

# Low-noise v.h.f. pre-amplifier

by R.A. Sansoni

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This circuit, designed for Amsat-UK as a 145MHz pre-amp for Oscar-10 working, is very tolerant of modification.

The design requirements for this pre-amplifier were a gain of 15dB or more, a noise figure below 1dB and a simple and reliable construction technique capable of withstanding the weather. I also planned to keep the cost of components below £10.

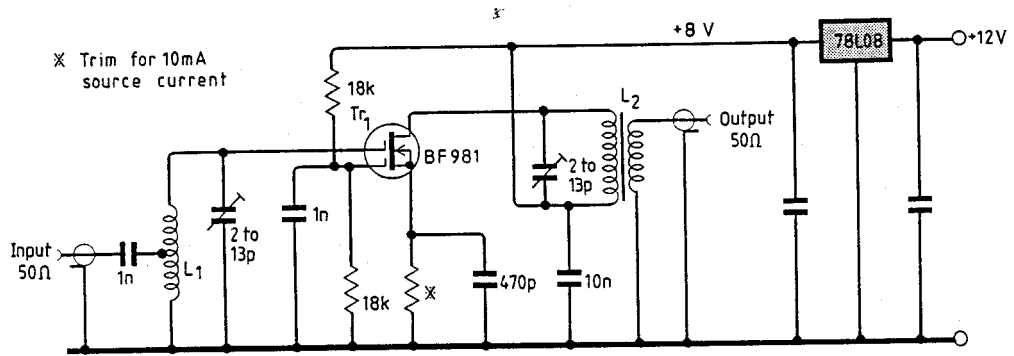
There is a wide variety of seemingly suitable r.f. transistors, at a wide range of prices. My first choice was the NE41137, which offers a gain of 20dB at 900MHz and a noise figure of 1.3dB. Many 'black box' manufacturers use this device at 432MHz. But its price (£4.50) seemed rather high and it was not very tolerant of mishandling or of high r.f. levels (as I found to my cost). Since the prototype was to be used in conjunction with a 40W transmitter, some elaborate coaxial relays would have been needed to protect it.

After further research I came upon the BF981 dual-gate mosfet, which gives around 18dB gain and 0.7dB noise at 200MHz, all for a price of only 85p. To my delight I found the circuit simple, effective and also very tolerant of modifications.

In addition, the device seemed more durable. I have been using this pre-amp in a sealed die-cast box at the masthead for a year with no measurable deterioration in its performance.

## Construction

The preamplifier is built on a double-sided copper-clad board. To provide a ground-plane the component side is left unetched. All leads through the board to earth



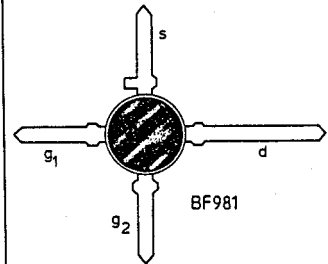
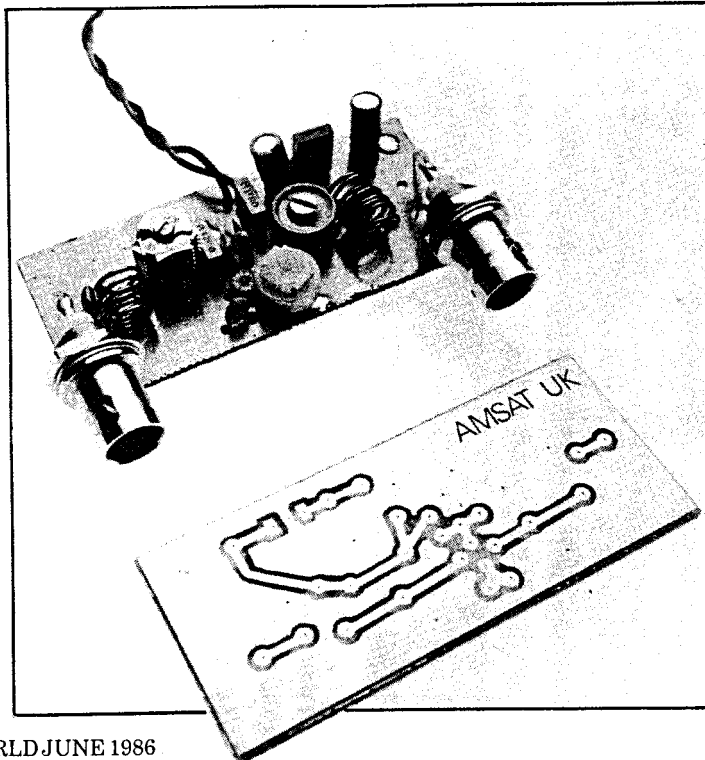
should be soldered both top and bottom; others should have the drilled hole chamfered to avoid shorting.

Coils are of 22sw.g. wire wound on a 6mm diameter former: L<sub>1</sub> has six turns, tapped one turn from the cold end; L<sub>2</sub> has six turns; and L<sub>3</sub> three turns.

The last piece to be soldered in should be the BF981. Its leads should be as short as possible.

For best results you should install the unit at the masthead to overcome losses in the downlead. It is small enough, however, to fit inside most 2m transceivers.

Typical noise figure quoted by the BF981's manufacturer is 0.7dB at 200MHz. The 8V regulator reduces gain to 15dB but helps maintain stability.



A ready-made p.c.b. for this design is available by post at £2 plus postage from Amsat-UK, 94 Herongate Road, London E125EQ. Amsat is a non-profit-making body: please enclose a stamped self-addressed envelope or an international reply coupon with any enquiry.