Output Filters

It is necessary to have suitable low-pass filters on the output of the PA to reduce harmonic output. Here lies the only slight problem in the conversion from the three higher frequency bands.

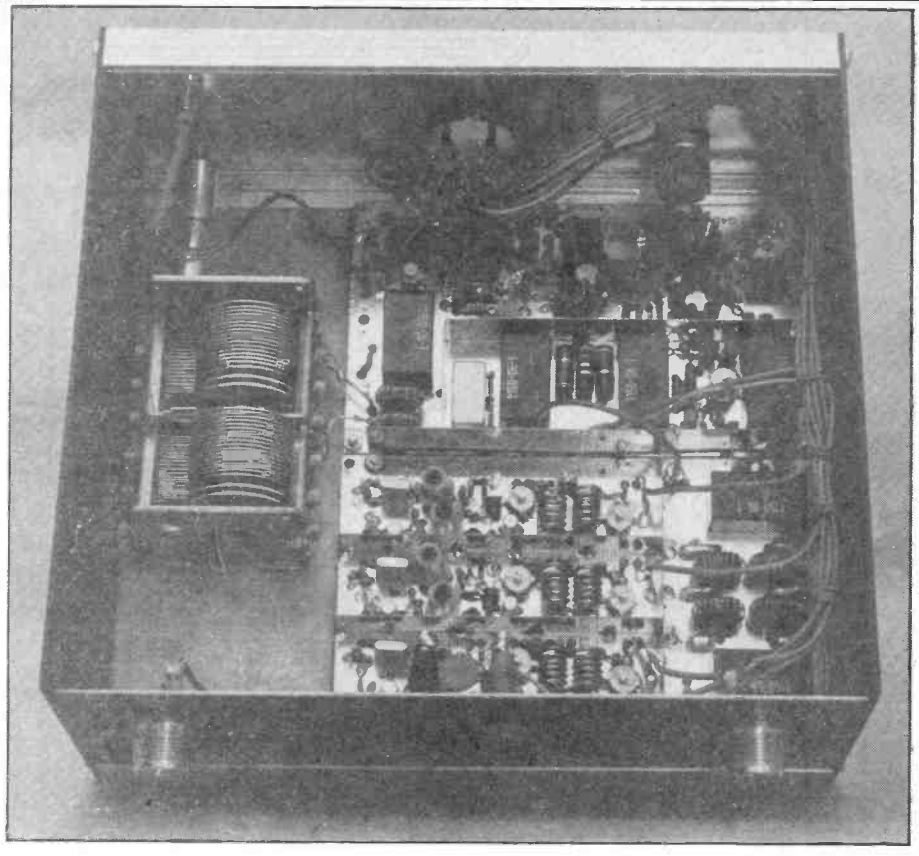
The original circuit needed only two low-pass filters to cover the three bands, as it is possible to use the same 30MHz cut-off filter for both 21 and 28MHz.

One 160, 80 and 40 metres, three filters are needed, one for each band, but space for only two is provided on the PCB. To avoid changing the PCB layout, the extra filter has been accomodated on the three-way switch used for band-changing, with suitable connections to bypass the relays when required. The PCB filters are used for 80 and 40 metres (switched by RLY5/6) and the 160 metre filter is wired on the switch.

In order to avoid having to use a number of connections to the 2-metre rig, RF-sensed switching is used to get from receive to transmit. A small amount of transmit power is fed to the detector circuit Q1, and used to switch the relays over via Q2. Adjustable hang time is provided by RV1 to avoid relay chatter on SSB. If preferred, it is possible to hard wire a connection from the PTT line on the microphone, or a special output if one is provided on the rig, direct to the base of Q1, via a 27k resistor, to provide 'hard' switching. If the PTT line is used, most rigs have this going to ground when activated, so a simple inverter would be required to give a positive voltage for the base of Q1.

Construction

The transverter is built on two double sided PCB's — one carried the three local oscillators and low pass filters, the other the remainder of the circuits. In the original design, the two boards were mounted on top of each other with a screen in-between, and the preselector tuning capacitor mounted on the side of the screen. If desired, the units can be mounted more conventionally in a case as shown in the photograph. If this is done, it is essential that a screen is made of to fit between the two boards so that the oscillator circuits cannot "see" the other board.



Procede with the construction as follows:

1. Start construction by inserting 1mm PCB connection pins at the points denoted in the layout drawings.
2. Next, taking the main PCB, assemble the components located between RLY4 and RLY1, starting at the top edge of the board and working down as far as Q4 and the 1n capacitors. It is important that the bodies of vertically mounted components are in the positions shown on the drawings. Keep all leads as short as possible. Transistors should sit in the PCB with their undersides about 4-5mm above the PCB surface. Be careful that the orientation of polarised capacitors is as shown — tantalum capacitors do not take kindly to being reversed!

Q2 has its emitter lead soldered directly to the top foil, and R40/41 are mounted under the PCB directly across the pads (they are *not* shown on the overlay).

3. Continue working around the board until all components except the transformers are inserted. Pin 1 of the SBL-1 is at the end of the package which has the letter "M" of the "MCL...." legend stamped on it.

Transformers

The block toroids used in the design are surplus types, and come with windings already on them. These must be removed — they cannot be used as they are!

When winding the transformers, one turn is defined as a wire passed through one hole and out of the other. Therefore for those transformers with primaries and secondaries, one pair of wires will emerge from one end of the core, and another pair from the other end. The tapped windings are probably easiest made using two lengths of wire twisted together with the join as the tap. The space within the cores is fairly limited so keep the windings neat and tight, but avoid stripping the insulation in the process.

The centre tapped 8 turn winding requires two lengths of wire each of 15cm, four turns about 15cm, and two turns 9cm of wire to wind. The 5 turn chokes use 10cm of wire. Make sure you know which end is which after winding (mark a P on the primary end).