

From:

<http://www.alanratcliffe.com/articles/volumepot2.shtml>

The electric guitar's volume pot is a simple device, and some would think there's not much you can do to hotrod things - or even that there's not much point to modding it. However, it does affect the tone of a guitar and you can do a few very simple tweaks to alter how it sounds and how it responds to volume changes.

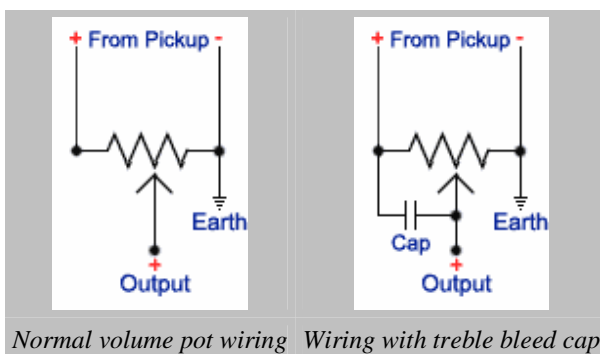
This month let's have a look at treble bleed (also called treble bypass) modifications and tweaks.

Treble Bleed Mods

Problem: You may have noticed that as you turn your electric guitar's volume pot down the sound loses treble becoming progressively bassier. This is particularly noticeable with single coil pickups - humbuckers are not affected nearly as much. This treble loss is not a problem for everyone, as many guitarists prefer to roll off the volume slightly to get a slightly darker and less overdriven sound for rhythm playing. Turning up the volume for leads then not only boosts drive, but brightens the sound too, helping it cut through the mix better. So I'd say the golden rule is - listen to your guitar, if the loss of treble is too extreme for your taste, start tweaking. If it sounds fine to your ears - leave things as they are.

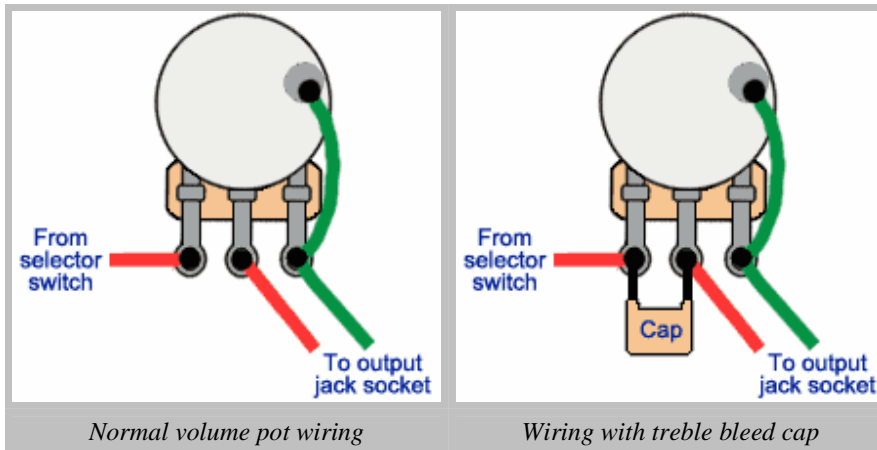
Why it Happens: This is due to the way the pickups, pot and the capacitance of the cable work together as a lowpass filter circuit similar to a tone control. Lowpass filter circuits have a cutoff frequency, above which they cut all frequencies. With the volume control up full the frequencies being blocked by the filter circuit are very high and do not have much audible effect on the tone. When you change the resistance in the circuit by lowering the pot (raising the resistance), the filter cutoff frequency moves down into the audible range and starts cutting audible higher frequencies from the sound, making it less trebly.

The cure: Higher quality, low capacitance cables have less affect on the treble as they move the cutoff frequency to a higher frequency. Unfortunately these cables tend to be very expensive and in many cases almost unusably thick, stiff and heavy. A shorter cable has lower capacitance, but that obviously can affect your movement onstage. However, you can compensate for the treble loss by using a capacitor to "bleed" more treble frequencies into the signal as the volume is turned down. This effectively makes a highpass filter to offset the high frequency losses of the lowpass filter.

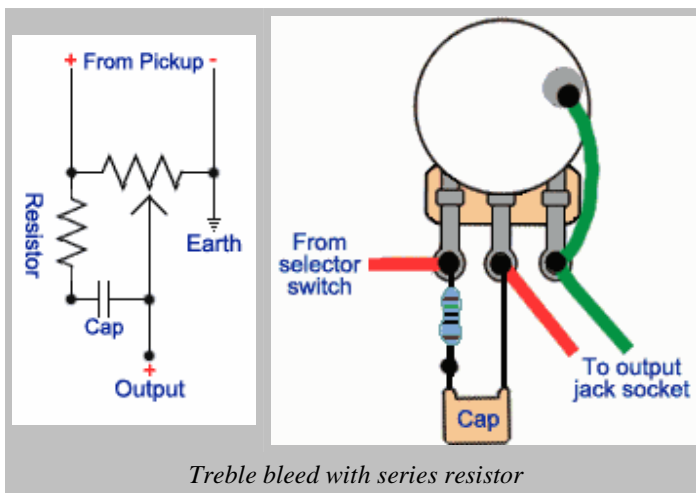


How to do It: Simply solder a capacitor from the live terminal on your volume pot (where the wire from the selector switch attaches) to the centre wiper terminal. When the volume is up full, this cap has no effect on the tone, but as the volume is turned down, more treble frequencies are bled

to the output. The capacitor value sets the frequency above which the capacitor passes signal, The higher the value, the lower the frequency. It's impossible to say exactly which value will work best for your guitar, as the effect is dependant on pickups, exact pot values, cable capacitance and amplifier input impedance. However common values to try are between 680pf and 2000pf (0.002mf. The type of capacitor used is usually a ceramic disc or a mylar film.



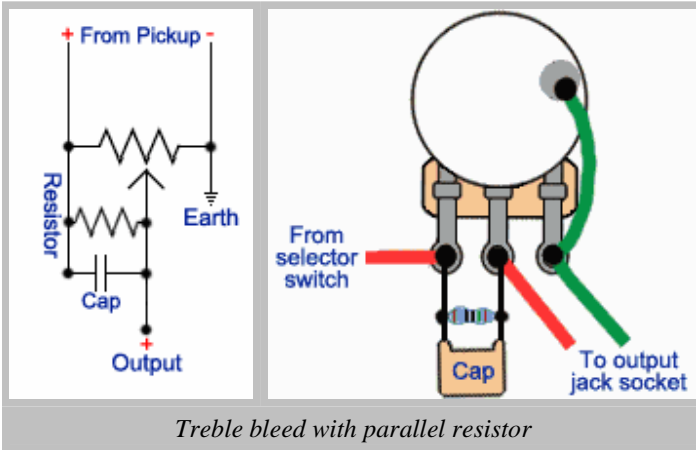
The downside: There is one small drawback to a simple treble bleed capacitor is that the guitar can actually become too bright as the volume is turned down. To offset this, a resistor in series with the cap will lower the amount of treble being bled through. Once again the exact value is impossible to predict for every situation, but resistance values between 50% - 100% of the pot value will usually do the trick. For the ultimate in tweakability, use a preset trimpot (a small pot which you can adjust and leave set at a fixed value) to set the exact amount of resistance you like.



Common examples

For those wanting to just solder on a few parts without the need for experimentation, there are a few accepted values that often give the desired results or near enough for most folks. Australian noiseless pickup maker, Chris Kinman recommends a 130K Ohm resistor in series with a 0.0012mf capacitor, which works well for most Strats. Also for Strats, pickup guru Seymour Duncan likes a 100k resistor in parallel with a 0.002mf cap. The parallel resistor actually changes the taper of the pot to better match the amount of treble bleed. My preference is for a series

resistor as I do not like the change in volume taper. For humbucker guitars, I like just a 0.001mf cap with no resistor.



Treble bleed with parallel resistor