



# Proposal for the Expansion of Knowledge of Electric Guitar Pickups

Ben McDermott

English 131

## Executive Summary

Guitarists everywhere are at a loss of thought, unable to understand why they cannot attain the tone they want and need with their brand-new amplifier and numerous effects pedals. These guitarists are forgetting the importance of guitar pickups. Without good pickups that are specialized for their genres of music, guitarists will never feel like they have the perfect tone. Pickups basically allow guitarists to have a whole different guitar sound come out of the same guitar they have always played.

The program presented in this proposal is really just a loose guideline to follow. The program's main goal is to expand the reader's understanding of pickups and their important role in making music. The objective of the program is that hopefully after learning more about pickups, the reader can make an educated purchase towards bettering their guitar set up.

Nothing extreme is required to do this program, only some occasional free time to learn and research pickups, and of course, some money to purchase pickups. This program does not have strict rules or anything because it is meant to better the guitarist's life, not add more stress to it.

I have played guitar for three years, so only the basics are discussed in this proposal. No technical knowledge that requires expertise in certain sciences is needed. This proposal was written by a guitar player who loves various types of music for guitar players trying to achieve sounds for various types of music. Along with beginner players, hopefully experts will also find something to take away from this proposal as well.

## Introduction

This proposal is intended to bestow rudimentary knowledge of electric guitar pickups upon guitarists of any skill level who do not know much about the role guitar pickups play in molding their sound. From this knowledge and information gained, the guitarist will be able to differentiate between the different types of pickups, the advantages of each that are important to them, and will then be able to improve or upgrade their current guitar set-up accordingly.

It is no secret that it can be difficult to understand why some electric guitar pickups are preferred for a certain genre of music over other pickups. The majority of guitarists pick up a guitar to learn how to play their favorite songs, not because they are searching for an introductory lesson on the basics of electrical circuits. In fact, learning about the intricacies of the electric guitar can appear to be a chore instead of another way in which a musician controls the music. Regardless of how the musician views it, he or she should focus on the fruits of their labor that lie ahead rather than on the minuscule reading they will have to do.

So what exactly do pickups do and why are they an integral part of the electric guitar? Without the pickups, electric guitars would not be able to exist. Pickups are devices consisting of magnets and coils of copper wire that basically transform the motion of the vibrating guitar strings into electrical signals (See Figure 2). The electric signal is carried through cables and processed through effects. Finally, it is transformed back into sound and played through the guitar amplifier (Brain, 2).

Changing guitar equipment is almost always going to be an expensive endeavor. It is crucial that the musician searching for a better sound can gain as good of an understanding as he or she can about the technology of pickups before investing in them. Playing around with

pickups, and really any guitar equipment, is no joke, financially speaking. If something goes wrong or the guitarist picks the wrong type of pickup because of lack of knowledge, he or she could end up being stuck with a broken guitar, horrible tone or sound, and an empty wallet with no money left over for a new guitar or pickups. This proposal is not meant to be strictly followed and adhered to step-by-step, but rather it should serve as loose guidelines and a clear, unbiased source of information on guitar pickups so that the musicians themselves can make their own decisions from the knowledge obtained.

## Project Description

The goal of this project is to teach guitarists about the different technologies of various popular pickups and give them an appreciation of what the electric guitar pickup can do for them. The objective of this project is to give guitarists enough understanding on the subject matter so that they may improve or upgrade their current guitar's setup. The guitarist himself will not be making the change of pickups to his current guitar because that would require an in-depth education in electric circuits and a high skill level of soldering.

## Methods

The project will begin with the guitarist reading the next few paragraphs of this proposal so that he or she may gain some background information. It is imperative that the reader absorb this information before proceeding to the next step. Without doing so, the project will be considered a failed attempt, and the reader will have to start over.

First of all, there are two types of pickups: piezoelectric pickups and magnetic pickups. Piezoelectric pickups work with all kinds of strings, no matter what material they are made from. Magnetic pickups only work with steel strings (Lemme, 3). Piezoelectric pickups are usually

only used with electric-acoustic guitars, guitars that are basically acoustic but are equipped with pickups so that the sound is amplified (Electric, 3). Because piezoelectric pickups also work with nylon strings, they are preferred by musicians who are looking to preserve that warm and organic tone produced by acoustic guitars but need the sound amplified so that effects can be implemented and large audiences can hear the music. Genres of music like country, pop, classical, and obviously acoustic music use piezoelectric pickups.

Magnetic pickups will be the main focus of this proposal because this group of pickups incorporates a wider variety of different pickups, which means it is used by a broader range of music genres. The most basic magnetic pickup is the single-coil pickup (See Figure 1). This pickup was commonly found on most of the first electric guitars produced by well known guitar companies today such as Gibson and Fender (Electric, 1). Because it was the most popular type of pickup when electric guitars were first invented, it is known as the pickups to use to get the “classic” sound of rock ‘n roll, country, and the blues. Single-coil pickups are also commonly known for a major flaw: picking up stray voltages. It is a well known fact that single-coil pickups often produced humming, ambient noises without any string vibration because they are extremely sensitive to magnetic fields produced by the voltages of other nearby electrical appliances (Lemme, 3). Despite this flaw, single-coil pickups have remained a staple in the guitar world for many reasons. They fulfill some musicians’ desires for the crunchy tone associated with classic rock acts such as AC/DC and other musicians’ wants for a country twang similar to old favorites like Willie Nelson. It also does not hurt that they are relatively cheap in comparison to other types of pickups. Most cheap guitars and knock-offs employ single-coil pickups, and Fender Musical Instruments Corporation still uses single-coil pickups in most of their guitar models.

In order to combat the humming noise produced by single-coil pickups, guitar companies began using two single-coil pickups side by side for every one single-coil pickup normally used. This caused the humming to be canceled out. This type of pickup arrangement began to be known as “humbucking” pickups, or humbuckers (Lemme, 3). Companies like Gibson soon turned to humbuckers as their default pickup arrangement. Humbuckers are known for producing a thicker sound than single-coil pickups, therefore making them popular in the hard rock and classic metal genre.

Today, one of the most popular brands of pickups is Electro-Magnetic Generator pickups. Though some guitarists would classify EMG pickups as humbuckers, others prefer to call them “active pickups” because unlike single-coil and humbucker pickups, EMG pickups are set to have a much higher reaction to the input of the vibrations of the strings, which cause them to have a high output. This produces an extremely heavy sound when combined with distortion effects, making these pickups popular in modern genres such as heavy metal and scream. Without distortion, EMG pickups can also produce a smooth, warm tone, often used for jazz or progressive rock (WHY EMG?). The main disadvantage of these pickups is that they often require their own batteries or power supply separate from the guitar. This means that in order to have EMG pickups, guitarists must be willing to regularly deal out money for new replacement batteries, and will often have to disassemble part of the guitar in order to swap out batteries.

Now that vital information about the major pickups in use today has been supplied, it is now time for the research phase of the program. After reading the above paragraphs, the reader must now take into account his or her current guitar model and the tone they desire. Once they figure out their own preferences, it is time to start browsing the internet for possible replacement

pickups! Musicians can always go directly to the pickup producer's website in order to gain a better understanding of the pickup in question.

Of course, the musician should remain unbiased about brands when searching for pickups. It is common knowledge that there are numerous instrument manufacturers that release various types of guitar pickups. However, it is not common knowledge that some guitar pickup producers do hide the truth or even lie about the abilities and advantages that some of their pickups possess (Lemme, 2). As long as you do not use the actual pickup producer's website or advertisement as your primary source of information when researching pickups and you possess some common sense, these lies shall not fool you. An example of this would be if a pickup manufacturer claimed that one of their pickups intended for heavy metal music was also great for playing country music. It is obvious that you should try out this pickup before buying it.

Besides the official websites of pickup producers, websites such as [Ultimate-Guitar.com](http://Ultimate-Guitar.com) and [musiciansfriend.com](http://musiciansfriend.com) give fairly accurate reviews of different pickup models because the review writers are just fellow guitar players who have already purchased the pickup models and are giving feedback to those thinking of buying them. These website reviews often break down certain aspects of pickups and gear into categories such as tone, versatility, durability, and overall sound.

Once the musician has their mind set on a few potential new electric guitar pickups, it is time to make a trip to the local guitar stores! This step is where the learning and research of pickups comes into actual practice. It is imperative that the musician try to attain as similar of a set up as he or she can to his or her own set up at home when trying out gear in the store. This way, when a purchase is finally made, there will be no horrible surprises or drastic changes to the

overall tone or sound of the instrument with the new pickups. As the musician tries out different pickups in different guitars, he or she should pay attention to the different aspects of the pickups, much like the reviewers did on websites. He or she should also make sure to try out the guitar pickups with different effects, and focus on the question of how well does the pickup arrangement satisfy their desire for a certain sound.

After selecting the current pickup of their dreams, the musician must set up an appointment with the guitar store's guitar technician. Nearly every guitar store has one so that they can also charge for repairing and pickup replacement services. After the guitarist gets his or her pickups replaced, it is very important to check the guitar with the new pickups as soon as he or she can, so that if there are any problems such as difficulty transmitting the electric signal, constant humming when there should not be, or worst of all, no sound being produced at all, he or she can take it back to the store immediately to get it fixed. If all goes well, the musician has successfully completed the project, and is now one giant leap closer towards achieving the sound that he or she so desperately wants! Pickups are the start of where the moldable sound of the guitar first begins getting altered. It is the beginning of the guitar sound's long travel through numerous cables and effects towards the amplifier. If you cannot have a good start (good pickups), how can you expect to have good results (great sound)?

### Timeline and Milestones

Once this program is started, there is no exact time limit regarding when it must be completed. This is not exactly a necessity or high priority where the general health of the public will be in jeopardy if it is not completed. Some musicians can walk into the guitar store and walk out with new pickups, a new effects pedal, and sometimes even a new guitar on the same



day. Other musicians spend lots of time analyzing everything about gear that they are considering purchasing. Upgrading equipment is expensive. It is important that you make the right decisions when you do it so that you are not throwing money away, so you should take as much time as necessary to feel right about purchasing new equipment. In other words, the timeline of this project all depends on the reader's comfort with and understanding of guitar equipment.

As for milestones, it is really quite obvious when the reader is making progress. When the reader is in the guitar store and can actually understand what type of pickups he or she is trying out and manipulate them using effects to get closer to the tone they want, this is a good sign. This is also the most important milestone to achieve, because instead of focusing on getting new pickups right now, the guitarist has in fact expanded his knowledge of pickups, which is an invaluable quality for playing guitar in the long run.

## Budget

The budget also varies from musician to musician like the timeline does. It all depends on how much the musician is willing to spend and what time of sound they want. If the musician is looking to get single-coil pickups, it will probably cost around \$200.00 total, including pickup installation services. If the musician wants humbuckers, the cost will be around \$300.00 for decent ones. EMG pickups will probably run around \$400.00 , including installation services.

## Qualifications

Instead of giving background information on the author that is totally unrelated to this field such as academic achievements, I find it more important to give the reader an idea of who I

am as a musician, something that seems to be much more pertinent in relation to the field of study that this proposal covers. I have been playing guitar for three years, and have gone through constant changes of desires for different sounds throughout that time. I started out with the need to play indie music and classic rock 'n roll. Since then, I have also dabbled towards achieving tones of jazz, blues, punk, and currently metal. I have done research on many types of equipment for guitar, have made several purchases, and have played many different types of guitars. Currently I have a Fender Stratocaster 50<sup>th</sup> Anniversary Edition that was made in Mexico. It has single-coil pickups at the moment, but I plan on changing them to EMG pickups when time and money allow. I have fixed my guitar and effects pedals before, so I also have some experience in dabbling with the electric circuits that make electric guitar playing possible. Obviously there are going to be better guitarists out there that could give you much more in-depth information on electric guitars, but I do know the basics of playing guitar, which is what this proposal covers.

Appendix



Figure 1

(Fender American Standard)

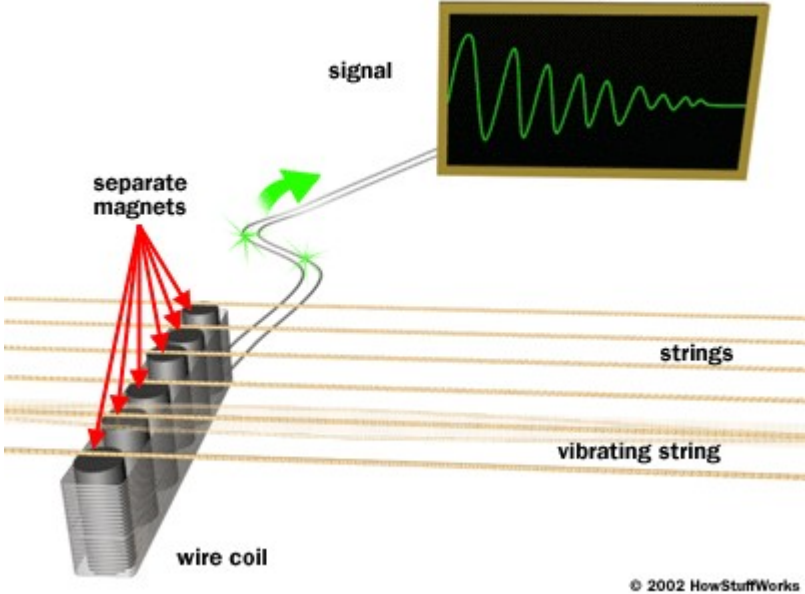


Figure 2 (Brain)

Works Cited

Brain, M. (n.d.). How Electric Guitars Work. In *How Stuff Works*. Retrieved from <http://entertainment.howstuffworks.com/electric-guitar1.htm>

Electric Guitar Pickups. (n.d.). *HyperPhysics*. Retrieved from <http://hyperphysics.phy-astr.gsu.edu/hbase/music/eguitpickup.html>

Fender American Standard HSS Stratocaster Electric Guitar. (n.d.). *Musician's Friend*. Retrieved from <http://guitars.musiciansfriend.com/product/Fender-American-Standard-HSS-Stratocaster-Electric-Guitar?sku=515747>

Lemme, H. W. (1986, December). The Secrets of Electric Guitar Pickups. In *BuildYourGuitar.com*. Retrieved from <http://buildyourguitar.com/resources/lemme/>

*WHY EMG?* (n.d.). Retrieved from <http://www.emgpickups.com/pages/whyemg>