



Solo ES Style DIY Hollow Body Electric Guitar Kit

Assembly Manual
ESK-35

V 1.02

Show Off Your Custom Built Guitar!

When you have your guitar finished, please take a few pictures and send them to us for potential posting into the picture gallery on our website.



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<http://Facebook.com/SoloMusicGear>



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Remember, you can always find us online at <http://SoloMusicGear.com> to upgrade your parts, try a new kit, or ask us a question.

Thank you for purchasing a Solo DIY guitar kit. This unfinished guitar kit has everything for building an electric guitar – you will need only some basic tools and finishing supplies. All challenging wood cutting, drilling and shaping is already professionally done, as well as fret leveling and dressing.

1. CHECKLIST

Before you start working on your DIY guitar project, please check all the parts received in this kit.

2. TOOLS AND MATERIALS NEEDED

You will need the following tools and materials:

1. Sand Paper (180, 240 and 320 grit)
2. Sanding Block
3. Soldering Iron & Solder
4. Masking Tape
5. Finishing Supplies
6. Screwdrivers

3. SAFETY MEASURES

Some woodworking skills are required to complete this project. Always be aware of the necessary safety precautions and follow them – be sure to use safety glasses and a dust mask when you are working with any tools. If you are a novice, you should look for help and guidance of a more experienced friend. And never forget that it's always better safe than sorry.

4. FINISHING THE BODY AND NECK

Before you start finishing the neck, please inspect the frets and the fingerboard. Even though all wood is kiln-dried it may still shrink a little so you may get sharp fret edges.

In this case you need to use a fine needle file (Emory boards for finger nails can be used instead) to remove all sharp edges: first make all fret edges flat with the fretboard edges on both sides, than use masking tape on the top of the fretboard to protect it, and work on each fret's edge to smooth it by slightly rounding it. Before removing the masking tape, consider polishing the frets with fine steel wool.

STEP 1 – The body and neck have been coated with a poly resin sealant. They need to be sanded before finishing. **DO NOT SAND THE FINGERBOARD.**

For sanding both neck and body, use a flat sanding block for all flat surfaces and by hand for edges and

rounded/curved surfaces. Start with 180 grit sandpaper, continue with 240 and finish with 320, always moving along the grain only. Before the final sanding, wipe the wood with a damp cloth and let it dry to raise the wood grain.

STEP 2 – There are many different ways to apply finish to your guitar. Do a little research to decide which type of finish you want to use. One good starting point is to review tutorials at the Project Guitar website: <http://www.projectguitar.com/tut/tutorial5.htm>

STEP 3 - For any type of spraying finish (lacquer or paint) you will need to mask three areas with masking tape: neck pocket on the body, neck's fingerboard and truss rod nut. Press the tape tightly to the wood, not allowing any gaps at the edges, to completely prevent the finish leaking to these areas.

STEP 4 - You will also need to make hangers for both the body and neck (if you want to apply any spraying finish). Make them from a strong metal wire (wire dress/coat hanger can be used for it).

STEP 5 – Apply the finish by following the manufacturer instructions. Remember that spraying the finish is not an easy process as it requires certain skill and experience – you might want to practice first on some scrap wood. Always remember your safety – work only in a well ventilated area, away from any open fire and wear a respirator mask and safety glasses.

STEP 6 – Final polishing for high gloss finishes can be done manually or using a power drill with a foam polishing pad. The finishing tools and materials are readily available in many automotive/hardware supplies stores.

TIP: Consider an oil rubbed finish (sometimes called “wipe-on oil finish”) as a good and safe alternative. Tru-Oil® (known as a “Gun Stock Finish”, based on Linseed Oil) or Waterlox® (Processed Tung Oil) is highly recommended. Oil finishing takes longer, but it is very safe and easy to apply and a high quality finish can be achieved, even by a novice.

5. ASSEMBLY

Notes: The ESK-35 is a more advanced kit, and requires skills and techniques that are more specialized than on other kits. Be sure to read through the assembly process, cross-reference to your websites on guitar building, and please consult a skilled friend or guitar tech for more detailed tips! You can elect to glue the neck before or after finishing, however, you must tape the areas that will be glued to ensure a proper bond if you decide to finish the body and neck separately. We suggest that you attach the neck first and complete your finishing before proceeding with the assembly.

STEP 1 – Gluing the Neck. The ESK-35 is a semi-hollow body guitar and has a glued in neck (no screws). This design is known as a set-neck. Assuming your guitar body and neck have been prepared for finishing, and that all surfaces have been cleaned up, you can 'dry-fit' the neck to the body (just hold it in place to see how tight or loose it fits). It is very important to create register marks so the neck can be glued in the correct

location with regards to the pickups and bridge. You can use a clamp to lightly hold the neck in place while you take 2 straight edged rulers and hold them against the sides of the neck (remember that the neck should be flat to the bottom of the neck cavity and pushed into the neck cavity as far as possible)...align the neck so that the edges of the neck align equally to the two holes for the bridge pins...this will ensure the strings follow the correct path over the neck and pickups to the bridge. (Tip : use a piece of painters tape or masking tape across the body right behind the bridge post holes to make a couple pencil marks for aligning the neck) When you are comfortable with the neck location, you will want to create gluing cauls for the back of the body and the top of the neck. These are soft-wood scraps that will prevent the clamps from making marks in your guitar. The ESK-35 has a tongue on the end of the neck, one of the clamps will be placed on this tongue. You will need a piece of wood that you can slot to avoid the frets, or have a piece of closed cell foam to sit between the gluing caul and the fret-board (so that you don't damage the frets). Using a good quality carpenters glue, make sure you spread a thin coating of glue on both surfaces, assemble the neck to the body and clamp lightly....ensure the neck registers properly with the alignment marks you made earlier...tighten the clamps and re-check the alignment. When you are satisfied, clean up the excess glue with a damp cloth, making sure you wipe away all traces of exposed glue. You will want to leave the clamps on for 24 hours to ensure proper bonding and curing. At this point, please refer to the section on finishing your guitar, before proceeding with the rest of the assembly.

STEP 2 – Wiring Assembly. Take a piece of tracing paper and trace the hole configuration on the top of the guitar...transfer this tracing to a piece of cardboard and cut some small holes to mirror the guitar top....push the pots, switch and input jack into the appropriate holes, and turn the cardboard over. This will be your template for soldering all your wires (except the pickup wires. Follow the wiring diagram at the back of the manual, and be sure to leave a gentle arc of wire in between each connection, so there is some play between controls. You will need to drill a small $1/16''$ - $3/32''$ hole between the neck pickup cavity and the bridge post hole, closest to the controls. This will be for your ground to bridge. Take the ground wire and strip $3/8''$ - $1/2''$ to bare wire and insert this bare wire into the bridge post hole through the pickup cavity...when we insert the bridge post, this wire will be held in place. Route the other end of this wire through the existing hole in the pickup cavity so that it can be soldered to the closest ground connection. Now take your pickups and route the wires through the appropriate holes so they will be accessible to the controls (Don't screw the pickups down at this time, just hold them in place with a piece of painters tape so they can be properly aligned later). Pull all three wires through the closest part of the f-hole and cover the face of the guitar with a protective cloth. Lay the pre-soldered wire harness in place on the cover, and complete your wiring as per the diagram. Now the fun part.....how do we get all these controls into the body and up into the correct holes? The easiest might be to use pieces of fishing line....tie them securely around the threaded post on the pots, switch and input jack, and route the other end of the line through the appropriate hole in the guitar body, so when you are finished, you have one piece of line coming through each of the 6 holes. Now carefully manoeuvre all the parts into the body, through the f-hole until all pieces are inside. Gently pull the fishing line sections so the appropriate controls are lined up beneath each hole. Now you can pull each of the controls through the hole and fasten them with washers and nuts! (Note : It is always a good idea to check your connections before the final assemble of the electronics in case you have an issue....easier to fix before all the controls are mounted!) OK, the final piece of the electronics puzzle is aligning the pickups. (Note : There are adjustable screws on the top of each pickup...they will be faced in opposite directions...one set toward the neck and one set toward the bridge.) Using two straight-edges again, held against each side of the neck,

make sure the pickups are evenly aligned between the straight-edges, and parallel to the end of the neck. Using an awl, mark the holes in the corners of the pickup surrounds, drill a tiny pilot hole and fasten the pickups to the guitar.

STEP 3 – Inserting the Bridge Posts. If you look through the f-holes on this guitar, you will see there is a solid block of wood running from the neck to the tail of the guitar. The two posts for the bridge will be inserted into this block through the holes on top of the guitar body. It should be quite a tight fit, and the posts should be inserted all the way to the shoulder. Make sure the ground wire will make adequate contact with the post. There are two ways to insert the posts...if you have access to a drill press or arbour press, remove the adjustment wheel from the post, and (protecting the back of the guitar) push the posts into place with the press. If you do not have a press, remove the adjustment wheels from the posts, and gently tap the posts into place using a nut driver or metal tube to avoid damaging the threaded adjustment posts on top. You are now ready to drop your tune-o-matic bridge on top of the posts....but wait until you are ready to string the guitar, as the string pressure is what holds the bridge in place.

STEP 4 – Scratch Guard. You can elect to install the scratch-guard (or pick-guard) or not. If you want to install it....hold it in place to make sure the pick-up surrounds align with the cutouts. You may have to do a bit of sanding and/or filing, to ensure a good fit. There should be an equal space all the way around each cutout, for a clean professional look. Attach the l-shaped bracket to the bottom of the pick-guard loosely, and mark a hole on the side of the guitar where it will be attached. Also. mark the second screw hole on the top beside the neck....drill small pilot holes for both screws and attach.

STEP 5 – Tuning Keys. Line up the tuning keys, the washers and the threaded barrel nuts in the order you want them on the guitar. Insert the post through the back of the headstock, install the washer and then screw the threaded barrel nut so that it is finger tight. Do this for all 6 tuners and align them so the spacing is clean and professional. Mark the back of the headstock for the screws, drill small pilot holes and install all 6 screws. Now, using an appropriate wrench or driver, tighten the barrel nut on the front of the headstock. Finally, take the truss rod cover and align it properly over the truss rod...mark these screw holes and drill pilot holes as well. Do not install truss rod cover until the guitar is completely set up however, in case you need to make more adjustments.

STEP 6 – Tailpiece. The tailpiece for the ESK-35 has 3 holes for attachment. You will first have to align the tailpiece, so the strings have the correct position and equal pull. You can use whatever method is easiest, but if you take 2 pieces of string and attach them to the outside tuners, stretch the strings back to the tailpiece and loop them through the outside string retainers; it will be very easy to slide the connection plate along the back edge of the guitar until the alignment is 100%. When you have the correct location, mark all 3 holes, but only install screws in the upper two holes. You will need to place a strap button over the single hole before installing that screw. The second strap button will be installed on the upper horn of the guitar, usually in the middle of the rim at the end of the horn, or in the back of the horn. This is a personal preference decision, although it does affect how the guitar hangs on the strap.

STEP 7 – Installing the Strings : You are now ready to install your strings. Just before you start, it is a good idea to treat the fretboard with a light oil. This keeps the fret-board from shrinking and cracking, plus

reduces discoloration and dirt from entering the pores in the wood. You can purchase fret-board oil, or you can use any light non-food oils, like tung oil or walnut oil or lemon oil.

The strings are numbered from the thinnest to the thickest from 1-6. (This means the top string when you are playing the guitar is the thickest and is number 6) In standard tuning the open notes are 1-E, 2-B, 3-G, 4-D, 5-A, 6-E. The strings are installed by inserting the ball end into the appropriate slot on the underside of the tail-piece. Stretch the string over the appropriate saddle and slot on the nut, and wind through the correct tuning key. Repeat for all six strings and bring the guitar strings to tension (tune the guitar).

Once all the strings are installed and brought up to pitch using a tuner, you are ready to move on to 'Setting Up the Guitar'.

6. TUNING AND SETUP

Tuning a 6-string guitar:

The open strings of a guitar, from the thickest to thinnest, in standard tuning are:

- E (2nd octave) – the thickest (or lowest sounding) string - is the 6th string
- A (2nd octave) – is the 5th
- D (3rd octave) – is the 4th
- G (3rd octave) – is the 3rd
- B (3rd octave) – is the 2nd
- E (4th octave) – the thinnest (or highest sounding) is the 1st string.

There are different methods to tune a guitar. Using a digital tuner is the easiest way. However, it is good to learn tuning (and checking the accuracy of tuning) by ear with natural harmonics, unisons, octaves etc.

Guitar playability and intonation depends on its setup, so you may want to spend some time mastering the necessary skills – be persistent in finding the optimal action (string height), neck relief and intonation throughout the entire neck.

Adjusting Strings Height:

The string height is ruled by 3 physical adjustments. First, the nut at the headstock of the guitar must be properly slotted for height and string gauge. The nut supplied with this kit has been slotted for medium gauge strings and should be acceptable as far as the height of the string over the 1st fret. Second is the height of the bridge and/or saddles (depending on what style of bridge is supplied with the kit). Since the fret-board has a radius on top, you must be sure to reflect that radius in the string height...in other words, when the string height is adjusted, the strings should have the same radius as the neck. The third adjustment is the 'Neck Relief' and you will be referring back to the section 'Adjusting Neck Relief' during this part of the set-up. Using the

supplied allen key for the saddle screws, you can raise or lower the strings at the bridge....remember, the lower the action the easier the guitar will play, but the more prone to the strings buzzing on the frets! The higher the strings, the harder the guitar is to play, but you eliminate the fret buzz.

For the 1st string (the thinnest one) adjust the height using the saddle for that string, so there is a 0.063" - 0.078" gap (1.6 - 2 mm) between the string and the 12th fret. This should create a gap of about 0.01" - 0.016" (0.25 - 0.4 mm) between the string and the 1st fret (this is a very small gap so you may want to use feeler gauges for this measurement).

For the 6th string (the thick one), adjust the gap between the string and the 12th fret to 0.078" - .01" (2 - 2.5 mm) and you should find yourself 0.016" - 0.024" (0.4 - 0.6 mm) between the string and the 1st fret. Adjust the height of the remaining 4 strings so they create the same radius as the fret-board (you may want to make a cardboard radius template to assist in these adjustments....resting the template on the two outside strings will allow you to adjust the inner 4 to the face of the template).

You may have to go back and forth between String Height and Neck Relief until you come to the perfect union the first time you set up the guitar!

Adjusting Neck Relief:

Neck relief is the amount of bend in the neck to allow for proper string vibration. The physical properties involved here are the strings pulling the headstock forward (toward the front of the guitar), the thickness of the strings (heavier gauges obviously have more tension and will pull the headstock forward more forcibly), and string height (a combination of how the nut is cut and how high the bridge and or saddles are adjusted). Because of the relationship between string height and neck relief, you may have to go back and forth between adjusting the neck relief and adjusting the string height a couple times.

Your Solo Guitar neck has a built in truss rod which counter-acts the forward pull of the strings...in other words, when you tighten your truss rod, you straighten the neck, or pull the headstock toward the back of the guitar. You will have to make truss rod adjustments usually when setting up the guitar for the first time, and then in spring and fall when there are major humidity changes in the weather (remember, humidity affects the wood of the guitar neck, either swelling or shrinking it).

String up the guitar as normal with your chosen gauge of strings....make sure the strings sit properly in the nut slots at the headstock of the neck, and that the strings are brought to tension (tune the guitar). The strings should sit easily in the nut slots, not be loose, and especially not sit on top of the slot (if either the slots are too loose or too small, you will want to consult an expert to either fill or file out the slots). Now, take a couple minutes and refer to 'Adjusting String Height' to ensure the bridge and/or saddles are correctly adjusted. Place a capo at the first fret and press down on the 16th fret....now place a straight edge (which is at least 12"/30cm long) on top of the frets between the capo and the 16th fret and measure the gap between the ruler and the 8th fret. Use the 6th (heaviest) string to measure. Optimally, you will look for a gap of .001" - .002" (0.25 - 0.5 mm) but slightly more could still be acceptable. By turning the truss rod screw with the supplied allen key clockwise, you will reduce the gap,

and by turning counter-clockwise you will increase the gap. Never turn the truss rod screw more than 1/4 turn at a time! Now return to the 'Adjusting String Height' section and re-adjust your string height so you have nice low action on the strings without buzzing on the frets! If you do have 'string or fret buzz', you will either have to increase the neck relief slightly, or increase your string height.

Adjusting Intonation:

There are several factors that come into play when setting the intonation on your guitar. For this kit, we will adjust to the basics and leave you to research the rest for yourself. Essentially, each string played open, should have exactly the same pitch as that string fretted on the 12th fret (the 12th fret is the halfway point between the nut and the saddle). You will want to use your guitar tuner for this adjustment.....play each string open and adjust them to their prescribed notes (E,A,D,G,B,E thickest to thinnest or 6th - 1st). Now play each string while you fret at the 12th fret and adjust each saddle toward the 12th fret or away until the fretted note matches the open note. If the fretted note is sharp, you must move the saddle away from the neck.....if the fretted note is flat, you must move the saddle closer. Intonating your guitar properly will help to ensure that it plays in tune up and down the neck, and that chords sound correct.

Adjusting Pickup Height:

The final step in your guitar set-up is setting the pickup height. Pickups work on a magnetic field that is affected by the vibration of each string. You can be too close to the strings and you can also be too far away from the strings with the pickup....too close will create 'ghost tones' that will make tuning your guitar difficult and will also affect the sound of your guitar in a negative way. Adjusting the pickups too far away reduces the effect of the magnetic field and therefore reduces the output of the pickup....so the guitar will sound quieter and have less dynamics.

You will find one or both of two types of pickups in your kit....either single coil or humbucker. Because humbuckers use opposing magnets, they can be adjusted much closer to the strings than single coils can... Set your volume on full for each pickup and the tone control at halfway...plug your guitar into an amplifier and start adjusting the pickup height closer and away from the body while you play each string or strum.....you should notice an obvious difference in volume and tone by doing so. Adjust each pickup to where it sounds best. There is no universal rule for pickup height because it relies on string height, string gauge, pickup type, magnet type etc etc...so by experimenting, you will find an adjustment that provides the best sound.

ESK-35 Wiring Diagram

