U.S. Guitar Kits, Inc.
Assembly Instructions for Acoustic Guitar Kit

Welcome

Thank you for purchasing the kit. All the guitar components needed to build your guitar are included to build a fine instrument. You will need glue, finish, a variety of ordinary woodworking tools and average woodworking skills. Knowledge of the use and sharpening of scrapers is crucial and included is a set of instructions for this tool from a tool supplier.

Please note that although we warrant this kit to be free from defects in materials and workmanship for 30 days from purchase, we cannot guarantee the outcome of your instrument since skill levels vary greatly. If you take your time and follow these instructions precisely and in the order in which they are presented you will be rewarded with an instrument of which you can be proud for a lifetime. Take your time, work carefully. Please keep your kit sealed until ready to use to avoid problems due to moisture and humidity. We will not replace parts that have been affected by moisture.

Always use safe methods while working and employ all safeguards including safety glasses and other personal safety devices.

Tools, Jigs and Materials

- A STRAIGHT straightedge at least 18" long;
- flat scrapers
- a utility knife or sharp ½" chisel;
- a 10mm deep socket with handle or equivalent open end wrench;
- a shot filled hammer with plastic or brass heads (or both);
- a tapered reamer (plumbers reamer)…1/8" to ½"
- a selection of drill bits including 3/8", .065"/1.7mm, .182"/4.6mm, .056"/1.4mm;
- a roll of blue painters tape (or other strong tape that does not leave a residue) OR some (25 to 30) big fat rubber bands measuring at least 16" to 24" long when stretched;
- choice of aliphatic resin (Titebond) or liquid hide glue;
- bottle of slow setting gel cyanoacrylate glue and a bottle of accelerator, de-bonder recommended to un-stick fingers;
- tube of Duco® cement or similar clear plastic-to-wood glue;
- acetone;
- a 20" radius sanding block including 80, 120 & 220 grit adhesive backed sandpaper;
- 400, 600, 1000, 1500 grit sponge sanding pads, higher grit micro-mesh pads are optional depending on the desired sheen of the fingerboard;
- a fret crowning file;
- a small triangular file;
- a bastard mill file;
- a good wipe-on gel finish. Avoid stain and oil finishes and give preference to hard finishes such as lacquer or urethane. Avoid Minwax® (sorry).

A final word before you start- It is highly recommended that you read ALL of the assembly instructions first, then go back and start assembly. Although it may not make sense to you be sure to follow the instructions in precise sequence or you may have to disassemble parts or even start over.

Also, be sure to read and understand the use and care of all tools and wear the proper safety equipment including but not limited to safety glasses, hearing protection and all guards that are part of the equipment used.

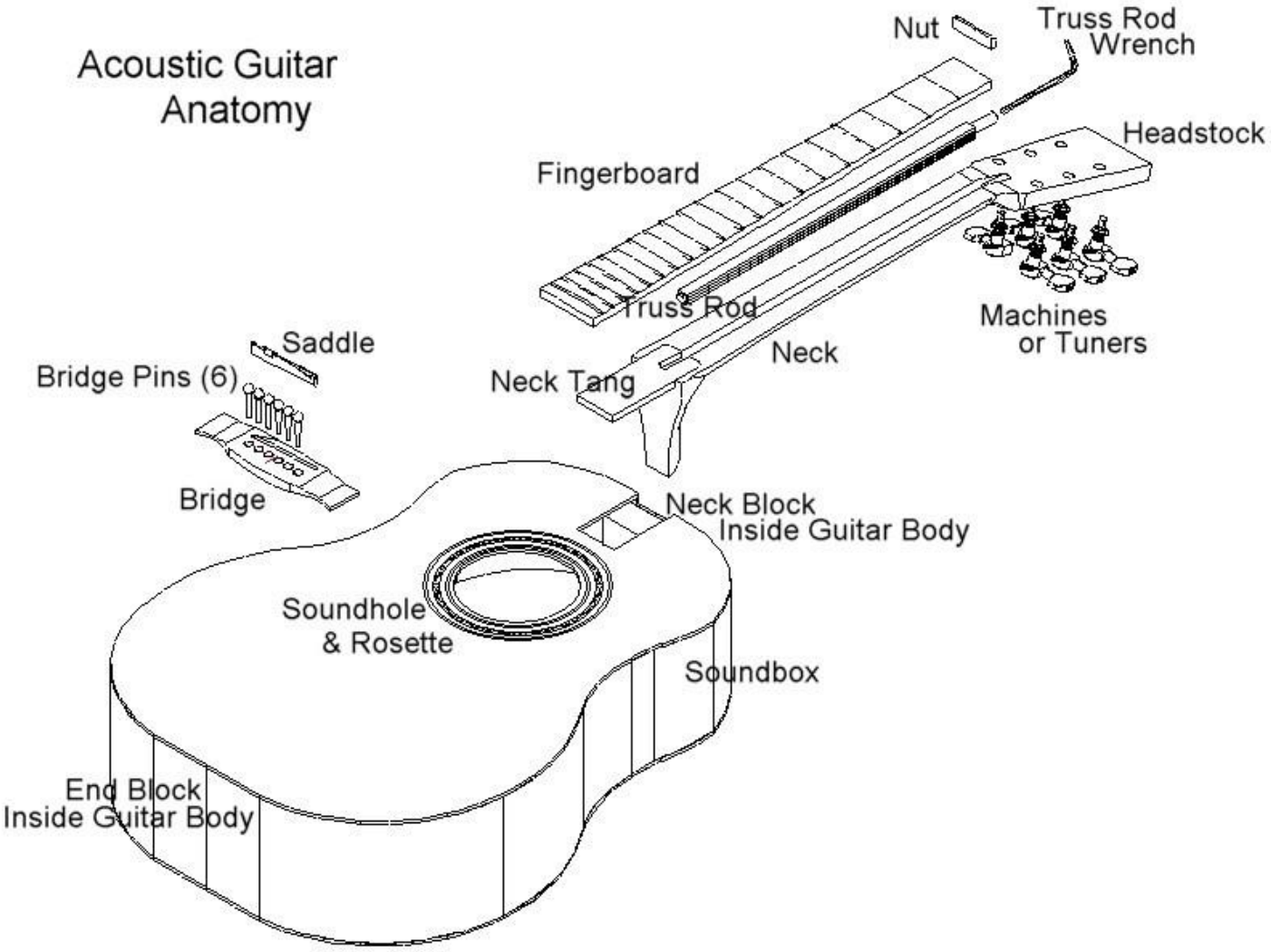
It is important to note that this is a fine project that takes time and very precise measurement. Be sure to take your time on each step and ALWAYS be safe using the tools during your woodworking projects. Also, be in the

right frame of mind where your mind is clear and not distracted. Stay focused and you'll be more likely to remain safe and end up with a nice guitar.

Good Luck!

Guitar Terms & Anatomy

The guitar is made up of several components. The following list is a list of those components that can be cross referenced to the diagram for easy identification.



Not illustrated are:

1) Frets-Hammered/Pressed into the Fingerboard
2) Abalone Dots & 12th Position Marker-Glue into the Fingerboard
3) Kerfed Lining-Pre-glued to inside of soundbox where the sides meet the top & back
4) Bracing-Pre-glued to top & back
5) Binding & Purfling-Glued to the perimeter of top & back where it meets the sides

Section One-Getting Started

Miscellaneous Parts Preparation: There are several small parts that need to be prepared for assembly and can be worked on in no particular order.

1) ***Fit the Machines***
   a. Using a tapered reamer slowly remove enough material to make the machines a press fit. Note: ***Backside of the headstock only!***

   OR

   b. Using a 3/8" non-brad point drill bit and a drill press, center the drill and bore 3/8" deep holes on the ***backside of the headstock***, following the existing holes. ***(DO NOT DRILL ALL THE WAY THROUGH!)***

   Note: Use a drill press to control the depth of cut.
   Tip: Drill a scrap block to determine depth so that machine sits flush in hole.

   IMPORTANT NOTE: DO NOT DRILL HOLES ALL THE WAY THROUGH THE FACE OF THE HEADSTOCK.

2) ***Truss rod fitting***-Make sure the truss rod's flat surface is face up and lay just below flush with the top of the neck. The truss rod should fit without having to jam it in, at the same time, it should not be loose.
3) ***Sand bridge***-Sand the back of the bridge to remove any machine marks and clean the surface with acetone (just before glue up) to remove any oils and create good adhesion for the glue. Break the edges on the rest of the surfaces.
4) ***Sand the Fingerboard***-Sand only the back of the fingerboard to remove any machine marks being careful not to remove any more material than necessary. Also, sand evenly being careful not to sand a twist in the fingerboard. Clean this surface with acetone (just before glue up) to remove any oils and create good adhesion for the glue.

Section Two- Setting the Neck Angle and Gluing the Fingerboard

Step One-Preparing the Neck

The neck is an important step in fitting to the body before the fingerboard is attached. Extra time here will ensure a tight fit between the back of the fingerboard and the top in final assembly, as well as having good playability.

The tang is separate from the neck at this point. Go ahead and hold the neck heel flat against the body of the guitar and hold a straightedge on top of the neck to span the body. The goal is to have the neck "in plane" referring to a straight line running on top of the neck and the top, to the rough location of the bridge.

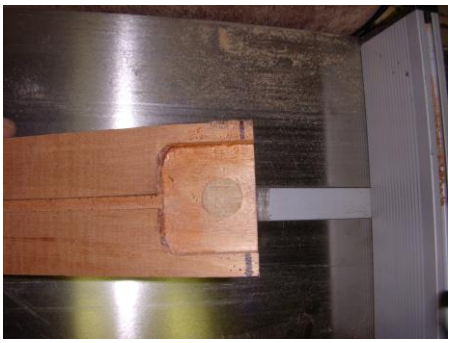
Next, you should place the fingerboard on top of the neck with the bridge in its rough location. Place the straight edge on top of the fingerboard and project it out to the bridge. ***The straight edge should be above the height of the bridge between 1/32" and 3/32".***

See below for details to correct "Pitch Back or Pitch Forward". If sanding is needed, a light touch and careful attention not to sand a twist into the neck. Continue to check progress by attaching the neck and placing a straight edge over the neck and check for "flat" across the top. As a final reality check, bolt the neck on using the two long neck bolts and make the final check.

IMPORTANT NOTE: Mark the top of the neck at the two sides where the tang will be inserted. Make that mark 1/8" back on both sides. These are "witness" marks that are guides that will keep you from sanding one side more than the other.

DISC SANDER INSTRUCTIONS - CORRECTING NECK ANGLE

If you have a disc sander, the below instructions will provide steps to quickly correct the neck angle. The machine setup here is critical to the outcome and improper setup and subsequent sanding could result in an undesirable and irreversible result. Check and double check.

Make some markings on the face to be sanded and two marks at the top of the neck.
Push the neck heel face flat on the sander disk face (***without it on***) and then push the mitre gauge (loose at this point) up against the side of the neck....tighten the angle knob.
This will ensure you will sand the correct angle left to right and not sand a skew.
Set the angle of the table (small increments) and sand a quick witness mark to be sure you're sanding evenly on the neck heel face.

IMPORTANT NOTE: Be sure to initially touch the neck to the heel surface and check that the sanding mark is not just on one side. If this is not correct, it will cause the neck to sit skewed on the body of the guitar.

If the neck is sitting to far back, an adjustment of the table so that the heel closest to the top of the neck is pretty much the only thing being sanded and the bottom of the heel barely gets touched.
Once the bottom of the heel comes in contact with the disk face....STOP...you're there…..re-fit

Pitch Back

If your neck is pitched back and there is a large gap above the bridge and below the straightedge, the neck heel needs to be sanded more at the top of the neck and feathered in to the bottom of the neck heel (little if any off the neck heel). This will allow the neck to rotate forward.
BE SURE TO SAND FLAT AND EVENLY! When you dry fit the neck, it should NOT rock in the middle of the neck heel…you have hump in the middle….flatten out the middle…..re-fit.

Pitch Forward

If your neck is pitched forward and the straight edge hits below the height of the bridge, the neck needs to be sanded more at the bottom of the neck heel (and little if any off the top of the neck heel.) Make a mark 1/16" back on the neck heel face. Use that line as a reference to sand back to.

BE SURE TO SAND FLAT AND EVENLY! When you dry fit the neck, it should NOT rock in the middle of the neck heel…you have hump in the middle….flatten out the middle…..re-fit.

Neck Bolt Tip

You may need to open the holes on the body where the neck bolts go through. Do not use a bigger drill bit as that could oversize the hole too much. Use a small file to elongate the hole either up or down depending on whether the neck needs to shift up or down a little bit.

As a final test, bolt the neck on and dry fit the fingerboard and bridge. Using the straightedge laid on top of the fingerboard, project that line to the bridge which should be at the same height or just above (between 1/16" and 3/32"). Continue to make adjustments to get within this tolerance.

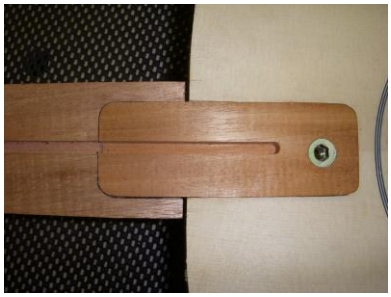
The fingerboard should be able to lie flat on the top of the neck and the (body) top without any gap under the fingerboard. If there is a gap, the pocket may need to be lowered. ***See High Tang/In Plane – Next page.***

Insert Neck Tang

Once the neck is "in plane" glue in the neck tang. Be sure it clamps flat and does not "creep" out while gluing.

"Creep" is when a glue joint moves during the gluing and clamping process. It is important to have straight downward clamping pressure and not clamping at an angle. Angled clamping pressure can often slowly pull pieces away from each other during a glue up.

NOTE: You may find that if you change the neck angle, the neck tang may be too long and push the neck away from the body (shown in picture). Simply shorten the length of the neck tang on the end that fits into the neck. Be sure to sand this evenly so that the tang fits nicely into the neck pocket.



High Tang/In Plane Note: You will also need to be sure the bottom of the tang mortise is at the same height as the mortise in the body. If they are not equal, set up a router with a straight bit and freehand the groove staying away from the sides of the mortise. Clean up cut with a chisel. Typically, the body mortise would need to be lowered by a very small amount….1/32" to 1/16".

Test Fitting

Once you have everything where you like it, bolt it all together in a dry fit and sand the top of the neck tang flush with the top. Do one final check using the straightedge on the fingerboard and check the tolerance over the bridge. Do not proceed unless this is within tolerance.

Important Neck Angle Troubleshooting & Support

As each kit may vary slightly, it is important to get the neck in "plane" with the top. If this step is rushed without careful attention to detail, setup for good playability in the later steps will be very difficult to correct at that time.

If you encounter an issue that you are not comfortable troubleshooting, please e-mail us a digital picture to info@usguitarkits.com with a description and we will contact you immediately to get you back on track. Our goal is to ensure 100% customer satisfaction.

Step Two- Gluing the Fingerboard

1) Locate the Truss Rod.
    a. The truss rod is a threaded steel rod embedded in a square aluminum channel. It strengthens the neck and also allows the counteraction of string tension over time. Make sure there is no tension on the rod by turning the nut counterclockwise until you feel it is free.
2) Fit the Truss Rod.
    a. Insert the truss rod into the slot on the neck. Install it so that the allen key adjuster is towards the headstock and is bottomed out in the slot. Do not allow the truss rod to extend into the headstock. The fit should be snug but not too tight. If it is too tight, carefully open the slot with a file or sandpaper. Ultimately the truss rod should be flush or slightly below the surface of the neck. Some trimming of the bottom of the truss rod slot may be required to "seat" the rod so that it sits at or just below flush.

3) Locate the fingerboard.
    a. Be sure to cut off excess scrap at the nut end of the fingerboard.
    b. Place the narrow edge at the top of the neck against the nut, center it carefully along the length of the neck.
    c. Be sure the neck has been sanded to remove any machine marks.
    d. Use acetone and a rag to wipe the back of the fingerboard just before the final glue up.
        i. Use caution when using or disposing of any hazardous materials.

4) Locate the String Nut.
    a. The Nut. A small piece of hard material with 6 slots in it. Place it temporarily on the neck against the headstock veneer. Use the nut to hide the seam in the headstock. Be sure it lays flat.
    b. Remove the Nut and mark the neck in pencil.

c. With the fingerboard still in place, place a piece of blue tape right up to the end of the fingerboard. This now becomes your glue line and any glue that squeezes out will be removed with the tape.
d. With the fingerboard still in place, make a pencil outline where the tang is not in contact with the fingerboard. Also, mark where the threaded inset would be on the back of the fingerboard. You don't want a lot of extra glue filling up the threads of the insert.

5) Glue the Fingerboard.

a. ***<u>Glue both surfaces. Fingerboard and Neck.</u>***
b. No glue down the center of the fingerboard
c. No glue at the threaded insert location of the neck tang.
d. Cover the truss rod with a length of masking tape then apply glue <u>sparingly</u> to the remainder of the neck surface. The masking tape is to avoid getting glue on the truss rod which must act freely in order to work.

<u>NOTE:</u> Before placing the fingerboard on the neck REMOVE the tape used to prevent glue from getting on the truss rod.

6) Replace the fingerboard on the neck and using the plastic wire ties or c-clamps with a caul and anchor the fingerboard securely until the glue sets. A perfect amount of glue will show itself as tiny dots of squeezeout along the entire length of the fingerboard on both sides. *Rather than wiping off glue squeezeout wait a little while until it starts to set and then scrape it off. If you use hide glue allow it to dry completely then scrape it off. This will avoid finishing problems later.*
7) Set this assembly aside to dry and let it dry for at least 1-2 hours. (assuming aliphatic resin-white or yellow glue)

Section Three-The Body Work

Step Three-Gluing the Bindings and Purfling

Note: All the layers of the "purfling" are attached to one another on one end. Before trying to glue all of the layers of the "purfling" and the binding for the top at the same time, unravel the "purfling" layers and run them through your fingertips tape them to a flat board or let them hang freely for a day or two to "relax".

1) Make a clean 90 degree angle cut on one end of the binding. Get your Duco cement, binding, and blue tape close by. Starting at the top, middle of the back, begin by sparingly applying glue into about 3" of the rabbet. Fit the binding into the channel then tape it firmly in place. Continue gluing & taping until you go all the way around the guitar. Don't stretch the binding. Take a few of those big rubber bands (if you have them) and stretch them around the waist (narrow part) of the body. If you do not have rubber bands, use plenty of blue tape at the waist of the guitar. Check for any gaps between the body and binding, and then check again. Proceed around the guitar, and finish where you started, cutting a tight butt joint to hide the joint. (See Special Tip)
2) Allow the glue to dry overnight.

Note: The gluing section must be completed in a single session.

Special Tip: Pour enough acetone to cover a small pile of binding shavings in a small container. (one color only…white or black). The acetone will melt the binding shavings and can be poured/placed in the butt joint seam. Allow it to dry and sand flush for a vanishing joint.

Remove tape and scrape binding flush with the back and sides. Instruction sheet available for reference.

This will take a good amount of time and where the most noticeable details can be found on your instrument. So, take your time.

Note: While scraping, be sure to scrape only the binding and **NOT** the sides or back veneer. The veneer is thin and scraping through will leave you with a noticeable mistake. Some finishing tricks can be performed to hide a small problem but try not to do this.

Section Four-Mark and glue the bridge, finish prep the neck.

Bridge Locator Jig

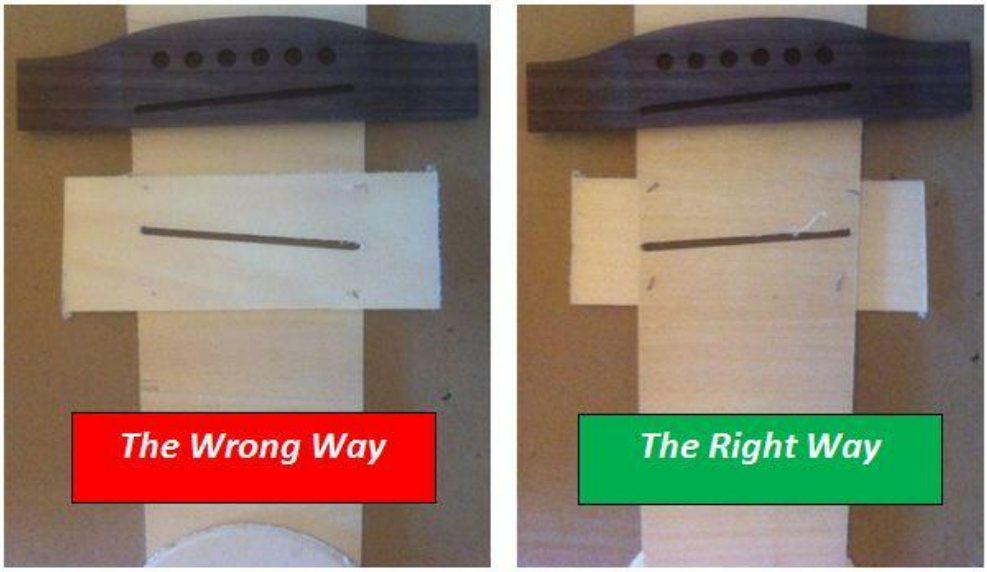
The bridge location is another critical step. There are several books, articles and tools to read up on to better understand this process. The key is to simply understand the distance from the nut to the twelfth fret needs to be equal to the distance from the twelfth fret to the saddle with "compensation".

It is important to use the tool provided to ensure you have the right overall scale length of 25.6". The bridge locator tool can be used to place either left of right hand guitars. However, the Bridge Locator Tool pictured below is to show the correct use and orientation, based on a Right Hand guitar.

Note Left Handed Changes: If you want to build a Left Handed guitar, you must put on a left handed bridge and saddle as well as a left handed nut. You can re-produce the Nut very easily with a piece of bone or corian or other dense material. Contact info@usguitarkits.com and we can supply a left handed bridge and saddle in exchange for the right handed bridge, saddle and nut.

Important Step

Be sure to review the pictures below and understand the slot in the bridge should be parallel to the slot in the jig.

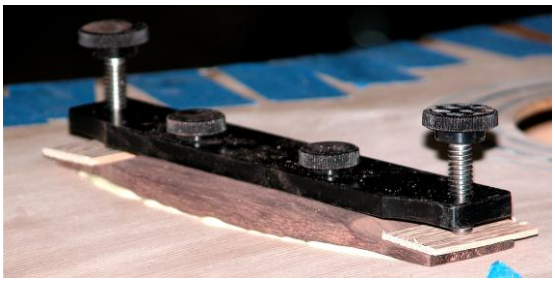


Step One-Marking and Gluing the Bridge

1) With the neck attached to the body, place a straight edge on the side of the fingerboard and draw a light pencil line in the rough location of the bridge.
2) Using an awl or a nail, push a small hole through the center of the one and six position on the bridge ***(off the body)***.
3) The kit comes with a bridge locator tool. This tool sets the scale length by positioning it with the end of the fingerboard (nut end) and allowing the slot in the tool to align with the bridge saddle.
4) Set up the bridge locator tool so the saddle will fit through the jig and into the bridge saddle position and the other end zeros out and the nut position.
5) Mark the one and six location through the bridge and onto the body and be sure to center the bridge left to right using the initial marks from the straight edge in step one to ensure the strings will be centered across the fingerboard.

   Note: These are important steps to be sure the bridge locates such that the strings center up on the fingerboard. If the bridge locates to one side or the other, the strings could actually run off the fingerboard at the higher frets.

6) Tape the bridge in place temporarily while holes are drilled using the .182”/4.6mm bit, through the bridge pins holes at the first and sixth string locations.
7) Remove the bridge and sand the entire top.



STOP! See Finishing on p26.

8) Apply acetone to a rag and wipe the back of the bridge to clean it and remove any natural oils. Let it dry for a few minutes.
9) Apply glue to back of bridge and use the bridge clamp to locate the bridge and tighten the wing-nuts and thumb screws securely.

   Note: Be sure to use 1/8” scraps between the thumb screws and the bridge to eliminate any damage to the bridge.

DO NOT OVERTIGHTEN!!!!!

Section Five-Preparing the Fingerboard, Inlays & Leveling the Fingerboard

The fingerboard is the heart of the guitar. If it, along with the associated work, is not *perfect* the guitar will not play in tune with itself.

Your fingerboard is made from rosewood and has been slotted, but requires some handwork to complete.

Step One-Fingerboard Shaping and Inlay Installation

1) ***Sand the Fretboard Radius***
    a. Using a 20" radius sanding block with 80 grit sandpaper, begin sanding until a radius is formed the length of the fingerboard.

Important Note: You can sand the radius on the fingerboard with the neck off the guitar. However, use the jigs shown on page 19 to support the fingerboard at the high frets. Not supporting the end of the fingerboard while applying sanding pressure, could break the last two frets completely off the fingerboard. Use the jig!

Important Note: Continue checking the radius by citing down both ends of the fingerboard being careful NOT to sand too much off one side or the other. It must be even and straight.

Important Note: Continue to dry fit the neck onto the body and set a good straight edge on the top of the fingerboard. The straight edge should sit on top of the fingerboard and project right at the top of the bridge in its rough location.

Critical Step/Note

Important Note: Once the radius is really close, go ahead and install the neck using all three bolts. Double check the fingerboard again for flat. Using the straightedge, the projection should now be 1/32" to 1/16" above the top of the bridge.

2) Locate the routed rectangle on the face of the fingerboard and the genuine abalone block inlay. This rectangle represents the 12^{th} fret and will be inlaid with the abalone block.

3) Using a small chisel, square the corners of the routing until the supplied inlay fits flush & snugly.
4) Clean any dust from the routed hole.
    a. ***Just Right!*** Try to fit the marker in as flush as possible.
    b. ***Too High.*** If the marker sits to high, continue to remove material from the bottom of the cutout until it sits flush.
    c. ***Too Low.*** If the marker sits to low, the dust from the radius sanding can be packed with the marker to build up the height.
5) Put several drops of cyanoacrylate glue into the hole and press the inlay into it firmly. Hold for about 60 seconds. DO NOT get glue in the fret slots!!!!

    Note: Blow out the fret slots and place tape over the surrounding fret slots to eliminate any glue flowing into them.

6) Locate the remaining abalone dot inlays. Using a pin or toothpick, apply a small drop of cyanoacrylate into a hole on the fingerboard, press an inlay into it and then proceed to the next hole. Do not put glue in all the holes and then install the inlay… do one at a time.
7) Along one edge of the fingerboard there are more holes that have been drilled for the side-marker locations. Locate the white plastic rods that are in the bag of parts with the kit and dry fit them first for a good fit!
8) Apply a small amount of Duco/CA glue onto the rod, insert it until it bottoms out, then cut it off close to the fingerboard with a utility knife. Continue until all the holes are filled.
9) Allow this assembly to dry then lightly sand the abalone inlays until flush with the fingerboard. Use a 20" radius sanding block, progressing through 120 grit sandpaper.

Note: It is crucial to sand the radius evenly from both sides of the fingerboard as well as sanding a straight surface from one end to the other.

10) Finish sand the fretboard using the high grit sanding pads (400, 600, 1000, 1500). Take your time with each grit to really bring a nice luster out of the wood.

Note: Some makers progress from the 1500 grit pads to the micro-mesh pads all the way to 12,000 grit. The fingerboard will be like a mirror.

Note: Remember, there is NO finish applied to the fingerboard.

Section Six-Fretting the Fingerboard and Shaping the Neck

Complete all fretting steps including installation and dressing, install machines, shape the neck and install the machines.

Note: Before moving ahead, ensure that the fingerboard is completely flat by placing an accurate straight edge along the fingerboard.

Step One-Fretting the Fingerboard

The fretting process is where each fret is carefully hammered into place.

1) Using a wood file, file the neck flush to the fingerboard being careful ***NOT*** to remove any wood from the fingerboard.
2) Use a small triangular file in the fret slots to break the edge and create relief.

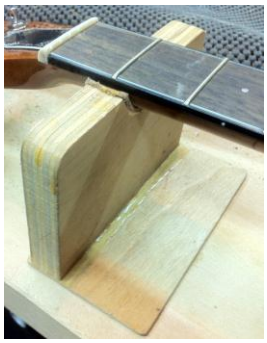
   JUST BREAK THE EDGE!!

Important Note: Clean the fret slots by running a thin knife or saw, being careful not to expand the width of the fret slot.

Important Note: Sight the edge of the fingerboard and a fret tang.Check to make sure that the fret slots are cut deep enough to accept the tang. If a slot is not deep enough, use the Japanese saw to deepen the slots.

3) Position the neck securely on a bench, supporting the area where you will hammer the fret. Gently but firmly hammer the fret by tapping the ends to get it started and alternate hits on each end and moving toward the middle until the fret is tight to the fingerboard. You will hear and feel a noticeable difference when the fret is completely seated.

Note: Below are two simple to make jigs for fretting. The first one allows you to have solid support directly underneath the fret you're working on. The second jig gives full support on the high end of the fingerboard while hammering these frets. Notice is both applications, the jig is sitting directly on the bench and not on the foam mat. Otherwise, you'll never be able to fully seat the fret.

4) Trim any fret overhand/excess with the end nippers flush to the fingerboard.

Step Two-Dressing the Frets

Using a straightedge, check the frets to ensure one fret is not higher than another and no "buzzing" will occur.

1) Using a "bastard mill file", file the ends of the frets flush to the side of the fingerboard.
2) Using the same file at roughly a 30-40 degree angle, file the ends of the frets to create a soft relief. When filing, stop just at a point where the file begins to hit the side all the way up and down the fingerboard.
3) Using a good straight edge, look for any high frets where the straight edge may "rock" indicating a high fret and continue to seat those frets.
4) Use a flat sanding block starting with 200 grit sandpaper (progress through the grits) and finish up with the fine sanding pads up to 4000 Grit to polish the ends of the frets.

Step Three-Shaping the Neck

This aspect of the guitar is the most personal part of the guitar. Everyone has a different feel and you may prefer to shape the back of the neck differently than someone else. This is all a personal preference. Without doing anything more than sanding the existing neck shape, the guitar neck will likely feel comfortable for many different players.

As a guide, we suggest using a round wood rasp and cutting a groove in the neck at the first fret to roughly .85" and .92" at the 11th fret.

Then, using the same file, connect the two grooves and begin rounding, shaping and feathering in the neck to a comfortable feel.

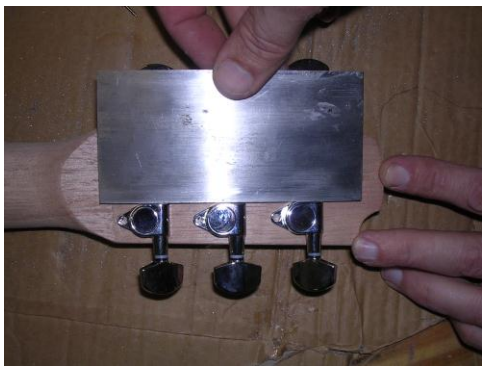
The finish thickness at the first fret should be no less than .83" and .90" at the 11th fret.

Step Four-Heel Cap

There is a small plastic heel cap that needs to be glued with the neck on the body. Once glued, remove the neck and shape the heel and any further neck shaping for final comfort.

Step Five-Install Machines

There are three left and three right machines. To make this simple, be sure to position the machines so that the screw hole is down. Install the machines on one side of the headstock and using a small straight edge, line up all the machines. The straight edge will make it easier to lineup. Once in place, mark the hole and drill a 1/16" hole. Be careful not to drill all the way through. Secure each machine with a single screw.



Section Seven-Fitting and Adjusting the Saddle

Step One-Fitting & Adjusting the Saddle

Fit the saddle into the bridge by taking a flat piece of wood to use as a handle and attach a piece of double stick tape and pick up the saddle with the tape. Slowly sand one face of the saddle on a flat surface using adhesive back sandpaper attached to a flat and "true" surface. Gently round the corners of the two ends. Continue to test fit the saddle until it fits snugly in the bridge without having to force it but NOT loose. Be sure the saddle bottoms out in the bridge.

> ***Note:*** Continue to lower the saddle until the adjustments & specifications in the next section can be met. Be sure to read and understand the tolerances you are shooting for and continue to test play the guitar until it plays the way you want.
>
> ***Note:*** The first time you string your instrument, the guitar will need to settle before making drastic adjustments. Remember, there is now a lot of tension from the strings that will begin to make the adjustments difficult initially. Most production guitars will be strung and left aside for a period of time while the neck settles with tension and at pitch.

Step Two-Ream the Bridge for the Endpins and Gluing the Nut

Drill the remaining holes in the bridge using the .182"/4.6mm drill bit. Using the tapered reamer, slowly cut and fit the bridge pins so the ball sits just above the height of the bridge. Be sure NOT to go to deep or the pins will not hold the string in the bridge.

Make sure there is a flat, clean surface for the nut to rest on and that there is solid contact on both the bottom of the nut as well as the end of the fingerboard. This will ensure good glue adhesion for the nut.

Step Three-Putting it all together and Adjusting the Truss Rod

1) Bolt the neck on and string it up.
2) Every guitar is going to be different and will react differently to string tension. Be sure to snug the truss rod adjustment so it does not rattle but do not create any additional adjustment without letting the guitar settle in with all the strings at full tension, at pitch.

Section Eight-Final Setup

The four construction tools (tapered reamer, bridge clamp, radius sanding block and fret hammer) and the methods will get you to this "construction" point. A guitar may require a few more "tweeks" and a few other specialty files to complete these adjustments.

We suggest:

1) A set of Nut Files that allow for different grooves to be cut into the nut for the various diameter strings.
2) A Double Cut File that allows a builder to level a high fret(s).
3) A Medium Crowning File that allows a builder to reshape the "crown" on the fret if leveling is needed.
4) www.usguitarkits.com for specialty guitar making tools.

Step One-Cutting the Nut Grooves

Cut a pencil in half the long way, sand it flat on a piece of sandpaper and sharpen the lead to a point. Lay the flat side of the pencil on the top three or four frets with two layers of blue tape on the top of these frets, dry fit the nut and project a pencil line onto the face of the nut. Be sure that the grooves cut into the nut are slightly above this line. Assuming they are, go ahead and glue the nut using CA glue. If the grooves are below the pencil line, the nut will need to be shimmed with a small piece of veneer. Once the nut is glued, erase the pencil line and re-draw the line again to be sure it is exactly where it needs to be. Using the specific nut files for the diameter of the string size, slowly file to just slightly above the pencil line being sure to file back from the from edge of the nut.

Step Two-Leveling a High Fret(s)

1. Using a double cut file, slowly level the high frets being careful not to lower the surrounding frets.
2. Using a fret crowning file, create an even crown on each high fret to ensure the string will ride freely over the top with no snags.
3. Using the same file, round each of the ends of the frets.
4. Using the small needle file, remove the burr on either side of the fret.

Note: This is a critical step and will take a fair amount of time, skill and practice to perfect the techniques. There are several books, articles and tools to read up on to better understand this process. This could be class by itself so this manual is simply to take you through the proper steps.

Continue to work on dressing the frets and completing any and all of the previous steps so far.

Step Three-Setup

Setup determines the guitar's playability and reflects the individual builder or player's preferences. If you are looking for a fingerboard that is easier to play, you'll want lighter strings and a lower action. If you like your sound to project better, you might prefer a slightly higher action. The action is set by the amount of relief you've allowed the neck to maintain.

String tension can pull the neck up and therefore increased the spacing between the strings and the fingerboard and may be reduced by the use of the Truss rod to counteract the effect of the string tension.

If the action is low, buzzing is more likely to occur. So a lower action requires more attention to Setup. A certain tolerance must be maintained between strings and frets and a slight fall away must be introduced where the fingerboard lies over the guitar body.

It is not a good idea to try to set up your guitar before you've strung it to pitch, in other words, before you have tuned the strings to the tension they will maintain and allowing some time for the guitar to settle. This is simply because you need to know what the neck's reaction is going to be before you can decide on the proper remedy.
In a perfect world the neck will bend just the right amount to give you the right action and you will hear no buzzing. That is, however, very unlikely. You may want to make any necessary adjustments before you tackle intonation since any changes in the neck, nut, bridge or even string choice will require that you revisit intonation.

The tone and volume of the acoustic guitar are very much affected by the bridge and saddle since this is the place where the vibration of the string is transmitted to the guitar's body. A little patient attention to these areas will greatly improve your playing enjoyment.

Let's take a look at some of the tolerances we are shooting for.

Height of the saddle portion protruding from bridge = Min. : .093"
Max. : .25"
Ideal : .12"

Optimum distance from high E string to first fret = .06"
Optimum distance from low E string to first fret = . 08"

Optimum distance from high E string to 12th fret = .12"
Optimum distance from low E string to 12th fret = .14"

Section Nine-The Finishing Touches

These last two steps can follow the finishing section and be completed at the very end.

Step One-Trussrod Cover

Once the setup is complete and any truss rod adjustment is made, position the truss rod cover by butting it up against the nut. Mark and pre-drill the holes and secure cover with three screws.

Step Two-Strap Button and End Pin

Drill the endpin with a ¼" drill bit and follow that hole with a tapered reamer, continuing to test fit so that the endpin will require a slight tap for final seating. Do not completely seat this endpin until the final sanding and finishing is complete.

The strap button comes complete with a button, screw and a felt washer. Do not install this until the guitar has been completely finished with a top coat. Locate the button on the bottom side of the neck heel. (The bottom side is the side of the neck furthest away when you are holding the guitar to play it). Exactly where to place the strap is up to you and may also be based on the strap design itself. Be sure to drill hole clear of the neck bolts.

Section Ten-Finishing

You will want to apply a top coat of finish to the instrument to protect the bare wood from dirt and oils. There are countless finishing products to use and each will require that you read through the instructions carefully for application, cleanup and most importantly health and ventilation requirements. Many builders use nitro-cellulose lacquer but there are many precautions needed to use this product. There are many water-borne products available that are less volatile and less hazardous. Also, there are some nice hand rubbed oil finishes that require much more work but with spectacular results. We suggest several tests on scrap woods to find the perfect finish before working directly on your new instrument.

We hope that you have enjoyed the process and have an instrument that you will show to others. Hopefully, you or someone you have made this for will begin to play this with the appreciation of all your time and efforts.

Thanks again for purchasing a kit from US Guitar Kits, Inc.
We would love to see a picture of your finished guitar.
Visit our site at www.usguitarkits.com or send us an e-mail at info@usguitarkits.com.

Safe building and happy playing!!!!!

U.S. Guitar Kits, Inc.
Finishing Instructions for Acoustic Guitar Kit

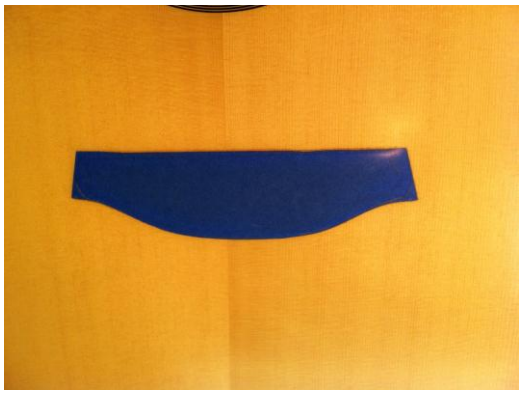
STOP (from p15) - When to Begin the Finish Process

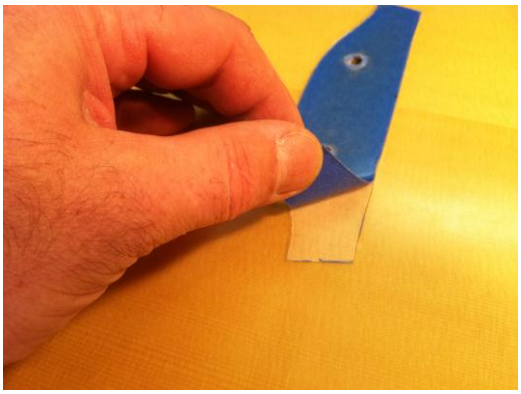
Many folks will complete the steps of construction and stop before the bridge is glued on. It is very easy to tape off this area and complete the finishing and final rub out without having the bridge in the way. This will give you a better overall finish result.

Simply apply some blue tape to the body in the rough area of the bridge and use the bridge clamp to position the bridge. Using a sharp razor blade, carefully cut the tape around the bridge and remove the excess. Be very careful not to cut the top….tape only! Finally, remove the bridge and build up several layers of tape to protect the top surface.

Once the finish and rubout is complete, punch out the two holes and relocate the bridge again using the bridge clamp. Using a sharp razor blade, cut through the finish around the bridge, being careful ***NOT*** to cut into the top.

You now have a clean, bare wood surface to do the final glue up of the bridge. The other beauty is any excess glue squeeze out will sit on the finish and be easily wiped off with a clean, damp rag. No glue contamination on the top!





Time to Bring it Alive-The Finish!!!

Be careful not to get to hasty. Instead, take your time and savor the rewards of a beautiful guitar with a fantastic finish.

There are many finishing specific books and references available on the subject and would suggest reading up and experimenting on scraps before applying a final finish.

There are also many finishes that can be used that will provide a durable and beautiful finish.

Disassemble the Guitar

Before starting to sand, remove the neck from the body, machines, truss rod cover and endpin.

Surface Preparation

Anyone will tell you, the finish is only as good as the preparation. This means taking extra special attention to the details of sanding through the various grits, not skipping grits, and finishing with grits up to 320 or 400.

> ***Note:*** It is crucial to hand sand the sides and back to ensure a light touch, being careful NOT to sand through the veneer. ***BE CAREFUL!***
>
> ***Note:*** Using a scraper, scrape any excess glue. Do not try and sand out a glue "blob" on the back or sides. You will sand through the veneer before you sand the glue. ***AGAIN, BE CAREFUL!!!***

Taping

Once you have completed all of the sanding, tape off the fingerboard, bridge and nut. (Remove the nut if you have not already glued it.) Place tape where the nut was placed if it is removed. Otherwise, the glue will not stick to the finish.

Once, you have completed the sanding and taping process you are ready to begin applying a finish.

Grain Filler

Grain filler is used on open pore woods like mahogany to raise the low areas of the pores and help to level the final finish and not see waves.

The color grain filler used can either be used to simply level the pores or used to highlight the pores with a contrasting color like black. The latter creates a visually deep, rich look to the surface of the neck and headstock.

If you built a Sapele guitar, this can also be done on the back and sides.

> ***Note:*** Do not apply grain filler to the surface of the fingerboard. This should already be taped/masked off at this point.
>
> ***Note:*** NEVER apply grain filler to the top of either of the guitars. This would be incorrect. There are NO deep pores to fill on Cedar or Spruce.

Before applying grain filler, many professional finishers will use a sealer coat of shellac on the surface and letting it dry before applying the grain filler. This will prevent the moisture in the filler from swelling the wood and creating cracks in the finish later.

Once the grain filler has dried completely, sand the excess off and wipe the surface with a clean rag.

Nitro-Cellulose Lacquer

The most common finish seen on most production guitars today is nitro-cellulose lacquer.

It is typically sprayed in a very specific environment with many precautions taken to comply with the product safety requirements.

This should not be taken lightly as there are significant health and safety concerns as well as strict laws enforcing proper methods of use and disposal.

USGK offers finishing products from the Behlen company that can produce excellent results when used properly and in accordance with safety and application procedures. Products include vinyl sealer and instrument lacquer for the finish. They also have a full set of rub out products to bring a super glossy finish to your guitar. You can also use super high grit wet polishing

sandpapers starting at 3600 grit all the way up to 12000 grit to achieve equal results.

Additional Products and Sources

There are many finishes that are not as volatile or ass difficult to control that can achieve good results in a well ventilated area.

Again, follow the instructions regarding the specific product you use.

Consult a local retail finishing supplier for ideas on user friendly finishes. There are also mail order finishes focused on "water borne" type finishes that can be applied either by spray or brush that do not have the volatility of nitro-cellulose lacquer.

Final Comments on Finishing

It is very difficult to take you through every step of finishing as there is a world of various finishes and application techniques as well as material use and safety precautions to follow.

We do stress preparation as the key to any finish.

We also stress following a complete finishing process on some scrap materials to understand all the steps to achieve the final look you want.