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The P90 Pickup's Hidden Talents

In this article, I am converting the classic P90 into what I call, my P80 'Rockabilly' pickup.

The P90 Equipped Guitar: I am using an Epiphone 'WildKat' as the test bed.



The WildKat is fitted with Epiphone P90 pickups which are loud and tonally on a par with the standard Gibson style P90s... if not microphonic, sadly.

**I use the word 'tonally' in its English form, meaning the ratio of bass to treble output. Not the more common American use, which implies a change of harmonic structure - in English, the latter would be covered more accurately by the word 'sound'.*

The Problem: For me, with its hollow body, the WildKat can sound dark and muddy through an amp. So I carried out some investigations and found that the coaxial wiring inside the Wildkat was causing huge treble loss. So I replaced it with RG179PE video distribution cable. You can read about that project here:

http://www.award-session.com/pdfs/Epiphone_WildKat_Tone_Problem.pdf

After the wiring upgrade, it sounded really nice indeed, but I wanted a more 'Gretschy' bright with 'old school' twangy sounds. The tone was still a little 'thick' with the standard P90s. So I set about finding ways of making it give me the tones I was looking for.

The Investigations: The stock P90s were nice and loud, but rather microphonic, so I bought a pair of GFS Alnico Vintage Wound Dogear Black Pickups: http://store.guitarfetish.com/GFS-Alnico-Vintage-Wound-Dogear-Black-Pickup_c_84.html.

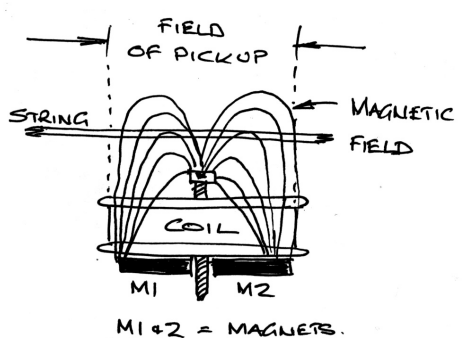
This cured the microphony, but the tone output was just the same. I expected this anyway, because I knew the P90 has a very wide pickup area. It is a rather large PU! And I know that it has two very large AlNiCo bar magnets that run along the whole PU width under the coil. The bar magnets are polarised north and south along the edges of the bar... not the two furthestmost ends.

So, I pondered on it more. I thought about replacing the P90s with a pair of Gretsch 'HiLoTron' PUs. TV Jones can supply a 'P90 Dogear' mount for them: <http://www.nexternal.com/tvjones/pickup-rings-and-screws-c26.aspx>. This would give it the brighter tone I wanted because they have a narrower 'pickup field' (PF) than the P90. They are very simple pickups with one bar magnet, like those in the P90 and a set of six 'screw' pole pieces... also just like the P90. The small coil resistance (around 4k) and low inductance of the 'HiLoTron' PUs combined with their narrower PF, is responsible for their bright 'sprangly' tonality. This is just what I wanted. But further research on the TV Jones website showed me that they were around \$130 each, plus shipping, import Duty and VAT. That's fair enough, but for this project I didn't want to spend a lot on what is a budget guitar. No, I preferred to make do with what I already have, if I could.



Left - The excellent Gretsch style 'HiLoTron' pickup from TV Jones on a black Gibson mount.
 Right - An underside view showing similarity with the P90

How A P90 Works: A P90 is quite a simple pickup. It has just one coil and two bar magnets. Through the centre of the coil, there are six (ferrous) steel screws which are called 'pole pieces.' As you can see from the drawing below, the magnets are placed under the coil bobbin; one each side of the steel screw shafts. The two AlNiCo magnets are polarised North and South along the 'long' edges of the magnet bars and are placed 'in opposition' next to the protruding pole piece screw shafts on the lower side of the coil bobbin. They are usually glued in place to prevent them flying out of position during assembly. This ensures that the magnetism is forced up the screws and, as such, become part of the magnet too.



As you can see, the 'pickup field' (PF) is very wide... in fact about 40mm. This has the effect of making the tone somewhat 'thick' as many refer to it. It's perfectly OK for lots of solid body guitars where, mainly, the bridge PU is used for raunchy rock styles. But for those who like 'hollow body' guitars which sound quite middly to start with, one would probably say that the P90s can be too thick! It's just a case of a **great** pickup being used for the wrong application... not really the fault of the P90!

Unfortunately, guitar manufacturers often use components that have an 'image' about them drummed into guitar buyers by the press and tradition, therefore, the mention of 'P90' will attract many players as being 'something with a proven track record.' Sadly, this is the wrong reason for choosing the P90 for my needs... but it's there and we're stuck with it!

The good news is, we can modify the P90s to sound better on hollow body guitars! Turn them into something similar to pickups Gretsch and Guild used on early electric hollow guitars. This is where my 'P80' mod comes in... it's very simple and extremely effective!

The P80 Modification: As confirmed, it is the wide pickup area that is making the tone thick. With the P90, it is very easy to take them apart and I was able to carefully extract the P90s from their cavities without even having to detune the strings! A great advantage when experimenting.

There is a bottom plate which screws to the coil bobbin from underneath. So I carefully removed the bottom plate to reveal the two magnets sandwiched between it and the coil bobbin.

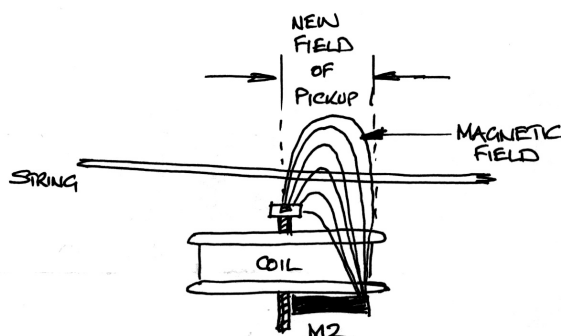


Left: Underside of the P90 with retainer screws in place

Right: The P90 opened up

I then removed one magnet, the one nearest to the neck. This has the effect of narrowing the 'pickup field' (PF) under the strings to about 10-12mm. The narrower this PF, the brighter the tone will be. Leo Fender developed narrow PF pickups for the Jaguar guitar for the same reasons.

Removing one magnet will reduce the output of the PU. BUT, you will find that the output is still much more than that of a typical Strat PU... so, for me, that's plenty.



By now you should start to see that the PU, when reassembled, will have a construction very similar to the 'HiloTron' (HLT). Except that the pole pieces are in the centre of the PU, unlike the HT. But this is actually a bonus, not a negative! It means that you now have the benefit of deciding which area of pickup you like best... with the magnet close to the neck or with it on the bridge side.

"Does it really make any difference?" I hear. Well yes, because the field of pickup is now

mainly down one side of the pickup, so rotating the PU 180° in its cavity can produce two different tonalities. Depending on its rotation, it will pick up harmonics from two different parts of the string... the very reason guitars have two or three PUs in various locations. For example, the Tele neck PU is 3mm closer to the neck than that of a Strat! And most can hear that!

With the magnet close to the neck, its rather warm and Gibson like; and with the magnet on the bridge side the tone is closer to a Gretsch. However, the P90s coil is higher in DC resistance (around 7.6k) and inductance (9 Henries) than a Gretsch HLT, so will produce more bass output than the HLT PU. But hey, we're heading in the right direction and making the WildKat, for me, much more useable!



Left: One magnet removed Right: The bridge PU with its cover removed

Naturally, you can apply this modification to the bridge PU as well, but I would suggest that the magnet nearest to the bridge is selected to be the one that's left in. Just to confirm, remove the magnet on the 'neck' side. But you can experiment quite easily by simply rotating the PUs in their cavities. But the 'bridge side' magnet option gives the real ballsy sound we all like to have for raunchy solos! Well, I do anyway!

Again, just to confirm, once the mods are complete and the PUs reinstalled back into the guitar, my WildKat has the forward 'neck side' magnets removed from both PUs.

Warning: Make sure you mark the ends of the magnets with a felt tip pen BEFORE you remove them, you WON'T remember which way round they must go back in, should they fly out or fall out whilst the back plate is removed.

If you put the magnets back wrongly, you could experience the PUs being out of phase or have very low output when the two magnets are replaced to restore it to full normal P90 operation.

Be careful NOT to over tighten the Dogear cover screws... they can strip the ply body top very easily, as it's only about 6mm (1/4") thick!

Conclusion - The P80 'Rockabilly' Results: I have to say that this mod has transformed the guitar's tonality into much more of a 'rockabilly' or early 'rock 'n' roll' sounding machine! No, it's not exactly like a Gretsch with 'HiLoTron' pickups; but it does have 'that' flavour and for me that's all I wanted. And now, it's a guitar which stands up in its own right with, what I think, is its own unique 'crossover' Gretsch/Gibson sound and a lot more attitude than when it left the Epiphone factory in China. I'm enjoying it very much now; and it doesn't sound like budget guitar at all! In all, I have invested only £210 (\$300) in the instrument with all the mods. A very fair outcome in my books!

Unfortunately, to get the best out of this P80 mod on the Wildkat, you'll have to carry out the wiring upgrade too, mentioned earlier. Otherwise the guitar will sound a little lacklustre still. But for other P90 equipped guitars, the P80 mod alone should be just fine!

Comment: I used to play a 1963 Gibson ES330 back in the nineteen sixties, and employed a **FAL** treble booster with it to get more treble. I wish I'd worked out this simple mod back then. This 'WildKat' mod would have been purrrrrfect!

Now this guitar really lives up to its name... a true WILDKAT!!

Try this mod on any guitar with P90s, if you feel it is a bit on the sluggish side tonally.



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