

Billie and Ladyday 300B SET Capacitor Upgrades

Coupling Capacitor Choices

Over a period of a few months I experimented with a number of capacitor types in the Billie / Ladyday at the coupling stage between the 6SL7/ECC35 driver tube and 300B output tube. The standard capacitor supplied in the kit was a Solen which was respectable but nothing special. I eventually replaced these with some Audyn KP-SN tin-film-foil types I had in my parts box from an old project. The Audyn cap was much better, sounding very clean and faster than the Solen. It made the Solen sound a little muddy in comparison. However the Audyn did sound a little dry at times. I could have lived with this and stopped there but the desire to try other types of capacitor got the better of me.

Audionote Copper PIO

The next coupling capacitor I tested was an Audionote Copper paper in oil (PIO). The PIO cap has amazing levels of mid range detail. Very smooth sounding but not overly dull as some PIO capacitors can be. Lush and seductive especially on vocals. They give the sound more 'flesh' and body which you do not get with plastic foil type capacitors. It is possible to be seduced by the lovely mid range produced with this type of cap and ignore the rest of the music range. I know that PIO capacitors are disliked by some so it really is a matter of personal choice. Some amplifier builders prefer plastic film caps, some Teflon and others PIO. PIO capacitors create a kind of window around the mid-range. If you mostly listen to acoustic based music and vocals then a good PIO capacitor works very well and female vocals are particularly nice. They may also help in a bright and lean sounding system, creating a smoother and fuller sound. However, in my own setup, with electronica, instrumental or newage based music the high frequencies sounded a little rolled off with some loss of extension and attack.

RS Film Foil

The next capacitor under test was the RS arcotronics film-foil poly types. These are a fairly cheap capacitor to buy and are sold as industrial types rather than audio specific. These are very much more suited to electronica and instrumental styles of music being open and fast with no loss of extension or attack. However they did sound grainy on vocals and this for me made them unsuited for a wide range of music styles. The Audyn tin-foil type was the better plastic capacitor out of these two.

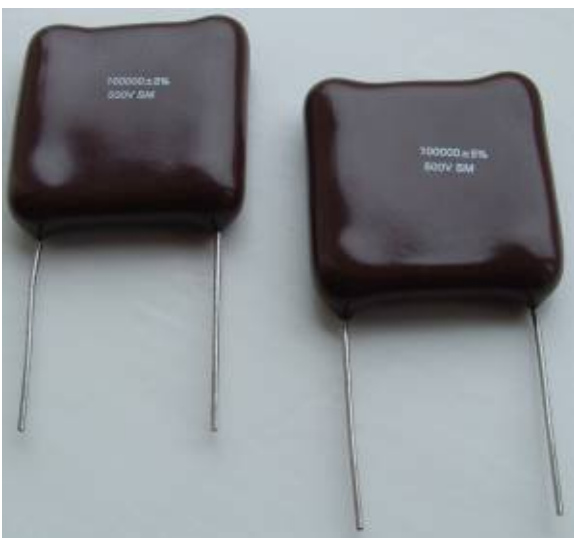
Jupiter Beeswax

I also tried a Jupiter Beeswax type which had some of the smoothness of the Audionote Copper PIO but with more openness and better high frequency extension. These are a good compromise between PIO and plastic capacitors and should suit someone with a wide taste in music styles.



Silver Mica

Finally I tried a 0.1uF 500V silver mica capacitor. These I got from Brian at diyhifisupply. This value of cap is large for a silver mica and impossible to buy in the UK from the normal main suppliers like RS. According to Brian these are difficult to manufacture without problems and he had them specially made.



So in the end I stuck with the silver mica's. If I listened to purely acoustic material (jazz, blues and girl guitar etc) then the Audionote Copper PIO would have been a good choice. However I also listen to electronica, newage and alternative rock so more speed and attack was needed than a paper capacitor could give. A tin foil capacitor such as the Audyn was a great choice and I would be quite happy with this but the silver mica being neutral seemed to be the lesser of all evils. In the end the best capacitor is none at all, as close to a piece of wire as technically possible.

You can calculate the lower roll off frequency for the value of the coupling capacitor in the Billie / Ladyday using the formula $1/(2 * \pi * R * C)$. R is the parallel resistor to ground (grid leak resistor) which is 240K as standard and C is the coupling capacitor value. So $R=240000$ and $C=0.47 * 10^{-6}$ which gives a frequency F at 1.41 Hz (the -3dB point). 1.41Hz is a little too low really. Therefore any coupling capacitor 0.1uF or higher will be ok to use. Why amplify frequencies so low and 'waste energy', a 0.22uF or 0.1uF is a better value to use here.