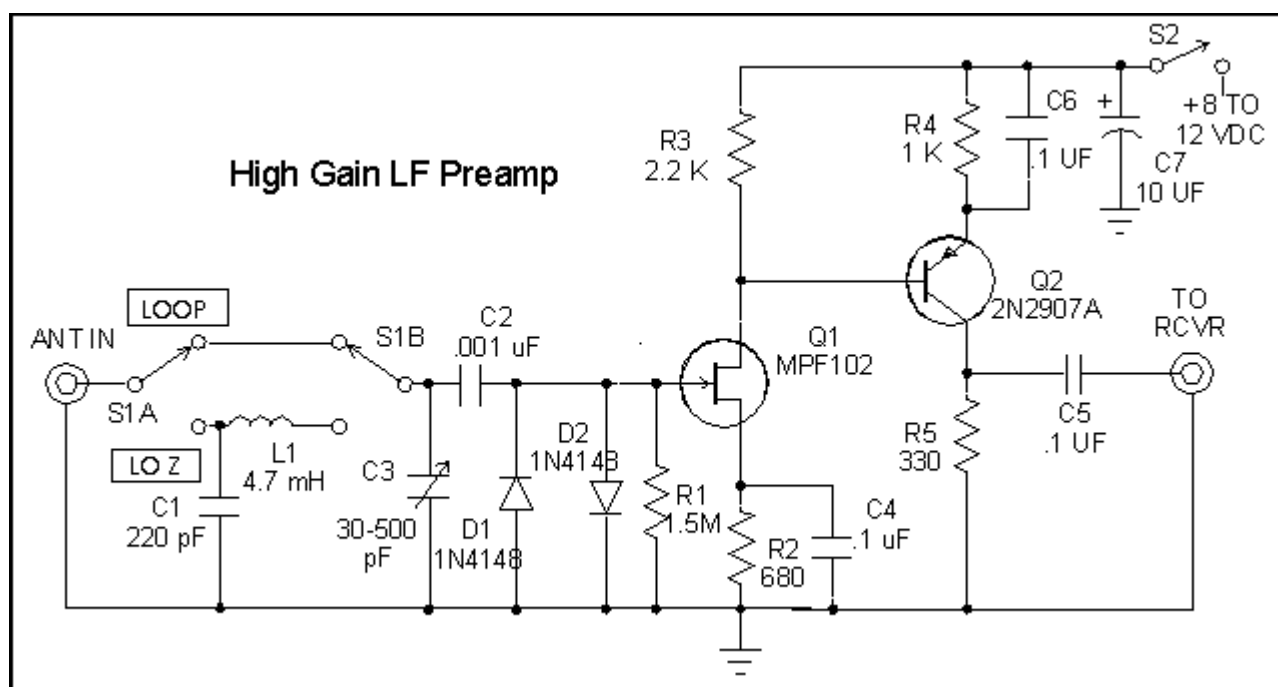


High-Gain Preamp

By Lyle Koehler, KØLR

An on-line version of my [Universal Antenna Preamp](http://www.lowfer.us/k0lr/preamp/preamp.htm) article, which first appeared in the August 1995 LOWDOWN, is available in the File Libraries section of the Longwave Home Page. This preamp will work with short whips, parallel-tuned loops, and various forms of coax-fed wire antennas. There are other "bells and whistles" including options for remote tuning and regeneration. All of these features are useful under some circumstances, but frankly I rarely use most of them, and a simpler circuit is usually adequate.

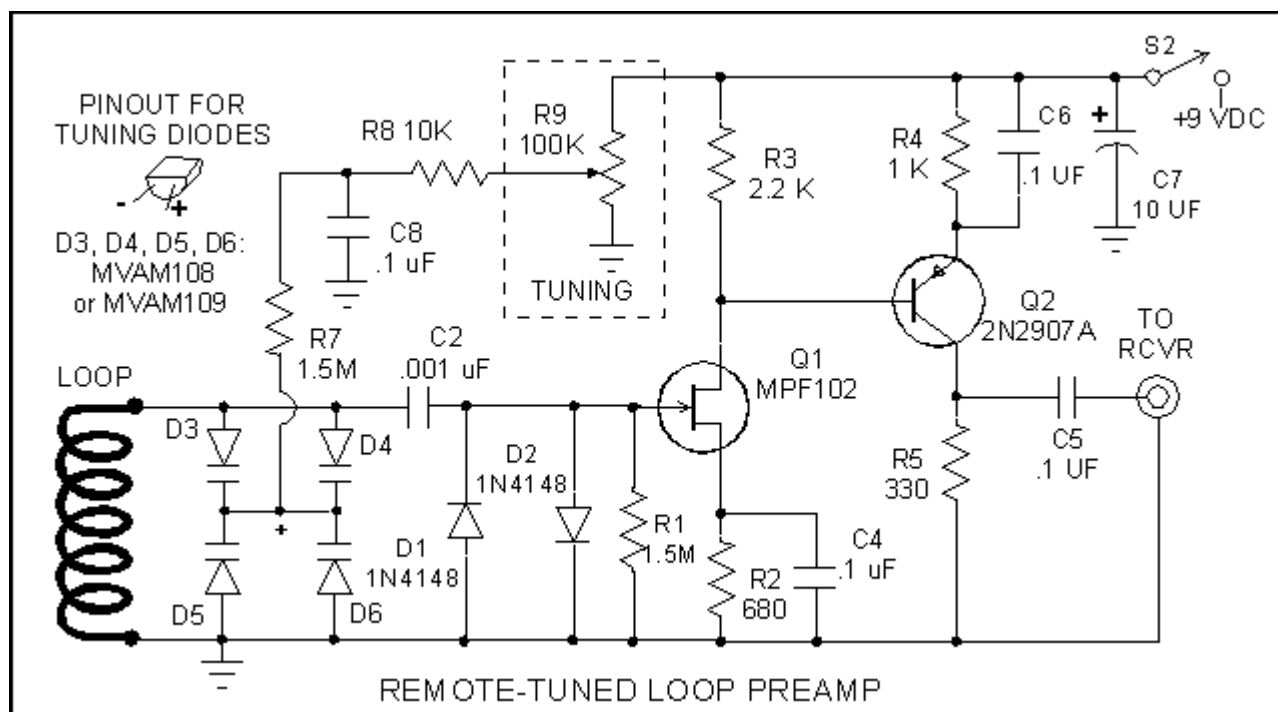
The circuit shown in the diagram below may be used with either parallel-tuned loops or with coax-fed wire antennas. With switch S1 in the "LOOP" position, the frequency range of the preamp is determined by the inductance of the loop and the capacitance range of variable capacitor C3. The diagram shows a range of 30-500 pF for C3. At one time, Mouser Electronics sold a compact 2-gang capacitor that was ideal for this circuit, but unfortunately they have discontinued the part. A single or dual 365-pF variable would be a good substitute. I recommend Reg Edward's RJELOOP3 software, available on the G4FGQ web page, for designing a loop that will work on the desired frequency range with whatever capacitor you have available. Although the preamp was designed for use on LF, it will deliver good performance well into the HF range with the proper loop antenna. It is important to keep the lead lengths short when using the "LOOP" position. For example, if the loop is connected to the preamp through 3 feet of 50-ohm coax, this puts a fixed capacitance of about 90 pF across the loop and will limit the upper end of the tuning range. Any reasonable length of almost any coax may be used between the preamp and the receiver.



The "LO Z" or low-impedance position of S1 is used for coax-fed wire antennas. There is enough gain for use with fairly short whips such as the 5/8-wave 2-meter whip that I often use for mobile LF reception. When used with large antennas like an 80-meter or 160-meter dipole, it may be necessary to attenuate the input signal to prevent overloading. A 0.02 uF or larger capacitor connected across the input terminals will help to reduce overloading from strong local broadcast stations. The recommended part for L1 is a Mouser Electronics 434-02-472J. Different values of L1 may be substituted for use on frequencies other than LF.

Diodes D1 and D2 are simply clamping diodes to protect the gate of the FET from high voltages that might

It helps to mount the antenna some distance from the shack, to get it away from noise sources like power supplies, computers, and the digital display in the receiver itself. When used with a parallel-tuned loop, which is how I do 99 per cent of my longwave listening, the preamp has to be located close to the loop and some form of remote tuning control is necessary. Those who are not as mechanically challenged as I am might find ways to do it with motor-driven air-variable capacitors. An easier solution is to use voltage-variable capacitance diodes (often referred to as "varicaps" or "varactors") in place of capacitor C3. In the diagram below, C3 has been replaced by two pairs of MVAM109 or MVAM108 diodes, which will give a capacitance range of about 40 to 500 pF. A loop with an inductance of 2 millihenries should tune from about 160 to 500 kHz. The tuning control potentiometer R9 can be in the shack, with a two-conductor shielded cable carrying the power and tuning voltage to the remote preamp. A separate coax is used to carry the signal from the preamp to the receiver. My "universal preamp" article shows how to run power, signal and tuning voltages through a single coaxial cable. However, it's often easier just to run separate wires. It is not necessary to use an extremely well regulated power supply, although the maximum voltage applied to the tuning diodes should not be much higher than 9 volts (only 8 volts is required to get the full tuning range with the MVAM108). The + side of the diodes, as indicated in the sketch showing the pinouts, goes to the common connection point of the diodes, where the tuning voltage is applied.



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Small Parts has them in his [on-line catalog](#). Tuning diodes are also available from DC Electronics (1-800-467-7736) and Tech America (1-800-877-0072).