Kolster-Brandes "Rejectostat" Receivers

Models K-B 888, K-B 888A, K-B 888B, and K-B 888C

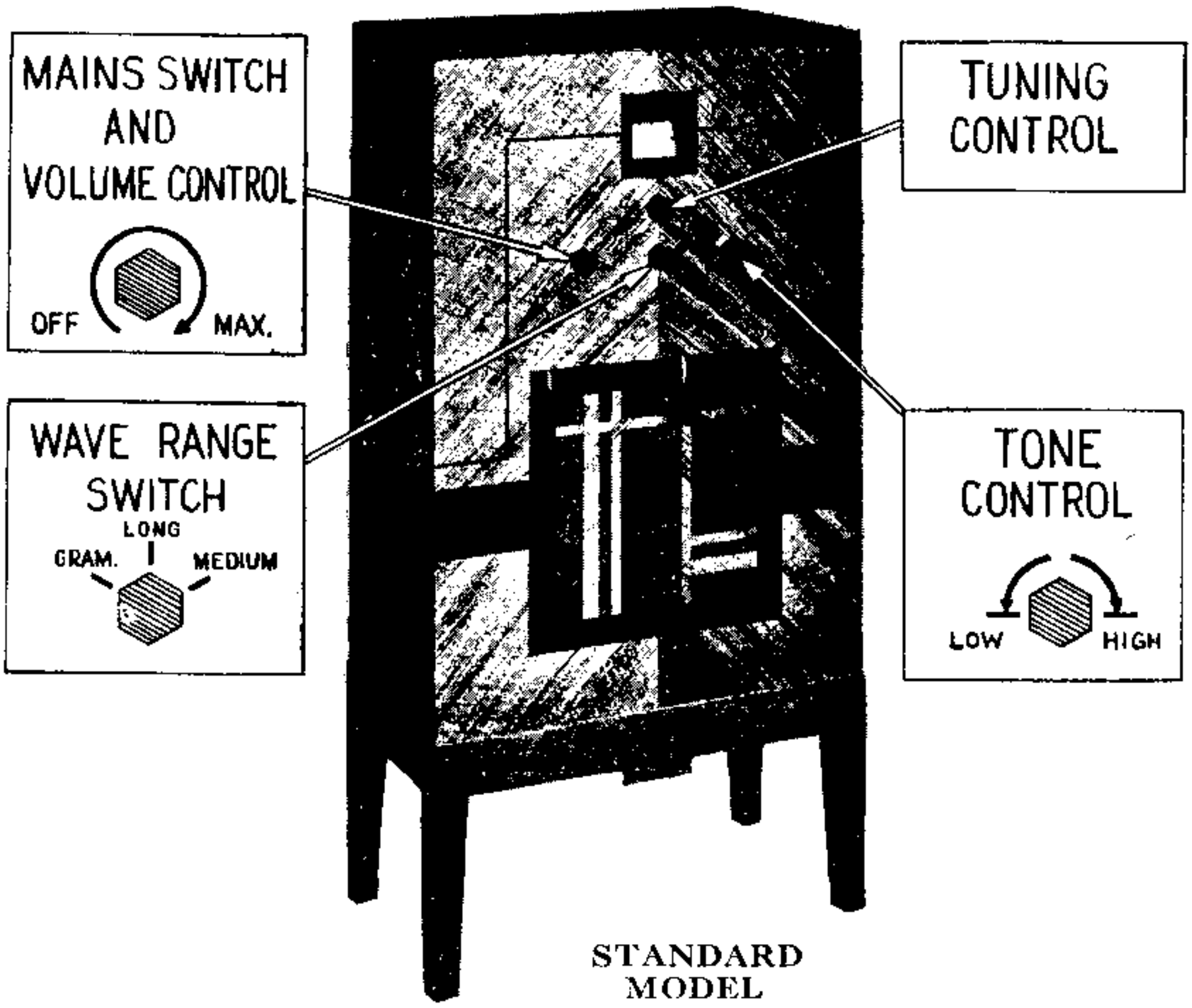
1. SPECIFICATIONS

1.1. ELECTRICAL SPECIFICATION

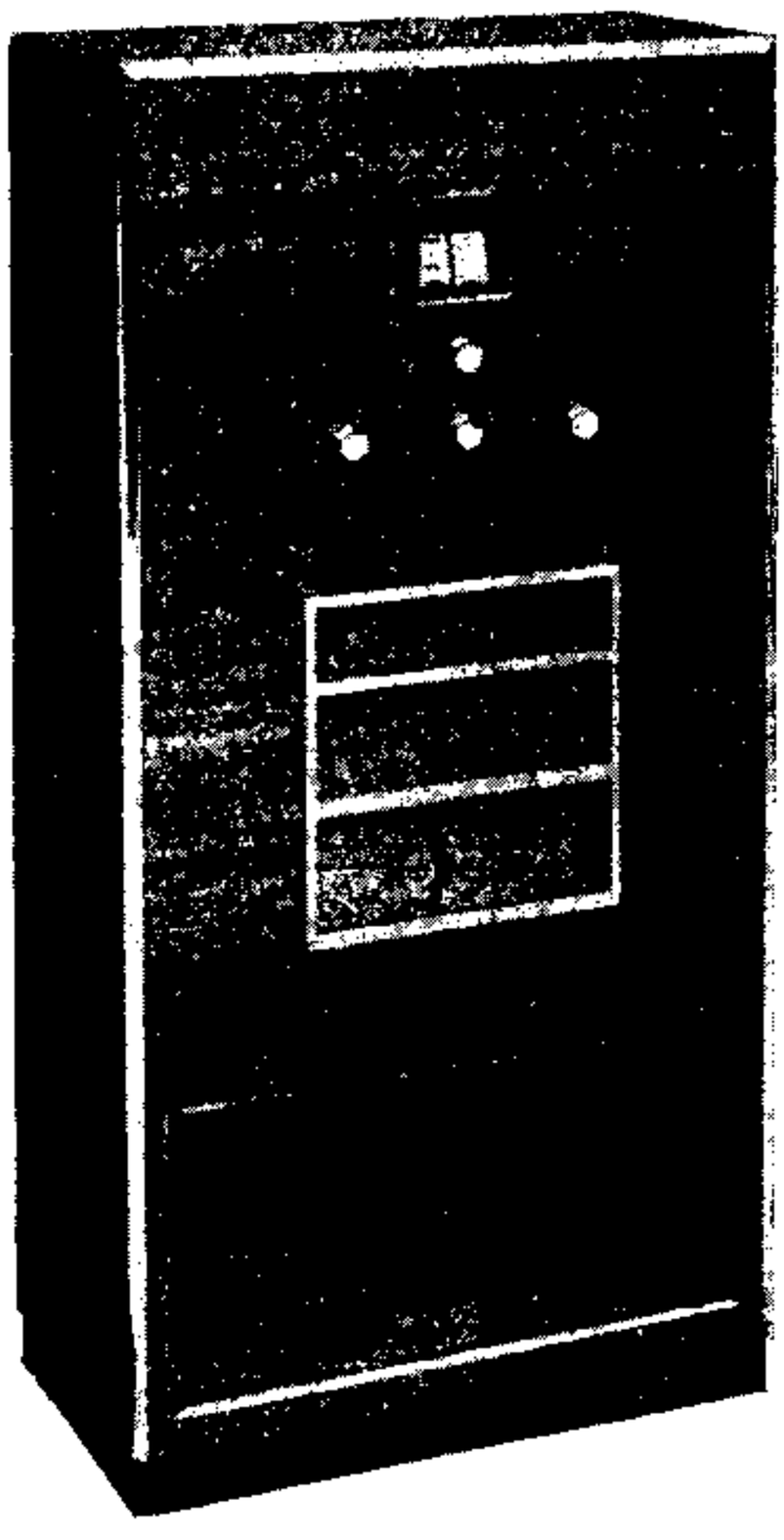
Voltage Rating	K-B 888 and K-B 888B ...	...	200-250 volts.
	K-B 888A and K-B 888C	...	100-130 volts.
Frequency Rating	... ...	...	40-100 cycles per second. (Special models for 25-40 c.p.s. are specially marked.)
Power Consumption	... ...	...	90 watts.
Recommended aerial length	... ...	...	75-100 feet with "Rejectostat" system.
Type of circuit	... ...	...	A.C. double detection Super-het., using 3 H.F. pentodes, double-diode-triode, diode-tetrode and 2 output pentodes in push-pull.

Types and Numbers of Valves :—

Code	Purpose	Micromesh	Mazda	Mullard	Osram	Cossor	Philips
V1	High-frequency amplifier ...	9.A.1.	—	V.P.4.	V.M.P. 4	MVS.Pen.	E.447
V2	Detector-oscillator	8.A.1.	AC/S2/Pen. (met.)	S.P.4. (met.)	—	MS. Pen. (met.)	E.446
V3	Intermediate frequency amplifier	9.A.1.	—	V.P.4.	V.M.P. 4	MVS.Pen.	E.447
V4	Inter-channel noise suppression ...	—	—	S.D.4.	—	—	—
V5	2nd detector and 1st L.F. amplifier	11.A.2.	—	T.D.D.4	M.H.D.4	D.D.T.	—
V6 V7	Output pentodes	7.A.2.	—	Pen. 4.V.A.	M.P.T. 4	MP.Pen.	—
V8	Rectifier	R.3.	UU.120/350	D.W.3.	U.12.	442.B.U.	1807



STANDARD MODEL



THE CONTROLS OF THIS RECEIVER ARE IDENTICAL WITH THOSE OF THE STANDARD MODEL.

DE LUXE MODEL

Fig. 1

Number of high-frequency stages	One.
Input circuit	Tuned.
Type of detector-oscillator	H.F. pentode.
Number of Intermediate stages	One.
Number of I.F. transformers	Two.
Type of 2nd detector and automatic volume control	Diode.
Number of L.F. stages	Two.
Type of rectifier	Full-wave Thermionic.
Type of loudspeaker	11″ (280 m.m.) diameter excited moving-coil.
Undistorted output	5 watts.
Sensitivity	Better than 10 microvolts.

1.2. PHYSICAL SPECIFICATION

	"Standard" Model		"De Luxe" Model	
Height	41¾″	1 m. 060	43″	1 m. 092
Width	21½″	546 m.m.	21½″	546 m.m.
Depth over knobs	12¾″	324 m.m.	12¾″	324 m.m.
Nett weight	74 lbs.	33 kilo. 560	78 lbs.	35 kilo. 380
Weight, packed for delivery ...	112 lbs.	50 kilo. 800	116 lbs.	52 kilo. 620
Weight, packed for export ...	151 lbs.	68 kilo. 500	155 lbs.	70 kilo. 300

1.3. FEATURES

These Kolster-Brandes "Rejectostat" Receivers, models K-B 888, K-B 888A, K-B 888B and K-B 888C, are radio receivers of the console cabinet type, employing a modern super-heterodyne circuit. "Standard" models have medium-toned walnut cabinets, black fittings and short legs, while "de luxe" models have natural walnut cabinets with chromium-plated fittings. The latter cabinets are to the design of Betty Joel Limited, the well-known modern furniture designers.

Some of the outstanding features of these models are :—

(1) The elimination of electrical interference due to complete screening and the use of the "Rejectostat" aerial system.

(2) Diode second-detection.

(3) Automatic Volume Control.

(4) Variable inter-channel noise suppression (Q.A.V.C.).

(5) Double-tuned intermediate frequency circuits in band-pass arrangement.

(6) Continuously variable Tone Control.

(7) Automatic Tone Compensation.

(8) Push-pull output pentodes.

(9) 11″ diameter loudspeaker, output 5 watts.

(10) Arranged for operation with K-B 357 Short-wave Converter, which may be left permanently connected.

(11) Arranged for operation from Gramophone pick-up, which may be left permanently connected.

(12) Sensitivity and selectivity more than adequate for any ordinary purpose.

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2. ELECTRICAL DESCRIPTION OF CIRCUIT

2.01. AERIAL AND HIGH-FREQUENCY CIRCUIT

The aerial is coupled to the tuned grid circuit of the high-frequency amplifier valve, a variable slope H.F. pentode (V1), through a special coupling winding having a high impedance. This winding has no chassis connection, and is connected to the Receiver "Rejectostat" if the latter is used.

2.02. OSCILLATING FIRST DETECTOR (or Detector Oscillator)

In this receiver, a single H.F. pentode (V2) fulfils the functions of "local" or "beating oscillator," and of first detector. The output of the H.F. amplifier valve feeds into the H.F. coupling transformer, the primary of which consists of two windings inductively coupled to the long and medium wave secondary (or grid) windings. The anode circuit of the detector oscillator is tuned to both the oscillator frequency and the intermediate frequency, and oscillation is maintained by virtue of coupling between the anode and cathode circuits.

2.03. INTERMEDIATE FREQUENCY AMPLIFICATION

Another variable slope H.F. pentode valve (V3) is used in a single stage I.F. amplifier. Two I.F. transformers tuned to 130 kc/s. are used in a band-pass arrangement, which gives a flat top selectivity characteristic and makes for ease of tuning. Transmission side-bands are not destroyed with such a system, so that the high musical tones are reproduced clearly, giving very pleasant tone quality.

Both the primary and secondary windings of the I.F. input transformer are tuned. The I.F. output transformer has one primary and two secondaries, all three being tuned. This extra secondary winding is to supply the auxiliary second detector which is part of the Inter-channel Noise Suppression Circuit.

2.04. SECOND DETECTOR AND AUTOMATIC VOLUME CONTROL

Second detection is obtained at the diode portion of the double-diode-triode (V5), the two diode anodes being in parallel. Automatic volume control action is realized by applying the voltage drop across fixed resistances in this circuit to the bias on the H.F. and I.F. amplifiers.

The output of this stage is resistance-capacity coupled to the grid of the triode portion of the same valve.

2.05. INTER-CHANNEL NOISE SUPPRESSION CIRCUITS

As already mentioned, the I.F. output transformer has two secondary windings. One is connected to the second detector (2.04) and the other is connected to the diode portion of the diode-tetrode valve (V4) used for the Inter-channel Noise Suppressor. The rectified output of this auxiliary second detector is fed on to the control grid of the tetrode portion of the same valve, and the anode of this section is connected to the biassing circuit of the triode which acts as the first L.F. stage (2.06).

The principle of operation is thus :—

(a) When a carrier-wave is being received, rectification of the modulated I.F. takes place in both the second detector (diodes of V5) and the auxiliary-second-detector (diode of V4). The former feeds the L.F. stages of the receiver and the latter applies a potential to the control grid of the tetrode portion of V4, so arranged that no current flows in the tetrode anode circuit of V4. When no current flows in a circuit, it may be considered as disconnected and accordingly there may be considered no connection between the tetrode-anode circuit of V4 and the grid circuit of V5. Therefore L.F. amplification takes place in the triode portion of V5 in the usual manner.

(b) When no carrier-wave is being received, however, the A.V.C. raises the sensitivity of the I.F. and H.F. stages to maximum, with the result that "mush," and other parasitic disturbances would produce considerable noise from the loudspeaker. There being no carrier-wave, however, there is no steady rectified output from the auxiliary-second-detector applied to the tetrode control-grid, so that a heavy current flows in the tetrode anode circuit which includes the triode grid bias resistance (R2.) This results in the bias on the triode becoming such that no amplification takes place and the L.F. end of the receiver becomes "dead."

The receiver is, therefore, silent unless a carrier-wave of definite intensity is being received, and the intensity necessary to operate this device is controllable by varying the screening-grid potential of the tetrode, which is accomplished by the "Suppressor Control" (VR2.)

The result is that one may adjust the suppressor so that the circuit allows the reception of the weakest station having "programme value," or which it is desired to receive, whereupon reception of this and of any other more powerful station will not be affected, but should the tuning control be set between two stations (as when tuning) or for a very weak station, the receiver will be absolutely silent.

A refinement is that the suppressor is arranged to silence the receiver unless the tuning is set accurately on the carrier-wave of a transmission, so that the characteristic thin, weak reproduction experienced when a receiver with A.V.C. is tuned on one of the sidebands of a station is impossible.

2.06. FIRST L.F. STAGE

This comprises the triode portion of the double-diode-triode (V5), and is transformer coupled to the output stage. This transformer is mounted on the framework of the loudspeaker.

2.07. OUTPUT STAGE

Two of the new high-voltage steep-slope pentodes (V6 and V7) are used in "push-pull" for this stage. An impedance-matching output transformer (also mounted on the loudspeaker frame) couples this stage to the dynamic speaker, and the undistorted power output is of the order of five watts.

2.08. MANUAL VOLUME CONTROL

The volume control is a tapped 0.5 megohm variable resistance in the resistance network between the diode portion and the triode portion of V5. This control acts as a potentiometer, and varies the input voltage to the triode grid. The mains-supply "on-and-off" switch is ganged to this manual volume control in the usual manner, and the automatic tone compensation circuit is connected to the tap on the potentiometer.

2.09. AUTOMATIC TONE COMPENSATION

When the volume of the output of a radio receiver is reduced with the manual volume control, the quality appears to suffer, the very high and very low notes being lost. This is actually not a fault of the receiver, but is due to the fact that the human ear is less sensitive to these frequencies than to the middle frequencies when the sound is weak. By means of the special circuit connected to the tap in the volume control, the middle frequency notes are attenuated more quickly than the high and low, with the result that the quality appears to the ear to remain unchanged while the level changes. A series tuned circuit, resonating at approximately 1,000 cycles per second, connected between the volume control tap and chassis produces this effect.

2.10. TONE CONTROL

A seven-step condenser type tone control, having a capacity range of 50-2,500 micro-microfarads, in series with a resistance of 150,000 ohms, is used. Although variable in steps its action is extremely smooth, affords a very wide control of tone, and appears continuously variable. It is connected between the control-grids of the two output valves (V6 and V7).

2.11. GRAMOPHONE REPRODUCTION

Any normal pick-up is suitable for use with this receiver, and it may be left permanently connected to the two appropriate terminals on the back of the set. No extra volume control is required, as when the receiver is switched to the gramophone position the volume control and the tone control remain in circuit, and the automatic tone compensation circuit also operates.

2.12. SMOOTHING CIRCUIT

Adequate smoothing is obtained by using three eight-microfarad dry electrolytic condensers, an iron-cored choke and the field coil of the dynamic speaker. This arrangement results in an output practically devoid of hum. A full wave rectifier valve supplies the necessary anode and grid voltages.

3. INSTALLATION NOTES

It is assumed that careful reference has been made to the instruction booklet accompanying every Kolster-Brandes receiver, as it will appreciably assist the user of the receiver in installing it and operating it correctly.

3.1. AERIAL AND EARTH

These receivers are specially designed for use with the Kolster-Brandes "Rejectostat" aerial system. They will, of course, operate equally well with conventional aerial systems; but when electrical interference is present, noise-free reception can only normally be obtained by the use of the "Rejectostat" system. In either case, the longer and higher the aerial, the better will be the signal-to-noise ratio and general performance. If used with the "Rejectostat" Aerial System, it is only necessary to plug the Receiver "Rejectostat" into the triple socket panel at the back of the chassis after erection of the aerial system (see the "Rejectostat" section of this Manual).

When a conventional open aerial and earth are used, connect the aerial lead-in to socket "A" and the earth wire to both sockets "C" and "E."

3.2. MAINS TRANSFORMER

All models are delivered with the mains transformer tapped for the highest voltage. If the supply is of lower voltage, remove the fuse assembly and re-insert it in accordance with the table below.

Models	For mains voltage Between	And	Plug into socket marked
K-B 888 & K-B 888B	236	250	245
	216	235	225
	200	215	205
K-B 888A & K-B 888C	121	130	125
	111	120	115
	100	110	105

3.3. CONNECTING AN ADDITIONAL LOUDSPEAKER

An additional loudspeaker may be operated from any K-B 888 type receiver, if desired. A good permanent-magnet moving-coil speaker should be employed and NO OUTPUT TRANSFORMER MUST BE USED. The speech coil of the speaker must possess an impedance of not less than 2 ohms and may, with advantage, have a somewhat higher impedance of any value up to 7 ohms. This value should be ascertained from the makers or suppliers before purchasing.

ALWAYS SWITCH THE RECEIVER OFF BEFORE MAKING OR BREAKING LOUDSPEAKER CONNECTIONS.

Two small wander plugs should be attached to the connecting leads from the speech coil of the additional speaker and, if it is desired to operate the additional loudspeaker only, remove the plug from socket "D" (see Fig. 2) and leave it disconnected, taking care that it does not make contact with any other sockets or metal parts of the speaker. The two plugs connected to the additional speaker should then be plugged into sockets "C" and "E" in the loudspeaker terminal board.

If it is desired to operate the two loudspeakers simultaneously, insert the additional speaker plugs into sockets "C" and "D" leaving the internal speaker plug disconnected.

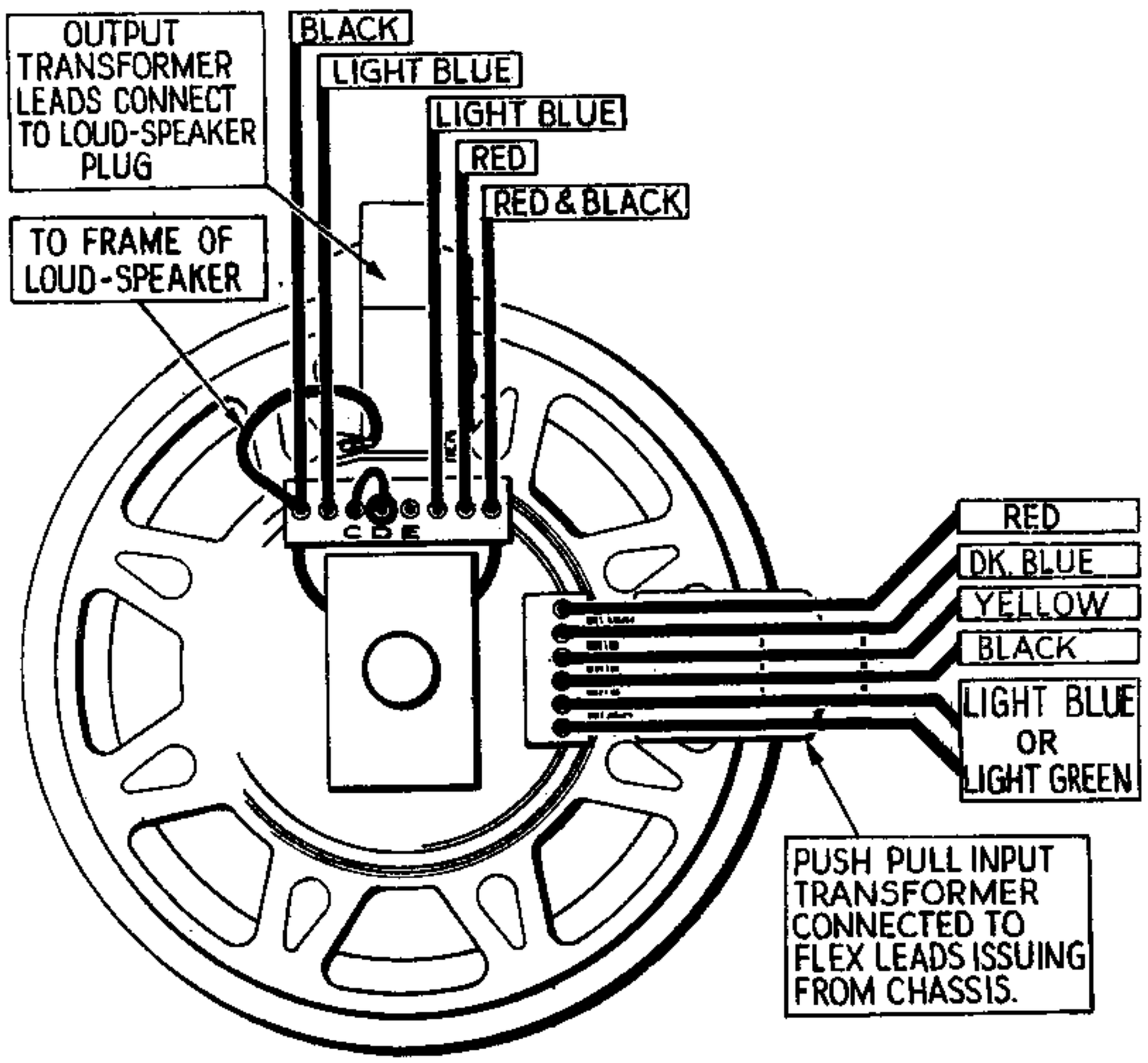


Fig. 2
Connections to Loudspeaker.

3.4. FUSE

Should the fuse burn out, it may be replaced by removing the fuse assembly from the chassis and pulling the two halves apart. A new cartridge may then be inserted. The ratings are as follows :—

K-B 888 and K-B 888B	1,500 m.a.
K-B 888A and K-B 888C	2,000 m.a.

3.5. USE WITH SHORT-WAVE CONVERTER

These receivers are suitable for use with the K-B Short-Wave Converter, type K-B 357 (see paragraph 5 of General Section).

4. SERVICE DATA

4.01. VOLTAGE, CURRENT AND RESISTANCE TABLES

The voltages, currents and resistances given in the following table were measured with a "Weston" model E.665 Selective Analyser, and the three input sockets of the receiver were all short-circuited together throughout the measurements. The volume-control was kept in the maximum position.

D.C. Resistance of Coils, Etc.

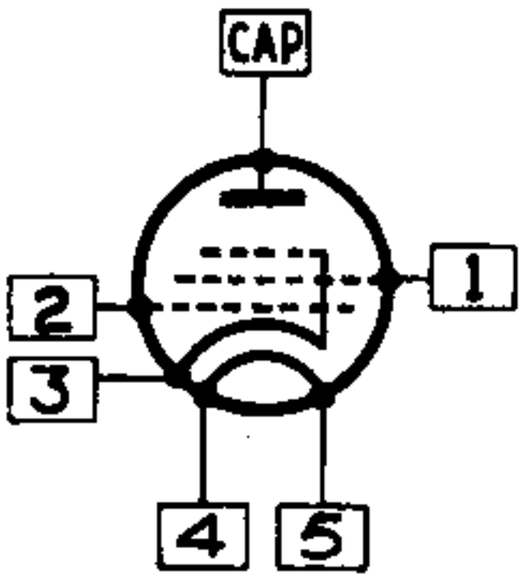
Coil	Winding	Tags	Resistance
L1	Aerial coupling	A.D.	20 ohms
	M.W. grid	B.F.	4 „
	L.W. „	K.H.	20 „
L2	L.W. primary	D.A.	8 „
	M.W. „	I.E.	2 „
	M.W. secondary	B.F.	4 „
	M.W. „ (grid tap) ...	C.B.	2 „
	L.W. „	K.H.	14 „
L3	M.W. cathode	D.A.	2 „
	L.W. „	I.E.	2 „
	M.W. anode	B.F.	4 „
	L.W. „	K.H.	14 „
L4	Primary	G.H.	57 „
	Secondary	D.E.	57 „
L5	Primary	G.H.	57 „
	Secondary	D.E.	57 „
	Suppressor	A.B.	57 „
L6	Auto. tone compensation choke	—	1,100 „
L7	Smoothing choke	—	90 „
L8 Output transformer ...	Primary (centre tapped) ...	—	150+150 ohms.
	Secondary	C.E.	1 ohm
L9 Intervalve transformer ...	Primary	—	1,900 ohms
	Secondary (1)	—	4,000 „
	„ (2)	—	4,000 „
Loudspeaker ...	Field coil	—	1,350 „
	Speech coil	D.E.	8 „
Mains transformer ...	Primary common to 245v. tap	—	22 „
	„ „ „ 225v. „	—	20 „
	„ „ „ 205v. „	—	18 „
	Secondary	Between anodes of V8	250 „

VOLTAGES AND CURRENTS

VALVE	Chassis [EARTH] to :—				Anode Current [Cap]	Priming Grid Current [1]
	Anode [Cap]	Priming Grid [1]	Control Grid [2]	Cathode [3]		
V1	200v.	43v. (250v. range)	0	2.2v. (10v. range)	0.2 m.a.	0.1 m.a.
V2	200v.	40v. (250v. range)	0	2.2v. (10v. range)	0.7 m.a.	0.3 m.a.
V3	200v.	110v. (250v. range)	0	2.2v. (10v. range)	1.5 m.a.	1.3 m.a.
	This valve must be decoupled during measurement by connecting a condenser of 0.1 microfarad between the disc carrying the anode connection and chassis.					
	Tetrode Anode [Cap]	Screening Grid [3]		Cathode [6]	Anode Current [7]	Screening Grid Current [3]
V4 control at MAX ...	—5.0v.	— 90v. (250v.	—110v.	—110v.	0	0.3 m.a.
V4 control at MIN. ...	—2.5v.	—110v. range)			0.7 m.a.	0
	Triode Anode [7]	Diode Anode [1]	Diode Anode [3]			
V5	130v.	—0.3v.	—0.3v.	0	1.0 m.a.	—
		Priming Grid [3]	Control Grid [2]			Priming Grid [3]
V6	270v.	285v.	0	18v.	34 m.a.	8 m.a.
V7	270v.	285v.	0	18v.	34 m.a.	8 m.a.
V8	Anode [1] to Anode [2] 680v. A.C.	—	These two readings will flicker due to A.C.		Anode Current [1] D.C. 28 m.a.	Anode Current [2] D.C. 28 m.a.

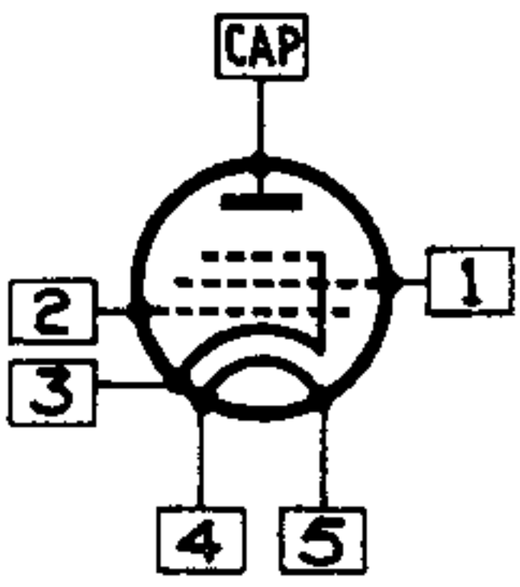
In order to facilitate the actual measurements when using the "Weston" Selective Analyser, the diagram opposite indicates the numbering of the electrodes of the various valves corresponding to the numbers on the contact jacks of the socket selector.

It is only necessary, however, to insert the meter leads into the contact jacks bearing the numbers indicated within square brackets in the table above. "CAP" indicates the connection at the top of the glass envelope of a valve, and "EARTH" refers to two contact jacks on the socket selector which can be connected to the chassis under test by means of a clip-lead provided.



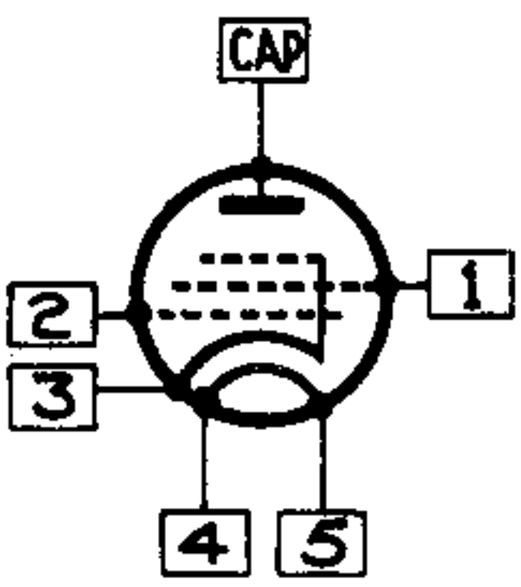
I H. HF. PENTODE

V1



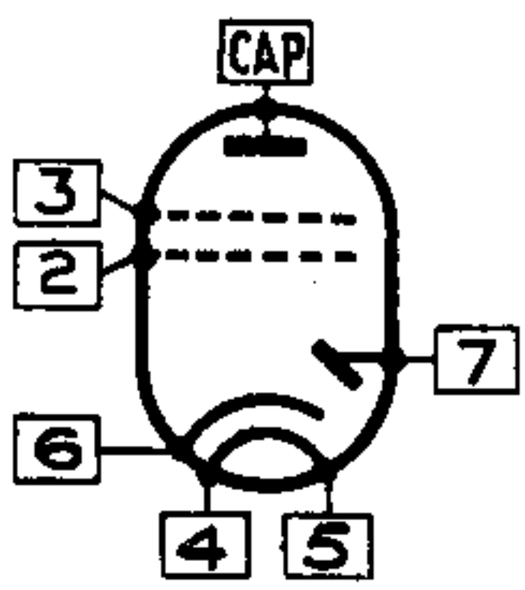
I H. HF. PENTODE

V2



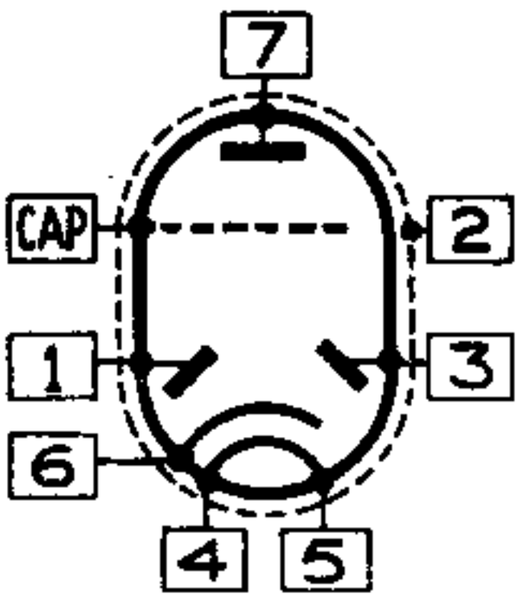
I H. HF. PENTODE

V3



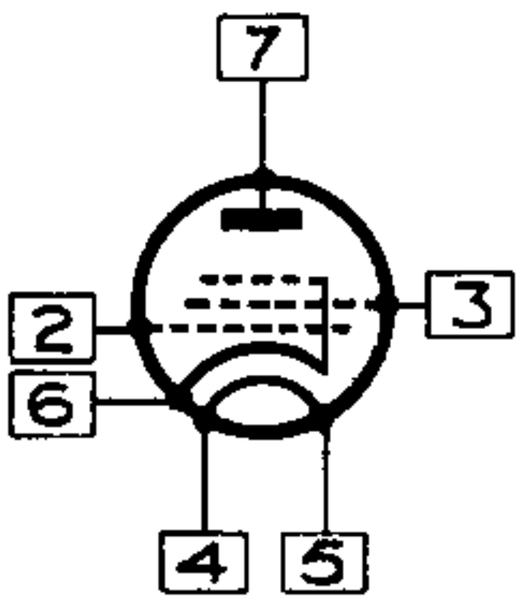
I H. DIODE-TETRODE

V4



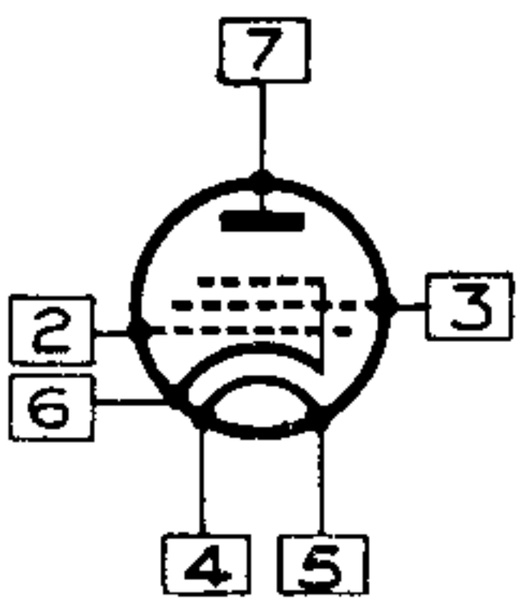
I H. DOUBLE-DIODE TRIODE

V5



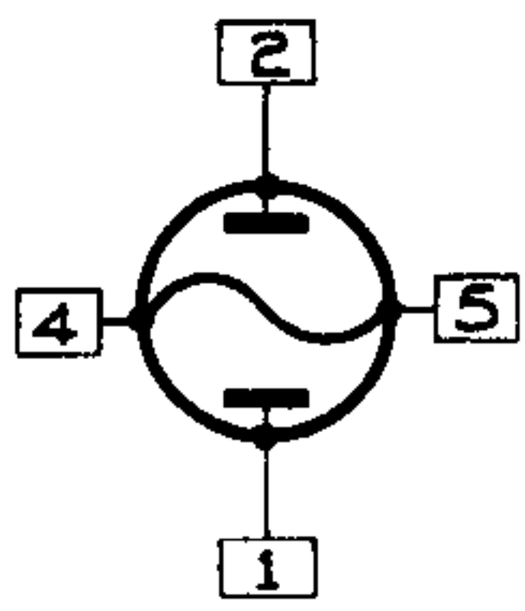
I H. L F. PENTODE

V6



I H. LF. PENTODE

V7



FULL WAVE RECTIFIER

V8

Key to Numbering of Valve Electrodes.

4.02. WIRING

The wiring is carried out in accordance with the scheme described in paragraph 3.5 of the General Section, except for the flexible leads to the Push-pull Input Transformer mounted on the loudspeaker frame; the colour-code for which is indicated on the Circuit Diagram, and also in Fig. 2.

4.03. DIAL ILLUMINATING LAMPS

Two of these are used, one illuminating the L.W. side of the tuning scale and the other the M.W. side; the appropriate lamp being brought into action by the wavechange switch. In the gramophone position, both lamps are extinguished.

The lamps are held in small screw-type holders mounted on a pivoted bracket, which may be swung out of the tuning-drum from the rear of the receiver in order to replace the lamps.

These lamps are 5.5 volts. 0.3 amp. rating, and only similar lamps should be used in replacement.

4.04. MAINS TRANSFORMER

Should it ever be necessary to change the mains transformer, this is easily accomplished by cutting off the leads about $\frac{1}{2}$-inch from the soldered ends and removing the nuts which hold it to the chassis. When refitting the new one, take care to replace the lead strips and to tighten the nuts thoroughly, as otherwise vibration of the laminations, resulting in hum, will occur.

The colour of the remaining short lengths of wire will ensure that the connections are correctly remade.

4.05. GANG CONDENSER

To prevent microphonicity, this unit is flexibly mounted on rubber pads (see paragraph 3.1 General Section).

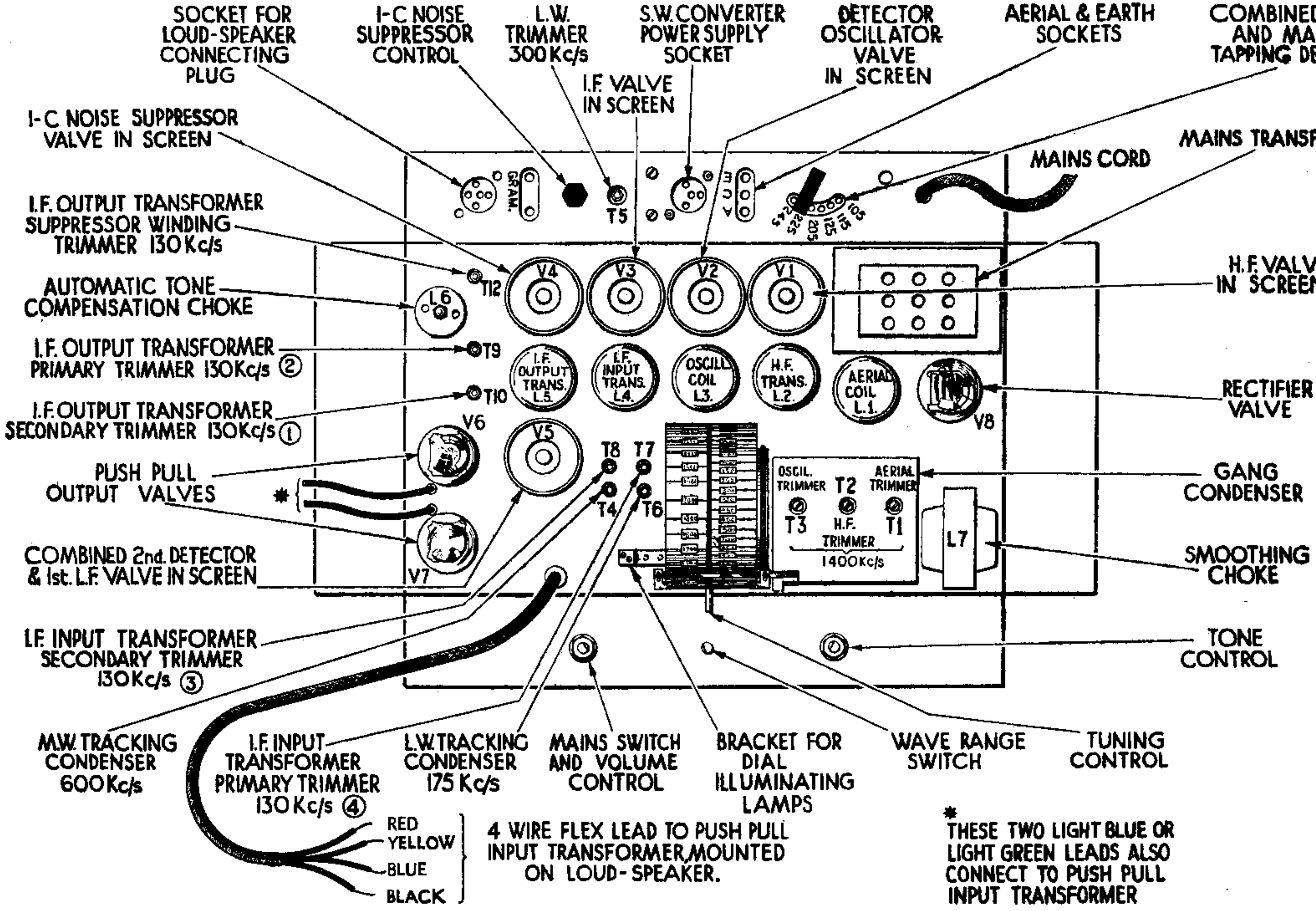


Fig. 3

View of top of Chassis, with sides and ends bent outwards to indicate positions of components

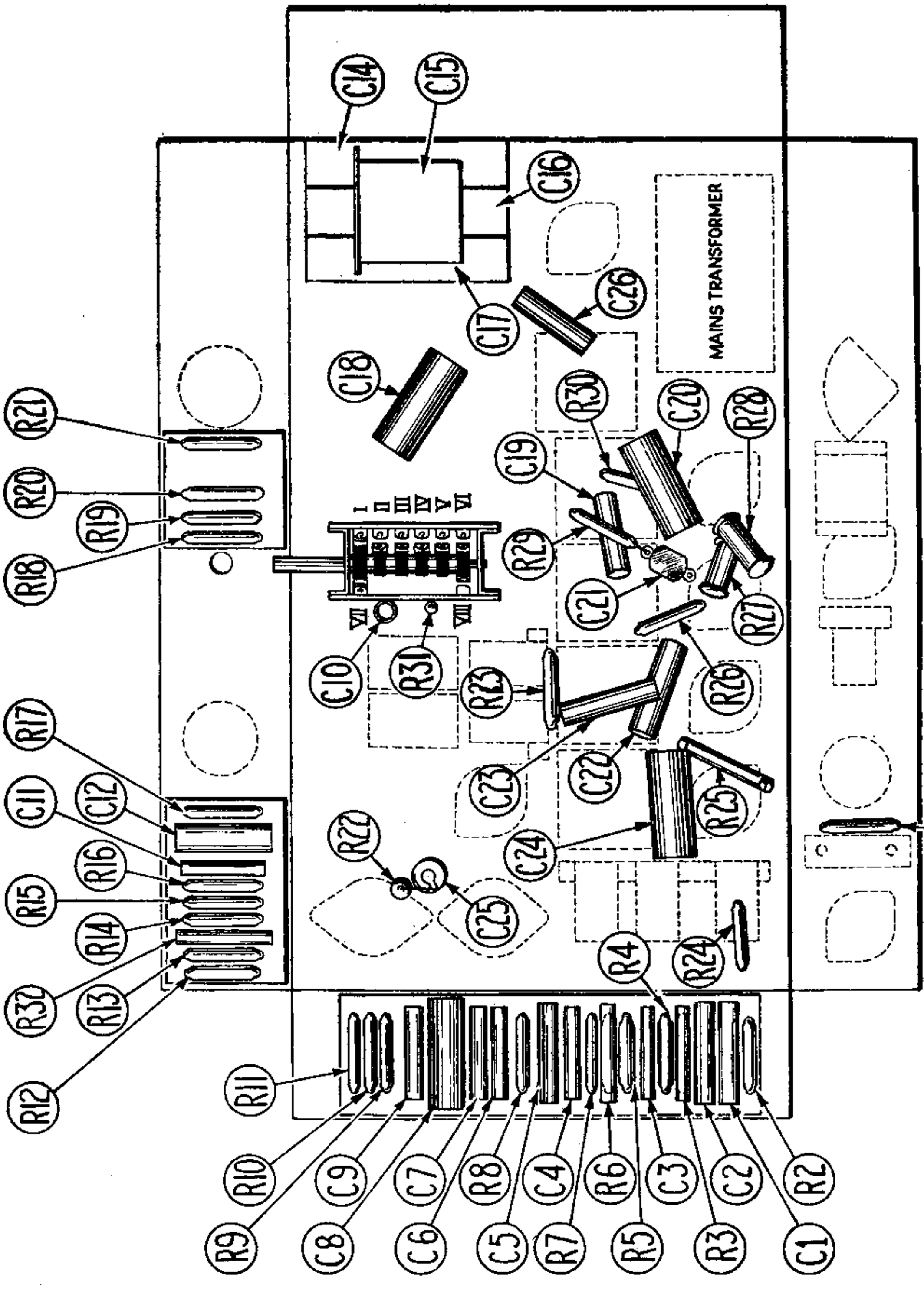


Fig. 4

View of Inverted Chassis, with sides and ends bent outward to indicate positions of resistances and condensers.

KEY TO CIRCUIT DIAGRAM

RESISTANCES

Code	Resistance	Rating
R 1	250,000 ohms	½ watt
R 2	70,000 ,,	½ ,,
R 3	4 megohms	½ ,,
R 4	250,000 ,,	½ ,,
R 5	100,000 ,,	½ ,,
R 6	250,000 ,,	½ ,,
R 7	500,000 ,,	½ ,,
R 8	100,000 ,,	½ ,,
R 9	50,000 ,,	½ ,,
R10	150,000 ,,	½ ,,
R11	4,000 ,,	½ ,,
R12	5,000 ohms	½ watt
R13	10,000 ,,	½ ,,
R14	3,000 ,,	1 ,,
R15	50,000 ,,	½ ,,
R16	50,000 ,,	½ ,,
R17	10,000 ,,	½ ,,
R18	3,000 ,,	½ ,,
R19	400 ,,	½ ,,
R20	150,000 ,,	½ ,,
R21	250,000 ,,	½ ,,
R22	250 ,,	2 ,,
R23	500,000 ohms	½ watt
R24	5,000 ,,	1 ,,
R25	100,000 ,,	½ ,,
R26	500,000 ,,	½ ,,
R27	2 megohms	½ ,,
R28	15,000 ,,	½ ,,
R29	500 ,,	½ ,,
R30	50,000 ,,	½ ,,
R31	250,000 ,,	½ ,,
R32	10,000 ,,	1 ,,

VALVES

Code	Function
V1	H.F. amplifier.
V2	Detector-oscillator.
V3	I.F. amplifier.
V4	I-C noise suppressor valve.
V5	Combined 2nd detector and 1st L.F. amplifier
V6, V7	Push-pull output valves.
V8	Rectifier.

CONDENSERS

Code	Capacity
C1	0.1 microfarad
C2	0.1 ,,
C3	0.0005 ,,
C4	0.0001 ,,
C5	0.02 ,,
C6	0.0001 ,,
C7	0.0001 ,,
C8	25 microfarad 25v. electrolytic
C9	0.006 ,,
C10	0.1 microfarad
C11	0.006 ,,
C12	0.05 ,,
C14	8 microfarad electrolytic
C15	1 ,,
C16	8 ,, electrolytic
C17	8 ,, ,,
C18	0.5 microfarad
C19	0.01 microfarad
C20	0.5 ,,
C21	0.0001 ,,
C22	0.1 ,,
C23	0.1 ,,
C24	0.5 ,,
C25	25 microfarad 25v. electrolytic
C26	0.1 microfarad

VARIABLE RESISTANCES

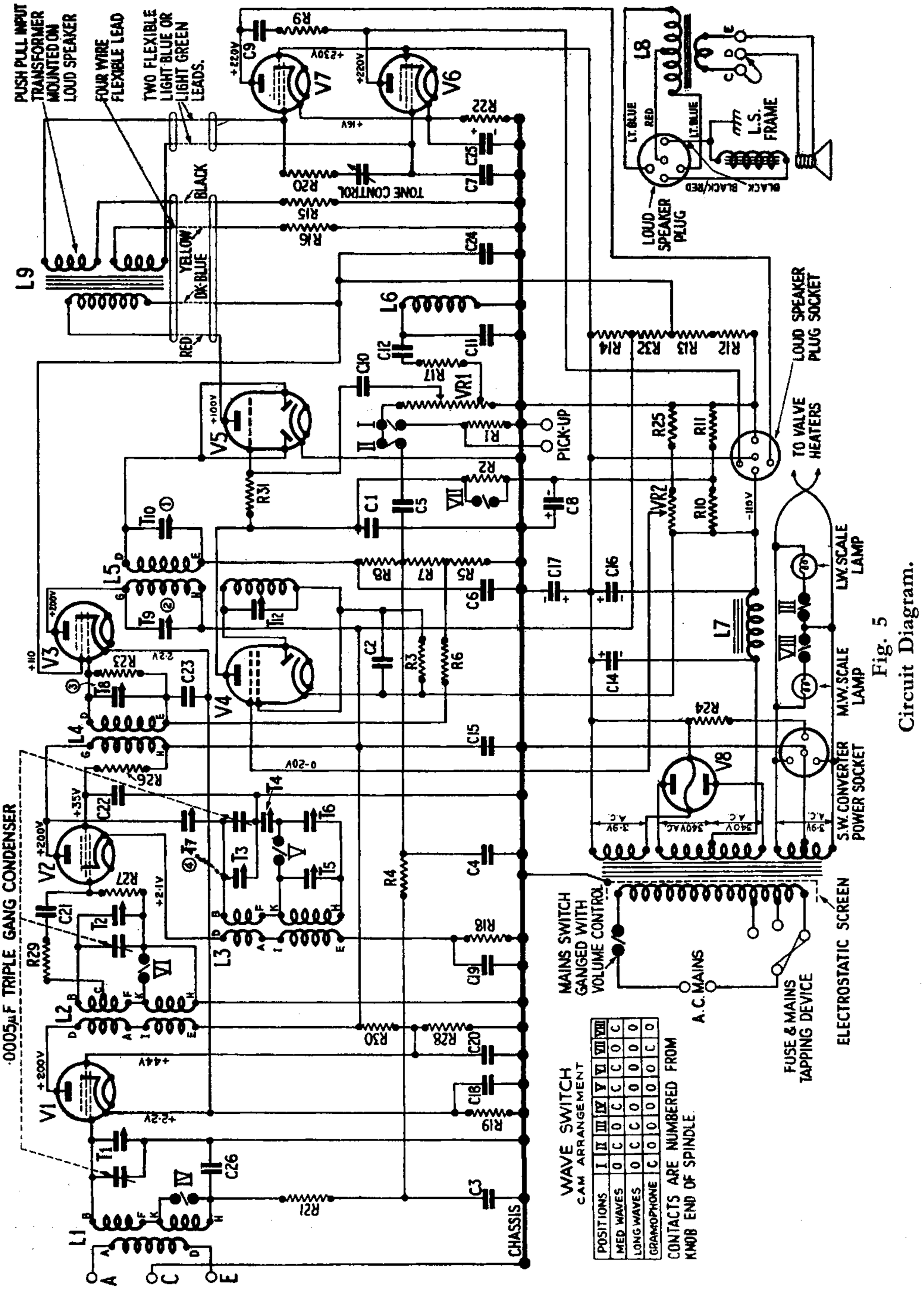
Cod	Resistance	Function
VR1	500,000 ohms ...	Volume control
VR2	20,000 ,, ...	Suppressor control

INDUCTANCES

Code	Function
L1	Aerial coil.
L2	H.F. transformer.
L3	Oscillator coil.
L4	I.F. input transformer.
L5	I.F. output transformer.
L6	Automatic tone compensation choke.
L7	Smoothing choke.
L8	Output transformer.
L9	Push-pull input transformer.

TRIMMERS

Code	Function	Trim at
T 1	Aerial trimmer	1,400 kc/s.
T 2	H.F. trimmer	1,400 ,,
T 3	Oscillator trimmer	1,400 ,,
T 4	M.W. tracker	600 ,,
T 5	L.W. trimmer	300 ,,
T 6	L.W. tracker	175 ,,
T 7	I.F. input transformer primary trimmer ...	130 ,,
T 8	,, ,, ,, secondary trimmer ..	130 ,,
T 9	I.F. output transformer, primary trimmer ...	130 ,,
T10	,, ,, ,, secondary trimmer ...	130 ,,
T12	,, ,, ,, suppressor winding trimmer	130 ,,



POSITIONS	I	II	III	IV	V	VI	VII	VIII
MED WAVES	0	C	0	C	C	C	0	C
LONG WAVES	0	C	C	0	0	0	0	0
GRAMOPHONE	C	0	0	0	0	0	C	0

Fig. 5
Circuit Diagram.

4.06. TUNING DRIVE

Should slip develop in this drive, the tension in the cord may be increased by hooking the small helical spring (visible inside the drum from behind) on to another of the three pegs on the spoke. If the limit is reached, the cord should be shortened, and the spring hooked on to the first peg.

4.07. COILS

See paragraph 3.2 of the General Section. The H.F. coils for this receiver are interchangeable with those for the K-B 666 series, and are identified by a light blue stripe on the edge of the base.
The Aerial or Preselection Coil Unit (L1) is marked with one coloured dot, the H.F. transformer (L2) with two, and the Oscillator Coil Unit (L3) with three.

4.08. TAGS ON COIL BASES

These are lettered in accordance with paragraph 3.3 of the General Section, and the letters correspond to those on the Circuit Diagram.

4.09. REMOVAL OF KNOBS

The knobs on these receivers are kept in place by internal flat springs bearing on flats on the control spindles. They are best removed by wrapping a cloth around the knob so that the cloth lies between the knob and the cabinet front and pulling.

4.10. REMOVAL OF CHASSIS

First of all remove the knobs as above, then unsolder the leads from the Push-pull Input Transformer, mounted on the loudspeaker frame. These may be recognised from Fig. 2, and care must be taken that the Output Transformer leads are not detached, as these are disconnected by removing the loudspeaker plug from the chassis.
Next, four screws which pass upwards through the chassis platform must be removed, and the chassis may then be slid out of the cabinet.

5. ALIGNMENT OF CIRCUITS

Unsatisfactory performance of this receiver due to improper adjustment of the I.F., H.F. and oscillator circuits will not be indicated by any readings obtained with a voltage and current testing set.

It is not absolutely essential that the chassis be removed from the cabinet, to adjust the trimmers, but it considerably simplifies matters to do so. The seals with initials "K-B" should also be removed.

It is essential that the operations of "lining-up" the receiver be carried out strictly in the order indicated and, unless otherwise stated, it is detrimental to the performance of the receiver to go back to an earlier adjustment once a subsequent operation has been carried out.

First, adjust the signal generator to deliver a considerable output at the intermediate frequency of 130 kc/s. and switch on the receiver with the output meter connected to the loudspeaker. Turn the waveswitch to "long waves," the volume control to maximum, the tone control fully clockwise and the suppressor control fully counter-clockwise.

Set the gang condenser to maximum capacity, verifying that the scale pointers are in line with the datum line on the drum, and take leads from the signal generator output to :—

(a) The chassis (centre socket of panel marked A.C.E.)

(b) The "junction" of R29 and C21.

Stop the local oscillation by short-circuiting the cathode windings of V2—this is most easily effected by clipping a "crocodile" clip across tags "D" and "E" (see paragraph 3.3 of the General Section) of coil unit L3.

PROCEDURE

(1) Unscrew (counter-clockwise) the four I.F. trimmers, T7, T8, T9 and T10 until they are quite loose and the minimum capacity is reached.

(2) Screw (clockwise) the trimmer, T10, marked 1 on the top view of the chassis (Fig. 3) until a maximum output is indicated.

(3) Adjust T9 (marked 2), in exactly the same way.

(4) Repeat for T8 (marked 3).

(5) And for T7 (marked 4).

No deviation from this order is allowable and once any of these trimmers has been set, it must be left, because it is in this way that the band-pass characteristic of the intermediate frequency amplifier is achieved.

(6) Remove the short circuit from the cathode winding.

(7) Adjust the signal generator to 1,400 kc/s. and apply the output to the sockets marked "A" and "E" of the triple socket panel.

(8) Turn the waveswitch to "medium waves" and set the gang condenser so that the scale pointer is in line with the mark "S.W. Converter."

(9) Fully unscrew, counter-clockwise, the oscillator trimmer (T3) and fully screw down, clockwise, the high-frequency (T2) and aerial trimmer (T1). All three are to be found beneath holes in the top of the gang condenser (see Fig. 3).

(10) Now screw down the oscillator trimmer until a signal is received and adjust for the greatest output.

CAUTION.—Care must be taken when screwing down that a weak signal is not missed, as it is possible to receive a signal in two positions of this trimmer, the first reached when screwing clockwise is the required beat, the other is the "second channel."

(11) Unscrew the high-frequency stage trimmer to give the highest output.

(12) Adjust the aerial trimmer similarly.

(13) Return to the oscillator trimmer and attempt to increase the output by a small adjustment of this.

(14) Tune the signal generator to 600 kc/s. and tune in to this by the tuning control of the receiver.

(15) Adjust the medium wave tracking condenser (T4), for the best output, at the same time moving the tuning control of the receiver to and fro with a rocking motion to get a final reading. Set the pointer so that 500 metres is indicated.

(16) Repeat operations (7) to (13) and attempt to get an improvement by a slight adjustment.

(17) Switch to "long waves" and turn tuning control until 1,000 metres is indicated.

(18) Adjust the signal generator to 300 kc/s. and tune in to it by means of the **longwave trimmer (T5).**

(19) Adjust the signal generator output to 175 kc/s. and tune in to it by means of the receiver tuning control.

(20) Adjust for highest output by the long-wave tracking condenser (T6), at the same time rocking the tuning control to and fro to find the best position. Make an adjustment of the pointer if necessary. 175 kc/s. corresponds to 1,714 metres.

(21) Adjust the signal generator to 300 kc/s., adjust the tuning control so that 1,000 metres is indicated and see whether an improvement can be made by slightly readjusting the long-wave trimmer (T5).

N.B.—Always work with the intensity of the output of the signal generator as low as possible, as in this way the accuracy of adjustment will be augmented.

6. COMMON TROUBLES

6.1. NON-ALIGNMENT OF CIRCUITS

This shows up as lack of sensitivity and/or selectivity at certain parts of the tuning-range. The remedy is to line up the circuits as described above.

6.2. MISADJUSTMENT OF INTER-CHANNEL NOISE SUPPRESSOR

If the variable control is turned too far clockwise (looked at from the rear of the cabinet) then only the most powerful stations will be received. If it is turned completely counter-clockwise, the Suppressor circuit becomes inoperative. Some position between these is easily found which allows of reception of the weakest station which has "programme value" but which suppresses the unwanted "mush" between stations.

If the Suppressor trimmer T12 is incorrectly adjusted, the cut-off will be more sudden on one side of a station than on the other ; and the apparent position for resonance (that is, the best position of the tuning to receive a station) will vary with the setting of the Suppressor control VR2.

To adjust the Suppressor trimmer, tune the receiver to a fairly weak transmitter, turn the suppressor control clockwise until the station is just cut out, and adjust the trimmer to bring it in again at maximum strength. Now just cut it out again with the control and again adjust the trimmer to bring it back again. Continue until the best adjustment is found, so that with the control set so that the station is just received, a small adjustment of the trimmer in either direction will cut it out.

6.3. INSTABILITY

This causes continuous whistling, howling, or "motor-boating," and is almost always due to an open-circuited or disconnected by-pass condenser, particularly C18, C20, C22, C24, C7 or C15.

A faulty valve in the H.F. or I.F. positions also gives this effect.

If the instability only occurs at the bottom of "medium waves," incorrect adjustment of the oscillator or H.F. trimmers is a possible cause.

6.4. MICROPHONICITY

This is a howl set up at high volume levels due to acoustic feed-back, and in its less acute forms only causes "boomy" or indistinct reproduction, especially of speech.
Its commonest causes are :—

(1) Defective valves.
(2) Tuning condenser not sufficiently freely mounted (see that packing between condenser and cabinet has been removed).
(3) Faulty loudspeaker.

6.5. "NOISY BACKGROUND"

When using a sensitive receiver fitted with automatic volume control, a "noisy-background" will frequently be experienced if the "pick-up" of the aerial is insufficient. The remedy is to arrange a higher or longer aerial—the bigger the better. If the Suppressor is incorrectly adjusted considerable noise will be received between stations, because the A.V.C. will raise the sensitivity of the set to its maximum, whatever the position of the manual volume control. If this noise is not reduced almost to inaudibility when a station is tuned in, then a "Rejectostat" aerial is required.

If the noise persists after removal of aerial and earth connections, the probable cause is a loose connection, either in the chassis or mains cord. Other possible causes are intermittent short-circuits in the chassis, faulty valves or the speech-coil of the loudspeaker may be touching the magnet.

Excessive valve hiss is usually due to an inadequate aerial being used, but other causes are :—

(1) Defective H.F. valve (V1).
(2) Aerial coupling coil open-circuited.
(3) Incorrect potential on priming grid of V1.
(4) R21 disconnected or open circuited.

6.6. HUM

When mains hum is present, make sure that one side of the valve heater circuit is not accidentally connected to the chassis. Alternatively, one or more sections of the triple 8-microfarads electrolytic condenser may be open-circuited, the smoothing choke (L7) short circuited, an output valve or the rectifier faulty, the coupling condenser C21 short-circuited, or the screen of a screened lead disconnected from the chassis.

6.7. FAILURE OF AN 8-MICROFARAD CONDENSER

Should the set be switched on accidentally without the loudspeaker plug in its socket, or should the plug be removed while the set is working, a very heavy over-voltage will be applied to the electrolytic condensers, which will break down. Dry electrolytic condensers are not self-healing, and a new unit will have to be fitted.

7. PRICE LIST OF SPARE PARTS

Prices, which are subject to alteration without notice, are retail, quoted delivered at Sidcup. The usual Authorized Dealers' terms apply.

DESCRIPTION	ORDER No.	PRICE
Coil assembly, Aerial coil unit L1	A.33373	6 0 each.
,, ,, H.F. transformer unit L2	A.33393	6 0 ,,
,, ,, Oscillator unit L3	A.33379	6 0 ,,
,, ,, L.F. input transformer unit L4	A.33376	5 6 ,,
,, ,, I.F. output transformer unit L5	A.33394	6 0 ,,
Mains transformer, 100-130 volts, 40-100 cycles	A.33968	1 15 0 ,,
,, ,, 200-250 ,, 40-100 ,, ...	A.33969	1 15 0 ,,
,, ,, 200-250 ,, 25-40 ,, ...	A.33958	2 5 6 ,,
Fuse holder assembly	A.33980	3 9 ,,
Fuse cartridge, 2,000 m.a. for 100-volt models	21219	6 ,,
,, ,, 1,500 m.a. ,, 200-volt ,, ...	23815	6 ,,
Fuse holder, moulded halves	33906	9 ,,
,, ,, spring catch	33962	3 ,,
,, ,, clip and pin	33905 33908	4 ,,
Dial lamp bulb	27945	9 ,,
,, ,, holder	33351	6 ,,
,, ,, bracket	33920	4 ,,
,, ,, screen	33923	3 ,,
Volume control, tapped, and with mains switch	33916	10 6 ,,
Tone control, complete	A.34290	6 0 ,,
Automatic tone compensation choke L6	A.34587	7 6 ,,
Triple gang condenser (less drive)	A.30797	1 7 6 ,,
Tracking condenser	—	4 6 ,,
I.F. trimming condenser, double	A.33888	4 6 ,,
L.W. trimming condenser	A.33889	2 6 ,,
L.W. tracking condenser	A.33976	2 6 ,,
Wavechange switch, complete, but less resistances and condensers	A.35892	6 6 ,,
,, ,, fixed contact spring	A.33365	1 3 half doz.
,, ,, moving contact spring	A.33364	1 6 ,, ,,
,, ,, locating spring	33332	4 ,, ,,
,, ,, locating pulley	33329	2 each.
Tuning scale	33932	1 9 ,,
Scale pointer	33830	5 per pair.
Pointer bracket	33832-1	4 each.
Escutcheon, black moulded type	33936	2 3 ,,
K-B medallion	34543	2 9 ,,
Knob, black moulded type, less spring	34515	9 ,,
Knob, chromium-plated type, less spring	34515-1	1 6 ,,
Spring for securing knobs	27906-1	1 6 doz.
Screening can for coils	33872	1 2 each.
,, ,, valves	34527	1 0 ,,
Fibre disc for valve terminals	34520	4 ,,
Tuning control drive spring	28515	2½ ,,
,, ,, ,, cord	32058	2½ yard.
Split-pin for tuning control spindle and wave-switch spindle	8756	3 doz.
Rubber grommet	27935	1 1 ,,

DESCRIPTION	ORDER No.	PRICE
Lead seating strips for mains transformer, long	33934	1 each.
„ „ „ „ „ short	33935	1 „
Output transformer complete	A.34480	11 6 „
Push-pull input transformer complete	A.33987	15 6 „
Loudspeaker field coil	A.34486	12 6 „
„ speech coil, spider and cone assembly ...	—	6 6 „
Smoothing choke L7	A.33981	10 6 „
Suppressor control VR2	35815	4 6 „
Loudspeaker four-pin plug	A.33881	2 6 „
Special connecting wire (specify colour) in six-yard coils ...	34614	10 „
Screened insulating sleeving	21140	7½ „
Insulating sleeving ¼" diameter	8040-1	4 „
Bare copper flex in six-yard coils	27626	1 0 per coil.
P.K. self-tapping screws No. 4 × ¼"	27718	7 doz.
„ „ „ No. 6 × ⅜"	27719	8½ „
„ „ „ No. 10 × 1"	27720	11 „
Resistances 250 ohms 2 watts	20917-25	2 3 each.
„ 3,000 „ 1 watt	20911-3	2 0 „
„ 5,000 „ 1 „	20911-5	2 0 „
„ 10,000 „ 1 „	20902-1	2 0 „
„ 400 „ ½ „	20903-4	1 6 „
„ 500 „ ½ „	20903-5	1 6 „
„ 3,000 „ ½ „	20905-3	1 6 „
„ 4,000 „ ½ „	20905-4	1 6 „
„ 5,000 „ ½ „	20905-5	1 6 „
„ 10,000 „ ½ „	20906-1	1 6 „
„ 15,000 „ ½ „	20906-15	1 6 „
„ 50,000 „ ½ „	20906-5	1 6 „
„ 70,000 „ ½ „	20906-7	1 6 „
„ 100,000 „ ½ „	20906-10	1 6 „
„ 150,000 „ ½ „	20910-15	1 6 „
„ 250,000 „ ½ „	20910-25	1 6 „
„ 500,000 „ ½ „	20910-5	1 6 „
„ 2 megohms ½ „	20904-1	1 6 „
„ 4 „ ½ „	20904-4	1 6 „
Condensers (mica and paper insulation) :—		
0.0001 microfarad (mica)	8258-1	1 0 „
0.0001 „	28323	9 „
0.0005 „	32048	1 0 „
0.006 „	33722-2	1 0 „
0.01 „	27434	1 6 „
0.02 „	33308	1 6 „
0.05 „	34530	1 6 „
0.1 „	34535	2 0 „
0.5 „	33955	2 3 „
1.0 „	32127	2 9 „
Condensers (electrolytic) :—		
25 microfarads, 25 volts, with connecting wires ...	32821-3	3 6 „
25 microfarads, 25 volts, with terminals	32821	3 6 „
8 microfarads, 450 volts...	34630	7 0 „
"Sorbo" rubber washer for gang condenser...	34633	7½ doz.
"Sorbo" rubber bush for gang condenser	34634	6½ „
Special insulated box-spanner for trimmers	—	1 6 each.

K.B SERVICE MANUAL

CHANGES AND CORRECTIONS

No. 3

Issued November, 1936

To be inserted at the front of your Service Manual, and the following alterations, corrections and additions made in the appropriate sections.

N.B.—This sheet replaces that issued in October, 1934, which should be destroyed.

PAGE.	PARAGRAPH.	DETAILS.
B 3	1.3 (3)	For "present reaction" read "preset reaction."
B 4	2.8, last line	For "20,000 ohms," read "10,000 ohms."
B 7	4.01 anode current of output pentode	For "23.0" read "33."
B 8	Fig. 3	For "Oscillator trimmer" read "aerial trimmer," and for "aerial trimmer" read "oscillator trimmer."
B 10	Key to Circuit Diagram	For "VR . . . 20,000 ohms" read "VR . . . 10,000 ohms."
C 1	1.1 Valve Table	Add VMP4 under "Osram" against "high frequency valve" and "I.F. valve."
C 5	2.09 Tone Control	For "50—2,500 microfarads" read "50—2,500 micro-microfarads."
C 10	Key to Circuit Diagram	For "C4 . . . 0.1" read "C4 . . . 0.5 . . . ."
C 10	" " " "	Add "25 volts, electrolytic" after "C6 . . . 25 microfarad."
C 10	" " " "	Delete "25v. (electro)" after C16, C17 and C18.
C 10	" " " "	After L5, for "transformers" read "transformer."
C 11	Circuit Diagram	End of aerial coupling winding joined to socket A, for "I" read "A."
C 16	7. Price List	Coil assembly, I.F. transformer unit, for "A.33396" read "A.33376."
C 17	7. " "	Special box spanner for trimmers, for "1s. 0d." read "1s. 6d."
E 9	4.01, D.C. resistance of coils	L.2 L.W. secondary K.H. for "14" read "20."
E 20	7. Price List	Coil assembly, for "L.F. input transformer" read "I.F. input transformer."
E 21	7. " "	Add "per Yard" after :— "Screened insulating sleeving 21140 . . . 7½d. . . ." and "Insulating sleeving ¼" dia. 8040-1 . . . 4d. . . ."
E 21	7. " "	Condenser, 0.0001, 28323, for "9d." read "1s. 0d."
F 14	7. " "	0.1 condenser, 34535, for "1s. 6d." read "2s. 0d."
H 11	5. " "	0.5, C2, 33955, for "2s. 6d." read "2s. 3d."
L 4	2.06 H.T. Supply	For "iron-cored choke (L6)" read "iron-cored choke (L8)."
L 5	2.09 Mains Filter	For "H.F. choke, L7 and L8," read "H.F. choke (L9) and (L10)."
L 5	3.1 Aerial and Earth	In the 4th paragraph, for "As the sensitivity cannot. . . ." read "As the selectivity cannot. . . ."
L 7	4.1 Resistance of Coils	The resistance of coils for L6, L7 and L8, to read L8, L9 and L10 respectively.
L 8	4.2 Voltages and Currents	For "Choke L6" read "Choke (L8)."
L 12	Key to Circuit Diagram	For "C20 . . . 0.0006," read "C20 . . . 0.006." (See note in paragraph 7.3.)
L 22	Key to Circuit Diagram	Delete "325v. electrolytic" after C.8. Add "325v. electrolytic" after C.10.

(Continued overleaf)

PAGE.	PARAGRAPH.	DETAILS.
L 19	Price List, triple condenser block	For "C8, C9 and C10" read "C8, C9 and C12."
M 8	Fig. 3	For "H.F. auto transformer" read "L.F. Auto transformer."
M 11	5.	For "1500 metres" read "1500 Kc/s."
P 14	Key to Circuit Diagram	R.7 and R.25 for "meghom" read "megohm."
P 16	4.03	For "postion" read "position."
P 19	6.07	For "KB.383" read "KB.383-A."
S 10	Fig. 6	C.8 is omitted from circuit diagram. This 0.1 microfarad condenser is connected between the common connection between R4 and R8 and the chassis.
S 14	5.2	The last three trimmers specified should be :— T.10 Oscillator coil long wave calibration trimmer—trim at 300 Kc/s. T.11 Aerial coil long wave calibration trimmer—trim at 300 Kc/s. T.12 Bandpass coil long wave calibration trimmer—trim at 300 Kc/s.
S 16	6.	Correction. When the link between A and B is broken, the *internal* loudspeaker is disconnected.
T 17	7.2	The last three trimmers should be :— T.10 Oscillator coil long wave calibration trimmer—trim at 300 Kc/s. T.11 Aerial coil long wave calibration trimmer—trim at 300 Kc/s. T.12 Bandpass coil long wave calibration trimmer—trim at 300 Kc/s.
T 19	8.3 External loudspeaker	The final sentence of the first paragraph under this heading should read :—"The wire connection between "A" and "G" can be replaced by an ordinary Q.M.B. on-off switch, and the internal loudspeaker can then be disconnected when and as required."
U 16	7.2	The last three trimmers should be :— T.10 Oscillator coil long wave calibration trimmer—trim at 300 Kc/s. T.11 Aerial coil long wave calibration trimmer—trim at 300 Kc/s. T.12 H.F. coil long wave calibration trimmer—trim at 300 Kc/s. In the T.2 description "H.F." should be substituted for "bandpass."
U 18	9.4 External loudspeaker	The final sentence in the first paragraph should read as correction for page T.19 given above.
V 11	7.1	Connecting an External Loudspeaker, final sentence of paragraph should read :— "The connecting tags are indicated on the diagram below."
		Please note also that in models KB.426, KB.427 and KB.428 trimmers T1, T2 and T3 are once more trimmed at 1400 Kc/s.
W 5		V.1 Anode Voltage should be 170v. (168v.).