TWO MORE "CONNOISSEUR" SETS

AEGIS KITS AVAILABLE FOR POWERFUL RECEIVERS

THE instant success and popularity of the "Connoisseur Five" prompted us to bring out these two additions to the "Connoisseur" range. In the case of the six-valve receiver the addition of a stage of R.F. amplification gives considerable improvement in sensitivity and image-ratio as well as a better A.V.C. characteristic due to the extra tube controlled. The seven-valve receiver incorporates an extra stage of I.F. amplification as well as the stage of R.F. This results in greater selectivity, even better A.V.C. due to the large number of controlled tubes and improved I.F. stability.

From the

ENGINEERING STAFF

AEGIS MANUFACTURING CO. PTY. LTD.

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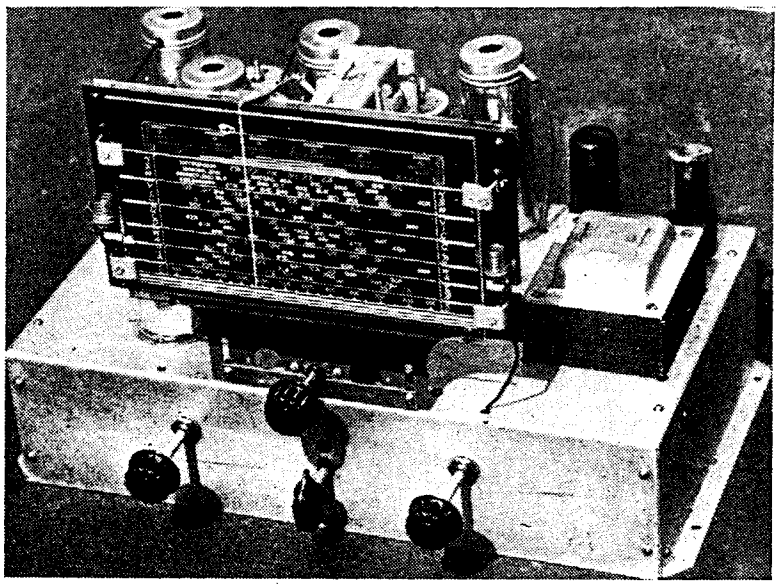

Photograph of the seven-valve version of the "Connoisseur," one of the most powerful receivers we have handled, even including imported communications-type receivers. It is ideal for the DX enthusiast.

THE SIX-VALVE VERSION

This receiver is similar to the original "Five" with the addition of the stage of R.F. amplification, plus some minor modifications. It is designed around our R.F. Coil Kit Type K2 and the chassis has been designed to suit either the six or seven-valve version. In the case of the six the I.F. transformer and valve mounting holes in the back left hand corner of the chassis are not used. We have only shown the circuit of the seven-valve receiver, but it is only necessary to disregard the 6U7G I.F. amplifier tube with its associated I.F. transformer and components, the receiver having been designed with sufficient flexibility to enable this.

The receiver once again employs back-bias, although it will be observed that the mixer has cathode-bias applied to it. This is because there is no A.V.C. on the mixer on the short-waves and some bias on the mixer is desirable as it has a stage of amplification ahead of it. The increase in bias caused on the broadcast has no adverse affect as while it reduces the gain very slightly it does not affect the signal-to-noise ratio and this is the deciding factor in a receiver of this size. The screens of the R.F. and Mixertubes are operated from individual voltage-dividers consisting of .05 meg. resistors. This maintains the screen voltages more nearly constant with varying A.V.C. voltage and helps to give the improved A.V.C. characteristics. The screen of the I.F. amplifier is fed with a .1 meg. series resistor to give an extended "grid-base" and so reduce the tendencies of "modulation-rise" on strong signals causing increased distortion. Decoupling has been used on all plate and grid circuits in the interests of good stability.

The audio amplifier is the same as the previous "Connoisseur", incorporating the new "Feed-back Tone Control," but with the addition of one improvement. This is the inclusion of a "Hum Neutralisation" condenser from the screen of the 6J7G audio amplifier tube to H.T. as described in Radiotronics No. 90, page 153. This results in considerable improvement in the reduction of hum. The power transformer rating has been increased to 80 mA. to carry the extra current drain.

For the I.F. transformers to be used in this receiver we recommend the Aegis Type J9 for the interstage transformer and the type J10 as the diode transformer. These transformers have been designed with the maximum selectivity obtainable in conjunction with a reasonably broad "flat-top" re-

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"CONNOISSEUR"

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sponse to give adequate audio-frequency response.

The Seven-Valve Version

The inclusion of an extra stage of I.F. amplification to the previous six-valve receiver produces a piece of equipment to suit the tastes of the most ardent DX-er.

The use of a third I.F. transformer enables the selectivity to be considerably improved and at the same time the inherent stability of the I.F. channel can be increased. This statement may be regarded by many who have used two stages of I.F. amplification as being somewhat astray when they remember their difficulties in getting the "bugs" out of it. This can, in most cases, be explained very simply as it would be safe to say that in practically every case the I.F. transformers used were standard high-gain types designed for a single stage of amplification. When two stages of I.F. are to be used it requires that the I.F. transformers be specially designed for the job. To appreciate this fully it can be seen that our previous six-valve receiver, which has sufficient gain to literally deafen you, would be hopeless with the inclusion of another stage of high-gain I.F. with a nominal gain of 400? From this it can be seen why there is extreme difficulty in maintaining stability from regeneration. It should also be realised that the increase is overall gain of say 400 will not improve the usable sensitivity by 400 times. This usable sensitivity is governed by the signal-to-noise ratio and the percentage of noise to signal is entirely a function of the aerial coil and the R.F. stage, so that any increase in gain in the I.F. stages amplifies the noise generated in the R.F. stage as well as the signal, with no improvement in signal-to-noise ratio.

With this point in mind we can design our I.F. transformers to have considerably lower gain than that normally required for single stage work. This enables a number of improvements in the characteristics of the I.F. channel. Firstly, circuit loading on the tuned circuits can be reduced to negligible proportions enabling higher effective working "Q" to be obtained with improved selectivity. This applies particularly to the diode circuit which normally reduces the effective "Q" of the transformer to less than half. With these specially designed I.F.T.'s the loading effects of the diode can be forgotten, as it is too small to be of any account. The I.F.T.'s can be used in any receiver that one might be contemplating building employing diode detection without any fears of loss of selectivity provided that the diode load resistor is not less than .5 meg. Secondly, the detuning resulting from "Miller-Effect" is also reduced to negligible proportions, so that the I.F. channel always remains in tune in the presence of a signal with extreme fading. It is these points which warrant the

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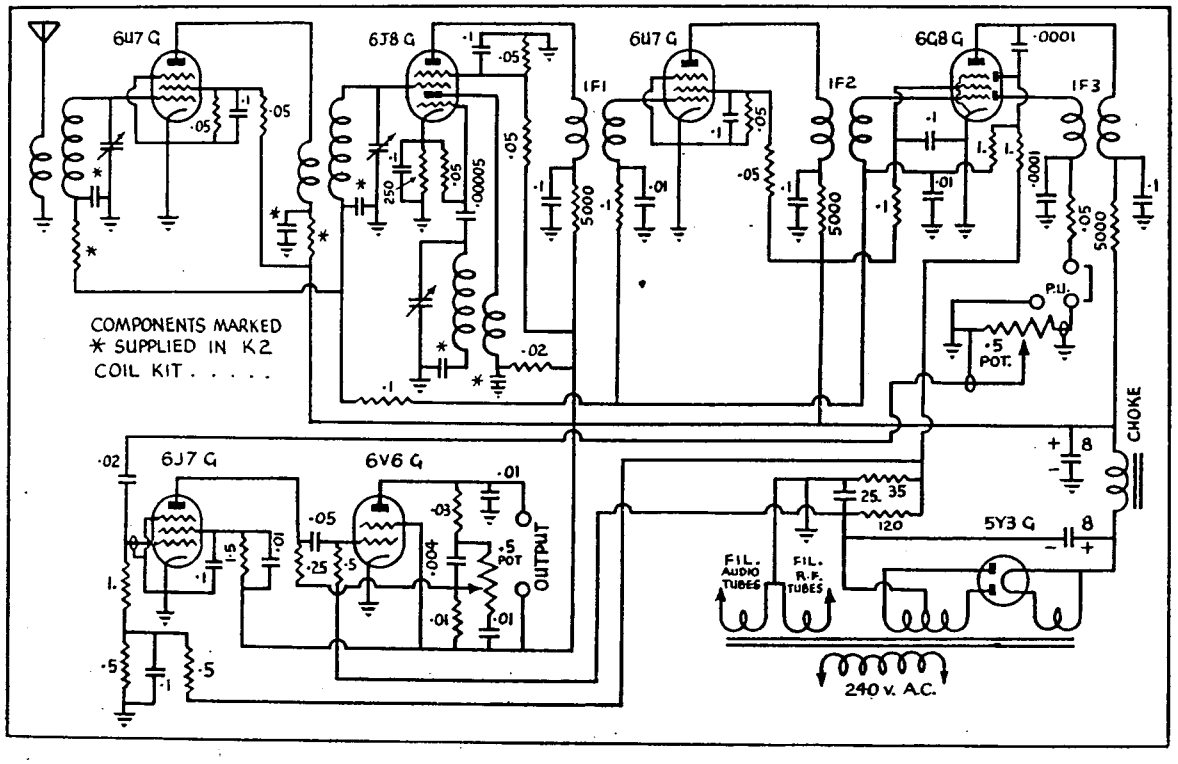

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statement that the I.F. channel is more stable and will give the ultimate in performance.

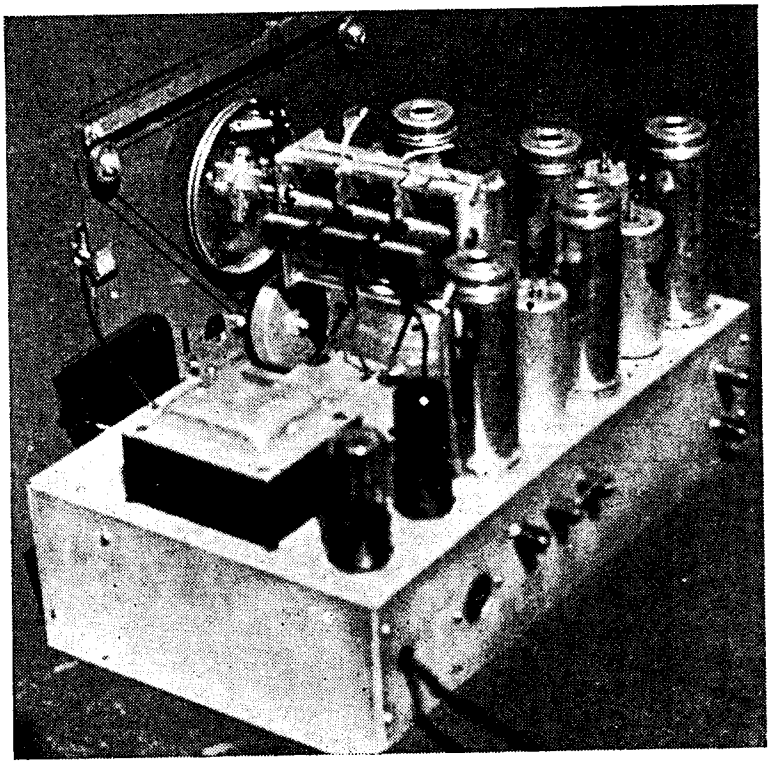
We have designed two types in these two-stage I.F. transformers as follows: One is a medium selectivity type with a band width of 4.5 kcs. at 6 db. and 20 kcs. at 60 d.b. These will be known as Type J20 as the interstage—No. 1 and 2— and Type J21 as the diode transformer —No. 3. The other is a high selectivity type with a band width of 3.6 kcs. at 6 d.b. and 15 kcs. at 60 db. These will be Type J22 as the No. 1 and 2 and Type J23 as the No. 3. We therefore recommend them to the amateur and DX-er who contemplates a new receiver requiring extremely good selectivity.

The design of this seven-valve receiver otherwise is on the same lines as the previous six. The additional I.F. stage is operated under similar conditions to the R.F. stage

PARTS LIST FOR

"CONNOISSEUR SEVEN"

1—Aegis Coil Kit Type K2.
2—Aegis I.F. Transformers T J20.
1—Aegis I.F. Transformer Type J21. or 2—Type J22 and 1—Type J23.
1—A.W.A. 3 Gang Condenser.
1—Dial Type.
1—Aegis Chassis Type.
1—Power Transformer. 325-0-325 V at 80 mA. 5V at 2 A. 6.3 V at 2 A. 6.3 V at 2 A.
1—Filter Choke 15 H. at 80 mA.
1—Speaker Permag. 5000 ohms.
2—6U7G Valves.
1—6J8G Valve.
1—6G8G valve.
1—6J7G valve.
1—6V6G valve.
1—5Y3G valve.
5—Valve shields.
8—Octal Sockets.
1—Octal Plug.
5—Terminals 2—Black 3—Coloured
5—Miniature Grid Clips.
2—Pilot Lamps 6.3 V.
1—½-in. Rubber Grommet.
1—Power Cord.
18-in. Resistor Mounting Strip.
Plain and Shielded Hook-up Wire.
Tinned Copper Wire 20 G.
Hardware.
1—.00005 mfd. Mica or Ceramicon Condenser.
2—.0001 mfd. Mica or Ceramicon Condenser.
1—.004 mfd. Mica Condenser.
5—.01 mfd. Paper Condenser 400 V.
1—.02 mfd. Paper Condenser 400 V.
1—.05 mfd. Paper Condenser 400 V.
10—.1 mfd. Paper Condenser 400 V.
2—8. mfd. Electro Condensor 525 V.
1—25 mfd. Electro Condenser 40 V.
1—35 ohm Resistor.
1—120 ohm Resistor.
1—250 ohm Resistor.
3—5000 ohm Resistor.
1—.01 meg Resistor.
1—.02 meg. Resistor.
1—.03 meg. Resistor.
8—.05 meg. Resistor.
3—.1 meg. Resistor.
1—.25 meg. Resistor.
3—.5 meg. Resistor.
3—1. meg Resistor.
1—1.5 meg. Resistor.
2—.5 meg Potentiometers.



with the screen fed from a voltage divider of two .05 meg. resistors.

ALIGNMENT

Little will be said about the actual alignment of either of these receivers. Suffice it to say that at the outset the alignment procedure is perfectly straight-forward. At the least we would suggest that receivers of this calibre deserve the advantage of alignment on a reasonably good signal generator as this can be the difference between a good set and just a mediocre one. We shall therefore just touch on the principles of alignment of the R.F. stages relying on the person tackling a job like this knowing something about it.

The principles used in the alignment of the R.F. stages are quite simple—it being considered not necessary to worry about the I.F. stages—and they are these: (1) The trimmers on the coils are used to adjust the high-frequency end