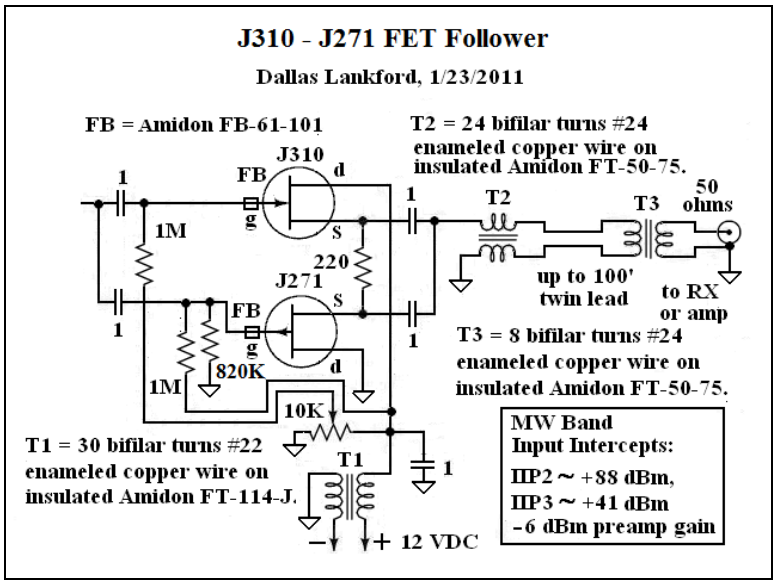
# J310 – J271 FET Follower

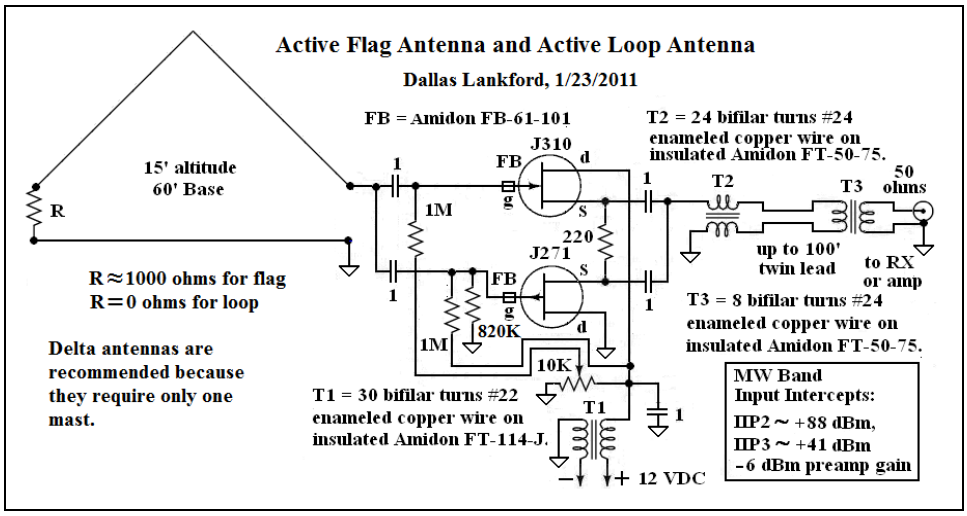
**Dallas Lankford 3/11/2014**




The FET follower in the schematic at right uses a J310 - J271 complementary pair like Trask did for one of his amplifiers. But there the similarity ends. The 220 ohm value of the source bias resistor was recommended to me by Jack Smith of Clifton Laboratories because of bias problems he encountered with the 100 ohm value which Trask used. Trask did not use separate gate biases or adjustable J310 gate bias to improve IIP2 of the amplifier. These two features were my ideas. As Jack remarked, "Your circuit is better than Trask's."

I developed this amplifier in late 2010. The version in the schematic at right is not the only version that I built. Originally I used a 1M resistor for the 820K resistor. After measurements with a version which had adjustable gate bias for both FETs, it was found that the 820K resistor typically gave slightly better IIP2. Because of variation from one J310 – J271 pair to another, dual gate bias adjustment is necessary for highest IIP2. However, in my opinion the dual gate bias adjustment version is unnecessarily complex because the increased IIP2 over the 820K bias for the J271 is not large.

I built my FET followers with through hole (leaded) parts. However, leaded J310 and J271 FETs are no longer available. Clifton Laboratories has a surface mount version of the FET follower (called a Z10130A FET Buffer Amplifier) here. It is available both as a kit and completely assembled with optimized IIP2. I recommend the latter.




The FET followers described above were developed to "activate" flag antennas (connecting the FET follower directly to the output of the flag antenna without an antenna transformer), which increased flag antenna sensitivity by making a step down transformer unnecessary (giving about a 10 dB voltage output increase). The FET follower also outputs the open source voltage of the loop into 50 ohms or thereabouts (or an additional 6 dB voltage output increase). The J310 – J271 FET followers described above also have lower noise output than other FET followers I have used, which further enhances the sensitivity of an active flag antenna compared to a traditional flag antenna with step down transformer follower by low impedance amplifier.