HF active receiving loop antenna.

John's (now G8CQX, previously G4UAZ) original active loop antenna design upon which the M0AYF version is based.

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HF active receiving loop antenna

While transmitting loops are still unfamiliar and rather strange beasts, simple loop receiving antennas date back to the earliest days. However, they are coming back into favour as the basic element of compact "active" antennas. John Hawes, G4UAZ, has drawn my attention to a design for a matching amplifier that he published in the *CARA Newsletter* (December 1984), of the Cheltenham Amateur Radio Association. He writes:

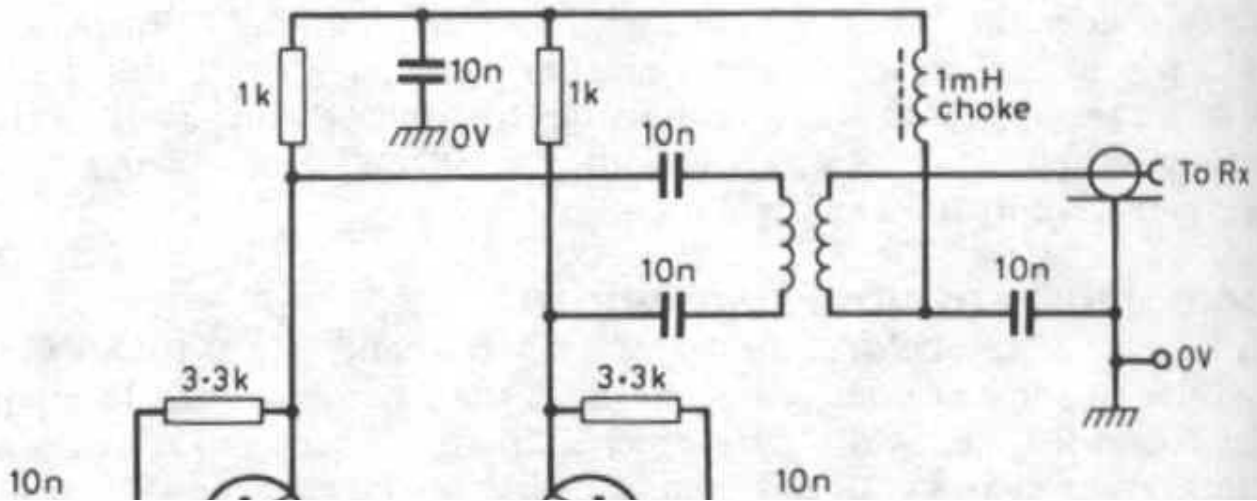
"Several active antennas have already been featured in *TT*, but I believe mine has the virtue of great simplicity yet seems to have good signal-handling capabilities, despite being essentially a broadband, untuned antenna."

The following notes are extracted from the original article:

"Small antennas (compared with the wavelength) are dogged with the problem of low radiation resistance. This means that an incoming signal must be transformed to the impedance of the receiver input with low loss. Conventionally this implies a narrow bandwidth, and matching difficulties. An answer is the so-called 'active' antenna with a small passive antenna element directly coupled to an impedance-transforming amplifier. Most commercial models use a small rod element and high input-impedance amplifier. Bipolar transistors do not lend themselves to this type of amplifier, and even fet devices have a large input capacitance.

"It seems more feasible to use a small loop antenna with a low input impedance. Such systems have been described before in *TT* but I wanted a simple amplifier that could be built in an evening or two: see Fig 7. I used BFW17A transistors, but any general-purpose rf type should work.

"The design uses a push-pull (long-tailed pair) configuration, presenting a balanced input to the loop. Shunt voltage-feedback is used to reduce the input impedance as well as to linearize the amplifier. Used with a square loop with 2m sides made from 16swg enamelled copper wire, it received



signals on 7MHz equivalent to my full-sized G5RV (with loop in vertical plane), and works over the full hf range. My amplifier was built on Veroboard with "ugly" wiring. The only difficult component is the 1:1 rf transformer for which I used a toroidal core from the junk box. Several turns of twisted bifilar wire were wound on the core, and checked as follows: First, one of the windings should be wired across the input of a receiver tuned to the lowest band of interest. The other winding must be open-circuit, and little reduction in signal should be noted provided the primary inductance is adequate. Then wire in receiver as in Fig 7(b). Before trying the amplifier, a dc check is worthwhile, about 10·5V on the collectors and about 3V on emitters should be found with a 12V supply. I power my amplifier through the coaxial feeder with the circuit of Fig 7(c), but if you do not wish to spend money on 1mH chokes, running a separate supply wire would be entirely satisfactory. It makes an interesting constructional project."