

# Big Woods Mountain Dulcimer



Musicmaker's Kits

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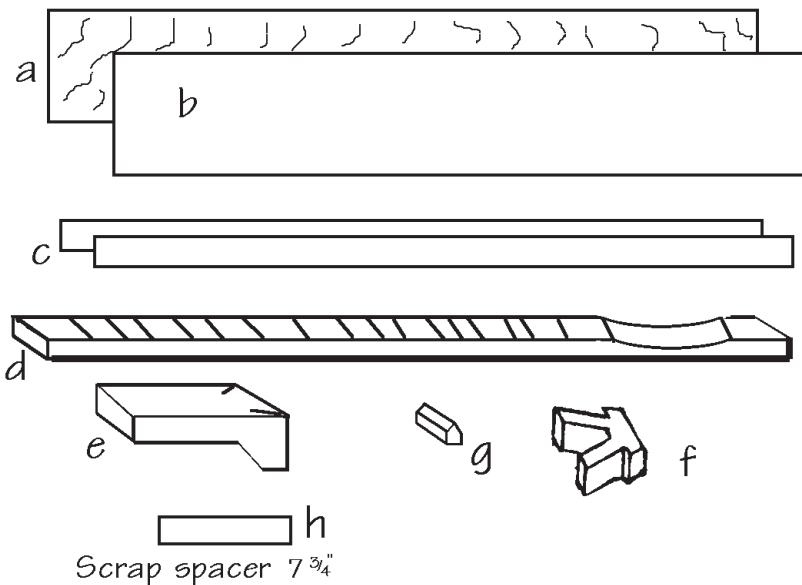
## Wood Parts:

- a) 1 back panel (1/10" dark ply)
- b) 1 soundboard (1/8" light ply)
- c) 2 sides, walnut
- d) 1 fretboard, walnut
- e) 1 peg head, walnut
- f) 1 tail block

## Hardware:

- 4 geared tuners
- 8 tiny screws
- 1 plastic nut (3/4" x 1-1/2")
- 4 tail pins
- 1 leather scrap
- 1 flatpick
- g) 1 bridge
- h) Scrap spacer (7-3/4")
- 1 fretwire (36")
- 1 set of dulcimer strings
- 1 assembly instructions

# Big Woods Mountain Dulcimer



## **BEFORE YOU BEGIN**

Please take the time to check over the parts of our kit now, to make sure everything is there. If you discover a problem, call us right away so we can rectify it quickly without causing you much delay in your project. We also suggest skimming through the entire directions before beginning, just to get an overview of the project. You may decide that you need to gather more tools or purchase a few optional decorations or accessories to enhance the finished instrument. Now is a good time to decide so you can avoid delays when you reach those steps of construction.

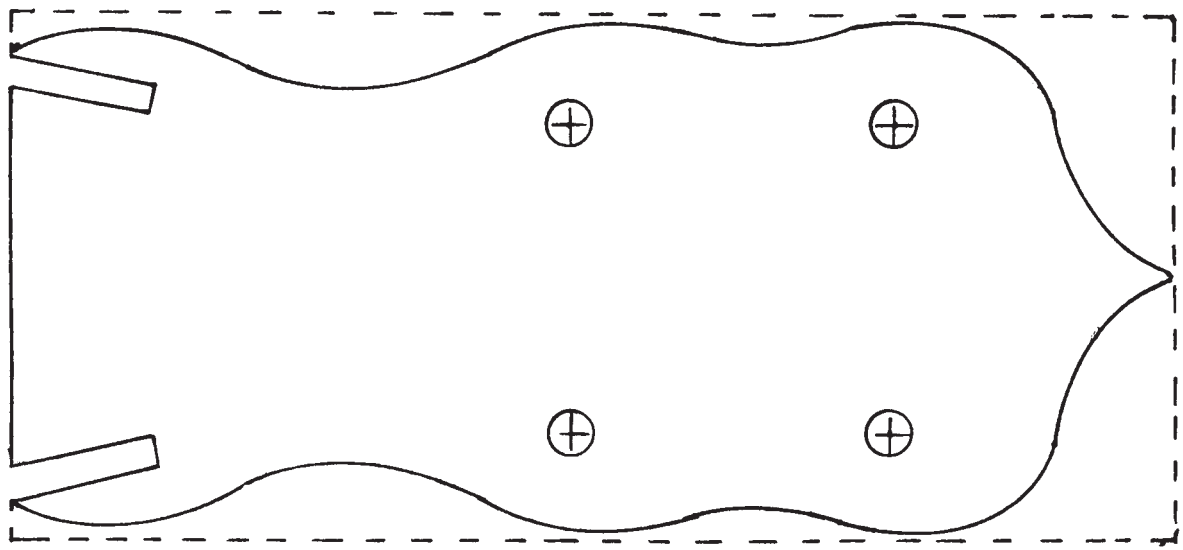
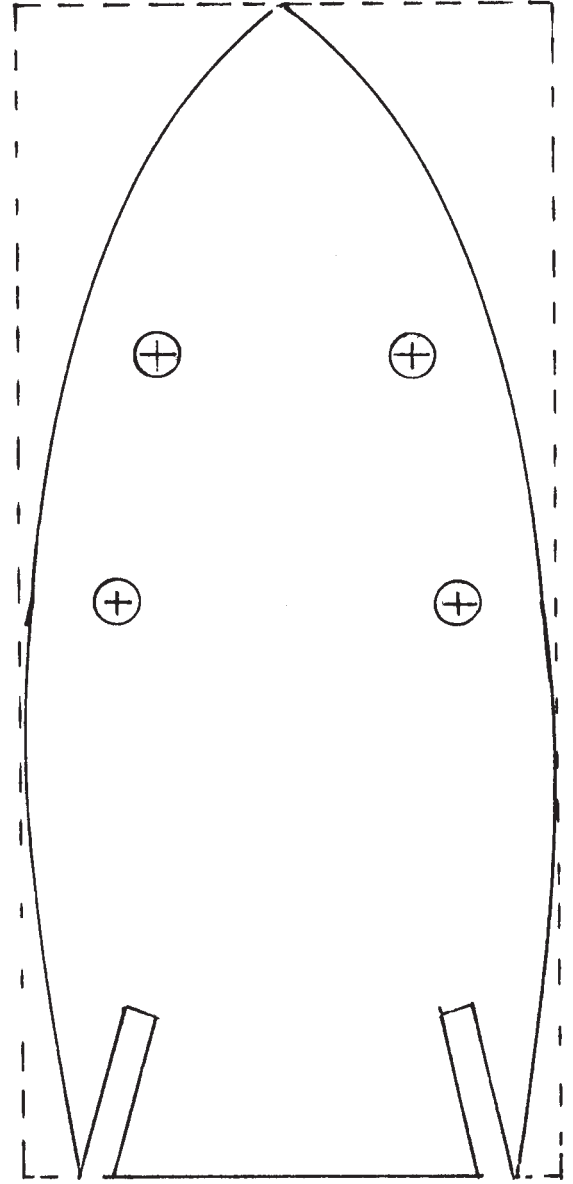
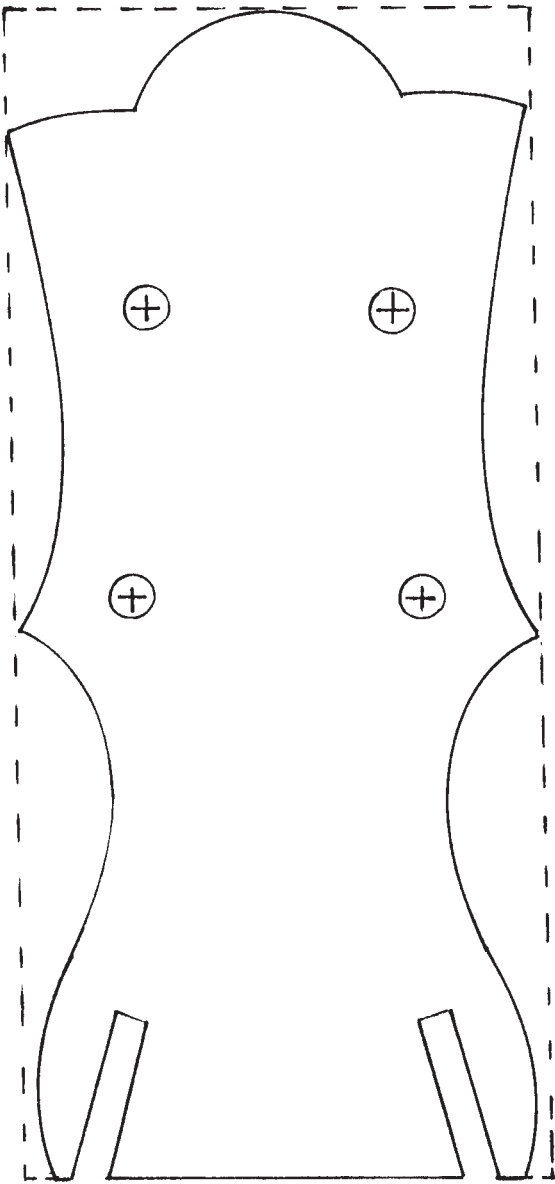
## **ASSEMBLY INSTRUCTIONS:**

1. Procure a bottle of woodworking glue, such as Elmer's Carpenter's Wood Glue, or the equivalent to assemble this project. No need for any exotic instrument adhesive.

### **SHAPING THE PEGHEAD**

2. Cut the peg head to the desired shape, or just round over the corners if you don't have tools for further shaping. Some sample patterns are shown on the next page, but you may create your own design, making sure to leave room for all 4 geared tuners.

3. Drill the four holes in the PEGHEAD for the geared tuners. Mark the correct location for those holes according to the patterns shown on the next page. (If you created your own shape for the PEG HEAD, space the geared tuner holes at least 1" apart, and about 1/2" from the edge of the wood.) Use a 1/4" drill bit to bore straight through the PEG HEAD.

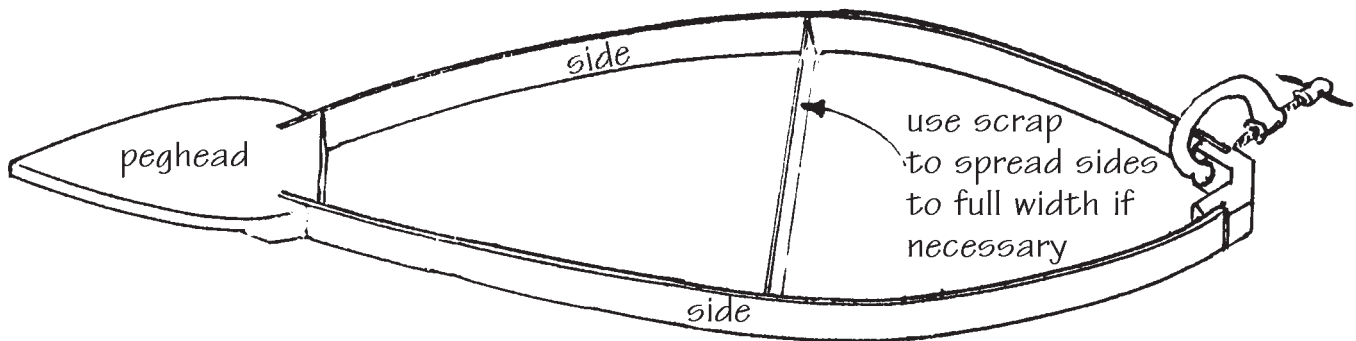


## ASSEMBLING THE FRAME

### 4. Test-fit the SIDES into the notches of the PEG HEAD.

We do our best to make the parts fit together snugly, but there may be some variation from one batch to the next. If the SIDES are too loose, you may tighten them by inserting a little wood veneer or even paper tagboard on the inside of the notch. If they are too thick to go into the notches, simply sand them on the inside surface until they fit.

Test-fit the SIDES to the TAIL BLOCK also. You may need to clean out the



corners of the notch to get the SIDES to fit all the way.

When satisfied with the fit, glue the SIDES to the TAIL BLOCK first, using clamps to hold the parts together until dry.

5. Bend the SIDES around and glue them into the slots in the PEGHEAD, taking care to set the whole assembly on a flat surface to dry. Make sure the parts are properly aligned.

When dry, remove any roughness or glue residue from the glue joints.

## THE SOUNDBOARD

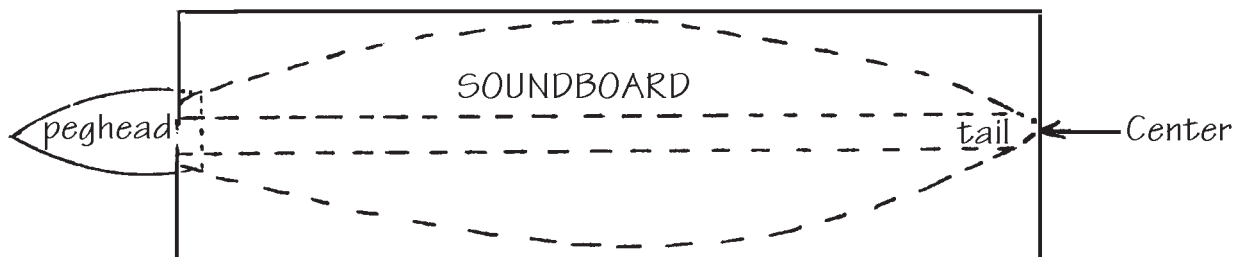
6. Check over the SOUNDBOARD and select which side you prefer to have showing at the top of the dulcimer. It is simply a matter of choosing the grain that you like best.

7. Put the SOUNDBOARD on your work table with the good side facing up. Draw a centerline down the length of it. Mark the center of each end of the FRETBOARD also, so you can place it correctly on the top of the soundboard.

Place the FRETBOARD on the SOUNDBOARD and draw the outline of it lightly on the surface of the soundboard.

8. Mark the center of the dulcimer body at the HEAD and TAIL ends to make it easy to center it correctly on the SOUNDBOARD.

9. Now place the body of the dulcimer on the **SOUNDBOARD**. Make sure that the **SIDES** spread out nearly as wide as the **SOUNDBOARD**, to give you maximum size (if necessary, you may insert a 7-3/4" scrap of wood at the widest point to spread the **SIDES** a little more).



**NOTE:** The **SOUNDBOARD** should extend over the **PEGHEAD** far enough to cover the slots, as shown.

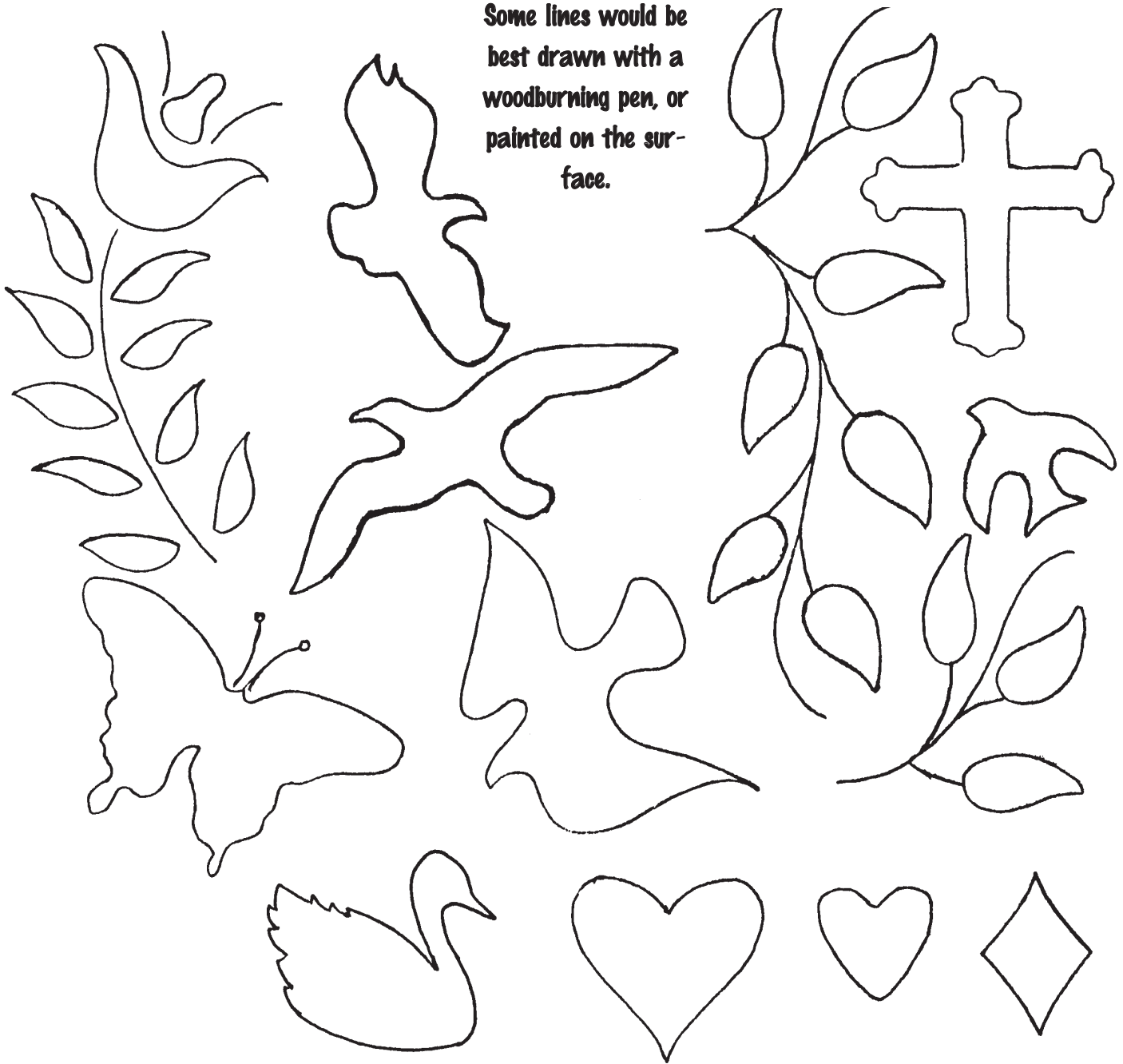
Center the frame and trace the outline of the frame onto the top of the **SOUNDBOARD**. Mark which end is the **TAIL** and which is the **PEG HEAD**.

10. Now that you can see the shape of the instrument on the **SOUNDBOARD**, you can plan where to put some soundholes. They may be simple round holes or complex shapes like the patterns shown on the next page. If you will be decorating with our laser-cut **ROSETTES**, you'll need to cut round holes that are 1-3/4" diameter. Then the **ROSETTES** can be glued on top of the **SOUNDBOARD**, around the rim of those holes.



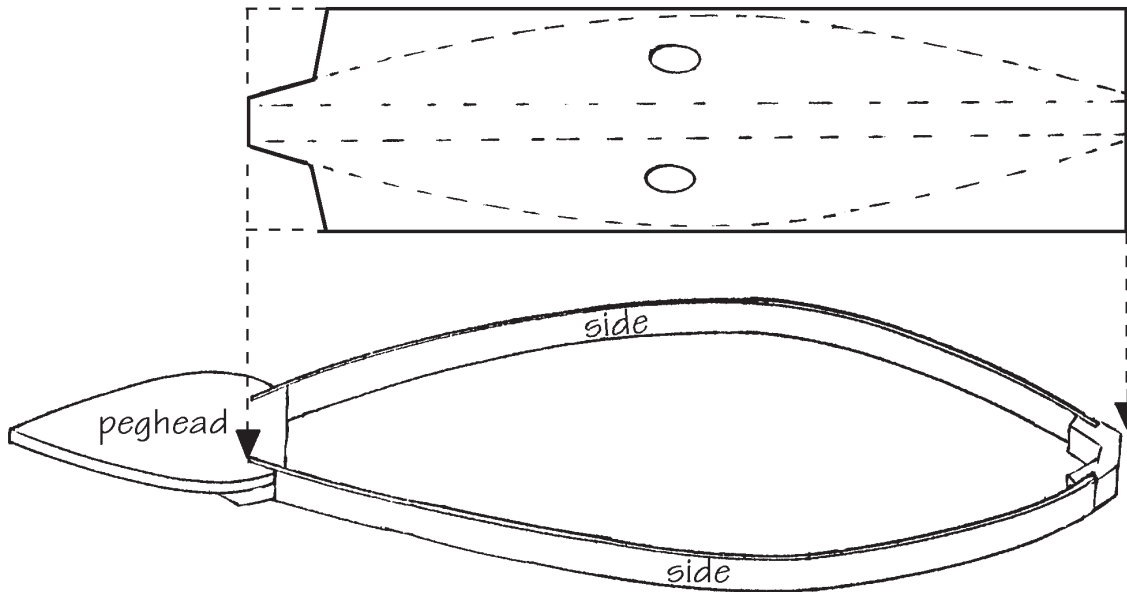
We usually put two matching holes in the **SOUNDBOARD** on opposite sides of the **FRETBOARD**. But the size and placement of the soundholes can be varied, and does not seem to affect the sound of the instrument, so go ahead and be creative. Here are a few shapes to consider:

Some lines would be best drawn with a woodburning pen, or painted on the surface.



11. Cut the soundholes and sand them smooth now, while it is easy to get to both sides of the **SOUNDBOARD**.

12. Before gluing the **SOUNDBOARD** to the frame, it is best to cut the end that overlaps the **PEGHEAD** first. Just extend the curved line of the frame to the end of the **SOUNDBOARD**, and cut the wood to that line. Otherwise it will be difficult to make this cut after gluing the parts together.



13. Prepare for gluing the **SOUNDBOARD** to the dulcimer body, taking care to orient it correctly:

**IMPORTANT:** Please work on a very flat surface in order to avoid gluing your instrument into a warped or twisted shape.

Center the **SOUNDBOARD** on the frame and check to see that the **SOUNDBOARD** extends beyond the **SIDES** on each side of the frame, covers the slots in the **PEG-HEAD**, and covers the entire **TAILBLOCK**. A little excess overhang is fine.

When satisfied with the fit, squirt a bead of glue around the entire top edge of the dulcimer frame, covering the **SIDES**, the **TAILBLOCK** and the base of the **PEGHEAD** with a thin film of glue. Then replace the **SOUNDBOARD** in position, watching carefully to line up both ends to be centered on the frame.

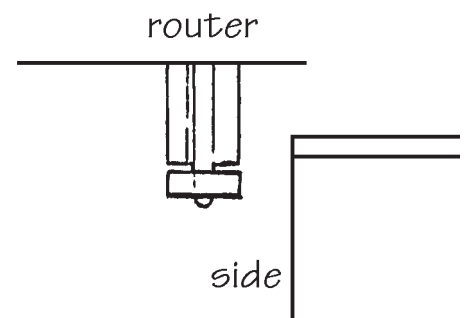
Use clamps or weights to hold the **SOUNDBOARD** firmly down to the frame, so that some glue squeezes out around the entire circumference of the dulcimer.

**DOUBLE-CHECK RIGHT AWAY TO MAKE SURE THE ASSEMBLY HAS NOT "DRIFTED" OUT OF ALIGNMENT UNDER THE CLAMPING PRESSURE.**

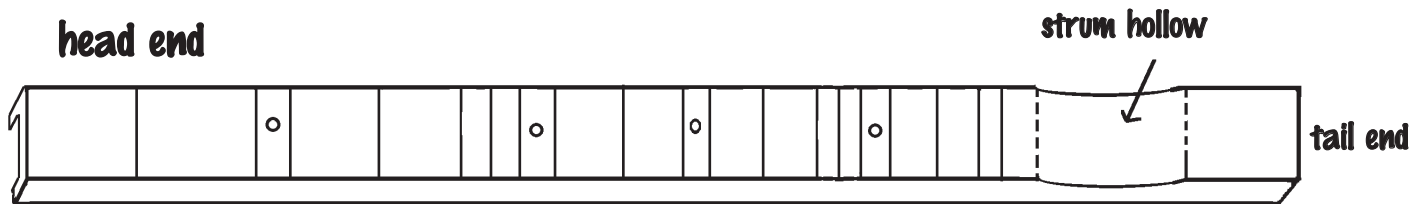
14. Next, trim off the excess overhang of the **SOUNDBOARD**. You may cut it with a coping saw or bandsaw to within 1/4" of the sides, but the final trimming should be done with a rasp or coarse sandpaper wrapped around a piece of wood. If you have a router, you can trim it very nicely with a flush-cutting bit.

### THE FRETBOARD

15. (OPTIONAL) If you choose to inlay some pearl marking dots in the **FRETBOARD**, this is the best time to do it. Many dulcimer players like having small marks inlaid at certain points along the fretboard to help guide



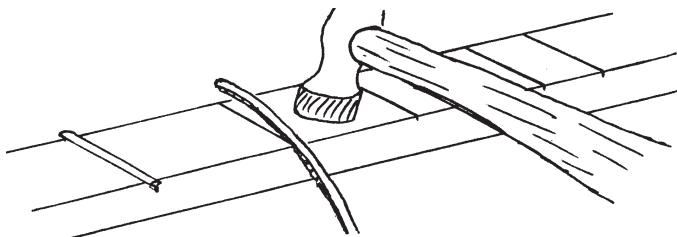
them in playing. The diagram below shows where these marks are most commonly placed.



We carry some small round dots of mother-of-pearl that are easy to install by simply drilling a hole in the wood. Give us a call if you would like to order some. You may also use wood plugs of a contrasting color for this decoration. Birch or Maple plugs would show up nicely against the dark Walnut surface.

Be sure to sand your inlays down flush with the surface of the FRETBOARD after installing them.

16. It is best to install the frets into the fretboard BEFORE gluing the fretboard onto the instrument.



Place your FRETBOARD on a good firm surface for this operation. A flimsy table top will not do. Better to work on a concrete floor or a cement block. Otherwise, your wood will just bounce around as you try to pound the frets into place.

a) Begin by placing the long length of fretwire over one of the slots cut in the fretboard, so the end hangs over the edge of the wood just 1/16" or so.

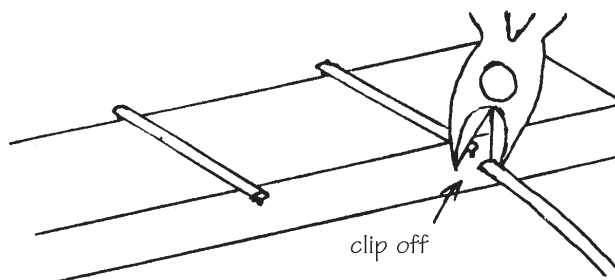
b) Position the fretwire so that the "tang" will be driven down into the fret slots. (See diagram)

c) Use a hammer to lightly tap the fretwire into the slot, until the "crown" of the fret contacts the wood surface.

HINT: Tap one end of the wire in first, then the other end, and finally seat the middle. Be careful not to pound too much in the middle, or you will bend the wire so the ends begin to lift up again. two or three taps should do the job.

d) When the fretwire is securely held by the wood, use a wire cutter to clip off the excess, as close to the wood as possible.

e) Proceed to the next fret slot in the same way, and so on until all frets are installed.

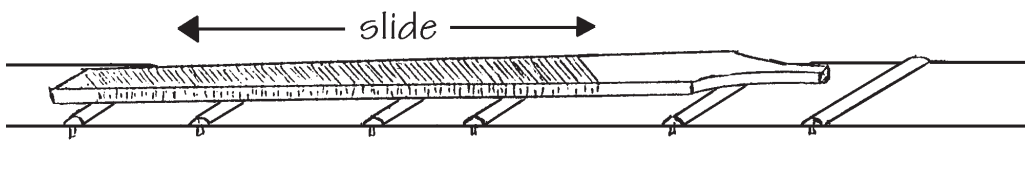


**HINT:** Some experts prefer to glue the frets in place, using 5-minute epoxy. This can be especially helpful if you have trouble with one or two pieces and end up overworking the fret wire or enlarging the slot so it no longer holds the wire firmly. Use a c-clamp and a scrap of wood to hold the errant fret in place while the epoxy sets. Then clean off excess adhesive with a sharp knife.

17. After the frets are all installed, look them over very carefully to make sure each one fits all the way down against the wood. If one fret stands higher than another, it may cause buzzing problems later when you try playing the dulcimer. Now is the time to take care of the problem.

We generally find that a few good taps from the hammer are sufficient to seat any frets that are too high. But make sure you are working on a very firm surface. A bouncy table will only make this job impossible.

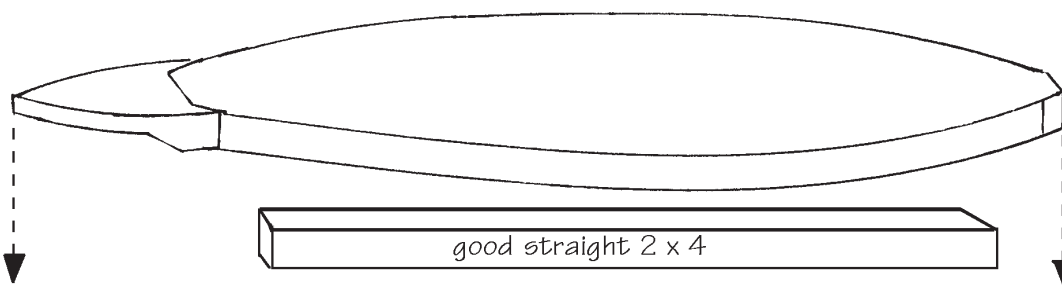
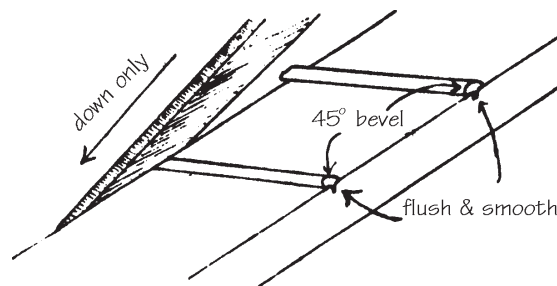
18. If you still end up with some frets higher than others, you can use a large flat metal file to level off the tops. Just lay the file on the FRETBOARD lengthwise and slide it back and forth over the frets until they are level. You can tell which frets are high by how much they become worn down before neighboring frets are even scratched by the file.



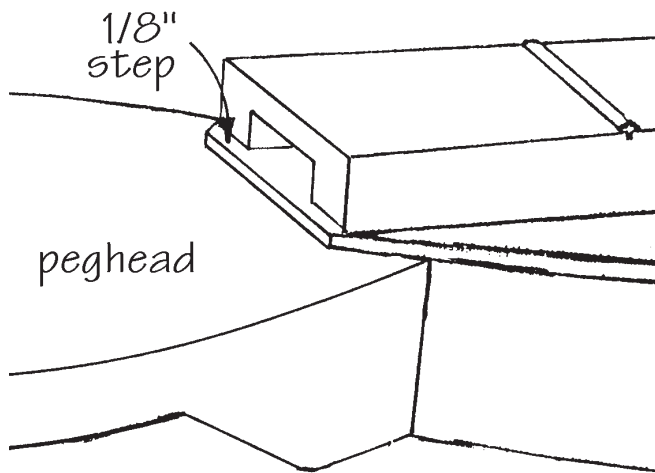
frets are high by how much they become worn down before neighboring frets are even scratched by the file.

19. File (or sand) the ragged ends of the frets down until they are smooth and flush with the sides of the FRETBOARD. If you happen to have access to a belt sander, you'll find it a real boon to this part of the project. The fretwire is soft enough metal to work very easily with a sanding belt, and an otherwise lengthy task can be completed in minutes.

20. File (or sand) a 45 degree bevel at the ends of the frets, as shown, working the file in a downward motion only to avoid lifting the frets up.



21. In order to glue the FRETBOARD in place, you will need to support the inside of the SOUNDBOARD with scraps of wood or something (an old 2 X 4 would do



nicely).

Place the FRETBOARD on the front side of the SOUNDBOARD in the center. Take care to note the TAIL end from the PEG HEAD end! The strum hollow of the FRETBOARD will be near the TAIL of the dulcimer.

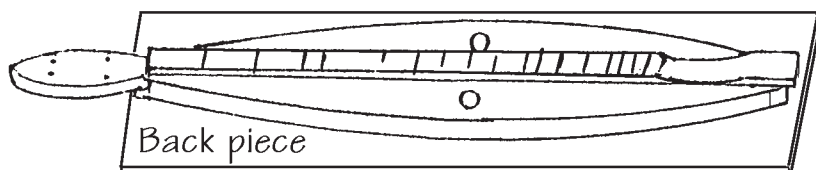
**IMPORTANT:** Position the head end of the FRETBOARD 1/8" from the end of the SOUNDBOARD, as shown, so as to leave a "step" for the PLASTIC NUT to stand on.

When all is ready, apply glue to the underside of the FRETBOARD and glue it firmly to the SOUNDBOARD with weights or clamps holding it down until dry.

**NOTE:** Yes, the tail end of the FRETBOARD will hang over the end of the dulcimer. That's OK -- you'll be trimming off the excess later.

## THE BACK

22. Place the BACK piece on your work table with the best side facing down, and center the dulcimer frame on it. (**NOTE:** One face of the BACK is walnut and the other is cherry. You may select whichever face has the nicest looking grain to show outward.)



Check to see that the BACK extends beyond the SIDES on each side of the frame, and covers the entire TAILBLOCK and "heel" of the PEGHEAD. A little excess overhang is fine. Outline its position with a pencil.

23. Before gluing the BACK onto the frame, we suggest that you sign and date the instrument in a place that will be visible through one of the soundholes. In the coming years, family members and friends will appreciate this instrument all the more if it is signed by the maker.

24. Now you can squirt a bead of glue around the entire edge of the dulcimer frame, covering the SIDES, the TAILBLOCK and the "heel" of the PEGHEAD with a thin film of glue. Then replace the frame on the BACK in the position marked.

**IMPORTANT:** WE RECOMMEND HOLDING A STRAIGHT-EDGE AGAINST THE FRETBOARD TO SEE IF IT IS LEVEL AND STRAIGHT. A BOWED FRETBOARD WILL MAKE THE INSTRUMENT DIFFICULT TO PLAY. YOU CAN STRAIGHTEN A BOWED FRET-

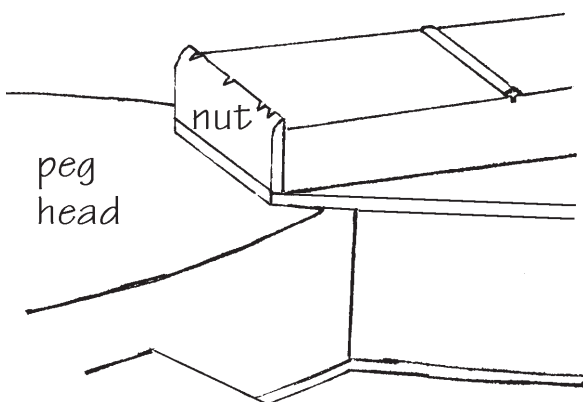
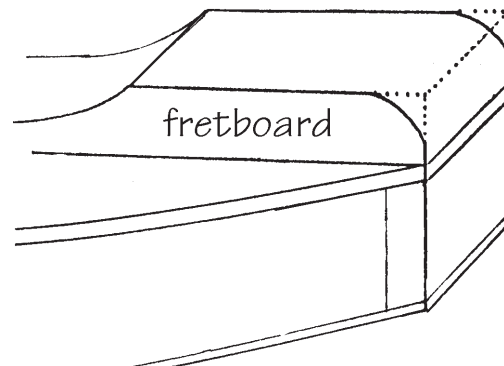
**BOARD AT THIS STEP BY "FLEXING" THE FRAME SLIGHTLY AS YOU GLUE THE BACK IN PLACE.**

**Use clamps or weights to hold the frame firmly down against the BACK, so that some glue squeezes out around the entire circumference of the dulcimer.**

**When dry, trim off excess BACK material to meet the sides, just as you did the SOUNDBOARD.**

## **FINAL DETAILS**

**25. Now you can trim off any excess FRETBOARD material that hangs over the tail end of the dulcimer. We also like to round over the end, as shown, to avoid having a sharp corner for the strings to go around.**



**the end of the FRETBOARD.**

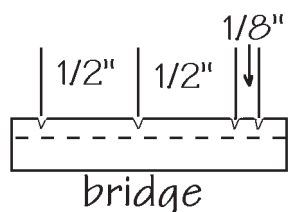
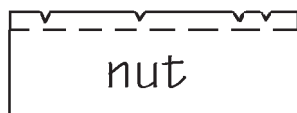
**26. The last item to glue into place is the "NUT", which is not a piece of metal hardware that screws onto a bolt, but a small piece of plastic that holds the strings at the PEGHEAD end of the FRETBOARD. We like to trim it to size and round over one edge before gluing it into place.**

**The NUT should stand about 1/8" above the FRETBOARD.**

**Use Epoxy or Superglue to fasten the NUT to**

**27. VOILA! You are done with the gluing. All that remains is the finishing process.**

**Start by sanding the entire instrument to clean up any glue residue and to lightly round over any sharp edges. A medium (150 grit) sandpaper should do well for this operation.**



**Follow that with a fine (220 grit) sandpaper to smooth everything off nicely.**

**28. One small wooden part remains: the BRIDGE. This will not be glued in place, but just held down by the strings, so you can "fine tune" the dulcimer by moving the BRIDGE as necessary.**

**Trim the BRIDGE to the proper length to fit across the width of the FRETBOARD. Then sand it smooth to**

prepare it for finishing.

29. This would be a good time to file some notches in the NUT and BRIDGE to hole the strings at the correct spacing. Use a triangle file to cut very shallow notches at first -- just enough to keep the strings from sliding sideways. Later on you may file them deeper to lower the strings closer to the surface of the FRETBOARD, if necessary.

## **APPLYING THE FINISH**

30. Now you are ready to apply a finish. Here are a few guidelines:

**STAIN -- STAINS** are coloring agents and should only be used if you dislike the natural color of the wood. We usually do not apply stains to our projects, especially when they are made with naturally beautiful hardwoods such as cherry or walnut. These woods look very nice with just a clear finish. But, if you want to color the wood differently, your staining should be accomplished before applying a surface finish such as oil, varnish, or lacquer. We like **ANILINE DYES** for darkening the wood without obscuring the grain. Our 3-color powdered dyes (code FINI-40) can be mixed with denatured alcohol to the desired shade. The advantage of these dyes are quick drying time, deep colors, even penetration, and the opportunity to create a "sunburst" shading effect.

**OIL --** An oil finish will give your wood a low luster appearance, bringing out the natural color of the grain, but it tends to soak into the wood and appear dry and "thirsty" after awhile. The principal advantage of an oil finish is that it can be applied and wiped dry immediately, so you can proceed to installing hardware (and strings) right away. The disadvantages of oil are that it usually does not give much surface protection or sheen, although there are some brands that include waxes and/or varnishes to give more surface build-up and luster.

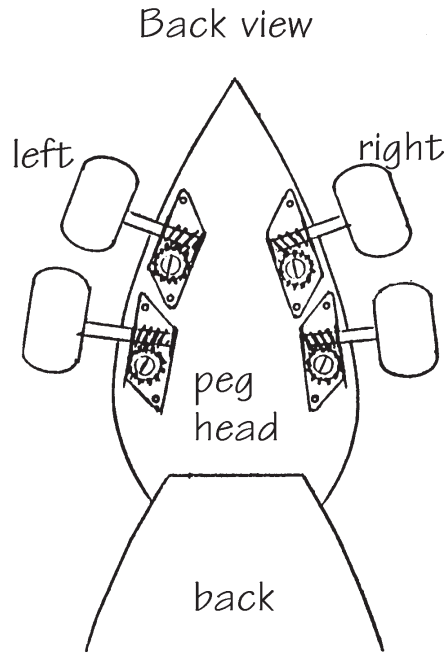
**VARNISH --** Any regular varnish will work fine on this project, but we recommend our wipe-on polyurethane called **MUSICMAKER'S INSTRUMENT FINISH**. Our complete finishing kit (code FINI-20) includes detailed instructions, sandpaper sheets, tack cloth, foam applicator, and lint-free wiping cloth, along with a 1/2 pint can of semi-gloss polyurethane varnish. The advantages of finish are its simple application, durability, and deep, soft luster. It also works well for protecting Heat Transfer decorations.

**LACQUER --** Many professional instrument makers still use lacquer for their finish. The most readily available lacquer is called **Deft Clear Wood Finish**. It is best to purchase a can of liquid to brush on as a sealer coat first, and then use an aerosol can of the same product to spray on the final coats. The advantage of this finish is its quick drying time, but the disadvantage is the strong odor of the toxic lacquer fumes. **CAUTION:** Lacquer finish will not work over Heat Transfer decorations -- it dissolves the toner.

Apply the finish of your choice.

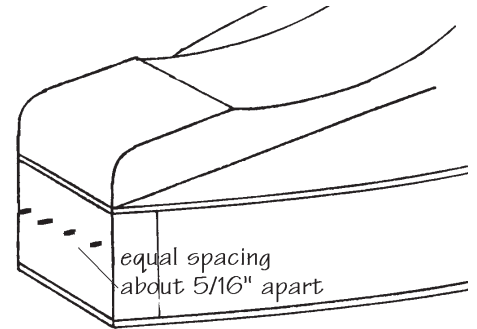
**HINT:** If you plan to use a varnish or lacquer, then we recommend you cover the top of the fretboard with masking tape before applying your finish. The reason for this is that some surface finishes can become sticky after awhile from the perspiration of your fingers as you play. Once the finish is dry, then you can remove the tape and apply a light coat of oil to the top of the fretboard

## INSTALLING HARDWARE & STRINGS



31. Position the geared tuners in the PEG HEAD as shown, noting that there are two "left-hand" tuners and two "right-hand" ones. Use a nail or awl to punch the location of the screws in the underside of the peg head.

32. Drill shallow starting holes in the peg head for the tiny screws that will hold the tuning gears in place, using a 1/16" bit. Then install the tuners, using the tiny screws provided.



33. Use the same 1/16" drill bit to put three

small holes in the TAILPIECE, as shown, for the TAIL PINS.

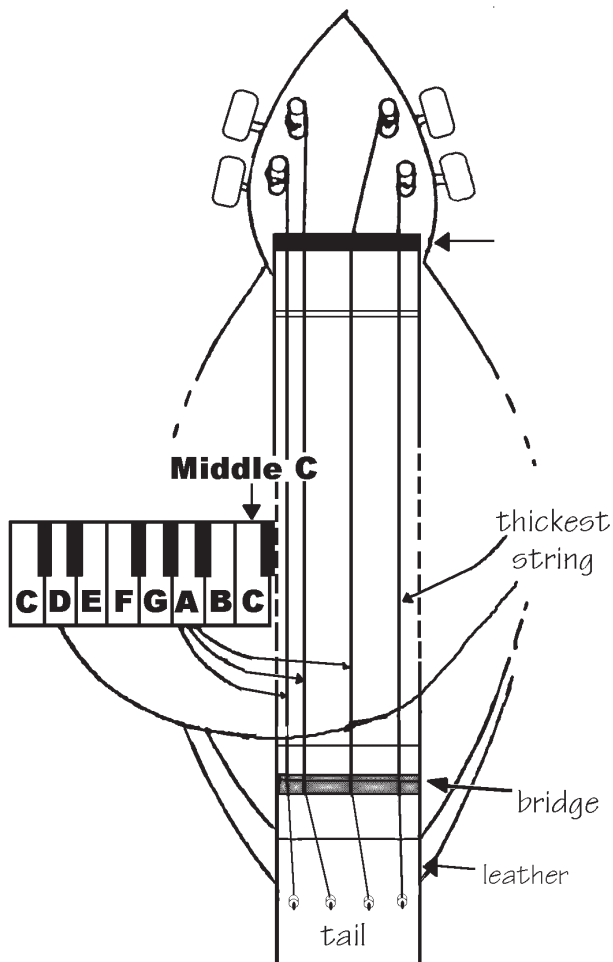
Pound the tail pins into place, leaving about 1/8" standing above the surface of the wood.

34. Now you can install the strings! Attach each string to the dulcimer by slipping the ball end over the correct tail pin, and poking the other end through the hole in the appropriate geared tuner, as shown:

Position the LEATHER SCRAP under the strings at the end of the fretboard to prevent the strings from scratching the wood.

Allow enough slack in the wire to provide at least two or three windings around the post before it becomes taut.

Turn the gears so that the strings wind in the direction shown. When the first string is installed, slip the BRIDGE into place. The top of the bridge should be 31-1/2" from the NUT.



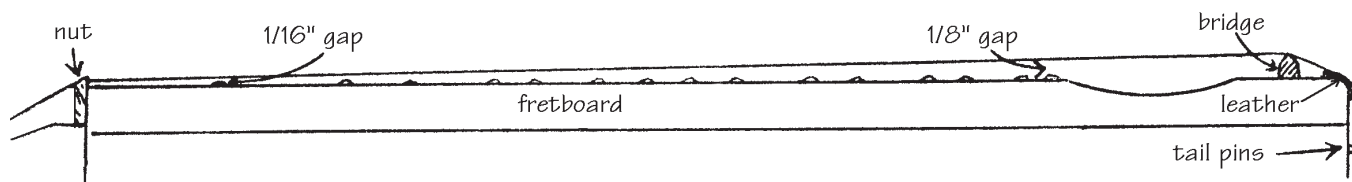
Tune the strings to the notes shown here for starters. There are many different tunings possible for this instrument, but this major tuning (Ionian mode) is the most commonly used with beginning instruction books.

**NOTE:** The illustration shows the proper string placement for standard right-hand playing. If you wish to make this a left-hand instrument, simply reverse the notch pattern in the NUT and BRIDGE, and reverse the order of stringing.

35. Once the strings are installed, check their height above the frets to make sure they will be easy to play. The ideal string height would be about 1/16" above the first fret (nearest the PEGHEAD) and 1/8" above the 17th fret (nearest the strum hollow). You can raise the string height by adding a shim under the bridge, or lower it by sanding the bridge a little shorter or filing the grooves a little deeper for the strings.

Be careful not to lower the strings too much, or the strings will tend to buzz and rattle against the frets when you play.

36. Fine adjustments can be made in the placement of the BRIDGE to make sure the dulcimer plays perfectly in tune. The measurement given earlier (31-1/2")



should be very close to the exact placement, but some variation may occur depending upon final string height and string thickness.

The technique for finding the exact location of the bridge requires a good musical ear or an electronic tuner. Test the accuracy of the octave note by plucking a string with one hand while pressing it to the 8th space from the nut with the other hand. That note should sound exactly one octave above the same string when plucked in the "open" position (vibrating at full length).

If the octave note is a little too high (sharp), then slide the bridge a little toward the TAIL of the instrument. If the octave sounds too low (flat) compared to the open string, then slide the bridge toward the strum hollow. Make adjustments until you find the correct placement, then mark that location on the fretboard with a pencil in case the bridge gets bumped out of position in the future.

**CONGRATULATIONS!** You have successfully completed making a mountain dulcimer that should give you many years of musical satisfaction. We hope you have enjoyed the project.