# 31 A fruit-powered medium-wave radio

Introduction

This is a one-evening project that will result in a working medium-wave (MW) radio, and will also teach you a little about the way electricity can be generated from the right metals and a little (safe) acid. All you need are three lemons or other citrus fruit, three pieces of copper and three pieces of zinc (or galvanised metal) for your power supply.

Construction

Figure 1 shows the circuit and **Figure 2** its layout on a simple 'plug-in' prototype board. The six pieces of metal are connected as shown, to wire the three lemons in series; use ordinary wire between each lemon and the next. If you have a meter to measure the total voltage, it should be about 1.8 V. Use a standard ferrite rod, and wind on it about 40 turns of single-conductor PVC-insulated wire.
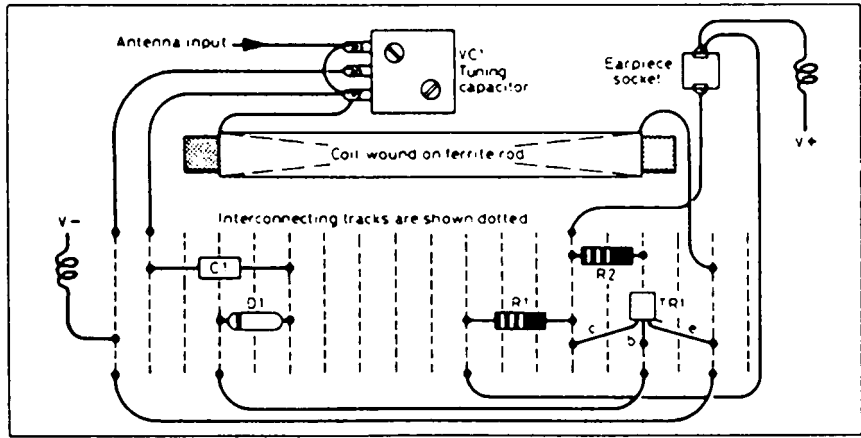
Figure 1 Most parts are plugged into the board as shown – soldering is not required
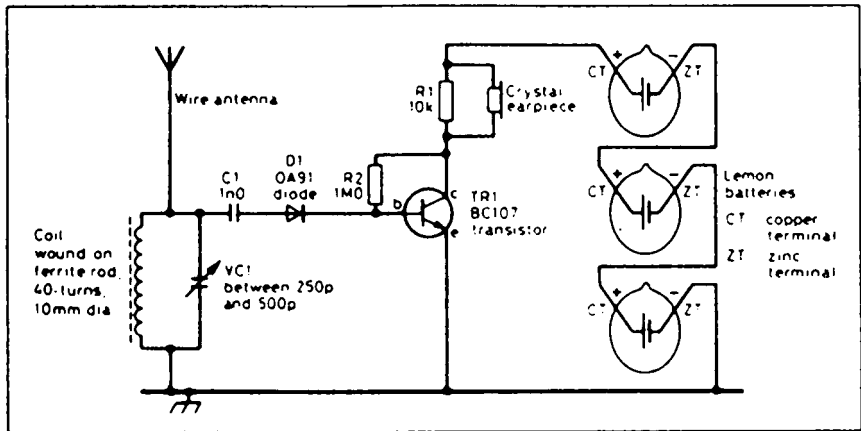
Figure 2 Three lemons power the radio, which gives good results for such a simple circuit

Wire up the circuit on the board as illustrated in Figure 2. Soldering is not required with this type of board – just plug in the components and the wires. Only one transistor is needed. The tuning capacitor, VC1, selects the station you want to hear, and D1 helps to remove the carrier from the RF signal. The resulting audio signal is fed to TR1, a small transistor audio amplifier, which makes the signal big enough to drive a crystal earpiece comfortably. Walkman-type earphones will not work, so invest in a crystal earpiece which you can use in several other projects, too! If you use a smaller capacitor than that specified for VC1, you will need more turns on the aerial coil.

Tests on the prototype indicated that the radio will run for about a week on three lemons!

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Parts list

Resistors: all 0.25 watt, 5% tolerance
    R1   1 megohm (MΩ)
    R2   10 kilohm (kΩ)

Capacitors
    C1   1 nanofarad (nF) min. ceramic
    VC1   250–500 picofarad (pF) variable

Semiconductors
    TR1   BC107 npn (or BC108, BC109C)
    D1   OA90, OA91 germanium (not silicon)

Coil
    L1   2 metres of single-conductor insulated wire on
                 a standard ferrite rod

Additional items
    Plug-in prototype board, e.g. Maplin YR84F
    Wire aerial at least 3 m long
    Crystal earpiece
    Three juicy fruits