

an Introduction to Antennas

Car CB antennas are the same as already described but the ground plane consists of the metal body of the car, and good results are possible from a well fitted mobile CB system.

Home MF and HF Antennas

For long and medium wave reception the ferrite rod antenna is now mostly used; but sometimes there is merit in employing the old type of "long wire" antenna consisting of a horizontal span (say 9m) and a vertical down-feed (say 4-5m). Current is induced in both sections, but the horizontal section certainly enhances the signal collection. A wall-mounted vertical rod can also be relatively efficient if mounted high on a chimney stack clear of electrical interference.

Such an antenna, however, is often best fed into suitably ratioed transformers with balanced screened cable between as shown in Fig. 3.11. This prevents the pickup of interference on the downlead.

For h.f. work a tuned antenna becomes possible, such as a centre or end-fed dipole, and this is much the best way to secure good reception on short waves. There are hosts of different antennas which can be used but, sadly, there is just insufficient space here to investigate them. Design, however, is based on the tuning of antennas as already detailed.

Ferrite Rod Antenna

This type of antenna is a development of the loop antenna which many years ago was commonly used in so-called portable radios. The loop, however, is still used for certain applications. With a ferrite rod the air within the loop is complemented by a core of ferrite of very high permeability with respect to that of air, which is unity. Core material for the l.w./m.w. bands is commonly a nickel-zinc ferrite of permeability ranging between 200 and 500 and the design is such that at these frequencies eddy current losses are remarkably small. Because of the high permeability and low losses the loop (which is now a coil) can be of small diameter, allowing the antenna to be mounted

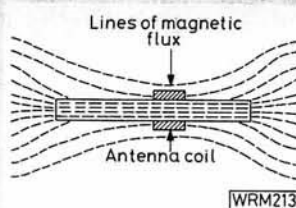


Fig. 3.12 ▲

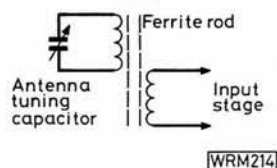


Fig. 3.13 (top right)

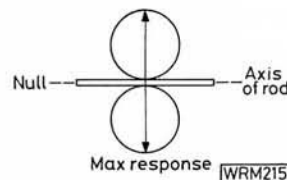


Fig. 3.14 ►

easily at the rear of the tuner or inside the cabinet of a small radio.

The antenna works by concentrating the magnetic field of the radio wave along the ferrite rod and hence through the coil as shown in Fig. 3.12 and the coil is tuned and coupled to the first stages of the receiver as shown in Fig. 3.13. Compare this with Fig. 3.7.

Although one or two arrangements have been mooted for v.h.f. f.m. ferrite rod reception, no receivers that I know of have yet been marketed with a v.h.f. ferrite rod antenna. The permeability falls off and the losses increase at frequencies much above 10MHz, though a special material which works up to about 100MHz has been developed, so perhaps we shall see f.m. tuners with inbuilt ferrite rod antennas one day.

Because it is sensitive only to the magnetic component of the radio wave, the ferrite rod antenna is directional, having deep nulls when the ends are pointing to the station and maximum pick up when broadside on. This makes it possible to adjust the position to minimise interference, the polar pattern being figure-of-eight, as shown in Fig. 3.14, the same as a horizontal dipole.

This leads us to the reason why we use a horizontal dipole for v.h.f. f.m. reception. At one time the urban skyline was cluttered by vertical TV antennas in numerous configurations. Now, of course, our TV antennas are that much smaller because they are tuned to the shorter wavelength of the u.h.f. channels, but instead of being vertical their elements are horizontal, as those of v.h.f. f.m. antennas. Why, then, are some antennas vertical and others horizontal? You will have to wait until Part 4 to find the answer.

Kindly Note

Simple Top-Band Receiver—June 1984

The p.c.b. track pattern and component overlay contained two errors in the region of the LM380 amplifier (IC2). An amended track pattern and overlay for the affected area is shown below. If you have a p.c.b. with the wrong track pattern it can still be used simply by adding a wire link between IC2 pin 14 and R22 (+12V) and another between IC2 pins 2 and 3. It is not necessary to modify the connection to pin 13 as this is already disconnected internally.

