

AERIALS for 160 Metres

PART 1

J.R.GREEN G3WVR

A number of readers considering building the VMOS Top Band Transmitter, which appeared in the July issue of *PW*, have requested further details of suitable aerial systems for use on the 160 metre band.

The problem on this band is, of course, the very long length of wire required to produce a true quarter-wave-length aerial system, something in the region of 39 metres, or 128 feet. Shorter aerial systems can be tuned to resonance by means of a loading coil, but there will inevitably be some loss of power in the inductor used, and the shorter the aerial, the greater the loss.

Long-Wire Aerials

Some may have gardens long enough for 128 feet of wire, strung to a convenient tree, or a pole at the end of the garden. However, height is important, and for field days and the like, a kite or (slightly more predictable in behaviour) a balloon may usefully be pressed into service as a practical alternative to a skyhook!

A suggested system is shown in Fig. 1. This may be connected directly to the output socket of the transmitter, or via the shortest practicable length of 50Ω coaxial cable.

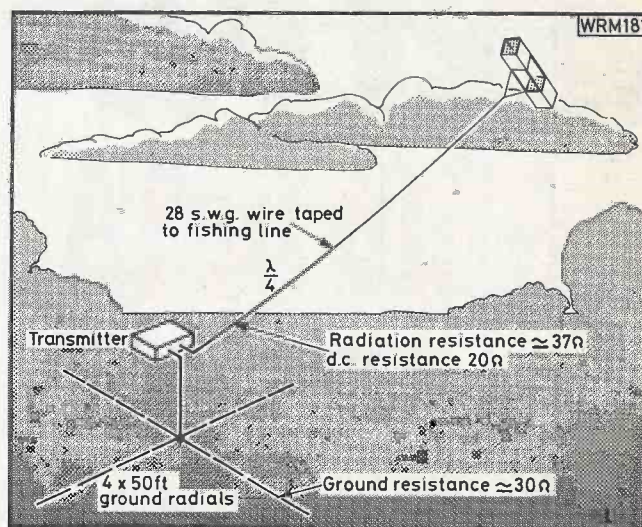


Fig. 1: A kite or balloon-supported, quarter-wave aerial system

A Tree Aerial

By using an eighth-wavelength aerial, with a loading coil, use can be made of a 60ft tree, as shown in Fig. 2. The aerial should be connected to the tap on the coil which gives the maximum reading on the ammeter.

Using a catapult to erect an aerial can be a hazardous business, and the following procedure should be followed to minimise the risks. (See Fig. 3)

1. Spool out the wire as shown.
2. Make sure that the wire from the weight exits at the top of the catapult pouch.
3. Hold the catapult well away from yourself, and sideways.
4. Turn your head away before firing.
5. Always wear a glove—a thick one!
6. Make sure that there are no people, animals, or property around that could be injured or damaged by a foul shot.

Remember—catapults are dangerous.

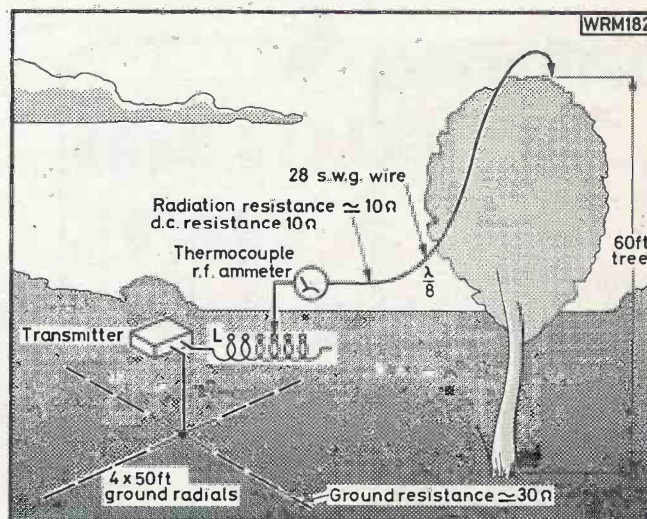


Fig. 2: An eighth-wave aerial system, erected with a catapult and lead weight. Loading coil L is 40 turns of 22 s.w.g. on a 50mm dia. former, tapped every 4 turns

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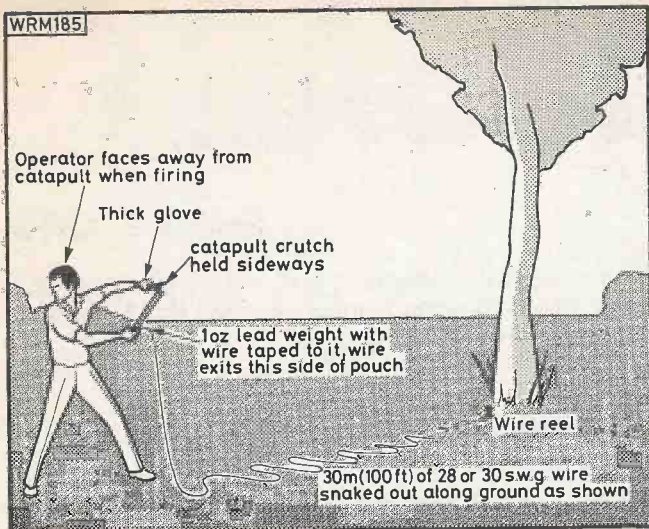


Fig. 3: Erecting an aerial by catapult. The operator should stand about 30m from the trunk of the tree

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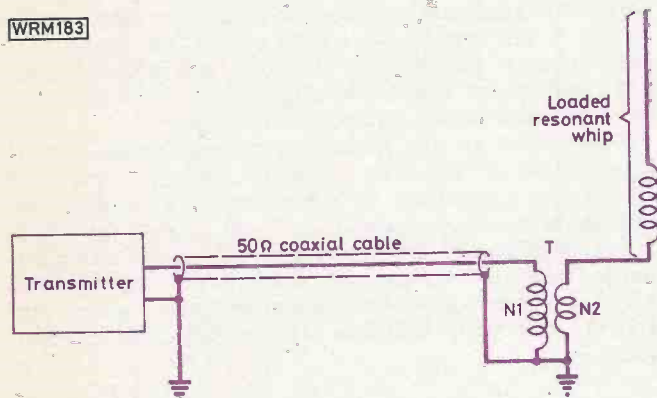
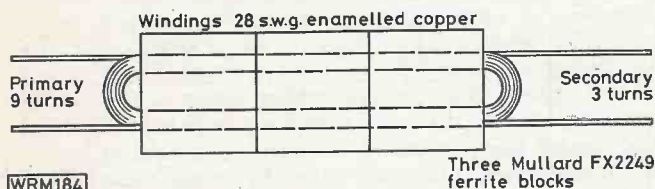


Fig. 4: Loaded whip aerial for mobile use. Transformer T is an r.f. matching transformer with step-down ratio $N_1:N_2$ of around 2:1–3:1 (see Fig. 5)



WRM184

Fig. 5: An r.f. matching transformer suitable for use in the loaded whip aerial system of Fig. 4

Mobile Whip Aerial

For mobile use, the aerial will be very much less than a quarter wavelength long. A whip aerial, such as shown in Fig. 4, must be accurately tuned to resonance by means of the loading coil at its base, or centre. In other words, its impedance must be real.

The real impedance plus losses should be less than 50Ω , and a step-down matching transformer will be required, with a turns ratio $N_1:N_2$ of 2:1 or 3:1. This transformer can be similar to that used for T1 in the VMOS Transmitter, taking the form shown in Fig. 5.

NEXT MONTH—TOP-LOADED VERTICALS

Practical Wireless, November 1979

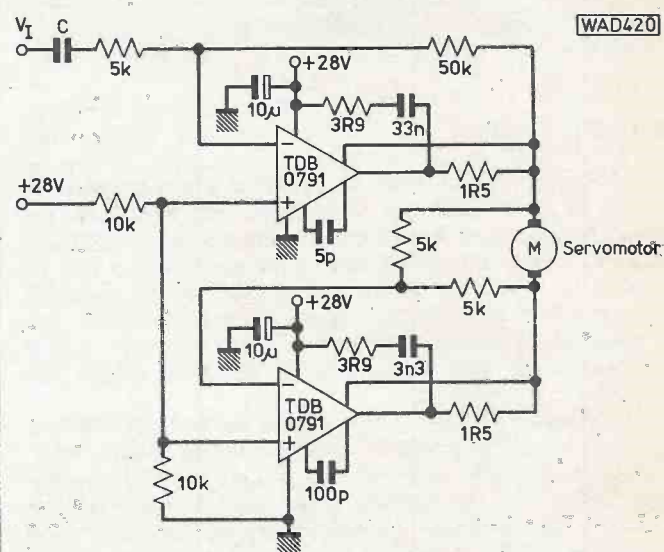
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Thomson-CSF TDB0791

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Typical Applications

A d.c. servo amplifier for driving a motor is shown in Fig. 6. The feedback resistor values are chosen to provide a gain of about 10 times. An input of 1V will therefore produce about 10V across the motor at a current of up to 1A, the current again being set by the value of the output resistor. The input voltage can thus be used to control the motor speed.



WAD420

Fig. 7: A circuit for controlling the speed of an a.c. motor from an alternating input voltage

The circuit of Fig. 7 employs a pair of TDB0791 operational amplifiers to drive an a.c. motor, the two amplifiers operating in push-pull. The circuit gain is again about 10 times so that a small input signal can be used to produce a much larger voltage across the motor.

In both of the circuits of Figs. 6 and 7, the input current can be quite small compared with the motor current. A steady input voltage is required for the operation of the Fig. 6 circuit, whereas an alternating input voltage is fed to the Fig. 7 circuit. The value of the input capacitor C in this circuit depends on the alternating frequency of the input voltage and should not have too high an impedance at the frequency concerned.

Availability

The TDB0791-SP is available from Watford Electronics, price £3.50 each plus 30p postage and packing, plus VAT.