# The Process of Building a Solid-Body Electric Guitar

Electric guitars are stringed instruments that use electronic components to amplify and distort their sounds. There are four types of electric guitars: solid-body, semi-hollow body, hollow body, and chambered. Each body style offers different sound qualities, though the solid-body guitar is most commonly used. The electric guitar has many components, illustrated in Figure 1 below[1], but can be broken down into three main sections: the body, the neck, and the head. The process of producing an electric guitar involves four main stages of production: constructing the body, constructing the neck, wiring the electronics, and assembling the components to form a complete product. Depending on the manufacturer, the process of building an electric guitar may be performed manually, with the aid of tools, or mechanically by machines. Production takes place in factories or workshops that have the proper woodworking tools and machinery. The entire process takes about a week[2] but production occurs year-round as the manufacturer makes guitars in order to meet consumer demand.

This document will briefly cover the four stages of production. After reading this document, the reader will hopefully have a better understanding of how a solid body electric guitar is built.

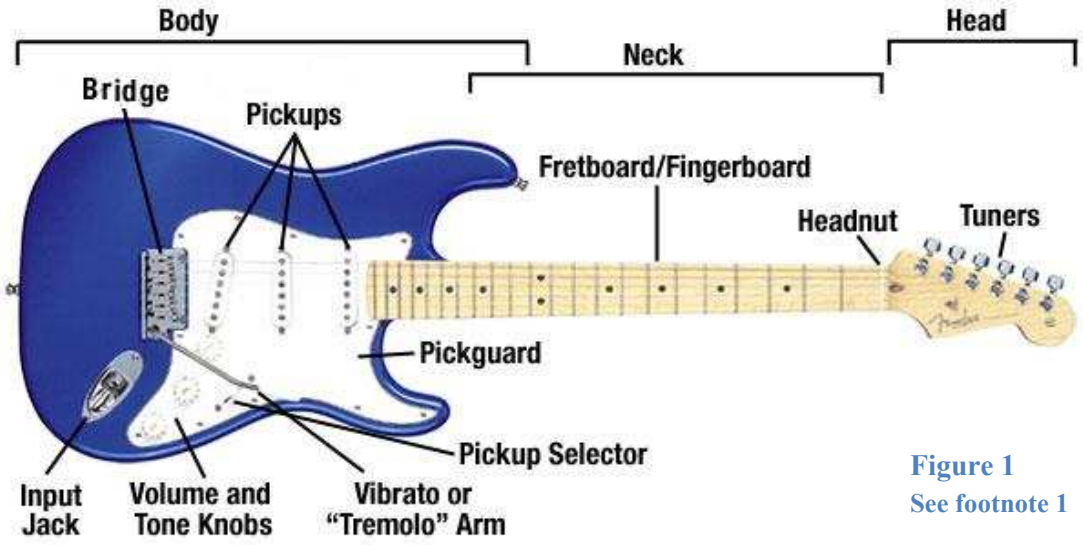


**Figure 1**
**See footnote 1**

**NOTE**
This document is **NOT** meant as an instructional manual. It is merely a process description meant to allow the reader to better understand the process of building a solid body electric guitar. Readers **SHOULD NOT** attempt to use this document as an instructional guide, nor should readers attempt to build a guitar without consulting a professional and learning how to safely operate the necessary tools and equipment. For more in depth information regarding the guitar building process, you may wish to consult a website such as www.projectguitar.com.

[1] *Electric Guitar Basics.* 2011. *MusiciansFriend*. Web. 13 April 2011.
[2] This timeframe varies depending on a number of different variables that affect production time. For example, building the guitar manually with the use of tools rather than machines will take more time.

## Constructing the Body

The process of building an electric guitar begins with the construction of the guitar body. The first step of production is selecting the wood that the body will be made of. The wood affects the sound, quality, durability, weight, and appearance of an electric guitar. Many different types of woods are used including (but not limited to) alder, mahogany, basswood, and maple. These woods are used for the body; the neck is comprised of different wood.

Once a wood has been selected, the process of constructing the body of the guitar can begin. The body begins as a "blank", which is a rectangular block of wood (or two blocks if the body is comprised of two pieces) with the relative dimensions of a guitar (20"x14"x1.75"). The body-blank will be slightly thicker than the guitar body in order to allow for shaping. If the body is comprised of two blocks of wood, then the two pieces of wood are glued together.


**Figure 2.2 – See footnote 4**
**An outline of the body is traced onto the body blank.**

**– See footnote 4**
**is cut out of the wood**
**ly to be worked on.**

An outline of the body is then traced onto the body-blank and the body shape is cut from the wood (Figure 2.3 above)[3]. The body is then contoured using a belt sander to provide a more finalized shape. The lower left section of the guitar body is sanded down so that it is angled. This contour is the armrest. Above this, on the back of the guitar body, another contour is added that looks like an inverted half-dome. Following this, the body of the guitar is then routed by machine in order to create a socket for the neck and cavities for the pickups, tremolo (this goes on the back of the body), and the input jack. The edges of the tremolo cavity on the back of the body are routed again by hand in order to allow space for a cover to be put on when the guitar is fully assembled (see Figure 4 below on the right).


**Figure 4 – The tremolo cavity being routed. See footnote 3**

Once the body has been contoured and routed, it is sanded in order to ensure that it has a smooth surface and that there are no faults or cracks. If any cracks or chips are found, they are sealed and sanded to keep a smooth surface. Once this is done and the body is completely shaped and smooth, then it is ready to be painted. The body is covered with two coats of paint. Any designs or special coloring is added with the second coat of paint. This has to dry and then a finish or a lacquered coat is applied to the body in order to provide a shiny cover.

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[3] Steve (ripl3y). *Project Guitar.* Web. 9 April 2011. http://www.projectguitar.com/tut/body.htm
[4] Jeff Miller. *GuitaristJeffMiller.* Web. 9 April 2011. http://www.guitaristjeffmiller.com/guitars10.htm

## Constructing the Neck

The neck begins as two separate pieces of wood. There is the neck itself which is generally made of a hardwood that has a similar tone as the body of the guitar and the fretboard which is made of rosewood or maple. The first thing that needs to be done to the neck is shape the neck joint to fit the slot on the guitar. The neck is measured and cut so that it fits snugly in the socket that was routed for it. Once this is done, the headstock of the guitar is shaped and holes are drilled for the tuning pegs (Figure 5 below)[6]. In addition to this, a hole is drilled down into the neck for the truss rod, which is a rod that can be tightened or loosened in order to change the bend in the neck. This must be done before the fretboard is attached, otherwise the fretboard is likely to crack when the hole is drilled or when the truss rod is inserted.

Next, the fretboard is measured so that it will fit onto the neck of the guitar. Before the two pieces are glued together, however, slots are cut in the fretboard and the frets and are hammered into place. Then the two pieces of wood are glued together and the sides are sanded down to remove any glue and to hide the join line by making it smooth. The final touch to the fretboard is to add inlays between certain frets as markers for the musician. These inlays are generally made of mother of pearl and are simple dots, though some can be more elaborate shapes. These are placed on every odd fret except for the first and the eleventh, and two are placed on the twelfth fret.

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## Assembling the Electronics

After the body and the neck of the guitar have been built, the electronics need to be assembled. This step is relatively quick compared with the previous steps. The pickups are wired together and placed in the cavities on the front of the guitar. After that, the pickup wires are pulled through both the hole for the input jack and the hole connected to the tremolo cavity. The wires will be connected to additional parts during the final assembly.

## Final Assembly

Once the guitar and the neck have been constructed and the electronics have been added, the guitar is ready to be assembled. A pick-guard is placed over the pickups in order to cover up the cavities and protect the guitar body from being scratched. The pick-guard also has three knobs that screw through it and into the guitar for adjusting tone and volume. The wires of the pickups are soldered to the electronic components connected to the knobs in order to allow the knobs to control the sound of the guitar.

Once this is done, the bridge is placed in the lowest guitar cavity and drilled in place. The bridge will be connected to a tremolo system (a system designed to rock the bridge back and forth using a "whammy bar" in order to affect the sound by tightening or loosening the strings). The wires

[6] Jeff Miller. *GuitaristJeffMiller*. Web. 9 April 2011. http://www.guitaristjeffmiller.com/guitars10.htm

that were strung through the tremolo cavity are soldered to the tremolo system. In addition, a cover in added over the slot for the input jack and the wires here are soldered to the metal cover so that the guitar pickups can be connected to an amplifier.

The final step in this process is to attach the neck to the guitar. The neck is put in place and holes are drilled through the body of the guitar and into the neck. These holes are then used to screw the two components together and the guitar is now completed and ready to be strung.