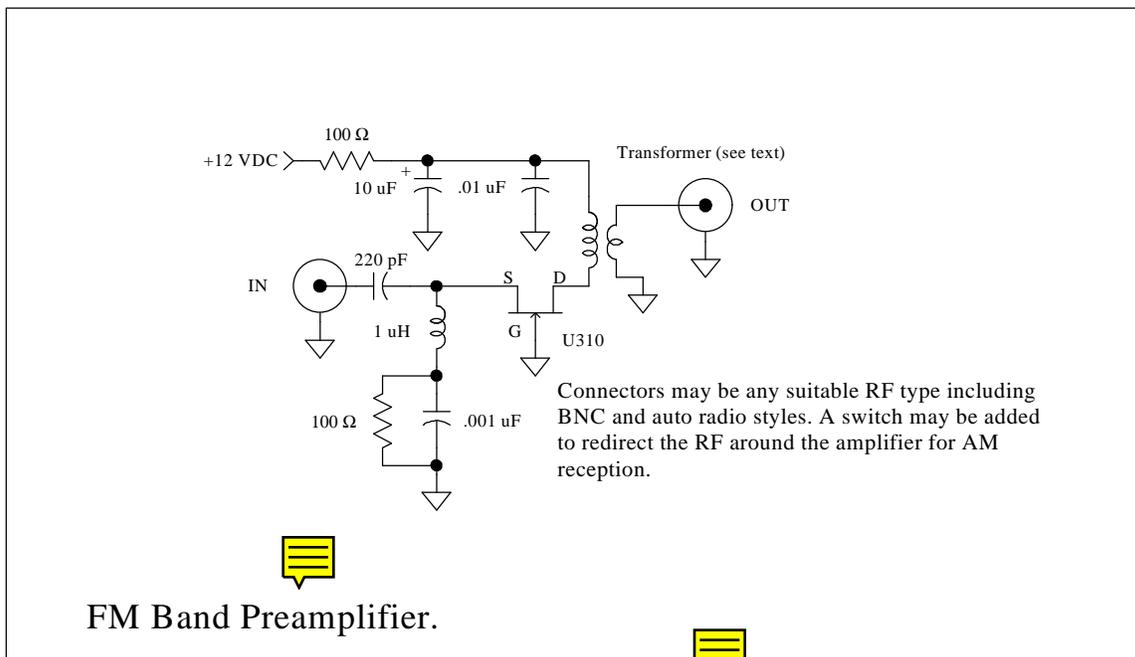


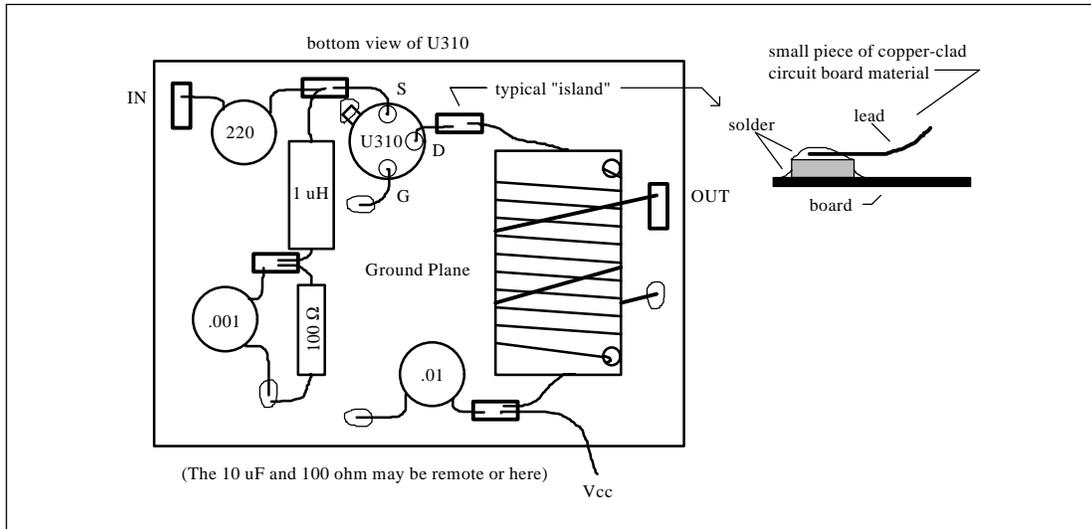
FM-Band Preamplifier

Here is a high performance RF amplifier for the FM band which can be successfully built without any special test equipment. The grounded-gate configuration is inherently stable without any neutralization if reasonably good layout techniques are employed. The output transformer is designed to resonate with the FET's drain capacitance at about 92 MHz giving the amplifier the highest gain at the low end of the band where the weaker stations operate. No tuning capacitor is needed as long as the transformer is built precisely as described.

The performance of the amplifier is quite good. The noise figure is below 2 dB and the gain is over 12dB. The low noise figure and good gain will help car radios or home stereo receivers pick up those weak distant stations or the lower power "talk radio" and university stations. FM receivers lose signals abruptly so if your favorite station fades in and out as you drive, this amplifier can have a dramatic effect.

The coil is wound on a section of an ordinary pen cap. Find a ball-point or felt-tipped pen with a plastic cap with an outside diameter of 0.4 inches. Cut off a piece 0.6 inches long. Poke small holes 0.1 inches from each end to secure the ends of the primary winding. Wind a ten turn primary of solid copper telephone wire around the tube passing each end through the small hole to secure the winding. Any small-gauge insulated wire which nearly covers the tube will work but the common telephone cables (which typically contain 25 colorful twisted pairs) yield excellent prototyping wire. The secondary is two turns wound around the ten turns.





Build the amplifier on a piece of copper-clad board. The case of the FET is connected to the gate and may touch the ground plane. In fact, one nice mounting method is to drill a hole just large enough for the case to pass so that the FET rests on the flange with the leads pointing up. Solder the ground lead and the little tab to the ground plane. Other connections may be made with insulated standoffs or even tiny pieces of copper-clad board glued in place. If double-sided board is available to make the little islands, they may be soldered in place. A nibbling tool makes tiny, rectangular bites which are a good size for RF work. Larger pads will exhibit excessive capacitance to ground.

The grounded-gate amplifier may be retuned for other frequencies by changing the output transformer. Amplifiers up to 500 MHz will work well with noise figures near 3 dB and gains near 10 dB. An autotransformer tapped near the VCC end can replace the two-winding transformer at higher frequencies. Add a series 100 pF capacitor to prevent VCC from reaching the output connector.

