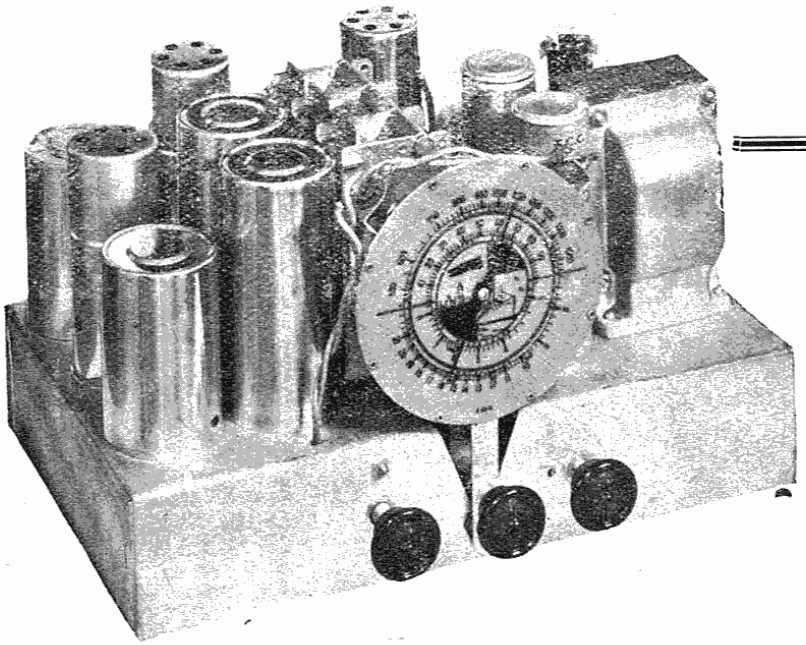


* *Five Valves*
* *High-gain Circuit*
* *Dual-wave Coverage*
* *Band-pass Tuning on Broadcast.*
* *Simple and Cheap to Build.*

The Exelrad "BAND-PASS DUAL-WAVE FIVE" ★ ★ ★

This new Exelrad kit-set is a considerably revised version of the "Dual-wave Comet," which proved so popular with constructors last year. It was decided to maintain the series of glass valves for this model, primarily on considerations of initial cost, since metal valves are at the moment higher in price than the glass types. Also, in order to obtain good performance with a minimum number of valves, the familiar 6B7 dual-purpose detector and amplifier is used, and this has not, as yet, been reproduced in metal.

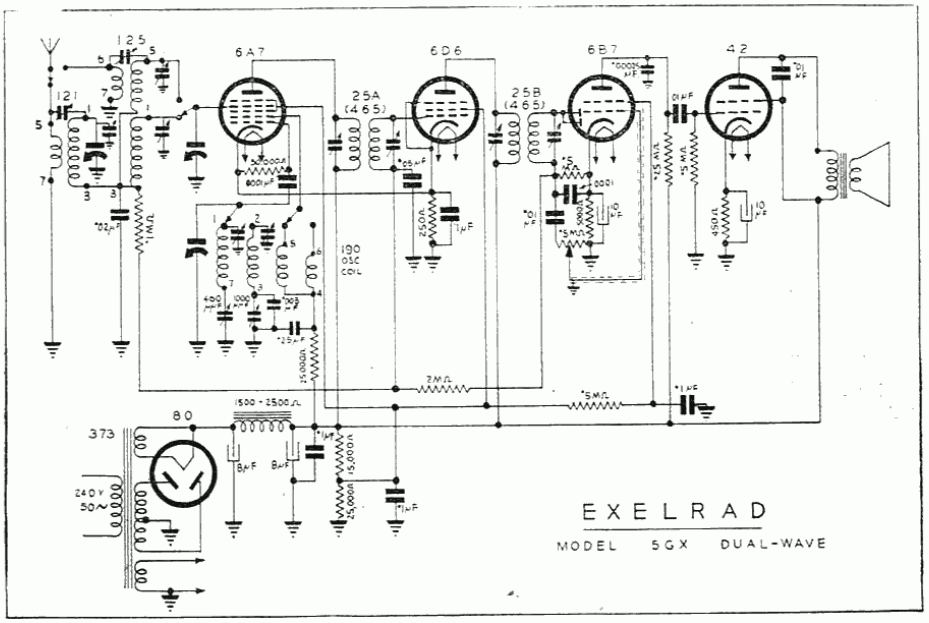
The tuning ranges are 550 to 1500 kilocycles per second, and approximately 6 to 16 megacycles per second. The chassis layout has been improved, and the finished receiver is more compact and workmanlike. As in the case of the "Air King 7" (with metal valves), special high-efficiency coils have been developed for this model, the broadcast coils being wound with Litz wire. Similarly, type 25A and 25B intermediate frequency transformers are used to assure maximum possible selectivity.

Band-pass on Broadcast.

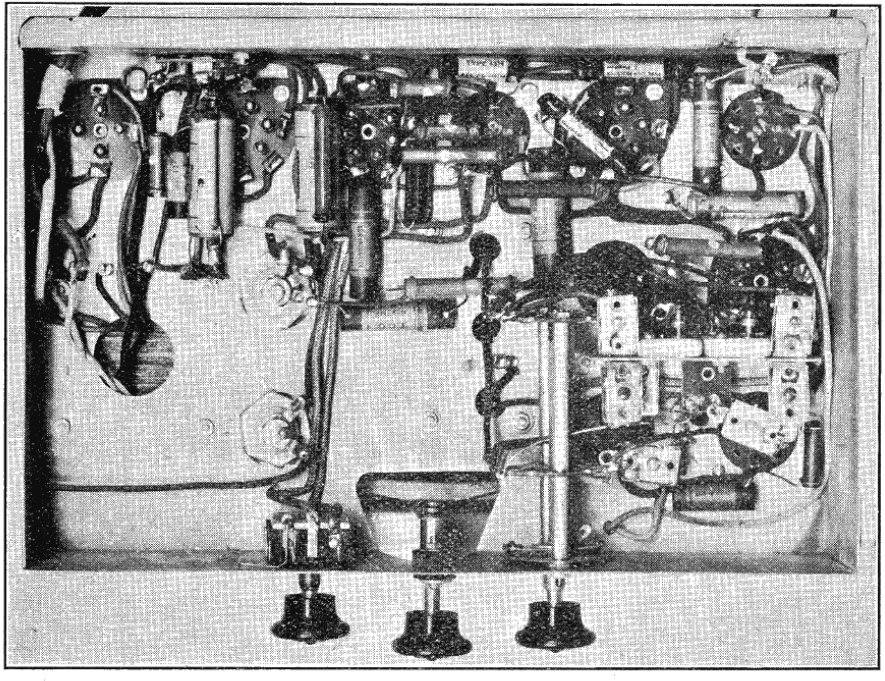
An examination of the circuit diagram will show that on the broadcast band, an extra tuned stage precedes the frequency-changer, in order to provide a much greater degree of selectivity in the radio-frequency circuits. The circuit is capacity-coupled by means of the .02 mfd. fixed condenser, which also serves as a by-pass on the automatic volume control circuit.

As the impedance of this condenser decreases with increase of frequency, there is a tendency for the sensitivity to fall off at the high frequency end of the dial. This, however, has been compensated for by the insertion of a coupling trimmer between the aerial and grid terminals of the coil 121. By this means the sensitivity at the high-frequency end of the dial is restored. Although band-pass tuning is not used on the shortwave band, the same scheme is utilised to assist in levelling out sensitivity on this band also.

It will be noted that several features of the "Air-King Seven" are made use of in this circuit, which is designed on modern conventional lines. Once again a 1500-ohm speaker field is desirable, although a 2500-ohm field may be substituted with some loss of available high-tension voltage. The new "Exelrad" full-vision dial is again used, with a dual-wave scale of similar appearance to the original all-wave type. The illustration actually shows an all-wave dial scale, as the new scales were not available when the



The circuit of the "Band-pass Dual-wave Five"—a modernised version of the "Dual-wave Comet" described last year.



This under-chassis view shows details of the wiring, and of the padder and trimmer assembly.

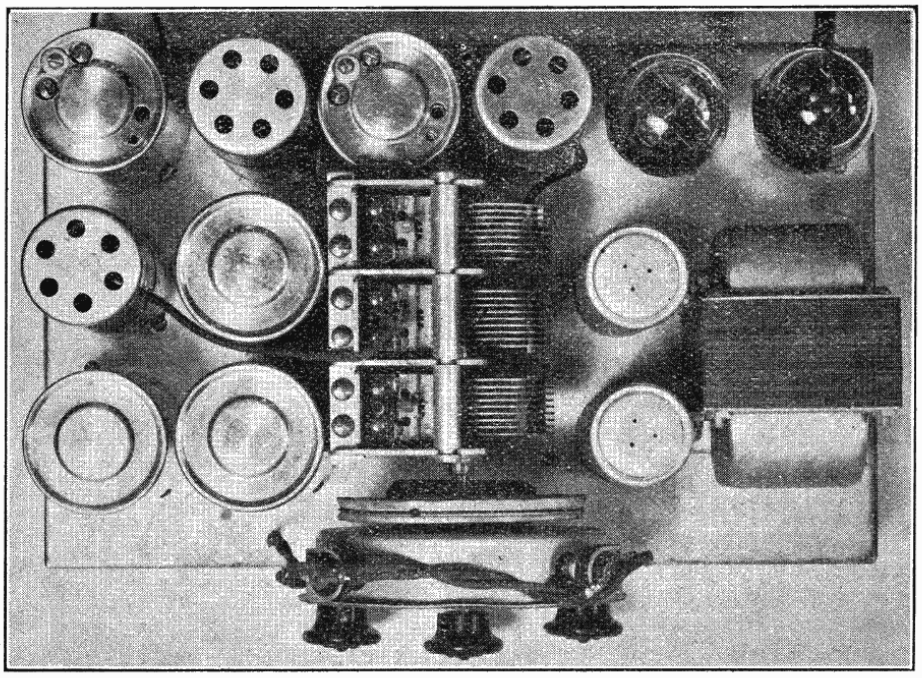
model was photographed. An optional feature is the provision of antenna and earth terminals; on the model wires are shown, but the chassis will be punched for the usual terminals if desired.

Should it be desired to make provision for the use of a gramophone pick-up the circuit shown in the "Radio Times" for December last (the "Air-King Seven") may be incorporated without difficulty.

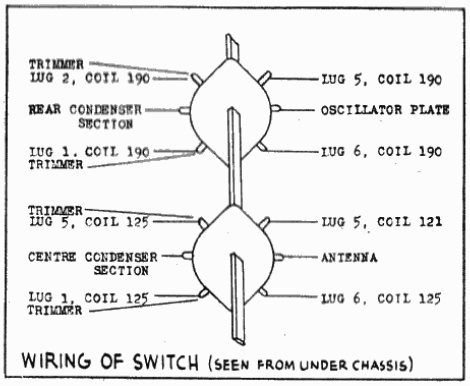
The Assembly.

The wiring of this model is extremely simple and actually requires little detailed explanation. After checking over the complete kit to make certain that all parts have been supplied, a start may be made with the assembly, consulting the photographs and other diagrams to assist in this process. With the chassis are supplied a condenser bracket (for a Stromberg-Carlson type G condenser) and a small fin on which the padders and trimmers are to be mounted.

Fit four of the rubber grommets to the base of the condenser bracket, with the thick part down toward the chassis. The fifth grommet is to be placed in the hole in the chassis below the cut-away for the full-vision dial. On the small fin provided, the two padders are mounted, so that they are adjustable from the front of the chassis when it is turned on its back. The bottom fixing bolt of the short-wave (1000 mmfd), padder also carries a trimmer on the other side of the fin, while the bottom bolt of the broadcast padder carries an insulated



Above: A view of the completed set.

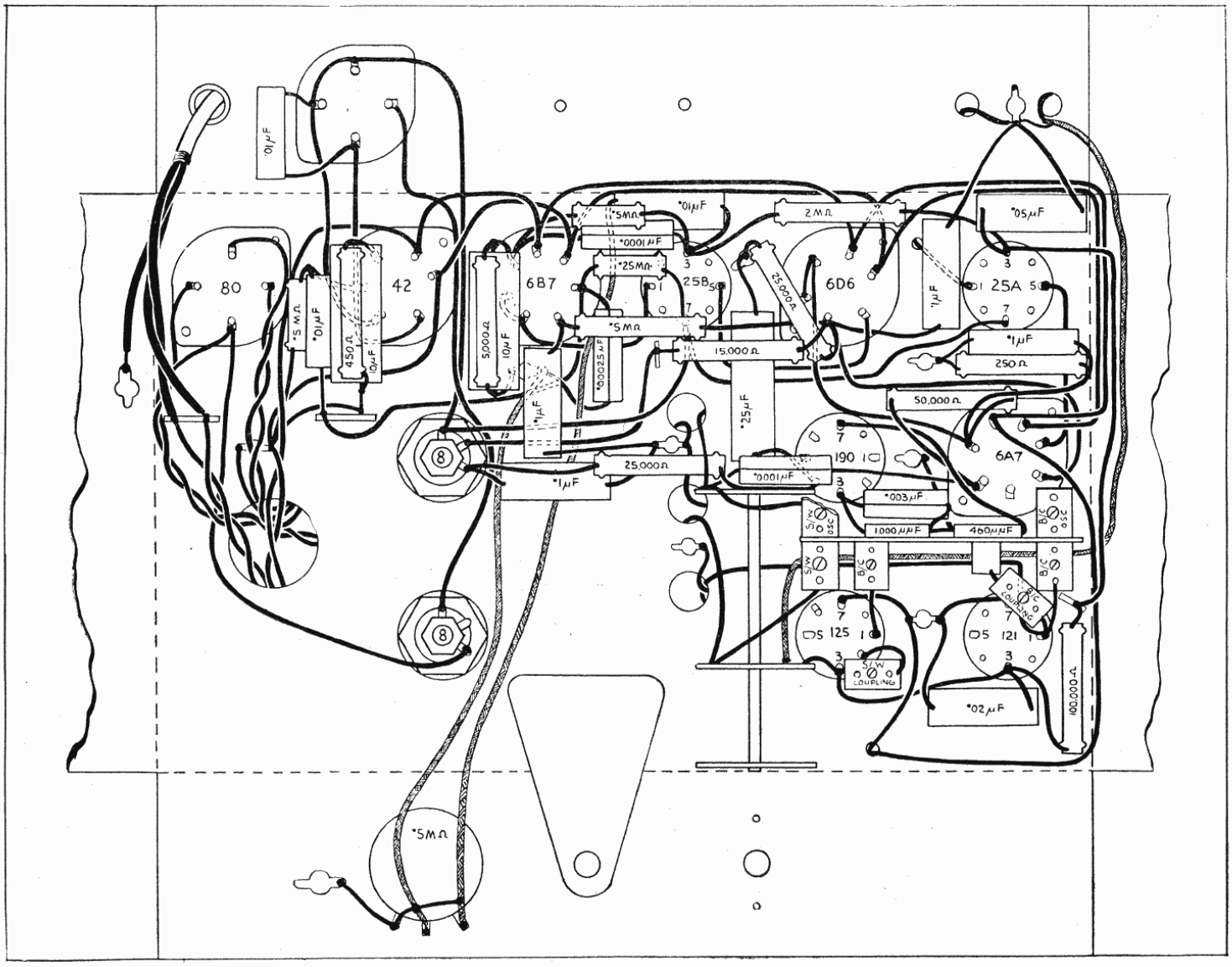


Details of the wave-change switch wiring.

wiring lug. Four other trimmers are mounted on this fin, back to back, bolted through the holes in the upper corners of the fin. These can be easily distinguished in the photograph of the underside of the completed model. This fin should be prepared before being bolted in place under the chassis.

The Wiring.

Having mounted the valve sockets (not forgetting to affix their shield bases where necessary), power trans-



The complete under-chassis wiring is shown in this diagram.

"Band-Pass Dual-Wave Five"—Exelrad Kit of Parts.

1—C2281 steel chassis with condenser bracket.
1—373 power transformer, Exelrad.
2—4-pin valve sockets.
2—6-pin valve sockets.
2—7-pin valve sockets.
1—type G Stromberg-Carlson .00035 mfd. 3-gang condenser.
1—F3310 Exelrad dial with P3215 dual-wave scale.
5—rubber grommets.
1—S5304 Exelrad 4P2T 2-deck wave-change switch.
6—T25 Exelrad trimmer condensers, 25 mmfd.
1—1000 mmfd. padder condenser.
1—460 mmfd. padder condenser.
1—type 121 broadcast antenna coil.
1—type 125 shortwave antenna plus broadcast sec'y coil.
1—type 160 dual-wave oscillator coil.
1—25A intermediate frequency transformer, 465 k.c.-sec.
1—type 25B intermediate frequency transformer, 465 k.c.-sec.
2—8 mfd. electrolytic condensers, 500 volt.
2—10 mfd. electrolytic condensers, 50 volt.
1—0.25 mfd. tubular condenser.
3—0.1 mfd. tubular condensers.
1—0.05 mfd. tubular condenser.
1—0.02 mfd. tubular condenser.
3—0.01 mfd. tubular condensers.
1—0.003 mfd. mica condenser.
1—0.00025 mfd. mica condenser.
2—0.0001 mfd. mica condensers.
1—0.5 megohm volume control.
1—2.0 megohm carbon resistor.
2—0.5 megohm carbon resistors.
1—0.25 megohm carbon resistor.
1—100,000 ohm carbon resistor.
1—50,000 ohm carbon resistor.
2—25,000 ohm carbon resistors, 1 watt.
1—15,000 ohm carbon resistor, 1 watt.
1—5000 ohm bias resistor.
1—450 ohm bias resistor.
1—250 ohm bias resistor.
1—4-wire speaker cord and plug.
3—3-piece valve shields.
3—grid clips.
3—knobs.
1—8ft. 3-wire power cord.
2—6.3 volt pilot lamps.
2—G2751 Exelrad insulated wiring lugs, single.
3—G2752 Exelrad insulated wiring lugs, double.

EXTRAS (not included in kit):

SPEAKER.

1—8-inch dynamic speaker, 1500 ohm field, to match single pentode (Jensen).

VALVES:

1—6A7, 1—6D6, 1—6B7, 1—42, 1—80 (Raytheon, National Union, Philips, Tung-Sol, Radiotron).

former, tuning condenser, intermediate frequency transformers, coils, electrolytic condensers (8 mfd. only), volume control, and wave-change switch, the actual wiring may be commenced. The dial need not be mounted until the wiring is completed. Note the position of the various insulated wiring lugs. A double lug is mounted on each rear bolt of the power transformer, a single one is mounted on the rear bolt of coil 121, and a single lug on the front bolt of transformer 25B.

Before going too far, it should be unnecessary to point out that grid and wiper wires should be soldered to the variable condenser before it is mounted on the chassis, thereby saving much acrobatics and bad language later.

Commence with the power transformer. The two yellow wires are joined to the insulated lugs on the left-hand rear transformer bolt, as seen on the wiring diagram. The power cord is later connected to these same lugs. The two red wires are joined to the filament contacts of the 80 rectifier socket, the two green wires to the plate contacts of the same socket, and the two black heavy wires are led to the filament contacts of the 42 output socket, one wire being grounded en route by means of the earth lug near the power transformer. The black rubber-covered wire is also grounded to the same lug. The remaining filaments may now be wired in parallel with the 42 output socket.

One side of the 80 filament is connected to the front electrolytic condenser, which is also wired to one side of the speaker field. The other side of the field, which is the main high tension supply for the receiver, is connected to the other electrolytic condenser, from which various other leads are taken as shown. Across this second electrolytic condenser is placed a 0.1 mfd. paper condenser (high voltage) as a radio-frequency bypass. Still from the same electrolytic, a high tension lead is run to lugs 7 of both intermediate frequency transformers; another lead to the insulated lug near transformer 25B, and also through a 25,000 ohm resistor to lug 4 of coil 190. The various cathode resistors and their bypass condensers should now be wired in place as per the diagram, followed by the other bypass condensers from high-tension screen, and A.V.C. lugs.

From the insulated lug near the 25B transformer, a 15,000-ohm resistor is wired to the screen lug of the 6D6 valve, from which a 25,000-ohm resistor is joined to the earth lug alongside to complete the bleeder arrangement for the screen supply. This is fed back through a 0.5 megohm resistor to the screen of the 6B7, each screen being bypassed with a 0.1 mf condenser.

Wiring the Coils.

The placing of the other resistors and condensers is self-explanatory, if both the wiring and schematic diagrams are consulted. The coil wiring, however, calls for some comment. Of the seven trimmers required, five have already been mounted on the fin. These are the usual trimming condensers and the switch-wiring diagram will indicate their connection, except for the one which is connected directly to lug number 1 of coil 121, and which is also directly connected to the front condenser section without switching.

The coupling trimmer for the broadcast band is to be connected between lugs 1 and 5 of coil 121. The trimmer is first screwed up until it is almost at full capacity, and one end is affixed to the insulated lug already mounted on the fin. The other end is joined to the wire connecting the normal trimmer (bolted to the top right-hand corner of the fin) to lug 1 of coil 121. The insulated lug is connected to lug 5 of the same coil and serves as a solid anchor for the coupling trimmer.

The other coupling trimmer, on the shortwave band, is adjusted in the same way for capacity before being placed in position. One end is wired to the lug on the wave-change switch which is joined to lug 6 of coil 125, while the other end is connected by means of a piece of solid wire to lug 5 of the same coil. It will be seen that all the coil and switch wiring is not shown in the wiring diagram in order to avoid too complicated a drawing, but the schematic and switch diagrams will make the deficiencies quite clear.

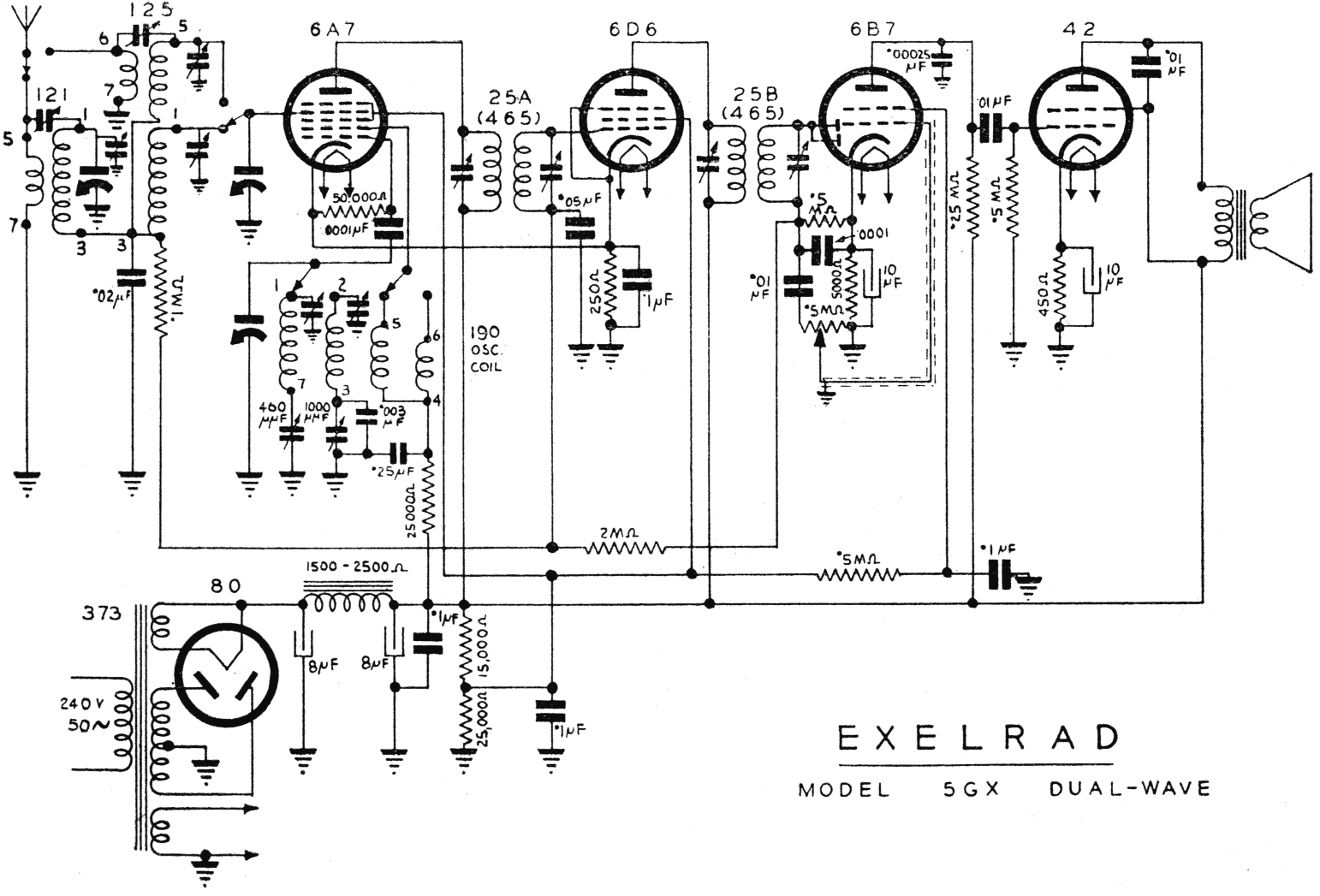
Finally, the warning plate should be mounted on the back of the chassis if not already done; the power cord fitted, red and black to the double insulated lug and white to the earth lug so that it takes all the strain on the cord; and then the tuning dial, set with the condenser fully meshed. One side of the pilot lamp sockets is grounded, the other wire picking up the requisite voltage from the 6A7 socket as shown. A careful check over and the receiver is ready to be lined up.

It is always preferable to line up a receiver with a standard signal generator, but this is not always possible to home constructors. The intermediate frequency transformers are aligned in the factory, and should not require much attention. Without a signal generator, it will be necessary to make use of station frequencies to trim and pad the finished receiver. The first line-

up should be made at about 1400 kilocycles on the broadcast band, and in the absence of stations, the amount of noise present gives some idea of the state of alignment of the stages. The coupling trimmers should **not** be touched, as their pre-set value should be sufficiently accurate under average conditions.

The known frequency is set on the dial by means of the oscillator trimmer, after the other two trimmers on this band are adjusted for maximum sensitivity. At the 600 kilocycle end of the dial, the receiver may be adjusted by making use of 2YA on 570 kilocycles. This is set on the dial by means of the padding condenser. Returning to the high-frequency end, recheck the alignment at about 1400 kilocycles and the line-up should be complete. If it is found necessary to alter the coupling trimmer on either band, it will be found necessary to readjust the normal trimmer associated with that stage, as these two adjustments are interlocked.

A similar procedure is followed on the shortwave band, first obtaining a line-up at the high-frequency end of the dial by means of the aerial trimmer. If the signal is off calibration, set it on the dial by means of the oscillator trimmer as before, and realign the aerial trimmer. Padding is carried out at the low frequency end of the dial, and a known frequency about six megacycles should be used for this.


125
121
6A7
6D6
6B7
42
25A
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OSC.
COIL
80
373
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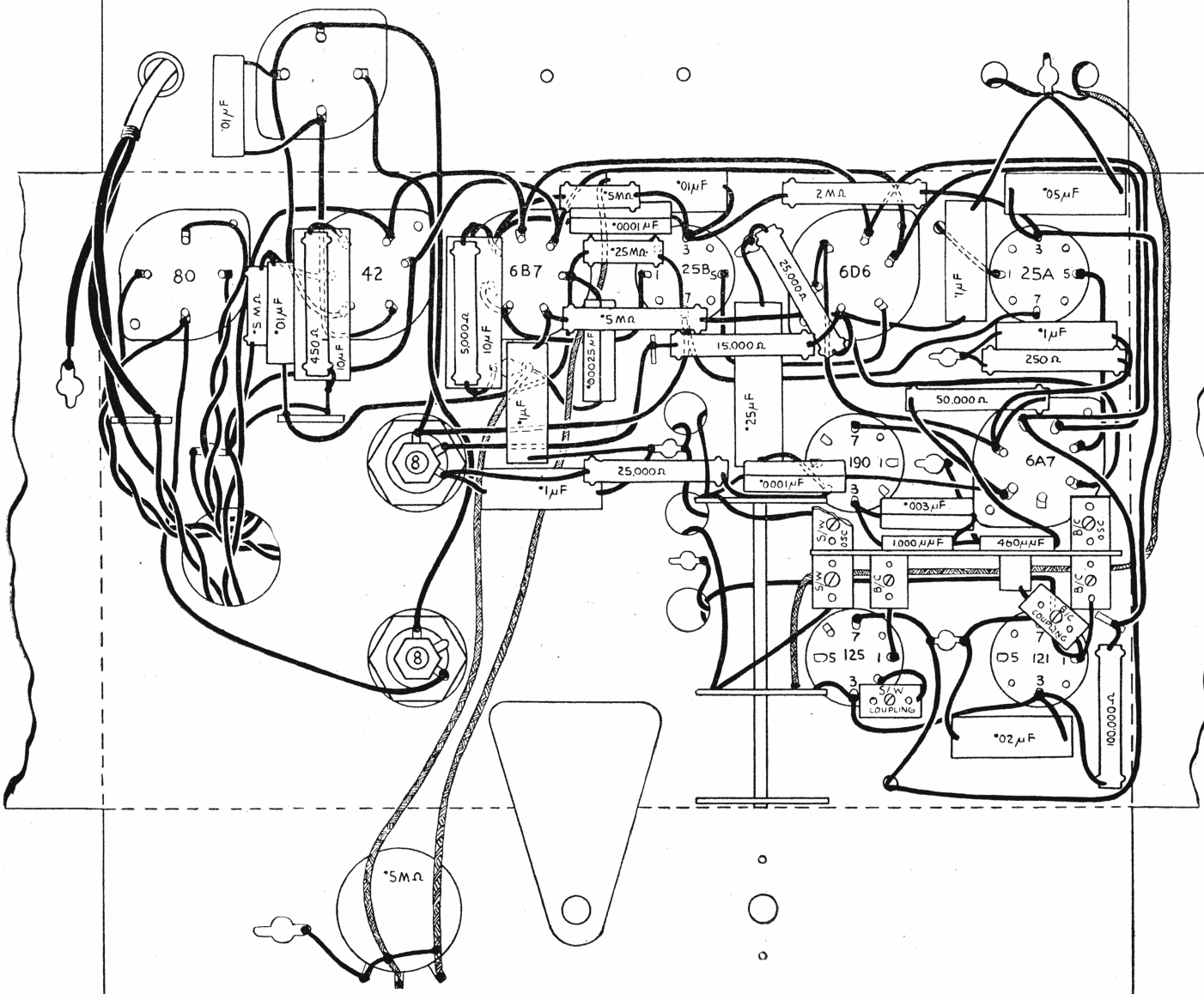
50~
1500 - 2500Ω
EXELRAD
MODEL 5GX DUAL-WAVE


·01μF
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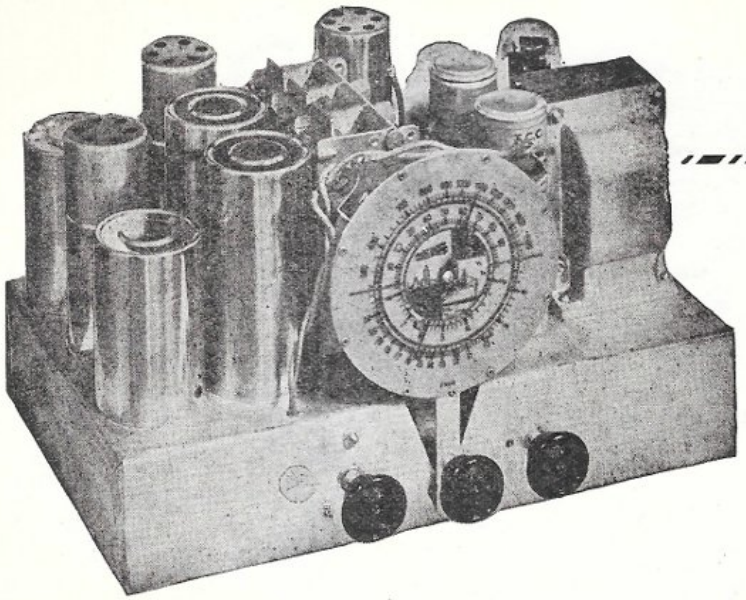

* *Five Valves*
* *High-Class Circuit*
* *Dual-wave Coverage*
* *Band-Pass Tuning on Broadcast*
* *Simple and Cheap to Build*

Exelrad "BAND-PASS DUAL-WAVE FIVE" ★ ★ ★

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The tuning ranges are 550 to 1500 kilocycles per second, and approximately 6 to 16 megacycles per second.

"BAND PASS DUAL WAVE FIVE"

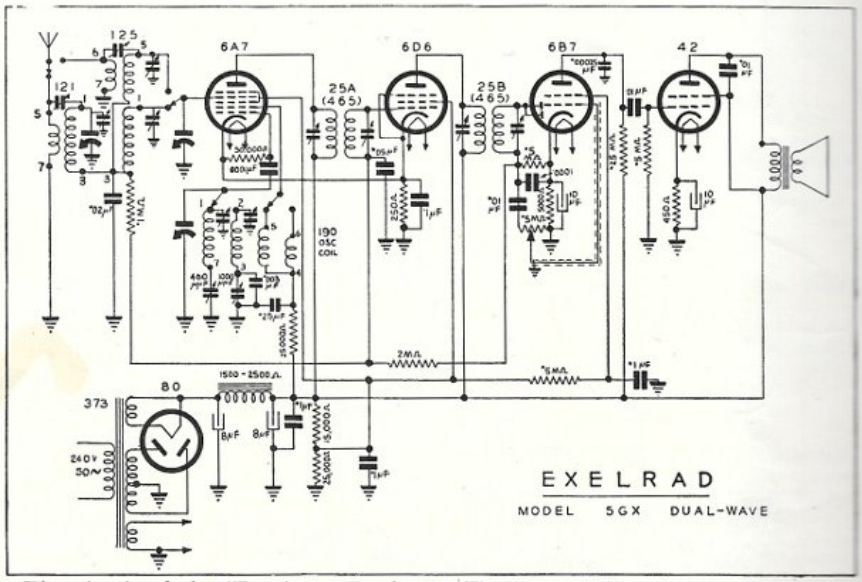
KIT PRICES:

(K)

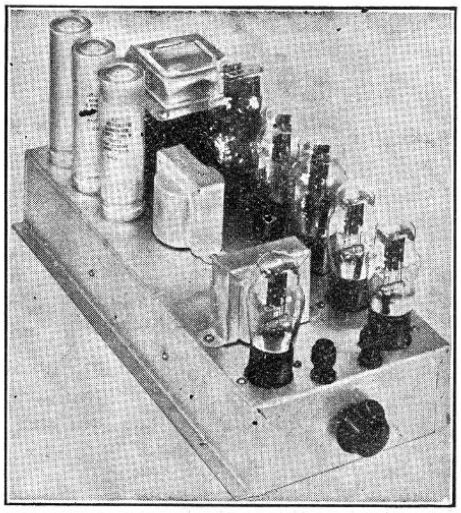
Exelrad Kit for Band Pass Dual-wave Five, with Valves and Speaker Cat. No. FK613 ..... **£15**

Ditto, less Valves and Speaker— Cat. No. FK614 **£10/10/-**

Ditto, complete with Valves, less Speaker— Cat. No. FK615 **£12/5/-**



The circuit of the "Band-pass Dual-wave Five"—a modernised version of the "Dual-wave Comet" described last year.



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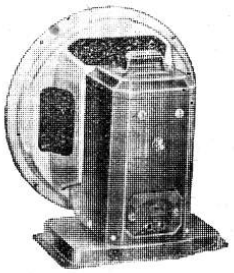
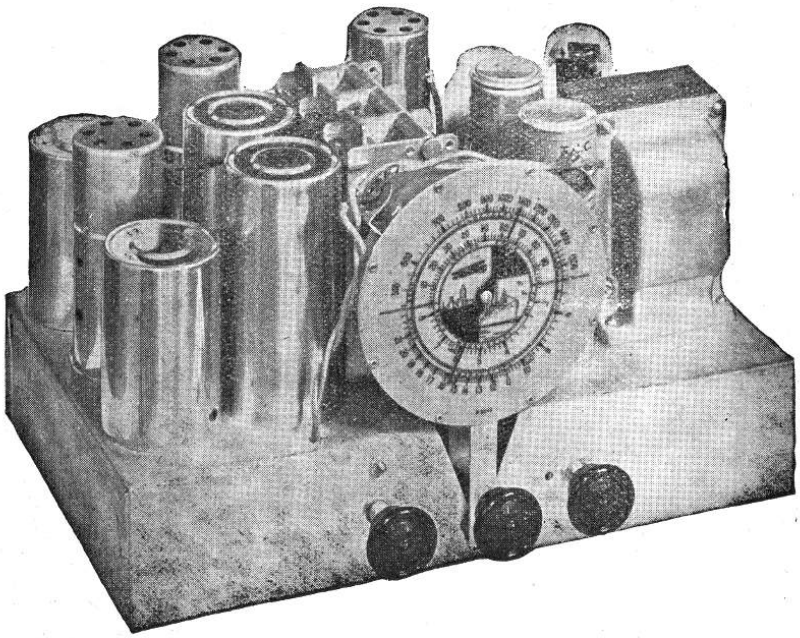


BAND-PASS DUAL-WAVE FIVE



Band-pass Kit, complete with Valves and Speaker: **£14**

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