A very simple experimental short wave radio receiver. This is basically just a crystal radio with two stages of transistor amplification afterwards. If I remember I used a pair of low impedance headphones with this radio. They were the large types and had excellent sound insulation: when you wore them you wouldn't hear much of what was going on in the room. This probably helped to hear what must have been some very quiet signals from this radio.

The diagram below shows the circuit diagram of this radio, drawn by reference to the circuit board itself.

All the components are from scrap. Starting at the left of the photograph, you can see two small coils on formers. One has 9 turns, the other 6. They both have a ferrite slug which I adjusted to get different frequency ranges. I could switch between the two coils, giving two ranges. The radio was built on perforated matrix board: but not the usual "modern" stuff with a 0.1-inch matrix. This old board had 0.15-inch hole spacing. The variable capacitor has a screw for attachment of a tuning knob, but I had none so would vary it by turning the vanes of the by hand. The two transistors are also scrap. They are the circular black (BC153) and metallic (BF185) components in the photograph. All the resistors and capacitors were junk too, the values were chosen according to what came to hand rather than any calculation. The components ahead of the first transistor are unmarked; the fixed capacitor would have been of the order of a few picofarads. The diode is a germanium type.

For an aerial, I strung a piece of wire from my bedroom window at the top of the house to a clothes line pole at the end of the garden, which was narrow and thin. It must have been around 120-150 feet of wire.

This very simple radio actually operated surprisingly well. I spent many hours listening to the BBC World Service and the Radio Moscow World Service (at that time, the English-speaking world radio service of the former USSR). It was of great interest to hear often differing views of the same world events.

{gallery}simple{/gallery}

Miroslav wrote to me with the following comment: *"I noticed two errors in simple radio receiver schematic. Both BC and BF transistors are shown without base DC bias resistors. If some kid attempts construction, they will be disappointed and unable to find a fix. As it stands, the circuit might still produce some output, but only at very large signal levels and with clipping (class C operation)."*

I think that Miroslav is correct, however, the circuit diagram as drawn does accurately reflect the radio I actually built and used, and I can verify that it did work very nicely, with no DC bias resistors. I discussed this with friends Arv K7HKL, Ian K3IMW and John VK6JY. Various theories were put forward, including rectification of AC to produce some DC bias (in the detector diode) and leakage in the 2uF coupling capacitor. Also the 220K collector resistors mean collector current is quite low in any event (note, I used sensitive headphones). Arv built the receiver to try it out, and found that it does work, with the coupling capacitor absent or reversed:

Arv K7HKL writes: *"Your Simple Radio Receiver circuit works great if the interstage capacitor is connected backwards. When I put it in correctly the receiver generates distorted audio ...that means that your receive circuit was probably direct-coupled as a mostly DC amplifier ...I tried it both ways, with both tantalum and electrolytic capacitor types. Same results with both types. Then I shorted the cap and the radio continued to work..."*

From this, I think it is a quite possible explanation, that I had my 2uF coupling capacitor backwards.