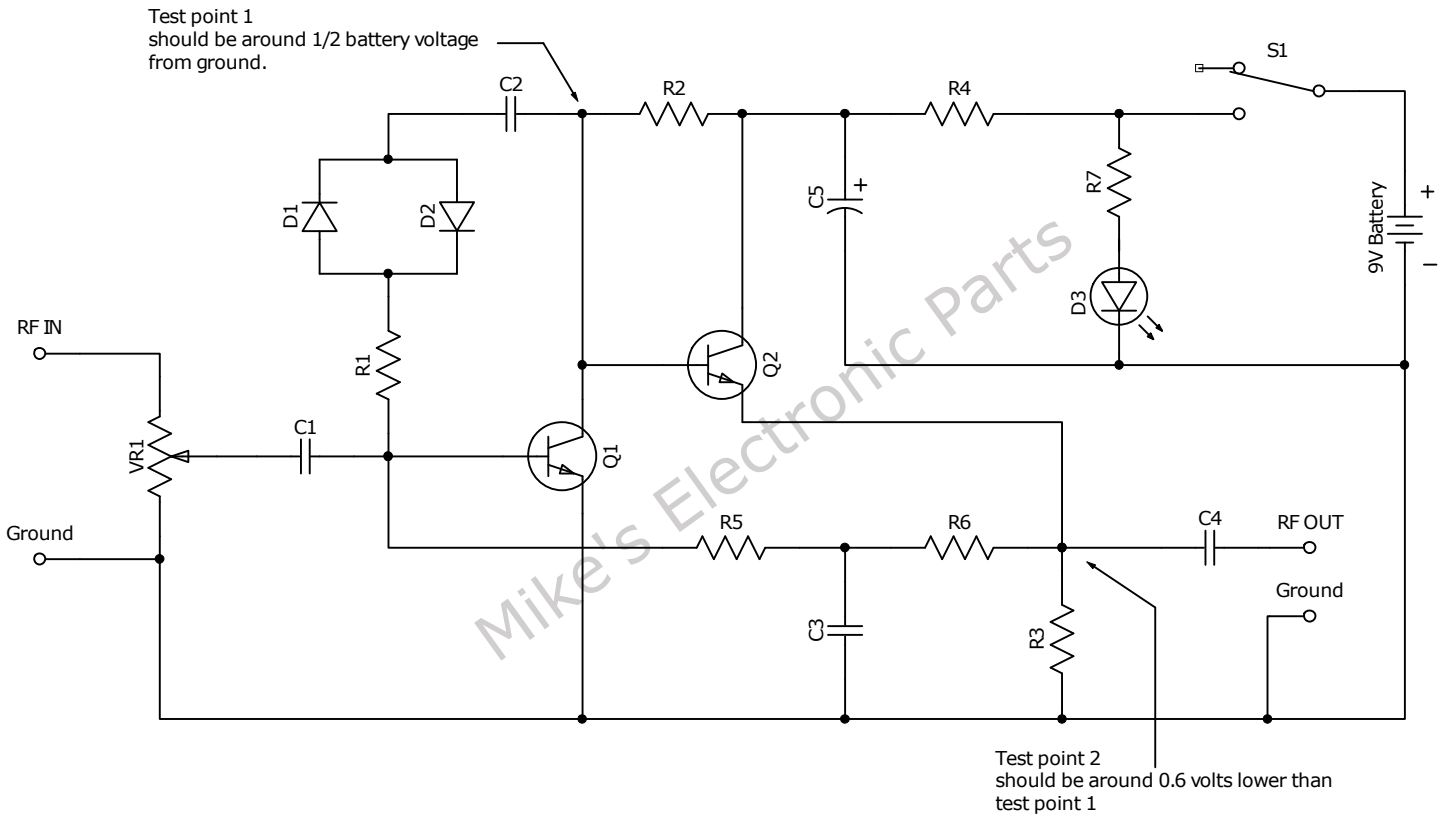


Broadband RF Preamplifier Active Antenna

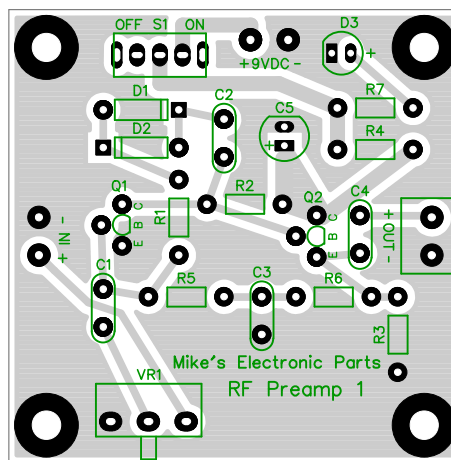
Designed by Scott Lowe
Mike's Electronic Parts, LLC.



Parts List

- VR1 = 1K Potentiometer
- R1 = 2K Ohm
- R2 = 10K Ohm
- R3 = 1K Ohm
- R4 = 220 Ohm
- R5 - R6 = 2.4M Ohm
- R7 = 2.7K Ohm
- D1 - D2 = BAV19
- D3 = Red LED
- C1 - C2 = 100pf
- C3 = .001uf
- C4 = .1uf
- C5 = 100uf 25 volts
- Q1 - Q2 = PN100A
- S1 = On - Off Switch
- 9V Battery Clip

PN100A
Flat side up



Broadband RF Preamplifier

Designed by Scott Lowe

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This is the schematic and circuit board layout for our broadband rf preamplifier. The amplifier should give very good gain up to around 25 MHz. Use an antenna around 10ft to 40ft and a good ground. The use of a physical earth ground is optional. If using an outdoor antenna, please use an earth ground for safety purposes.

According to the data-sheet, at the amperage Q1 - Q2 are drawing, they should have a voltage gain around 250 minimum. Q1 determines the gain and Q2 is just a voltage follower (no gain). The circuit uses soft clipping to reduce the gain on strong stations while producing the most gain on the weaker stations. C3 helps keep a constant feedback voltage on the base of Q1 allowing most of the gain control to be done by the diode clipping circuit.

D1 - D2 are BAV19 diodes selected for their low capacitance, however 1N914 and 1N4148 diodes will work.

Q1's input impedance is very high before the clipping circuit starts working so the 100pf capacitor is plenty large enough to allow the amplifier to operate well under 100KHz.

Q1 amplifies the signal and Q2 transforms the signal for low impedance drive through C4.

The RF Preamplifier Kit is not a starter kit, it is intended for experienced builders. We cannot and do not guarantee your results, only that this is the circuit we use.

Optional

The LED D3 and the resistor R7 are optional. These can be left out of the circuit with no performance change.

The switch is optional. You may either wire the circuit board to an off board switch or a jumper can be put in place on the circuit board.

The variable resistor may be wired to an off board variable resistor rather than a board mounted variable resistor.

The RF Preamplifier kit includes a clip for a 9 volt battery (9 volt battery not included in kit). Optionally, power may be provided by a 9 volt DC power adapter. If you experience hum while using a 9 volt DC power adapter, the power adapter may be noisy and may not be filtered very well. A different 9 volt DC power adapter may clear this up. A battery should always provide clean power.

Broadband RF Preamplifier

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Connecting Your RF Preamplifier To Your Radio

To connect your RF Preamplifier to your radio use one of the following methods. Some experimentation may be required to find the optimal coupling.

The connection to your radio may be made inductively by wrapping a few turns of wire around your existing coil or placing a few turns of wire next to your existing coil. Connect the ends of your few turn coil to the RF Preamplifier's output and ground. For optimal results, experiment with the number of turns and location along or next to the coil.

For an inductive coupling, you may also experiment with placing the RF Preamplifier output coil close to the radio's tuning coil rather than wrapped around it. If the RF Preamplifier output coil is small enough, you may also place it inside the radio's tuning coil.

If you do not have access to your radio's existing coil, wrap a few turns of wire around a ferrite rod. Connect the ends of your few turn coil to the RF Preamplifier's output and ground.

If you have ever had your receivers case opened and know where the tuning coil is then just mount the ferrite coil on the outside of your receiver as close as possible and parallel with the coil flat side facing the coil.

If you do not know the location of the radio's tuning coil, use this method to locate it. Turn your AM radio on and tune to a very faint station. Turn on the RF Preamplifier and set the injection control to full power (variable resistor to full right). Take the ferrite rod and move it up and down, side to side along the back of the radio. Listen to your receiver as you move the ferrite coil around. What you are looking for now is maximum noise or any change in the receiver. If you have a station tuned in it may get better or worse or go away, either way what we want now is a place that causes the most change. When you have found this spot you may temporarily mount the coil housing. You can tape it in place for testing.

Turn the amplifier on and turn the Injection full counter clockwise. Now tune in stations and adjust the Injection Knob for best results. If you here more than one station at time you may have a transmitting station nearby and the amplifier amplifies it to the point that it overloads the tuning circuitry in your receiver and over powers the weaker stations. If everything works where the Ferrite Coil is then you can mount it permanently with double sided tape or you may use Velcro if you have more than one receiver you want to use it on.

The connection to your radio may be made directly. If your coil has a tap a few turns from ground, the output can be connected directly to the tap. Connect the RF Preamplifier's ground to your radio's ground. If your radio has an antenna input, you can connect the RF Preamplifier output directly to the radio input. You will need to create an appropriate cable for your radio's input. Ideally, keep the RF Preamplifier about 3 feet from the radio. Start with the injection control all the down (full left) and slowly increase until you get the desired results.