Schools Technology Project 2006

Kit of parts available at £30 inclusive
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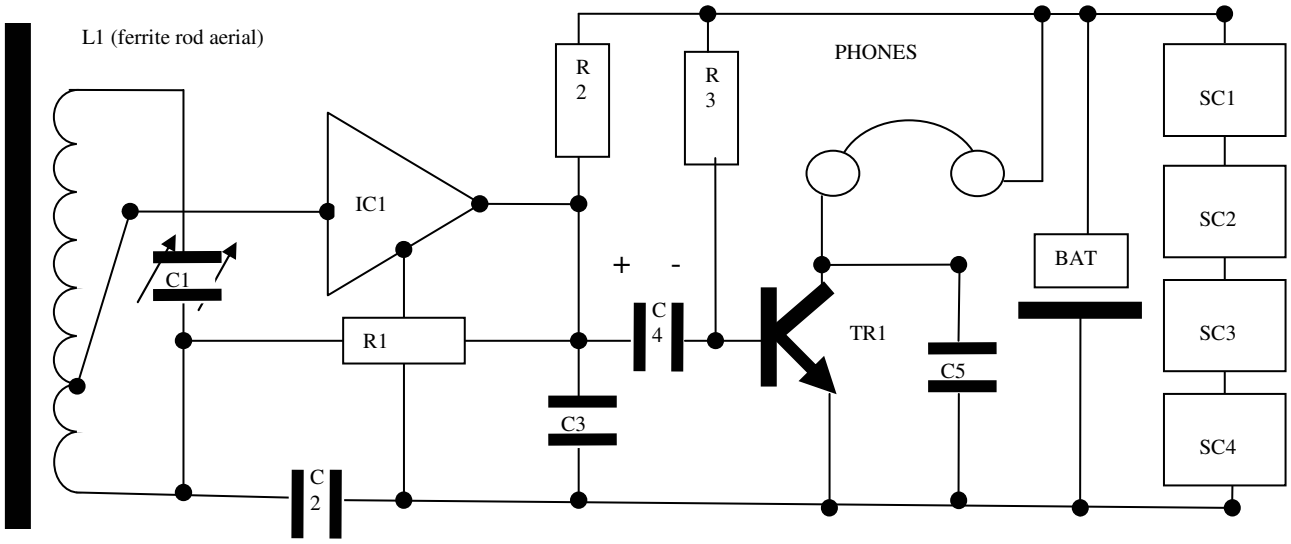
Fig 1

Solar Powered A.M radio

A low voltage radio chip, the ZN414 and one transistor is powered by 4 silicon photovoltaic cells to provide a go anywhere radio for a worthwhile “first project” in electronics. Miniaturation has been abandoned in favour of simplicity of construction and an open layout. Combined with a suitably fabricated plastic case it forms attractive finished product which is independent of an expensive power source.

Circuit Diagram Fig 2

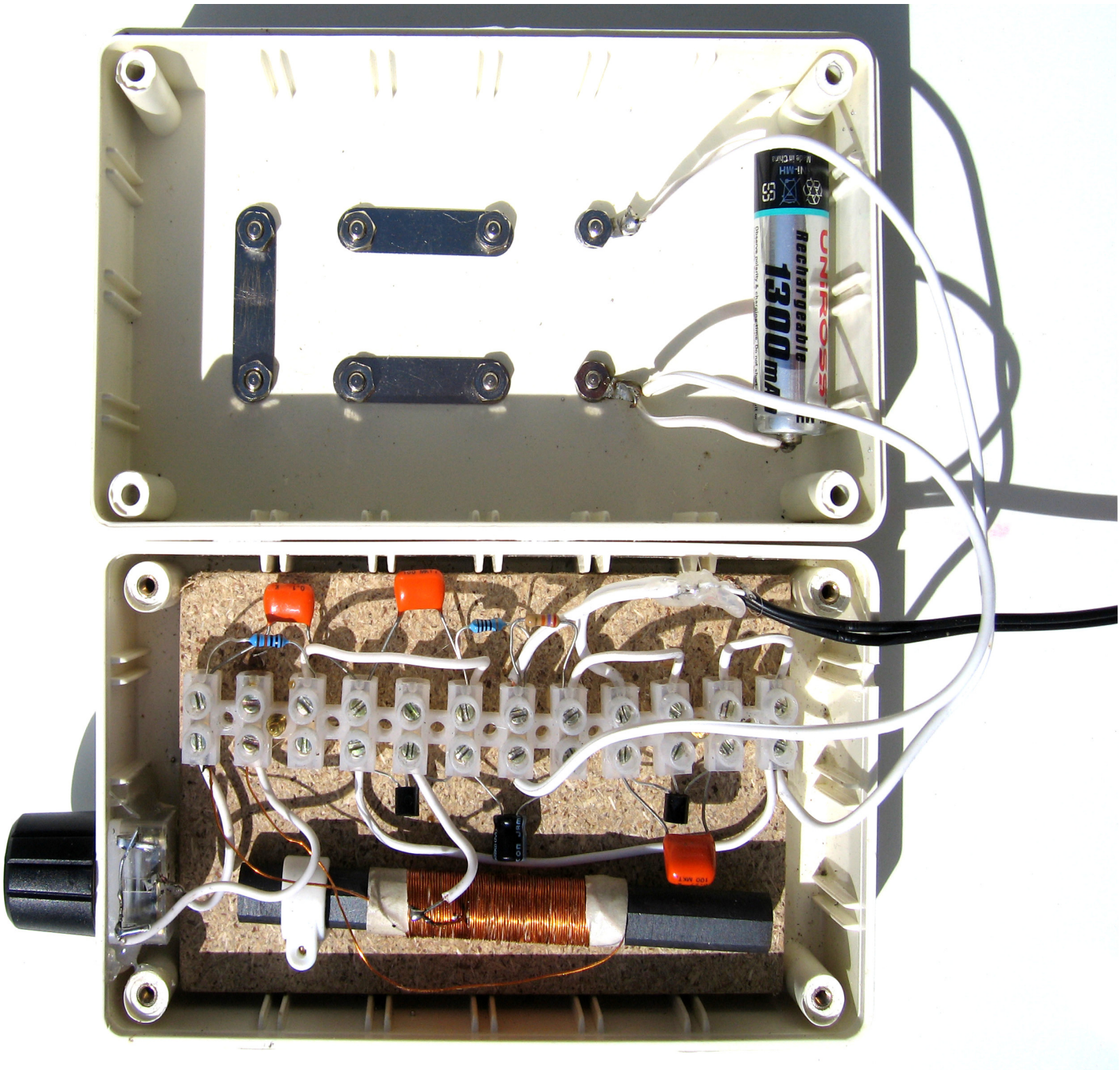


Component list

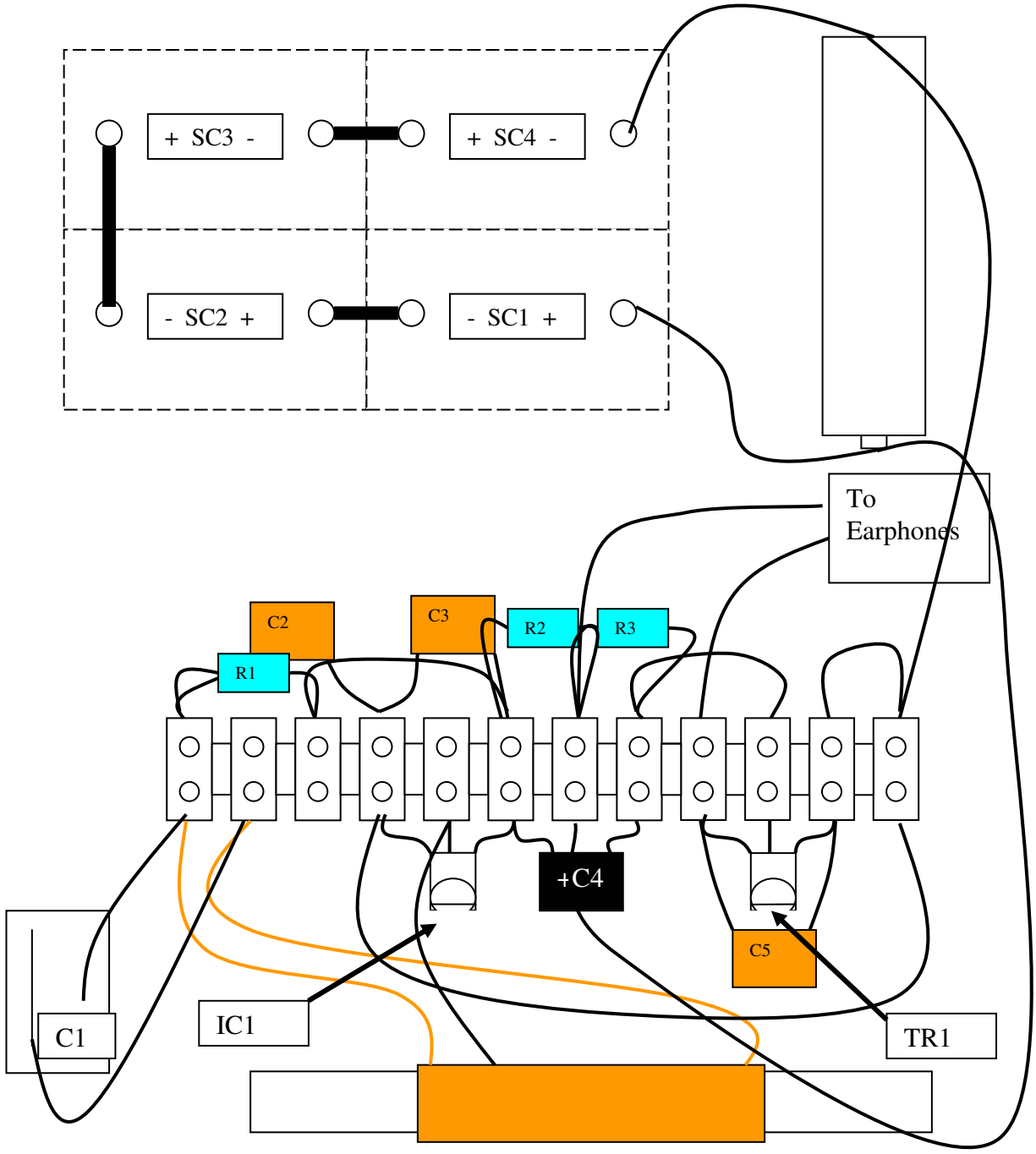
R1 100k.ohm, R2 1.1k.ohm, R3 33k.ohm, C1 Tuner capacitor C2 &C3&C5>0.1uF, C4= 100uF, IC1 MK484, TR1 BC548 transistor, SC1-4 silicon solar cells, L1 ferrite rod, Stereo phones in series to make 60 ohm headset, BAT rechargeable NMh cell

Component layout

All components except the tuning capacitor are mounted onto a 12 way terminal strip mounted on a 0.5 inch plywood base. Fig3



Chassis part details (terminal strip wiring) Fig 4



Note IC1 and TR1 are connected with the flat portion towards the base wooden plate.

Instructions

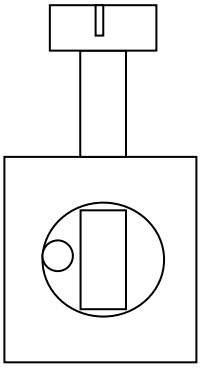
Make up and test the power supply first.

Join up the solar cells observing the correct polarity. You may test this with a voltmeter when illuminated with a tungsten lamp, the voltages should add up.

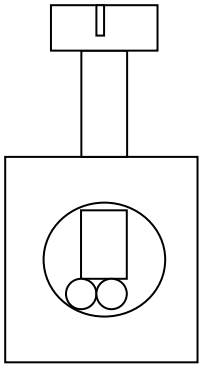
Only then may you join up the NMh cell with the correct polarity. Otherwise you will have made a solar battery discharger.

If the power supply is working correctly then it may be placed in direct sunlight to charge up the cell while the radio circuit is constructed.

The wiring is completed on the 12 way connector block, component leads may have been modified by either soldering or doubling back. This is because it may be difficult to hold the wires inside each terminal hole. See Fig 5, the terminal side view.



Wire at the side of terminal screw, loose and may be pulled out easily.



Multiple wires under terminal screw, held firmly and will not fall out..

The use of pointed nose pliers will greatly assist making and testing these connections.

It is advised that the wiring is thoroughly checked before connection of the power supply voltage.

Component values

For resistances there are two different colour codes indicting values. In general the first two or three bands indicate the value and the last band is the multiplying factor.

Black indicates 0, or 1(10^0) when used as a multiplier

Brown indicates 1, or 10(10^1) when used as a multiplier

Red indicates 2, or 100(10^2) when used as a multiplier

Orange indicates 3, or 1000(10^3) when used as a multiplier

Yellow indicates 4, or 10000(10^4) when used as a multiplier

Green indicates 5, or 100000(10^5) when used as a multiplier

Blue indicates 6, or 1000000(10^6) when used as a multiplier

Violet indicates 7, or 10000000(10^7) when used as a multiplier

Grey indicates 8, or 100000000(10^8) when used as a multiplier

White indicates 9, or 1000000000(10^9) when used as a multiplier

There are however usually more bands than 4 on a typical resistor with tolerance and temperature coefficient etc.

All the kit components have been attached to an annotated card for simplicity.

Handling components

Take care not to bend component leads too sharply close to the body, this applies particularly to the orange capacitors which can break of completely if put under stress. Components leads should be bent to suit their position on the connector block.

Use and charging

The best place for charging is outside in bright sunlight, the radio is permanently switched “ON” so eventually the battery will go flat. This is not such a problem as the suns energy is free.

The radio has only one tuned circuit so often 2 stations are heard together, though this can often be minimised by careful alignment of the ferrite rod with the wanted station.