Practicalities

Very often one sees people construct very complicated RF projects and they apparently work first time. This is unlikely to be true as most circuits require a lot of hard work to optimise them and get them working reliably all the time, and to remove the spurious operating modes (ie oscillation — when it is not required) which always seem to appear especially when RF is involved.

This month, tips on successful RF construction, brewing your own PCBs simply — and an HF SWR meter for £7!
By Ian Poole, G3YWX.

The major factor in getting these circuits working satisfactorily is experience; knowing what one can and cannot do, how to lay out the circuit for example — as the layout of a circuit will greatly alter its operating characteristics. One way to improve the operation of many RF circuits is to use a 'ground plane' earth on a printed circuit board, and one of this month's ideas, covered later, is about "brewing" one's own PCBs. Also important when constructing RF circuits is the provision of plenty of decoupling in the appropriate places so that supply rails and the like do not act as RF 'feedback' lines. A few strategically placed decoupling capacitors will go a long way to improving the operation of most RF circuits. One further point to watch is that large value capacitors will become inductive at high frequencies and therefore it is often a good idea to use two capacitors, one large and one small, to decouple a particular point. It is quite common practice to decouple screen grids in valves using a 1000pF and a .1uF capacitor and this technique can be employed well elsewhere.

Homebrew PCBs

There are probably many occasions when the home constructor wants to make up his own printed circuit boards but finds that he has not got the facilities required. Admittedly very few of us have access to all the equipment for making double size taped PCB artworks, together with all the photographic equipment for reducing this and producing positives, or all the facilities for making the board from these with photoresist and ultraviolet light! I was in this position and had to seek a simpler and more down to earth way of making up boards. Firstly, I dispensed with all ideas of using photography and simply traced out the outline of the tracks with pencil onto the copper clad board itself. We are now ready to apply our 'etch resist'. In my case I used model aircraft coloured 'dope', but if the wife or girlfriend has some old nail varnish that she does not want then this can be used equally as successfully. A solution of ferric chloride is then made ready to do our etching. This can be obtained as a ready made up solution or made up from the crystals which can often be obtained from the local chemist. If not, I have seen it on sale at some mobile rallies. Care should be taken with this as ferric chloride does stain and can cause skin irritation. The solution should be made fairly strong but it is difficult to give the exact amounts of ferric chloride and water required. *(about 500 grammes per litre is a rough guide — Ed.)*

In practice, probably the best method is to make up the solution and if the etching is taking too long then add some more ferric chloride crystals. Normally it takes about half an hour for the etching to be complete, and when this appears to have happened then the board should be removed immediately from the solution — otherwise the

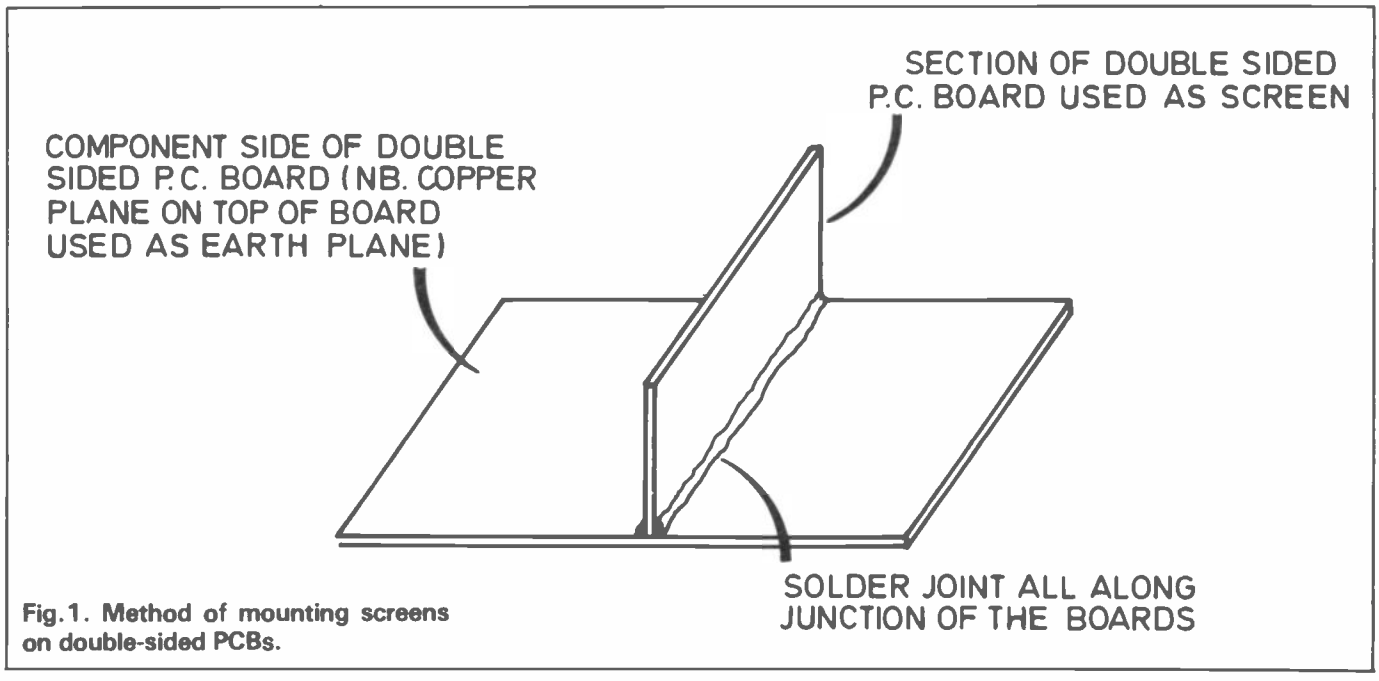

Fig.1. Method of mounting screens on double-sided PCBs.