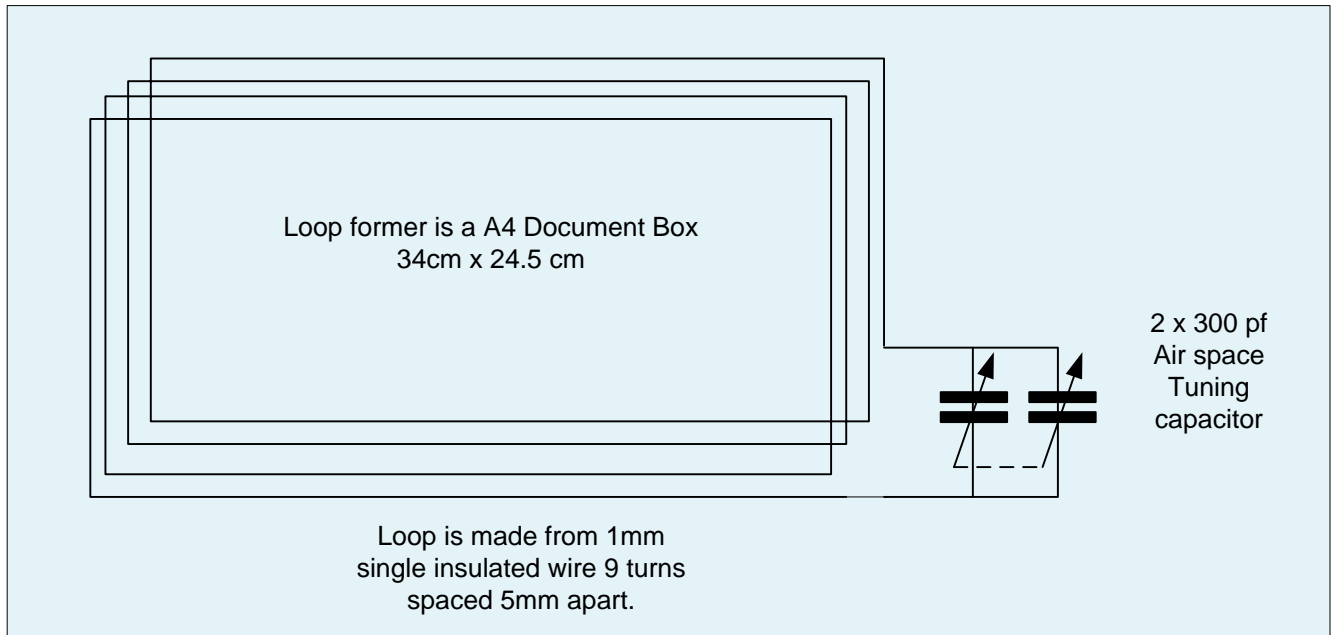


The **British Forces Broadcasting Service (BFBS)** Medium Wave loop antenna was designed so that the ex-Gurkha Soldiers employed as security guards at my place of work could listen to BFBS Broadcasts from the Sandhurst Military Academy. The **OFCOM licence** limits the AM transmitter power to 1-2 watts and hence the radius of coverage is about 3-4 miles. The Gurkha's domestic radio using an internal ferrite antenna had difficulty receiving the broadcast because it was further away. The reception was improved by placing the loop antenna close to the radio as shown in the later photograph and tuning it to 1134KHz.. – No electrical connections were required between the antenna and radio.



CONSTRUCTION NOTES

Construction is relatively straight forward with a knob attached directly to the shaft of the twin gang capacitor. The 9 turns of 1mm insulated wire are spaced 5mm apart. Two holes are drilled at the bottom of one side to allow the ends of the coil to enter the box. The wires are then soldered to the capacitor, which is mounted at the bottom of the box, so that the centre of gravity is kept low and the tuning can be done without tipping the box over.

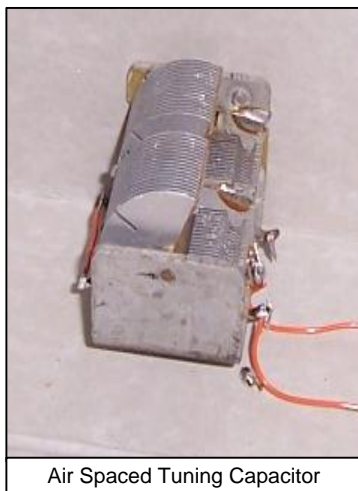
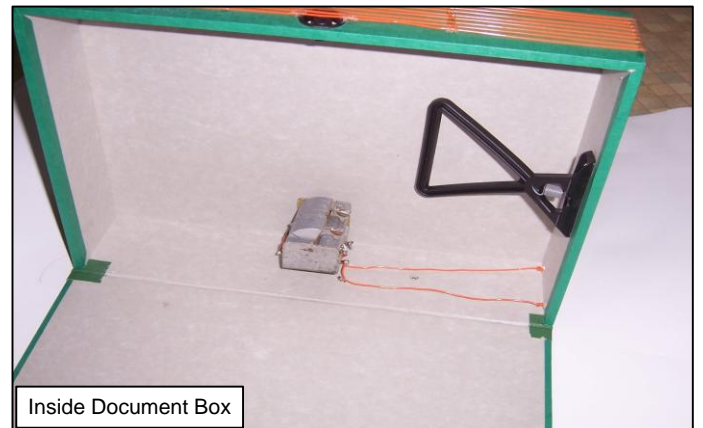
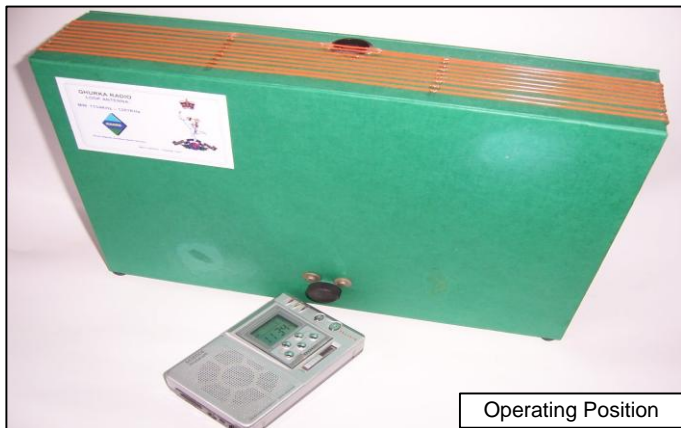
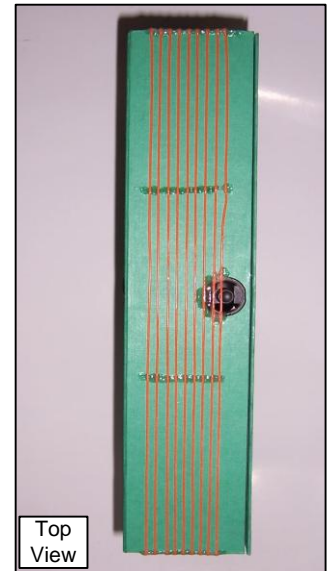
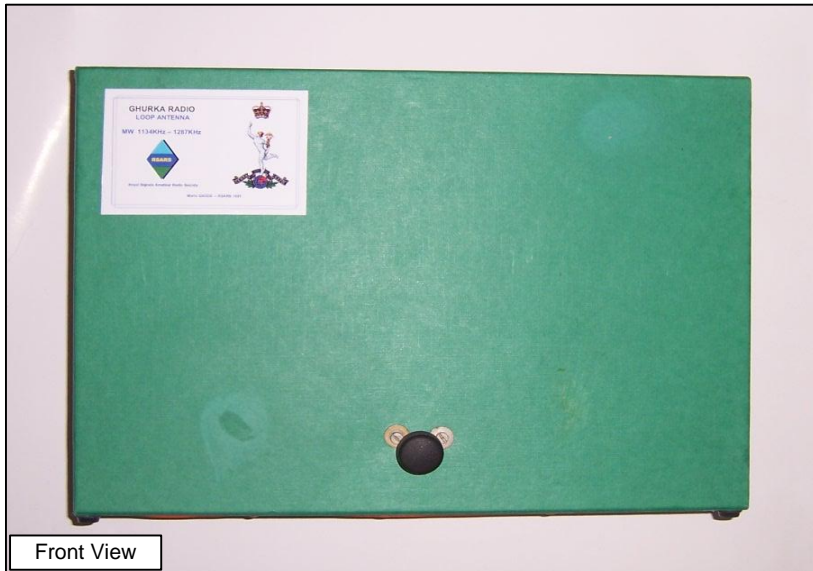
The coil is wound keeping the wire tight. The ends of the coil are secured by tying a knot on the inside of the box. This is necessary to keep the wire tight on the box during the early stages of construction. Later the wire is secured to the box using clear contact adhesive (Bostik in the UK). This is applied on the four corners, and across the wires on the sides. This ensures that the wires do not move and change the inductance of the coil, and hence the tuning of the loop .

TUNING THE ANTENNA

The long axis of the document box has to point in the direction of the transmitter, and the domestic radio's long axis with the ferrite rod has to be broadside to the transmitter. The two should initially be at right angles to each other. The final position may need to be changed to suit local conditions. It was found that the loop is very directional and moving the long axis 10 degrees off the line of the transmitter produces a noticeable change in the signal strength.

First tune the radio to the desired frequency, then bring the loop antenna close to the radio. Tune the loop by adjusting the capacitor slowly. The correct tuning point is where the signal is heard to increase.

Please note that the loop antenna is passive, and has limitations on how much it can improve the Signal to Noise of these weak broadcasts. If you are on the fringe area 6-8 miles away then this may work for you. My QTH is about 5-6 miles from the Transmitter and I get excellent reception using this antenna.



NOTES.

The loop's former is an A4 Document Box - 34cm x 24.5 cm. The box door is positioned at the rear and provides access to the tuning capacitor during construction.

The 9 Turns Coil is wound tightly around the box using Orange insulated wire 1mm diam.

The 300+300pF Tuning capacitor is fixed to back of the box using 2 short Bots & washers. The black plastic knob used for this design was a push-fit type. Alternative miniature tuning capacitors that are found in small transistor radios can be used. If the value is smaller then add an extra 1-3 turns to the coil to compensate for the smaller value .

$$\text{The loop's resonance Frequency} = 1 / \sqrt{(2\pi LC)}$$

Top View photo shows the clear contact adhesive that is used to secure the wires to the boxes edges and sides.

Operating Position photo, shows the small radio tuned to 1134KHz which is not at right angles to the loop antenna as might be expected. This was because the offset position provided a better signal to noise ratio in the location it was being tested i.e. a slightly noisy environment

Final Note :- *Tested by two ex Gurkha Security Guards in Berkshire on 16/8/10 and very pleased with the results listening to the Sandhurst broadcast on 1134KHz.*

