

F5X-P, an All-FET, Pure Class A Preamplifier (i)

XEN Audio

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Circuit Topology

With the success of the F5X Power Amplifier project, there has been a popular demand for a matching preamp. For the single ended F5, a number of such proposals already exist. And there were also suggestions of using the UGS for the balanced F5X.

In our opinion, however, it would be a pity to not have a matching preamplifier of at least the same speed and bandwidth as the F5X power amplifier, after take such trouble in making the latter fast. The most logic approach is of course to use the same basic circuit as the F5X. Indeed, why not.

A couple of months after we simulated the first circuits of such a mini-F5X, John Curl made public the schematics of his excellent JC-80 design, and the similarities in circuit topology are startling. Of course this is John's design some 30 years ago, and all credits go to him. The JC-80 uses an H-arrangement between the input stage JFET sources, very similar to the balanced F5 Turbo published by Nelson Pass a bit earlier. We also think this is as good as, if not better than the floating X as in the F5X power amplifier, and the PCB can also support the H-configuration, in addition to grounded and floating X. Everyone can then experiment for himself and pick the solution best suited to his likings.

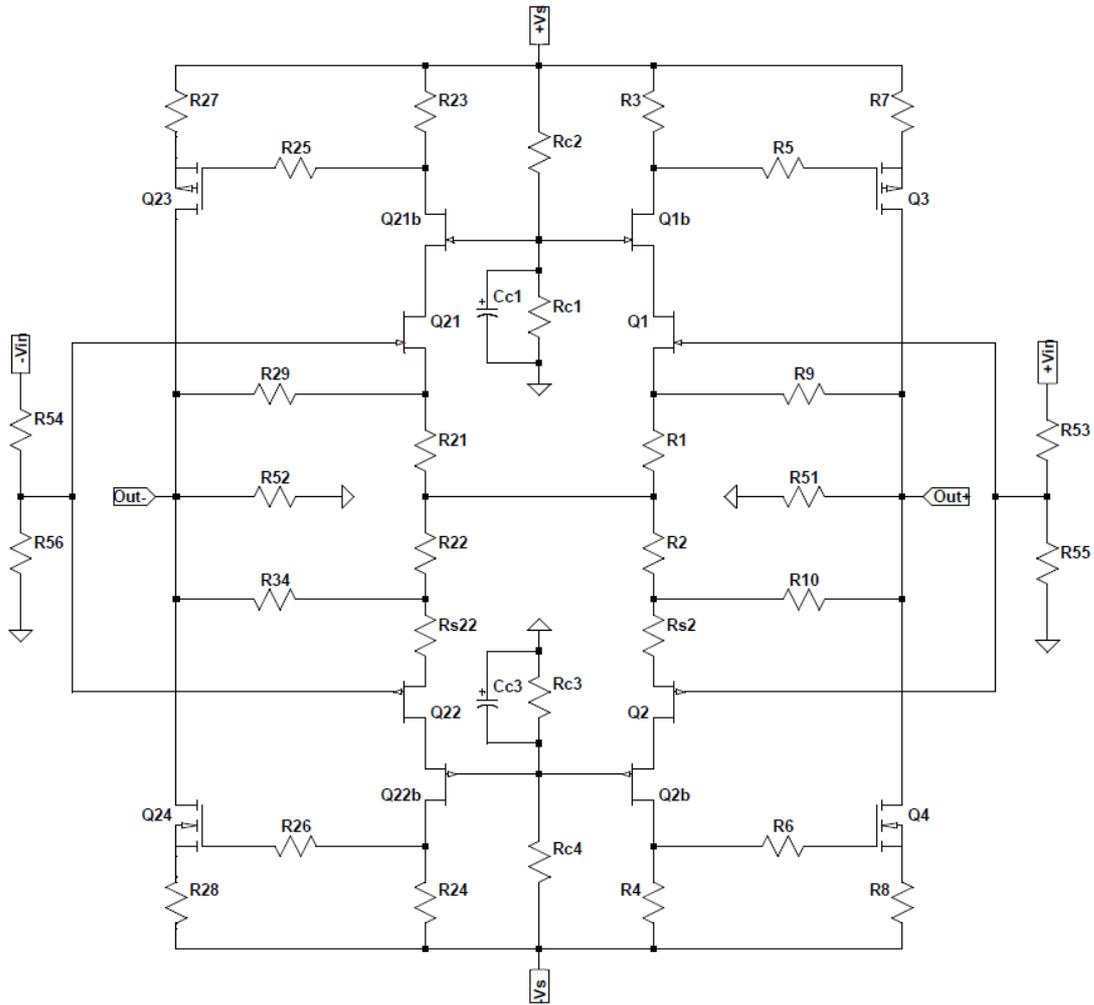
Again, as in the F5X power amplifier, the input stage can operate with or without cascode, and the PCB is also designed to support both. Having said that, simulations appear to suggest that there is no significant performance difference in both, so the final decision will again have to be made by listening tests.

The basic circuit is shown here with JFET cascodes. One can of course use low-noise bipolar devices (e.g. BC550C, BC560C) for the cascode devices instead, if the JFETs are too difficult to get. Component values are deliberately left out, as this is still work in progress and hence subjected to changes during the test phase.

As a first attempt, we believe it is possible to do away with any servos by good thermal coupling between the devices. Even if these were proven necessary, this can be added as a daughterboard to the main circuit PCB, thus not compromising the simple, symmetrical layout of the latter.

Some more target specifications :

Bandwidth	> 600kHz
Closed Loop Gain	approx. 20dB
Output impedance	approx. 10 ohm
Distortion (Balanced)	2 nd <80dB, 3 rd <90dB, 4 th <140dB at 4Vrms output (full swing for F5X) 2 nd <100dB, 3 rd <120dB, 4 th <150dB at 0.35Vrms output (normal listening)



F5X Preamplifier Basic Circuit Topology