

# Modern Top Band Transmitter

By O. M. DERRICK (GM3OM)\*

WHEN the writer became interested in Top Band work it was decided to build a special transmitter although it was known that many amateurs obtain excellent results with simple hook-ups or converted ex-Government equipment. It is considered that the requirements for this band are the same as for the higher frequencies: a T9 signal, ability to net on a signal without any frequency pulling when the p.a. is tuned, good frequency stability and break-in facilities. The transmitter described in this article has all these desirable characteristics.

## The Circuit

The circuit adopted is shown in Fig. 1. The first stage (V1) employs a 6SN7GT double triode valve, one section being used as a series tuned Colpitts oscillator, which is cathode coupled to the other section acting as

an untuned buffer-amplifier. The latter is in turn cathode coupled to V2 (6V6GT), a tuned buffer-amplifier stage in which the tuned circuit is fairly flat. The arrangement provides excellent isolation of the frequency control circuit from the later stages of the transmitter. In the p.a. stage an 807 is used, the top cap anode providing good isolation between the grid and anode circuits.

Keying of the transmitter takes place in the cathode of the v.f.o. and the circuit includes a simple but effective key filter which reduces any local interference, an essential in any transmitter. The netting switch—a d.p.d.t. toggle type mounted on the front panel—is arranged so that in the net position no h.t. is supplied to the screen of the 807, while at the same time, the key jack is shorted allowing netting of the v.f.o. and adjustment of the drive to the p.a. In the operate position the screen of the 807 is connected to the h.t. line and the short circuit on the key jack removed.

\*261 Main Street, Larbert, Stirlingshire.

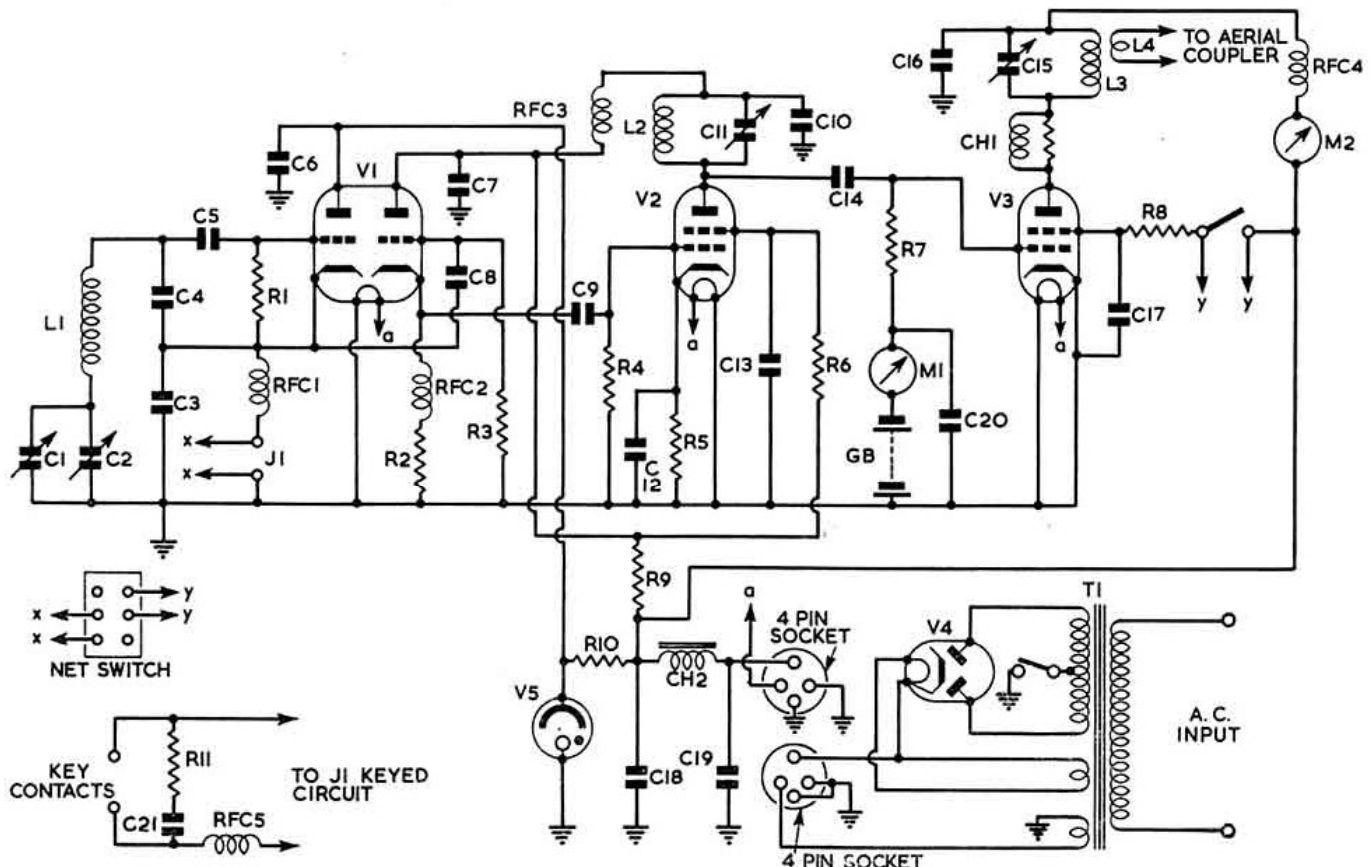


Fig. 1. Circuit diagram of the Top Band transmitter.

C1, 50  $\mu\text{F}$  midget type.  
 C2, 150  $\mu\text{F}$  midget type.  
 C3, 4, 16, 17, 0.001  $\mu\text{F}$  mica.  
 C5, 8, 9, 14, 100  $\mu\text{F}$  mica.  
 C6, 7, 10, 20, 0.01  $\mu\text{F}$  mica.  
 C11, 100  $\mu\text{F}$  midget type.  
 C12, 13, 0.01  $\mu\text{F}$  paper.  
 C15, 250  $\mu\text{F}$  variable.  
 C18, 19, 8  $\mu\text{F}$ , 500 V wkg.  
 C21, 0.1  $\mu\text{F}$   
 CH1, 100 ohm 1 watt resistor with 8 turns  
 20 s.w.g. enam.  
 CH2, 15-20 H choke.

GB, Grid bias battery, small layer type, 45 volts.  
 J1, Key jack.  
 L1, L2, 64 turns, 22 s.w.g. enam., 1  $\frac{1}{2}$  in. ribbed former.  
 L3, 32 turns, 20 s.w.g. enam., 1  $\frac{1}{2}$  in. diam. ribbed former.  
 L4, 8 turns at "cold" end of L3.  
 M1, 0.5 mA m.c. meter.  
 M2, 0.50 mA m.c. meter.  
 R1, 3, 20,000 ohms  $\frac{1}{2}$  watt.  
 R2, 1000 ohms  $\frac{1}{2}$  watt.  
 R4, 33,000 ohms  $\frac{1}{2}$  watt.

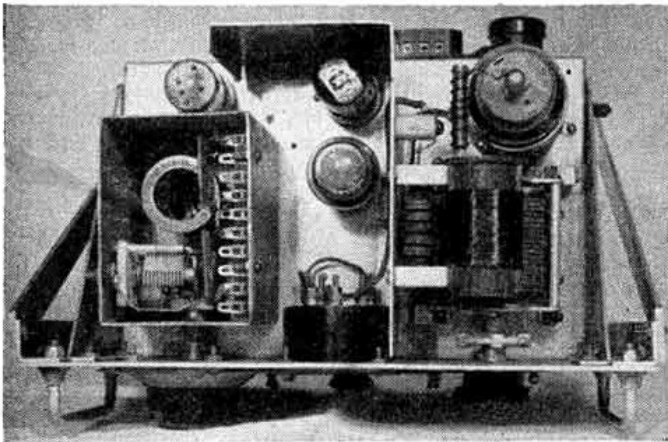
R5, 470 ohms  $\frac{1}{2}$  watt.  
 R6, 47,000 ohms 1 watt.  
 R7, 10,000 ohms  $\frac{1}{2}$  watt.  
 R8, 10,000 ohms 2 watt.  
 R9, 10,000 ohms 5 watt.  
 R10, 10,000 ohms 5 watt.  
 R11, 1500 ohms  $\frac{1}{2}$  watt.  
 RFC1, 2, 3, 4, 5, r.f. chokes.  
 T1, 350-0-350 V, 100 mA, 5 V 2A, 6.3 V 3 A.  
 V1, 6SN7GT.  
 V2, 6V6GT.  
 V3, 807.  
 V4, GZ32 or 5R4GY.  
 V5, VR150/30.

The grid current requirement of the p.a. is approximately 1 mA for an input of 10 watts.

### Construction

Details of the general layout of the transmitter can be seen in the photographs. Two chassis, each 10in. x 6½in. x 2in. with 12in. x 7in. front panels, are mounted on angle uprights to form a compact table top rack taking up little space on the operating table. The provision of handles on the upper chassis makes for easy handling.

As in any transmitter, the construction of the v.f.o. calls for care. The components, L1, C1, C2, C3 and C4, are mounted in a steel or heavy aluminium box 3in. x 4in. x 4in. which is bolted to the main chassis, the 6SN7GT being mounted outside at the rear. The band set condenser, C1, is a midget type, the spindle being cut short and slotted for adjustment with a screwdriver; it is mounted on the side of the box. C2, also a midget type, has its spindle brought out through the front panel to the vernier tuning control. With a capacity of 50  $\mu\mu\text{F}$ , the Top Band just occupies full scale. Wiring of the v.f.o. components should be carried out with 12 s.w.g. copper wire.



Plan view of the Top Band transmitter. To the left is the v.f.o. box which contains L1, C1, C2, C3 and C4. V1 is at the rear of the chassis. In the rear centre is V2, and in the centre V5. The p.a. stage is to the right.

The following stages call for little comment. The tuned circuit of V2 is below chassis, while the p.a. stage components are above. It is important to use a screen around the lower half of the 807; as a precautionary measure an anti-parasitic choke is included in the anode circuit. The vertical screen on the upper side of the chassis is also used for supporting some of the p.a. anode circuit components. The coil formers for L1, L2 and L3 are all 1½in. diameter ribbed type similar to Eddystone plug-in formers with the pins removed. L1 is mounted vertically and bolted through the v.f.o. box and chassis. L2 and L3 are mounted horizontally on small insulated pillars.

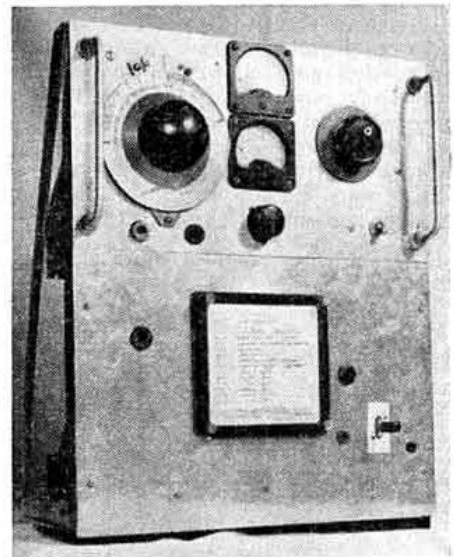
The power supply is built on the lower chassis. A combination of grid-leak and battery bias is used for the 807, the battery being one of the small layer built types. A battery was adopted with some hesitation but considering the limitations of the h.t. available greater efficiency can be gained from its use; it has proved perfectly satisfactory.

In order that the equipment may also be usable in connection with the local R.A.E.N. group, a simple plug and socket system is used so that the transmitter can derive power from a car battery and vibrator or rotary converter.

### V.F.O. Calibration

The v.f.o. dial should be directly calibrated in kilocycles using a BC221 or other accurate frequency meter. A piece of art card cut to shape and glued to the dial and marked with the band edges in red serves admirably.

On the lower panel is mounted a frequency chart showing all the spot frequencies of shipping stations, as published in the R.S.G.B. BULLETIN, so providing a ready reference to the frequencies to be avoided within the band. A cover from a TU unit protects the chart.



Front view of the transmitter showing the mounting of the two panels. The v.f.o. dial is at the top left-hand side with the p.a. anode and grid current meters in the centre and the p.a. tuning control to the right. A chart showing the frequencies of coast radio stations is in the centre of the lower panel.

### Operation on 3.5 Mc/s

If desired, a switch can be fitted to short out half the turns on L2 (centre tap to cold end) so that the tuned buffer stage can be used as a doubler with the p.a. tuned to 3.5 Mc/s. No alterations to the p.a. tank circuit are necessary as the inductance and capacity specified will resonate in the 3.5 Mc/s band near the minimum setting of the condenser.

### Results

Results with this transmitter have been most satisfactory although the location of GM3OM is far from ideal, situated as it is in a hollow. The aerial system is a Marconi which slopes to within 12ft of the ground. So far stations in 90 British counties have been worked, including daylight QSOs of up to 300 miles. During last winter, contacts were made with ZC4, DL, OH, OK, HB. Listener reports were received from Sweden and Norway.

### Television Interference

Although the interference problem to television receivers is not normally troublesome when using Top Band, the transmitter has been thoroughly tested for TVI. A number of different makes of television receiver were operated in the same room as the transmitter using indoor TV aeriols. No interference was noted on either c.w. or phone. Further tests, carried out with a television receiver employing a 14 Mc/s i.f. stage installed in an adjacent house proved satisfactory, no interference being caused. Since then the transmitter has been in constant use both on Top Band and 3.5 Mc/s with no complaints.

CONSTRUCTIONAL ARTICLES  
ARE STILL WANTED