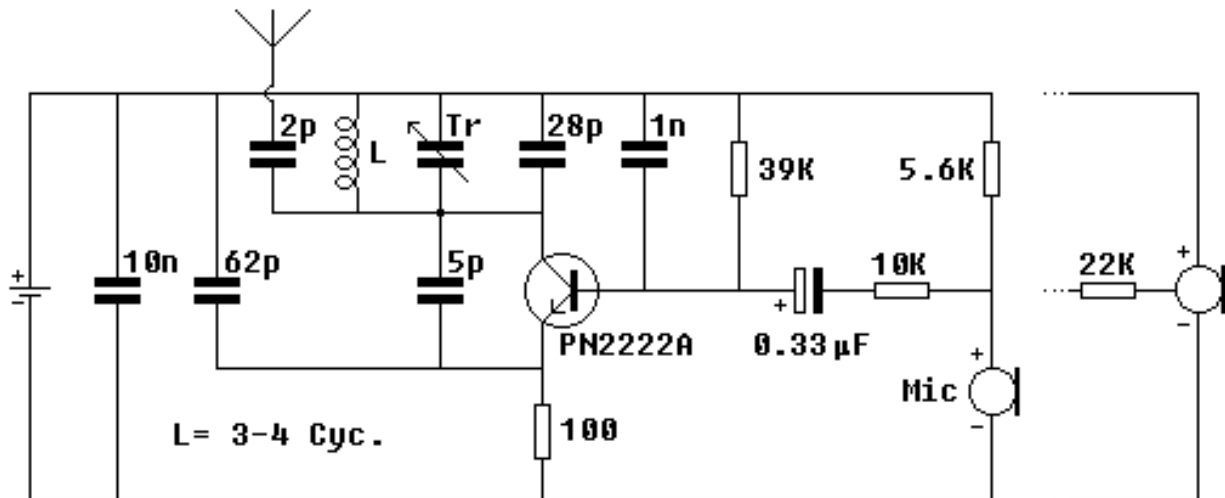


Mini FM transmitters take place as one of the standard circuit types in an amateur electronics fan's beginning steps. When done right, they provide very clear wireless sound transmission through an ordinary FM radio over a remarkable distance. I've seen lots of designs through the years, some of them were so simple, some of them were powerful, some of them were hard to build etc.

Here is the last step of this evolution, the most stable, smallest, problem-free, and energy saving champion of this race. Circuit given below will serve as a durable and versatile FM transmitter till you break or crush it's PCB. Frequency is determined by a parallel L-C resonance circuit and shifts very slow as battery drains out.



Simple FM Transmitter, 30/50 meters range, operates with 1.5V

Simple FM Transmitter involves on a single transistor oscillator

Technical data:

Supply voltage	:	1.1 - 3 Volts
Power consumption	:	1.8 mA at 1.5 Volts
Range	:	30 meters max. at 1.5 Volts

Main advantage of this circuit is that power supply is a 1.5Volts cell (any size) which makes it possible to fix PCB and the battery into very tight places. Transmitter even runs with standard NiCd rechargeable cells, for example a 750mAh AA size battery runs it about 500 hours (while it drags 1.4mA at 1.24V) which equals to 20 days. This way circuit especially valuable in amateur spy operations :)

Transistor is not a critical part of the circuit, but selecting a high frequency / low noise transistor contributes to the sound quality and range of the transmitter. PN2222A, 2N2222A, BFxxx series, BC109B, C, and even well known BC238 runs perfect. The key to a well functioning, low consumption circuit is to use a high hFE / low C_{eb} (internal junction capacity) transistor.

Not all of the condenser microphones are the same in electrical characteristics, so after operating the circuit, use a 10K variable resistance instead of the 5.6K, which supplies current to the internal amplifier of microphone, and adjust it to an optimum point where sound is best in amplitude and quality. Then note the value of the variable resistor and replace it with a fixed one.

The critical part is the inductance L which should be handmade. Get an enameled copper wire of 0.5mm (AWG24) and round two loose loops having a diameter of 4-5mm. Wire size may vary as well. Rest of the work is much dependent on your level of knowledge and experience on inductances: Have an FM radio near the circuit and set frequency where is no reception. Apply power to the circuit and put a iron rod into the inductance loops to change it's value. When you find the right point, adjust inductance's looseness and, if required, number of turns. Once it's OK, you may use trimmer capacitor to make further frequency adjustments. You may get help of a experienced person on this point. Do not forget to fix inductance by pouring some glue onto it against external forces. If the reception on the radio lost in a few meters range, than it's probably caused by a wrong coil adjustment and you are in fact listening to a harmonic of the transmitter instead of the center frequency.