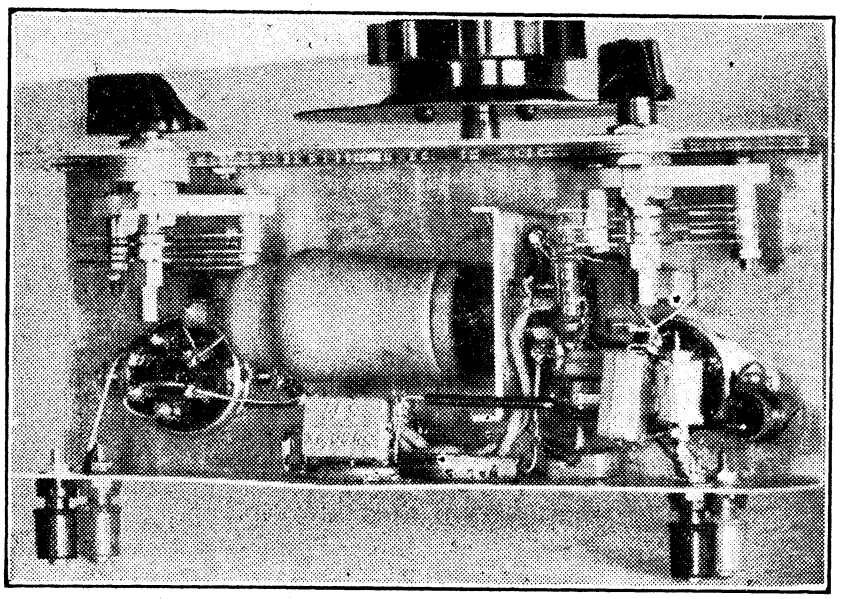
MORE ABOUT SIMPLE 6-METRE GEAR



Here is an under-chassis view of the converter with all major components in view. The ECH-35 is supported on a metal bracket, and the small parts are grouped round it. Note the output coupling coil and its trimming condenser.

Continuing this series of articles on U.H.F. apparatus, we give this month some details of a very simple 6-metre converter which can be easily built, and which will give excellent results when used in conjuction with a short-wave receiver capable of being tuned to 10 mcs. which is the nominal I.F. used.

THE converter is no more than the front end of the receiver described last month, with a small output coupling coil wired in place of the first IF transformer.

We built it on a small chassis 8½in. x 3½in. x 2½in. deep. If you add 1in. to the 3½in. measurement, you will have a little more room to mount the components grouped round the valve socket, and your wiring will be made easier.

The front panel measures 9½in. x 7in. The photograph taken from beneath the chassis shows the general placement of the band-set condensers and the valve. The latter is mounted on its side to allow very short leads in all the tuned circuits. This is quite a point on these frequencies.

The oscillator circuit uses plate tuning, which we have found preferable to grid tuning, mainly in the matter of freedom from "pulling" between oscillator and signal circuits. There is very little of this to be found with the converter. When the signal is tuned in with the band-spreader, the aerial trimmer is peaked with practically no detuning of the signal itself. This is largely due also to the use of a comparatively high IF as against the 465 kc for the ordinary short-wave set.

In the interests of stability, all earth returns for bypass condensers, &c., associated with this section of the circuit should be made to one point. Use the smallest components you can get, as this will facilitate fitting them in with the shortest possible leads.

Band-spreading is obtained by tapping down the oscillator coil with the condenser attached to the tuning dial. The tap is placed just far enough up from the low potential end of the coil to give the degree of bandspread required. Some experiment will probably be needed in this connection, although the coil details we have given should work out pretty well if all other circuit constants are the same. The lead to this condenser will be longer than the others, but this isn't such an important matter in the oscillator circuit which operates on fairly high C in any case. It would be much worse were it in the aerial circuit.

You will find connections to the aerial coil very much shorter. The coils themselves may be made to plug in, as we have done, or they may be soldered permanently in place if desired. Old valve bases may be used here, or, better still, trolitul coil plugs, which should by now be available in the radio stores. The latter need a little care in soldering to the pins to avoid melting the trolitul.

by John Moyle VK2JU

The output coupling coil is tuned with a 3-35 air-dielectric trimmer. The procedure is to connect the converter when wired up, having first tuned the short-wave set to approximately 10 mc. Place a temporary short circuit between the oscillator tuning condenser plates, and adjust the 3-35 trimmer until the maximum noise level is heard in the set. Remove the short, and with the oscillator condenser about halfway meshed, you should be able to peak the aerial trimmer on noise level, or on a station, if you are lucky enough to strike one straight away. The oscillator band-set is adjusted so that the tuning range of the dial covers all the stations on the band. Slight adjustments to the aerial trimmer will be needed when tuning from one end of the band to the other.

It is a good plan to adjust the feedback coil for the oscillator until a milliameter connected between the "cold" end of the oscillator grid leak and earth reads about 150 microamps, or .15 mills. A figure of 200 microamps is the optimum value, but the oscillator may super-regenerate before this figure is reached. In any case, it should not be less than about 100 microamps.

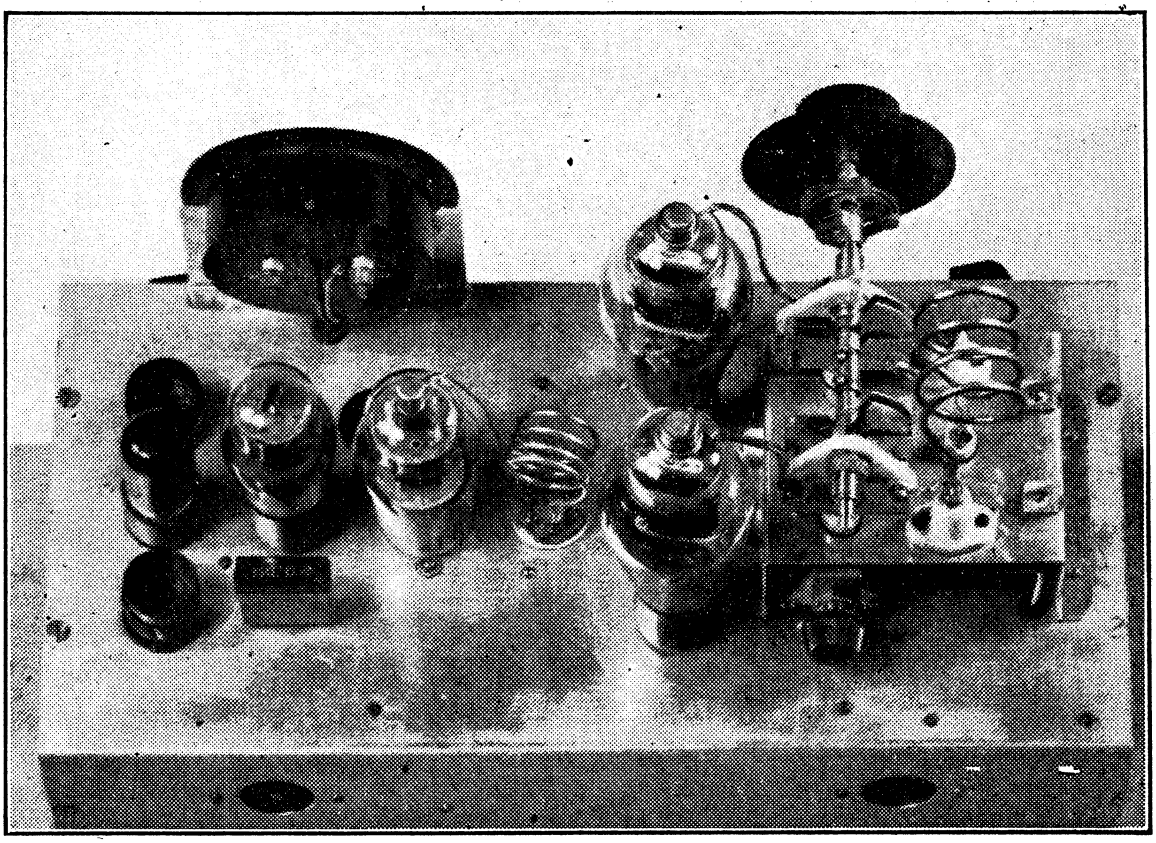
The power for the converter is obtained from the receiver itself via a plug and socket at the back of the converter.

Any good panel-mounting vernier dial will do for tuning. The aerial grid coil has seven turns of 18-gauge wire ¼in. in diameter, and the aerial coil itself about four turns closely coupled to it at the earthed end. The oscillator coil has six turns of the same gauge and diameter, with a feedback coil of four turns closely coupled. This coil should be reversed if the oscillator refuses to "gee." The coils are substantially the same as for the set described last month. The tap may be made provisionally about halfway up the oscillator coil.

The 10 kc. coupling coil is wound on a 3-8in. former with 30-32 gauge wire. The larger coil has 25 turns, and the output coil 10 turns. Both are close wound. Connections are to plate, earth, earth and output terminal, in that order.

Incidentally, the use of 1.9 kc. I.F.'s in last month's 5-valve set, and an 1852/6AC7 or an EF50 as the I.F. amplifier, will give you all the gain you require, plus freedom from pulling, acoustic feedback, and easier tuning, because of the lowered selec-

LAYOUT FOR 4-STAGE PUSH-PULL TRANSMITTER



Here is the transmitter referred to in the article. It is built on a standard 17-inch chassis, and all coils are plug-in. The plate coil of the doubler is here mounted under the chassis to avoid feedback, although a large coil can could have been used to shield it. The layout is equally suitable for low frequency transmitters owing to the plug-in coils being used.

tivity. We have found no need for two I.F. stages under these conditions. You will find it a big improvement over the use of a single 465 kc. stage. The 6SK7 will hardly give enough gain with the new intermediate frequency.

The 6J8G will give quite good results in this same circuit, but its characteristics are not as good as those of the ECH-35, particularly in conversion efficiency. In fact, at least one well-known and very capable amateur has obtained good results with this valve even on 166mc. Personally, we don't advise it on this band except for the experience, as the figures show much better efficiency by the use of acorns and other special valves.

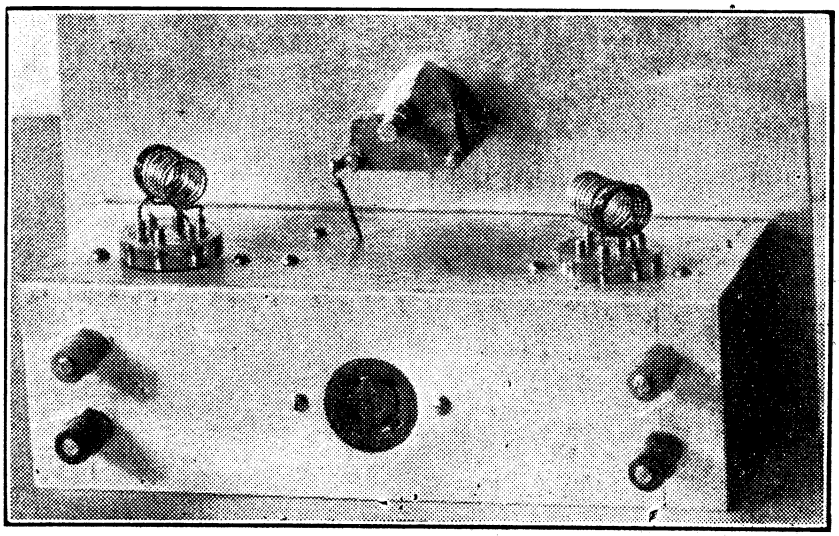
The 6K8 could also be used in a simple converter using a similar layout to the one described here. However, as this valve is quite different in construction from the ECH-35 type, you may have to carry out some experiments of your own to get best results.

The intermediate frequency of 10kc. is not necessarily the only one you can use, but is generally accepted as being the most useful on all counts. If another frequency were to be employed, the characteristics of the coupling coils would of course be somewhat different, although there will probably be no need to alter the specifications of the tuning coils. The position of the oscillator band set would be different of course, but there is enough capacity in a circuit to take care of quite a selection of intermediate frequencies.

The same layout could be used with a pair of acorns, or better still, with a 6AC7 or EF50 as the mixer, and a conventional triode such as the 6C5 as an oscillator. In this case, the wiring would be different, and we suggest that straight grid injection be used. There is a good case for a cathode-tapped oscillator circuit, which allows the oscillator voltage to be taken from the oscillator cathode for mixing into the grid circuit.

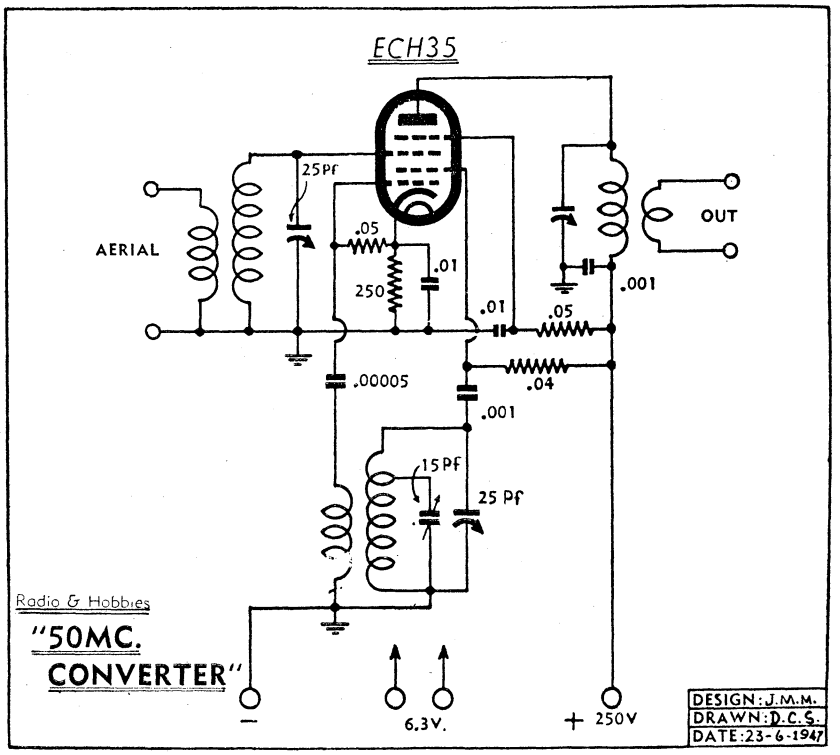
In our next issue, we shall have some practical data on the use of such valves, also coil data and other relevant circuit constants. We have been doing a good deal of work on the subject in recent months.

We show here a photograph of a



A rear view of the converter showing the bandspread condenser and the plug-in coils.

SIX-METRE CONVERTER CIRCUIT



Complete simplicity is a feature of the converter circuit. In last month's issue, a sketch of coil connections was given. Although the makers advise an oscillator plate feed resistor of .04 meg., we found it easier to obtain satisfactory grid current with .02 meg.

new transmitter we are just ready to try out for 6 metres. Essentially it is last month's transmitter with a push-pull 809 stage added. The layout is equally suitable for a single-ended job using a single 809, of the type we have used so successfully for some time at VK2JU. It has a 6V6G, tritet tripler, a 6V6G, or better still, a 6L6G doubler, driving an 807 amplifier. Using a split plate coil, this valve drives the 809's in push-pull.

The final stage is built on a metal bracket which supports the split-stator tank condenser and tank coil. Underneath the bracket, and mounted on the same bolts as hold down the tuning condenser, are the neutralising condensers. Feed-through insulators of course are used in this connection. The picture shows quite clearly the short leads which result.

The 807 runs on about 450 volts, or more if extra drive is required, and the 809's at present have 600 volts, giving an input of 100 watts without trouble. They neutralise perfectly, and there is enough output to light a 60 watt globe to full brilliance. Standing current of the 809's is about 100 mills.

We hope to give the circuit diagram of this transmitter in our next issue, together with some further details on a converter, and converter valve operation on 6 metres. The new converter will be a larger job using an R.F. stage and one I.F. stage, and gives somewhat better performance than the smaller one detailed here.

With all these receivers, converters, and transmitter, it is essential to use a good aerial. A simple co-axially fed dipole will do quite well at least for a start. But you will be disappointed if you think your present 20 or 40 metre aerial will be just as good. Try it and see!

A VACANCY ON R. & H. STAFF

WE have a vacancy on the staff of "Radio and Hobbies" for a technical journalist. Qualifications include good all-round experience and knowledge of radio receivers, with the ability to design, build, and describe them. The pages of our magazine illustrate the type of work to be done. An amateur licence and experience with transmitters would be an advantage. Working conditions are good, and there are prospects for advancement. Apply by letter in the first instance to the Editor, Radio and Hobbies, 60-70 Elizabeth-st., Sydney giving details of age, experience, and salary required. References may be sent, but copies only. Suitable applicants will be given appointments for interview.