StewMac®

Sheet #i-5371 Updated 11/18

PREMIUM SOLID-WOOD UKULELE KIT

Assembly Instructions

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Tools and supplies

These are the tools and supplies we recommend for assembling this kit. StewMac item numbers are included where applicable.

Tool you will need (required)

Clamps (few are needed, but more are handy)
- 4-6 Small cam clamps (#3721)
- 2 Small sound hole clamps (#2010)
- 20 Mini clamps (2 packs of #3712)

Flat mill file or pillar file (#4175)
Razor knife (#4878)
Small chisel (#1619)
Fine-cut saw (#3617)
Side cutter or fret cutter (#0619)
Hammer for fret installation (#4895)
Micro-Mesh Soft Touch Pads (#3730)
Electric hand drill
1/4" and 1/16" drill bits (#4850, #1710)
Scissors
Straightedge to reach from string nut to bridge (#3850)
Good quality rule accurate to 1/64" (#4905)
18" Rule

Optional tools

Go-bar Deck (#4731)
Laminate Trimmer (#0488)
Flush Trim Bearing + Router Bit (#1298-B, #1298-000)
Fret Beveling File (#3760)

Supplies

Titebond Original Wood Glue (#0620)
- or StewMac Fish Glue (#0702)

StewMac #20 Medium Super Glue (#0020)
Masking tape or low-tack protective tape (#1683)
Double-stick tape (#1689)
Scraps of wood for various clamping cauls and supports
Waxed paper
For body mold:
- 3/4" plywood, 19"x12"
- Four 2-1/2" steel corner braces with mounting screws
- Eight large screw eyes or screw hooks

Sandpaper (#5562 or #5096)
- 60-grit, 80-grit, 120-grit, 220-grit, 320-grit, 400-grit

Sanding blocks (scrap wood or #3701, #3699)
ColorTone Wipe-On Poly Finish (#3622)
ColorTone Liquid Stain (optional)
Steel wool, 0000-gauge
Fretboard oil or lemon oil (#3863 or #3864)
Paste wax, such as car wax
Cotton balls
Scraps of t-shirt material

Welcome to instrument making!

Whether you're a first time builder or an experienced luthier, this kit is a great way to have fun and learn a lot.

This solid-wood ukulele kit will produce a professional quality instrument you will be proud of for decades to come. The design and construction is similar to an acoustic guitar, but faster and easier to build.

This kit can be assembled with basic tools, but we've also shown how to use more specialized lutherie tools in the construction of this ukulele.

When you're done, you'll have an excellent sounding ukulele, and you'll have the necessary skills to start building guitars!

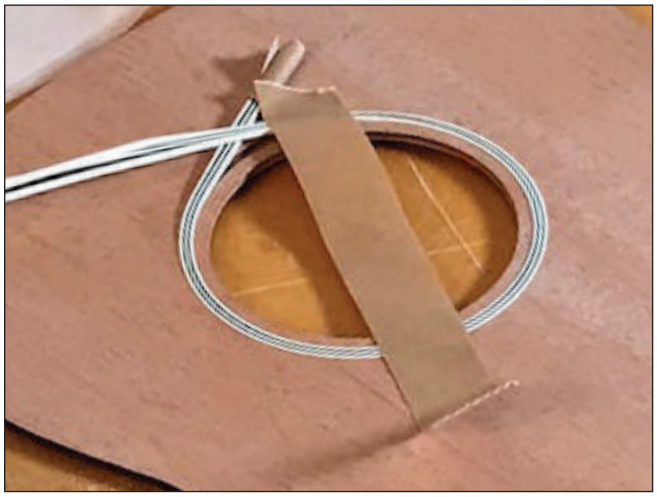
Parts list

Kit contents

Top
Back
Sides
Fully shaped neck
Slotted ebony fretboard
Tuners with mounting hardware
Carved, drilled bridge
Shaped saddle
Rosette purfling
Fretwire
Two back braces
Six top braces
Shaped bridge plate
Lining
Neck block
Tail block
Rubber binding bands
Full-size bracing plan

Installing the rosette

Before we dive into bracing the top of your ukulele we need to install the rosette. Your top has come with a pre-routed channel that the rosette will fit perfectly into.



To get started locate the cream and black purfling pieces. Neatly arrange them in the following configuration: cream / black / cream / black / cream. As you can see it's challenging to align them all neatly, they have a tendency to slide around. To help hold them It is helpful to use a tight piece of masking tape on the end to help keep everything in place.

Once you have them arranged place them in the rosette channel.

Using a razor blade or your fret cutters trim the ends of the rosette. It's not absolutely necessary that the purfling pieces make a perfect join. The upper ring of the rosette will be hidden under the fingerboard extension.

Next remove half the rosette.

Flood the channel with glue (Titebond Original Wood Glue works very well for this application).

Now take your finger and guide the purflings back into the glue filled channel. The glue acts as a lubricant and everything should slide back in place very easily. (Don't worry about the mess, we will clean that up in a second.)

Now remove the purflings from the unglued side and repeat the process. Be sure you remove enough of the purfling so the entire rosette is glued into the channel.

Now we will clean up all the excess glue from the top of the instrument and any that may have got through the soundhole on the inside of the top. (It's a good idea to wipe up any glue that may have got on your workbench as well.)

Now place a sheet of wax paper on your workbench under the top, and one over top the wet glue on your rosette and weight it down with something heavy to dry – a spare 10lb plate does the job nicely, but a heavy book would work equally well.

Let this dry for 2 hours.

After 2 hours, remove the weight and use a sanding block with 120-grit adhesive sandpaper to sand the rosette flush with the top. Be sure to sand in a wide area so you don't accidentally make the top thinner in this area.

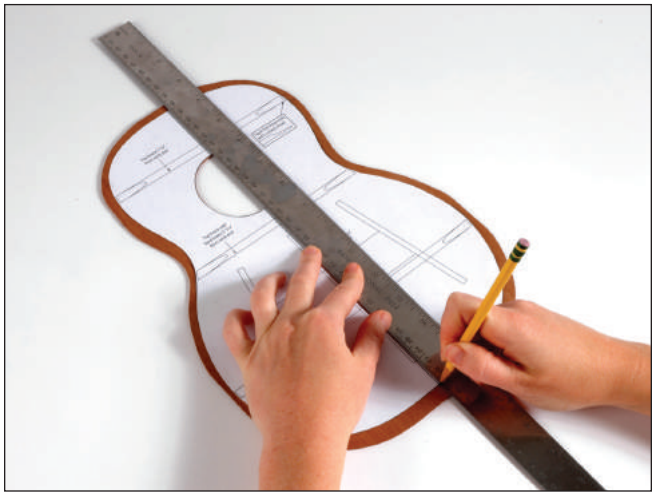
Brace the top and back

Begin by carefully cutting out the plan on or just outside the solid black line that denotes the sides. This can be done with scissors or a razor knife.

Transfer the brace plan to the wood
Mark a centerline precisely on your back plate along the center seam.

Tape your plan carefully to your back plate taking care to ensure the centerlines match perfectly at both ends.

Locate the back braces by using a pushpin, awl or scribe to poke small holes into the wood at the brace ends. The back braces are the two horizontal braces at the waist and lower bout.



Connect these holes with a pencil and straightedge, which will be your marks for where to glue the braces.

Save the plan drawing for use later throughout the build process.

Gluing the back braces
Notice that the bottom of your back braces have a radius. This adds structural integrity to your instrument as well as improves the sound quality.

You can glue each brace separately, or use a Go-bar Deck and a radius dish to clamp more than one brace at a time.

Do a dry run before gluing
It is always a good idea to test your clamping setup before you apply glue. Decide where to place clamps and cauls on your bench, and frequently check to see that the braces are located in the proper location and held down tightly from end to end.

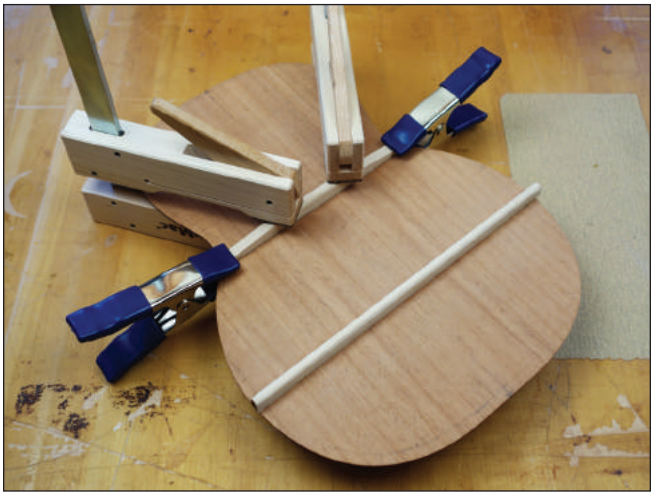
You don't want to figure this out while the glue is drying!

The important thing is that you're comfortable with your clamping plan, and have seen that it works before you're under the time pressure created by wet glue.

Apply the glue
For this application we recommend using Titebond Original Wood Glue or StewMac Fish Glue.

Apply a thin bead of glue to the brace and use your pinky finger to spread an even, thin, film of glue across the entire brace. Quickly wipe your hands with a dry cloth and seat the brace in the proper location.

Start by placing a clamp (or Go-bar) in the center of the brace. Parts tend to skate around during clamp up, so it is always a good idea to ensure your brace hasn't moved from its intended location. If you are using clamps, lightly snug it up once your brace is in place.



Now place a Go-bar or clamp at each end of the brace. (Again, frequently check to ensure your brace hasn't moved during clamp up.)

If you're using clamps, 3 will usually suffice for a ukulele, but if you like feel free to add a couple more for added assurance. Snug them all up. It doesn't take a lot of clamping pressure so there is no need to over tighten your clamps.

If you're using Go-bars feel free to place 2 more bars on the brace for added clamping pressure.

Wait 5 minutes and clean up the squeeze out. (Waiting a few minutes gives the glue a bit of time to gel which makes clean up easier.)

One extremely effective way to clean up squeeze out is to use a scrap piece of spruce that has been sanded into a crude "chisel" blade. The soft wood doesn't dent your brace or leave marks yet cleans up the glue quite nicely. Any remaining glue residue can be wiped away with a damp (NOT wet) cloth rag.

Ensure your brace is seated tightly to the back across the entire length.

Let it dry for 2 hours.

If you are using a Go-bar Deck feel free to go ahead and glue up the other brace in the same manner now. If you're using clamps it's best to wait and install the braces one at a time.

Bracing the top

We are going to begin by locating the position of the top braces similar to the approach we used on the back.

Mark a centerline precisely on the center seam inside your top. (While you had a choice of which side was the exterior on the back of your ukulele, the top has been predetermined since the rosette will be on the face of the instrument.)

Tape your plan carefully to the interior of your top plate taking care to ensure the centerlines match perfectly at both ends, and the soundhole aligns with the drawing.

Locate the upper and mid transverse braces with a pushpin, awl or scribe. These are the long horizontal braces just above and below the sound hole.

Note: The mid transverse brace resides in the same location as one of your back braces, so don't let this confuse you.

Connect these holes with a pencil and straightedge, and you have the brace locations marked for gluing.

Now carefully mark the locations of the bridge plate and 3 vertical fan braces. Once this is done lightly draw the locations of all the braces for your top.

Remove the plan. We will be using it again shortly.

Gluing the top braces

As with the back braces you can glue each brace separately with clamps, or use a Go-bar Deck and a radius dish to clamp more than one brace at a time.

However, unlike your back braces which had a slight radius, you'll notice the top braces are flat. This means that if you're using a Go-bar Deck you'll want to make sure to remove the radius dish and replace it with a flat surface (or flip the radius over and use its flat back.)

Do a dry run before gluing

Getting the brace locations exactly right on the top is critically important to the structural integrity and tone of your instrument. So like you did when gluing the back braces, take a few minutes and do a dry run of your clamping setup before you apply glue.

We recommend starting with the bridge plate first, followed by the fan braces.

If you are using a Go-bar Deck you can probably glue all 3 of the fan braces in place in one session, if you are using clamps it may be better to take them one at a time.

Take your time. There is no rush.

Apply the glue

Let's start with the bridge plate. Put a small dab of glue in the center and use your pinky to spread an even, thin film all the way to the edge. Wipe up any excess glue on your hands and glue that may have run over the edges of your plate.

Precisely locate the bridge plate and apply a clamp or Go-bar to the center. After the clamp is applied carefully recheck the position of the plate and apply additional clamps (or Go-bars).

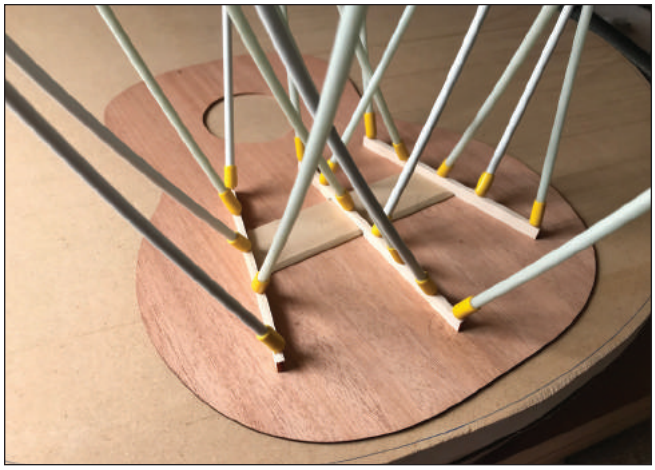
Ensure the bridge plate is seated tightly to the top all the way around. After 5 minutes clean up the squeeze out. Wait 2 hours and remove the clamps.

Now it's time glue in the fan braces. The center fan brace has a notch for the bridge plate. Locate this brace directly on the centerline. Apply glue and lightly clamp it in place.

The two outer fan braces should bump up to the right and left side of the bridge plate. To get the best tone from your instrument is important that the fan braces are all making contact with the bridge plate.

Glue them all in place using the same method we have been using and clean up any squeeze out.

Let them dry for 2 hours and then remove the clamps.



Next glue in the lower transverse brace followed by the upper transverse brace.

Let the braces dry for 2 hours before removing the clamps.

Optional: showing the gluing setup with clamps.

Make the body mold

Now we are going to turn our attention to the ukulele body, and this begins with creating an outside mold.

This is a very simple fixture: a piece of plywood (or MDF) and four 2-1/2" corner braces (angle brackets). It holds the body pieces in shape while you build.

Start with a high quality piece of 3/4" plywood (or MDF), 19"x12". Draw a centerline down the middle of the board.

Tape or spray mount the plan drawing to the plywood, aligning it on the centerline. The bold black line on the plan drawing is the final shape of your uke.

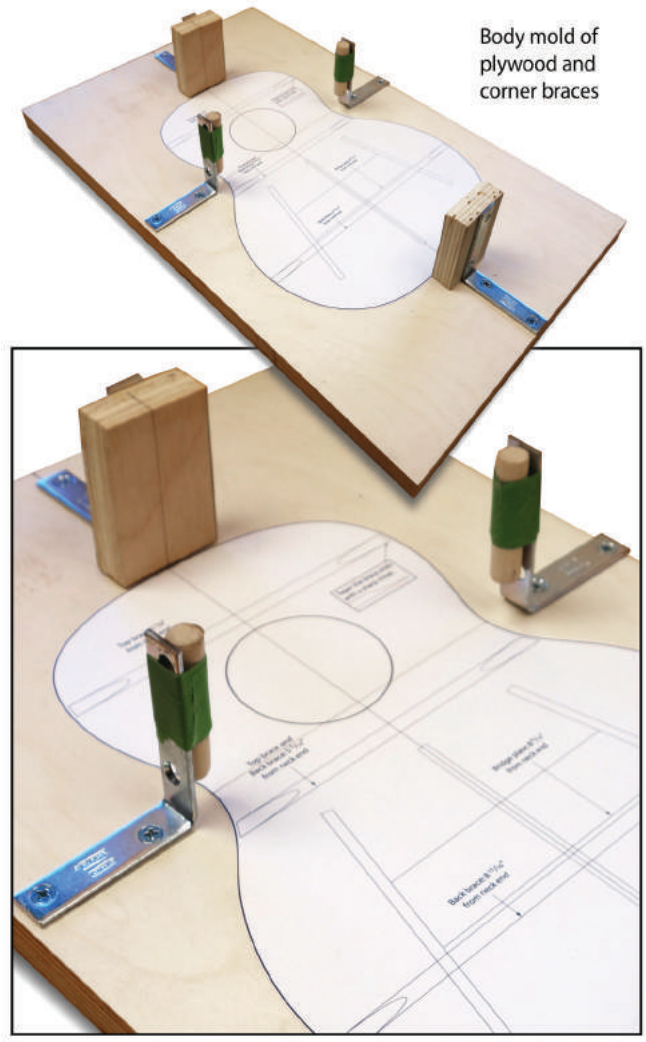
Attach blocks of wood to two of the corner braces, as shown in the photo (below). Screw these two braces to the plywood, on the centerline. Position them so they are against the bold line of the uke shape. These are clamp supports for gluing the neck block and tail block to the sides.

These clamping blocks should be no taller than the sides of the ukulele.

The other two corner braces support the sides at the uke's waist. To avoid metal scarring the mahogany sides, give these brackets some padding. A piece of dowel wrapped in masking tape works well.

Screw these braces to the plywood, positioning them against the uke outline at the waist.

Now we're ready to begin working on the body.



Assemble the body

Place the bent sides into the body mold, with their ends butted together at the center. Now you can see the body of your ukulele taking shape!

If the sides are oversized and extend more than 1/8" past the centerline when you insert them in the mold they will need to be trimmed.

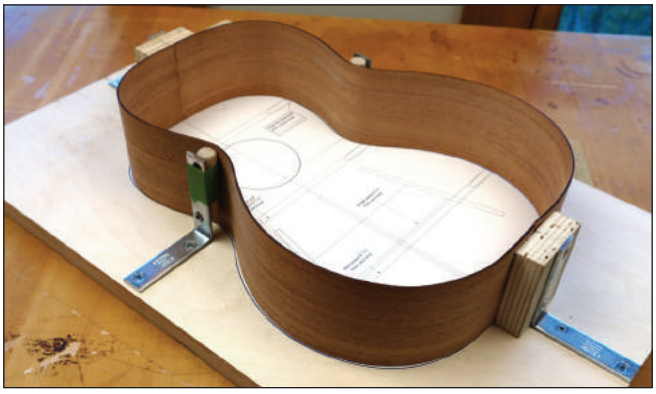
To do this, while holding the sides down firmly in the mold, and ensuring they line up nicely with picture of the sides affixed to your work board, carefully mark the centerline on your side near the headblock. Remove the side, mark a square line and carefully cut this with a saw. (A little double stick tape and a wood block provide a good fence to ensure your cut is square and straight.)

Reinstall the side in the mold. Align the newly trimmed side to the centerline at the neck block, hold the sides down to the work board to ensure they line up with the profile on your plan and mark the centerline at the tail block. Mark and cut the side the same way you made the previous cut.

Repeat the process for the other side.

Now we are going to glue in the neck and end blocks.

Snap the sides into the mold so the neck and tail ends fit end-to-end perfectly. Align the seams to the centerlines marked on your plan.



If the sides don't precisely match the body shape on the plan drawing, don't worry. A little variation between ukes is fine. As long as the side curves match each other nicely, you'll have a great looking instrument.

The corner braces will hold your sides nicely square to the baseboard, so the body doesn't "lean" in one direction. If you like, use a square to double-check this.

The tail block is the smaller of the two blocks, and the neck block has horizontal extensions on both ends.

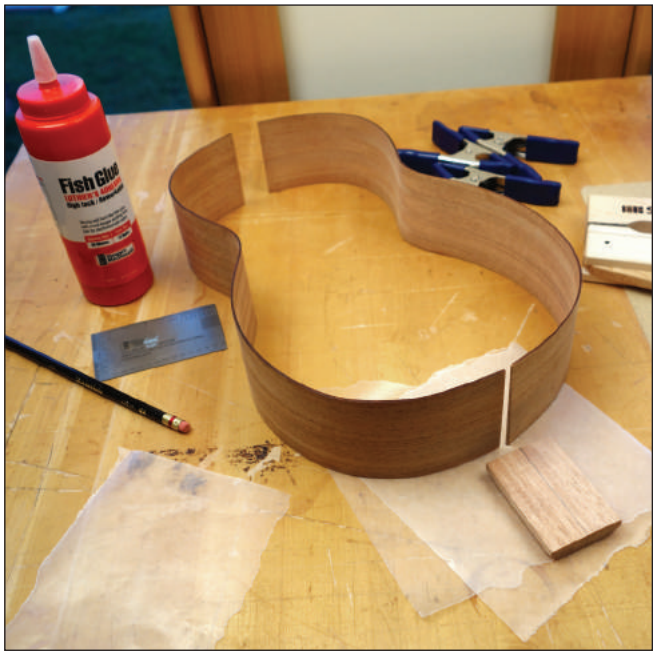
When gluing in the neck block, place the "square" horizontal extension toward the top of the ukulele and the "rounded" extension toward the back of the instrument.

Carefully measure and mark a centerline on both blocks.

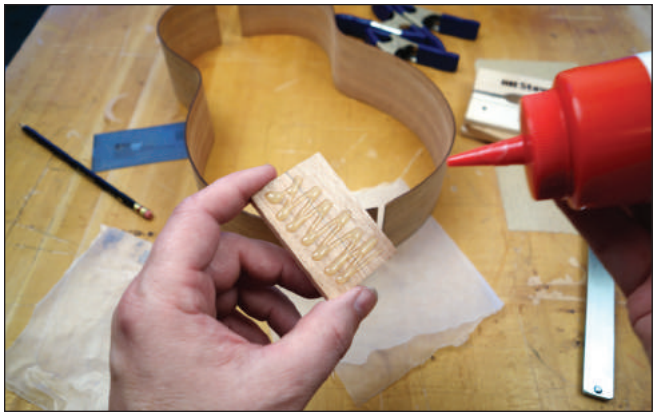
The neck and tail blocks need to be the same height as the sides. If yours are taller than the sides, trim them with a saw or chisel. This is easier to do now than later.

Glue the sides and blocks

You can glue the blocks in using the mold as support, or out of the mold. Each method has pros and cons. Using the mold provides rigidity, however, clamping up outside the mold allows the visibility to ensure everything is aligned perfectly during glue up.

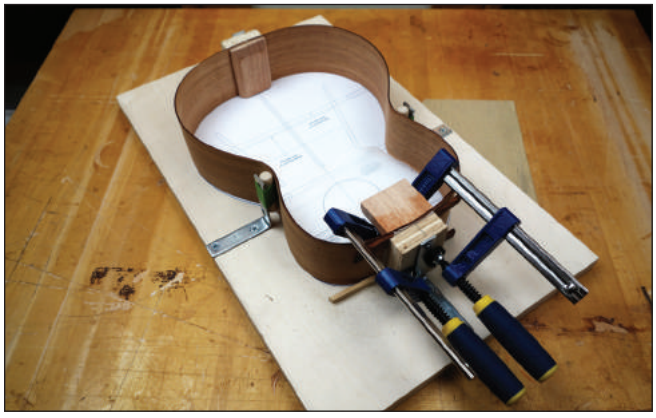


For these instructions, we are going to glue up the tail block outside the mold, and the neck block inside the mold.



When you're comfortable with your clamping setup, put glue on the neck and tail blocks.

Put a little glue on the narrow edges of the sides that butt together, too. If the neck and tail blocks quickly absorb the glue, add more to make sure you have a slightly wet gluing surface. You don't want a glue-starved joint.



Clamp the blocks and sides, and let them dry for 1-2 hours. Use warm water to clean up any glue squeeze out. Titebond and Fish Glue cleans up nicely after 10 - 15 minutes. It is still wet enough to remove, but rubbery enough to make clean up less messy.

Install the linings

The flexible wooden linings will be glued to the edges of the sides, flush with the top and back. These strengthen the body and provide a wider surface for gluing the top and back.

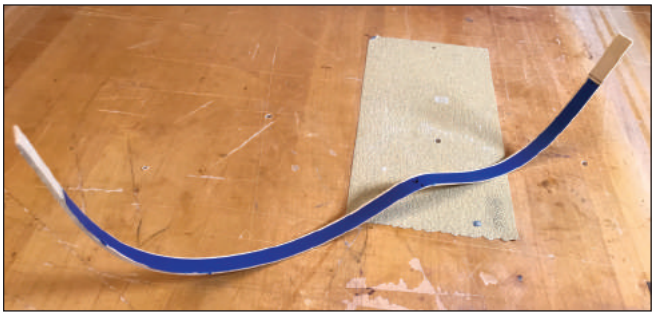
For firm gap-free pressure all along the linings, you'll need at least 12 Mini Clamps for Linings to glue one lining strip. Using even more, closely spaced together, ensures that the linings are pressed to the sides at every point along the curves.

The linings are oversized and will need to be trimmed before glue up.

The easiest way to do this is to carefully install a piece of blue painters tape flush with the top edge of the ukulele's side. Take your time to ensure the tape aligns perfectly with the top edge of the side. Carefully trim the tape exactly where it meets the neck block and the tail block. Before removing the tape, place a visible mark at the apex of the waist.

Remove the tape and align the mark on the tape to the apex of the waist on your pre-bent lining. Carefully align the tape to the top edge of your lining.

At the end of the tape make a pencil line.

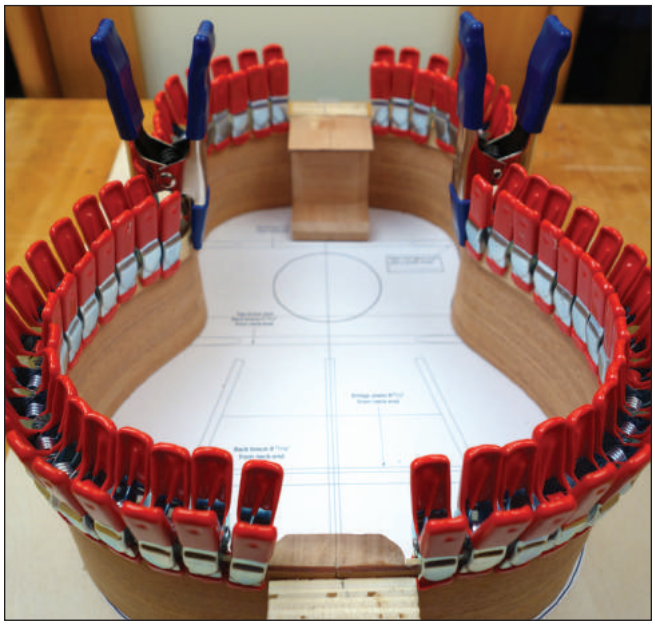


Technically, the pencil line at the ends of the tape should give you a perfect fit. However, due to small errors in alignment of the tape when measuring the sides, and when fitting them to the linings if you cut to the pencil lines the linings will be a smidge too short.

To account for this make a mark 1/16" past the trim line at the ends of the tape, draw a square line and cut the lining at these locations.

Do a dry run of the clamp up before applying glue. Fit the ends of the linings against the neck and tail blocks. Starting at the neck block apply clamps closely working toward the tail block.

Once all the clamps are in inspect the rim carefully to ensure the linings are tight to the sides. If there are no gaps you're ready to glue!



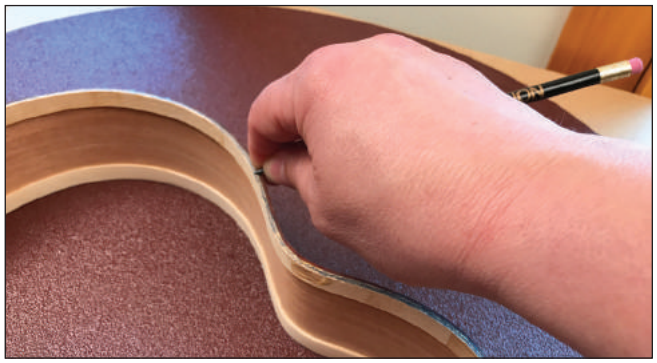
Apply glue to the linings and clamp them. Wait 10 minutes and clean up any squeeze out by gently scraping it away with a razor blade. Any remaining glue marks can be gently scrubbed off with a damp (not wet) cotton rag.

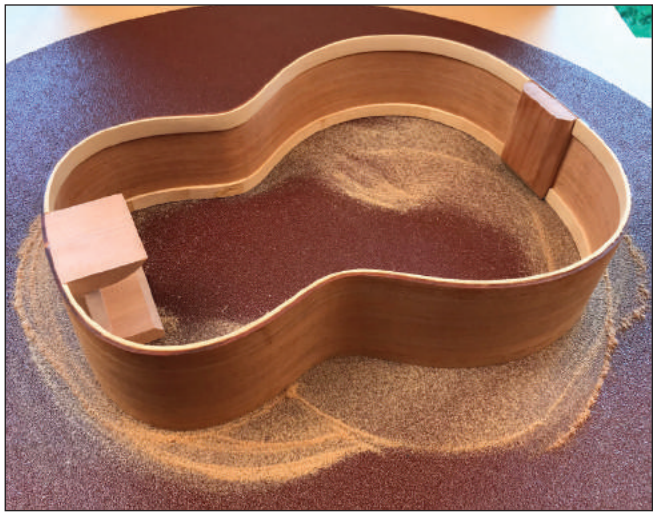
If you have enough clamps you can glue up both halves of the rim at once. Allow them to dry for 1-2 hours before removing the clamps, then turn the sides over in the body mold and glue the linings to the other edge.

Sand the linings flush

The edges of the sides need to be smooth and uniform for gluing the top and back. The easiest way to do this is with adhesive sandpaper taped down to a flat surface (such as a piece of MDF).

Remove the rim from the mold and draw a pencil mark across the face of the blocks and linings. Lightly rotate the rim on the sandpaper until the lines disappear.

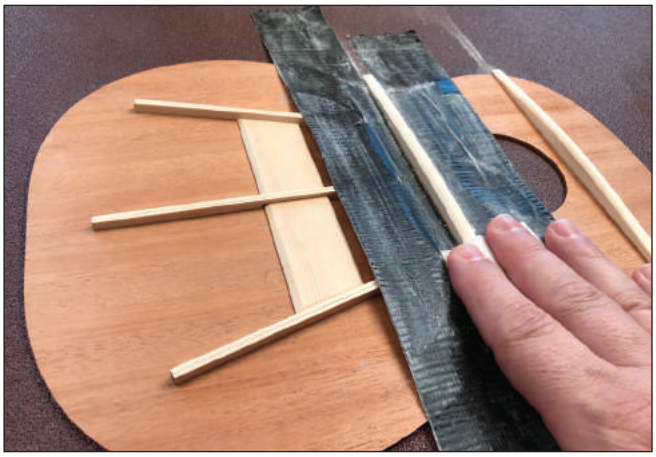




Shaping the Braces

After the glue has dried at least 2 hours, and all the clamps have been removed lightly shape the top and back braces.

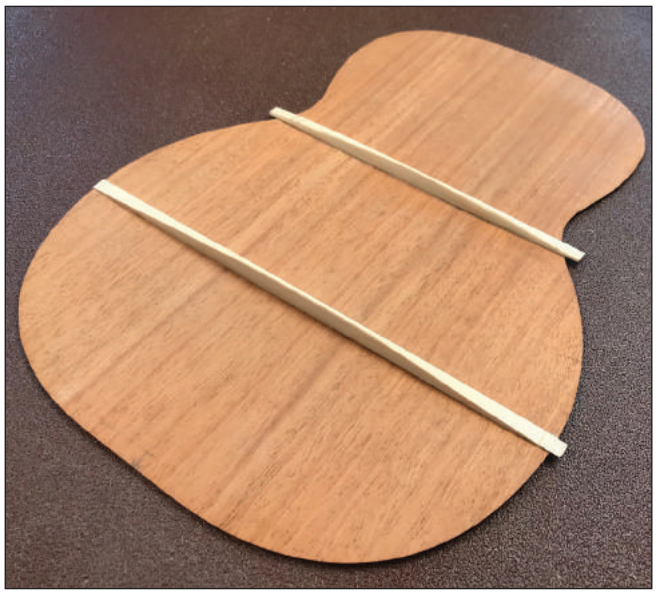
Using a small block of wood with adhesive sandpaper attached lightly round over the top of each brace.



(To keep your work clean and neat, and to protect the top and back plates of your instrument it is helpful to put down protective layers of tape. Simply take regular duct tape or masking tape and stick it to your shirt a few times to remove some of the stickiness and apply it right next to your brace.)

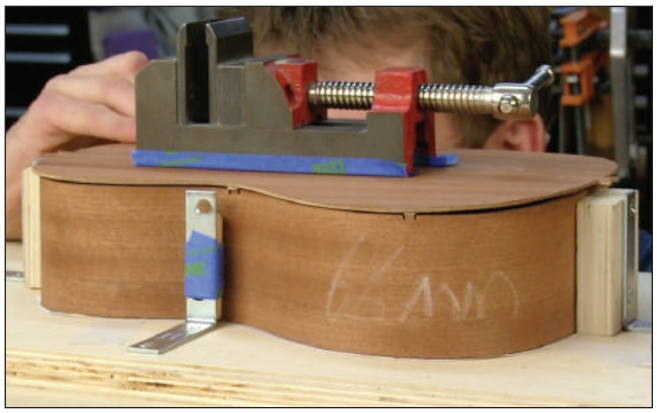
Once the top of your brace has been roughly shaped with the sanding block use a piece of sandpaper between your fingers to round over the top of the brace.

Sand each brace with 80-grit, 120-grit, and 220-grit and try to create an even, uniform, attractive looking brace.



Fit the back to the sides

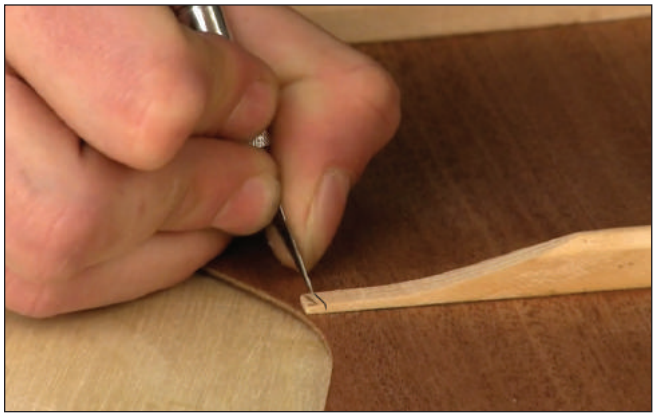
The braces on the back are intentionally longer than the width of the body. When you place the back on, these braces will overhang the sides.



The next step is trimming braces to length, and creating notches in the side linings so the back drops in place.

Place the back in position, aligning it on center. Use a weight to hold it in place. Make small pencil marks on the sides to show where the braces touch. Extend these marks over the edge of the sides and linings.

With a sharp razor knife, cut notches in the linings for the braces. A small chisel is helpful for chipping out the notch. Trim the ends of the braces so they fit within the sides, dropping into the notches. Scrape the trimmed brace ends off the back. When you're done, the back fits flat onto the sides, with the braces keyed into the notches.



The top and back are slightly oversize, with edges that hang over the sides. This overhang will be removed after gluing.

Glue the back on the rim

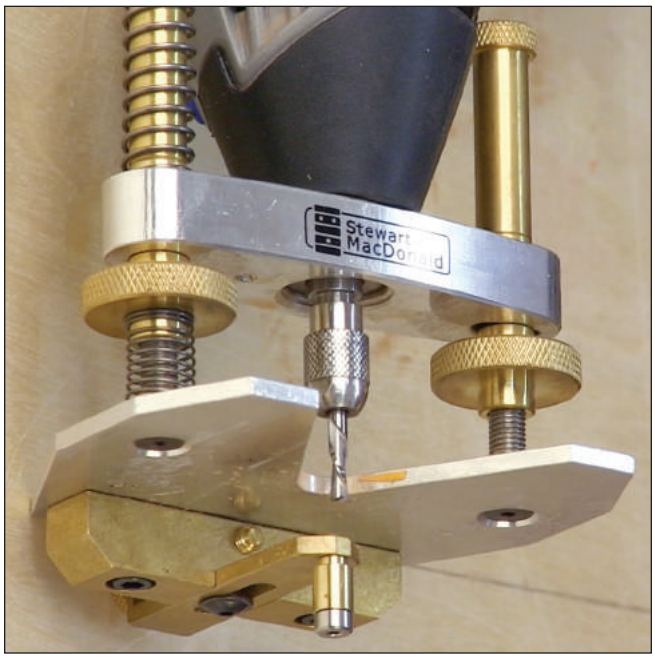
To get good clamping pressure all around the back, the body mold is now put to use again. By adding screw eyes or hooks around the edges of the of the plywood, you can affix the rubber clamping bands included with your kit. If your clamping band is an unbroken loop, cut it to make it one long strip.

Tie the end of the clamping band and stretch it tightly over the body to the opposite corner. Continue strapping from corner to corner until the back is clamped under a web of rubber bands. Tie off the end to one of the screw eyes. Try this as a dry run.

When you're ready for glue, apply it to the edge of the side and lining, and to the end of the neck and tail blocks. Put the back in position and wrap with the rubber clamping band. Let the glue dry for 2 hours, then remove the body from the mold. Clean away any dripped glue, especially where it can be seen through the soundhole of the assembled body.

Trim the overhang

Before you glue the top on, you will need to trim the overhang on the back of your ukulele. This involves cutting the overhang slightly proud of the sides, then sanding away the remainder to make the edges smooth and flush with the sides.



A Dremel rotary tool with StewMac's Precision Router Base and Edge Guide is ideal for trimming the overhang. Use a down-cut router bit to make a clean cut. Rout away most of the overhang, leaving it small enough to remove with sandpaper.

You can also trim the overhang with a sharp razor knife and a flat file. Using the knife, carve away a small bit of wood with each cut, reducing the overhang until it is close to the sides. Follow with the file to bring it close enough to remove with sandpaper.

Beware of tear out. Whether you use a router or a knife, you must pay attention to the grain of the wood on the body curves.

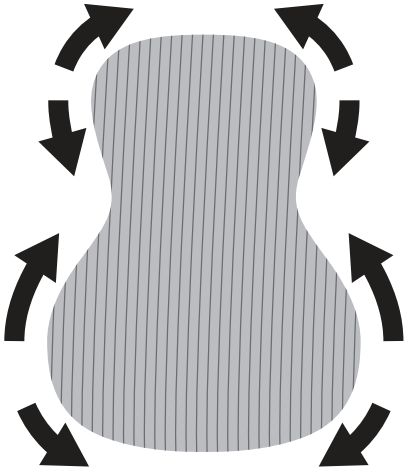
At the curves, a cutting tool working against the grain wants to dig into the wood. This action makes it easy to tear out a chunk of wood.

To avoid tear out, plan your cuts so that the router or knife approaches each curve on its downward slope, rather than climbing upward. The eight arrows on the illustration show the direction to make each cut around the body.

After trimming, the remaining back and top overhang should be very small. You'll remove this with a file and sandpaper.

To avoid tearout, make your cuts on the downward slope of the curve, with the grain.

Don't cut upward against the grain.

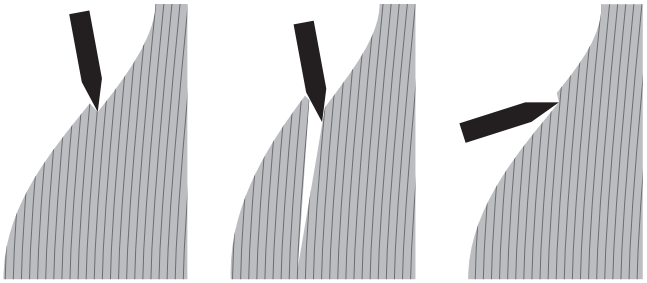


Tearout: accidentally breaking at the grain line

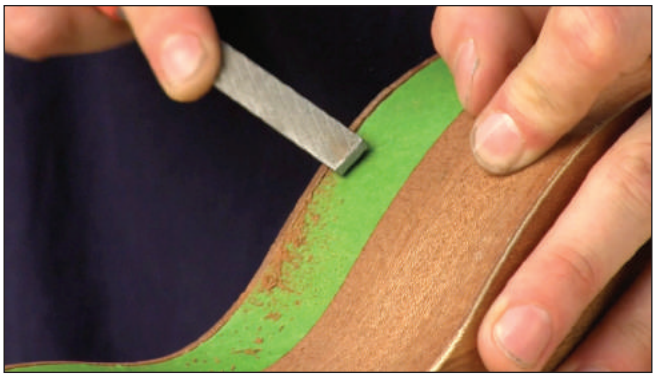
Cutting tool approaching a curve from this direction invites tearout.

Tearout: the wood breaks at the grain.

Cutting from the opposite direction makes tearout much less likely.



Sand the top and back flush with the sides
A flat file will remove the remaining bit of overhang, followed by sandpaper to make a smooth, flush edge.



Put masking tape on the sides to protect them from file marks. Carefully file away the overhang until it's small enough that you feel ready to switch to sandpaper. You might not need the file at all: 120-grit sandpaper may be all you need.

With a flat sanding block, follow the outer curves of the body to flush the edges with the sides. A curved sanding block or a stout wooden dowel makes a good sanding block for the inside curves at the waist.

Don't sand the sides at this point. That comes later. Just make the top and back edges flush with the sides.

Sand until you have a smooth edge all around the uke.

Glue the top on the rim
Now we will fit the top and glue it on.

Reinsert your body back in the mold with the freshly glued on back facing down. Align the centerline with the marks you placed on your end blocks.

Just like with the back braces, we will need to trim and fit the horizontal transverse braces. Perform the same steps you did for the back braces - trim them to length, and create notches in the linings so the top drops in place.

It's very important during this step that the centerline of the top remains on center with the rim. Take your time while notching the braces and gluing up to make sure everything is in the proper location.

Use the same clamping procedure to install the top. Wait at least 2 hours and remove it from the mold and trim the overhang like you did on the back.

Prepare the neck

Install the side dots

The position markers on the side of the fingerboard are made from a small plastic dowel, 1/16" in diameter. The dots are centered between the same frets that have inlaid dots on the board.

Use your scribe, awl or pushpin to mark holes for drilling. Make sure all the holes are centered equally down the side of the board. You might want to put two dots at the 12th fret to indicate the octave; this is optional on a ukulele.

Using a drill with a 1/16" bit, start each hole by briefly running the drill in reverse. This will create an indentation in the wood to center the bit so it doesn't wander when drilling. Hold the drill square to the surface, and drill each hole about 1/8" deep.

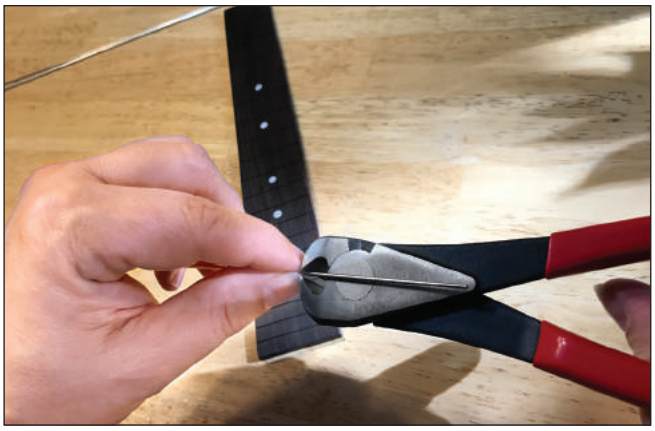
Turn the end of the side dot dowel against a piece of sandpaper to clean up the end so it will slide into the hole. Then dip it in Titebond glue and insert it in the hole.

Wipe away any excess glue, then cut the dowel off at the surface of the wood using fret cutters or side cutters. After installing all the dots, use a file to level them flush with the surface of the wood. The result is a line of small round position markers.

Preparing for fretting

Use a smooth flat work surface. You want a solid table that won't bounce or shake when you tap the frets with a hammer.

Lay the end of the wire over the first fret slot, so it protrudes only very slightly over the edge of the board. Holding the wire down with one hand, cut the fret at the other side of the board. This creates a fret that's cut to length for this slot, with very little extra metal to file away from the ends later.



Use a fret cutter or side cutter to cut the fretwire.

Set the cut fret aside and move on to the next. Fasten a piece of masking tape to your table, sticky side up, to keep your cut frets in order while you work.

Install the frets

The top of the fret is called the crown. The strip that fits into the fret slot is called the tang. Position the first fret so the tang sits on the fret slot. Hold the fret in position by pressing it down at the center with one finger. With a hammer in your other hand, tap the two ends of the fret into the slot.

When the ends are seated in the slot, you can remove your finger and tap down the center of the fret. Do this for each fret down the board.

Any hammer can be used, but a small one, like a fretting hammer, works best. Don't hit the fret or the board hard enough to cause dents.

Glue the frets

Adding medium viscosity superglue under the frets, such as StewMac #20, keeps the frets seated.

Turn the board on its side and run the glue under the fret slots. A small whip tip on the glue bottle will help direct the glue into the fret slot.

After adding glue to each slot, turn the board over and do the same to the other side.

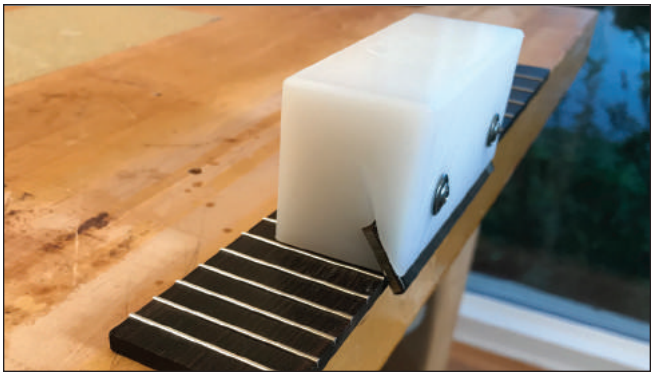
File the fret ends

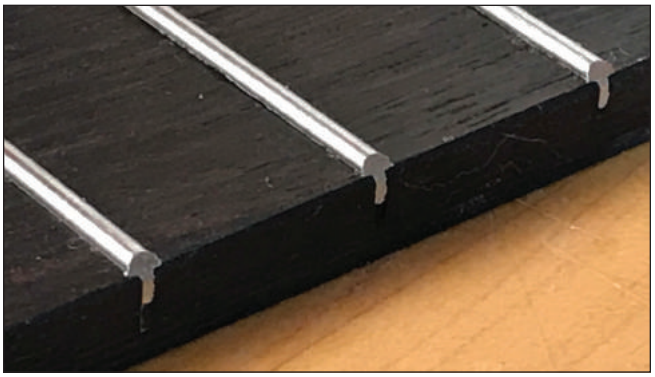
Clamp the fretted fingerboard onto a piece of wood with one edge overhanging. This is a convenient way to file the fret ends. Use cauls to prevent the clamps from damaging the fingerboard.

Using long strokes with a flat file, remove the ends of the frets so they are flush with the fingerboard edge.

A two-handed grip is recommended: it takes firm pressure to file down the fret ends—especially at first, while their cut ends are sharp and uneven.

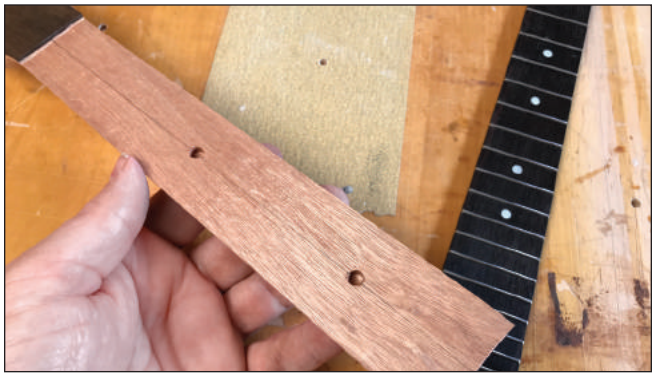
When you've made the fret ends flush, tip your file and give a slight bevel to the fret crowns. This makes the frets more comfortable to play. When the fret ends on one side are smooth, rotate the board and perform the same procedure to the other side. (Optionally you can use a Fret Beveling file – #3760 – to get a perfectly uniform bevel on both sides of your fingerboard.)





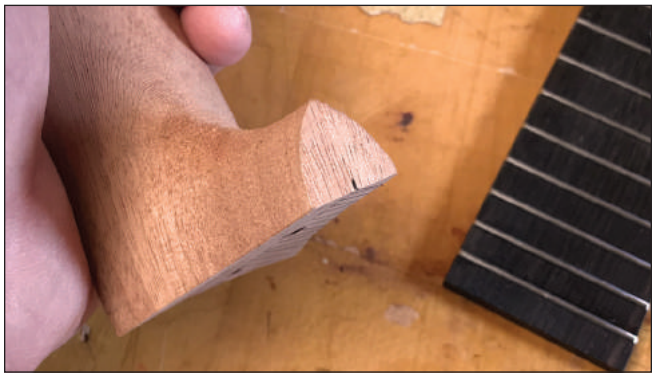
Pre-fit the neck

Now is a good time to pre-fit the neck. Let's start by carefully drawing a centerline down the face of the neck (where the fingerboard will be placed), and extend this line through the underside of the heel (the part of the neck that makes contact with the body).

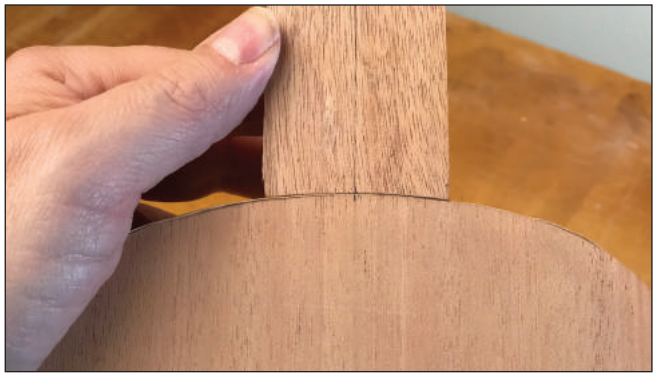


Carefully extend a pencil mark on the heel so you can re-draw a centerline to the underside of the heel as necessary.

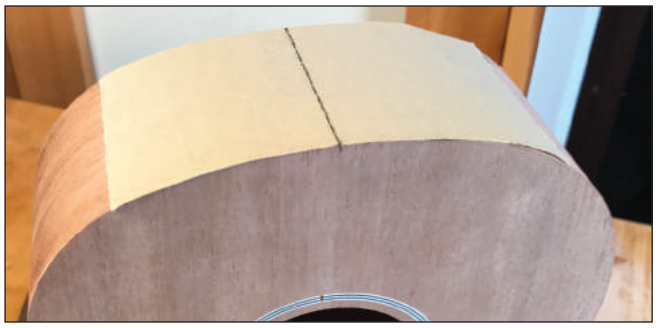
Gently set the neck in position so the centerline on the neck closely aligns with the centerlines on the front and back of the body. Lightly mark the shape of the heel on the body of the instrument.



Now take a rule or straightedge and check to make sure the sides are perfectly flat along the lines you just drew. If they aren't flat use a sanding block affixed with 120-grit sand paper and lightly sand the entire surface of the side (with the grain) until the area where the neck meets the body is dead flat.



Now, affix 80-grit adhesive sandpaper to the body of the instrument and trim off any overhang with an exacto knife or razor blade.



Gently sand the underside of the neck profile on the body taking care to keep the centerlines on the body and neck aligned. (This isn't as hard as it sounds.)

When the bottom of the neck is fully sanded and the cheeks of your neck set flush against the sandpaper your neck has been roughed in and this will allow it to quickly be fine-tuned later just before gluing.

Drill the neck joint

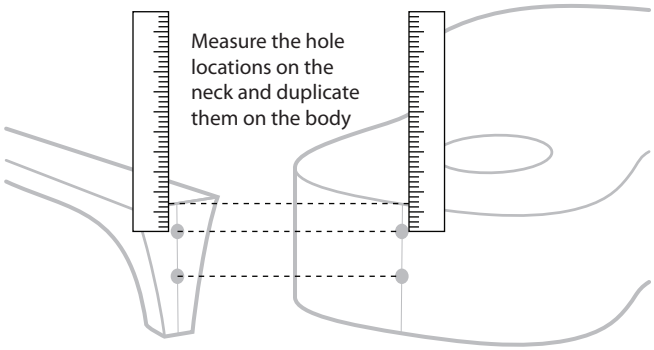
Now let's drill the holes for the neck location.

The neck has two 1/4" diameter holes for the dowels that

support the neck joint. You need to drill matching holes in the body to fit these dowels.

Measure from the top of the neck to find the center of the two dowel holes. Use these measurements to mark and drill matching holes on the body.

After measuring the locations the pins carefully mark them with a pencil and make a deep indentation with a scribe, awl or push pin. This will help keep the drill bit aligned when you drill the hole.



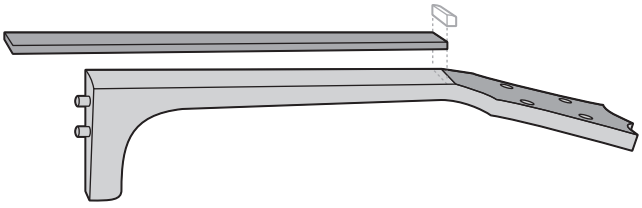
Note: It is possible that the locating holes may not align with the centerline on the body due to small differences in where the holes are drilled on the neck.

Drill the two holes using a 1/4" drill bit. To keep the drill from skating around as you begin drilling the hole, start the drill in reverse until it makes an indentation that will help keep the drill positioned.

Drill them 3/8" deep. (Mark your drill bit with a piece of masking tape to keep from drilling the holes too deep.)

Attach the fingerboard

The nut should seat firmly between the pre-attached headplate and the fingerboard.



Align the nut against the headplate and trace a pencil along the face of the neck to determine the fingerboard location.

Carefully measure and mark a centerline on each end of the fingerboard, and draw a centerline down the back of the fingerboard.

You should already have a centerline drawn on the face of the neck. Carefully mark the underside of the heel with a pencil at the centerline location. This will help you ensure the fingerboard is perfectly aligned on the neck.

Registration pins

It's very important that the fingerboard is perfectly aligned on center to the neck. As you may have experienced parts tend to skate around during glue up.

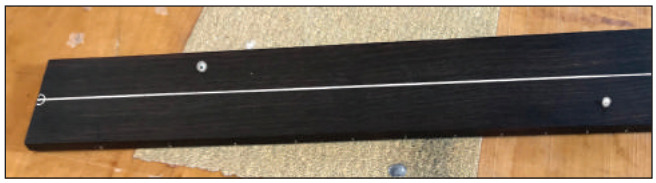
To help with this we can optionally add 2 locating pins in the fingerboard that will hold the fingerboard securely in place during glue up.

You should have excess side dot material left over from an earlier step where we added side position markers to the fingerboard.

Using a 1/16" drill bit carefully drill a hole 1/16" deep in the reverse side of the fingerboard between the 1st and 2nd fret. You want to drill this hole about half way between the centerline and the edge of the fingerboard.

Insert the fret board position marker material in the hole you just drilled and snip it off with 1/8"–3/32" protruding above the fingerboard. (It's not necessary to glue the material in if it fits snugly in the hole.)

Now repeat the process between the 10th and 11th fret.



When this is completed carefully align centerlines you made on the fingerboard with the centerlines drawn on the neck and firmly squeeze the fingerboard onto the neck. (Remember to align it with the pencil mark you made for the nut. It's a good idea to cover the pencil line with finger board. This will ensure the nut fits nice and snug.)

The plastic fingerboard marker material will easily embed into the softer mahogany. These will serve as registration pins to help hold the neck in place during glue up.

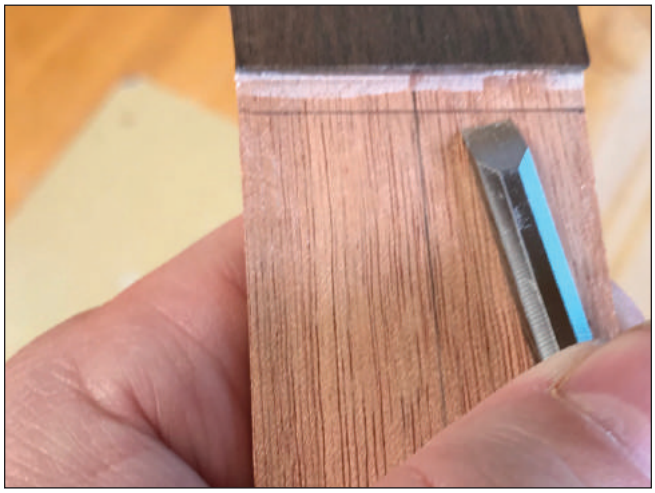
It's important that the fingerboard seats tightly on the neck.

If the registration pins hold the neck up (even the slightest amount) use a file to lightly remove some material from the registration pins until the fingerboard sits dead flat against the neck.

Preparing the nut area

If there is any dried glue squeeze out from where the headplate was applied it is easiest to remove it now before the fingerboard is glued on.

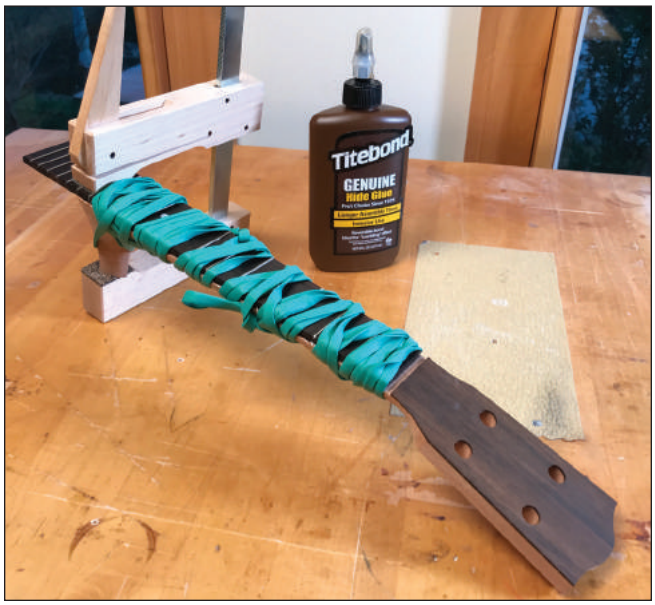
It is easiest to remove this with a very sharp chisel. Simply lay the back of the chisel along the face of the fingerboard and gently remove any dried glue.



Gluing the fingerboard on the neck

Brush glue onto the surface of the neck, and press the fingerboard in place.

Wrap the board tightly with rubber binding bands. Even with the registration pins it is important to check to be sure the board is centered on the neck.



If there is any glue squeeze out in the nut slot or under the fingerboard near the heel wait 5 minutes and clean it up as you did with the braces. (Don't worry about squeeze out along the edges of the fingerboard. We'll clean that up after it is dry.)

Allow the glue to dry overnight.

Smooth the fingerboard/neck transition

The glue joint between the fingerboard and neck needs to be smoothed to get a comfortable transition between the rounded neck and the flat edge of the fingerboard.

Use a flat file and sandpaper to slightly round the fingerboard edge, blending it into the neck. At this stage, you're shaping, not final sanding. Final sanding comes later, as you prepare for finishing.

While filing along the length of the neck, this is a good time to double-check the bevel of your fret ends. When playing the uke, you'll appreciate the feel of the rounded neck blending smoothly into the fingerboard, with comfortably beveled fret ends.

Trim the heel

If the heel of your neck extends past the sides of the ukulele we will need to trim the neck so the heel transitions nicely from the back of the instrument.

Seat the neck into the body using the dowel pins and ensure it is aligned on center.

Mark a line where the heel cap extends past the body.

Extend this pencil line up both sides of the heel so the entire amount to be removed is marked.

Carefully trim off the excess with a saw. You should NOT take the line. We want the heel to remain just a tiny bit proud of the back of the ukulele body after trimming.

Now, take a flat sanding block with 120-grit adhesive sandpaper and sand the transition between the back of the instrument and the heel smooth.

When you're done you should have a flowing surface that extends directly from the back of the body and the neck.

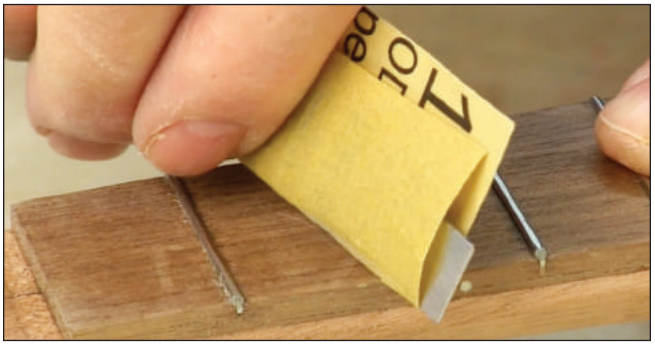
Level the frets

No matter how carefully you've installed the frets, some fret tops will be higher than others.

To level the frets, tape 320- and 400-grit sandpaper to a flat table top. Lay the frets face-down on the 320-grit and slide back and forth to sand them. When all the fret tops have been scuffed by the paper, the frets are level. Follow this with 400-grit paper, sanding gently to remove scratches.

Round the fret ends

The beveled fret ends will have some roughness from filing. 400-grit sandpaper wrapped around a metal ruler makes a good tool for rounding them. Stroke the ends where they meet the fingerboard, rounding them until they feel smooth.



Round the fret tops

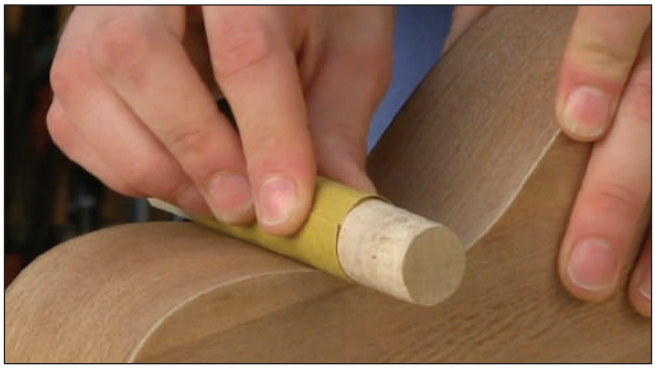
Leveling the frets leaves flat surfaces on the fret tops. Round off these flats using 400-grit sandpaper wrapped around your fingers. Run the sandpaper up and down the fingerboard to smooth the frets. Follow this with 600-grit paper for a nice satin surface.

Sand the body and neck

Sand with 180-grit

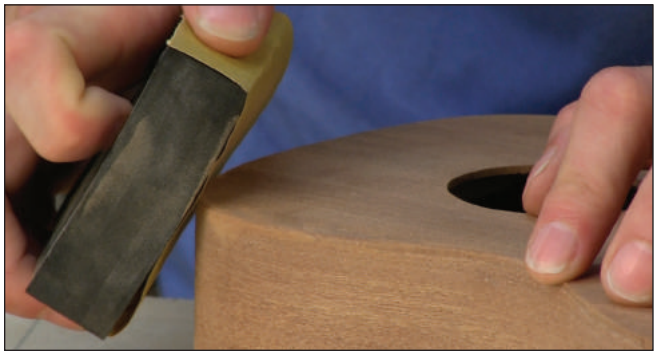
Sand the body using 180-grit sandpaper and a flat sanding block. Make your sanding strokes with the grain direction, not sideways across it. You're looking for and removing any scratches deeper than the grain itself, and a sideways or circular motion will create small new scratches.

A stout wooden dowel makes a good sanding block for the inner curves at the waist.



Other than the top edge directly under the fingerboard, smooth all sharp edges to make them slightly rounded. When edges are too sharp, it's easy to accidentally sand the finish away at those points when you sand between coats. Knock off all sharp edges so they receive and hold a good coat of finish.

Carefully examine your work using glancing light to find any scratches you missed. Continue with the process until all deep scratches are removed.



Raise the grain by damp sanding

Sandpaper cuts away the fuzzy fibers of wood grain. Sanding causes some of these fibers to lay down flat, even though they haven't been removed. When wet finish touches them, the fibers lift up and make your finish feel rough.

Solve this problem by raising the grain with a damp rag. When you're done with the 180-grit sanding, wipe the wood with damp rag (not wet. After the wood dries, you'll feel the roughness of the raised grain.

Sand with 220-grit

Now move on to sanding with 220-grit, which cuts away the fibers raised by the damp rag. Completely sand the body and neck.

Examine your work thoroughly for any scratches that may have been left by the 180-grit sand paper.

Once you're satisfied you've removed all the scratches and everything is smooth, the wood is ready for finish.

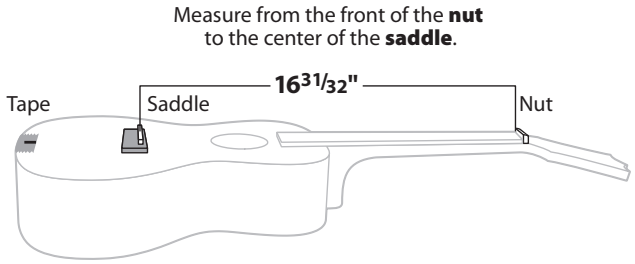
However, before finishing, you will need to establish the bridge location in order to tape off the area where it will be glued later.

Locate the bridge

The bridge needs to be at the correct distance from the nut for your uke to play in tune. We've made locating the bridge very simple: you just need one measurement.

Dry-fit the neck onto the body using one of the neck joint dowels. With a straightedge down the middle of the fingerboard, find the center point on the tail of the uke. Mark this on a piece of tape.

Measure carefully along this centerline to locate the bridge. Start from the end of the fingerboard where it will contact the nut, and measure 16-31/32".

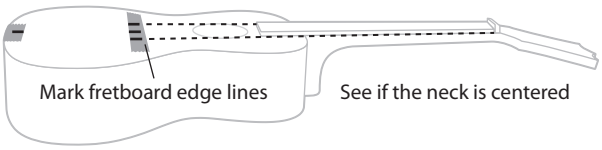


This is the distance from the nut to the center of the saddle. This is a critical measurement so take your time and double and triple check your work. Use a piece of tape to mark this location on the uke. The tape should be longer than the width of the bridge. Line up the edge of this tape with the center of the saddle slot to ensure proper bridge placement. Draw a pencil line from the center of the saddle slot to the edge of the bridge on each side to aid in lining up the bridge. It can be erased later.

Place a piece of tape along the front edge of the bridge while holding it in the proper location. This will mark the location of the bridge, the first piece of tape can be removed. With your straightedge, mark the centerline on this tape.

Center the neck

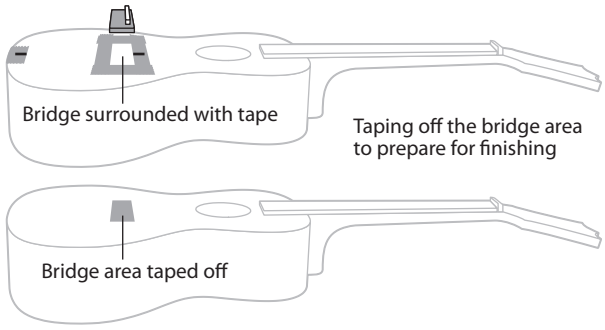
Check to see if the neck is centered. Place the straightedge along both sides of the fretboard and mark the tape at the bridge location. These two marks should equally straddle the centerline that you've already marked. If they're off-center, shift the neck until it's centered.



Small spring clamps through the soundhole can grip the fingerboard to keep the neck in its corrected position while you center the neck.

Tape off the bridge area

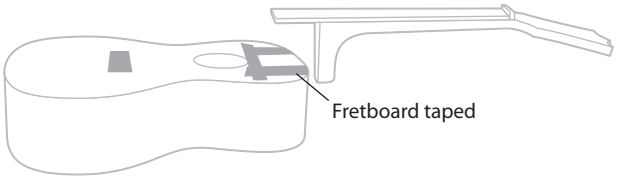
Pencil a centerline on the front edge of the uke bridge, and line the bridge up against the tape that marks your measurement. With the bridge centered and square to the centerline, place masking tape around all four edges.



Remove the bridge, and you've a framed the bridge's "footprint" with masking tape. Cut more tape to exactly fill the inside of this frame. Remove the outer tape. After you've applied the finish, this taped-off bridge area will be left unfinished for good adhesion when you glue the bridge.

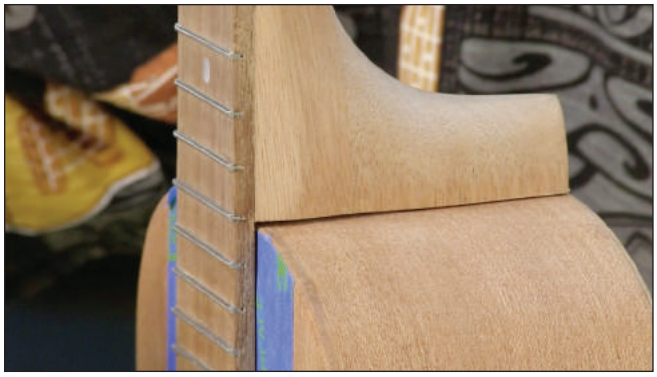
Tape off the fingerboard area

Put tape around the fingerboard extension to create a "frame" around this area also. Before you place tape inside the frame, consider whether your neck joint needs to be adjusted.

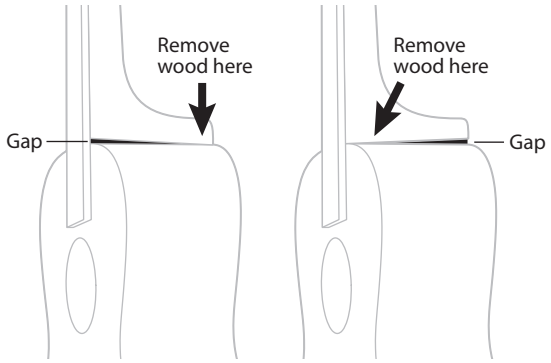


Fitting the neck joint

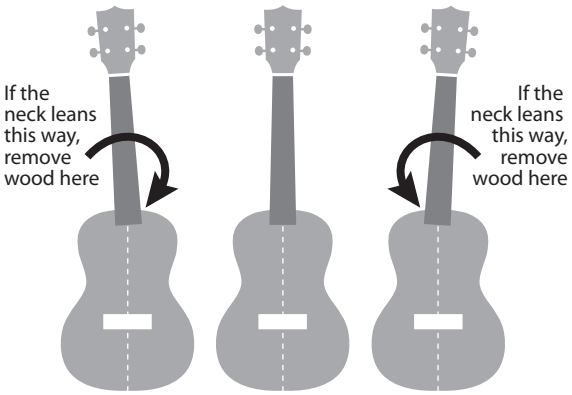
When you dry-fitted the neck, if it needed to be shifted left or right for centering, the neck joint needs to be adjusted. Or, you may find a gap between the neck and the body. This can be caused by any number of things, and it's not hard to correct.



The gap in the photo above can be fixed by removing wood from the heel of the neck. Because the gap is toward the fingerboard, wood needs to be removed from the bottom of the heel. If the gap were ran the opposite way, wood would be removed from the top of the heel.



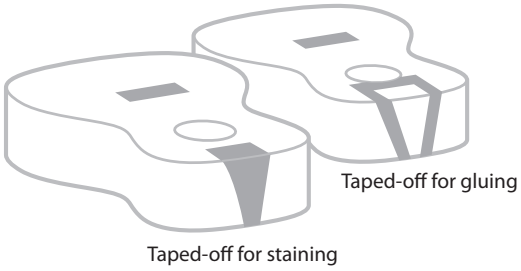
If the neck leans to the left or right, wood needs to be removed from the opposite side of the neck heel.



Remove wood by strip-sanding with 80-Grit sandpaper. Cut a strip of paper to fit under the area you're sanding, and slide it between the neck and body. Hold the neck firmly down onto the body, and pull the sandpaper out. Repeat this until enough wood has been sanded away. Wear gloves to avoid paper cuts from the edge of the sandpaper.

Tape off the neck heel area

Frame the neck heel with masking tape, as you did for the bridge and fingerboard.



The next step depends on whether you're going to stain your ukulele or give it a clear natural finish. If you're staining, tape inside the neck heel and fingerboard extension, then remove the frame of tape. Like the bridge, the neck joint area is now masked to keep it free of stain and finish, for gluing later.

If you're not staining, the frame of tape around the neck joint is ready for gluing the neck.

Apply the stain (optional)

If you're going to stain the wood, do it before attaching the neck. When the neck is on, stain accumulates along the seam where the neck meets the body. To avoid having to remove stain from this crevice, stain the neck and body separately.

If you're choosing an unstained natural finish, you can skip this section on staining and attach the neck.

It's not impossible to have difficulty with stain. Dark spots, light spots or otherwise uneven coverage are possibilities. If you want to follow the easiest, most foolproof path to a finished uke, go with the clear natural finish.

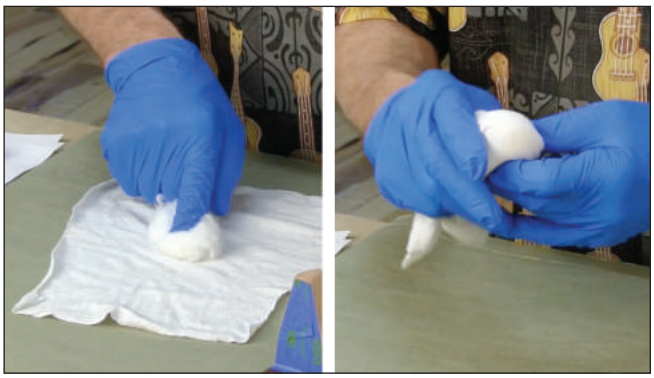
Use ColorTone Liquid Stains to create rich dark browns or vibrant colors. The color in the bottle may be exactly what you want, but don't hesitate to mix colors.

Mix the stain with water

ColorTone Stains are concentrated, so mix them with water. The amount of water and stain depends on the color you're after and the wood you're staining.

Wipe on with cloth-wrapped cotton

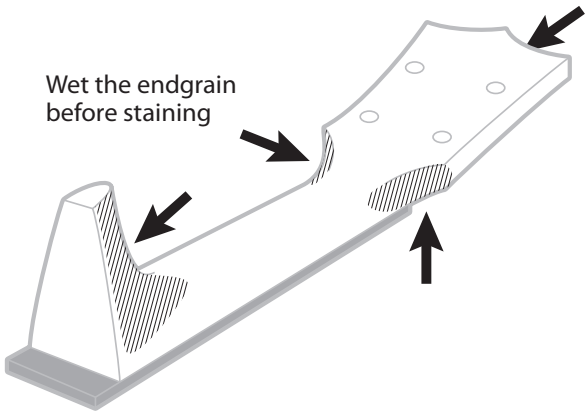
Wrap a ball of cotton in a scrap of t-shirt material to make a pad for staining.



Wet the endgrain with water

Down the length of the neck, the wood grain runs straight. The carved heel and peghead have exposed endgrain, indicated by dark areas in the illustration below. The end of the peghead is endgrain also. These areas will absorb more stain than the straight grain, making them darker.

Compensate for this by wetting these areas with a damp cloth before you begin staining. The damp endgrain will suck up less stain than if it were dry, giving better balance to your stain overall.



Wait until your color is mixed and you're ready to begin staining before you wet the endgrain, so it doesn't have time to dry out.

Wipe on the stain

Wear gloves! Work quickly with the cloth/cotton pad, building the color evenly all over the body and neck. You can go back and apply more stain, and can even darken the edges around the body using a semi-dry staining pad.

Attach the neck

At last, it's time to put the neck on the body! The neck will be held in place during gluing with a rubber binding band. A small clamp will hold the fingerboard extension to the top. This might be the spring clamp used when test-fitting the neck.

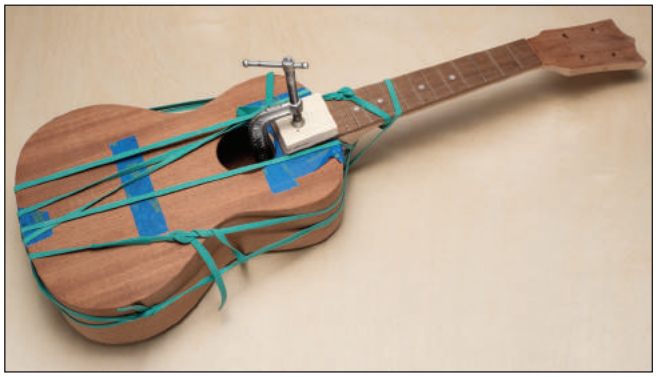
If more pressure is needed on the fingerboard extension, a C-clamp can be used. Use a piece of scrap wood as a caul to protect the frets from the clamp.

Inside the body, the clamp foot will land on the top brace. To best protect the brace from damage, make a caul from a small piece of scrap wood. This caul elevates the clamping surface above the brace allowing the clamp to be applied without interference.

If you stained your uke, apply masking tape again around the neck joint surfaces. Apply glue to the neck heel and fingerboard extension, and to the matching areas on the body. Put glue on the dowels and the holes they fit into.

Clamp the neck in place, checking to make sure it's aligned and centered. Tie the rubber binding band to the neck. Stretch it down over the tail of the uke and back up around the heel of the neck, wrapping tightly.

When the neck is bound with rubber bands, clean away any squeeze out you can reach. Allow to dry overnight (there's a lot of glue in that neck joint).



Apply the finish

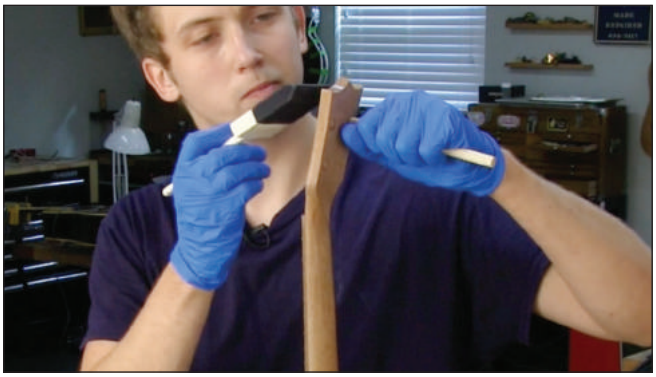
Tape off the fingerboard to avoid getting finish on it. If there is a gap between the neck and body, fill it with ColorTone Grain Filler. A mix of our Mahogany and Ash colors made a good match for the light mahogany of this unstained kit.

Tape off both sides of the gap, then use a knife to press the filler into it. Wipe off the excess with a damp paper towel and peel away the tape. Clean up with paper towel if needed. Allow to dry, then sand with 400-grit paper.

Wear nitrile or other protective gloves when handling the uke now, to keep the surface dry and clean for finishing.

Make a holder peg

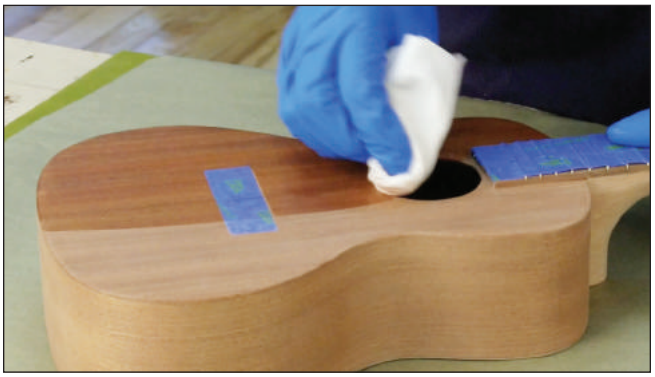
You can hold the uke by the neck while finishing the body, but by the time you're finishing the peghead you'll need a hand grip.



Sand a taper onto the end of a dowel, so it will press-fit into one of the tuner holes, like a violin peg. This gives you a handle while adding the last stroke of finish. You can also clamp this peg to your table when leaving the uke to dry.

Wipe on the first coat

Using ColorTone Wipe-On Poly finish, apply the first coat using the pad made of cotton wrapped in a piece of t-shirt cloth. The wood will soak up this first coat very quickly; it's basically a sealer coat. Allow to dry.



Scuff-sand with 400-grit

When the coat is dry, lightly sand it with 400-grit paper, to remove surface imperfections.

Brush on the second coat

A foam brush lays down more finish than a cloth pad, so brushing builds the finish more quickly while still being very easy to do.

Scuff-sand again with 400-grit

When dry, lightly sand again with 400-grit paper.

Apply the final coat

Add a third coat for a complete finish. Allow to dry for a day.

Shiny or satin?

The finish will have a nice sheen. If you'd rather have a satin look, you can dull the finish by rubbing it with 0000-grade steel wool.

Glue the bridge

Be careful not to install the bridge backwards! The saddle goes toward the neck, and the string tie block goes toward the tail.

Remove the tape from the bridge area and fingerboard. Place the bridge onto its "footprint" and tape around it to catch any glue squeeze out.

Reduce the tackiness of masking tape
Masking tape's adhesive is strong, and contains chemicals that could react with your new finish—so don't leave tape on the finish any longer than you have to. Also, make the tape less tacky by pressing it onto your clothing before applying it.

Dry-run your clamping setup
You can glue the bridge with a single clamp. Protect the top of the bridge with a wooden caul. Apply pressure to the ends of the bridge with small wooden wedges.

Be sure to NOT place the clamp on top of the center fan brace over the bridge patch – this could damage the soft spruce. Instead place the camp just to the right or left of the fan brace.

Glue and clamp up
Apply the glue and clamp the bridge. Clean away squeeze-out, and allow it to dry for 45 minutes.

Install the tuners

Put the tuners in the peghead, and place the washers over the string posts. Add the hex nuts and make them finger-tight. Line the tuners up so they stick out at right angles, not crooked. Use a sharp awl to mark the tuner mounting holes. Drill the pilot holes and install the screws. Use a wrench to tighten the hex nuts on the peghead face.

Fit the nut and saddle

Place a straightedge on the frets, and see where it meets the bridge. It should be roughly at the height of the bridge top.

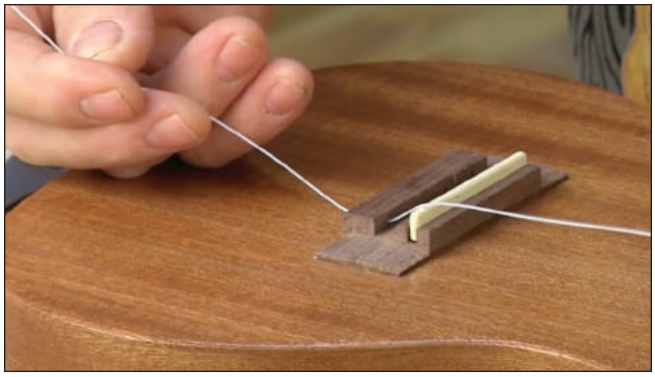
Press the saddle into its slot and rest the straightedge on it. Pretend the straightedge is a string and imagine that string passing over the first fret. Lift the straightedge so it's a little less than 1/16" above the first fret (about .050"). This is a good height for your strings. When the nut is installed, we'll want it to hold the strings at about this height.

Clean up the nut ledge

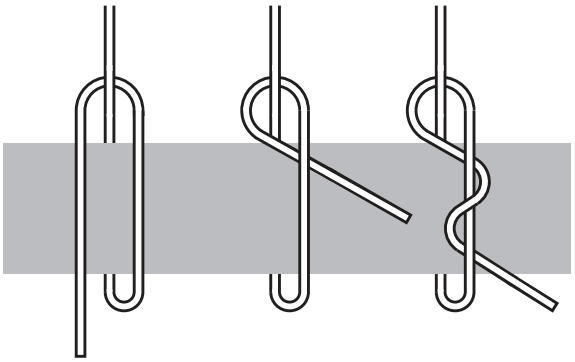
Use sandpaper to be sure the flat area for the nut is level and free of finish. An easy way to do this is to double-stick tape a piece of 220-grit sandpaper to the bottom of the nut and slide it back and forth. Remove the sandpaper and place the nut in position, holding it with a bit of double-stick tape.

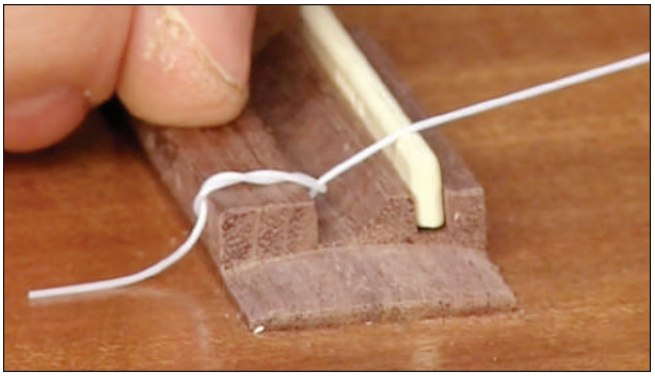
Install the two outside strings

There are four strings on a uke—two thin ones and two thicker ones. The thin ones are the outermost strings. Install these two outer strings so you can check the height of the nut and saddle.



Thread the string through the back of the bridge. Tie it as shown in the three-step drawing below. Draw it tight.





Pull it tight, and the knot holds securely.

When installing all four strings, tuck the tail end of the first string into the wrap of the second string. Continue this pattern for a clean job of stringing the uke.

Uke strings are stretchy. To get them to hold tight to the string post, pass them through the hole, around and through again to create a knot. This is quicker than slowly wrapping many times to get a good grip on the post.

Adjust the nut height

If the string heights are comfortable, you're almost done. If the nut is too high, you can lower it by sanding material off the bottom. Tape sandpaper to your table and slide the nut on it until you've removed enough material. Hold the nut against a piece of wood to keep square. Also smooth and round the ends of the nut on the sandpaper.

If the nut is too low (unlikely), place a thin shim cut from wood or a business card under it to raise it.

Oil the fingerboard and bridge

Before stringing up, wipe the fingerboard with fingerboard oil or lemon oil. Use a Q-tip to do the same for the bridge.

Install the nut

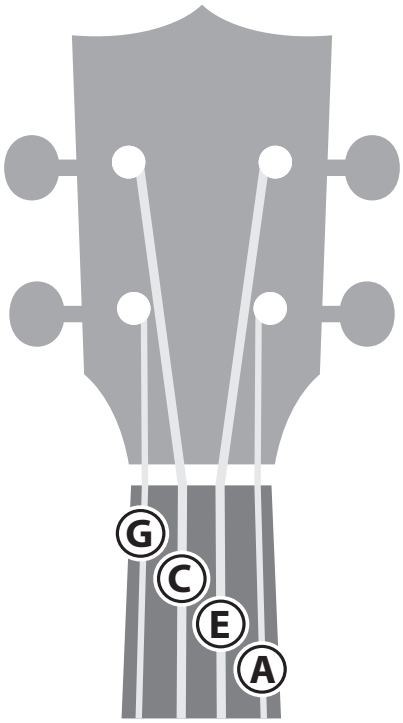
Put a small drop of glue under the nut, and place it in position. The strings will hold it securely.

Install the strings

String up and you're done! Your uke is ready to play.

Tune your uke

The four open strings are **G C E A**. Have fun with your new custom-built uke!



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