Modifications to the B44

Mark 3 Transmitter-Receiver

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The Microphone

THE B44 is a well known, very popular ex-Army v.h.f. transmitter receiver, and performs well with only the most fundamental changes made to enable it to operate on the 4m amateur band. Nevertheless, there is considerable room for improvement, especially if the equipment is to be used for more than just local net contacts, and one of the first sections worth investigating is the microphone and early modulator stages. Many amateurs have attempted to improve the modulation level, which is sadly deficient as it stands, by exchanging the moving coil microphone supplied with a carbon insert or adding an outboard preamplifier.

The first method is probably quite effective, but some may consider it a retrograde step as it degrades the speech quality. An extra amplifier stage is more satisfactory, but in most installations takes up space. The microphone case, however, provides a very convenient solution; the moving coil insert is quite small, and yet the case is relatively large, thus leaving ample space for a simple single transistor preamplifier capable of equalling the microphone's quality and raising the modulator output to a much more useful level. Provided the equipment is run from a battery, as when mobile, there is, too, a convenient supply for the preamplifier.

The circuit which the writer has incorporated in his B44 microphone case is drawn in Fig. 1. As shown, it is only suitable for negative earth operation, but if the alterations for positive earth operation described in the next section of this article are carried out, it will only be necessary to transpose the connections X-X. The right-hand section of Fig. 1 provides all the necessary information for modifying the connections to the socket on the B44 panel. The component layout and wiring in the microphone case is shown in Fig. 2. The OC71, 8 μF capacitor and 560 K ohm resistor are all miniature components, and fit quite snugly, without fouling the outer cover when re-assembling.

This modification has performed without trouble, and has enabled the writer to maintain comfortable 4m contacts, receiving good reports, with Wales, the Midlands, Yorkshire and Cumberland. The equipment was operated from his home QTH, using a four element aerial.

Operating the B44 on 12 volts Positive Earth

The B44 can only be used with a negative earth 12-volt supply system, and therefore before it can be used for mobile operation from most types of vehicle, several changes in the internal wiring of the power supply unit must be performed. The circuit of the power supply before the alterations have been carried out is shown in Fig. 4. The sequence of modifications follows.

(i) Remove the two screening covers below the chassis of the power supply. Unsolder the blue battery supply wire and the red and white output wires from the power supply. Remove the six retaining screws and detach the supply unit from the chassis.

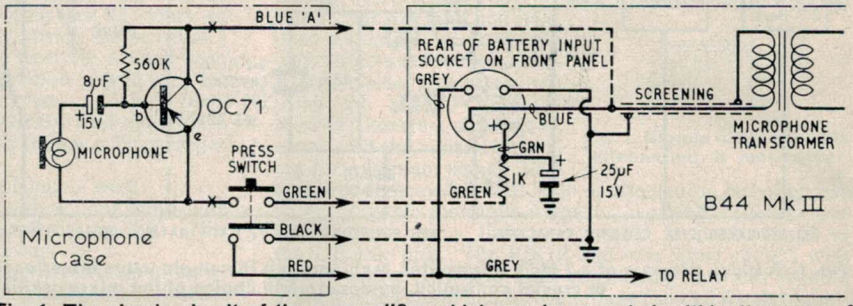

Fig. 1. The simple circuit of the preamplifier which can be mounted within the case of the moving-coil microphone supplied with the B44. Although the transistor specified is an OC71, many other types will be found suitable, the only change which may be required being the value of the 560 K ohm collector-base resistor. The existing press-to-talk facilities can be retained. Necessary circuit changes on the main chassis can be determined from the right-hand section.

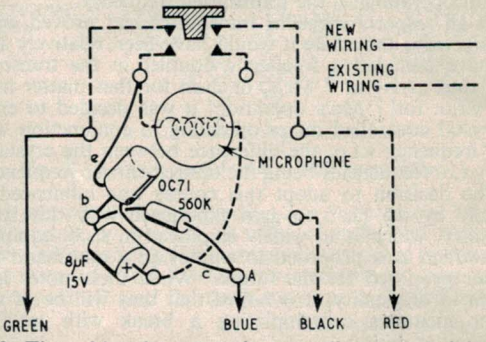

Fig. 2. The wiring layout and connections needed in the microphone case. Existing wiring which does not have to be touched is shown dotted.

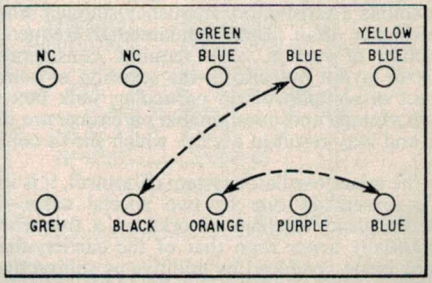

Fig. 3. The four wires to the transformer terminal board which must be interchanged for positive-earth operation.

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(ii) Unsolder the connections and remove the 100 μF l.t. filter capacitor C1, insulate the can from the fixing clip, and remount it. Resolder the connections to this capacitor in reverse, i.e., the blue lead to the negative terminal and the positive terminal to the chassis.

(iii) Remove the screening can from the vibrator transformer and change over the black, orange and blue leads according to Fig. 3. Replace the screening can.

(iv) Remount the power supply unit on the main chassis and solder the blue, red and white wires in the original positions.

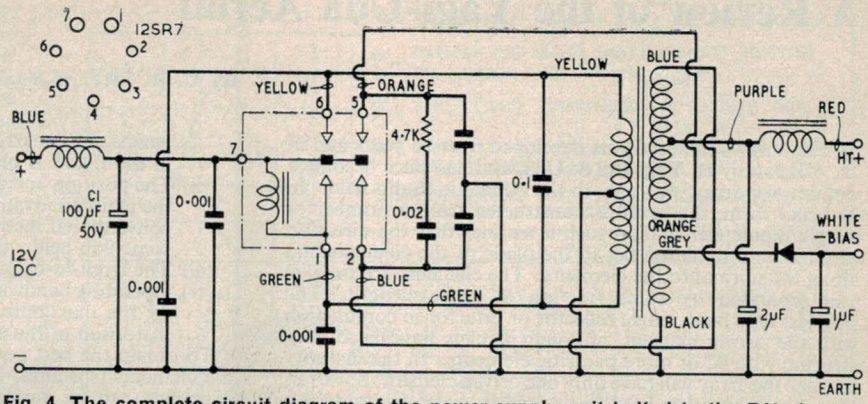

Fig. 4. The complete circuit diagram of the power supply unit bolted to the B44 chassis. Necessary changes for positive-earth operation are described in the text.

(v) Reverse the wires on the back of the main power input socket, and change over the battery meter leads.

(vi) Remove the cover of the aerial filter and reverse the connections to the diode in the final compartment. Replace the cover.

Before actually connecting the set to a car accumulator, it is a wise precaution to check the condition of the battery, as the current drain will be very heavy. Frequent attention must be paid to its state of charge, or it can easily suffer a very short life under these conditions.

Three Cases of TVI

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the remaining six turns for L2. The time taken per unit was no more than half an hour and the results were perfect. No fancy checking was necessary—the units were just connected to the television aerial input socket, the aerial connected to the socket of the filter, and the interference was gone.

Of course the first thing to point out to the complainant is the improved definition in his picture now that the filter is in use, which helps to explain away the tobacco tin dangling from the back of the television receiver.

Within a week of fitting these units the engineers arrived from the GPO and each complaint was very efficiently investigated from the aerial down. I found the engineers more than helpful and real diplomats when it came to explaining to the complainants that it was the sets that were really at fault. They explained that they could supply a filter to the complainant, but it would cost money. However, if they had no objection to having these tobacco tins I had no objection to leaving them. All was accepted and all were happy.

To cover myself in each instance I wrote to the owners of the sets explaining that I had fitted these units, that they were a passive device and that I took no responsibility for any fault in either their installation or the receiver. I also suggested that perhaps they would like to fit their own unit in the near future, but no acknowledgement has been received.

Another and more recent visit has been made by the GPO engineers following an official complaint from a viewer some 250 yards away. The set was a Robinson Rental and the fault was identical to the other three. The same procedures were followed and another TTF (Tobacco Tin Filter) made its successful mark.

In conclusion I should like to emphasize the point that the GPO engineers were more than interested and helpful in providing assistance and advice.

Crystal Controlled Mixer/Oscillator

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of the transmitter tuned circuits to reject them and so prevent their radiation.

G. R. B. Thornley, G2DAF, has covered all these points in a very thorough manner in various articles on s.s.b. equipment.

Practical Design

The circuit employed by the writer is shown in Fig. 1. A 6BE6 is operated as a self-excited crystal controlled mixer employing a surplus 9·7 Mc/s type 10X crystal in a Colpitts arrangement between the valve's oscillator grid and its cathode. The v.f.o. frequency is fed to the "signal" grid of the 6BE6, and for an output of 7 Mc/s (subtractive mixing) the v.f.o. operates on 2·7 Mc/s.

Satisfactory attenuation of the v.f.o. and crystal fundamental frequencies, harmonics, and undesired mixer products is achieved by the anode tuned circuit plus the bandpass coupling circuit used between the buffer amplifier and the p.a. which is operated in class AB1.

When the circuit was originally tested, it was found that the output frequency drifted erratically. This was eventually traced to the signal grid being driven into a few microamperes of current by the v.f.o. output. While this could have been cured by reducing the value of the coupling capacitor between the cathode follower and the signal grid, it was found better to increase the value of the cathode bias resistor to the 1·5K ohms shown on the circuit diagram. This point is mentioned since, with this circuit, if a very high output v.f.o. is employed, it may be necessary to experiment with the value of the capacitors which couple the v.f.o. to the signal grid.

Conclusion

One additional benefit of this particular design is that if the crystal is replaced by one at the carrier frequency, in this case in the 7 Mc/s range, then the transmitter becomes crystal controlled. In certain applications this may be a useful feature.

The mixer system described has been successfully employed by G3JKS in a transmitter for 14 Mc/s, and it is hoped that the information given will encourage other members to experiment with this method of approach.