MEASURING RHO, THE ALTERNATIVE TO SWR

RADCOM, FEBRUARY 1998

I HAVE READ the fine article by G4FHU, in which he points out the desirability of measuring reflection coefficient rather than SWR. In fact, I would go further and claim that it is only possible to measure the SWR directly by making measurements of the maximum and minimum voltages or currents on the feeder itself.

All the so-called SWR bridges we use measure the forward and reflected voltage, either directly or indirectly; and the indication is usually on a meter which shows the reflected voltage, normally standardised against the forward voltage, but calibrated in SWR. Surely it is easier and more accurate to calibrate a meter scale of 0 to 100 as reflection coefficient, which lies between these values than in SWR which lies between one and ıfinity. G4FHU is to be congratulated on pointing this out and perhaps help to lay to rest the bogey of SWR, which is only really of concern when considering the voltages on the feeder system, whereas the reflected voltage is what is of concern when designing matching sections, Antenna Tuning Units and bridges

A Harwood, G4HHZ

ALTERNATIVE Nickel-Zinc ferrite cores that appear to have sufficiently similar properties, and use the type 61 material that is similar to that of the originals, are Fair Rite 59-61-5101 and Amidon FT-82-61.

A suitable core material is very important, but the A_L value of 55nH for 1 turn is not absolutely critical. Nevertheless, L2 (shown in **Fig 1**) must have 13 turns, and L3 needs about 5 times the inductance of L2. If identical cores are used, L3 needs to be about 30 turns. Using two cores of the same type should produce an cceptable outcome, though, with an unlucky combination of core tolerances, it might be desirable to make fine adjustments to L3 by bunching or spreading the windings, or even by adding or subtracting a few turns.

Bob Pearson, G4FHU

VALVE OR TRANSISTOR AMPLIFIERS

TECHNICAL FEEDBACK, RADCOM, JANUARY 1998

I WAS INTERESTED to read the letter from OZ1XB in January's *Technical Feedback*. For most of my amateur career and part of my professional career I have been involved with the construction and installation of high power HF, VHF and UHF amplifiers. I have always been interested to see new designs for high power solid state amplifiers but have never, until recently, been tempted to build one. The designs have always seemed so complex when compared to equivalent valve designs (at least for power levels over about 150W output). Much of the complexity comes from the need to adequately protect the output devices. It has been said of switched mode power supplies that they are "always only a microsecond away from catastrophe". The same could be said to apply to solid state amplifiers. The other problem is that the devices have quite limited dissipation and are very expensive, especially when compared to second-hand valves. To overcome the dissipation problem, really high power designs use multiple power modules, again increasing the complexity many fold.

Recently however, for me at least, the view has changed somewhat, and I am well on the way to completing my first "full legal limit" solid state amplifier. And it's not just me; there is a revolution in solid state amplifiers happening right now - on 160m! I personally know of about a dozen in use or under construction. The main driver in all this has been, as so often happens, the work of one radio amateur. In this case Dave Pick, G3YXM. For many years Dave has been interested in using switching and low frequency devices as PAs on top band. I remember in the '70s his experiments with 2N3055 amplifiers on 160m - yes, some makes of device would work that high! More recently, Dave has been experimenting with switching FETs and has developed a repeatable design using a pair of devices. These transistors are incredible in that they are readily available, cheap (£12 each), and have a high dissipation (300 watts each). There is a down side in that they have a low maximum frequency, so realistically 7MHz is as good as you can do. Interestingly, it is possible to build a complete amplifier with components from the RS catalogue - no need to source the odd bits you need for high power valve amps. This makes the whole concept rather easy to implement. Dave has published his design on his web site (search for G3YXM). I have asked him about an article for *Radcom*, but he is reluctant. Pity. It would be difficult to build an equivalent valve amplifier with as few components.

Another driving factor for me has been safety. Like most amateurs, my high power designs have not always been the safest, and 4.5kV is rather unforgiving. My son is three, and I was not willing to take the risk of using my old amplifiers. 50 Volts is so much safer.

For the technically competent, solid state amplifiers using switched mode PSUs would be a great challenge, but as FETs improve a non-transformer approach (as used in some valve designs - PL509 types) will become a possibility.

I have seen the future, and it is definitely solid state.

Richard Newstead, G3CWI

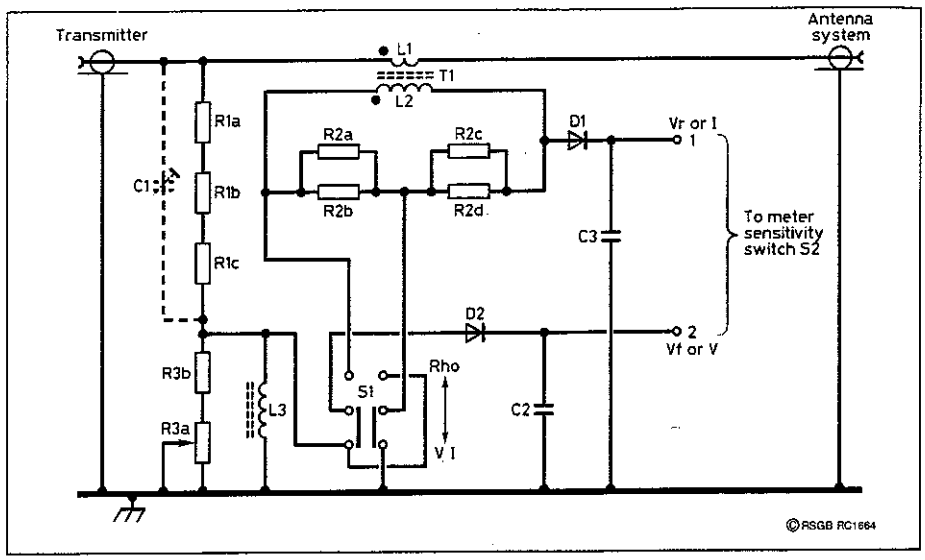

Fig 1: The RF section of the Rho meter. The cores for L1/L2 and L3 may be substituted as described in the text, but adjustment may be necessary.