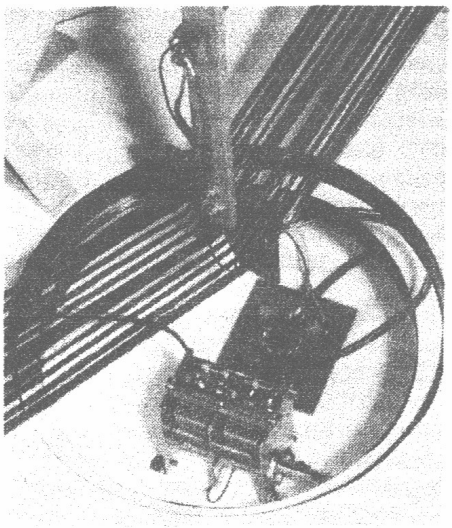
The input m.o.s.f.e.t.s operate in a common source current output mode, with gain-limiting source feedback voltage. Two advantages of this arrangement help maintain loop Q and satisfy requirement (1) above; these are (i) internal $C_{D\text{-}G}$ m.o.s.f.e.t. capacitance does not introduce degenerative feedback, and (ii) being in phase with signal appearing on the m.o.s.f.e.t. gates, overall negative feedback at the sources tends towards positive feedback at the loop via $C_{S\text{-}G}$ m.o.s.f.e.t. capacitance.

With the loop centre tap at ground potential, signal is fed to Tr1 and Tr2 gates using short lengths of 32 s.w.g. enamelled copper wire. Each m.o.s.f.e.t. has individual self-bias pre-set resistors R9,10, and is directly coupled to the output transistors Tr3,4. R9,10 must be set to mid position before assembly and carefully adjusted to bias Tr3,4 collectors at half supply potential before use. R5,6 and L1,2 define the gain characteristic outlined in (3) above, and introduce loop feedback via the m.o.s.f.e.t.s.

The toroidal output transformer is a home made, 8 turn, trifilar wound 1:1:1 component. Thread three 508mm lengths of 20 s.w.g. enamelled copper wire through the ferrite core and wind them side-by-side from the centre outwards. Winding ends should pass neatly through the printed circuit board as illustrated in Fig. 5. **If they don't—rewind!**

When turned OFF and at minimum resistance the output potentiometer R12 has no effect. When turned ON and advanced, track resistance in series with an 82Ω resistor R13, introduces variable 6 to 42dB attenuation as shown in Table 2.



Close-up details of the start and end of the two loops together with switch S1 and the tuning capacitors and p.c.b. fitted into the centre of the rotating system

Amplifier construction should not present any problems using the illustrated p.c.b. If necessary 0·1in matrix board can be used by copying layout and using point to point wiring. For termination and output potentiometer connection solder lengths of wire and 75Ω coaxial cable to the Veropins.

OFF	−10dB	−20dB	−30dB	−40dB
0	90	160	220	280

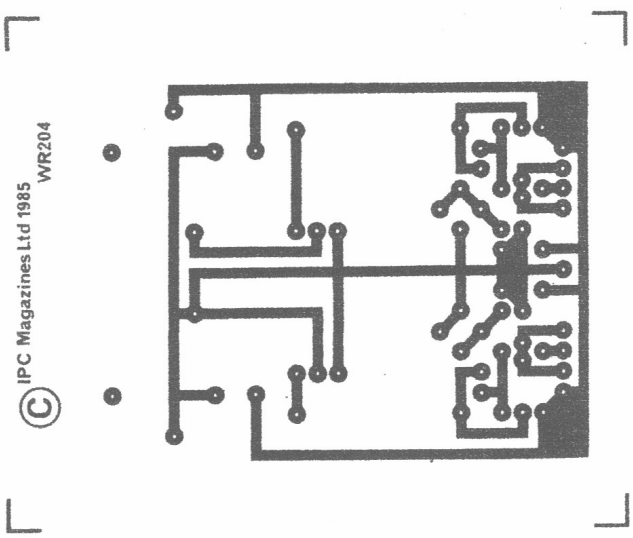
Table 2. Output Calibration Attenuation v. Rotation

Mount the finished assembly close to the tuning capacitor and check that both 32 s.w.g. gate wires are grounded via the loop before applying power. A 12V 85mA supply is satisfactory for reception at quiet locations, but 18V at 125mA will be necessary in areas that are permeated by high field strengths. Fig. 6 shows the simple, remote 18V d.c., mains powered supply used with prototypes.

The recommended dial drive and tuning variable are not normal "off the shelf" items. However the following companies will order them for you: Electrovalue, 28 St. Judes Road, Englefield Green, Egham, Surrey, TW20 0HB; Bi-Pak Semiconductors, PO Box 6, 63a High Street, Ware, Herts.; Cirkit, Park Lane, Broxbourne, Herts.; John Moxham, 22 Whiting Road, Windmill Hill, Glastonbury, Somerset. The unusual single pole three way toggle switch is available from Electrovalue.

By all means try the circuit using equivalent parts from the spares box, but use those listed for published performance.

Finish construction by making a rotatable winding support upon a tuner-amplifier housing. Photographs show my own "W-Q" loop in use with a 1953, type 1017, Marconi Mercury receiver, cassette recorder and phones. All antenna and receiver controls can be adjusted from the listening position.



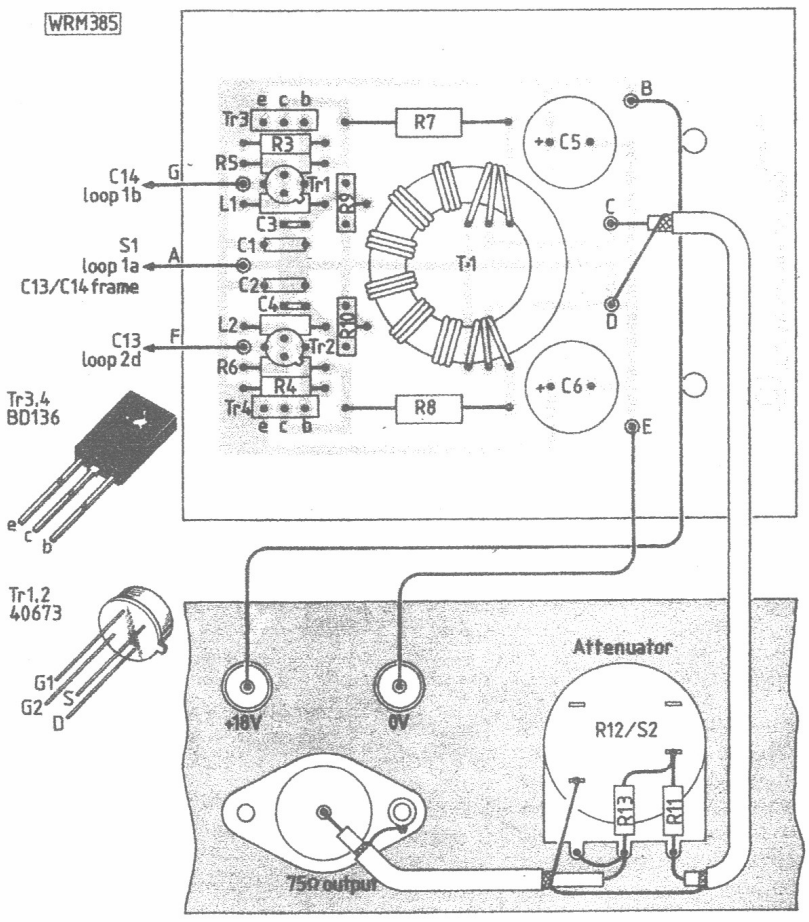


Fig. 5: Full size p.c.b. track pattern and component layout for the amplifier. Fig. 6: (Below) The circuit of a suitable power supply