

Volume controls

Testing, cleaning and/or replacement of standard 500K pots.

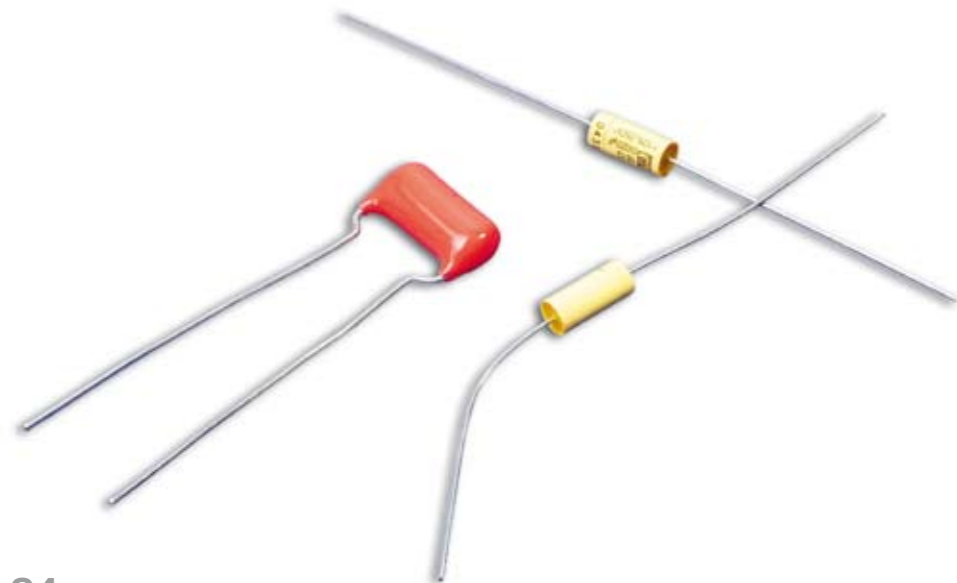
■ So why would you want to do this?

The Les Paul volume and tone controls are carbon-based potentiometers, an invention of the late 19th and early 20th centuries. They're crude and mechanical but they work. They do, however, generate 'dirt' by the nature of the mechanical friction of metal on carbon. This loose carbon inside the pot impedes the electrical contact and often causes it to be intermittent and prone to audible crackling. Corrosion of the metal parts adds 'snap' to the 'crackle'. We shall concentrate here on the volume pots, as due to their more frequent use these are the ones most likely to fail.



UNDERSTANDING THE RESISTIVE CAPACITOR CIRCUIT

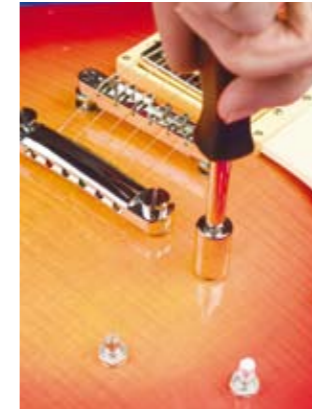
If you alter the resistance of a circuit (in this case by turning your guitar's tone control) and that circuit also has a capacitor in circuit, which it does, the frequency response of that circuit will alter. We perceive this as a change in subjective musical tone.



Testing a pot to see if it is still functional

Tools required

- Phillips '1' point screwdriver
- Solder and 25W soldering iron
- An accurate electrical multimeter, with an option for ohms or resistance measurement



- 1 Remove the knob from the suspect pot. Remove the retaining nut with a socket spanner.



- 2 Access the electrics by carefully removing the rear control panel cover with a Phillips '1' point screwdriver. Keep the screws together in a small container.



- 3 Isolate the pot by first labelling then unsoldering the internal wiring. If you're slow with your soldering iron, then use a pair of crocodile clips or something similar as effective 'heat sinks' to draw heat away from other damageable components. John Diggins actually uses a set of surgical forceps that not only draw away heat, but have enough mass to hold things in position if required.



- 4 Set the multimeter to 'ohms' measurement in the 2M range. Zero the meter. Bring the multimeter probes into contact with the two outer connection prongs. A Les Paul volume or tone control should present a reading of 500K, give or take 20 per cent. In this case on an auto ranging meter we get .489M ohms. A figure higher than this suggests the pot should be replaced.

NB: It's worth checking that the guitar has the correct pots fitted, as with an old guitar they may have been changed at some point. Sometimes the resistance value is marked on the pot casing.

- 5 If the pot is giving the correct resistance value you can also test the smooth working of the carbon track. Apply one of the multimeter probes to one of the pot's outer prongs and the other to the middle prong. Use crocodile clips to hold the probes in position. The resistance value indicated on the multimeter should smoothly alter as you rotate the pot control. If the needle shows an intermittent response the pot may need cleaning.



- 6 Repeat the process, this time testing the outer prong in relation to the middle prong.