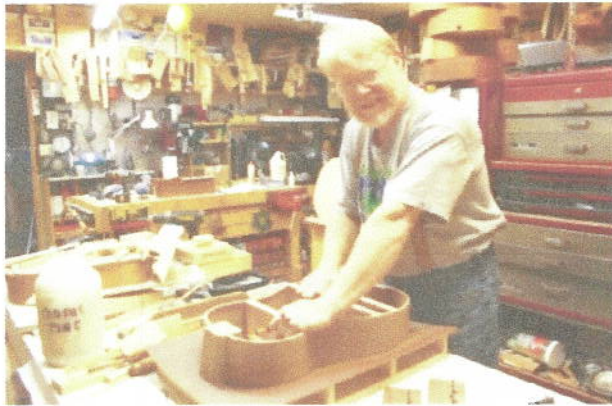


We recommend as pictured below, kerfing the bottom first; then turn the body over, move side retaining fixture, and glue kerfing to top edge between braces keeping it flush with edge.

Before you begin sanding make sure that all glued surfaces are completely dry. Braces will be below both the top and bottom edge by about 1/16". Sanding the sides down to the edge of the braces, will help give your instrument it's slightly arched top and bottom and create more stability as well as a nice appearance. This will also sand some of the kerfing. This is necessary and won't compromise your hurdy-gurdy.

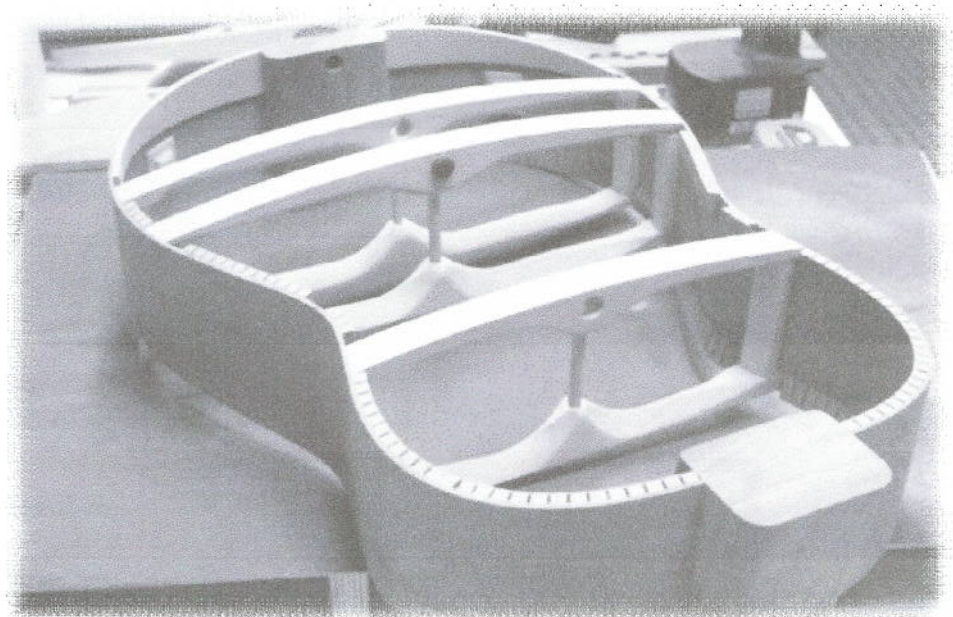
**15. □ Sand top and bottom** of body sides, kerfing, end blocks etc. to match 1/16" brace arc. We do it in the shop by using a sanding board with the correct arc on it. You can get the same results using a large flat board with sandpaper glued on it and rocking the body from side to side as you sand.

Another method: use a flat piece of 3/4" plywood, 2 foot by 4" with sand paper glued to one 4" side and a handle on the opposite side.



View of top with kerfing and braces in place and sanding done. Your kit will not call for as much kerfing or arc as this 3/4" arc Moriah model. Check plans for details.

*When in doubt consult  
the plans. If still in  
doubt feel free to call  
us. We enjoy sharing  
your building adventure  
with you.*



## Preparing and Installing the 2 Strap Button Reinforcement Blocks

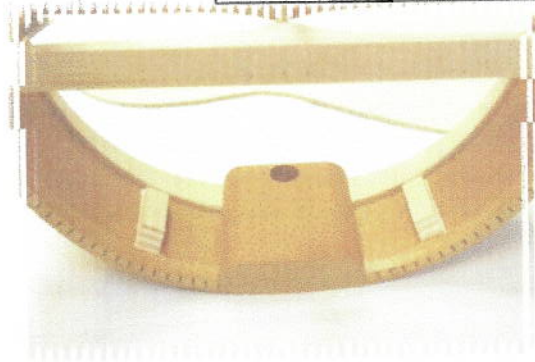
**Preliminary step;** take out strap button bracing. Compare to plan,

### 1.? Installing two button braces:

The 3/8" x 1/2" x 2 1/4" plywood strap button braces fit between the kerfing and the upper spruce reinforcement 1 3/8" from the tail block.

- Fit them in place
- glue with yellow glue and clamp until dry

Note: Titebond company claims that about 20 minutes clamp time are adequate in most cases when using their regular yellow glue.

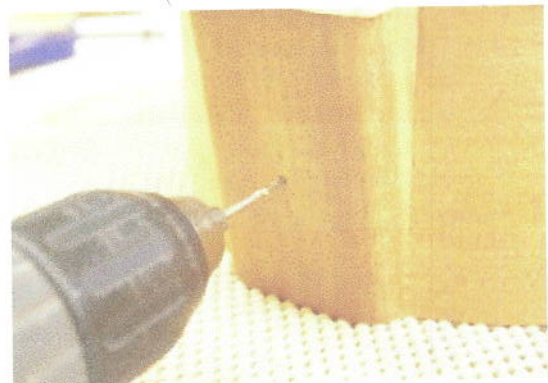


**2.? Mark and drill** for strap button screws in the vertical center of the sides and in center of width of the ply. Be careful to have the 3/32" drill enter the wood at a 90 degree angle and drill all the way through on both sides.



**3.? Mark and drill** for 3<sup>rd</sup> strap button screw in center of peg head block

The 3 strap buttons will be installed after all other work is done including the finishing.



## Preparing and Installing the Top (install top before the bottom)

**Preliminary step;** Compare to plan and familiarize yourself with the parts

### 1. □ Gluing the top in place

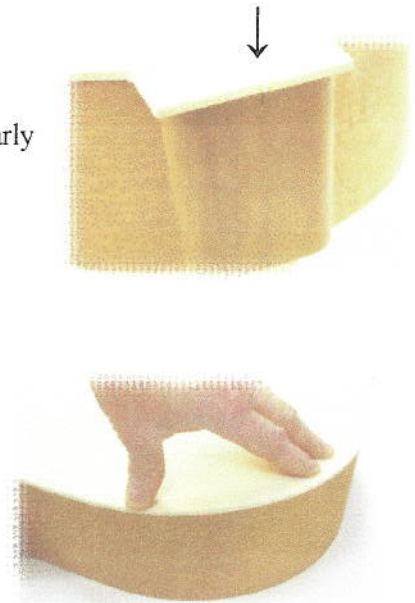
- make clear center lines on the front and side ends so you can see them clearly

There are lots of clamping methods that may be used to clamp the top or back after gluing

- Rubber bands
- Spool clamps like cello builders use
- Screw clamps
- Quick-grip clamps are used here

**Whatever method you use, do a dry run to see how it works and to learn how to do it accurately and quickly.**

Lay out all the things that you will need to do the job including some paper towels or rags to clean up any messes that happen at the worst possible time.



**Carefully check fit of top** on sides so that when just lightly pressed with fingers near the edge it will lay flat with no gaps. Sand more to correct fit if needed.

Here is a little “holding the glue bottle” trick that allows accurate and fast placement of the glue. The little finger becomes your guide along the edge of the side and it rests on the side and the tip of the glue bottle. Practice this on a bit on a scrap piece of wood, you will like it. Note also that we are placing the glue just at the intersection of the side and kerfing where it will make a continuous line to assure that there are no missed spots (yes, use a glue bottle that is controllable and relatively free flowing).

Applying just the right amount of glue is an art form! Too much will allow the parts to slide excessively until an adequate amount is squeezed out which also makes a big mess. Applying too little causes it to grab quickly, have little or no squeeze out and a weak glue starved joint.



**All parts that touch the top get glued – braces, sides, kerfing, & end blocks.**

**Here is the order we do it in the shop:**

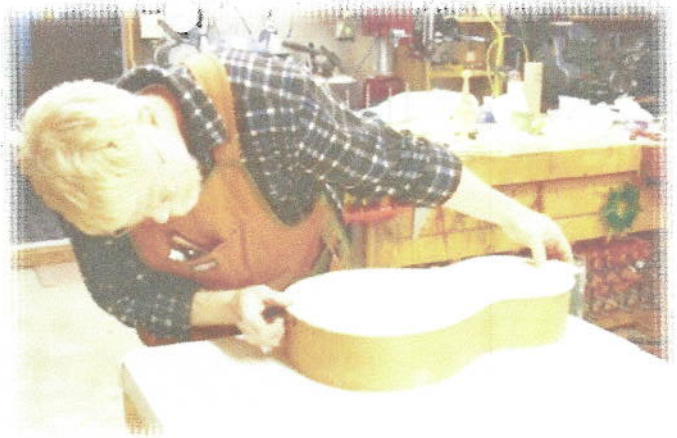
- end blocks first because of the thirsty end grain using just a little extra and spread with a finger
- apply glue to braces second and spread with a finger
- finally apply glue to sides and kerfing dabbing the glue with a finger to spread it out being careful to wipe glue away from the kerfing cracks
- Carefully wipe hands clean before handling top



Page 9



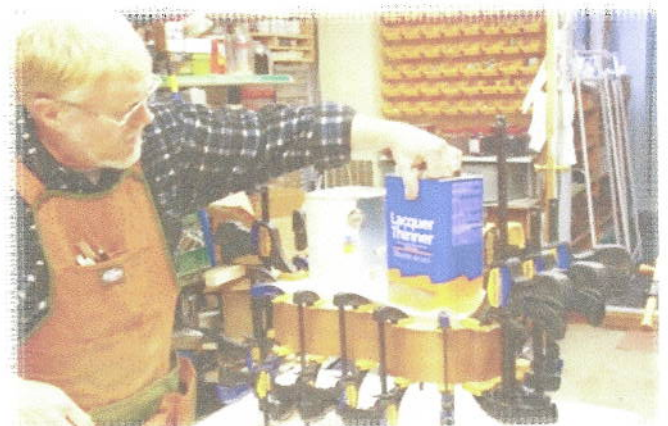
Quickly position the top paying close attention to aligning the centerline of the top with the center of the instrument's ends which you marked earlier



Clamp in place, checking constantly to assure alignment is retained



Weight the top to assure that the center makes secure contact with all the bracing.



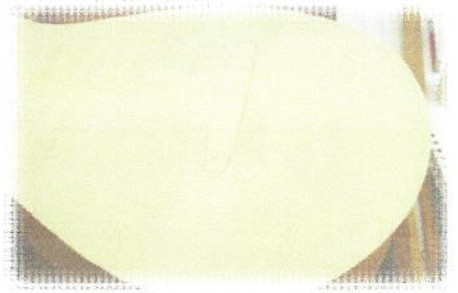
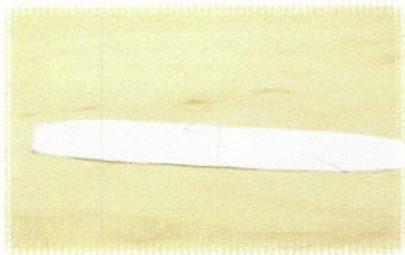
## Cutting the wheel opening (after installing top on sides, before gluing on bottom)

**Preliminary step;** Check plan and familiarize yourself with the parts.

- insert ball bearing into nose bearing
- adjust nose bearing so shaft fits in correct position according to plan.(extending 9/16" beyond end of instrument.) Ball bearing must be in nose bearing when you do this.

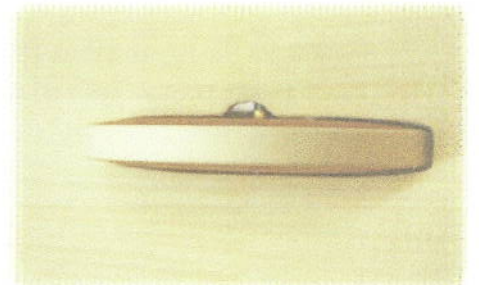
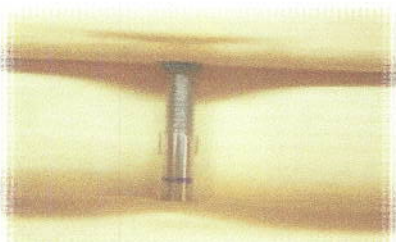
### 1. ☐ Marking and cutting opening

- mark actual center line of your shaft on the top of the instrument in pencil
- mark the center of the thickness of the wheel according to the plan on the soundboard
- based on this centerline mark wheel opening using a template made from the plan



- drill four corners with very sharp forstner bit, use a back up block to avoid chip out when the bit breaks through the top
- using a fine blade saw carefully cut out the opening. We use a jigsaw for this cut.
- Temporarily fit wheel on shaft in instrument (see instructions in Part II, page 17. You do not use grease at this time)
- mark edges of opening to actual wheel and sand to fit wheel, leaving 3/32" clearance
- round over wheel hole edges and sand smooth.
- using blue painters tape, cover the wheel hole on **inside** to keep inside clean

**"Remove wheel and shaft before continuing on to the next step of installing the back"**



## Sound Hole Cutouts

We are using a classic sound hole pattern. You may want to check out other sound hole shapes. There is a great variety available from traditional designs to creations of current builders.



1. Cut out the sound hole pattern on next page and use it to trace this shape on your top.

2. Using a clean cutting & sharp forstner bit, drill the 4 - 3/8" holes at the ends of the crescent shapes. Be sure to use a wood back up to prevent chipping at breakthrough points. Be very cautious that your fingers are not in harm's way.

3. Cut out the crescent shapes with a fine tooth jewelers saw or a jig saw with a narrow fine tooth blade. Try this cut first on a piece of thin scrap and check the back side of the cut to make sure that there is not too much splintering.



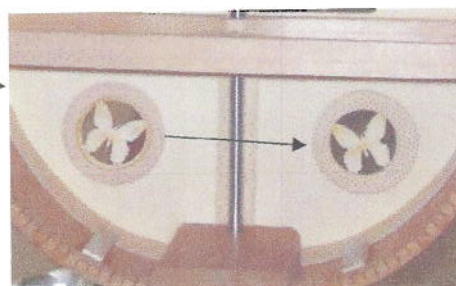
If you do break off one of the points you will need to carefully glue it back on. Cyanoacrylate glue and accelerator, available at most hobby shops, work well for this. **Be sure to use adequate ventilation** with this adhesive as it can cause allergic reactions and in some asthmatics it will cause breathing trouble.

The most difficult cut to make is on the pointed side where it is easy to break off one of the points near the drilled holes so do these cuts first while they are well supported with other wood. Start this cut from the hole and cut to the point from each side. Then cut the long arc.

Smooth the holes with sand paper. Strips of sandpaper can be glued around a dowel or on a small thin strip of wood for sanding the sound holes. If you chamfer the edges on the underside of the sound holes first (using your sanding sticks with a pull stroke from the top side) you will be much less likely to splinter the back side of the soundboard.

Round over all the edges and smooth the curves being very careful not to break off the points near the 3/8" holes.

It's easier to cut out and install round sound holes which are available in a variety of patterns and sizes starting at \$10. When using these, it is advisable to glue a circular reinforcement piece to the underside of the soundboard. They will be included in the kit when you order the round sound holes. Some builders prefer to cut these holes out on a drill press with a circle cutter before gluing top on sides.



## Preparing and Installing the Back (after gluing the top on)

**Preliminary step;** take out parts. Compare to plan the parts. If you are putting a decorative strip on the back, this is done before gluing back to body.

### 1. ☐ Install center reinforcement strip

- Put body on back and mark back center reinforcement between the upper brace and the middle brace
- Glue with yellow glue and clamp in place, centered on back glue joint between braces



### 2. ☐ Shape and tape

- Shape the reinforcement by feathering the edges with a plane, and chiseling the ends to a bevel
- Tape around the strip so that sanding does not damage the back (use blue masking tape as it doesn't stick so hard and usually doesn't pull out wood fibers)



### 3. ☐ Sand to final feather with a sanding block and then smooth with hand held fine sand paper.



### 4. ☐ Remove tape

Sign the label and put a thin coat of yellow glue on its back and put it into position. Roll it flat with a roller (pictured) or a rolling pin, dowel rod



- 5.□ Carefully check fit** of back on sides so that when just lightly pressed with fingers near the edge it will lay flat with no gaps at all points of contact around the body. Sand more to correct fit if needed.

We are using a 1/8" spacer under the far end of this sanding block to put the needed angle on the edges.



- 6.□ Gluing the back in place; use the same techniques as in gluing top on.**

**See pages 10-11**

Make clear center lines on the back and side ends so you can see them clearly.



**All parts that touch the back get glued – braces, sides, kerfing, & end blocks.**

Clamp in place, **checking constantly** to assure alignment is retained.

## Routing the Body Edges

**Preliminary step;** Compare to plan and familiarize yourself with the steps.

### 1. □ Routing the edges

- Flush trim edges of top and back with sides

We use a router table and a flush trim bit with a bearing on the end.

You can use a knife, or coarse sanding block being careful not to scratch the sides

**If you are adding decorative edge trimming, skip the following steps and go to instruction sheet for installing decorative trim.**

- Next using a hand held router with a 3/16" bit, round over the edges



### 2. □ Sanding the edges

- Holding a curved piece of 120 grit sandpaper sand the routed edges.
- Remove any bumps, ridges, or glue spots
- Finer grit paper will be used prior to finishing



The top gets done in much the same way except for the area where key chest and tuning head attach on the angled end block. **Do not round over** edge on the area where key chest attaches at the head block and where tail piece attaches on the tail block area. This last picture shows the back with the decorative strip which is offered as an upgrade for an additional charge.