

JEM Guitar Kit Assembly



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Introduction



California requires the following notice:

Warning

Some dust created by power sanding, sawing, grinding, drilling, and other construction activities contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm. Some examples of these chemicals are:

- *Lead from lead-based paints.*
- *Crystalline silica from bricks, cement, and other masonry products.*
- *Arsenic and chromium from chemically treated lumber.*

Your risk from these exposures varies, depending on how often you do this type of work. To reduce your exposure to these chemicals: work in a well ventilated area, and work with approved safety equipment, such as those dust masks that are specially designed to filter out microscopic particles.

Warning

Always wear safety glasses or goggles when operating equipment. Everyday glasses or reading glasses are not safety glasses. Be certain the safety glasses you wear meet the appropriate standards of the American National Standards Institute (ANSI). Because there are various ways to cut and join wood, you can make substitutions for the methods stated in this manual. We try to suggest the easiest methods possible. However, only you know your skills with each piece of machinery. Never compromise your safety by using a cutting method with which you are not comfortable. Instead, find an alternative approach that will yield the same result.

Warning

These instructions assume that you are familiar with the safe operation and use of woodworking machinery and woodworking tools, and understand the techniques used to assemble this project. If you do not qualify for both of these criteria, STOP building this project for your own safety. Read and understand the owner's manual for the machinery you intend to use, take a woodworking class or visit your local library for more information. Woodworking machinery and tools are inherently dangerous because they use sharp edges that can and will cause serious personal injury including amputation and death. Do not underestimate the ability of these tools and machinery to cause injury. Never operate any tool without all guards in place and always wear approved safety glasses. For your own safety, please heed this warning.

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1 Introduction

Thank you for purchasing a BYOGuitar.com guitar kit. This kit includes everything you need to build a



TIP: Get some finishing ideas by visiting [BYOGuitar.com](http://www.byoguitar.com) and [BYO Guitar on Facebook](#)

(<http://www.byoguitar.com/gallery/index.html>)

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complete custom guitar. In addition to the construction of your guitar, you will need to consider the finish – natural, solid color and possibly a design that will make your guitar unique. We suggest you do some research to determine your finish preferences. Procuring the required finishing materials, especially if they have to be ordered, will allow expedite your guitar project.

We carry a full line of finishing products to give you the beautiful finish you are looking for, whether a clear natural finish or a bold, colorful finish. We also carry an instructional DVD made by Behlen that will give you step by step instructions to help you achieve the look you want for your custom guitar.

These instructions assume you are familiar with the anatomy of a guitar. Refer to Figure 1 for many of the terms used in the assembly of your guitar.

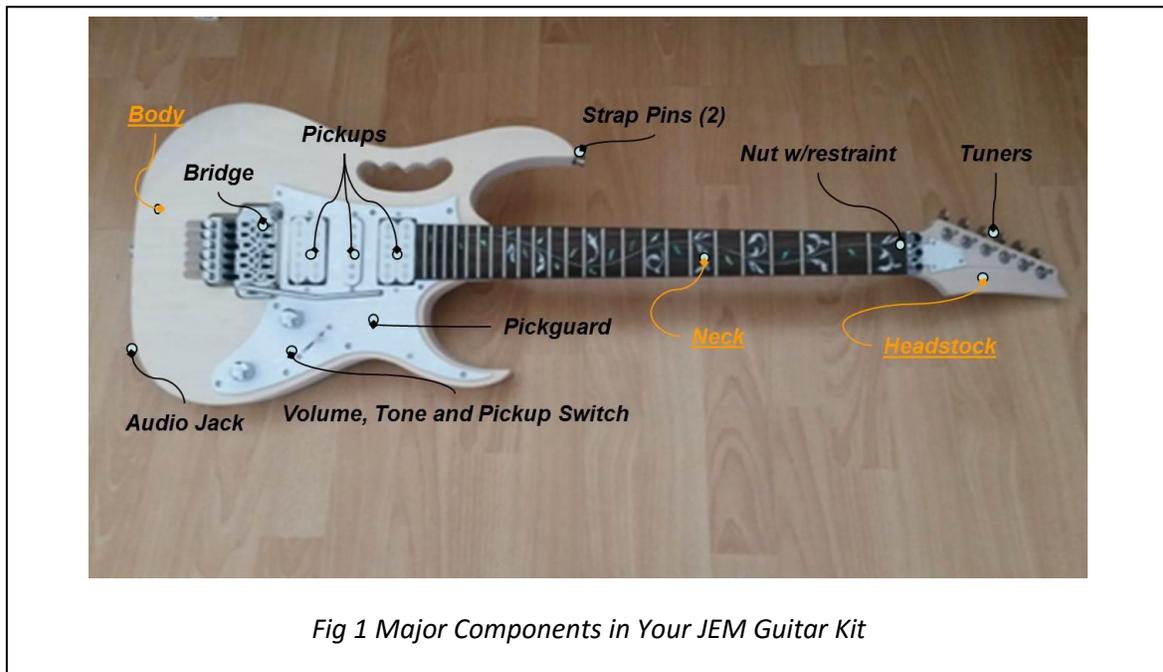


Fig 1 Major Components in Your JEM Guitar Kit

1.1 Material Check List

In preparation for the building of your guitar, all required material should be checked both for type and quantity. Use the following check list to ensure all piece parts are included. If you customized your order (ex. different tuners), ensure that these parts are accounted for. Please contact BYOGuitar if there are any discrepancies.

JEM Material List			
Item	Component	Quantity	Description
1		<ul style="list-style-type: none"> ☐ 1 JEM Body ☐ 1 JEM Neck ☐ Miscellaneous materials (see below) 	BYO JEM Guitar Kit
 TIP: use small interior packing box to inventory and organize piece parts			
2		☐ 1	JEM Pickguard with pickups
3		☐ 18 screws ^{3/8"} + spare	Mounting screws for Pickguard, Audio Jack & Back Plate
4		<ul style="list-style-type: none"> ☐ 1 ☐ 2 mounting inserts/screws 	JEM Bridge/Tremblock

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5		<ul style="list-style-type: none"> ☐ Trem Claw ☐ Springs, 3 ☐ Screws, 1 1/2", 2 	Tremelo parts
6		<ul style="list-style-type: none"> ☐ Arm 	Wammy bar
7		<ul style="list-style-type: none"> ☐ 4 ferrules ☐ 4 screws, 1 3/4" 	Neck mounting materials
8		<ul style="list-style-type: none"> ☐ 6 Tuning Pegs ☐ 6 Washers ☐ 6 Nuts ☐ 6 screws, 3/8" 	Tuning Peg materials
9		<ul style="list-style-type: none"> ☐ Jack ☐ Back access cover 	Output Jack
10		<ul style="list-style-type: none"> ☐ 2 Holders ☐ 2 plastic washers ☐ 2 screws, 1" 	Strap Holder materials
11		<ul style="list-style-type: none"> ☐ 1 retainer ☐ 2 screws, 1/2" 	String retainer materials

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12		☐ cover	Tremolo cover
13		☐ 6 strings	Strings
14		☐ Cover ☐ 3 screws	Truss rod cover
15		☐ Output Cable ☐ 3 Allen wrenches	Other

1.2 Additional tools/materials required:

Drill & drill bits	#1 & #2 Phillips screwdriver	Soldering iron/solder
Masking/painters tape	Finishing/painting material	Sand paper 220 & 320 grit
Guitar strap	Soap or candle	Feeler gauge
ruler	Wood glue	Wire cutter

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The remainder of the assembly instructions is divided into four sections:

Section 2 – Mockup & Fit check: in this section, all components will be checked for proper alignment and ensure that all holes have been drilled.

Section 3 – Finishing the Body and Neck: after fit check, the components are removed from the neck & body to allow the selected finish to be applied. This will allow you to customize your guitars' color(s). As the finishing will likely require several coats with sanding between each coat, ensure that the finish is completely dry.

Section 4 – Construction: the final assembly is the next step - once the finish has been applied and completely dried. In this section, all of the components are installed, internal wiring connected and strings attached – your guitar will ready to go!

Section 5 – Setup: in this section, adjustments are made to your guitar such as the height of the pickups.

Again, we thank you for your purchase of a BYO Guitar and we look forward to seeing pictures of your unique guitar! We also look forward to providing you with the guitar for your next project from our Custom Shop where you can select the wood for the body and neck as well as customizing all of the other components.

Let us know if your music, school, church or scouting organization would like to undertake a group project – BYO Guitar can supply multiple kits or custom guitars.



Some Ideas for Finishing Your Guitar and Examples of Our Custom Shop Products

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2 Mockup and Fit Check

The following steps will ensure that the base, neck, tuners, pickups, etc. are properly aligned and that all screw holes have been drilled.

2.1 Checking the Mounting Holes in the Neck

1. Check the neck for pre-drilled (4) mounting holes.
2. Skip to 2.1.2 if the holes are pre-drilled.

2.1.1 Drilling Mounting Holes in the Neck (Fig 2.1)

1. Place the neck in the pocket (...you should be able to fit the neck in the neck pocket by hand).
 - a. Make sure the neck is aligned properly with the pickup pockets.
 - b. Carefully clamp the neck in place – frets damage easily.

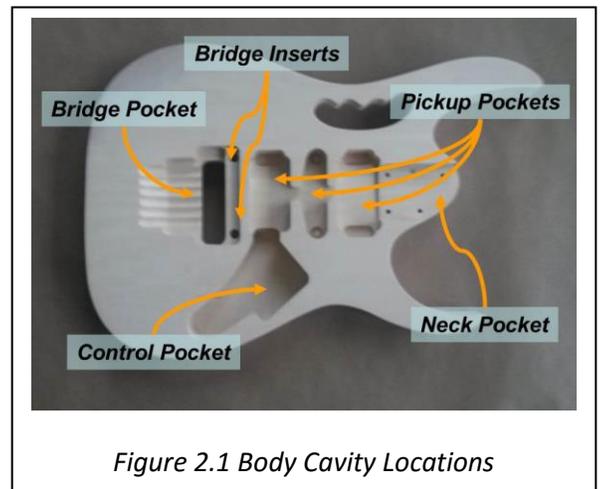
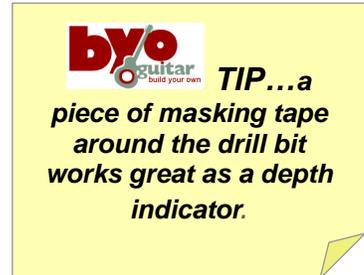


Figure 2.1 Body Cavity Locations

Section 2 – Mockup and Fit Check



- c. Using the 3/32 drill bit, place the bit in the hole through the body and tap it a few times to make a mark on the neck.
 - d. Remove the neck from the body.
2. Determine the neck mounting hole depth.
- a. Place one of the neck mounting screws with ferrule (item #7 on material list) through the body into the neck pocket.
 - b. Measure the amount of the mounting screw that extends up into the neck pocket, and mark your drill bit.
 - c. **Double check the depth** by holding the marked drill bit to the side of the neck and be certain the drill won't go through the fingerboard.
3. Drill the holes in the neck with a 1/8" drill bit. **Make sure you don't drill through the fingerboard!**



2.1.2 Mount the Neck on the Body

Temporarily attach the neck. Use caution, the last thing you want to do is snap the screw off in the hole!

1. Insert the neck into the neck pocket aligning the mounting holes in the neck and body;
2. Fasten the Neck & Body with 4 #7 x 1 ^{3/8}" screws and ferrules (item #7 on material list), but do not over tighten them.



2.2 The Bridge

Mounting the Bridge assembly (item 4 on material list) on the JEM guitar utilizes two inserts in the Bridge Pocket (Fig 2.1) that will be installed in Section 4. When finishing the Body (Section 3), be careful not to allow finish material into the insert holes.

2.3 Fit check & Alignment of the Pick Guard (...with mounted controls)

The Pickguard and controls (...volume, tone and pickup select switch) are supplied as a complete assembly ready for installation. Check wiring connections to ensure solid solder joints. Section 4 contains a physical/wiring diagram for any identified issues. The wiring on the pickguard may need to be unbundled in order to fit into the channel between the pickup pockets. Use caution when checking the Pick Guard as to maintain wiring integrity.

1. Place the Pick Guard assembly into the Control & Pickup pockets (reference Figure 2.1), temporarily

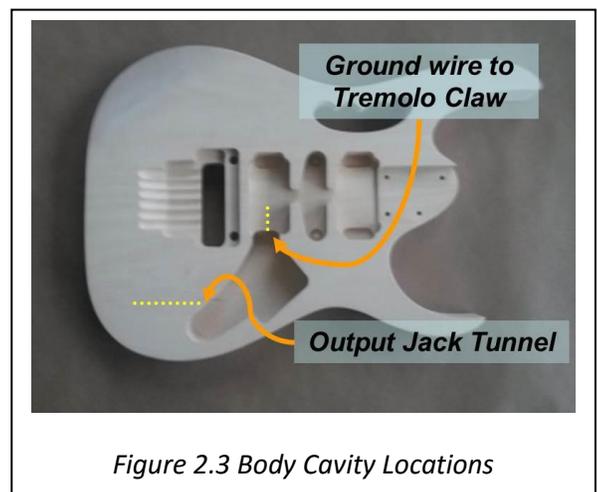


Figure 2.3 Body Cavity Locations

running the Output Jack wiring (...typically blue & black) and the Tremolo ground wire (...black) through the respective tunnels (Fig. 2.3).

2. Carefully move the Pick Guard so that it is flush with the top of the Body, while aligned with the Neck Pocket and the contours of the body. Mark & pre-drill 2 holes in the Body for mounting the Pick Guard. Using 3/8" screws (item 3 on Material list), attach the Pick Guard (2 screws).
3. After ensuring the alignment of the Body & Pick Guard, mark and drill the remaining Pick Guard holes with a 1/16" drill bit. Ensure all holes are pre-drilled.

2.4 Check Tremolo Claw Alignment and Fit Check (item #5 on material list)

Place the Tremolo claw in the back pocket of the Body (Fig 2.4) ensuring the claw is centered in the pocket.

1. In order to make the assembly process easier, pre-tin the claw ground point (raised tab in the center of the claw);
2. Using the claw as a template, mark the hole positions and pre-drill 2 holes;
3. Start the mounting screws approximately 1/2" into the Body – ensure they are centered (Figure 2.4).



Figure 2.4 Tremolo claw Alignment

2.5 Fit check of the Tremolo, Jack (Fig 2.5.1) and Truss Rod Adjustment Cover

2.5.1 Tremolo cover:

1. Place cover over Tremolo pocket, pearl finish up (item 12 in material list);
2. Mark the holes and drill starter holes with 1/16 drill bit.

2.5.2 Output Jack Cover:

1. Place cover over Output jack pocket, pearl finish up (item 12 in material list);
2. Mark the holes and drill starter holes with 1/16 drill bit.

2.5.3 Truss Rod cover:

1. Place cover over Truss rod access hole (Fig 2.5.3), pearl finish up (item #14 on material list);
2. Mark the holes and drill starter holes with 1/16 drill bit.



Figure 2.5.1 Back Body Cover Alignment

2.6 Check Strap Pins

1. Check for pre-drilled holes for the Strap Pins (item 10 on



Figure 2.5.3 Truss Rod cover

the material list), reference Figure 1.0.

2. If the holes are pre-drilled, skip to 2.7.
 - a. Mark the rear Strap Pin hole so that it is centered on the Neck/Bridge and the forward Pin on the most forward point on the top of the Body (see Figure 1.0).
 - b. Drill starter holes with a 1/16 drill bit.

2.7 Check Tuner Alignment

Each tuner consists of the tuner, washer, and a threaded bushing (item #8 on material list). The tuners are attached to the headstock with small wood screws.

1. Insert tuners, 6 each (item #8 on Material List), into the Neck Headstock. Ensure that the Tuner shafts are perpendicular to the Headstock (Fig.2.7).
2. Check alignment of set screw holes and tuner base.
3. If alignment is incorrect or holes are not drilled, mark hole locations and drill starter holes with 1/16 drill bit being careful not to drill through the headstock.



Figure 2.7 Tuner Alignment

2.8 String Retainer Bar

The two (2) holes required for the installation of String Retainer bar (2), Figure 2.8, will be during the guitar final assembly.

2.9 Mockup and Fit Check complete!

Carefully disassemble the Mockup and move on to the next step: applying the finish to your guitar!



Figure 2.8 String Retainer Bar

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3 Finish

Before starting the finish make sure all holes are drilled for any remaining hardware (pickguard, jack plate, strap pins etc). This section will cover the application of several finish types, including;

1. Solid color
2. Pigmented translucent, gel stain or alcohol dye
3. Penetrating stain or water based dye

The guitar body was sanded at the factory and coated with one coat of sand and sealer. To get a good finish, the body should be sanded with a series of sandpaper grits up to #320 grit. Apply a solid color finish, a pigmented translucent finish (Bursts, toners, Blonde, Butterscotch Blonde etc), a gel based stain or an alcohol based dye finish over the sanding sealer. If you plan on using a penetrating stain or water based dye, the sanding sealer must be removed.

How you proceed will depend on the finish you would like on your guitar.

The following paragraphs outline several finishing processes, starting with the sequence for a finish type (paragraph 3.1) followed by detailed explanation of each sequence step (paragraph 3.2).

Caution: if you remove the nut/string tie down from the headstock in preparation for finishing the neck, tape/cover the mounting area on the neck as to avoid material build-up that might influence the tuning of your guitar.

3.1 Finish Application Steps

3.1.1 Solid Color finish:

1. Sand the body and neck
2. Apply grain filler if desired.
3. Apply 2 coats of sand and sealer
4. Sand to 320 grit
5. Apply primer
6. Sand the primer
7. Apply color coats
8. Apply clear top coats
9. Buff finish

3.1.2 Pigmented Translucent, Gel stain or alcohol dye finish:

1. Sand the body and neck
2. Apply grain filler if desired.
3. Apply 2 coats of sand and sealer
4. Sand to 320 grit
5. Apply stain or dye
6. Apply clear top coats
7. Buff finish

3.1.3 Penetrating Stain or water based dye finish:

1. Sand the body and neck to bare wood
2. Apply grain filler if desired.
3. Apply stain or dye
4. Apply 2 coats of sand and sealer
5. Sand to 320 grit
6. Apply clear top coats
7. Buff finish



TIP... re-open any of the screw holes in the body. Use a toothpick or small drill held between your fingers to clean out any filler in the holes.

3.2 Explanation of Sequence Steps:

3.2.1 Sanding the Body and Neck

1. Wear a NIOSH-approved respirator and ANSI-approved safety glasses when sanding wood!
2. Before starting the finish on the neck mask off the surface of the fingerboard.
3. Use a flexible sanding block with #150 grit aluminum-oxide sanding paper to sand the guitar body until there is a consistent scratch pattern on the entire surface. Note: DO NOT round over

the neck pocket or the body cavities. When hand sanding, always sand in the same direction as the wood grain.

4. Re-sand the entire guitar body and neck with #220 grit sanding paper and lightly round over the outside edges of the body.
5. Wipe the guitar body and neck with a damp cloth to “raise” the wood grain.
6. Wait until the wood is dry and re-sand with #220 grit sandpaper to sand the “raised” grain smooth.

(Note: On a maple fingerboard you can apply a clear finish to the entire neck and fingerboard. Apply several coats and remove buildup on the frets between coats. An easy way to remove the finish buildup on the frets is to take a nail and file a half round slot in the head about the same size as the frets. You can then use this to easily scrape any finish build up.

If the neck has a Rosewood or Ebony fingerboard, be sure to tape off the fingerboard before applying the finish. Behlen’s Fingerboard Oil is a great product for your fingerboard.)

3.2.2 Applying Grain Filler

Grain filler will fill in the grain and create flat surface. This is essential if you are trying to get a high gloss finish. Oil based grain filler is recommended. We recommend using Behlen PORE-O-PAC grain filler. For most finishes use natural colored filler. The dyes used in darker fillers may over time find their way through the color coat.

Apply the filler by wiping across the grain. You can use a course cloth or your fingers to wipe the grain in. After it has dried about ten to twenty minutes the excess can be removed with a cloth dampened with mineral spirits. After about an hour repeat the process and let dry overnight. If you have removed most of the excess with mineral spirits the remaining filler on the field of the wood can be sanded off (use #220 again) in a few minutes. It is also a good idea at this time to reopen any of the screw holes in the body. Use a toothpick or small drill held between your fingers to clean out any filler in the holes. The body is now ready for a sand and sealer coating.

3.2.3 Applying Sanding Sealer

Sand and sealer is used to give the final coat a level base. It is also helpful in filling scratches which are too deep to sand out. We recommend using Behlen Vinyl Sealer. This comes in aerosol cans and can easily be sprayed on.

3.2.4 Solid Color Primer

The last step before applying the color coats is to apply a white primer coat. We recommend using Ohio Valley Nitro Primer. The white background will also let you apply an opaque color coat with less paint. Spray on two coats. When dry you may notice that the surface feels rough. Sand off the roughness with #320 dry and respray. Sand again. If the surface now appears smooth and all grain is opaqued you are ready for the color coat.

3.2.5 Burst and Translucent finishes

Bursts and Translucent finishes can be applied using aerosol cans of lacquer toner. Ohio Valley Nitro and Behlen have a full line of Nitrocellulose Lacquer Toners to achieve these finishes.

3.2.6 Clear Top coats

Apply several thin coats of the finish, following the manufacturer's instructions. Multiple thin coats usually produce a better quality finish than one heavy coat. Dry sand the entire body with #400 grit wet dry sandpaper after at least three coats of finish have been applied. DO NOT sand through the finish, be careful on the edges. Use a tack cloth to remove sanding residue. Apply more finish, sanding between coats, until the finish is the desired thickness.

3.2.7 Buff finish

When the final coat has dried at least a week, preferably a month, remove the masking. Wet sand the finish using #600 grit wet/dry sandpaper with a sanding block, followed with #1000 grit wet/dry sandpaper. Use a clean, absorbent rag to remove excess water. Let the guitar dry completely, then use a tack cloth to remove all residue. Buff the finish by hand or with a buffer, starting with a medium polish and working up to a high gloss polish.

Note: If you use a buffing machine, be careful to avoid going through the finish, especially on the edges.

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4 Assembly

After your finish has been applied and thoroughly dried, we can now assemble your guitar. In this section we will permanently install all of the components and solder the wiring for the bridge and pick guard pickup.



TIP... use a blanket or large towel on your work area to protect your guitars' finish

4.1 Installing the tuners

Each tuner consists of the tuner, washer, and a threaded bushing. The tuners are attached to the headstock with ³/₈" wood screws (refer to Section 2.7).

1. Place the six tuners into the holes on the back of the headstock;
2. Slide a washer over the tuner shaft and secure the threaded bushing onto the tuner – do not tighten yet;
3. Secure the machine heads to the guitar headstock with the supplied screws - tighten the threaded bushings. Remove the protective film if necessary.

4.2 Output Jack wiring & Installation

Section 4 – Assembling Your Guitar



Insert the Output Jack (item #9 on the material list) through the tunnel in the end of the Body; secure with supplied nut (align the jack contacts to allow for easy soldering prior to tightening).

1. Check the length of the Output jack wires – if they extend beyond the Body, it may be easier to solder the wires to the jack prior to inserting in the Body. Ensure that the wires run through the nut (inside the jack pocket).
2. Solder the signal and ground wires to the jack (see Figure 4.2) (Note: if the signal wire is shielded, solder the shield to the ground terminal on the jack).
3. Install Output jack cover – pearled surface up.

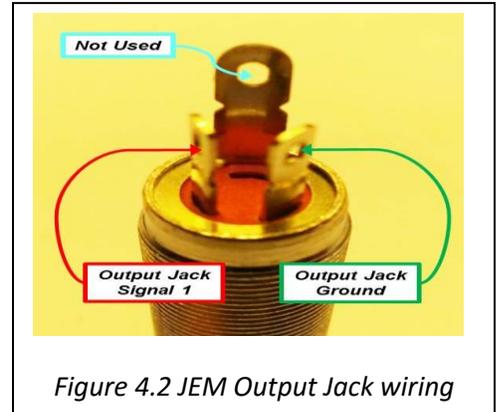


Figure 4.2 JEM Output Jack wiring

4.3 Installing the Strap Pins

Secure each strap pins (2) in the pre-drilled holes with the supplied screws (2ea, 1”).

4.4 Assemble Pick Guard, Bridge and Neck to Body

Refer to Figure 4.4 during this section. Noted wiring colors are typical and may vary.

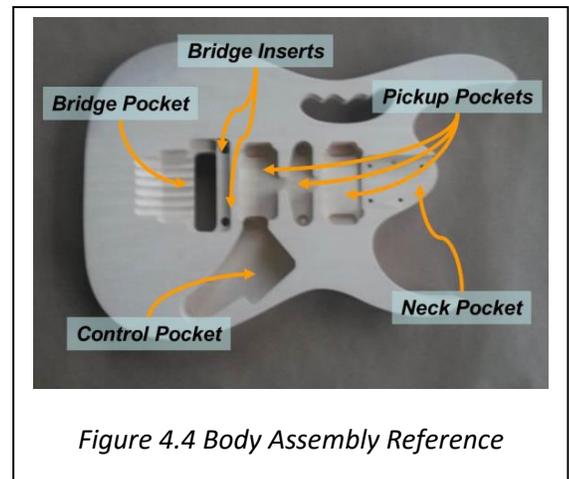


Figure 4.4 Body Assembly Reference

4.4.1 Pick Guard & Controls Installation

1. Check the wiring harness and the integrity of the solder joints, referring to Figure 4.4.1-1 as required.



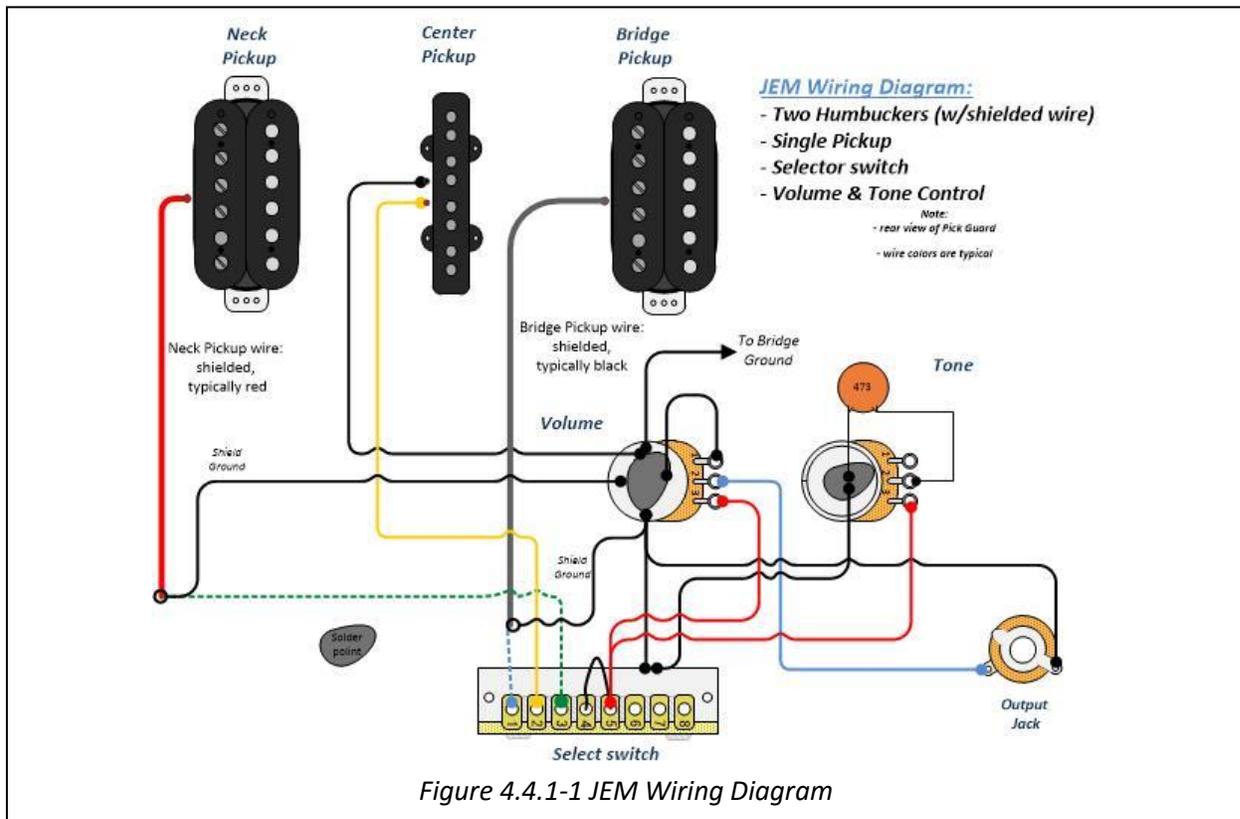
Tip...if the wires are not red, black & white, the 2 wires soldered to the Volume potentiometer case are the ground wires; the remaining wire is the signal wire: run the signal & 1 ground wire through the output jack tunnel and the remaining wire through the tremolo tunnel



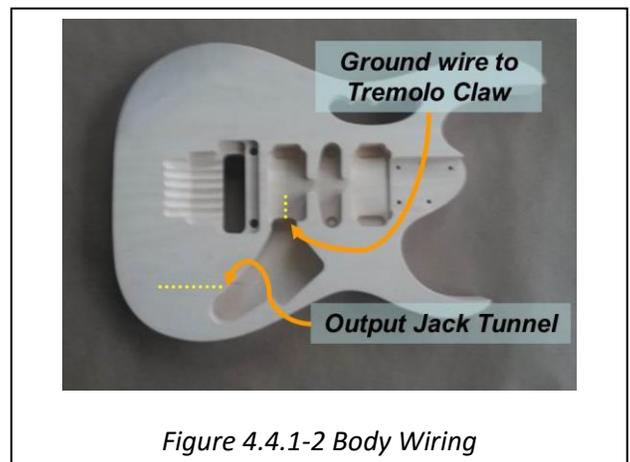
reminder... remove the protective film from the Pick Guard, back covers, tuners & pickups

Section 4 – Assembling Your Guitar

- Carefully insert the Pick Guard into the Pickup Pocket (Figure 4.1). Ensure that the wiring bundle fits in the channel between the pickup pockets:



- with the Blue & one Black wire (typical) running through the tunnel (Figure 4.4.1-2) between the Control Pocket and the Jack Pocket, and
- with the black ground wire (typical) running through the tunnel (Figure 4.4.1-2) between the Control Pocket and the Tremolo Pocket in the back of the Body.
- Seat the Pick Guard – gently pulling the wires to ensure they are through the tunnels.
- As done in the Mock up (Section 2.3), carefully move the Pick Guard so that it is aligned with the Neck Pocket and the contours of the body. Using 3/8" screws (item 3 on Material list), attach the Pick Guard.



4.4.2 Neck Installation

- Insert the neck into the neck pocket, aligning the mounting holes in the neck and body;

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2. Fasten the Neck & Body with 4 #7 x 1 ³/₈" screws ensuring alignment of the Body, Pick Guard and Neck – do not over tighten.

4.4.3 Installing the Floyd Rose Tremolo

Unlike hard mounted bridges, the Floyd Rose style utilizes a floating bridge base that allows the tremolo to pivot forward and backward. The floating bridge is balanced (positioned) between the tension of the strings and the tension of the springs in the back pocket in the body of your guitar. This type of system requires several iterations of the string & spring tension adjustment to optimize your style of playing.



Figure 4.4.3-1 Tremolo Claw Installation

1. Remove the adjustment screws from the inserts (item #4 on the material list) and gently tap the insert into place (ref. Fig 4.4) using a piece of wood on top of the insert so you don't damage it.
2. Install the Trem claw in the front of the bottom Pocket (Fig 4.4.3-1), ensuring it is centered in the Pocket, so that about ½ of the screw threads are exposed. This allows you to adjust the tension of the springs.
3. Insert the adjustment screws into the inserts – final height adjustment will be made when the strings are installed.
4. Solder the bridge ground wire to the tab on the trem claw.
5. Prior to installing the trem block, set the Fine Adjustment screws to mid-range (Fig. 4.4.3-2) and loosen the string locking bolts so they can be hand tightened. Should the saddle blocks (small black inserts behind the string saddle) fall out, ensure that the indentation faces the locking bolt when you replace them.
6. Insert the trem block in the front of the Body and attach the springs using pliers to stretch the springs into position. Use the center and each end tab on the claw to attach the 3 springs (Fig 4.4.3-3). **Caution:** if you lose grip of a spring it can fly and cause injury as well as damage to the paint on the body. Tighten the screws on the

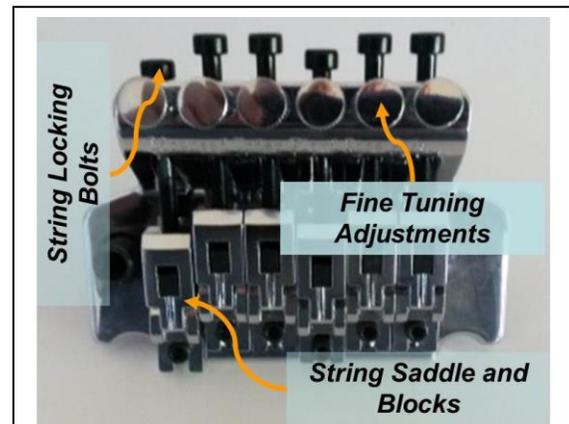


Figure 4.4.3-2 Bridge Adjustments



Figure 4.4.3-3 Tremolo Claw Installation

Section 4 – Assembling Your Guitar



spring claw so there is a little play in the block. The block still needs to be able to move if you plan on using a whammy bar.

4.5 Install the Strings

Like most projects, there often several tricks that will make the assembly easier and your guitar better. Properly stringing your guitar is just one of those tricks. Please review the  following videos:

“TECH TIP: Restringing your Floyd Rose Guitar”: this video deals with replacing the strings on a Floyd Rose Guitar but includes tricks that can be used for your initial string installation.

<https://www.youtube.com/watch?v=zEH3Ey76yb4&nohtml5=False>

“Framus Tutorial: Setup of a Guitar with a Floyd Rose Tremolo”: this video also covers the replacement of the strings as well as additional setup procedures you will need for section 5.

<https://www.youtube.com/watch?v=YN7qF6JLoIc>

Additional resources are available on  as well as the internet. Although these videos address restringing a guitar, the principles and techniques will help you string your guitar – as well as provide a visual for stringing your guitar.

1. At the headstock, remove the 3 string lock blocks from the nut using the 3mm Allen wrench and align the tuners so that the hole is parallel to the tuner shaft.
2. While holding the bridge assembly by the string locking bolts, use the 3mm Allen wrench to adjust the initial height of the bridge base so that it is approximately 1/8” above the Body. Ensure that the base notches are in the collared head of the adjustment screw (Fig. 4.5-1).
3. Carefully uncoil each of the strings (6), ensuring that the stings do not have a kink.
4. Select the low E string (largest diameter string) and remove the “string ball”, cutting the string approximately 1” from the ball. Place the string between the low E saddle and the retaining block, then tighten the associated string locking bolt with the 3 mm Allen wrench. Bend the string down against the saddle with your finger to form a 90 degree bend.
5. Adjust the hole in the first tuner to be perpendicular to the neck.
6. Run the string upward through the hole in the tuner till snug on the neck and nut slot; gently pull the string backward for a length of about 2 frets (check the video).
7. Run the string forward (toward the end of the headstock) wrapping the around the tuner and under the sting; bend over the string (toward the end of the headstock).
8. Tighten the string down with the tuner; when the string is snug against the 1st slot in the nut, trim the excess string.
9. Repeat steps 4-8 using the next smaller diameter string & the tuner.

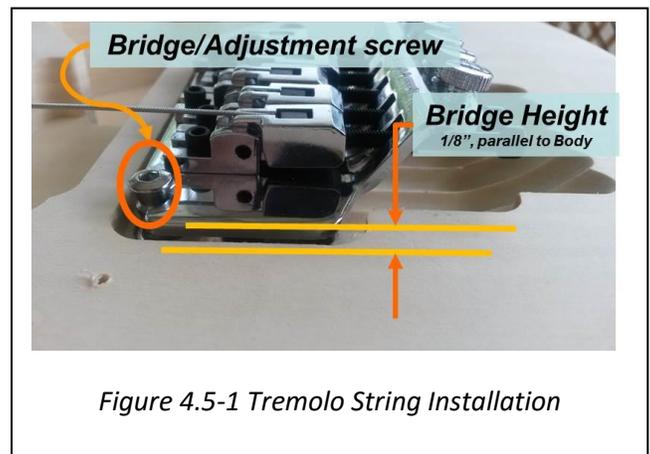


Figure 4.5-1 Tremolo String Installation

10. Replace the nut locking blocks, but do not tighten.
11. Install the Tremolo arm (item #6 on the material list) on the Bridge. Offset the arm end by approximately 2" (or at your preferred offset) from the high E string

4.6 Tremolo Claw Adjustment

The overall objective of this adjustment is to use the Tuners & claw tension adjustment to have the bridge base elevated 1/8", parallel to the Body and the guitar close to tune.

1. Recheck the height of the Bridge base ensuring the base is 1/8" on both sides of the Bridge – adjust if necessary.
2. Tune the low E string with the tuner – check base and Body for being parallel. Tighten claw to return to parallel if necessary. Ensure equal adjustment of both screws so claw remains parallel to Tremolo block.
3. Repeat 1&2 on remaining strings.
4. Recheck tuning on all strings – repeat 1, 2 & 3 as necessary.
5. Install the Tremolo cover over the Tremolo pocket using supplied 3/8" screws.



Tip... Put a shim or block between the string locking bolts and the guitar body. This will help hold the Bridge in place.

4.7 Installing the Strap Pins

Secure each strap pins (2) in the pre-drilled holes with the supplied screws (2ea, 1").

4.8 Installing the String Retainer & Truss Bar Access Cover

4.8.1 Truss Access Cover

1. Place the pearled access cover (item 14 on material list) over the Truss hole in the Headstock;
2. Attach with supplied screws.

4.8.2 String Restraint

The String Restraint is used to ensure a steep angle of the strings (relative to the nut) and is placed on the Headstock approximately 1/2" to the right of the nut string locks (Figure 4.8).

1. Align the restraint bar with the string nut with 1/2" spacing;
2. Carefully drill 1/16" starter holes.
3. Attach restraint with supplied screws – do not tighten until the guitar is tuned to your satisfaction.

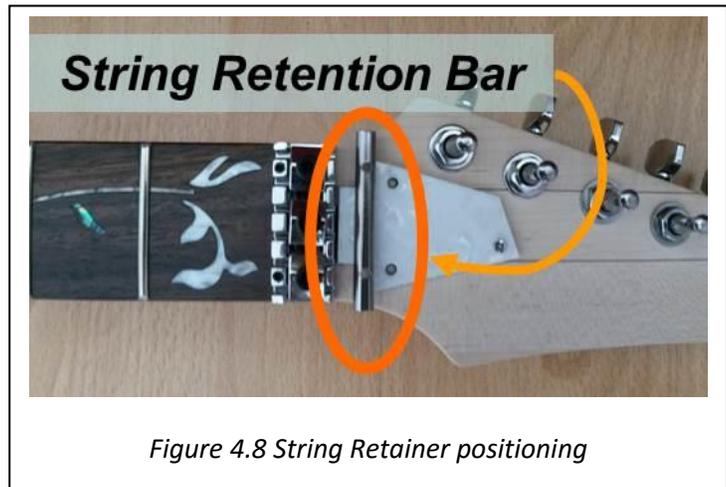


Figure 4.8 String Retainer positioning

Assembly of your Guitar is now complete – let's set it up!!

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5 Initial setup

In this section, we will address the initial setup for:

1. Adjusting the Neck (Truss Rod);
2. Adjusting the String Action (string height);
3. Adjusting the Pickup heights;
4. Adjusting the Intonation.

These adjustments will provide preliminary settings from which you can fine tune the sounds to your individual playing style. As with previous sections,  references are included for visualization and additional clarification of specific adjustments.



reference...check out the following



references that can be helpful in tuning your guitar:

- ✓ **tone generator for tuning:** http://www.get-tuned.com/online_guitar_tuner.php & <http://www.guitarforbeginners.com/onlinetuner.html>
- ✓ **downloadable “musical instrument tuner” from PerfectPitch** (<http://www.nch.com.au/tuner/>) **that will allow visualization of string adjustments**

In addition, check out this link for additional insights on setting up your guitar:

“How to Set up a Floyd Rose Bridge -- AND keep it in Tune”

[http://www.guitarrepairbench.com/electric-guitar-repairs/floydrose tremolo_setup.html](http://www.guitarrepairbench.com/electric-guitar-repairs/floydrose_tremolo_setup.html)

Ensure that the locks (3 each) are removed from the nut then tune the guitar.

5.1 Adjust the Guitar Neck: Truss Rod

The first major procedure in the setup is adjusting the neck relief. Neck relief simply refers to how much the neck bows. The degree of bowing in the neck is a matter of personal preference and is correlated to your playing style.

5.1.1 Check the Neck

Get a ruler or straightedge that is at least as long as the neck, but not so long that it reaches all the way from the nut to the saddles. If you can't get one between these lengths, and are willing to sacrifice a ruler, get one that's too long and cut it to length. Alternatively, you can

just cut a little out of one edge so that you can still make full use of the other edge of the ruler. Now lay the edge of the ruler along the frets (don't rest it on top of the nut, saddles, or pickups).

Using a feeler gauge or high resolution metal ruler, measure the string height (the gap between the ruler/string and the top of the fret) at about the 8th fret. The string height should be approximately 0.012" - simply slide the feeler gauge into the gap to see if it is too big/small.

5.1.2 Adjusting the Truss Rod

Tightening the truss rod adjustment bolt will cause the neck to warp backward (too much and the strings will buzz on the frets), and loosening it will cause it to bow forward (giving more relief.).

CAUTION: If you find that the truss rod is very difficult to turn, then stop. It may be that there is a problem with the neck or the truss rod and you may damage the guitar by forcing it.

Sight down the edge of the fingerboard from behind the headstock, looking toward the body of the guitar.

1. Remove the Truss access cover.
2. If the neck is too concave (action too high), use the 4mm Allen wrench to turn the truss rod nut clockwise to remove excess relief (only adjust ¼ turn at a time).
3. If the neck is too convex (strings too close to the fingerboard), turn the truss rod nut counter-clockwise to allow the string tension to pull more relief into the neck.
4. Check the tuning, then re-check the gap with the feeler gauge and re-adjust as needed.
5. Replace the Truss access cover.

5.2 String Lubrication

Lubricate the contact points of a string's travel to ensure tuning stability and reduce string breakage.

Lubricate string/saddle contact points on the nut and bridge with a light machine oil (...such as 3-in-1 oil



reference: ...check out the following



for adjusting the Truss rod as well as other setup adjustments:



<https://www.youtube.com/watch?v=YN7qF6JLolc>



TIP... do the neck adjustment in a series of intermediate steps and re-tune your guitar before each step – different tension on the strings changes the adjustment of the neck

because it contains anti-rust and anti-corrosive properties) every time you change strings. Use a Q-tip with oil rather than straight from the can.

5.3 Re-check the Bridge Alignment

As part of the Assembly section, the height and floating position of the Bridge were set up. In this step will recheck the Bridge and adjust if necessary.

1. Tune the guitar to pitch (...again)
2. Check the angle of the Bridge base relative to the Body: is it tilting toward the Body or lifting up from the Body?
3. If the Bridge Base is parallel to the Body and is approximately 1/8" above the Body, continue to step 5.4.
4. Remove the cover from the claw pocket in the back of the Body.
5. Adjust the Bridge mounting screws to the 1/8" height.
6. Adjust the screws in small increments to lower the Bridge (tighten), or to raise the Bridge (loosen). Adjust the screws equally.
7. Retune the guitar and check again – repeating steps 5-7.
8. Replace claw pocket cover.

5.4 Adjusting the Action (string height)

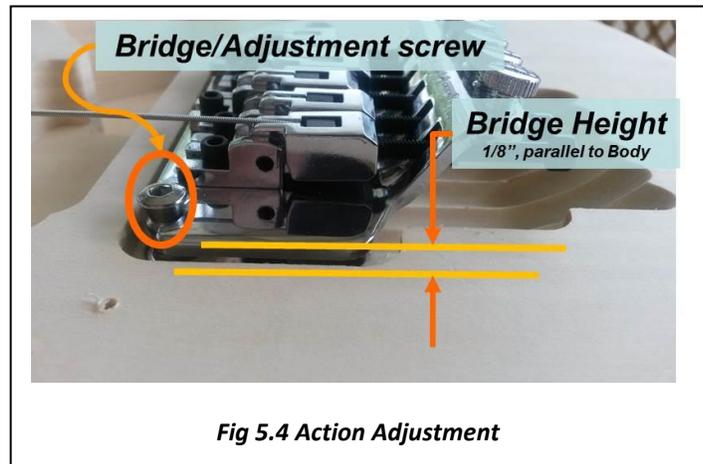
This will adjust the height of the strings over the 12th fret. Minor adjustments are made by raising or lowering the bridge which was previously set to 1/8" above the Body. As this is a matter of personal preference, this initial adjustment will give a place to start. There should be a gradual increase in height from the first string to the sixth string.

Adjusting saddle height is very easy on the JEM guitar. Since the bridge can only be adjusted at each end, there is no need to adjust each saddle individually.

1. Check and, if necessary, adjust the low (thick) E string height at the 12th fret to 2/64". Do this by adjusting the height of the bridge at the thick E string end (Fig. 5.4). This is done by rotating the Bridge insert adjustment counter-clockwise to raise the bridge or clockwise to lower it.

Adjust the height until string doesn't buzz on any fret from being too low, but low enough that you can play up and down the neck easily. There's usually a sweet spot where you can just start to detect some buzzing and you can leave it just a tiny bit higher than that. Be careful if you use a tool as it is easy to slip and damage the finish on your guitar.

2. Now do the exact same procedure for the high (thin) E string using the other adjustment screw to 3/64th over the 12th fret.



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3. Play the guitar a little bit to see if any of the other strings are buzzing. If, say, the A string is still buzzing, then raise up the end of the bridge nearest to that string a little bit.

5.5 Pickup Height (Figure 5.4)

Each pickup is adjustable on the bass and treble sides. Finding the best combination of tone and volume will require some experimentation.

- 1 Bridge pickup:
 - 1.1 Press the 1st string onto the last fret and hold;
 - 1.2 Using a machinist ruler, measure the distance from the top of the pole to the bottom of the 1st string – note bass measurement;
 - 1.3 Repeat #1.1 & #1.2 on the 6th string – note the treble measurement;
- 2 Center Pickup: repeat steps 1.1 through 1.3 (above) on the center pickup, noting measured heights.
- 3 Neck Pickup: repeat steps 1.1 through 1.3 (above) on the neck pickup, noting measured heights.

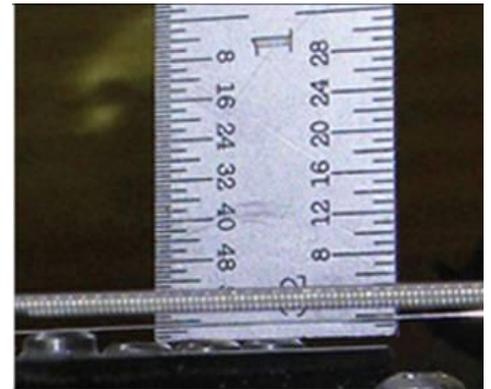


Fig 5.4 Pickup Height Measurement

Table 5.5		
Pickup Height Guide		
Pickup	1st String	6th String
Bridge	2/64"	3/64"
Center	2/64	3/64"
Neck	3/64"	4/64"

Using Table 5.4 as a reference, adjust the height of the pickups by turning the adjustment screws for the bridge, & neck pickups – recheck string heights after each adjustment.

5.6 Intonation (Figure 5.6)

Adjustments should be made after all of the above have been accomplished.

1. Set the pickup selector switch in the middle position.
2. Turn the volume & tone controls to maximum.
3. Check tuning. Check each string at the 12th fret, harmonic to fretted note (make sure you are depressing the string evenly to the fret, not the fingerboard).

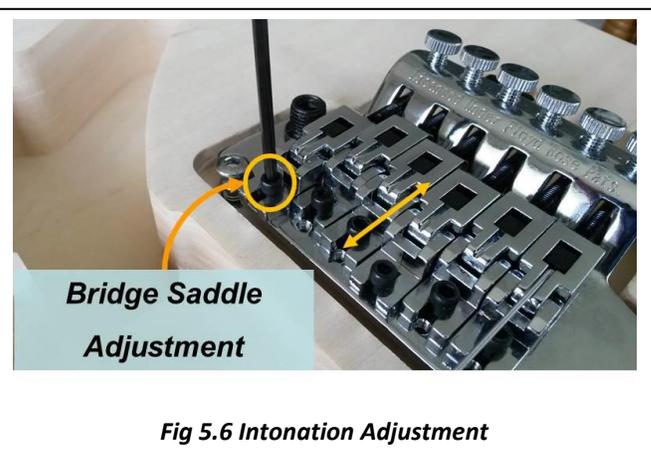


Fig 5.6 Intonation Adjustment

Section 5 – Initial Setup



4. If sharp, lengthen the string by adjusting the saddle back. If flat, shorten the string by moving the saddle forward. Otherwise, go to step 5.7
 - a. Loosen the nut lock (on the Headstock) for the specific string that you are adjusting.
 - b. Then using the Tuner, remove the tension on the Bridge saddle. Loosen the saddle bolt with the supplied 2.5mm Allen wrench (Fig 5.6). Adjust the saddle position in or out as determined in step 4. (Additional movement can be achieved by using the 2nd hole in the bridge to lock down the saddle).
 - c. Tighten the saddle lock bolt, retune the string and tighten the nut lock.
 - d. Repeat step 3 until you are satisfied.
 - e. Tighten the nut lock bolt.

5.7 String Retainer Adjustment

1. On the Headstock, tighten the string retainer so there is a slight downward angle from the nut to the tuners. Ensure nut locking bolts are secure.
2. Check that all pocket access covers have been screwed down (pearled side out) and that protective material has been removed.

5.8 ...Other Hints

There are a few other things that you can do to optimize your tuning stability:

1. Each time you play your guitar, before you do your final tuning, play for a few minutes to allow the strings to warm up. Metal expands when warm and contracts when cool. After you've played a few riffs, you can then do your final tuning;
2. Wipe the strings, neck and bridge with a lint-free cloth after playing;
3. When transporting or storing your guitar, even for short periods, avoid leaving it anywhere you wouldn't feel comfortable yourself.

Remember, guitars are tempered instruments! Re-tune, play and make further adjustments as needed.

We hope you have enjoyed building your guitar! If you have any questions along the way please email us at sales@BYOGuitar.com.

