

Sponsored by



Epiphone 'Wildkat' Tone Problem

How to make your Epiphone 'Wildkat' brighter. Find out what kills the treble output from this guitar!

The Epiphone Wildkat is a lovely looking instrument with gorgeous proportions and a sweet 1950's vibe.



The WildKat is fitted with Epiphone AlNiCo P90 pickups, which are loud and tonally similar to standard Gibson P-90s... but microphonic and will squeal like piglets at higher volumes. I replaced mine with a 'classic' set from GFS in USA, at around \$33/each plus shipping.

However, there are further problems tonally... this instrument is quite dark sounding into an amp and lacks dynamics. Many other players can be found on Google seeking possible fixes for this dire problem. **My investigations have revealed that 3.12 metres of inferior shielded coaxial cable has been used for the wiring and is causing obscene amounts of capacitance, which is shorting the higher frequencies to ground!**

On The Problem's Track: Any investigative work needs supporting evidence. I started the investigation by disconnecting both pickups from the control wiring. This enabled me to test the electrical control circuitry without the pickups influencing my test readings. I then connected a jack plug with two short wires attached to it, so that I could connect my 'capacitance' meter to the guitar's output socket using its crocodile (alligator) clips.

There are obviously three positions on the pickup selector switch, so I ensured that only the neck or the bridge positions were engaged, as I wanted to measure the capacitance in each of the neck and bridge 'control' circuits independently.

The Test Results:

My tests resulted in measurements of **940pf** (pf = Pico farads) for the neck pickup circuit and **860pf** for the bridge circuit! That's a huge amount of capacitance and will certainly destroy the treble in either setting! **Both measurements are totally unacceptable!** So treble attenuation is a very serious problem indeed! When it comes to passive electric guitars you must remember one golden rule: **"CAPACITANCE KILLS TREBLE"**

The 'Control' Capacitances In Isolation: I measured the capacitance of each component in the guitar without any wires attached to them. The results are:

1 x Volume (Neck PU circuit), Master Volume & Tone controls: 10pf each = 30pf

Selector switch: 26pf

Output jack: 22pf

Total capacitance: **78pf** (Same for the Bridge PU circuit). A very small amount in reality! If we subtract the 'controls capacitance' of 78pf from the 'neck pickup control circuit capacitance', then the coaxial cable is adding a colossal 862pf capacitance. **And I must say... it must be very hard to make coax cable this bad!!**

The results are that the Wildkat's coaxial wiring needs to be torn out and replaced.

To add insult to injury, the Wildkat has some pretty long runs of coaxial cable under the hood! Running from the Volume controls, diagonally all the way up to the Selector Switch... back down to the Tone, diagonally again... across the bottom over to the Master Volume in the lower right hand corner and finally... all the way back to the Output Jack. That's one heck of a load of 'zigzagging' for the cables - adding up to 3.12 metres in all!

Coax Cable Upgrade: It can be fixed... but not without a lot of work! I used **RG179 PE coaxial shielded** cable. This cable is intended as video signal distribution cable and is used worldwide. It's only 2.5mm in diameter, has a braided screen/shield and 7x30AWG multi-strand centre 'hot' conductor. It is only 55pf/metre!

You could use **RG174 AU** if you would prefer 7x34 AWG multi-stranded centre conductor, but has higher capacitance at 101pf/metre. This is probably similar to the cable **StewMac** sells for guitar wiring upgrades.

Replacing The Wildkat's Coaxial Cables: I used conventional methods for removing the controls from the hollow body, as there is not an inspection plate behind the two Volumes and Tone.

The five 'old' coaxial cables were removed:

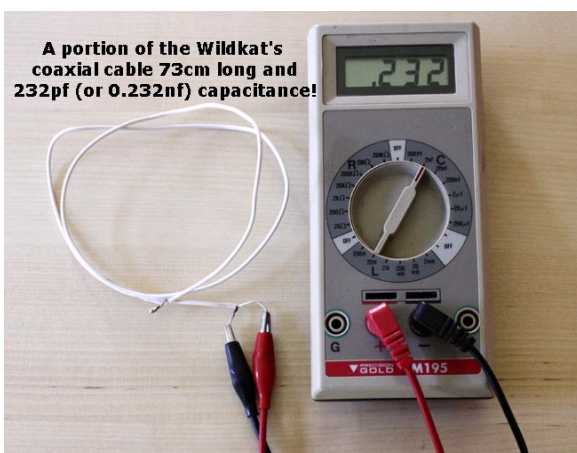
2 x 73cm white (232pf/each)

1 x 50cm red (156pf)

1 x 59cm grey (192pf)

1 x 57cm blue (182pf)

The cable capacitance measured, in brackets, is a colossal amount for each cable that is so short! The total length of coaxial cable is a massive 3.12mtrs! A decent 3 metre guitar cable would be only around 300pf! I installed the new RG179 PE cables cut to the same lengths as those taken out; however, I was able to trim the lengths down once the cables were inside the guitar to only 2.31 metres in total coax used.



The Bottom Line: After the re-wiring completion and using the same test meter, the capacitances for the neck and bridge PU control circuits have been established as ~189pf each.

This is a **capacitance decrease of approx 80%** in the neck and bridge control circuits! That's now lower than my 1971 Gibson Les Paul 'Deluxe' at 320pf for each circuit - which has far less wiring inside!

Should I Replace The Pots And Switches? No, not unless there's a problem with them. Their replacement will NOT improve the tone. As already shown, they have very low capacitance, so will not affect their treble performance. The pot's 'track resistance' quality will not affect the tone either. I know many claim it does, but I do not accept that at all. It's easy to replace components and 'fancy' that there's an improvement. Especially if 'everyone says so' and they've cost a small fortune. Plus it's easy for electronically unqualified players to be taken in by 'fantasy forum talk' sadly!

However, mechanical quality is another thing and you may feel replacing the pots with CTS pots will give a better feel and life expectancy. I do not accept that 'orange drop' or 'bumble-bee' capacitors will give any audible improvement. This is plain mojo frankly! Lol.



Conclusion: After the job was completed I plugged it into my working amp, a Session 'RetroTone', and I was blown away by the difference in treble output. You would not believe it's the same guitar. If you have the skill to do this work, then I would say it's definitely worth the three hours it takes.

Current and former Wildkat owners will feel particularly miffed at learning what is causing the lack of treble. It may be that Epiphone have just not fully considered the importance of the cable quality! In respect of providing the extra Master Volume (MV) facility, in its remote location from the other controls, they do not seem to have taken into account the far greater amount of capacitance all that extra cheap coaxial cable used would introduce. Let alone the extra loading by the MV pot on the signal! The use of a single Tone pot has also forced considerable extra cable use, and its resultant capacitance, because it has had to be situated after the pickup selector switch.

Unless you're handy with tools and guitar wiring jobs, then the cost of having it done professionally will certainly be a heavy toll over the instrument's face value. Sadly, the Wildkat seems to have earned a bad reputation... for very silly reasons that could have been prevented at the manufacturing stage, and still can!

With the wiring upgrade now done my Wildkat sounds bright and sprangly... just like a quality guitar should! It's now a true WILDKAT!

I have also carried out my P80 'Rock-a-Billy' mod to the pickups, which should also interest you if you want even more treble from the Wildkat. Details can be found here:

<http://www.award-session.com/pdfs/P90%20Hidden%20Talents.pdf>

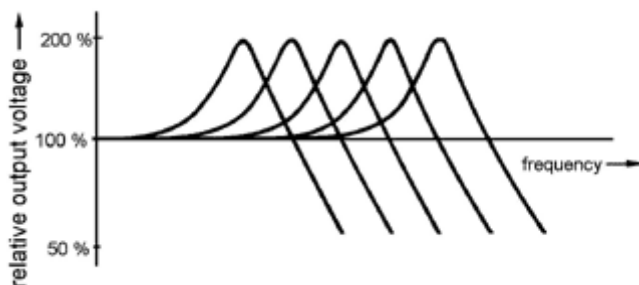
Because so many are finding it tough to locate the cable in small lots, I have made the RG179PE cable available on my website here in 5 & 10 metre lengths:

http://www.award-session.com/cleartone_specials.html

Project Update - 4th March 2013

Since publishing this Wildkat wiring upgrade, some players have mentioned that the sound can be, for certain types of musical genres, a little 'ice-picky' in the treble. So I have taken some steps to help tune this out if required. However, it should be mentioned that the Wildkat is not a solid body guitar and is not made from the finest woods, so please don't expect it to sound like a solid body Gibson Les Paul or ES335. It's almost completely hollow and will sound more like a hollow body ES330 or Casino!

It has to be said at this point, that many players do like the brighter 'Grestch-like' tone provided by rewiring the Wildkat. Others prefer a slightly rounder 'Gibson-like' character. This further mod is for the latter players.



What's causing extra top end output? - All guitar pickups have a strong peak of output at frequencies which can range from 2000Hz to 6000Hz. The actual peak frequency can be raised or lowered by the capacitance in the guitar's wiring circuitry. The guitar cable's capacitance will also change the peaks. As shown by the

image above for various capacitance values - borrowed from Helmuth Lemme's web article.

Now that the wiring upgrade has reduced the guitar's internal capacitance to only 189pf for each pickup circuit, the Wildkat can be, for some, rather bright or 'ice-picky'. But this is not a major problem, it can have capacitance added back for a slightly mellower or smoother tonality. Simply turning the tone control down does not have quite the same subtle effect. Earlier in the wiring upgrade text, I mentioned that my Gibson Les Paul Deluxe had about 320pf of capacitance in each of the two pickup circuits caused by the coaxial shielded cable. So, bringing it closer to that value will make it more suitable for the 'Gibson-like' tone fans.

Adding back a set amount of capacitance across the guitar's output jack will shift the pickup peaks downward in frequency, thereby, reducing the tendency towards the 'ice-picky' high frequency tone. You can use this trick on over-bright Fender Strats, Tellies or any other guitars which are just too bright. It won't harm anything and is easily removed if you don't like it. A great rainy Sunday afternoon project! It's certainly a lot cheaper than keep buying replacement pickups to find your perfect tone! I wonder why pickup makers keep quiet about this simple trick?

In the case of my Wildkat (with the GFS pickups and plastic covers) plus a 3 metre (10ft) guitar cable that has a capacitance of only 285pf (a high quality ClearTone™ cable), capacitor values of 220pf, 330pf and 470pf seem to produce the desired affect. Just select one of the capacitor values and solder it across the output jack socket between the hot and ground terminals. It is a subtle change, but you'll know when it sounds just right! I settled for 220pf... but it is all very subjective. It could even be installed on a replacement tone control equipped with a pull-switch! Don't waste your money on fancy caps, a cheap 'non-inductive' ceramic type is just perfect and will help prevent 'radio station' interference too!

Pickup tuning & credits: If you want to understand more about the effects of capacitance on guitar pickups and how it can be used to 'tune' pickups for more pleasing tones - or just for a very interesting read, then please go here: <http://buildyourguitar.com/resources/lemme/> This is a fine (no bull) article and also prevents me from having to write a similar text! There are one or two people on the Internet who really know their stuff and Helmuth Lemme is certainly one of them!

NOTES! *If you are using very long guitar cables, or budget high capacitance cables, then you may find that the tone is already perfect for you. In which case, ignore this update completely!*

If you still have metal covers on your P90 pickups, they could wildly alter the results from what I have described in this update. This is because metal covers generate 'eddy currents' in the metal (any type) and they affect the tone in quite an unpredictable way. I prefer to have plastic covers to prevent it from happening. Black covers look very cool to me as well!

Have Fun!!

© **Stewart Ward - June 2012/Updated March 2013**

Guitar amp designer since 1967 - MI Technical Consultant

Creator of: Session Amps & Award Session products

Website: www.Award-Session.com

Email: info@Award-Session.com

Other suitable component suppliers:

http://www.ebay.com/itm/Artec-Alnico-5-P90-Soap-Bar-Arched-Pickup-set-Chrome-/150511741870?pt=Guitar_Accessories&hash=item230b32ebae

http://www.guitarfetish.com/Wilkinson-Brass-Roller-Bridge-Locking-Studs-Chrome_p_866.html

Article sponsored by



http://www.award-session.com/cleartone_cables.html

Disclaimer: If you do not have the experience to carry out this mod, then please take it to your local guitar tech along with a copy of this article. I WILL NOT ACCEPT any liability for damage or injury caused whilst carrying out this modification. The owner must take all reasonable steps to ensure that their instrument is modifiable before starting any work. All risks must be born by the owner.

All trade marks acknowledged. Stewart Ward, ClearTone Custom Cables™ and Award-Session™ have no affiliation with their owners.