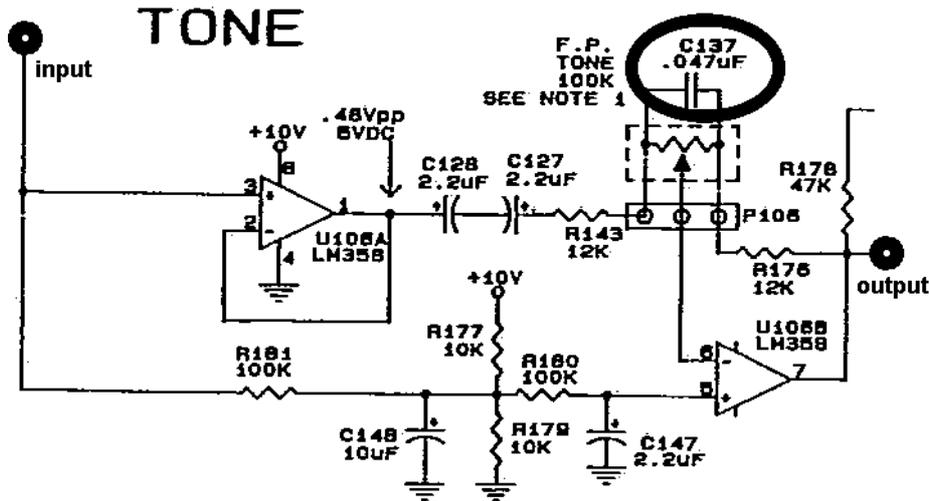


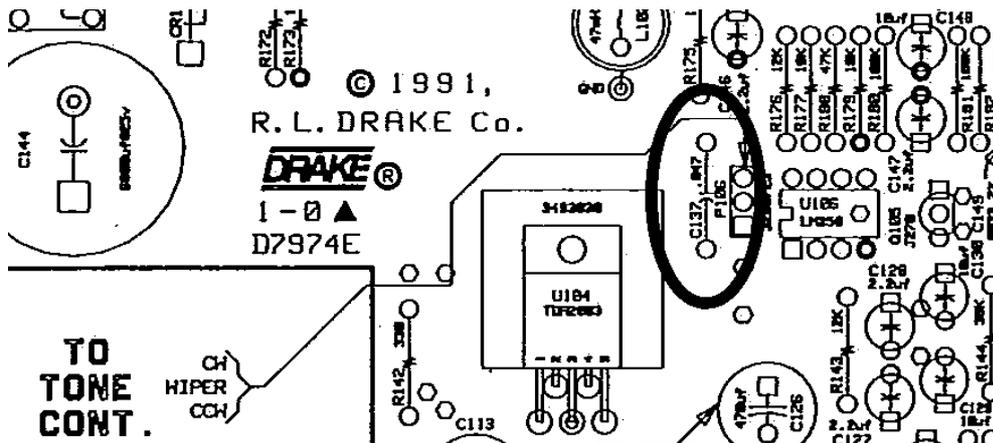
Modification of Tone Control in the Drake R8

The tone control in the R8 isn't very effective. The circuit description /1/ specifies a boost of +/- 10dB for the bass response. A simulation with 5spice /2/ of the circuit (picture 1) shows this +/- 10dB variation only at 100Hz and lower frequencies, higher frequencies have a much smaller variation.



Picture 1 Tone Control circuit in the R8

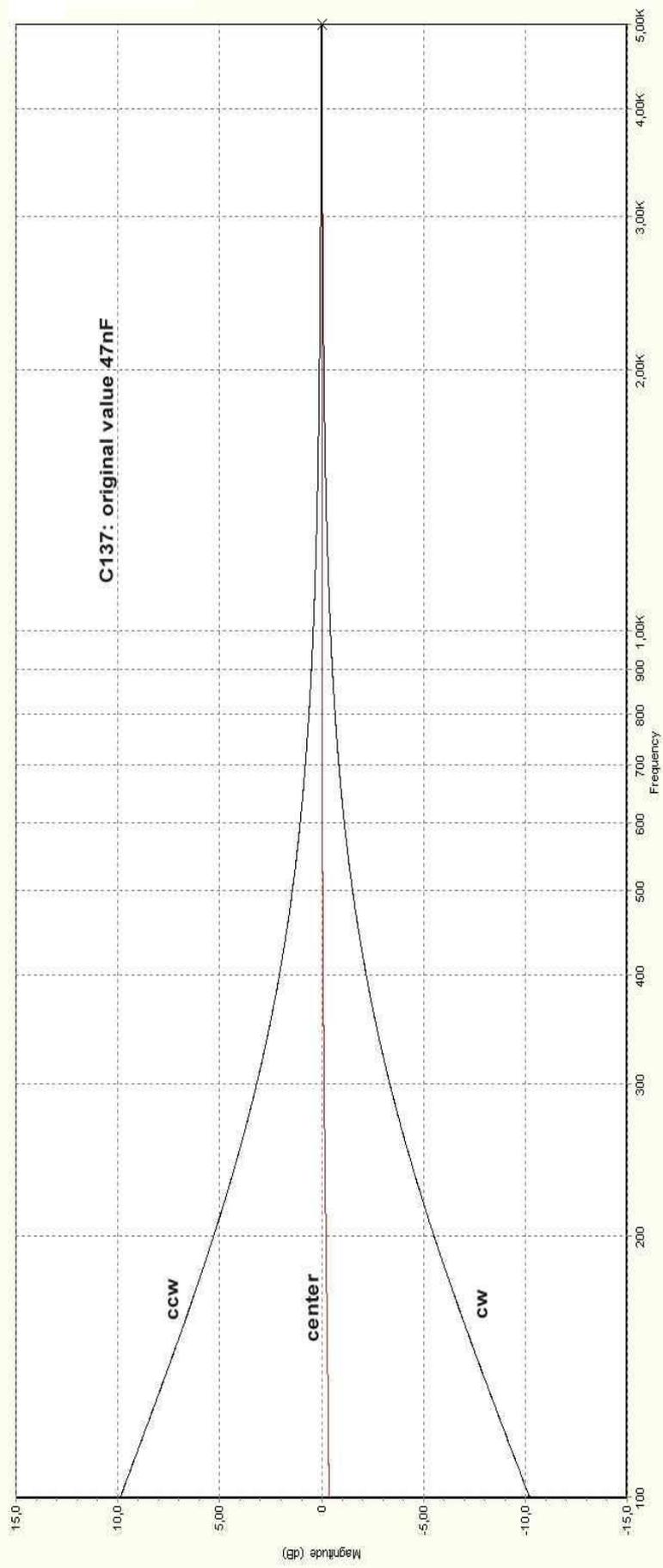
Analysing the circuit, C137 (47nF) is found as the determinant component in the tone control (pictures 1 and 2). In the simulation (picture 3), „cw“, „center“ and „ccw“ are the positions of the tone control pot at the R8's front.



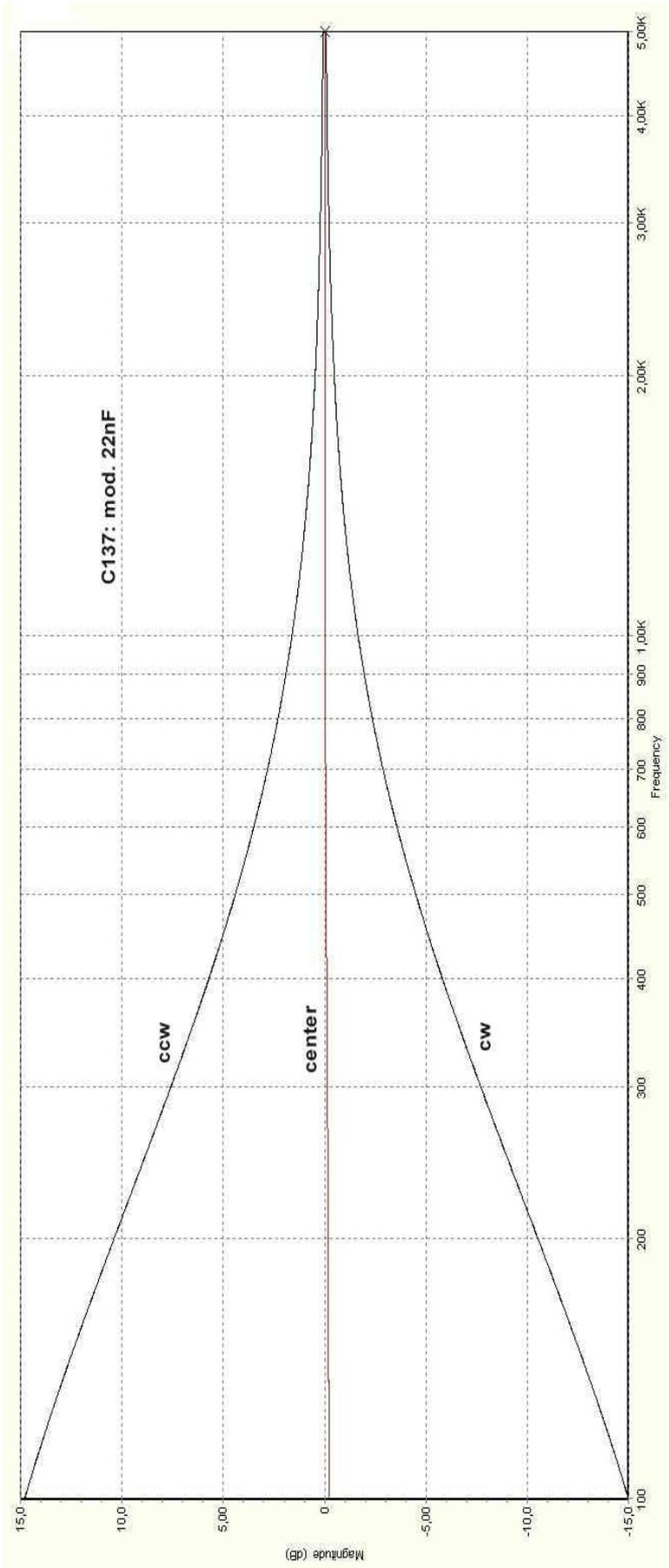
Picture 2 Second IF Board Layout

Solution:

Decreasing the value of C137 from 47nF to 22nF increases the possible variation in the bass response. The simulated result is shown in picture 4.



Picture 3 Simulation of Tone Control (original circuit)



Picture 4 Simulation of Tone Control (modified circuit)

Result:

The comparison of pictures 3 and 4 (same scaling) show the positive result: At 100Hz, the boost and cut is now +/-15dB instead of +/-10dB in the original circuit.

In the „center“ position of the tone pot, the frequency response is linear over the whole range (see note 2).

Note 1: A further reduction of C137 is possible; e.g. down to 15nF or 18nF, but this will affect not only the basses. In picture 4 the boost of 1kHz is app. +/-1,5dB, whereas in the original circuit (picture 3) the 1kHz-boost is only app. +/-0,5dB. That means, a further reduction of C137 leads not only to a boost of the basses but also to a boost of higher frequencies – there is no further win. A simple R-C-circuit can't be a very good tone control; it's always a compromise and not an equaliser.

My feeling is, that C137 = 22nF is a good choice.

Note 2: The small drop in the „center“ position (red curve) and the small unbalance at „cw“ and „ccw“ at low frequencies in pictures 3 and 4 are caused by the series capacitors C127 and C128.



Picture 5 Location of C137 (front end board removed)



Picture 6 C137, plug P106 removed

It is necessary to remove the front end board (4 screws and 2 screws at the back side) and bend it away (picture 5). Unplugging the front end board is not necessary, all cables are long enough.

Now, C137 can be replaced without removing the 2nd IF/Audio/power board (picture 6). Use a solder sucker to clean the pads and then solder the new C137.

**Use a grounded soldering tool !
Connect ground of R8 to the ground of the soldering tool**

- /1/ Servicemanager Drake R8
- /2/ www.5spice.com

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