Power Factor of Drake L-4B PA

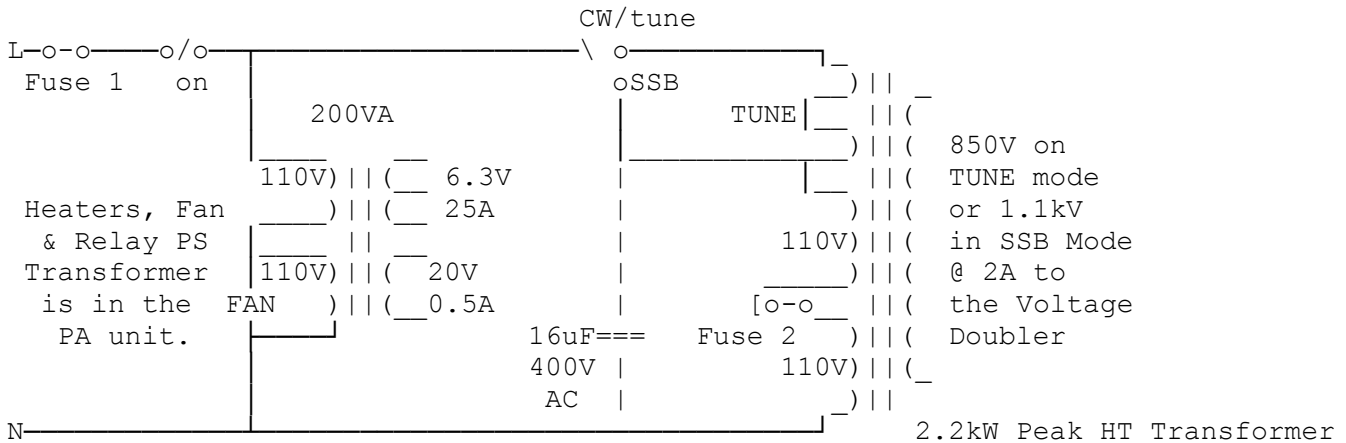By G8MNY   (Updated Oct 10)
(8 Bit ASCII graphics use code page 437 or 850, Terminal Font)

For /P work this USA made Drake PA has a very poor mains power factor, on 50Hz
it is only 0.5, this means in standby it draws 2x the mains current it needs
to.

Exactly where to put a PF correction capacitor is not straight forward, as the
PA has Tune & SSB modes where the mains tap on the HT transformer is changed by
30%.

```
                                  CW/tune
L─o-o──────o/o─────────────────────\ o───────────────┐
  Fuse 1    on     ┌──             oSSB          __)|| _
                   │     200VA          TUNE|__  ||(¯
                   │___     __          |_____)||(  850V on
                   110V)||(__ 6.3V       |            )||(  TUNE mode
  Heaters, Fan     ____)||(__ 25A        |       |__  ||(  or 1.1kV
   & Relay PS      │___   ||  __         |          )||(  in SSB Mode
  Transformer     │110V)||(  20V         |     110V)||(  @ 2A to
   is in the  FAN  )||(__0.5A         |     _____)||(  the Voltage
    PA unit.      └──────┘            16uF===  [o-o__  ||(  Doubler
                                     400V |       110V)||(_
                                      AC  |        _)||
N─────────────────┴──────────────────────┴───────┘  2.2kW Peak HT Transformer
```

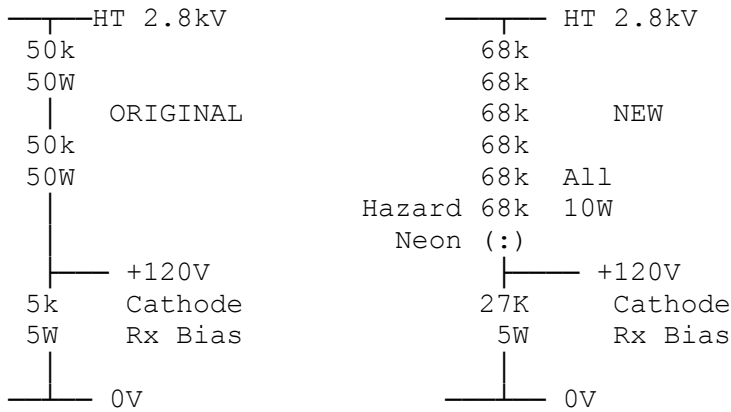For 110V mains, all the windings are put in parallel not series.

Wired to the above the correction is effectively about 10uF when on tune mode
& 16uF when on SSB mode. In the UK on 50Hz, the transformer is heavily
saturated in SSB mode with the extra mains TUNE tapping is bypassed. The 16uF
does the best it can to tune the heavily saturated HT transformer core (all 3rd
& 5th harmonic SSB mode.

Results were PF of 0.97 in tune mode (up to 600W PEP on good mains), & 0.7 in
SSB mode (up to 1300W PEP with odd order harmonics!), in the UK there is no
need to use the SSB mode with a 400W licence! Or in other words I saved at
least 1 Amp at 240V, so there is more available for other loads (lights &
rotator etc.) before the generator trips out on /P.

BLEED CHAIN
I reworked the PSU, changing the 2x 50k 50W + 5k 5W HT bleed & 120V DC tap
chain (was broken) for 6x 68K 10W + 27k 5W, & with a series HT warning neon all
on a smaller tag strip. The wasted power is much less & the light from the neon
is visible through the meshing cover.

I used the freed up space to mount the mains 16uF capacitor.

```
———┬—HT 2.8kV              ———┬— HT 2.8kV
 50k                        68k
 50W                        68k
  |     ORIGINAL            68k       NEW
 50k                        68k
 50W                        68k  All
              Hazard 68k  10W
                Neon (:)
  |                         68k
  ├——— +120V               ├——— +120V
 5k     Cathode            27K     Cathode
 5W     Rx Bias            5W      Rx Bias
  |                         |
——┴—— 0V                 ——┴— 0V
```

CAP STACKS
I also cleaned & remounted the 2 stacks of 4 electrolytics, this time avoiding
the need for HT crossover wires by putting the +ve multiplier stack near the
+ve output cable mount & the -ve stack on the other side!

See my Tech bul on "ALC line for Drake L-4B PA" & "PTT Line for Drake
L-4B PA".

Why Don't U send an interesting bul?

73 de John, G8MNY @ GB7CIP