# B24

## AND B25

# RECEIVERS

# TECHNICAL NOTES

**THIRD EDITION**

MURPHY RADIO LTD.
WELWYN GARDEN CITY, HERTFORDSHIRE
TELEPHONE WELWYN GARDEN 800

024/4/36.

# THE CIRCUIT

The Murphy B24 may be described as a five valve set in so far as it contains five valve sockets. However, owing to the use of high efficiency valves and to the fact that some of the valve envelopes contain multi-electrode systems, the B24 should be classified according to its performance rather than the number of valves employed. The accompanying schematic diagram (Fig. 1, page 10) shows the circuit.

In order to discriminate between two-valve systems contained in the same envelope distinguishing names will be given to them. Thus the components of V2 will be spoken of as V2 Triode and V2 Diodes: similarly the components of V4 will be referred to as V4 Triode and V4 Diodes. Since the two halves of V5 comprise identical pentodes no special differentiation is required in this instance.

In the case of V2 only one diode is actually used and its function is to damp the band pass secondary circuit so as to reduce the signal voltage and prevent overloading from the local station. A more detailed description of this device is given below.

The remaining two valves V1 and V3 are both high slope variable "mu" pentodes and are used respectively as first detector and I.F. amplifier.

Referring again to the circuit diagram, it is seen that the aerial is coupled to a band pass tuning arrangement (L3, L7, C1A, C1B, etc.) which incorporates an image frequency suppression circuit (Co, Lo). From the secondary of the aerial band pass tuning circuit signals are passed on, through C9 to the grid of V1, where they are mixed with the local oscillations generated by V2, and rectified, thus producing an I.F. signal at 117 Kc/s. This signal is fed through the I.F. transformer L15, L16, to the I.F. amplifier V3, and thence *via* the 2nd I.F. transformer, L17, L18, to the detector, V4 diode anode 1. The diode load takes the form of a one megohm volume control potentiometer (R19) from which is tapped off the L.F. input to V4 triode grid. This volume control, being in the L.F. portion of the set, is also operative on gramophone reproduction.

The I.F. signal is also applied, from L17, to V4 diode anode 2. This diode is about 2 volts negative with respect to filament: consequently with small signals no rectification takes place. When the I.F. signal is greater than 2 volts, however, the diode comes into operation, current flows through R14 and R15, and sets up a voltage proportional to signal strength. This voltage is applied through a decoupling system R5, C11, to the grid of V1, and about 4/5ths of it is applied through R9, C21, to V3 grid. Both these valves are of the variable "mu" type, so that the total amplification decreases as the signal strength is increased, thus giving A.V.C. action. The range of control obtained in this way may not, however, be sufficient to deal with the very large inputs obtainable from a powerful local transmitter, due to overloading taking place in the first valve. (Battery valves are unable to handle as large an input as their mains counterparts). Consequently the automatic "local-distance" device, mentioned above, is incorporated. This device consists of one of the diode elements of V2, and a resistance R4 connected in series; the other end of R4 being connected to L7. Since L7 is returned to a point one volt negative with respect to the filament of V1, normally no current flows in the diode circuit and no damping is introduced. However, when a station is tuned in that is sufficiently strong to produce more than one volt across L7, the diode becomes conducting and thus effectively damps the tuned grid circuit and limits the voltage applied to V1. In this way overloading is prevented in V1, and the succeeding valves.

In the anode circuit of V4 triode is a heterodyne filter, L19, L20, C26, C27, C28, C29, and this gives a very sharp audio cut-off at about 5,000 cycles. After passing through this filter, the signals are applied to the Q.P.P. output valve through a parallel fed 1 to 5 centre tapped transformer, T1. Across the output transformer primary is connected the tone control, C34 and R21, which latter is variable.

The H.T. supply is obtained from a battery having an initial potential of 133½ volts, and a tapping for 10½ volts grid bias. In addition, five tappings are provided to enable compensation to be made for slight variations in the characteristics of the two pentodes in the QP240 valve.

A point to be noticed is the unusual filament circuit of V1. The cathode coil must, of course, be inserted in one filament lead in order to form part of the grid to filament path, but unless a coil be inserted in the other filament lead also, this latter will form a short circuit across the cathode coil.

The actual controls of the set are four in number :

1. Upper central knob : Ganged tuning Condenser.
2. Left-hand knob : Volume control.
3. Central knob : Tone control.
4. Right-hand knob : On-off and wave change switch.

There are one or two points in this receiver which call for attention.

*Item* 1. The position of the following components should be noticed: the image frequency suppression condenser Co ; the band pass coupling coils L5, L6 ; the I.F. trimming condensers C15, C16, C17, C18. All these items are mounted underneath the chassis, and may be seen in Figure 3.

*Item* 2. The grid of V1 is isolated from the preceding circuits by a fixed condenser C9 : this enables A.V.C. voltage to be applied to V1, without affecting the potential of V2 diode.

# SPECIAL FEATURES

There are several peculiarities about Q.P.P. amplifiers which should be noted :

(1) The H.T. current taken by the output stage depends on the loudness of the reproduced signals. There is a small quiescent current (about 2½ mA) which is determined by the grid bias and the anode voltage ; as soon as signals are received, however, the anode current rises, and may even reach 25 mA on peak outputs. For this reason every endeavour must be made to avoid unnecessary waste of battery power, and instructions to this effect are given in the book supplied with the B24 receivers.

(2) Since the grid bias voltage applied to the output valve is more critical than is the case with an ordinary amplifier, some provision has to be made to keep a correct ratio between it and the anode voltage. Hence, as the H.T. battery voltage drops with use, it is necessary to reduce the Grid Bias voltage in the same proportion, and this is achieved by shunting the bias battery with a suitable resistance. To ensure that the H.T. and G.B. battery voltages are always in their correct proportions, it is essential to use only combined batteries for the B24 receivers. Separate G.B. and H.T. batteries must never be supplied when replacing the existing battery.



There are also one or two special points about the circuit which call for attention.

It will be noticed that there is a one megohm resistance in parallel with the pick-up jack and this will, of course, be shunted directly across any pick-up used with the receiver. When employing a high impedance pick-up this resistance must be allowed for in order to ensure a correct value of terminating resistance. Further an external volume control is not required and if fitted should be removed before the pick-up is connected in circuit.

If a milliammeter be inserted in the common H.T. and G.B. negative lead, with its negative terminal connected to the negative of the H.T. battery, a curious effect will be noticed. That is, when no station is being received, the current reverses, and the needle moves backward off the scale, but when a strong transmission is tuned in a deflection in the normal direction is obtained. The reason for this phenomenon is that the H.T. and G.B. currents are in opposite directions, and hence, when a milliammeter is placed in their common lead, it indicates the **difference** between the two currents. Now, the steady current from the G.B. battery is greater than the total quiescent anode current, and hence, in the absence of signals the resultant current is a reversed one.

# DISMANTLING

To remove the chassis from the cabinet, first take off all control knobs, then loosen the four knurled screws at the corners of the wooden back (it is unnecessary to remove them altogether) and the back will come off.

Take out the H.T. battery and L.T. accumulator and unthread the H.T. leads from the hole in the cross bar, by passing each lead separately through the slot at the rear. The H.T. and L.T. leads can then be drawn through the hole on the right-hand side of the cross bar. Next remove the loudspeaker plugs. Then with a Whitworth box spanner remove the three hex-headed holding-down screws. This must be done working from below, with the set projecting over the edge of the bench. The chassis will now slide out.

Note that the number of the set is given on the name plate fixed to the cabinet back ; it is repeated on the chassis itself (see Fig. 2).

If by any chance two sets are taken down at the same time, make sure that each back and cabinet are kept together, so that when replacing the chassis they may be returned to their correct cabinets.

## HETERODYNE FILTER

If a fault be suspected in the heterodyne filter it must be dismantled before its components can be checked : the procedure is as follows. First unsolder the two filter leads from their respective tags underneath the chassis, then undo the four screws that hold the filter case in position, and lift it away, threading the leads through the grommet in the chassis. Finally, the filter can be removed from its case by first unscrewing the three fixing screws and then gently pulling the assembly outwards, releasing the leads meanwhile. The relative positions of the coils and condensers can then easily be seen by comparing the actual assembly and the circuit diagram.

# PRACTICAL LAYOUT

The practical layout of the B24 differs in several respects from the B5. The most noticeable difference is the new position of the wavelength indicator, this being mounted on the chassis instead of on the cabinet ; a second important innovation is the clip fastening of the pilot lamp, which enables it to be easily removed for replacement. As before the loudspeaker is not part of the chassis, but is fixed to the cabinet : the speech coil leads are flexible, with plug and socket connections to the chassis.

Fig. 2 is a plan of the chassis. It shows the components that are above the base, and also the fittings on the back edge. The sequence of the valves is similar to that obtaining in the circuit diagram. The actual valves used are :

| | | | | |
|---|---|---|---|---|
| Back left hand | V2 | Mazda | HL21DD. | (Met.) |
| Left hand | V1 | ,, | VP215. | (Met.) |
| Third | V3 | ,, | VP215. | (Met.) |
| Fourth | V4 | ,, | L21DD. | (Met.) |
| Right hand | V5 | ,, | QP240. | (Clear) |

In order that the details of the wiring of the components enclosed within the coil cans may be clearly seen, diagrammatic views of the assemblies are shown in Figs. 5, 6, 7, 8, and 9 ; the views are obtained by looking at the coils from the top with the cans removed. In reading these diagrams care must be taken to see that the coloured tracers in the external connecting wires correspond exactly to the colours given in the illustrations. Otherwise confusion may arise owing to the diagram and the actual assembly being looked at from different angles.

A special illustration of the heterodyne filter is not shown, as the wiring is quite straightforward and follows the circuit diagram closely. Detailed instructions for removing this filter for examination are given on page 5, in the section headed " Dismantling."

On turning the receiver over we get the " worm's eye " view shown in Fig. 3. Most of this is clear enough, but there are four component assemblies which call for special notice, and separate illustrations of these are given.

W1587. This is a block of six condensers and eight resistors. Fig. 4 shows how it is arranged looking at the side where the tags show. The numbers on the condensers and resistors show where they are in circuit, by referring to the schematic diagram (Fig. 1).

The arrow heads show where all the external connections go to, so that by the aid of the diagram one can change the assembly and put in a spare, without error in re-wiring. (The common point of the six condensers is earthed to the case.)

V.1606. This lies to the right of the wave change switch : the internal and external connections can be seen in Fig. 10.

V.1607. This lies behind V3 : the internal and external connections are shown in Fig. 11.

V.1608. This lies behind the gramophone jack : connections are shown in Fig. 12.



# VOLTAGES AND CURRENTS

The following table of voltages is given as a guide only—considerable variations may occur without seriously detracting from the efficiency of the receiver.

Owing to the particular circuit employed in the B24, the various voltages depend to some extent on the strength of the applied signal. For this reason the readings were made with no signal being received, except with V4. In the latter case readings were taken with and without a strong signal, in order to give an idea of the change of voltage to be expected under working conditions.

Except where otherwise stated voltages are to chassis. They are those obtained with a " 1,000 ohms per volt " meter, having a maximum range of 0—250 volts.

The appended readings were taken with a new H.T. battery, reading 135v. from H.T. + 133 to H.T. — and 11v. from G.B. + to G.B. — 10½v. ; if a receiver is tested with a battery that has been in use for some time, the H.T. voltage will be less and all the readings will be proportionately lower.

| | | | |
|---|---|---|---|
| V5 Anodes : | | (1) 135V | 1.3mA. |
| | | (2) 135V | 1.3mA. |
| V5 Screens : | | (1) 132V | 0.3mA. |
| | | (2) 117V | 0.3mA. |
| V4 Triode Anode. | No signal : | 51V | 1.0mA. |
| | Strong signal : | 50V | 0.5mA. |
| V4 Diode anode 1. | No signal : | zero volts | |
| | Strong signal : | 0—5 volts according to the | |

resistance of the meter and the strength of the signal.

| | | |
|---|---|---|
| V3 Anode : | 135V | 1.4mA. |
| V3 Screen : | 60V | 0.4mA. |

V3 Grid : No Reading owing to high resistances in circuit. (R9, R15.)

| | | |
|---|---|---|
| V2 Triode Anode : | 50V | 0.5mA. |
| V2 Triode Grid : | No Reading | |
| V2 Diode 1 : | 0.8V | |
| V1 Anode : | 115V | 1.25mA |
| V1 Screen : | 55V | 0.4mA. |

V1 Grid : No Reading owing to high resistances in circuit. (R2, R5.)

| | | |
|---|---|---|
| Total Quiescent current | | 8.5mA. |
| Total Maximum current (very strong signal) | | 25mA. |
| Current in G.B. lead : | 10mA. | Independent of Signal strength. |
| Current in H.T. — ve common lead | No signal : | 1.5mA. (Reversed) |
| | Strong signal : | 15 mA. |

# TRIMMING

A modulated oscillator is highly desirable for trimming the B24 receiver : if this is not available only the radio frequency circuits can be adjusted and sets with faulty I.F. trimming must be returned to the Factory.

## APPARATUS REQUIRED

(1) An insulated screwdriver. The blade should be either covered with sleeving or wrapped with insulating tape for about an inch from the tip, leaving only 1/16th-inch of the tip of the blade exposed.

(2) 0-1.5v. or 0-50v. A.C. voltmeter. Alternatively a 0-5 milliammeter.

If an 0-1.5 voltmeter is used it must be connected directly across the speech coil of the Loudspeaker : if, however, an 0-50 voltmeter is used this must be connected in series with a 1.0 mfd condenser and the two together then connected across T2 primary. The 0-5 milliammeter should be connected in the anode circuit of V4, i.e., in place of the lead between R13 and the G Tag on W1587 assembly. Provided a reasonably weak H.F. signal is used it is not necessary to cut out the A.V.C. when trimming this receiver.

## GENERAL INSTRUCTIONS FOR TRIMMING

(*a*) Set the manual volume control at its maximum position; this ensures that, provided the receiver is worked at a normal volume level, overloading will not take place in the H.F. stages.

(*b*) Make all trimming adjustments with the greatest possible care, bearing in mind that the operation is essentially critical and that faulty trimming will completely spoil the performance of a receiver.

## TRIMMING BY MEANS OF A BROADCAST SIGNAL

(1) Tune in a fairly strong station between 200-220m.: identify it definitely and look up its wavelength in the *World Radio*. Compare with the reading on the set. If it is correct, go on at once to (2) below. If not correct, adjust the tuning control to exactly the right wave-length of the station, and then trim on C6 till you get the biggest meter reading :

(2) Trim C2 to increase the reading if possible.

(3) Do not touch the main tuning control. Trim C4 to best output ; go back to C2 and see if it needs further adjustment, then continue checking C2 and C4 alternatively until no improvement is obtained.

(4) Switch to long waves. Tune in Oslo or the nearest station to 1100m. available. Check its wave-length in *World Radio* against the setting; if correct go on to (5). If not set the tuning to the right wave-length, and trim on C7 to maximum meter reading.

(5) Leave the tuning control set, and do as in (2) and (3) but working on C3 and C5 instead of C2 and C4.



## TRIMMING BY MEANS OF A MODULATED OSCILLATOR

(1) Tune the oscillator to 220m. and switch to internal modulation Connect the output of the oscillator to the aerial and earth of the receiver (*via* the dummy aerial if this is provided). Now tune the set to receive this 220m. signal at maximum strength and adjust the oscillator output to give about half scale deflection on the meter. Check the reading on the set; if it is exactly 220m. go on at once to (2) below. If it is not correct adjust the receiver dial to 220m. and then trim C6 for maximum meter reading.

(2) Trim C2 to increase the reading, if possible.

(3) Do not touch the main tuning control. Trim C4 to best output : go back to C2 and see if it needs further adjustment, then continue checking C2 and C4 alternatively until no improvement is obtained.

(4) Switch to long waves. Tune the oscillator to 1100m. and tune the set to receive this signal at maximum strength, again adjusting the oscillator output to give a reasonable deflection on the meter. Check the reading on the set; if it is exactly 1100m. go on at once to (5) below. If it is not correct adjust the receiver dial to 1100m. and trim C7 for maximum output.

(5) Leave the tuning control set and adjust as in (3) and (4) but working on C3 and C5 instead of C2 and C4.

## I.F. TRIMMING

When I.F. trimming is necessary it should be carried out before the R.F. trimming. As, however, the latter is somewhat simpler it will probably be done first whenever the general symptoms indicate faulty trimming. However, if R.F. trimming does not clear the trouble and I.F. trimming has to be resorted to, then, when this is complete the R.F. circuits must be re-trimmed.

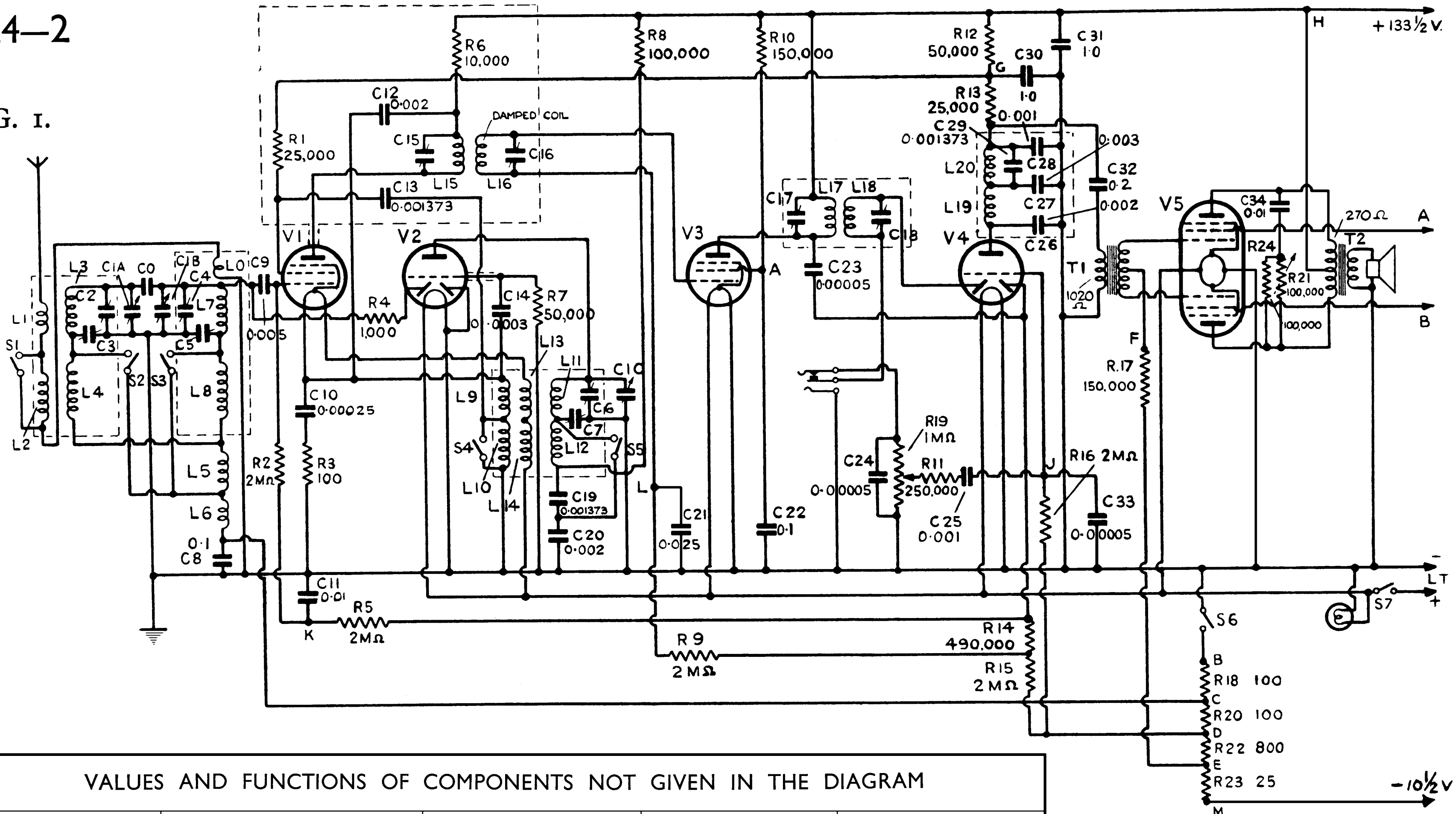
First switch the receiver to medium waves and short circuit L9 or L11 to prevent V1 oscillating. Then tune the oscillator to 117K.C. and feed its output (*via* the dummy aerial) to the input circuit of V3. That is, connect the A & E terminals on the oscillator to the grid of V3 and chassis, respectively. The output control is set to give a small deflection on the indicator and trimmers C18, C17 are adjusted (in turn) until a maximum reading is obtained. This is followed by the adjustment of C16 and C15, the oscillator output in this case being transferred to the grid of V1 Pen and chassis. When all four circuits have been trimmed for resonance the adjustment is complete and the R.F. circuits can be proceeded with.

## ADJUSTING THE IMAGE FREQUENCY SUPPRESSOR

This operation differs from normal R.F. and I.F. trimming in two important particulars: in the first place the maximum possible output is required from the oscillator, and in the second place the adjustment is for minimum and not maximum speaker response. The latter condition necessitates the use of the ear as an indicator, as in this special case an aural test is far more sensitive than the use of a meter. The actual adjustment is fairly simple. The oscillator is tuned to 333m. and the receiver to 450m., these being the conditions under which the set will receive a weak " image " signal from the oscillator. Hence, when this image signal is heard, it is necessary to adjust carefully the erinoid screw (situated on top of the band pass secondary coil) until the absolute minimum signal is heard in the speaker. Under these conditions the image frequency suppression system will be correctly adjusted.

# B24—2

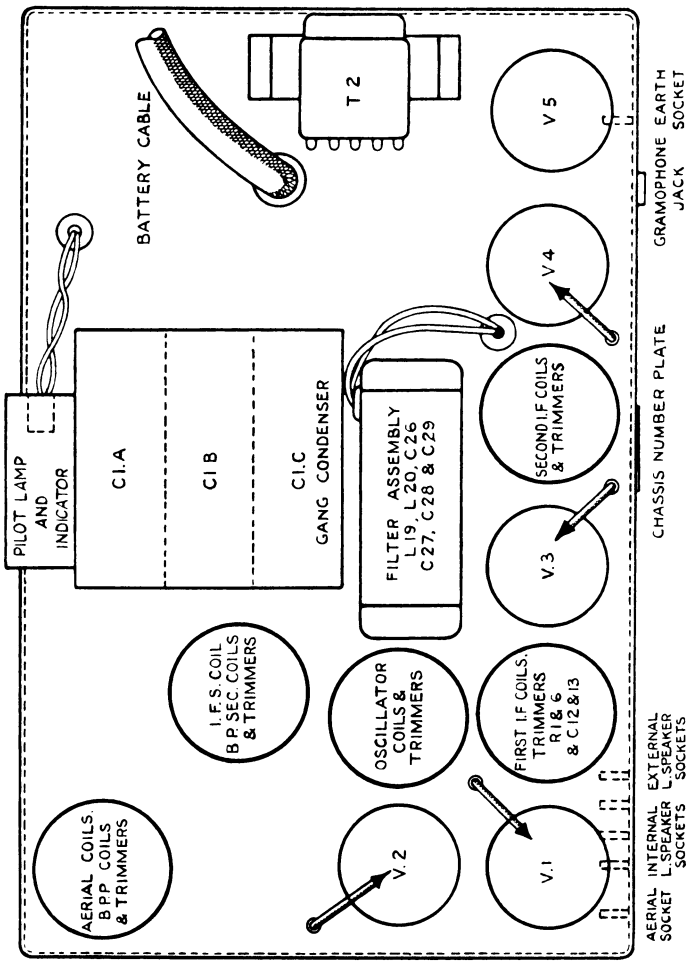
FIG. I.




## VALUES AND FUNCTIONS OF COMPONENTS NOT GIVEN IN THE DIAGRAM

| CONDENSERS | | INDUCTANCES | | | | VALVES | | | SWITCHES | | TRANSFORMERS | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | CAPACITY | No. | D.C. RESISTANCE | No. | D.C. RESISTANCE | No. | FUNCT'N | TYPE | No. | FUNCTION | No. | VALUE |
| C0 | 2 M.MFDS. | L0 | 0.25 Ω | L10 | .3 Ω | | | | S1 | CLOSE FOR S.W. | T1 | PRIM. 1020 Ω |
| C1A | .0005 MFD. | L1 | 1.0 Ω | L11 | 4 Ω | V1 | 1ST DET. | VP 215 | S2 | CLOSE FOR S.W. | | SEC. (a) 2000 Ω |
| C1B | .0005 MFD. | L2 | 7 Ω | L12 | 8.5 Ω | V2 | Osc. | HL21DD | S3 | CLOSE FOR S.W. | | (b) 2500 Ω |
| C1C | .0005 MFD. | L3 | 5 Ω | L13 L14 | .6 Ω | V3 | I.F. | VP 215 | S4 | CLOSE FOR S.W. | | |
| C2 | 5/70 M.MFDS. | L4 | 12 Ω | L15 | 40 Ω | V4 | 2ND DET | L21DD | S5 | CLOSE FOR S.W. | T2 | PRIM. 270 Ω |
| C3 | 5/70 M.MFDS. | L5 | 2.75 Ω | L16 | 40 Ω | V5 | Output | QP240 | S6 | CLOSE FOR ON. | | |
| C4 | 5/70 M.MFDS. | L6 | 0.75 Ω | L17 | 40 Ω | | | | S7 | CLOSE FOR ON. | | SEC. 0.21 Ω |
| C5 | 5/70 M.MFDS. | L7 | 5 Ω | L18 | 40 Ω | | | | | | | |
| C6 | 5/70 M.MFDS. | L8 | 12 Ω | L19 | 450 Ω | | | | | | | |
| C7 | 5/70 M.MFDS. | L9 | .2 Ω | L20 | 370 Ω | | | | | | | |
| C15 | 70/140 M.MFDS. | | | | | | | | | | | |
| C16 | 70/140 M.MFDS. | | | | | | | | | | | |
| C17 | 70/140 M.MFDS. | | | | | | | | | | | |
| C18 | 70/140 M.MFDS. | | | | | | | | | | | |

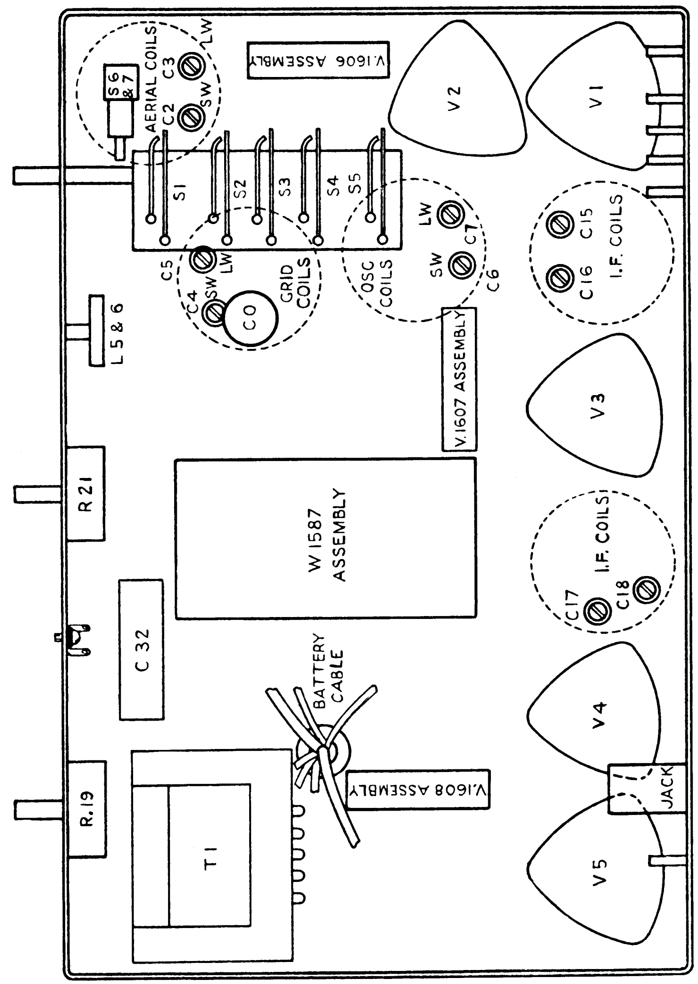
All resistances in ohms and capacities in microfarads unless otherwise stated.




PLAN OF CHASSIS

FIG. 2.






UNDERSIDE OF CHASSIS

FIG. 3.

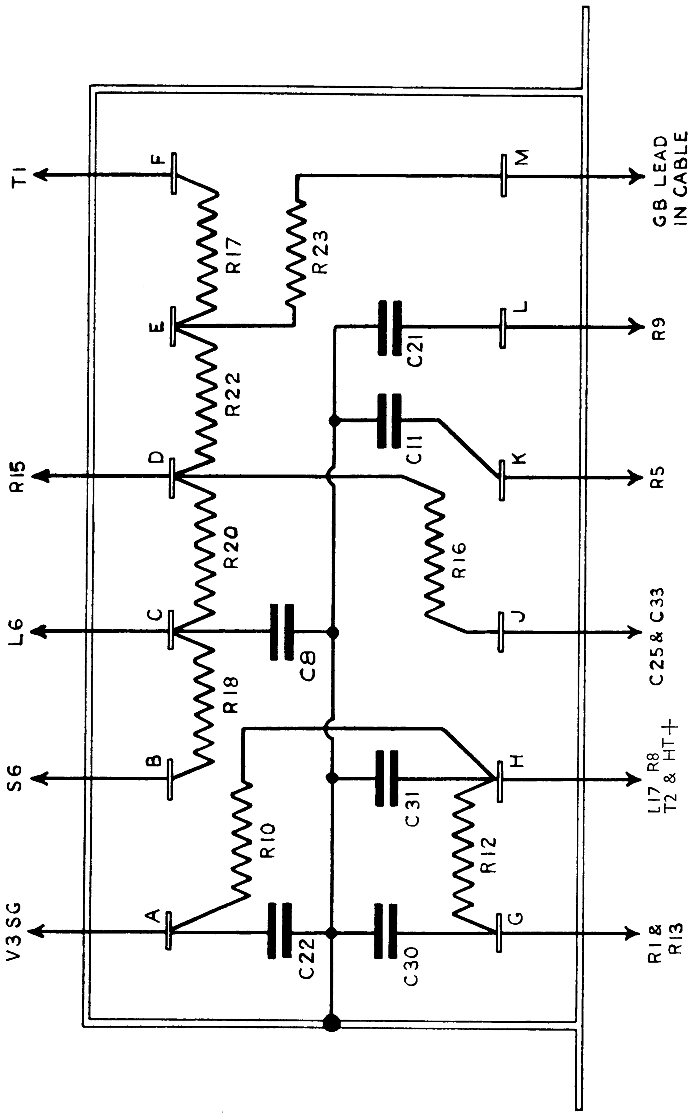
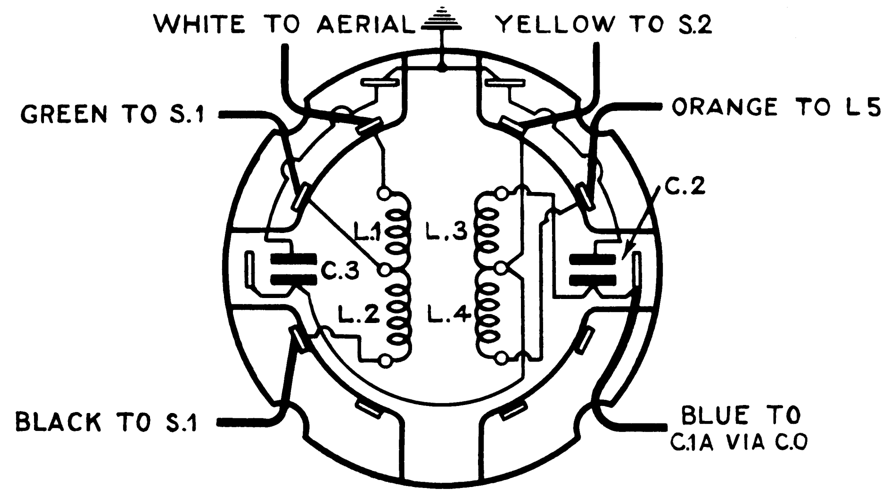



FIG. 4. W. 1587. CONDENSER & RESISTANCE ASSEMBLY



# AERIAL COIL

FIG. 5.




# GRID COIL

FIG. 6.

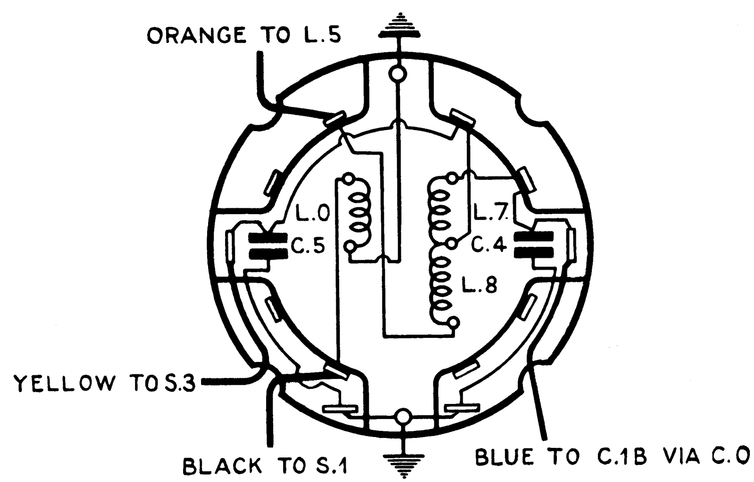


FIG. 7. **OSCILLATOR COIL**

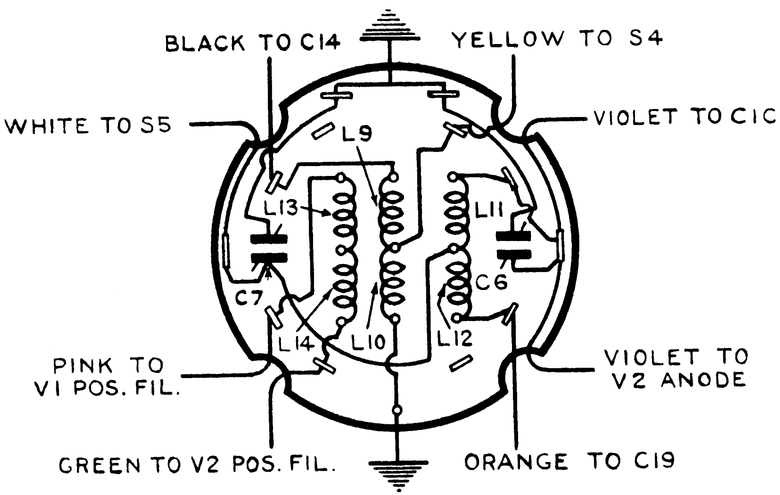
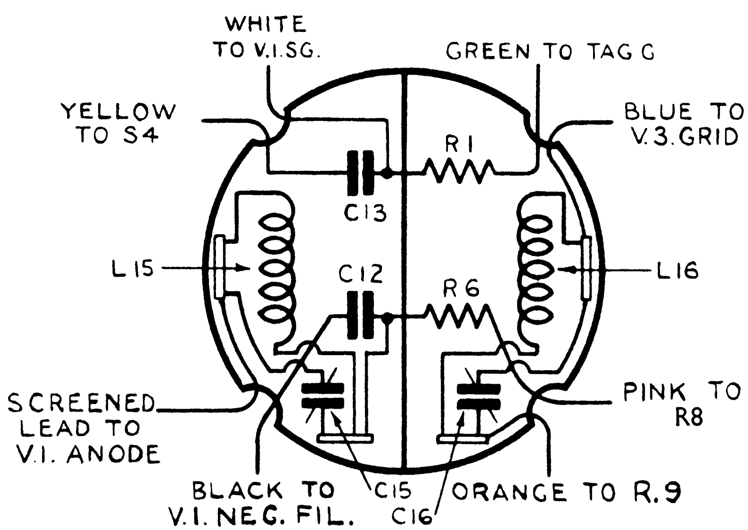


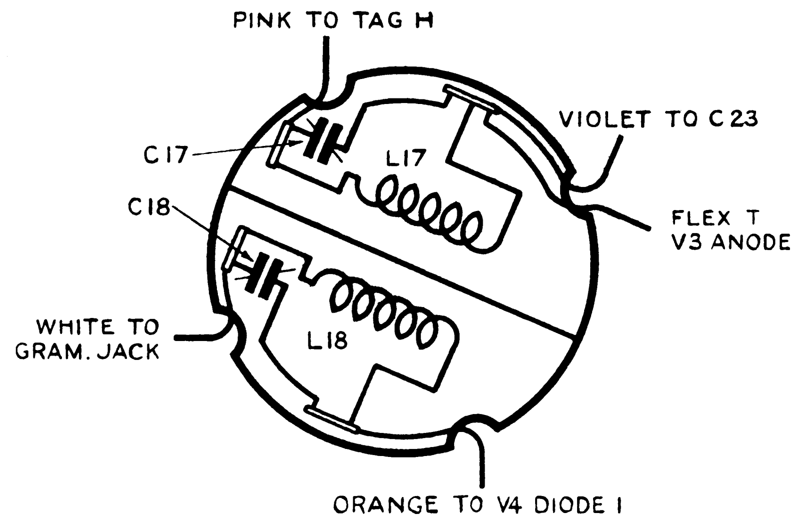

FIG. 8. **FIRST I.F. COILS**





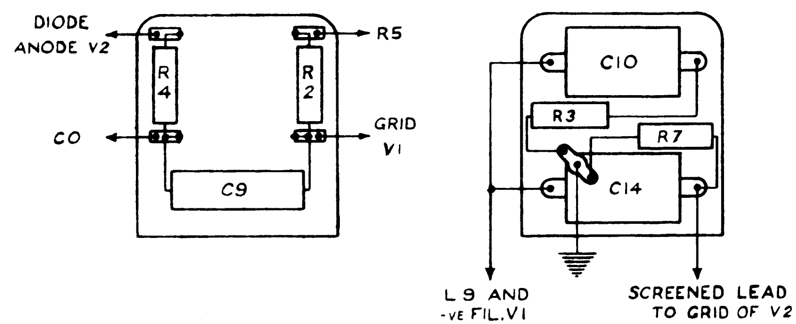

**SECOND I.F. COILS**

FIG. 9.



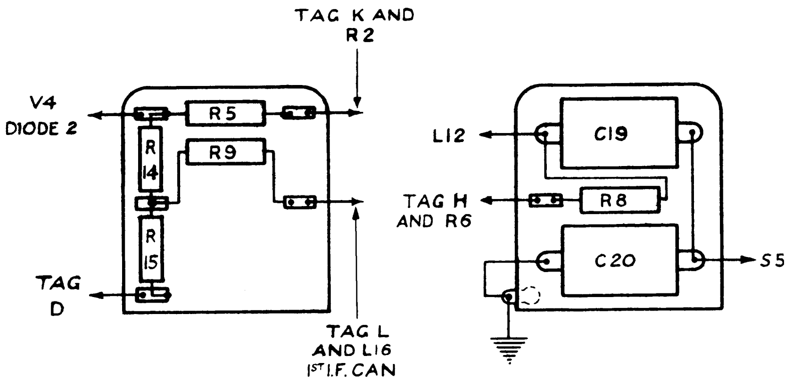

**V1606 ASSEMBLY**

FIG. 10.



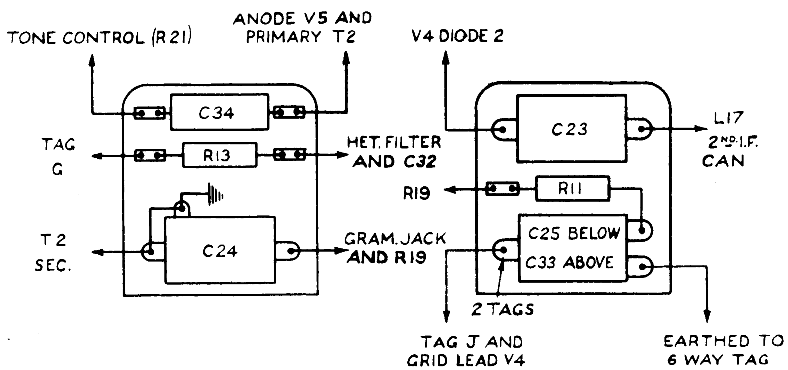
# V1607 ASSEMBLY

FIG. 11.




# V1608 ASSEMBLY

FIG. 12.






# B25 RECEIVER

THIS APPENDIX COVERS ALL THE DIFFERENCES BETWEEN THE B24 AND B25 RECEIVERS, AND SHOULD BE REFERRED TO WHEN SERVICE WORK IS CARRIED OUT ON THE LATTER MODEL

Although the circuit and layout of the B25 receiver are almost identical with those of the B24, a few differences do exist, and these are enumerated below.

R20, which is located in the W1587 Bank, has been altered in value from 100 to 200 ohms, and at the same time has been connected between Tags B and D instead of Tags B and C. As a result, Tag C will be at chassis potential instead of one volt negative, thus altering the delay voltage on V2 diode anode. Tag D will remain, as before, two volts negative, since the resistance between it and chassis is still 200 ohms : furthermore, the voltage distribution at the other tags will be unchanged. It should be noted that, in the B25, R18 is necessary only to provide a D.C. path across C8, which constitutes part of the band pass coupling impedance, and must not, therefore, be short-circuited.

Another change is to be found in the tone control circuit : here, a 50,000 ohms variable resistance, following a logarithmic law, has been used to replace the 100,000 ohms control shunted with a fixed resistance of the same value.

In the B24, C10, which is located on the V1606 assembly, has a value of .00025 mfd. In the B25 the capacity of this component has been increased to .00035 mfd : this change, however, is not incorporated in receivers prior to Serial No. 3800.

The remaining changes in the circuit lie in the values assigned to the trimming condensers, which have been altered to 10/50 mmfds in the case of the medium wave trimmers, and 10/80 mmfds for those associated with the long wave coils.

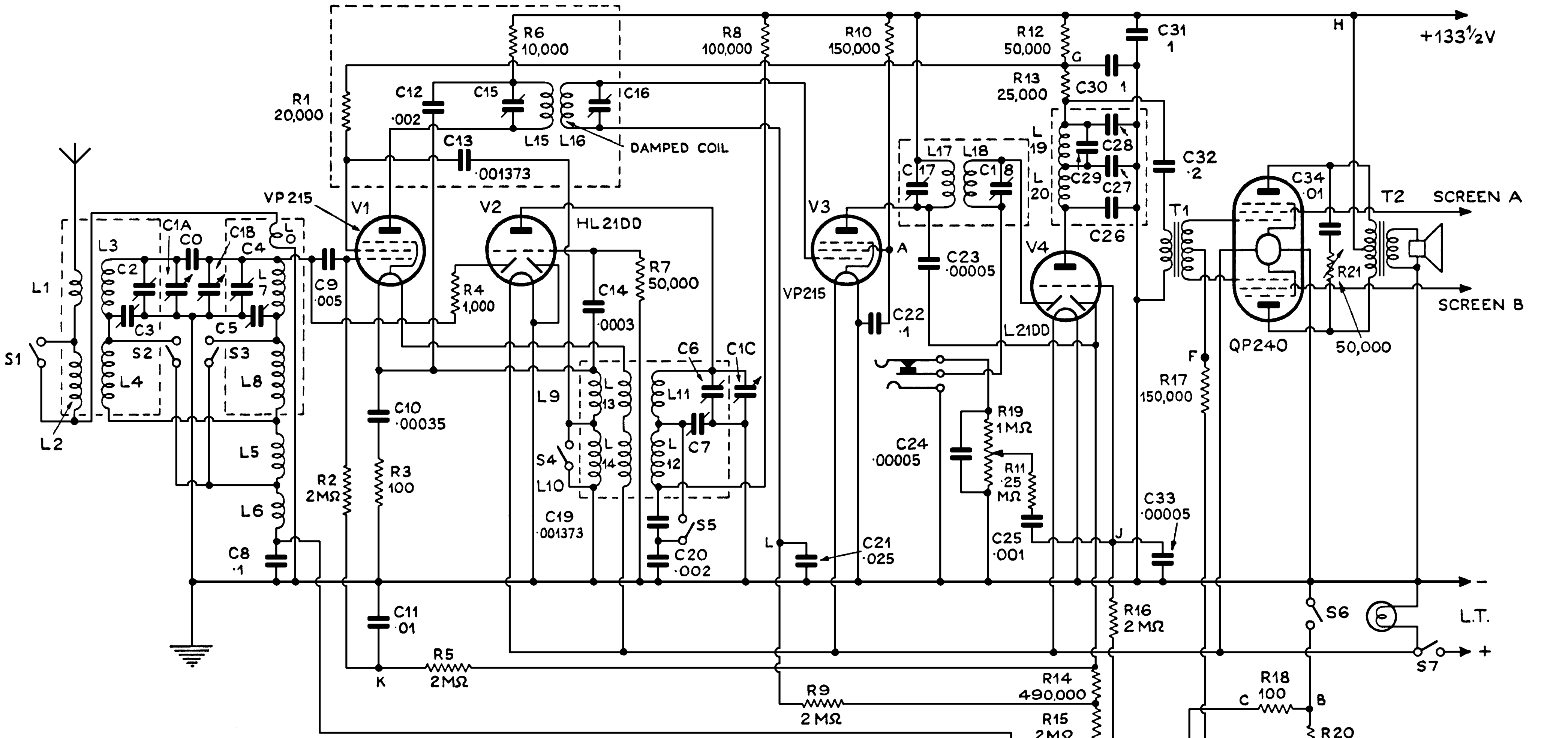
This lower maximum value has been assigned to the medium wave trimmers owing to the fact that less capacity is required in all the tuned circuits in order to allow the medium waveband to be extended below 200 metres. The long waveband, on the other hand, will now require a somewhat higher value, in order to compensate for the lower capacity contributed by the medium wave trimmer.

The on-off switch is, of course, incorporated with the volume control, and as a result, insufficient space remains below the chassis for the intervalve transformer. The latter has accordingly been allotted a new position above the chassis, while the output transformer, which is smaller, has been transferred below.

Finally, it should be noted that the purple tracer lead from the tone control to one anode of the QP240 valve has been taken by a new route in order to prevent any risk of coupling with the yellow lead to the volume control ; accordingly, it now runs round the condenser bank and behind V4 valve holder, and is kept as near to the chassis as possible.

The new values of components can be summarised as follows :

| | | | |
|---|---|---|---|
| C2 | 10/50$\mu\mu$F | C10 | .00035$\mu$F |
| C3 | 10/80$\mu\mu$F | | |
| C4 | 10/50$\mu\mu$F | | |
| C5 | 10/80$\mu\mu$F | R20 | 200$\Omega$ |
| C6 | 10/50$\mu\mu$F | | Between Tags B & D |
| C7 | 10/80$\mu\mu$F | | |




O44—10.35

## VALUES AND FUNCTIONS OF COMPONENTS NOT GIVEN IN THE DIAGRAM

### CONDENSERS

| No. | CAPACITY |
|---|---|
| C0 | 2 M.MFDS. |
| C1A | .0005 MFD. |
| C1B | .0005 MFD. |
| C1C | .0005 MFD. |
| C2 | 10/50 M.MFDS. |
| C3 | 10/80 M.MFDS. |
| C4 | 10/50 M.MFDS. |
| C5 | 10/80 M.MFDS. |
| C6 | 10/50 M.MFDS. |
| C7 | 10/80 M.MFDS. |
| C15 | 70/140 M.MFDS. |
| C16 | 70/140 M.MFDS. |
| C17 | 70/140 M.MFDS. |
| C18 | 70/140 M.MFDS. |
| C26 | .002 MFD. |
| C27 | .003 MFD. |
| C28 | .001 MFD. |
| C29 | 1373 M.MFDS. |

### INDUCTANCES

| No. | D.C. RESISTANCES | No. | D.C. RESISTANCES |
|---|---|---|---|
| L0 | 0.25 Ω | L10 | .3 Ω |
| L1 | 1.0 Ω | L11 | 4 Ω |
| L2 | 7 Ω | L12 | 8.5 Ω |
| L3 | 5 Ω | L13 | .6 Ω |
| L4 | 12 Ω | L14 | .6 Ω |
| L5 | 2.75 Ω | L15 | 40 Ω |
| L6 | 0.75 Ω | L16 | 40 Ω |
| L7 | 5 Ω | L17 | 40 Ω |
| L8 | 12 Ω | L18 | 40 Ω |
| L9 | .2 Ω | L19 | 450 Ω |
| | | L20 | 370 Ω |

### VALVES

| No. | FUNCT'N | TYPE |
|---|---|---|
| V1 | 1st Det. | VP 215 |
| V2 | Osc. | HL21DD |
| V3 | I.F. | VP 215 |
| V4 | 2nd Det | L21DD |
| V5 | Output | QP240 |

### SWITCHES

| No. | FUNCTION |
|---|---|
| S1 | Close for S.W. |
| S2 | Close for S.W. |
| S3 | Close for S.W. |
| S4 | Close for S.W. |
| S5 | Close for S.W. |
| S6 | Close for ON |
| S7 | Close for ON. |

### TRANSFORMERS

| No. | VALUE |
|---|---|
| T1 | Prim. 1020 Ω |
| | Sec. (a) 2000 Ω |
| | (b) 2500 Ω |
| T2 | Prim. 470 Ω |
| | Sec. 0.21 Ω |

# B25 CIRCUIT DIAGRAM AND DATA

All Resistances in ohms and capacities in microfarads unless otherwise stated.

MURPHY RADIO LIMITED,
WELWYN GARDEN CITY, HERTS.