

EXP-style Guitar Kit Assembly Manual



This guide provides step-by-step instructions to build a DIY EXP-style guitar using a kit. Even if you have never built before, you can learn how to get started by reading this tutorial.



There's nothing more satisfying than playing a guitar you have put together yourself!

Project Tools and Consumables

Before we get started check the list below and ensure you have the necessary tools and consumables required to complete the project.

Tools

- 2 X Timber clamps (*set neck guitar only)
- Electric jigsaw or coping saw (*If shaping the headstock)
- Steel ruler (at least 40cm)
- Hard sanding block
- Center punch (or similar tool for marking hole locations)
- Electric drill and assorted drill bits
- Large and small screwdrivers (phillips head and flat head)
- Pliers (needle nose preferably)
- Soldering iron

Consumables

- Disposable gloves
- Titebond, PVA, or similar wood glue (*set neck guitar)
- Small paintbrush
- Wood grain filler (If open grain timber such as Mahogany or Oak)
- Sandpaper. Various grades, from 120 up to 1500 (*depends on finish)
- Finishing supplies. (This depends on your choice of finish)
- Painters masking tape
- Assortment of clean rags and paper towel
- Denatured alcohol (or cleaning product with degreasing ability)
- 0000 fine grade steel wool
- Solder (and sponge for cleaning tip of iron)
- Container for storing finishing supplies.

Next, check that all parts have been included.

Parts List

Below are the parts you will find included in your packaging to complete an EXP guitar kit.

- EXP body and neck
- Neck plate, neck plate cushion and screws (if bolt-on neck)
- 2 x Strap buttons
- 6 x in-line tuners
- Stud mounted Tune-O-matic style bridge with tailpiece
- Neck and bridge humbuckers
- 2 x volume, 1 x tone controls, 1 x capacitor, 1 x 3 way pickup selector, and input jack
- Truss rod cover, pick guard and electronics cavity cover
- Cable and hex wrench (for adjusting truss rod)
- Tone and volume knobs
- Assorted screws and washers

Safety Precautions

To complete your guitar kit safely, also ensure you have the following on hand, and a well ventilated work space to work in.

Protective eyewear

Use protective safety glasses or a genuine face shield, not regular prescription, reading, or sunglasses.

Disposable gloves

Use disposable gloves if applying stains or oil finishes directly to the guitar.

Masks

Use an N95 rated dust mask for sanding and an R95 rated particle mask for finishing. If using water based finishing products an N95 dust mask may suffice for both sanding and finishing, but be sure to check the finishing suppliers recommendations first. Paint fumes are dangerous.

A well ventilated work area

Ensure your work space is well ventilated, especially when finishing to prevent a build up of potentially toxic fumes.

Making your Guitar Kit play & sound great

There are four stages to building a great kit guitar, these are:

1. Preparation and finishing

The finished surface appearance of your guitar e.g. staining, painting, or applying a hand rubbed oil finish.

2. Hardware Installation

Fitting the tuners, strap buttons bridge, and pickups.

3. Connecting the electronics

Connecting the pickups to the input jack, and incorporating a pickup selector and volume and tone pots.

4. Final Setup

Adjusting the neck relief, action, intonation and pickup height.

We'll cover each of these below, starting with preparation and finishing.

1. Preparation and Finishing

Inspecting the body

Once unboxed, carefully inspect the guitar body and neck under decent light.



Identify problem areas, as these should be addressed early on before commencing the project. This includes large dents that require filling, deep scratches that require sanding and glue residue on the surface of the guitar that will prevent your finish from being absorbed evenly. Glue stains will only apply for guitars with binding, and/or a veneer top.

Dry fitting the neck

Insert the neck

First push the heel gently into the back of the neck pocket, then push the neck down flat. This reduces the risk of chipping the thin edges of the neck pocket before the neck has been installed.

Check the scale length

You can check the location of your bridge post holes with regard to scale length by measuring the distance from the edge of the nut closest to the fretboard and the middle of the 12th fret and then doubling that number. An EXP guitar kit should have a scale length of 24.75" or 628mm.

If your scale length appears out by a few mm, keep in mind the position of the bridge is angled to compensate for the additional mass of the thicker bass strings and the saddles can be adjusted forward or back via the intonation adjustment screws

Check the neck alignment

The neck, once inserted into the neck pocket, should have very little sideways movement. If it does, mark the center on the neck heel and align this with the center of your neck and bridge pickup cavities.

If this results in a gap on either side of the neck, you may need to shim the neck. Otherwise smaller gaps can be filled prior to finishing using a filler.

Check the neck angle

Run a steel ruler along the fretboard and over the bridge.



The steel ruler should sit just above the saddles on the bridge when the bridge is sitting flat against the body.

Cutting the Headstock

If shaping your headstock start out by sketching a few rough concepts before transferring the design to paper at the correct size.

When designing your headstock be sure to leave a margin of at least 15mm from the last tuning hole and edge of the headstock (the equivalent distance between the tuning peg holes).

1. Once you have a completed design at the correct size cut the shape out and glue it to a scrap piece of timber to be used as a template. (You can also use cardboard).
2. Using a coping saw, jigsaw, or ideally a bandsaw cut out the headstock shape and sand the edges of your template smooth.
3. Taking a small clamp, clamp the template to the headstock and carefully trace the outline.

From there you can either cut the new headstock shape using the template as a guide, or remove the clamps and cut following the outlines you just made.

When cutting out your headstock shape protect the neck of the guitar when cutting, cut well outside the lines to allow room for sanding and keep your saw as vertical as possible to ensure sharp edges.

If unsure keep the design simple. A well executed simple design is better than a poorly executed complex one. Once complete, sand the edges until as smooth as the rest of the body and neck.

Setting the Neck



If you have a bolt-on neck guitar you can install the neck once you have completed the finishing stage, but construct a handle from a section of scrap wood. This will allow you to handle the guitar when finishing.

1. Clean out the neck pocket and heel of the neck. Remove any dust using a brush and ensure the neck cavity is clean.
2. Using a paint brush apply PVA or similar product evenly on the bottom of the neck pocket and the neck heel. Ensure you have an even coating on both surfaces.
3. Clamp the neck to the body of the guitar. You can use one, but two clamps is recommended. Ensure you have scrap wood on hand to protect the surface of the guitar when clamping and clamp firmly.
4. Follow the product recommendations with regard to when you can safely remove the clamps and handle the guitar. In most cases leaving the guitar overnight will do the job.

Prepping the body

Check the body carefully again for glue stains. In most cases glue stains can be sanded but if you notice stains on a veneer top, keep in mind the veneer is quite thin and you should first try to remove with a small amount of warm water and a clean rag.

Next we'll move onto prep sanding the body and neck.

Start by sanding the entire guitar using 180 grit sandpaper and follow that up with 240 grit paper. If you are applying a stain directly to the raw wood sand up to 400 grit, but sanding any smoother than this may begin to affect how well the stain is absorbed.

Once you have completed sanding up to 240 grit, wipe a small amount of moisture on the surface of the guitar. Using denatured alcohol is a good option here as it evaporates before it is absorbed into the timber, but water will also suffice. This will raise the grain of the timber which can then be sanded flat. Generally grain will only raise once.

Grain Filling

Grain filling is optional, and mostly depends on the wood your guitar is made from and whether you are aiming for a flat finish.

If your guitar is made from an open grain timber such as Oak or Mahogany, the open pores of the timber will prevent a flat finish unless filled. Basswood for the most part is optional. In most cases it's advisable to grain fill but if painting a solid color you can get by using a primer which will level and seal the surface.

If you are staining, depending on the product you are using, you can grain fill either before or after. In almost all cases I've found grain filling first results in a more even application, providing a better result.

There are a number of different grain fillers available, including solvent, water and oil based options, along with pre-tinted options. Oil based grain fillers penetrate deeper into the wood, but water is easier to work with with regard to drying times and clean up.

Using a tinted grain filler is also a great option if you would like to accentuate the grain pattern of the guitar as the excess will be removed when sanding, but the filler used to fill the pores will remain in place and emphasize the grain pattern of the wood.

Below are the steps required for applying grain fill:

1. Mix up enough product to grain fill the entire guitar. Follow the recommendations for the product you are using in terms of application, cleanup and safety, then mix your grain fill into a workable paste in a spare container.
2. Apply to the guitar using a clean rag, working in line with the grains pattern of the wood. Next, work across the grain really pushing the grain fill into the wood, making several passes.
3. Once finished, leave the guitar for ten minutes and then wipe away any excess using a clean damp rag. (check the product recommendations)
4. Once dry, sand back to the surface level of the guitar, working through the grades of sandpaper from 120 grit to 240. Sand enough to remove the excess grain fill but not enough to dig into the wood and create more open pores.
5. Inspect the surface of the guitar and repeat the process if required.

Masking

You should also mask the neck pocket, and body cavities of your guitar when spraying a finish. Mask the tuning peg holes on the headstock to keep the holes clean, along with the holes for the bridge and tailpiece and pay special attention to the truss rod. You should also mask the fretboard when spraying the back of the neck.

If your guitar has binding you can either attempt to mask off the binding, which in most cases will mean some finish still permeates the masking tape and will need to be removed, or not masking, and scraping the binding clean with a razor blade before spraying your clear coats.

I'd normally scrape the binding as this is a more effective use of time, rather than attempting to mask. But it's best to mask the binding if you notice any cracks as the finish you apply will permeate the binding staining it permanently.

Finishing

It's beyond the scope of this guide to cover every available way to finish an electric guitar but below are a few rules that apply to almost all finishing options:



- Carefully consider your finishing options with regard to how protective they are and how they might affect tone along with aesthetics.
- Choose your type of finish based on the wood itself. For example, it would be a shame to cover up a beautiful grain pattern with a solid color finish. Alternatively, staining a less figured piece of basswood for example may not provide a great aesthetic either.
- Wear gloves and a mask and work in a well ventilated area as required. Fumes from some finishing products can be toxic.
- Clean the body of the guitar using a product that includes a degreasing agent
- Wear disposable gloves when handling the guitar after cleaning.
- Make sure you are working in a relatively dust free environment and make sure to clean the cavities of the guitar body thoroughly after sanding. Dust accumulates in the cavities of the guitar, and when turning the guitar over that dust will become airborne.
- If staining, make sure to wipe away any excess that hasn't been absorbed after approximately ten minutes.

- Be aware of the compatibility of the products you use. If painting using spray cans I'd recommend using the same brand and type of paint for your seal coat, color coat and clear coats.
- If you have to spray outside avoid spraying on windy days.
- Spray the sides of the body first. That way when spraying the front and back you will be spraying over any overspray from the sides of the guitar.
- Don't spray heavy coats. In many cases, several lighter coats are a better option than 1-2 heavy coats due to the potential for runs.
- Check your binding for cracks. If cracks are present, mask the binding prior to applying a colored finish or the finish will penetrate the binding and become impossible to restore to its original state.
- Don't apply too many coats within recommended drying times. If you spray more than 3 coats in a day for example, your first coat may have trouble curing.
- If you are using steel wool on the body of the guitar prior to finishing ensure you remove all fibers left from the steel wool.
- Hang your guitar in a cool dry environment. Don't leave your guitar outside to dry and attract dust.
- In most cases, you can respray within an hour. If you leave it longer than this, you may need to leave the guitar for 24 hours and then lightly scuff up the paint with 600 - 800 grit sandpaper to ensure the ensuing coats will adhere to the previous coats. (This depends on the product you are using, so check the label).

If you're looking for a resource that covers guitar finishing in great detail, check out *Guitar Finishing Step-by-Step* by Dan Erlewine and Don MacRostie.

2. Hardware Installation

Installing hardware usually involves installing the tuners, strap buttons, bridge, and pickups. There are some best practices to follow including drilling pilot holes and aligning your hardware correctly which we'll cover in more detail below.

Pilot Holes

Drill pilot holes for all screws used on the body and neck of the guitar. The small screws used for securing your tuners for example are small, fragile and easily stripped.



Whenever installing hardware, or plastic covers:

1. Use masking tape on the guitar to mark the location of the hole using a pen (pencils usually don't result in sharp lines on masking tape)
2. Mark the location of the hole making an indentation in the wood through the masking tape using a hole punch or similar tool

3. Decide on the correct size drill bit ($\frac{2}{3}$ thickness of the screw) and mark the drill bit depth using a small piece of masking tape at approximately $\frac{2}{3}$ the depth of the screw to be installed
4. Always aim to drill your holes straight.
5. Use a countersink drill bit (or similar) to chamfer the edges of any holes in the body of the guitar, especially if painted using a solid color finish, to prevent chipping. You may want to drill less than $\frac{1}{3}$ depth on less dense timbers such as Mahogany and Basswood.

Installing strap buttons

Strap buttons not only support your guitar when playing standing up, the placement of the strap buttons also affects the balance of the guitar.

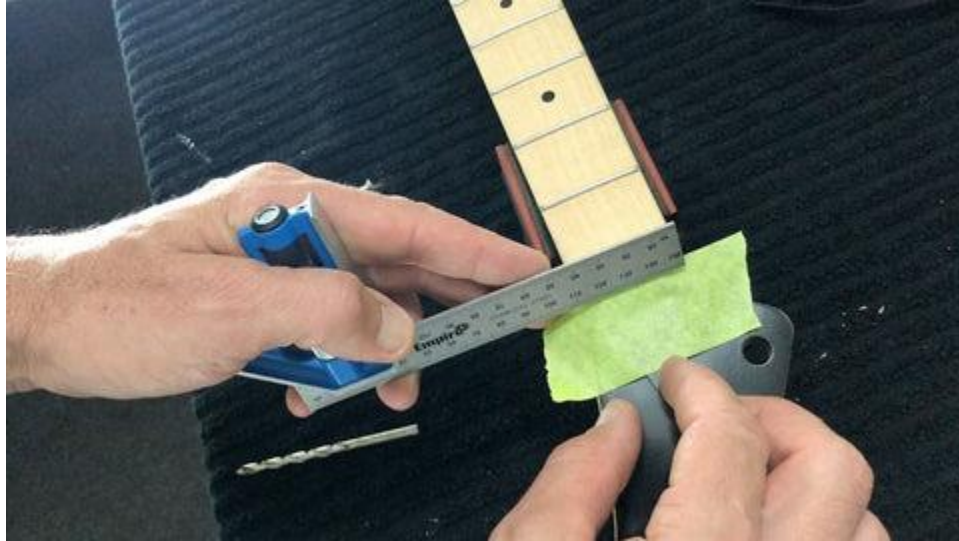


On an EXP guitar, there are a couple of options for the location of your strap buttons. For the rear strap button, you can center the strap button or position it approx. $\frac{1}{3}$ from the top of the lower bout.

The front strap button can either be positioned on the top horn or can be installed on the neck heel. Follow the method described above for all hardware installation including using painters marking tape for marking the location of pilot holes, and drilling to the correct size.

Installing the truss rod cover

While not strictly hardware, it's important to center the truss rod cover on the headstock.



The simplest way to do this is by using masking tape on the headstock, measuring half way across the headstock (the guitar has a nut width of 42mm, so the number should be 21mm) and drawing a line extending out from the nut to the end of the headstock.

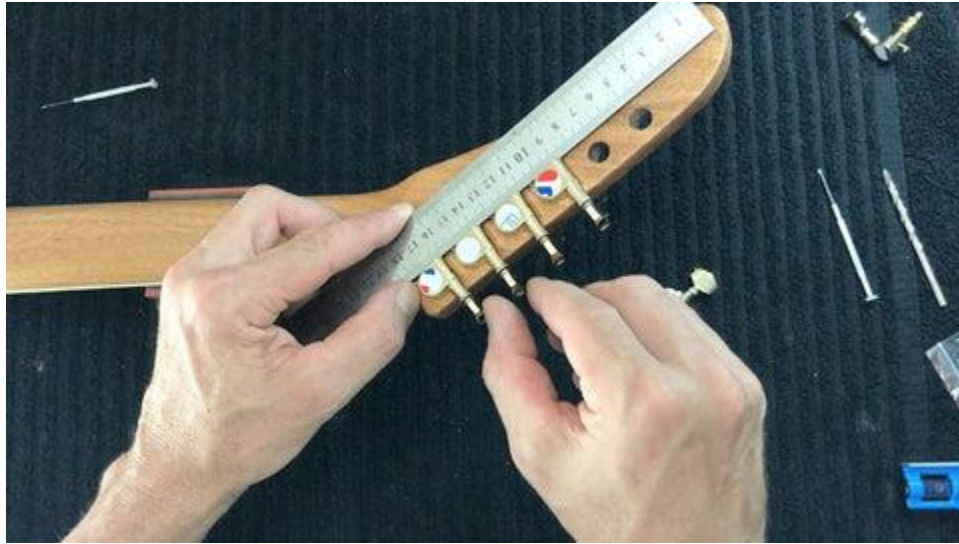
You can then align the truss rod cover with the nut and center by lining up the hole at the tip for the truss cover with the centerline.

Installing the Tuners

1. Start by inserting the tuner in the back of the headstock with the mounting hole facing back toward the body.
2. Place the washers over the tuning posts, then place the bushings and install the tuners by hand tightening.
3. Align the tuners (using either of the methods outlined below).
4. Mark the location of the mounting screws. Drill your pilot holes and install the small screws.
5. Remove the protective covering by firmly pressing masking tape onto the back of each tuner and removing both the covering and masking tape in one action.

Tuner alignment

If you plan on aligning the tuners to the headstock using a square, I'd recommend doing this as you install each individual tuner as there will be insufficient room to fit a square between the tuners in most cases.



You can also align tuners relative to one another using a steel ruler across your tuners once in place. Or install the first and last tuner, and using a steel ruler mark a straight line between them on masking tape to mark out the location of the pilot holes.

Installing the Bridge

When installing the Tune-O-matic style bridge you will need to first insert the ground wire against the bridge post bushing which allows us to ground the electronics.

Grounding the bridge



Look for a small hole on the side of the bridge post hole. This will normally be the hole closest to the electronics cavity. There should be a small hole just large enough to thread the ground wire through to the electronics cavity. There should also be a corresponding hole on the inside of the electronics cavity (as shown).

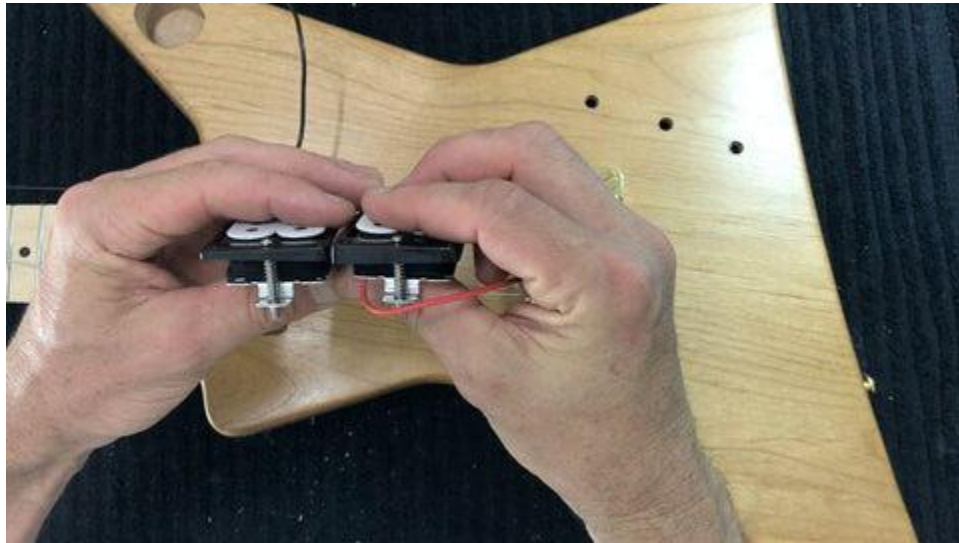
There will be a loose black wire within your packaging.



1. Remove a few mm of the PVC coating and expose the bare wires.
2. Thread the wire, ensuring the bare wires are exposed and will sit flush against the side of the bridge or tailpiece post bushing once installed.

3. Make a small 'hook' in the top of the wire so the ground wire sits at the top of the bridge or tailpiece post hole before installing the bushing.
4. Remove the post from the bushing.
5. Insert the bushing into the predrilled hole, ensuring the ground wire ends up sitting flush against the bushing. In many cases you may require a rubber mallet to force the bushing into place.
6. Screw the bridge posts to the bridge bushings and the tailpiece posts to the tailpiece bushings.
7. You can then fit the bridge over the bridge posts, but leave the tail piece for now as it will not remain in place until the strings are installed.

Installing Pickups



First, identify the neck and bridge pickup. You can easily tell them apart by the profile of the pickup surround. The pickup with the deeper pickup surround is the bridge. Then follow the steps below.

1. Taking the neck pickup thread the pickup wires through the hole in the rear of the neck pickup cavity, then position the pickup with the pickup wires adjacent to the top corner of the cavity.
2. Take the wires from the bridge pickup and neck pickup and thread them through the hole in the side of the bridge pickup cavity to the electronics cavity.
3. Install both the low E and high E string.
4. Position the pickups at the very front of the pickup cavity and then align them horizontally to the individual pole pieces corresponding to the low E and high E. (you can also use a square to check the alignment relative to the edge of the fretboard).

5. Mark your pilot holes as done previously, remove the pickups from the cavity, and drill the pilot holes.

3. Connecting the electronics

Soldering

If you haven't soldered before you're going to need a soldering iron, solder, and a damp sponge to clean the tip of your iron. I'd also recommend practicing before committing solder to your guitar

Most entry level soldering irons will do the job, and your kit will come with more than enough solder. Be careful when soldering. Solder won't melt until it reaches 185°C (365°F) and soldering irons get very hot, up to 392°-896° F in some cases.

When soldering there are a couple of things to keep in mind.

1. Tinning

Tin your soldering iron and the components you are connecting to. Tinning refers to maintaining a light coating of solder over the tip of your soldering iron and prevents the iron tip from oxidizing.

2. Preheating

Soldering is really about transferring heat. The lug or component you are connecting to should be preheated so the solder is drawn to it rather than staying on the already hot iron.

Wiring

Most of the electronics for kit guitars come pre-soldered, with the exception of the wiring that needs to pass through the cavities within the body of the guitar.

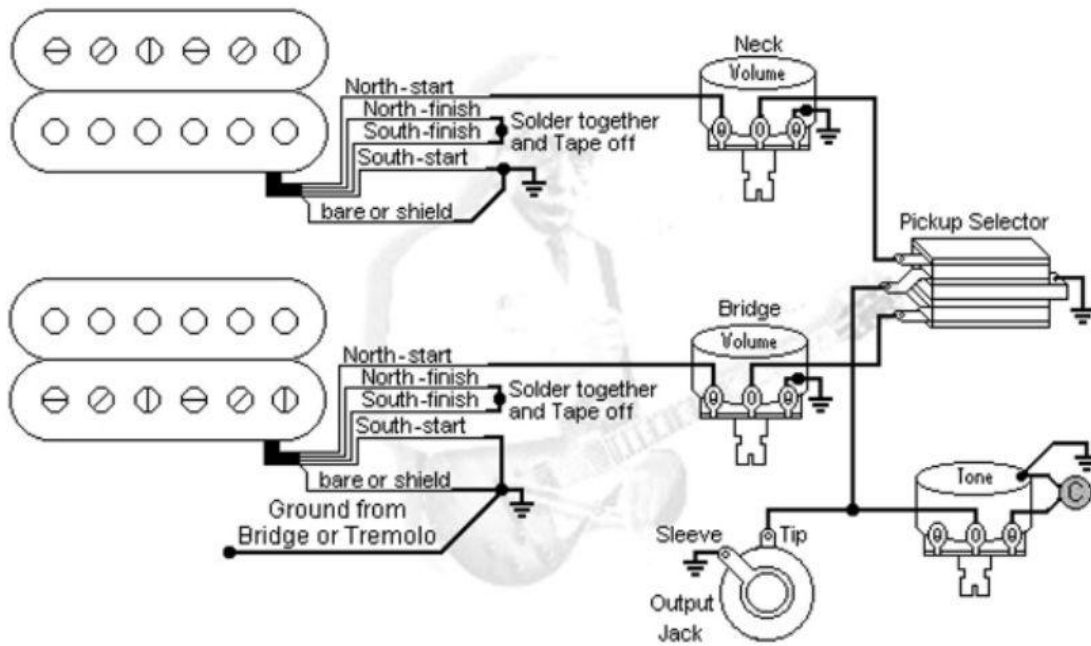
In the case of the EXP this means none of our connections are pre-soldered, mostly due to the location of the pickup selector.


The wiring diagram below shows one way the guitar can be wired (keep in mind there are many ways to wire an electric guitar).

We'll cover each of the steps below. The EXP-style kit has 2 wiring configurations. **2 Humbuckers w/ 2 volume, 2 tone, and 3 way switch**, or **2 Humbuckers w/ 2 volume, 1 tone, and 3 way switch**. We included the diagram for both on the next page.

2 Humbuckers w/ 2 Volumes & 1 Tone

with 3-way toggle switch

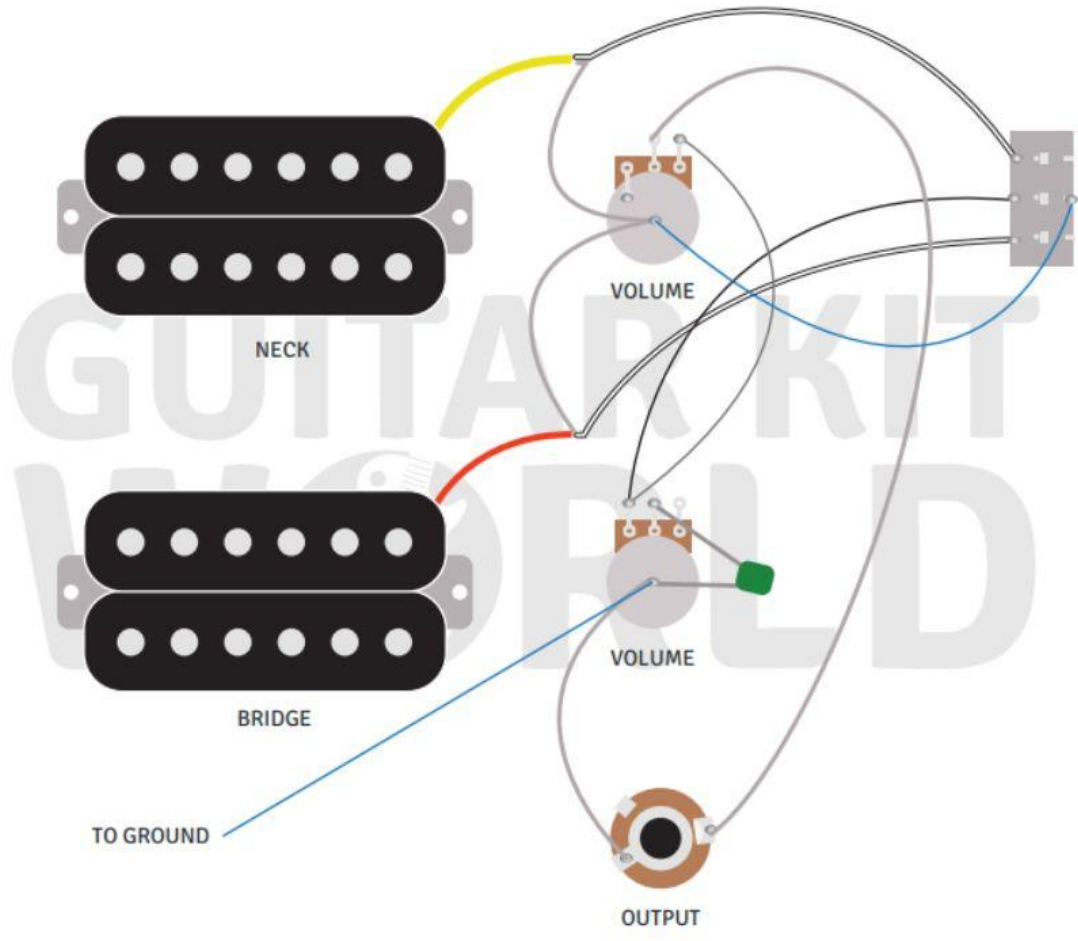



Solder all grounds  to back of volume pot



WIRING DIAGRAM:

HH, 1 X Volume, 1 X Tone, 3 Way Switch



	SOLDER POINT
	HOT WIRE (WHITE COATED)

* Wire colors may vary depending on manufacturer

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Install the pickup selector wires and pickup selector



1. Take the four long wires included in your packaging and thread them through the hole in the side of the neck pickup cavity to the pickup selector cavity.
2. Install the pickup selector to the pickguard.
3. The washer and nut will be on the pickup selector. Loosen these and reattach once the pickup selector is inserted into the pickguard.

Connect the pickup selector wires



The four wires will now be connected to the pickup selector.

1. Remember the colors you use for each (in most cases black is used for ground wires).
2. Solder a wire to one of the outside lugs that will be used for the neck pickup.
3. Do the same for the lug on the opposite side for the bridge pickup.

Next connect the wire you will use for your output wire to the two lugs joined in the center of the switch. Lastly, connect the ground wire to the last remaining lug.

Test your connections by lightly pulling on the wires and install the pickguard. Mark out your pilot holes and install the screws as we have done previously for installing hardware.

Installing the Pickups

Install both pickups as we have done previously and secure into place. Thread all wires, including pickup selector and neck and bridge pickup wires through the hole at the side of the bridge pickup cavity and place the guitar on its face. You can tape the different wires together to help keep track of them.

Ground the volume pots and installing the capacitor

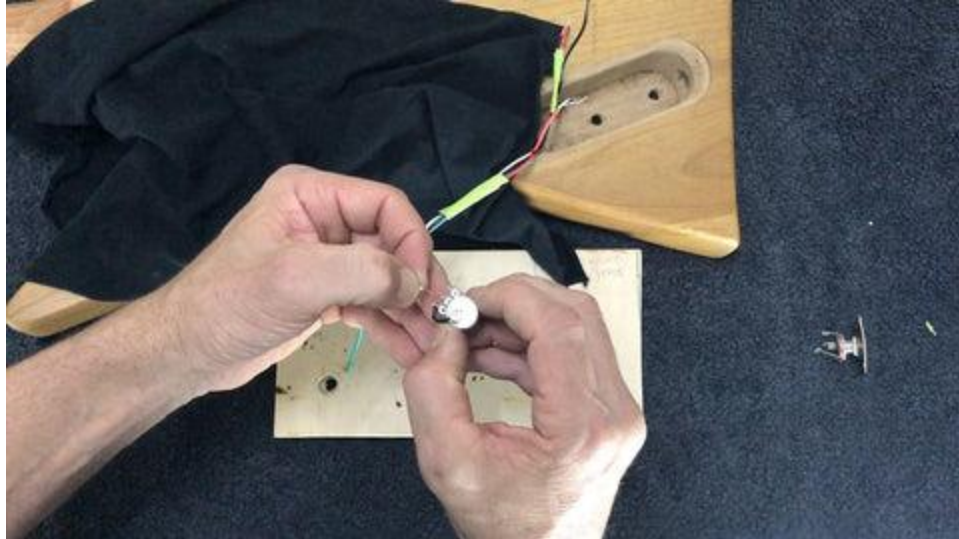
Connect the ground lugs (the lugs on the left if facing away) to the back of the casing. This can be done by either bending back the ground lug and soldering into place, or using a short wire.

Next take the capacitor (the small green filter) and connect to the output (middle) lug of the tone pot and back of the tone pot case.

Connecting the pickup selector to the volume pots

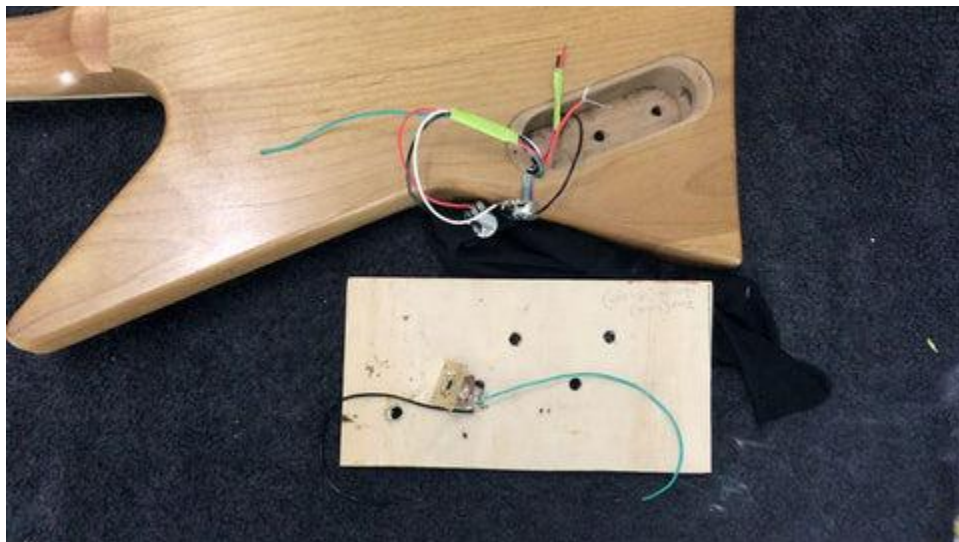
Next we'll connect the outputs of our volume pots to the pickup selector.

Do this by soldering the two wires used for the pickups (the two outside lugs on the pickup selector switch) to the output (middle lug) of the respective volume pot. So, connect the neck pickup selector wire to the neck volume pot for example.



Grounding the bridge

Next, taking the ground wire we installed to the bridge previously solder the ground wire to the back of either of the volume pots.

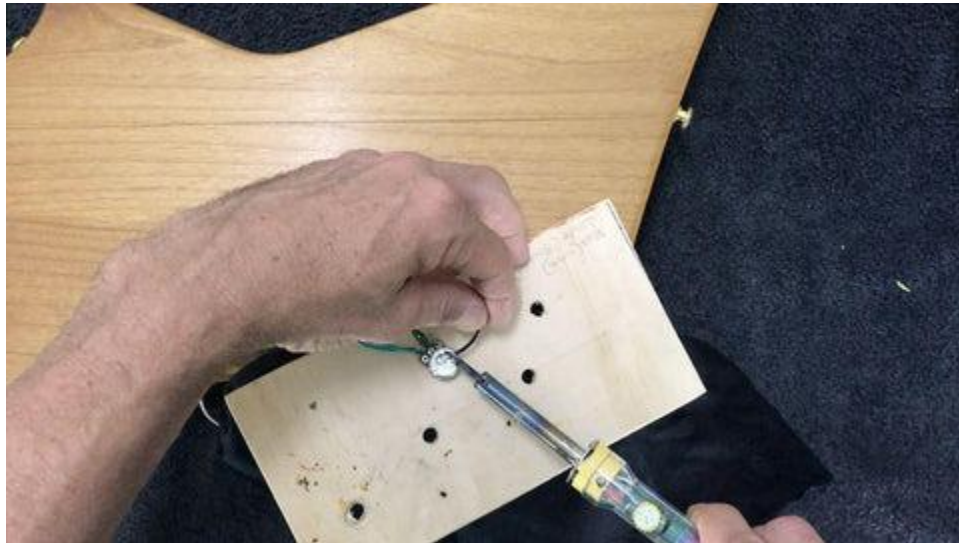


Connecting the output wires to the tone pot and input jack

Next, connect the loose green and black wires to the input and ground lug of the input jack. The ground lug on the input jack is connected to the inner sleeve of the jack. Once connected you can install the input jack as it won't be required again.

Connect the output and ground wires from the pickup selector to the tone pot

Join the two green wires (one of them should already be connected to the input jack) and solder them in combination to the ground lug (the left lug if facing away from you) of the tone pot.



Next, solder the remaining loose black wire to the back of the tone pot. You can now secure the tone pot into the electronics cavity if you choose.

Connecting the pickup wires

Next, we'll connect the hot and ground wires from our pickups to the input lugs of our volume pots.

To do this, connect the shielded wires to the lug on the right hand side of the pot if facing away from you and the unshielded ground wires to the back of the volume pot for each pickup.

Completing the ground circuit



Next, connect the remaining ungrounded components together on a circuit by connecting the two volume and the tone pots together by black wire from the casing of all three pots. From here our wiring is complete.

It is now time to test the pickups by securing the pots in place, installing the electronics cavity cover and plugging the input jack into an amp and testing the pickups and selector switch and volume by tapping on the pole pieces of the pickups in each position.

4. Final Setup

The last stage of our project is setting up the guitar. This is an important step that makes all the difference with regard to playability and tone. Our final setup will consist of four key areas:

- Neck relief
- String action
- Intonation
- Pickup Height

I'll provide a basic overview of each below. Also, keep in mind the guitar should be tuned to concert pitch and checked regularly during the process to ensure the correct amount of tension is on the neck as adjustments are made.

You may also want to revisit aspects of your setup once you have had time to play the guitar and have identified problems e.g. fret buzz or intonation issues.

Adjusting neck relief

The ideal guitar neck is one that has a small amount of inward bow or relief to provide clearance for the strings when vibrating. A neck that is too straight will very likely run into problems with fret buzz.

You can measure the straightness of the neck using a steel ruler. Another option is to hold down the first and last fret and then tap the 12th fret lightly of the low E string. If the string is already sitting hard against the fret more relief will be required. If sitting well above the fret, the amount of relief may need to be reduced.



To adjust the amount of relief, adjust the truss rod using the hex key included in your packaging. Turn counter clockwise to loosen the truss rod which will introduce more relief. Turn clockwise to flatten the neck further.

Remember to only make incremental changes of a quarter turn each time and make sure the guitar is tuned to concert pitch so the correct amount of tension from the strings is

placed on the neck. Be sure to continue to check your tuning through the entire setup process.

Adjusting the action



Action refers to the height of the strings from the fretboard of the guitar. This is usually measured from the top of the 12th fret to the underside of the low E string.

A good starting point is 2.4mm on the low E side and 1.6mm on the high E side, taking into account the different string gauges. Make sure the guitar is in tune before checking and making adjustments.

Action is adjusted at the bridge. Loosen the bridge posts to raise the action, tighten the bridge posts to lower the action.

Intonating the guitar

Intonation, in essence means, is the guitar in tune with itself. You can check this by tuning to standard tuning and then checking the strings at the 12th fret (an octave up from the open string). If the pitch is sharp you will need to lengthen the string length. If flat you will need to shorten it.

Your scale length is not a precise measurement as there is some compensation required for the additional mass of the heavier bass strings. This is also why most bridges on electric guitar are angled away from the body of the guitar toward the bass strings.



To lengthen the string, turn the intonation adjustment screws at the front of the bridge counter clockwise. To shorten turn them clockwise. Make sure the guitar is in tune before checking and adjusting.

Adjusting pickup height



Lastly, we'll check and adjust the pickup height. Much like string action, the height of your pickups is mostly based on personal preference and will depend on what you are hearing.

But, if unsure, a good starting point is 2.4mm from the top of the magnetic pole piece to the underside of the string. However, this should be measured when pressing down the last fret of the guitar.



To adjust the height of the pickups, adjust the mounting screws on the outside of the pickup surround.

Summary

And that marks the end of our project.

Once you have completed the steps outlined above. You should have a complete guitar ready to play. Keep in mind, as you become more accustomed to the guitar you may want to revisit some aspects, especially the final setup of the guitar.

You should also test the guitar, by going through each pickup position and testing the volume and tone pot. Also test for interference by taking your hands off the guitar and listening for hum. If you hear any signs of electrical interference you may need to open the electronics cavity and check your ground circuit.

Lastly I'd recommend playing each fret up and down each string and listening for fret buzz or any sign of dead notes. If you notice a problem, chances are it can be resolved by either adjusting your action or adjusting your neck relief.