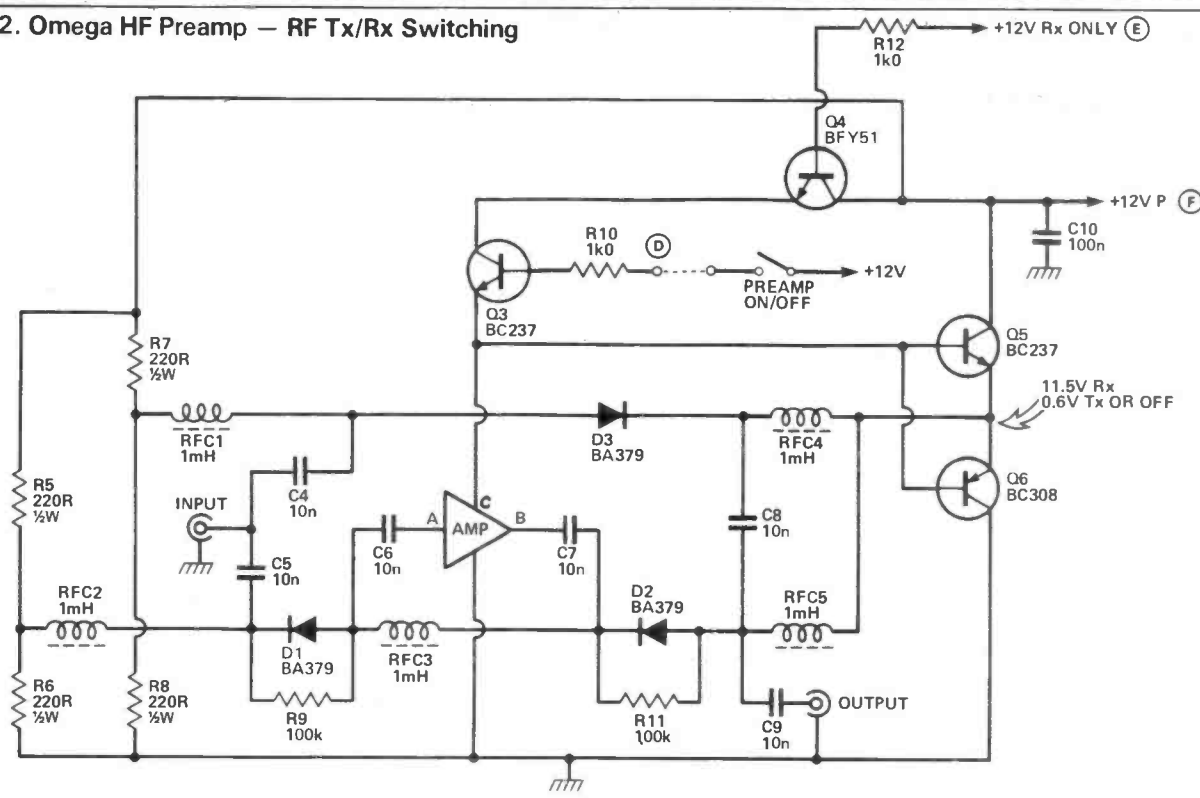
Fig.2. Omega HF Preamp — RF Tx/Rx Switching



inhibit parasitics associated with the transformer leakage inductances. The amplifier provides a flat gain of 15dB across the HF spectrum when correctly terminated on both input and output into 50 ohms. It has an output capability of +15dBm (about 30mW.

Switching

The pre-amp appears to be rather complex. Well, it is a bit but you can't escape something like it if the RF pre-amp is to be used with full CW break-in. Like the aerial changeover board described in an earlier issue of HRT, all the diode switching could be usefully replaced with relays.* However, modern PIN diodes driven with large amounts of switching current do not appear to introduce either losses or intermodulation products.

In the receive mode (pre-amp on) supply voltage to the amplifier at the emitter of Q3 causes the emitters of the complementary pair, Q5, 6 to go positive. This causes the pair of PIN diodes, D1, 2 to conduct connecting the inputs of the amplifier to the inputs and outputs of the module. Note that the 'earthy' end of this diode chain (seperated as far as RF goes by the choke RFC3) goes to a potential divider R5, 6. Current is diverted from R5 to the diode chain. Meanwhile PIN diode D3, isolated to RF by the usual clutch of chokes, is reverse biased to around six volts by the potential divider action of R7, 8.

In transmit, or with the RF pre-amp switched off, the emitters of Q5, 6 are drawn down to ground causing D3 to conduct, coupling the input and output together i.e. through circuit, while reverse biasing D1,2. This disconnects the amplifier. **G4JST**.

Construction

Although the circuit is shown in two diagrams for clarity, the whole preamplifier and switching is built on one double sided PCB and housed in a small diecast box. If you want to build you own PCB for any reason, the track lengths between the J310 and outputs and the transformers must be kept as short as possible, if the design objectives are to be met and unconditional stability obtained.

As we keep repeating in this series, short lead lengths above the PCB are essential and this will help prevent any 'stability' problems from occuring. (1) Insert and solder the seven 1mm PCB connection pins. (2) Insert and solder the fixed resistors. It is important that R2 is orientated with the body in the position shown. (3) Now wind T1 and T2. These are both wound on two-hole balun cores, and constructed in a smiliar fashion to transformers in previous parts of the series, As for the rest, one turn is defined as a piece of wire down through one hole and back out the other — so that both leads end up at the *same* end. T1 is wound on a small Fair-Rite core, and T2 on a larger 10mm square core. Keep the earthed leads as short as possible when soldering to the PCB. T1 requires 9cm of wire for each half of the secondary, and 5cm for the primary. T2 uses two lengths of 20cm for the primary and 8cm for the secondary. (4) The remainder of the components can now be soldered into place. Take care that the orientation of the transistor cases is as shown — Q6 has one lead soldered to the top PCB foil. The three Pin diodes should lie flat against the PCB, whereas Q4 must clear the foil to avoid short circuiting (the case is at +12v).

Testing

Once assembled, the unit can be tested, if you have the equipment, using a scope or RF millivoltmeter, and a signal generator. The gain of the preamplifier should be flat between 1.8 & 30Mhz at 15dB nominal. Both inputs and outputs must be terminated into 50 ohms for this measurement.

There is in fact little to go wrong, providing the instructions are followed. Some DC checks can be made as