

About Electric Guitars and Basses

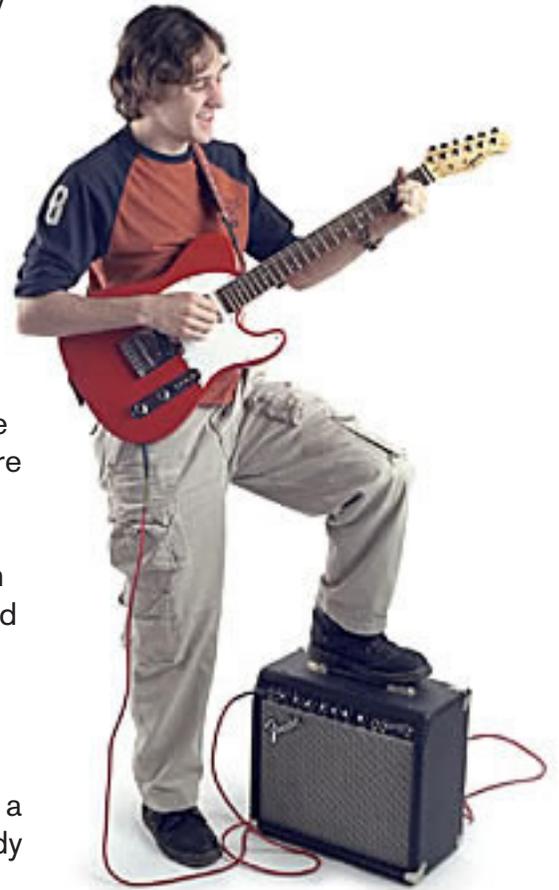
Since the development of the Spanish six-string guitar in the early 1800s, guitar makers and players had searched for a way to make the guitar's sound louder. (See Acoustic Guitars for more info.) Big changes came at the beginning of the 20th century when a number of guitar players and designers experimented with electrical amplification.

Major changes in guitar design began with the invention of the electromagnetic transducer commonly known as a "pickup." A pickup is a device placed underneath the strings of a guitar converting string vibrations into electrical energy. This energy is converted back into sound by an amplifier. The amplifier has knobs or switches that allow the player to increase or decrease the sound level of the guitar. (See section on Amplifiers for more info.)

As early as the 1930s guitar players began installing pickups in their acoustic instruments. Although this helped make the sound louder, it created a whole new set of problems - especially "feedback" when the guitar was played at high volume.

Several inventors developed a solution to this problem by experimenting with a solid body for the instrument by attaching a neck with strings to a solid block of wood. This solid wood body - not as resonant as a hollow body - created less feedback when amplified.

By the 1950s solid body electric guitars were mass-produced to keep up with the increasing demand for these new instruments. First seen as just a novelty, electric guitars have become one of the most popular and influential instruments in modern music - used to play blues, jazz, rock & roll, country, and rhythm & blues styles.



Electric Guitar Construction

Manufacturers experimented with different types of woods to create better sounding electric guitars - some used one or two pieces of hardwood like ash, alder, or poplar, while others used a combination of woods like maple and mahogany to produce a specific tone. It is the density of the different types of wood that has the primary effect on the way the guitar resonates.

Neck Design

The method used to join the neck of the guitar to its body is still a source of debate today among guitar players and manufacturers because it affects the amount of sustain - the length of time the string vibrates. Popular options are the "set neck" and the "bolt-on neck." Use of these and other methods vary by manufacturer and model. The original method used was a glued-in set-neck similar to traditional acoustic guitars and violins. This option was fairly expensive, however it provided more sustain and richness of tone when the instrument was played. The set-neck allowed the neck and body to vibrate uniformly from both ends of the string.

The most popular alternative to set-neck construction is a bolt-on neck. The neck is attached with four large screws through the guitar's body. It offers somewhat less sustain because it provides less wood to wood contact. Bolt-on necks are not expensive to produce, and they create a bright, focused tone which is perfect for lead guitar. Another advantage of the bolt-on is that it costs less to repair. If the original neck becomes damaged, it is possible to simply remove it with the aid of a screwdriver and replace it with another bolt-on style neck.

Another way electric guitar necks are attached is called "neck-through body." This technique creates a great amount of sustain when the guitar is played because the strings are attached from both ends to one piece of wood. The drawback is that it is more costly to produce.

Guitar Pickups

Another important contributor to the tone of the electric guitar is, of course, the pickup. Over the years many styles of pickups have been made. The basic components of a pickup are a magnet, and a spool (or "bobbin") with copper wire wrapped around it. The type and size of magnet, the thickness of the wire and the number of times it is wrapped around the coil determines the difference in the tone produced.



Electric Guitar Pick-Up

Single Coil Pickup: Made of a magnet surrounded by copper wire. Six pole-pieces are installed in a bobbin and wrapped with the wire. These pole-pieces correspond to each of the guitar's strings. A single coil pickup lends a bright, focused sound to the guitar.

Humbucker Pickup: This pickup cancels the sometimes annoying hum generated by a single coil pickup. It is essentially two single-coil pickups wired together. Because of its size, a humbucking pickup has a higher output and produces a somewhat darker sound than a single coil.

Electric Basses

The Electric Bass (also called a bass guitar) first became widely used during the 1950s at the beginning of the Rock & Roll era. Although first viewed as a novelty, the electric bass quickly became popular. As more musicians used amplified guitars, acoustic bass players had a hard time keeping their sound levels up to that of the much louder electric guitars. So, one advantage the electric bass provided was louder sound.

The smaller size of an electric bass made it easier to transport and to play. The solid wood construction of most basses also meant less risk of damage when traveling from gig to gig. Unlike the acoustic bass, most electric basses have frets - metal place markers which divide the neck into steps - making it easier for guitarists to double on the bass when no bass player is available.

In fact, although the ensemble role of the electric bass is essentially the same as the upright (acoustic) bass, its construction has much more in common with the electric guitar. There are some differences, however - the electric bass is usually about ten inches longer than the electric guitar and has four strings instead of six - tuned an octave lower than the guitar.

Today, Electric Basses come in all shapes and sizes and play a role in many styles of music. A variety of models are now available in five-string and six-string versions. Since the 1970s the "fretless" electric bass has risen in popularity, especially with Jazz musicians.



Bass Pickups

Like the Electric Guitar, the Electric Bass relies on an electromagnetic transducer commonly referred to as a "pickup" to create its distinctive sound. The pickup converts the vibration of the strings into electrical energy. This energy may be amplified, distorted or changed in a number of ways and then converted back into sound waves by the amplifier. The two most common pickups for electric bass are called Single Coil and Split Coil.

Single Coil: Traditionally this pickup is really just an electron magnet. It is composed of a magnetic object called a pole-piece, with a thin copper wire wrapped around it many times. The most common bass single coil pickup has two pole-pieces per string seated in a "bobbin" which holds them in place on either side of the string. Copper wire is wrapped around the bobbin, and then wired to the volume and tone control knobs on the bass. These, in turn, are wired to the bass' output jack.

Split Coil: This pick-up consists of two bobbins, one for the top two strings, the other for the bottom two. The set of pole-pieces in each bobbin is then wired with opposite polarities. This technique helps eliminate any interfering hum caused by AM radios, florescent lights, microwave ovens, television sets etc. which might also be picked up.



Electric Bass Pick-Up

EXPLODED DRAWING OF ELECTRIC GUITAR

