A 10/11 METRE DIRIECTION-FINDING LOOP AERIAL

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The DF loop is a reasonably simple antenna system which exhibits a figure of eight pattern in the horizontal plane together with vertical polarisation. For receiving purposes it is not necessary to match the very low radiation resistance of the loop. The induced signal voltage is the principal interest and this may be maximised by resonating the loop and feeding the receiver via a high impedance amplifier. The loop shown in Fig. 1 uses an FET push-pull amplifier, whose output is passed through push-pull emitter followers and a small ferrite balun. During early experiments a dual source FET stage was used, but this was discarded due to its inherent instability under certain tuning conditions. The output of this DF loop is very little less than for a full quarter wave whip.

The loop is constructed from a piece of PT29 75 ohm coaxial cable. The shield of the cable is split in the middle so as NOT to form a shorted turn. The shield forms a Faraday Screen as well as performing as a balanced tuning capacitor. Using 75 ohm coax with its lower capacitance as compared to 50 ohm coax enables a larger loop to be made. The PT29 is ½in OD and is self supporting. To make the loop a length of 3 feet or 1 metre is obtained. The outer jacket is cut back 1½in. to 2in at each end and a 1in. length is removed from the centre of the cable. This 1in. piece must be symmetrical about the middle of the length. Tin the exposed braid, taking care not to melt the insulation. When cool cut away the last inch of tinned braid and polythene insulation from each end of the cable, thus exposing the inner conductor. Rotate the cable under the knife when cutting so as to get a clean even cut. Mark the exact centre of the cable and cut around the circumference so as to remove the centre 1/16 in. of the braid. As the braid has been tinned a hacksaw may be used. Be careful not to cut too deeply into the insulation.

A piece of insulating tubing *[heat shrink is ideal]* should be slid over the centre and taped *[shrunk]* in place so as to exclude moisture from the break in the sheath. The loop is now formed into a circle and put aside until the amplifier and its housing have been completed.

The amplifier may be built on either a printed circuit board or a scrap of veroboard or matrix board. The layout should be reasonably symmetrical as the device depends on symmetry to work well.

The loop is tuned by the electrostatic screen and a small trimmer capacitance to give a convenient peaking adjustment. Trimpot R3 in the source circuits of the push-pull amplifier is used to balance the operating point of the two FETs. Earlier versions used twin balanced FETs but the present system is more convenient. Adjust the drain voltages to equality.

The balun is relatively non-critical and a trifilar winding of 7 turns on a small Q2 toroid has been found to be satisfactory.

The amplifier must be mounted in a small metal or plastic box to protect it from the weather. Small plastic soap boxes, diecast boxes or plastic electrical junction boxes are all suitable.

The loop is passed through two holes in opposite sides of the case, secured and connected to the amplifier.

When power is applied it should be possible to tune up on receiver noise or on a signal.

In use an attenuator between the loop and receiver is useful as it is necessary to reduce the signal considerably in the final stages of a hunt. Both RF and IF gain controls in the receiver will be found extremely useful.

A simple field strength meter can be connected to the loop for use on the final pedestrian part of a hidden transmitter hunt.

A protractor may be used for direction readout and should be mounted as accurately as possible. An accuracy of better than 5 degrees is possible — much better than is usually possible on 2 metres.

To obtain sense information and thus remove the ambiguity of the loop bearings a sense whip should be connected as shown in Fig. 2. This scheme is rather touchy on this frequency and the pattern tends to vary somewhat. The author prefers to take several bearings from different spots and plot them on a map.

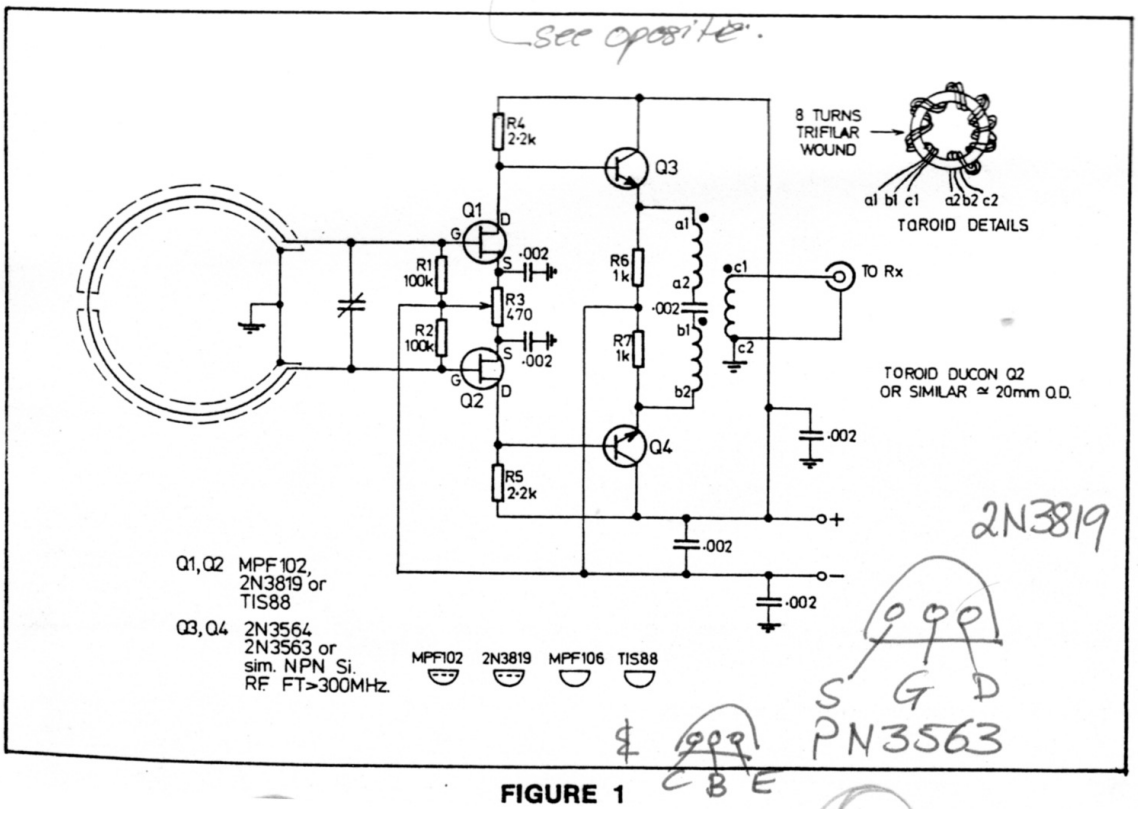

FIGURE 1

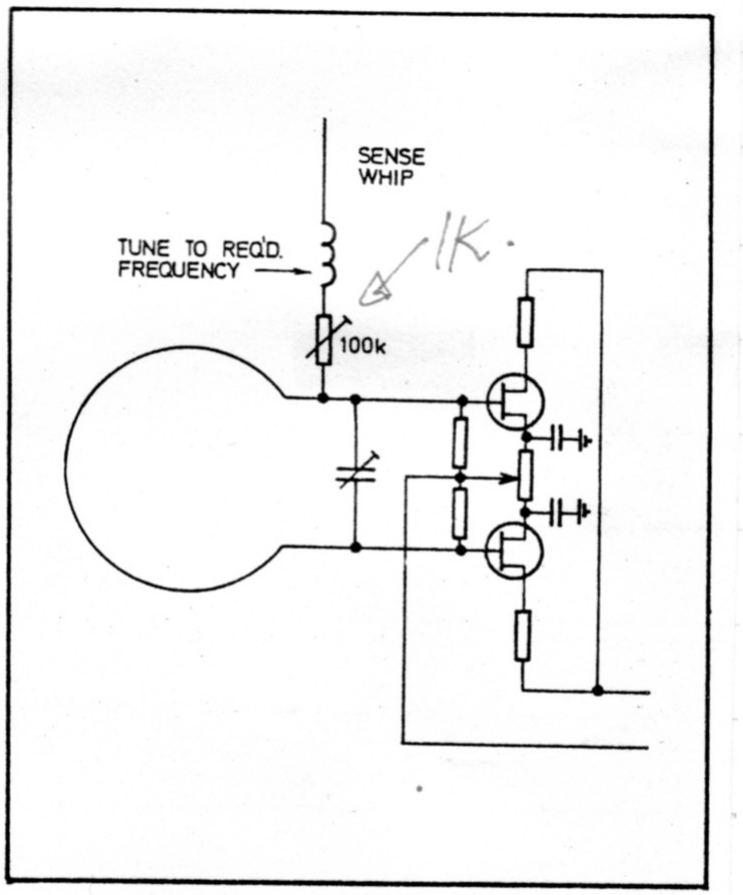

FIG. 2: Sense Coupling