Filter Capacitor Box

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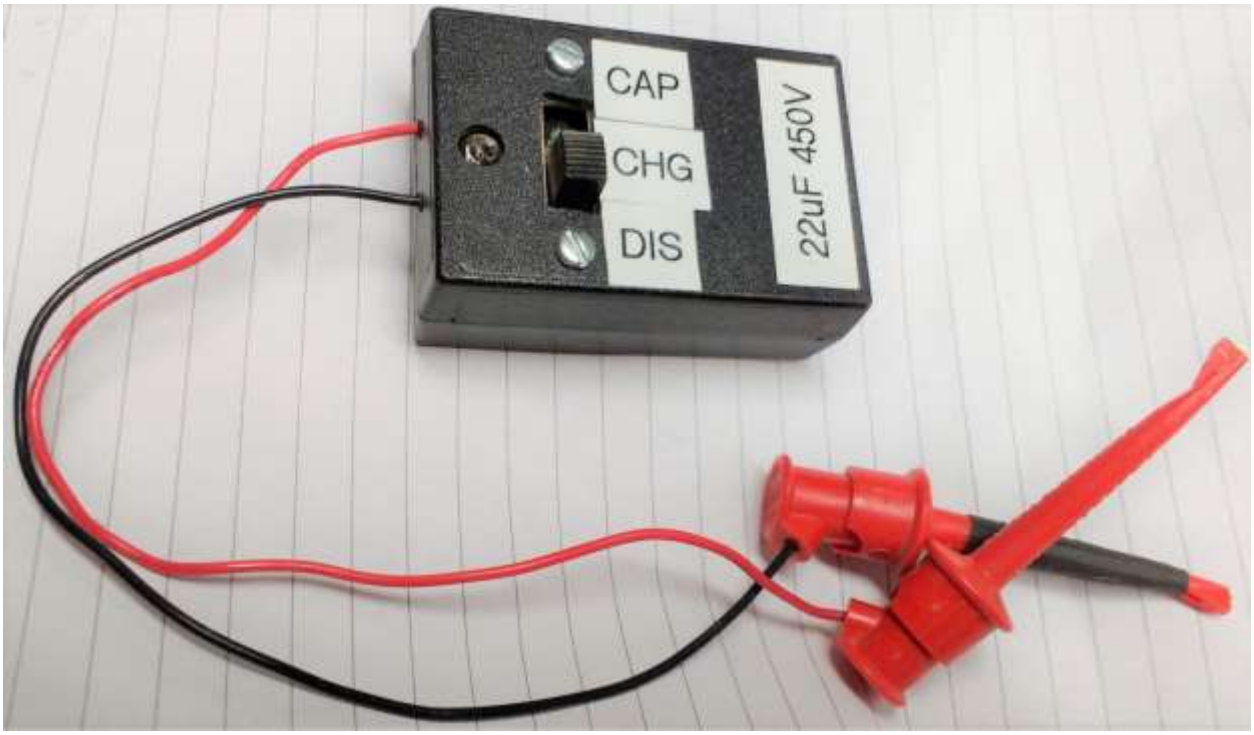
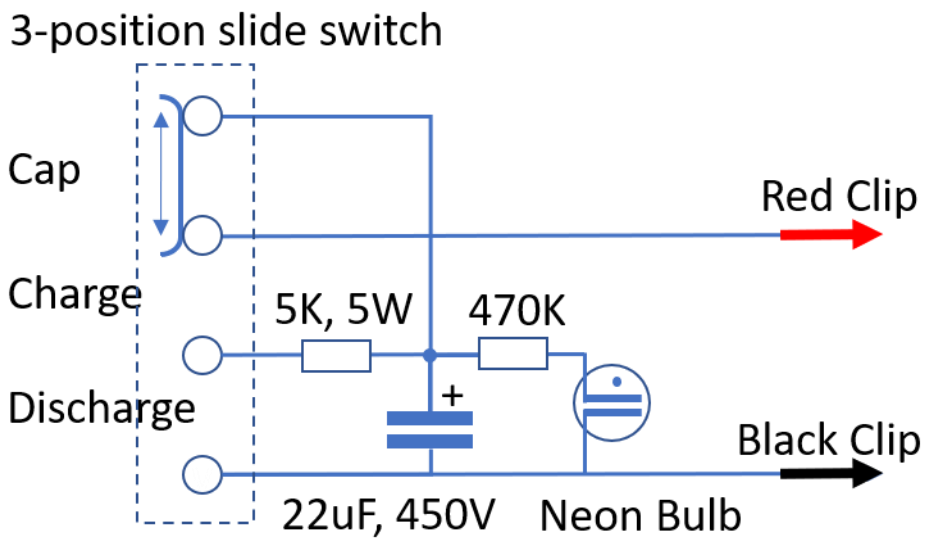
Possibly the quickest way to determine if a tube radio's power supply filter capacitor is effective is to place a known-good capacitor in parallel with it. If the radio's hum improves, then the filter capacitor should be replaced. (This is not a complete test; you should also check for DC leakage through the capacitor, which I will usually do with a clamp-on ammeter.) If the existing capacitor is good, there can be a spark and current surge when the known-good capacitor is connected. After the known-good capacitor is removed, it will retain a charge, which is a shock hazard. To alleviate these problems, I have made a filter capacitor box that makes connecting a capacitor easy and safe, and allows the capacitor to charge and discharge slowly.

The capacitor box consists of a capacitor, a 3-position slide switch, and a few parts all mounted in an insulated box. I include a neon bulb to indicate when a substantial voltage is present on the capacitor. The 5K (5 watt, in order to stand the surge current) resistor limits the current during the charge and discharge cycle. None of the parts' values are critical.





To use it, I set the switch to “Charge” and carefully connect the capacitor box in parallel with the questionable capacitor in the power supply. The 22uF value is a fairly typical and will usefully replace any filter capacitor less than about 50uF. Be careful when connecting the capacitor box as the voltages present are lethal. The neon light should illuminate, reminding you of the hazard. I then switch the box to “Cap” and listen (or maybe use an oscilloscope) to see if the hum improves. If it does, then the questionable capacitor is defective. Finally, I slide the switch to “Discharge” and safely remove the capacitor box after the neon light goes out.