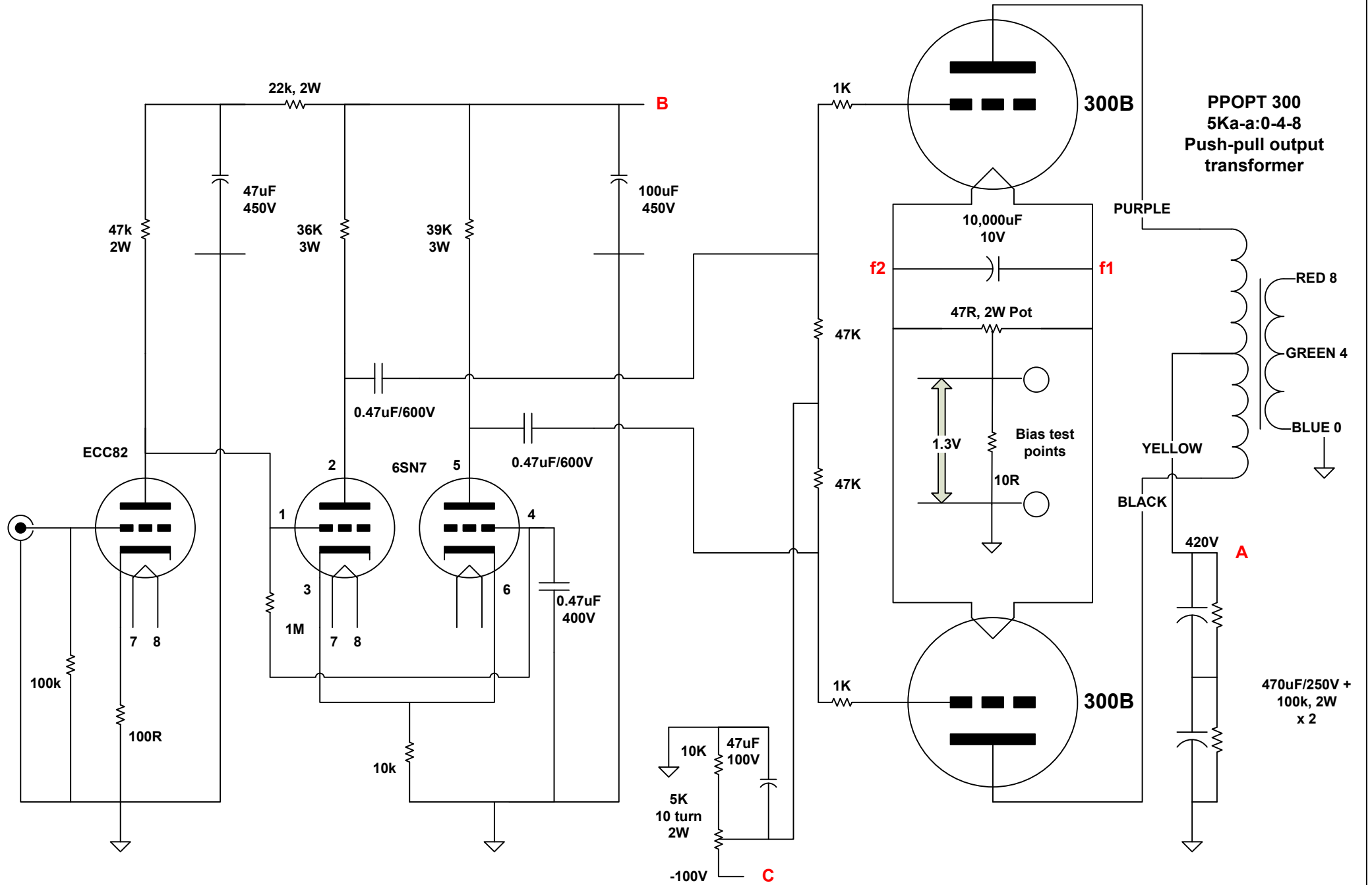
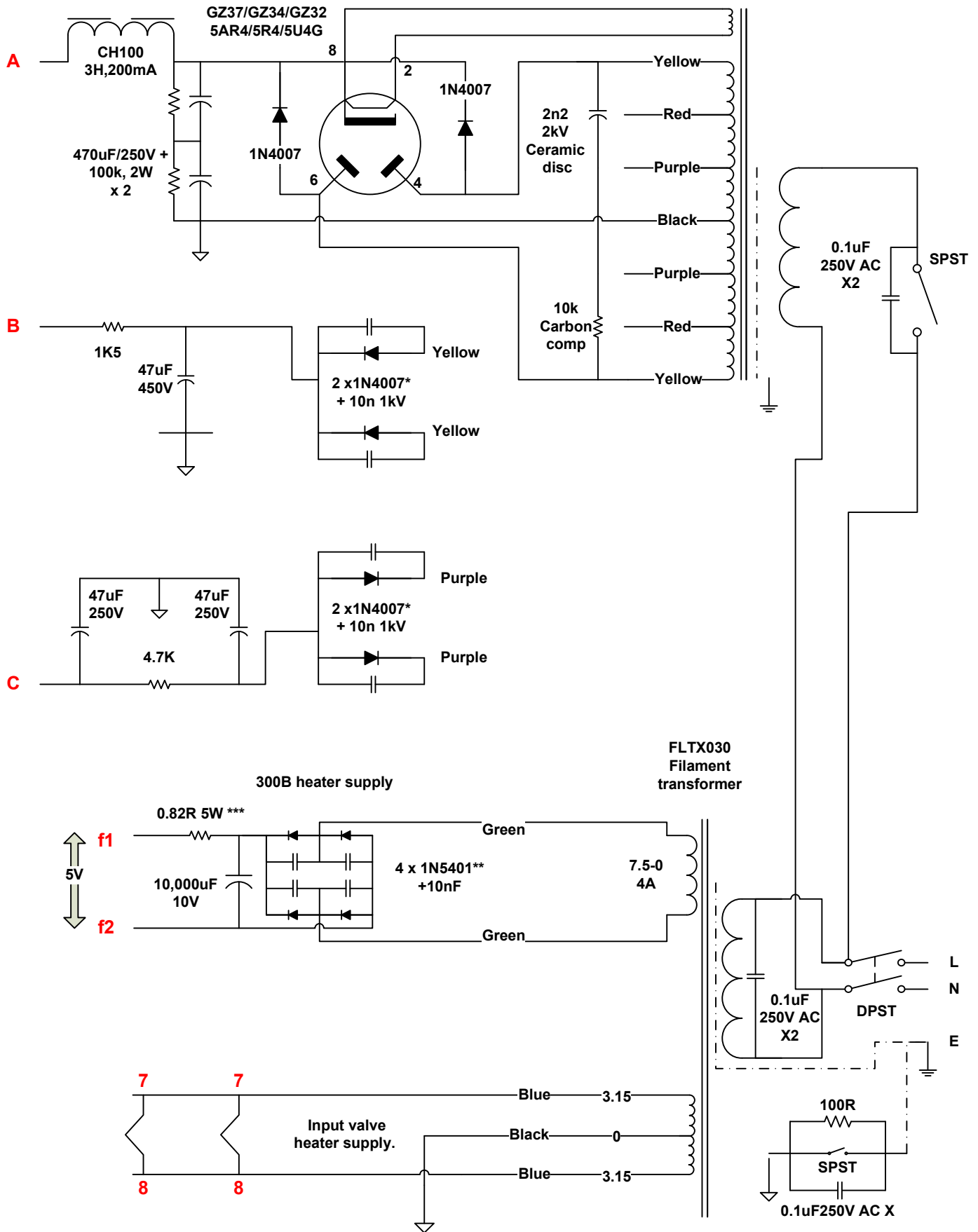


**PP001 Push-Pull 300B mono-block amplifier.**





\* 1000V soft recovery types can be substituted

\*\* hexfreds or soft recovery diodes can be substituted. Schottky types can also be substituted but an increased resistor value will be required.

\*\*\* If an external PSU is used, this resistor value will need to be adjusted to achieve 5V on the 300B filament

TENT labs filament supplies can be used directly with this filament transformer. If an external PSU is used, place the TENT supply in the audio chassis.

## PP001 Design Notes

PP001 is a push-pull 300B design and is resistor-capacitor coupled. Despite the fashion for all things single-ended, push-pull 300B amps are also very musical and are often more versatile than the SE's. Push-pulls are more load tolerant, have better bass dynamics, go louder and are capable of playing a wider range of musical styles.

### Audio Circuit description:

#### *Input and driver circuit.*

One section of a ECC82 forms the input stage. The cathode resistor of the ECC82 is un-bypassed for reasons of superior sound and gain reduction. It is directly coupled to a 6SN7 configured as a long-tailed pair phase-splitter/driver which drives a pair of 300B's in fixed bias configuration. This input/driver circuit contains only 3 capacitors, all of them high quality film types. The output transformers use high quality M6 laminations and are multi-section wide bandwidth (-3dB 15Hz->80kHz) designs.

#### *Resistor Capacitor (RC) coupling.*

There is a common assumption that resistor capacitor coupling is worse than inter-stage (IT) coupling. This is not necessarily the case. Both approaches have advantages and disadvantages. IT coupling generally sounds cleaner, faster and more dynamic whereas RC coupling gives a more traditional 'valve amplifier' sound. RC coupling is easier to implement as it takes up less space, there are no inherent hum issues and there is no need for an external power supply unit.

#### *Gain and Feedback*

This is a low gain design needing approx 1V RMS to generate full power output and should ideally be partnered with an active pre-amplifier. No negative feedback is shown but it could be applied to the cathode of the ECC82 if required.

#### *Biasing*

The 300B's are operated in fixed bias which is more efficient than cathode bias and also gives tighter bass. There is only one bias supply for each pair of 300B's meaning only a single adjustment is required but this does mean that matched pairs of 300B's must be used.

### Heaters

A separate filament transformer is provided and each pair of 300B's are DC heated from a single resistor-capacitor supply. There is no need for individual heater supplies in a fixed bias design as both cathodes are at the same potential. Each diode in the DC heater circuit is 'snubbed' with a small value capacitor. Higher quality diodes such as hexfreds or soft/fast recovery types can be substituted.

The output from the filament transformer is specified to allow the use of a TENT labs filament supply, something we endorse highly.

The input/driver valve is AC heated.

### Power Supply

#### *Driver supply HT and bias supply.*

The input/driver stage HT supply and bias supplies use solid state rectification for reasons of ruggedness and longevity. The diodes in the heater, bias and input/driver HT supply are by-passed with snubbing capacitors to kill switching noise. It is remarkable how smooth solid state diodes can sound when these measures are taken.

A 10 turn pot is recommended for the bias supply to make accurate adjustment possible.

#### *Output stage H.T.*

The output stage supply is unusual as it uses a valve rectifier in parallel with solid state diodes to combine the low impedance and high current capability of solid state with the good sounds of valves. This allows a relatively large input capacitor to be used (not possible with a valve rectifier) which is good for regulation and therefore bass performance. If the arrangement looks unusual it is, and there are no doubt sceptics that will doubt it's efficacy, but it does sound like a valve rectifier with good bass. It is possible to run without the valve rectifier to save on costs in which case some more snubbing caps will be a good idea. A low DCR choke is used for good regulation and noise filtering.

The separate filament transformer allows the filaments to be warmed before the HT is applied as using a valve rectifier in this configuration does not give a slow start. 10-15 seconds is recommended before turning on the HT.