Eagle Banjo Kit Instructions

Stewart-MacDonald

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Recommended parts, tools, and supplies

The following tools and supplies are recommended to assemble your kit. Though all of these tools aren't necessary to build your kit, they make many assembly steps easier and more professional. In some cases, ways to use simple objects instead of buying tools are suggested. Where applicable, item numbers for ordering from Stewart-MacDonald are included.

Parts

- Banjo tuners #5014 and 5th peg #0033 or #5017
- Banjo Head
- Tailpiece #0917, #0965, or #0916
- Strings #0140, #0142

Tools

- 6" rule
- Long straightedge (24" or longer)
- Electric hand drill
- Drill bits: 1/16", 1/8" , 1/4", 5/16", 3/8"
- Brad-point drill bit, 3/8" (optional)
- C-clamps (4-6 small/medium)
- Cam clamps or bar clamps, #3723
- Spring clamps (2-4, optional)
- Sharp razor knife
- Gauged Saw .010" #3596, or razor saw
- Nut-slotting files .012"/.016" (double edge) #4541 and/or .010" #0821 (optional)
- Small adjustable wrench, or 1/2" open end wrench
- Small needle file
- 12" length of dowel, or broomstick
- Small block plane or long flat bar (carpenter's level) for sanding fretboard
- Felt or rubber sanding block
- Smooth mill file
- Half-round bastard file
- 1/2" wood chisel
- Screwdrivers: small flathead and Phillips head
- Fret hammer #4895 (or small hammer with a smooth face)
- Fret cutter #0619 (or sharp side-cutter)
- Capo #0045 (optional), or homemade capo with a pencil and rubber band
- Small socket or hollow tube (to press in 5th peg)

Finishing supplies

- Colortone Waterbase Grain Filler #5577 and Scotch-Brite scouring pad
- Colortone Concentrated Liquid Stain (optional), Medium Brown #5033 or Red Mahogany #5032
- For waterbased finish: ColorTone Waterbase Brushing Varnish #5566 and polyester bristle brush (1-1/2" to 2")
- For nitrocellulose finish: ColorTone Aerosol Sanding Sealer #3883 and Clear gloss lacquer #3881
- Buffing or polishing compounds

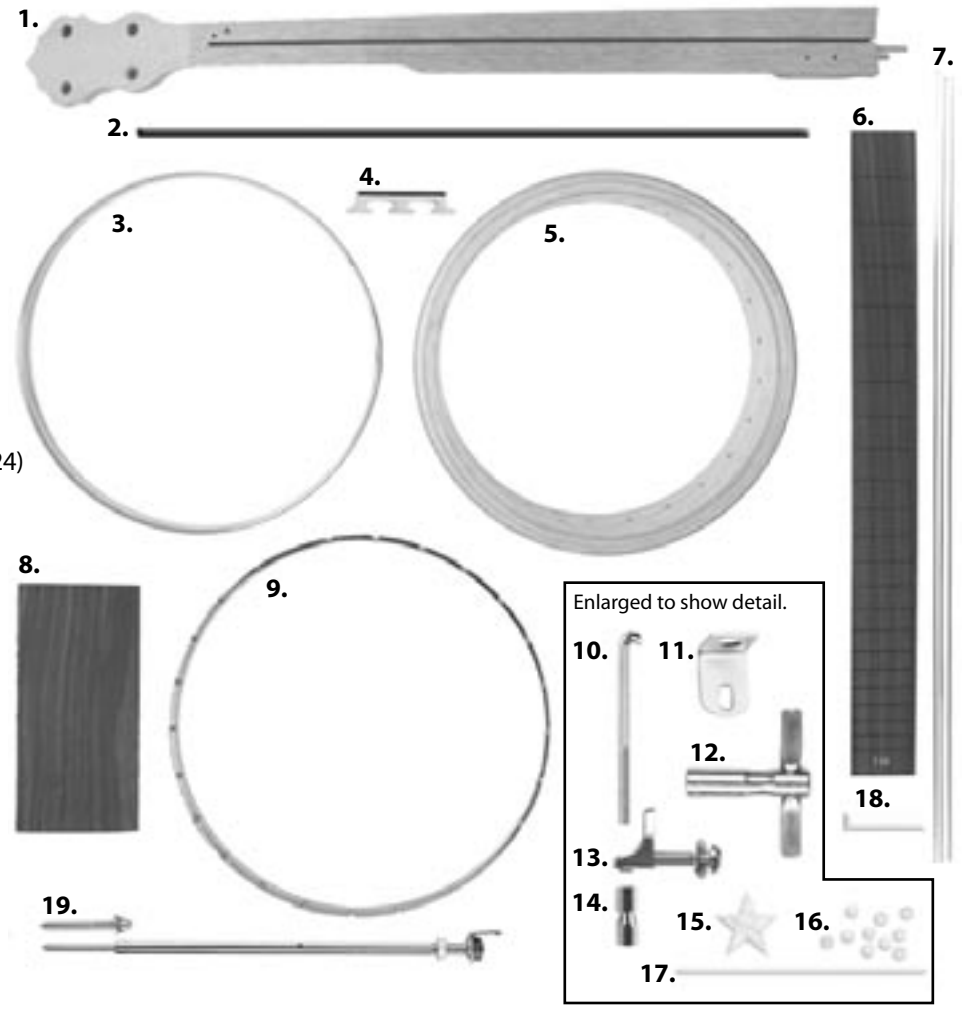
Supplies

- Naphtha solvent #0775, or lighter fluid
- Titebond glue #0620
- Instant Adhesive (thin and medium) #0010 and #0020, or water-thin and medium viscosity superglue
- Masking tape #0677
- Pencil
- White or yellow pencil
- Wax paper
- Sandpapers for wood and finishing, 3M Gold Fre-Cut Package #5562 (2 or more of each grit): 80 or 100-grit, 150, 220, 320, 400, 600, 800, 1000, 1200-grit

Kit parts list

1. Neck
2. Neck reinforcement bar
3. Tone ring
4. Bridge
5. Wood rim
6. Fretboard
   (scrap piece not pictured)
7. Fretwire (3)
8. Rosewood overlay
9. Notched tension hoop
10. Round Hook (24)
11. Tailpiece bracket
12. Bracket wrench
13. L-shoe with bolt and washer (24)
14. Hex nut (24)
15. Pearl star inlay (1)
16. Pearl inlay dots (10)
17. Plastic side dot material rod
18. Nut blank
19. Single rim rod set

Not pictured: rubber binding band, 5th string nut (a small slot-head screw), instructions.



Getting started

Welcome to banjo making! The banjo you're about to build is an open-back (no resonator), and is suitable for either old-time or bluegrass playing styles. It's an easy kit to build. We've designed the Eagle so that you can create a quality banjo with a minimum of tools. You don't need experience, either. The Eagle banjo is a great way to get your start in instrument building. When you're done, you'll be happy to find that it sounds great, too!

Review these instructions before starting, so you're sure you have everything you need. If you're new to building, here's a tip that every instrument builder knows (or finds out the hard way): Test the fit of all the parts before you assemble them. When you're gluing, dry-clamp to see that everything fits before you use the glue.

Since most of the work needed to build this banjo involves the neck, you might consider applying the finish to the rim first, and continue applying coats as you are building the neck. This way, when the neck is ready to attach, the rim will be finished, and you can install the hardware. The advantage of finishing the rim early is that you will only need to install the rim hardware once, and you won't dirty the light-colored maple by frequent handling. Basic finishing steps are included at the end of these instructions.

Be safe when using tools, glues, and chemicals. Wear eye protection and gloves when needed, and always use proper ventilation.

Fitting the tone ring and sanding the wood rim

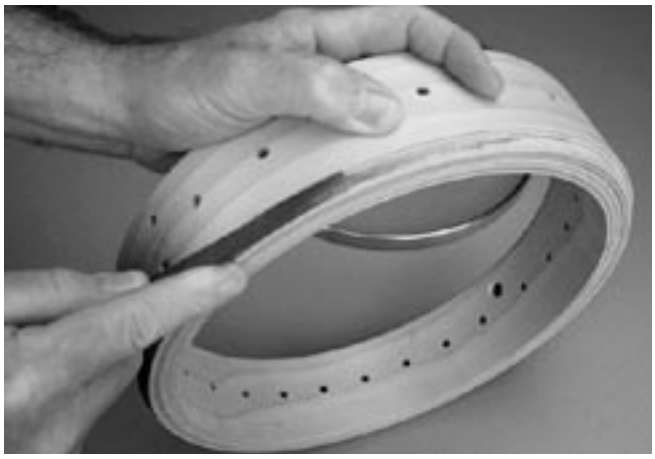
The brass tone ring will probably fit snugly onto the wood rim, and you'll be able to remove it easily. If excess humidity in your area swells the rim and the tone ring won't lift off, insert a table knife or other dull blade into the crack between the tone ring and the lip of the wood rim, and pry gently. Do this carefully in the area where the neck bolts on, so accidental pry marks won't show.

Lightly sand all the wood surfaces with 320-grit Fre-Cut sandpaper. Smooth any sharp edges with the sandpaper to avoid sanding through the finish later. Wipe off the dust.

Tape off all the areas on the wood rim where the tone ring will contact it. You can use a 12" length of 1" wood dowel (a broom handle, for example) as a handle during finishing.

Drill a hole in the end of the dowel and fasten it to the rim where the neck bolts on; you can use either of the two holes. Use a flat washer and a 2" drywall screw from inside the rim. The rim can be finished now if you prefer, or later after the neck is built. Follow the finishing schedule at the end of these instructions.

If the wood rim is swollen from humidity, and the tone ring won't go on, it will need to be sanded. Scribble with a pencil all around the tapered sidewall of the tone ring ledge. File off a small amount of wood, equally all around (the pencil should just be removed), until the tone ring will press down flush to the bottom of the ledge.



If necessary, file a small amount of wood from the tapered sidewall.

Use a length of wood dowel as a handle during finishing.

Shape the fretboard

On the face of the neck, where the fretboard will be glued, pencil a line 3/16" back from the break angle (the sharp edge where the peghead angle meets the face of the neck). This 3/16" area is where the string nut will stand.

Lay the neck face down on the back of the fretboard, and align the end of the fretboard with your pencil mark. Center the neck on the fretboard and trace the neck shape onto the back of the fretboard, including the end ("heel") of the neck.

Clamp the fretboard face-down on a riser block and use a small block plane laid on its side to trim the tapered edges until the pencil line is just starting to disappear. There should

Pencil a line 3/16" back from the break angle (dotted line).

Pencil the neck's shape onto the fretboard.

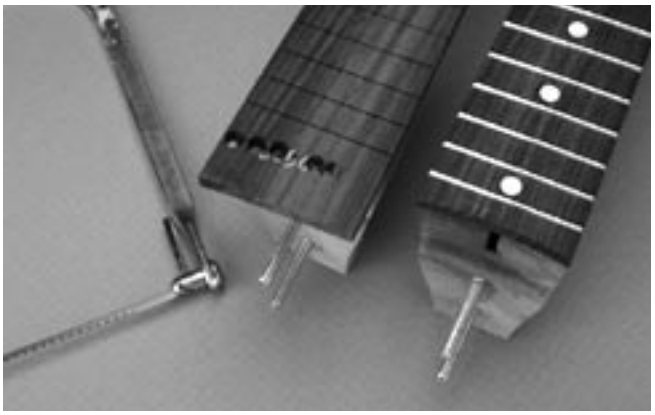
Using a block plane to trim the finger board.

Drill a series of 1/4" holes, then chisel and file to shape.

be little or no overhang of the fretboard at the edges of the neck.

Cut the 5th-string contour at the narrow end of the fretboard, from the 5th fret to the nut. Use a coping saw, bandsaw, or simply drill a series of 1/4" holes along the pencil line, and saw through them with a razor saw; then chisel and file up close to the pencil line.

Trim the fretboard to length with a coping saw or a bandsaw. Cut off the portion of the fretboard overhanging the neck heel, along the pencil line. Follow the curve carefully, and file off the saw marks. The end of the fretboard must be flush with the curve of the neck heel. If you don't have a coping saw, drill holes along the curve, and saw or chisel through them to shape the final contour.



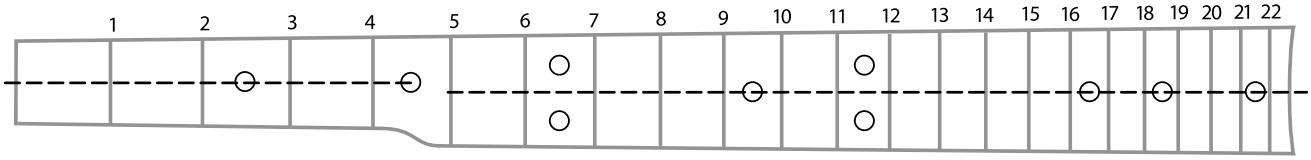
You can use a coping saw to shape the unfinished fretboard (left) to match the curve of the neck heel (right).

Inlay the pearl position markers

You need two centerlines to lay out the pearl dot inlays, one for the 4-string section of the neck (the 3rd and 5th fret inlays), and another for the remaining 5-string section. Find the centers of the nut end of the fretboard and the fourth fret, and pencil a centerline connecting them. Next, find the centers of the fifth fret and the last fret, and pencil this second centerline. Lay out the dot inlays for frets 3, 5, 10, 17, 19 and 22. Two inlays are used at frets 7 and 12. Centerpunch these locations.

Drill 1/4"-diameter holes for the inlays. A brad-point drill bit is preferable because it creates a flat-bottomed hole, but a regular twist bit will work. Drill slightly shallower than the thickness of the pearl. The small amount of pearl remaining above the fretboard surface will be filed and sanded away. Glue the dots in place with Titebond or superglue, pressing them almost flush to the fretboard surface with a flat block. Mixing some fretboard wood dust with the glue will give better looking results in case the drill bit has chipped the wood.

Level the pearl dots to the fretboard surface with a smooth mill file. Then sand it using a scrap wood sanding block with 150-grit paper, followed by 220-grit.



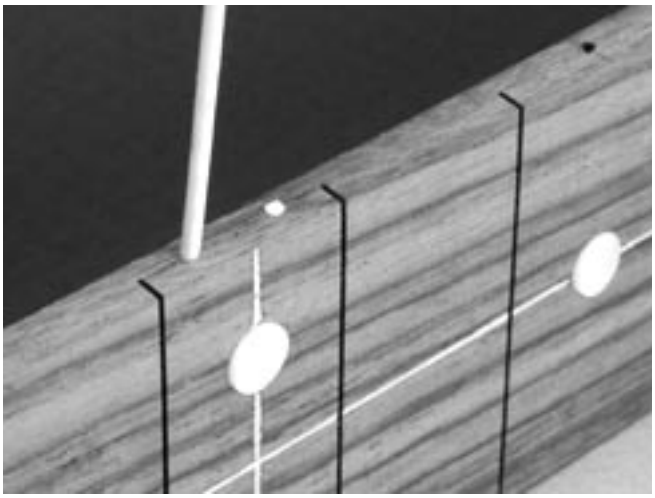
Lay out the dot inlay positions using this illustration as reference.

Inlay the side dots

On the edge of the fretboard (5th string side), drill 1/16"-diameter holes about 1/16" deep for the side dot markers. A single dot will mark frets 3, 5, 7, 10, 17, 19 and 22, and two dots will mark the 12th fret. Center the dots between the fret slots. At the 12th fret (the octave), drill the two holes 1/4" apart.

Side dots are created with the thin white plastic rod supplied with the kit. Place a drop of superglue in one of the holes, push the rod in, and nip it off so only a short length protrudes from the hole. Repeat for each of the side dots.

File and sand the side dots flush.



Pencil two centerlines to lay out the pearl dot inlays.

Install the frets

Clean the fretwire using a rag dampened with lighter fluid (naphtha) to remove grease, especially along the barbed area (the fret tang). When the rag no longer shows black, the wire is clean.

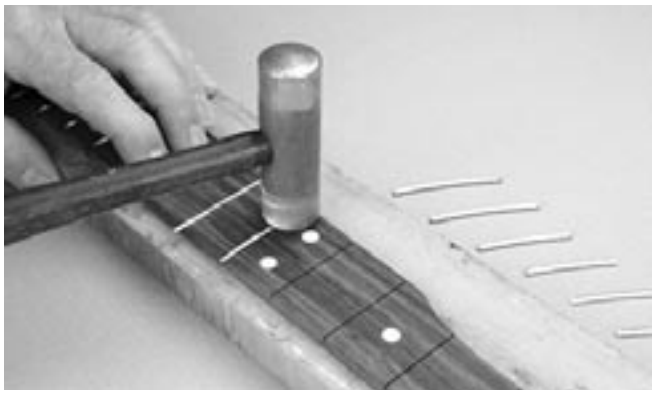
Cut the frets to lengths 1/4" longer than the fretboard width (so they overhang the edges by 1/8" on each side). Use the remaining extra wire to practice fretting on the slotted fretboard scrap supplied with the kit.

The frets should be firmly hammered into the slots with short, sharp, repetitive hammer strokes. A fret hammer is recommended; it has the correct weight and surface hardness to drive in the frets without damaging them. If you don't have a fret hammer, use a lightweight household hammer with a smooth, clean head surface. Pick a hard flat work surface to do this. Use the slotted fretboard scrap to practice fretting before working on the real thing.

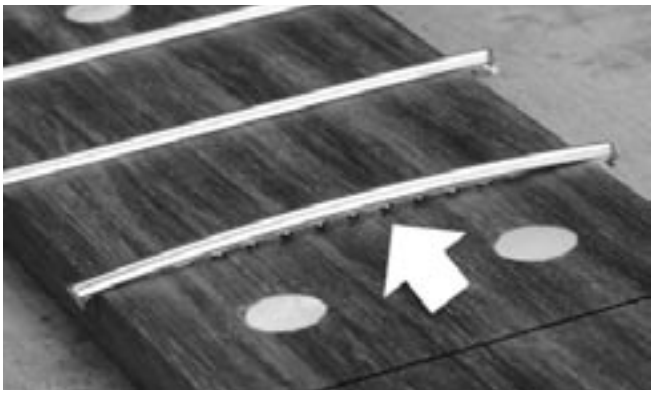
First, seat the ends of the frets by tapping them down at each edge of the fretboard. This will leave the center of the fret curved up slightly above the slot. Next, work across the fret with the hammer, seating the wire into the slot.

When all the frets are installed, place a flat hardwood block on top of the frets and hammer on the block to further seat them.

The fret "crown" is the rounded top. The fret "tang" is the barbed stretch underneath that is installed in the fretboard.



Seat the ends first by hammering them down at each edge of the fretboard.



The center of the fret is raised before seating.

"Massage" out a backbow. Squeeze, don't force!

Run superglue into the ends of the fret slots.

The frets pressed into the slots will cause the fretboard to curve into a slight backbow. Remove this bow by gently "massaging" the fretboard, curving it in the opposite direction. This will seat the frets more securely, and the fretboard will flatten out. Press gently on the board; overdoing it could crack the fretboard at one of the slots.

When the fretboard is flat, rest it on edge and angled slightly away from vertical. Run a drop of water-thin superglue into the ends of the fret slots. Do this on each side of the fretboard. The glue will wick though the slot and hold the frets down, and the fret ends will stay seated when you nip them off.

Remove the overhanging fret ends with fret cutters, or sharp side-cutters. Cut the fret approximately 1/64" away from the side of the fretboard to avoid marring the wood or unseating the fret.

With a smooth mill file, trim the ends of the frets flush to the fretboard. Next, hold the file at a 60-degree angle and put a bevel on the fret ends. As it trims away the fret ends, the file will also smooth the sharp corner of the fretboard. Stop when the file begins to pick up wood. If the corner is still too sharp, smooth it slightly by drawing a razor blade or a scraper along it (a sharp corner is uncomfortable and may cut the rubber strip used to glue the fretboard to the neck later).

Nip the overhanging fret ends.

Bevel the fret ends.

Trace the peghead shape onto the overlay

Place the peghead face-down on the rosewood overlay. Align the fretboard end of the overlay with the 3/16" penciled nut line on the neck (this excess will be trimmed away later). Trace the peghead shape onto the overlay using a white pencil. Trace inside the four tuner holes, too. Set the overlay aside, and move on to gluing the fretboard. While the glue dries, you can inlay the star on the overlay.

Install the neck reinforcement bar and the fretboard

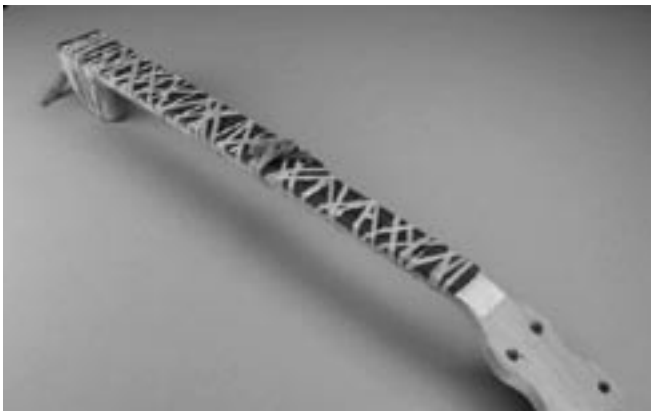
Degrease the neck reinforcement bar with lighter fluid (naphtha). Be sure the gluing surface of the neck is clean, smooth and level, using a long accurate straightedge. If your neck has developed either a slight backbow or upbow, you can straighten it when you glue in the reinforcement bar. If the neck's fretboard gluing surface is held flat when the reinforcement bar is glued in, the rod will hold the neck straight. To straighten the neck, temporarily bolt it to the rim (see "Install the neck"). Then clamp the rim to a flat table or benchtop, with the neck hanging off the edge.

For a backbow (the most common problem), prop up the peghead with a stick wedged between the floor and the peghead. Measure and trim the prop until the fretboard gluing surface is flat from end to end. Leave the neck propped as you glue in the reinforcement bar (use Titebond, but clean it from the fretboard surface so the fretboard can be glued on later). When dry, the neck will remain straight.

For an upbow, hang a plastic grocery bag from the peghead and add weight until the neck is straight.

Spread Titebond glue uniformly into the neck slot and onto the neck gluing surface. Press the reinforcement bar in until it seats in the bottom of the slot and is not projecting above the neck surface. You'll need a thin, uniform coat of glue for the fretboard gluing surface. Clean up any excess squeeze-out, and align the fretboard with the penciled nut line. Wrap the fretboard firmly to the neck using the supplied rubber binding band. This "self-centering" clamp will allow a little repositioning before the glue sets.

Use a thin, uniform coat of glue for the fretboard.



Align the fretboard on the penciled nut line, and wrap with the rubber band.

Inlay the star in the peghead overlay

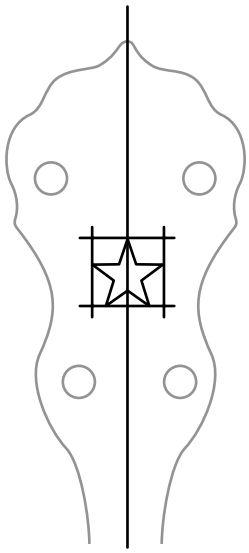
If you're a beginner, you'll find it easier to inlay the pearl star into the overlay before it's glued to the peghead and trimmed to shape. This also lets you inlay without a using a Dremel tool, if you don't happen to have one.

With your white pencil, trace the peghead overlay face-up, find the center at the string nut end, and the midpoint between the tuner holes. Draw the centerline in pencil, locate the pearl star along the line, and center it between the tuner holes. Hold the star down and outline it with a sharp pencil. Next, pencil a "box," with its four sides just touching the tips of the star.

Scribe the shape of the star onto the rosewood, inside the pencil lines, using a sharp #11 X-Acto blade with a straightedge to guide it. The "box" will indicate where to start and end your cuts.

Drill out as much of the wood inside the scribed star as possible, staying away from the scribed line. Use a 1/16" bit near the points, change to a 1/8" bit farther inside the star, and drill a 5/16" hole in the center. Use a chisel, razor knife and needle files to remove the wood up to the scribed lines.

Place the overlay, with the penciled peghead tracing facing downward, on wax paper resting on a flat surface. Place the star into the hole; it should be flush to the wax paper. Fill the edges of the hole with rosewood sawdust filed from the scrap edges of the overlay, and saturate that with water-thin superglue. Spritz with superglue accelerator to harden the glue (optional). When dry, peel off the wax paper.



The penciled "box" will indicate where to start and end your cuts for outlining the pearl star.

Square and size the nut blank

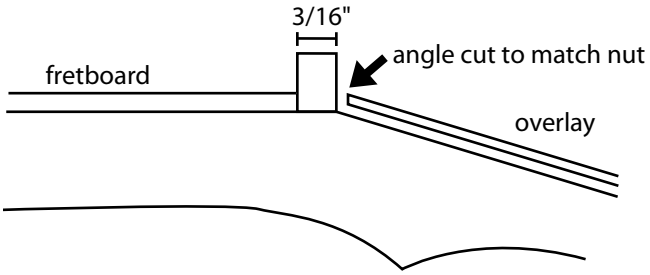
Using 100 or 120-grit sandpaper laid on a flat surface, sand the nut blank until it's uniformly 3/16" thick. The bottom surface of the nut should be square to the end of the fretboard, and to the 3/16" flat area on the neck surface. Get an ultra thin coat of wax on the nut blank by rubbing it on wax paper or a candle. Now you can use the nut blank to help align the peghead overlay perfectly for gluing, and to prevent glue squeeze-out in the nut slot. The wax will let you remove the nut later.

Cut the peghead overlay to shape

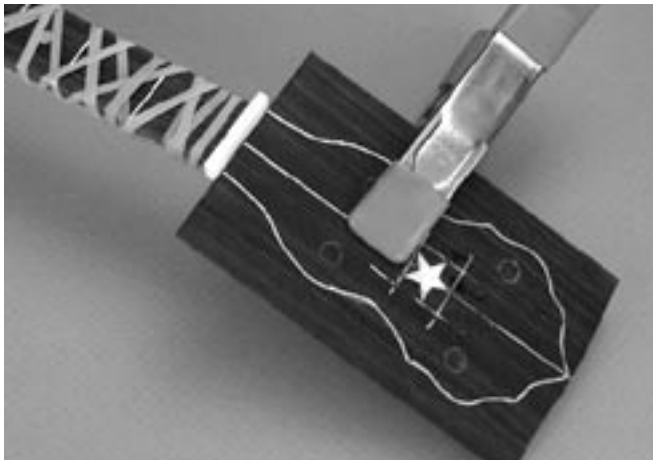
Cut off the end of the peghead overlay 1/16" away from the pointed end of the neck, leaving just enough for some overhang. Draw the centerline on the ends of the overlay and connect them, putting a centerline on the opposite side. Now clamp the overlay onto the peghead, this time with the flush side of the star inlay facing upward (the traced surface that previously was face-down when the star was glued in).

Align the new centerline with the center of the fretboard at the nut, and with the point at the end of the peghead. Butt the overlay tight against the end of the fretboard; it will be in approximately the same position as when you first traced it. Use a spring clamp to hold the overlay in place. Measure 3/16" from the fretboard and draw a line on the overlay. This amount must be sawn and filed away from the overlay to expose the nut-gluing surface on the neck. Hold the saw at the proper angle, so the overlay will butt tight to the nut when it's in place.

Use a coping saw or a bandsaw to trim the overlay almost to the pencil line, leaving 1/16" extra overhang. This will compensate for shifting or misalignment of the overlay during the glue-up.



The overlay should butt tight to the back side of the nut



Use a spring clamp to hold the overlay in place.

Install the peghead overlay

Glue the overlay to the peghead with Titebond. Use a protective caul on the rear of the peghead to protect the wood surface, and one on the face to keep it flat. A sheet of clear acrylic for the face caul will let you check the alignment.

When the overlay is clamped and the glue has set for 10 minutes, lift the nut from the slot and clean up any glue squeeze-out, which should be minimal. You don't need to set the nut back in place.

When dry, use a sharp knife and a file to trim the overhang flush to the peghead. Avoid removing any of the peghead wood, which is already shaped and smoothed.

A caul (in this photo it's clear acrylic) holds the overlay flat. Another caul protects that back of the peghed.

Kit tip:

If you have a staple gun or a desktop stapler, fasten two staples into the peghead front, spaced well apart. Clip them off, leaving only short prongs protruding. These will embed in the underside of the overlay to keep it from shifting during gluing. They should not be long enough to press entirely through the overlay, of course.

Carefully trim the peghead overlay flush to the peghead.

Shape and sand the neck

When the fretboard has dried, remove the rubber bands. Using a half-round bastard file, followed by a sanding block, trim any overhanging fretboard flush to the neck. Also, remove any machining marks or ridges left by the neck-shaping process. Block-sand with 150-grit, and then 220-grit. Use a hard flat block for flat surfaces, and a felt or rubber block on the round and curved areas.

Level and polish the frets

Lightly pass a smooth mill file, a carborundum stone, or a hard block with 400-grit sandpaper over the tops of the frets until they're level with each other. Check this with a long accurate straightedge. A few gentle passes should show a tiny flat area on all the fret tops. Next, use the hardwood block with 600-grit sandpaper to smooth out the flat areas.

Wrap two fingers with a piece of 400, 600, 800 and 1000-grit sandpaper in succession, and sand over the fret tops from end to end. The action of your sandpaper-wrapped fingers over the frets will round them a little as it burnishes and polishes the fret tops. Roll over the fret ends also to polish them and remove any burrs.

Wrap two fingers with sandpaper, and sand over the fret tops from end to end.

Open the pegholes in the peghead overlay

Clamp the peghead face-down on a hardwood backup board to help prevent chip-out. Use the pegholes as a guide and drill through the overlay with a 3/8" brad-point drill bit. After the first hole is drilled, unclamp the peghead and check to see how cleanly the bit has punched through into the hardwood backer. A twist drill will work, but a brad-point bit is better.

Drill through the overlay with a 3/8" brad-point bit.

Install the tuners of your choice

The 3/8" pegholes will accept standard geared banjo tuners, including our #5014 Five-Star pegs, which mount simply with a threaded bushing and washer. Each Five-Star peg requires a small hole at the back of the peghead near the peghole, to fit the anchor pin on the peg's gear housing. Drill these shallow holes carefully with an appropriate drill bit.

Special instructions for installing economy tuners

We also offer our #5017 economy (guitar-style) banjo tuner set as a money-saving alternative. The pegholes will accept the press-in bushings supplied with these tuners, or our #3458 conversion bushings if you prefer their appearance.

Install the bushings temporarily to center the tuners when you drill their mounting screw holes. You don't need to press the bushings all the way in at this stage (they'll be easier to remove for finishing if you don't). Press them only one quarter of the way in, using a caul on the rear of the peghead and a clamp. After the tuners are located and drilled, the bushings will press out easily from the rear.

With lighter fluid (naphtha), clean any grease off the tuners, and let them dry. Set them in place as in the photo, and mark the mounting hole locations with an awl. Drill the holes with a 1/16" bit and install the tuners. Wrap masking tape around the bit at the proper depth as a guide to avoid drilling through the peghead face.

The proper location of #5017 economy tuners.

Install 5th string peg

The neck is drilled to accept the friction-style 5th string peg supplied in our #5017 economy tuner set. If you prefer a standard 5th string peg, the hole must be enlarged and tapered. To do this you'll need an assortment of drill bits to enlarge the hole gradually, to keep the hole centered. Our #0618 reamer should also be used to produce the proper hole taper. You can taper the peghole with a rat-tail file if you prefer, although this is much more difficult.

Remove the peg screw, knob, and washer. Use a small socket that fits over the knob shaft, and press the peg into the hole slowly. Stop just after the ribbed splines of the peg housing disappear into the wood. Any hollow tube of the right size (or a dowel with a drilled hole) makes a good pressing caul. Clamp the neck on edge to hold it steady as you press the peg into the hole.

A good clamping setup for installing a 5th string peg. Press the 5th string peg into the hole slowly.

Install the hardware on the rim

When installing the L-shoe brackets, try to avoid marring the screws. Use a wide-blade screwdriver that fits the slotted heads snugly. The flat edge of the shoe faces the bottom of the rim. Install a bracket hook and hex nut into each shoe.

Install the neck

The neck should be mounted before the notched tension hoop is installed, so that the wide notch in the hoop, for string clearance, is aligned with the fretboard.

Slide the threaded neck bolts through the two holes in the rim. The kit includes two washers with a small diameter hole, and two with a larger size hole. The larger ones are for use on the tailpiece end of the rim rod. Install a washer with a small hole, and the brass "acorn" nut, onto the top neck bolt and tighten until just snug.

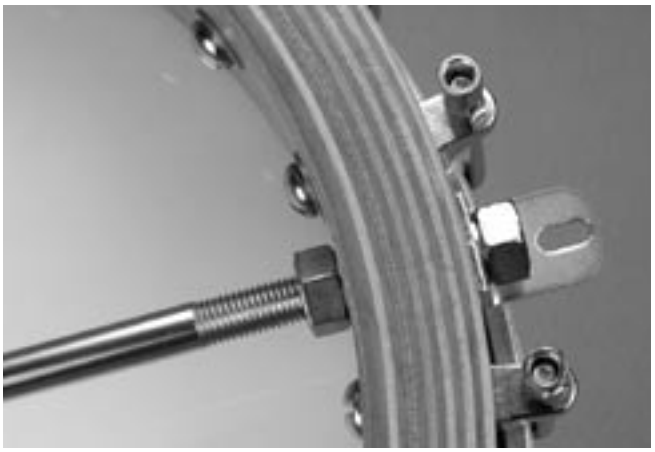
Thread one hex nut and large washer onto the rim rod, and slide that end of the rod through the 3/8" hole at the tailpiece side of the rim. Next, slide the L-shaped tailpiece bracket onto the rod, and install the other large washer and hex nut.

Leave the nuts loose for now. Screw the rim rod onto the bottom neck bolt, with the remaining small washer installed between them. Insert a nail or other thin object into the hole in the rod to turn it.

Tighten the rim rod and the upper acorn nut to pull the neck heel tightly to the rim. Now tighten both hex nuts until they lock the rim rod in place.

When installing the L-shoe brackets, try to avoid marring the screws. Use a wide-blade screwdriver that fits the slotted heads snugly. The flat edge of the shoe faces the bottom of the rim. Install a bracket hook and hex nut into each shoe. Install the hex nut with just a few turns so the hook will reach over the tension hoop.

Tighten the rim rod onto the bottom neck bolt.



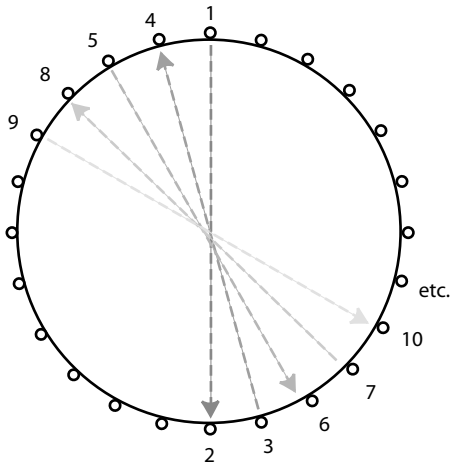
Close-up view of the hex nuts and washers.

Install the tone ring, head and tension hoop

Place the tone ring on the wood rim, and the banjo head of your choice (not supplied) onto the tone ring. Set the notched tension hoop in place. Be sure that the wide notch in the hoop is centered on the fretboard.

Install all the bracket hooks in the tension hoop notches until just snug. You should still be able to rotate the hoop slightly if it moves off center. Start tightening the bracket nuts a little at a time with the bracket wrench, in a diametric pattern for uniform tension.

Be sure the tension hoop remains level as you tighten the nuts. Continue until the plastic head starts to have a bright, clear sound when tapped with your finger. Stop at this point; you can't tighten the head to full tension without the strings and bridge in place.



Start tightening the bracket nuts a little at a time in a diametric pattern.

Fit the nut

Place the blank nut in position and mark the ends where it overhangs the sides of the fretboard. Draw a sharp line across the face of the nut indicating the height of the fretboard surface. Remove the nut and draw another line 7/64" above the first line. Clamp the nut in a vise, or butt it up against a wooden bench stop fastened to your work surface. File the nut down to the higher pencil line. The 7/64" height above the fretboard leaves enough room for string slots 1/32" deep, to hold the strings above the frets. The clearance between the bottom of the strings and the top of the first fret will be approximately .020". You can lower this distance later as desired.

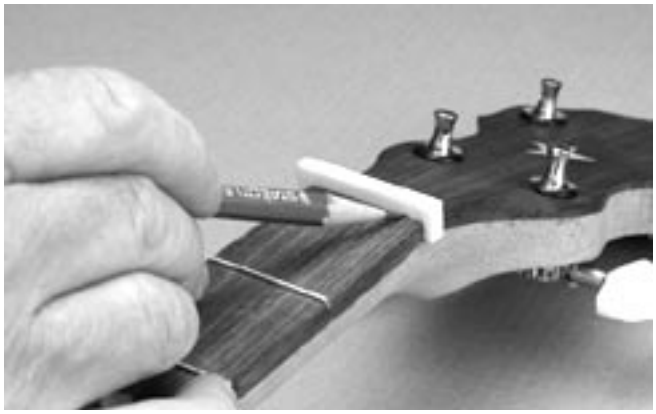
The neck measures approximately 1-3/16" wide at the nut. The strings are spaced in from the edge of the fret board approximately 1/8" on both treble and bass sides (you can squeeze them closer, or set them wider apart as you like). On our banjo we spaced the outside 4th and 1st strings at 15/16" apart on centers and located the inner two strings equally between them (the strings will be 5/16" apart). This was a good spacing for us. We marked the centers with pencil lines.

Scratch starter notches into the pencil marks with a sharp scribe, and then use your smallest razor saw or a nut file to start the slots. Be careful not to nick a fret or the peghead with your saw. The three gauged saw sizes we used on our banjo nut were .020", .013" and .010". We rounded the bottoms of the slots with our #0823 (.013") nut slotting file.

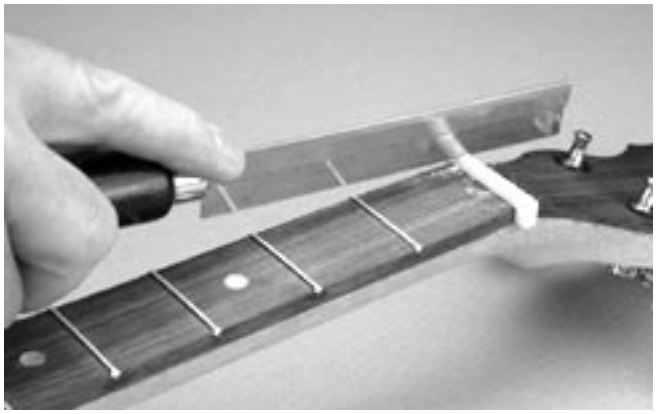
Kit tip

A set of gauged saws is an ideal way to cut string slots, but a single saw can do the whole job. Our .010" gauged saw will cut all the slots: simply roll it from side to side to enlarge the slots for the heavier strings.

File the string notches straight downward (don't change the string spacing by drifting to the side) until the slots meet the roughed-in specs. From this point leave the slots alone until the bridge is fitted and notched, and the strings are installed.



Draw a line across the fretboard surface onto the nut.



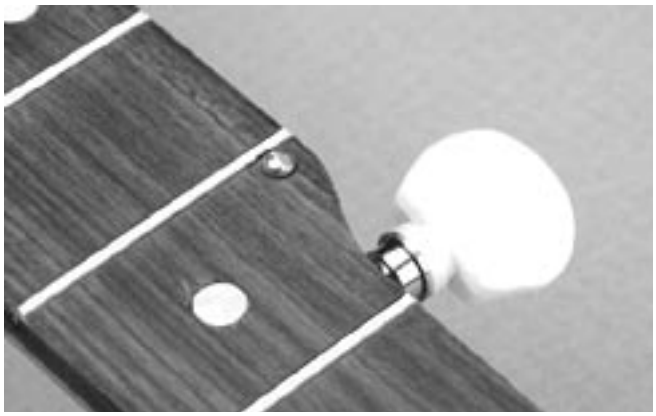
Use your smallest razor saw or a nut file to start the slots.

Install the 5th string nut

The simplest 5th string nut is a small slot-head screw (supplied), located on the peghead side of the fifth fret, about 5/32" from the edge of the fretboard. Use a small drill bit to drill a pilot hole for this screw. Tighten the screw head flush to the fretboard surface so the slot will guide the fifth string up and over the fret.

Kit tip

Instead of using the screw, you can install our #0098 5th string nut, a round micarta dowel. Drill a 1/8"-diameter hole first. It should be installed and slotted so the string runs up and over the fret.



Align the screw slot to guide the fifth string up and over the fret.

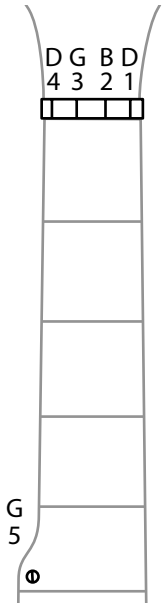
Install the tailpiece, strings and bridge

Install the tailpiece of your choice (not included) in the L-shaped tailpiece bracket, and onto the tension hoop. Snug the tailpiece's mounting nut.

Install the strings, but don't tune them to pitch until you have positioned the bridge. The center of the bridge top should be located 13-1/4" from the crown of the 12th fret (this can be fine-adjusted after the finished banjo is tuned to pitch). String tension holds the bridge in place, and glue is not needed.

A correctly installed tailpiece.

Tighten the head while tuned to pitch



Tune your banjo to G-tuning.
4th through 1st strings: D, G, B, D.
5th: G-octave.

Tune your banjo to G-tuning (4th through 1st strings: D, G, B, D; 5th: G-octave, matching the first string fretted at the 5th fret).

Continue tightening the bracket nuts a little at a time, until the bridge feet depress the head only slightly, and the banjo has a pleasing tone.

Be careful not to overtighten! A banjo head can be torn or pulled from its mounting band if excessive tension is applied. A tighter head will produce a brighter tone; a slightly looser head will give a darker, more mellow sound with more overtones.

Kit tip

Banjo head material greatly influences the sound of the instrument. Thinner plastic heads generally give a brighter tone, and thicker synthetic or skin heads produce a more mellow tone.

Check the action (string height) at the 12th fret

The slotted 5/8" bridge provided should give approximately the right string action. As supplied, it has no treble or bass side, but you may need to lower the notches slightly.

Be sure the nut is set in place at the peghead. Clamp a capo behind the first fret, and use it to pull the strings down to simulate a fairly low action over the first fret. Now you can measure at the 12th fret to see if the string action is correct. The correct action is a gap of 1/16" to 3/32" between the bottom of the strings 4 through 1 and the top of the 12th fret. The 5th string will be a little lower.

TIP:

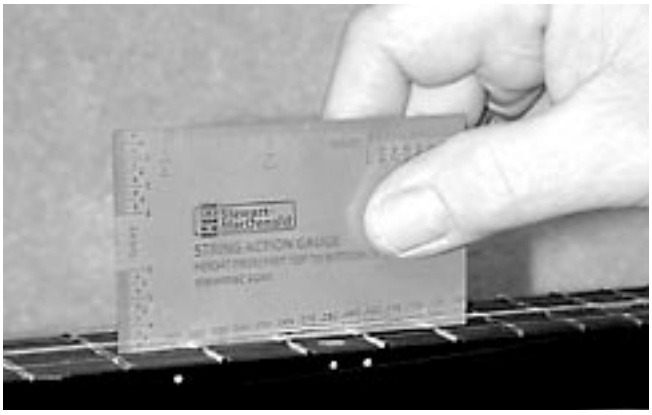
If you don't have a capo, use a pencil and a strong rubber band.

You can adjust the 12th fret action up or down as much as 1/32" by adjusting the inner and outer hex nuts on the rim rod: move both hex nuts toward the tailpiece to push the rim outward and raise the action; move both hex nuts toward the neck to squeeze the rim and lower the action. Be sure both nuts are snug when you complete your adjustments.

Important: Measure the inside diameter of the rim, all the way around, before adjusting the rim rod. After adjusting, measure again. **Do not move the rim more than 1/16" out of round in either direction!**

Remove the capo and lower the string slots in the nut. When the nut slots are at final depth, the bottoms of the string slots should be approximately .010" to .020" taller than the height of the fret. Look for a gap of approximately .015" to .020" between the bottom of the strings and the top of the first fret. You may prefer this string height slightly taller or lower, depending on your playing style.

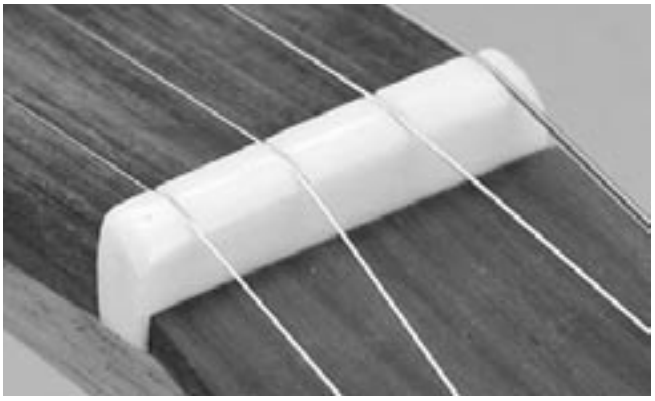
If the slots are much deeper than half the diameter of the strings, remove a little material from the top of the nut. As you file or saw the nut slots, if they get too deep to cut cleanly, stop and remove some excess material from the top of the nut.



Our banjo measured 3/32" under the 4th string, 5/64" under the 1st string, and 3/64" under the 5th string.

Final-shape the nut

When the slots are finished, loosen the strings, remove the nut, and file off any excess nut material. Use a smooth file and 220-grit sandpaper to smooth the nut to its final contours. Put two beads of Titebond glue on the 3/16" area where the nut will sit, and place the nut there. Lightly tension the strings, keeping the nut square. String tension will hold the nut in place while the glue dries.



Smooth and final-shape the nut.

Prepare for finishing

Disassemble the banjo. Final-sand the neck, and mask off the fretboard and the nut. Mask the areas of the rim that will be covered by the tone ring.

The mahogany neck will need grain filler; the rim will not.

There are any number of ways to finish your banjo, from simple to complex. For detailed directions on a variety of finishes, refer to our book #5111 *Guitar Finishing Step By Step*. The following instructions are for creating a plain and simple protective finish that's easy for the first-time builder.

Final sanding

Sand all the wood surfaces (except fretboard) to 320-grit. Dip a rag in warm water, squeeze out the excess, and use the rag to dampen the wood surfaces to be finished (avoid the fretboard playing surface and the area under the tone ring). This will raise the wood fibers. Let the wood dry for an hour or so, and then sand away the raised fibers with 220-grit. Repeat this damp-sanding process a second time. This prevents the wood grain from rising later during finishing, and gives a smoother surface.

Grain filler

We recommend using grain filler in the open wood pores of the mahogany neck, to achieve a smooth surface for finishing. Follow the instructions on the grain filler package. Medium-brown waterbase grain filler is a good choice. It dries fast, so be ready to remove the excess right away. A damp Scotch-Brite scouring pad works well for this. After drying, sand away any remaining filler with 320-grit paper, and then fine-sand with 400-grit. Use the grain filler after the first sealer coat of finish is applied.

Staining

A simple clear finish is easier than staining, but if you want to use color, we recommend our ColorTone Concentrated Liquid Stain. Apply the color on the wood, not in the finish.

Wiping the stain is easiest, but spraying a stain gives more uniform results. The stain will soak into end-grain, especially the contours of the mahogany neck, and can produce a blotchy look. For this reason, finishers often dampen end-grain areas with water before applying the stain, to lessen the absorption.

ColorTone Concentrated Stain in Red Mahogany makes a good stain for both the neck (mahogany) and rim (maple). Hold the bottle upside down and let the stain drop naturally into your mixing cup. Add 50 drops of stain per one ounce of water or alcohol. An ounce of stain is plenty for the neck and rim. Always test on scrap. If you apply the stain by wiping, use a soft, clean rag.

Finish application

If this is your first experience with finishing, we recommend using a brush-on waterbase varnish. Our ColorTone brushing varnish is formulated for this type of finishing. If you use a different product, follow the instructions supplied by the manufacturer. The following steps are for brushing a clear finish with ColorTone brushing varnish.

1. Mix the varnish well prior to use. Stir it gently, and don't shake it (to minimize bubbles).

2. Sand the grain-filled wood with at least 320-grit paper. Remove the dust with a soft cloth (don't use wax/oil tack cloths). Wash the wood surfaces with naphtha or denatured alcohol, to remove any oils.

3. Apply thinned varnish as a sealer; thin it with up to 50 percent water. Scuff-sand the first coat with 320-grit paper and let it dry overnight. Apply 2-3 coats of sealer, two hours apart. Scuff-sand the dried sealer again with 320-grit.

4. Apply the varnish topcoats at a rate of no more than three coats per day, 2-3 hours apart. Coats applied within this time frame will require no sanding between coats. ColorTone brushing varnish can be applied with a brush straight from the can. We recommend a polyester bristle brush, 1-1/2" to 2" wide, available at local hardware stores.

5. Let the finish dry overnight. Sand it with 320-grit, being careful not to sand through–especially if there is color under the finish. Apply three more coats as in step 4.

6. Let the surfaces dry overnight. Attempt a complete level-sanding with 800-grit paper. If this is not possible without sanding through, repeat step 4. When a successful level-sanding is accomplished, brush on two final coats.

7. The finish will cure best in a warm dry area. The final chemical cure takes about 200 hours.

8. Wet-sand the cured finish with 800-grit or finer. Buff with coarse buffing compound, and then with medium compound. Use fine buffing compound for the highest gloss (optional).

Finishing option: aerosol lacquer

Spray three light coats (not too wet-looking) of aerosol spray lacquer, waiting one hour between coats. Let these dry overnight, and then early in the morning "dust-sand" lightly with the same 320-grit sandpaper used earlier to knock-off any raised dust specs. Then spray three heavier, wetter coats, allowing 2-hour drying time between coats. Dry overnight.

Lightly level-sand the next morning. Use a foam backer or felt block with the sandpaper wrapped around it. Sand out some, but not all, imperfections. Try to sand away the "shiny spots," but not entirely. Spray three more wet coats as you did the day before. Let dry for three days.

Sand the lacquer with 800-grit gold Fre-Cut sandpaper until the shiny spots are gone. Then use 0000 steel wool to produce a low-sheen matte finish. (Or, you can sand with 1200 wet-or-dry paper after the 800-grit, and rub the finish to a shine with rubbing compound.)

Congratulations!

Now you're ready to reassemble and string up your banjo and play! We hope it will give you many years of enjoyment.

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