

Xtal Staff

You'll find an RLCD parts assortment in our on-line catalog. Its bill of material contains two fixed capacitors, an AM band toroidal coil form (FT82-61), two resistors and a 1N34 germanium diode. The assortment contains nearly all of the parts needed to build a basic AM band crystal set. All you'll have to add is a crystal earpiece, a tuning cap, and some hookup wire for an antenna and for winding a coil on the toroid form.

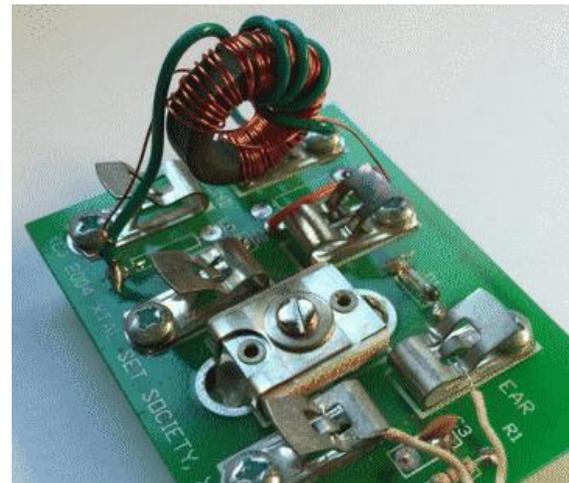
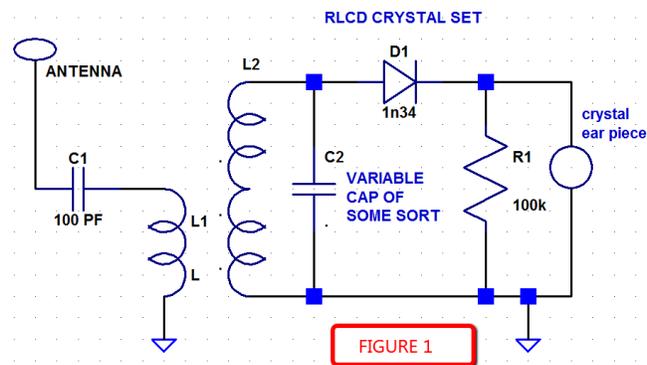
The schematic is shown in Figure 1. Capacitor C1 is placed in series with your wire antenna (of about 40 to 50 feet) to reduce its capacitance to roughly 80 to 90 pf.

You'll wind two coils on the FT82-61 ferrite core to make a step up transformer at AM frequencies. Wind about 58 turns for L2 first, using #26 enamel-coated wire. Then wire 4 to 8 turns of hookup wire for L1.

Figure 2 displays one example of how the set might be constructed. Note that the coil in the top-left portion of the picture shows using an FT82-61 ferrite core for the coil form. You could also wind wire on a piece of PVC plastic pipe or around a short section of 2 x 4, etc. Connecting the circuit together can take many forms. For example, you could use small nails as electrical terminals and run wires between the various terminals and components, etc.

L2 in parallel with C2 forms the tuned circuit for the set. To tune the crystal set to your local AM station you have several options: Leave L2 at 58 turns and use an adjustable capacitor of some sort (C2) to tune in the strongest station (the usual technique), use a fixed value capacitance and add taps on L2 to adjust tuning, or use a combination of both methods. This takes a bit of patience.

The detector diode (D1), bleeder resistor R1 and a crystal ear complete the circuit. One cannot use a pair of modern 8-ohm headphones since their resistance is too low for the circuit output. Powerless crystal sets like to see resistance of 10K or more at the output. Some old-time headsets have a resistance of from 2,000 to 10,000 ohms. These work moderately well with a crystal set.



The crystal ear consists of two metal plates enclosed in a plastic package with an ear plug added on one side. When voltage (from the crystal set output) is applied across its leads the plates inside the ear piece vibrate at the frequency of the audio voltage supplied.

Appendix:

Here's the formula for the number of turns required for the FT82-61 ferrite core for a given inductance. Let's say we want an inductance of 250 uH (micro-henry) = .250 mH (mill-henry). How many turns must we wind on the core?

$$N (\# \text{ of turns}) = 1000 * \text{SQRT}(L [\text{in mH}] / 73.3)$$

For our example, here's how we fill in the formula:

$$N = 1000 * \text{SQRT}(.250 \text{ mH} / 73.3) = 58 \text{ turns.}$$

73.3 is the factor for the FT82-71; other cores will have a different factor.

Xtal Set Society, March, 2016.