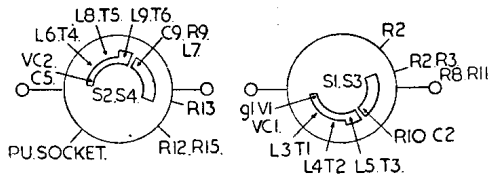
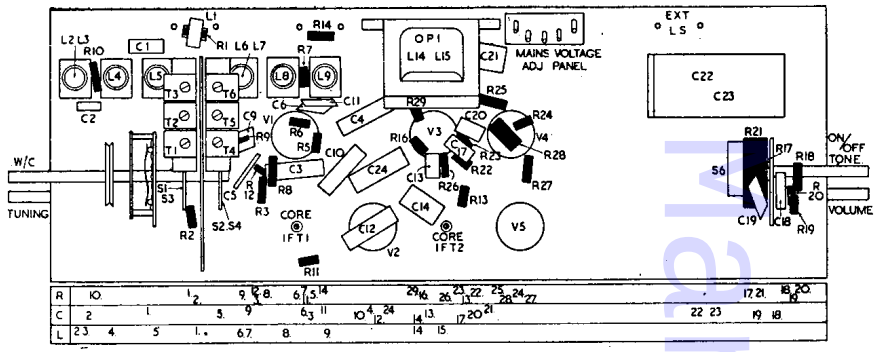
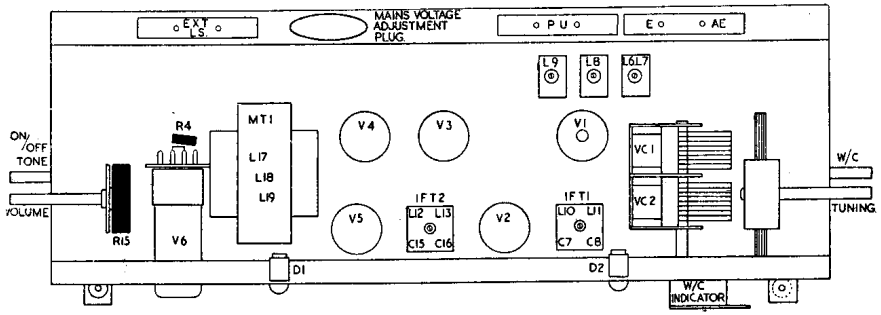
K-B MODEL ER30

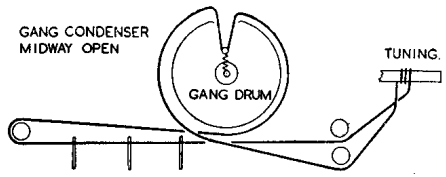
Six-valve, three-waveband superhet with sockets for low-impedance extension speaker and high-resistance moving-iron or crystal pick-up. Two-tone walnut-finished table cabinet. Suitable for use on 200-250V 50-100 c/s mains. Made by Kolster-Brandes, Ltd., Footscray, Sidcup, Kent.

WAVECHANGE SWITCH.
VIEWED WITH CHASSIS INVERTED.









INDUCTORS

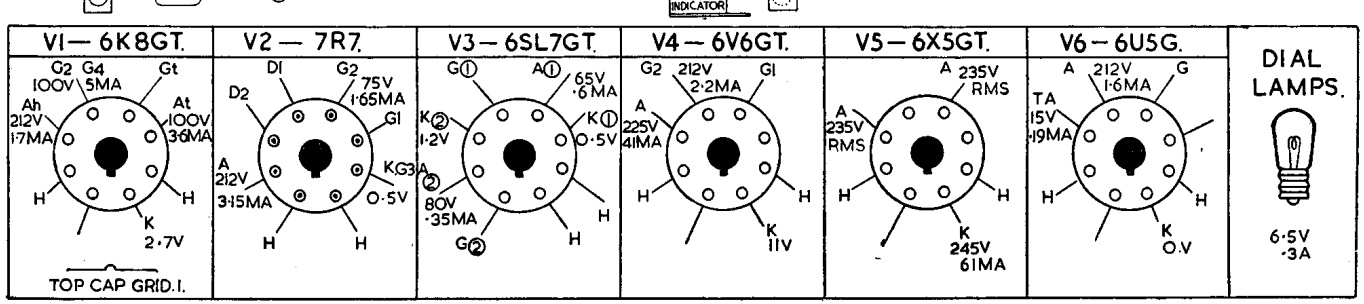
L	*Ohms*
1	14.5
2	.2
3	Very low
4	3
5	21
6	Very low
7	.25
8	3
9	8
10	3.5
11	3.5
12	3.5
13	3.5
14	450 Total. Tapped at 12
15	.5
16	2.5
17	600
18	Very low
19	46 Total

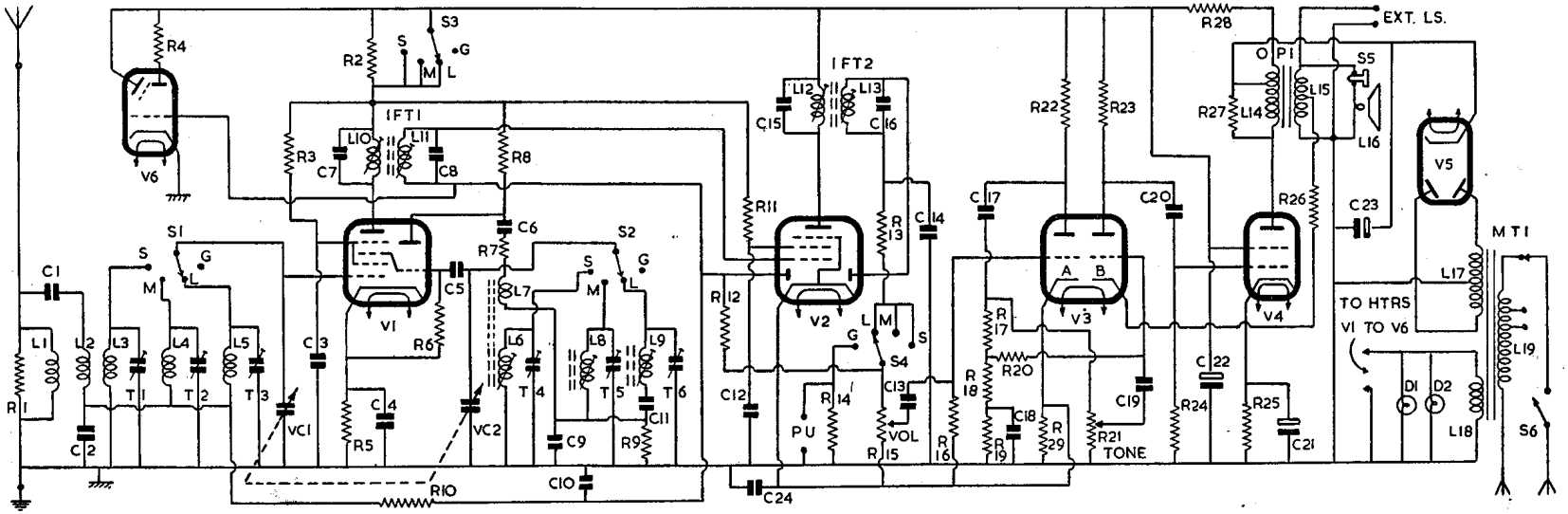
RESISTORS

R	*Ohms*	*Watts*
1	4.7K	¼
2	470K	¼
3	22K	¼
4	1M	¼
5	270	¼
6	47K	¼
7	100	¼
8	33K	¼
9	4.7K	¼
10	100K	¼
11	82K	¼
12	2.2M	¼
13	47K	¼
14	220K	¼
15	500K	Potr.
16	10M	¼
17	470K	¼
18	47K	¼
19	200K	¼
20	200K	¼
21	500K	Potr.
22	220K	¼
23	220K	¼
24	470K	¼
25	240	¼
26	4.7K	¼
27	47K	¼
28	1.5K	½
29	100	¼

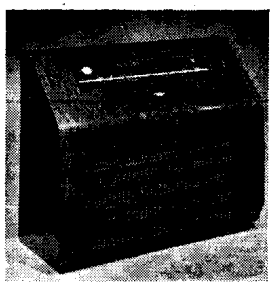
CAPACITORS

C	*Capacity*	*Type*
1	.005	Tubular 500V
2	.003	Tubular 350V
3	.02	Tubular 350V
4	.02	Tubular 350V
5	100pF	Silver Mica
6	200pF	Silver Mica
7	200pF	Silver Mica
8	200pF	Silver Mica
9	330pF	Silver Mica
10	.02	Tubular 350V
11	200pF	Silver Mica
12	.02	Tubular 350V
13	.005	Tubular 500V
14	100pF	Silver Mica
15	200pF	Silver Mica
16	200pF	Silver Mica
17	.01	Tubular 500V
18	.01	Tubular 350V
19	150pF	Silver Mica
20	.01	Tubular 500V
21	25	Electrolytic 25V
22	32	Electrolytic 350V
23	32	Electrolytic 350V
24	.1	Tubular 350V





K-B ER30



AERIAL signal is fed through C1 to SW aerial coupling coil L2 and thence to bottom end of grid coils L4 (MW), L5 (LW). L1, R1 connected between aerial and earth is a filter circuit. The grid coils L3 (SW) L4 (MW) L5 (LW) are trimmed by T1, T2, T3 respectively and switched by S1 to tuning capacitor VC1 and to g1 of triode-hexode frequency changer V1.

AVC decoupled by R10, C2, is fed through the tuned coils to g1 of V1. A following shorting blade on S1 short circuits the unwanted tuning coils. Cathode bias is provided by R5 decoupled by C4. Screen (g2, g4) voltage is obtained from R3 and decoupled by C3. L10, C7 which form the primary of IFT1, are in the hexode anode circuit.

Oscillator is connected in a tuned grid shunt-fed circuit.

The grid coils L6 (SW) L8 (MW) L9 (LW) which are trimmed by T4, T5, T6 respectively, are switched by S2 to tuning capacitor VC2 and through C5 to oscillator grid (gt) of V1. C9 (MW) and C11 (LW) are padding capacitors. A following shorting blade on S2 shorts circuits the unwanted oscillator tuning coils. Automatic bias for oscillator grid is developed on C5 with R6 as leak resistor.

Anode reaction voltages which are developed inductively by L7 on SW, and capacitively from across C9, C11 on MW and LW bands, are fed through limiter resistor R7 and coupled by C6 to oscillator anode of V1, of which R8 is the load resistor.

IF amplifier operates at 470kc/s. Secondary L11, C8 of IFT1 feeds signal and AVC voltages, decoupled by R12, C10 to g1 of RF pentode section of V2. Cathode bias is provided by R29 and decoupled by C24. Screen (g2) voltage is obtained from R11 and decoupled by C12. Primary L12, C15, of IFT2 is in the anode circuit.

Signal rectifier.—Secondary L13, C16 of IFT2 feeds signal to one diode of V2. R15 the volume control is the load resistor and R13, C14 form an IF filter.

Pickup.—Sockets are fitted for the permanent connection of a high-resistance moving-iron or crystal pickup. Pickup output is applied across load resistor R14 and fed to S4, which in its Gram position feeds signal to volume control R15. In addition S3, which is ganged to S4, removes the short across R2 in the common HT feed to V1 and g2 of V2 thus reducing applied voltage to below operating limit of valves and thereby silencing radio section.

AVC.—The DC component of the rectified signal appearing across R15 is used for AVC purposes and is fed by R12 decoupled by C10 to g1 of V2 to grid of tuning indicator V6, and via further decoupling network R10, C2 to g1 of V1. Although R12 is connected to second dio of V2 this diode plays no part in the operation of the AVC circuit—the valve tag being used as an anchoring point.

Tuning indicator.—Grid of V6 is fed from AVC line. Cathode is connected down to chassis and anodes are fed, one direct from HT line, and the other through load resistor R4.

AF amplification is provided by a twin triode V3. Rectified signal is fed through C13 to grid of V3A. Bias for the grid is developed on C13 with R16 as leak resistor. R29 in the cathode provides a cathode bias for pentode section of V2. R22 is anode load resistor. C17 feeds signal at anode V3A to tone control network R17, R18, R19, R20, R21, C18, C19, and to grid of V3B. R21 in its maximum position gives treble boost, whilst in its minimum position it gives treble attenuation. Cathode of V3B is returned to chassis through R26 and section of secondary L15 of output transformer OP1, thus introducing negative feedback into cathode circuit.

Output stage.—C20 feeds signal at anode V3B to g1 of beam tetrode output valve V4.

Secondary L15 feeds output of V4 to a 10in. PM speaker L16. Sockets are fitted on L15 for connection of a low-impedance extension speaker. A screw-switch S5 enables internal speaker L16 to be disconnected if desired.

HT is provided by an indirectly heated isolated-cathode full-wave rectifier V5. L17 the HT secondary of mains input transformer MT1 supplies its anode voltages. Having an isolated cathode its heater current is obtained from L18. Smoothing is given by R28, C22, C23, with section of primary L14, of OP1.

Heaters of V1 to V6 and dial lights obtain their current from secondary L18, one side of which is connected to chassis.

Primary L19 of MT1 is tapped for inputs of 200, 225, 250V 50-100c/s. S6, ganged to the tone control spindle, is ON/OFF switch.

Note.—Early models differed from the circuit shown as follows :—

AVC—R12 connected between top of R13 and pin 4 of V2.

R29, C24 omitted—cathodes V2, V3A and bottom of R15, R16 connected down to chassis.

R11 connected direct to HT line instead of through muting circuit R2, S3.

IF aligned to 465kc/s.

TRIMMING INSTRUCTIONS

Apply signal as stated below	Tune receiver to	Trim in order stated for max. output
(1) 470kc/s to g1 of V1 via. .1mF	MW range	L13, L12, L11, L10
(2) 600kc/s to AE socket via. dummy aerial	500 metres	L8
(3) 1.4mc/s as above ...	214 metres	T5, T2. Repeat (2) and (3)
(4) 175kc/s as above ...	1714 metres	L9
(5) 350kc/s as above ...	860 metres	T6, T3. Repeat (4) and (5)
(6) 6mc/s as above ...	50 metres	L6
(7) 15mc/s as above ...	20 metres	T4, T1. Repeat (6) and (7)

AUTO-DECCALIAN—

from page 37

type provided with dual-voltage field winding for 100-130, 200-250V 50c/s. The motor is normally fitted with a 50c/s driving pulley, but special pulleys for 40 or 60c/s mains are available.

For details of maintenance and adjustments to the changer reference should be made to Garrard Booklet or to our Service Chart of August, 1949.

Removal of pickup.—Gently press head of pick-up inwards and rotate an eighth of a turn in an anti-clockwise direction and withdraw from socket in tone arm.

Replacement of sapphire needle.—Remove pickup head from tone arm as described above. Remove the two screws situated in the top of the head and carefully open needle plate to full extent of its hinge. Lift out the rubber-bonded armature in which is located the sapphire needle. Replace with a new one and ensure that tip of needle passes through the existing hole in latex seal on underside of head. Close down needle plate, replace fastening screws and plug pickup into tone arm.

Removal of auto-changer.—Lift off turntable and record spindle. Remove mains leads from voltage changeover panel and unscrew small spring clip at right-hand side of inside case. Remove the three screws fastening sloping panel adjacent to auto-changer platform and lift off panel. Unplug pickup leads from input sockets on amplifier chassis. Remove the six screws fastening changer platform to case runners. Lifting rear edge of platform first, withdraw auto-changer from case.

Removal of amplifier chassis.—Remove auto-changer as described. Remove top panel above amplifier and unscrew ON/OFF switch from the panel. Remove the four chassis bolts accessible from bottom of case and undo nuts on LS bolts. Remove mains lead from input socket at rear of case and remove cable cleat. Chassis and LS can now be withdrawn.

Test Report

Sentercel Miniature HT and HF Rectifiers

The Sentercel miniature selenium rectifiers have been developed to meet the demand for a small size component for incorporation in modern radio and electronic equipment.

In the HT types RM1, RM2, RM3, size has been greatly reduced by employing a tubular rivet instead of the conventional spindle with end clamping nuts. The rectifiers measure approximately ⅜in. in length with cooling fin diameter of 1⅛ins. for RM1, and 1¾ins. for RM2 and RM3.

The units are of half-wave type, designed for a maximum input voltage of 125V RMS with a peak inverse voltage of 350. At a temperature of 35 deg. C. the maximum output currents are 60mA, 100mA, 120mA respectively. At 55 deg. C. the outputs fall to 30mA, 60mA, 90mA. The maximum instantaneous peak current is claimed to be unlimited and the rectifiers will withstand heavy overloads for short periods without damage.

These rectifiers are supplied in tropical finish either as single units or with two on a bracket.

The HF type M1 rectifier consists of a single element mounted in an aluminium case and fitted with wire connections. Its dimensions are ¼ by ¼in. and it is undoubtedly the smallest rectifier of its kind. It will operate as a normal diode detector up to 5 mc/s and with inputs as low as 0.5V. Below this input satisfactory rectification cannot be obtained. It has a self capacity of 20 pF, a forward resistance of 12,000 ohms, and a reverse resistance of 20 megohms. Maximum peak inverse voltage is 50.

The M1 is suitable for use in contrast expansion circuits, level and modulation depth indicators, detector and AVC circuits, and as an interference limiter and DC restorer.

On test the rectifiers were used to supply HT and to function as a detector in a typical radio receiver and both types operated satisfactorily. They are made by Standard Telephones and Cables, Limited, Aldwych, London, WC2.

More Pages from Service Casebooks

COMPLAINT: distorted sound on Murphy V136 and inability to obtain correct focus at any setting of the control. This was found to be due to low-emission sound output valve, the cathode current of which flows through the focus coil. The same effects have also been caused by a leaky coupling capacitor to the sound output valve.—C.M.J.

Symptom : Radiogram with radio normal, sound fading in the middle of the record.

THE pickup head and wiring were first tested, and found in order. The switching and wiring were also checked, and no fault found. The DDT was substituted without improvement. The fault was finally found to be caused by the cathode by-pass condenser of the DDT valve, which was open-circuit. Fitting a new one cured the trouble.—W.A.

Symptom : Radiogram with radio normal, distortion on records.

THE set had a " magic eye " tuning device, and on inspection it was found that the triode section of this was switched in, on records, to act as a first AF amplifier. This was resistance coupled, through a condenser, to the grid of the output valve, and the condenser was faulty, causing, when the set was switched to gramophone reproduction, positive bias on the output valve grid. The faulty condenser was not in circuit on radio, which consequently was not affected.—L.H.

Symptom : Radiogram—dead on both radio and records.

THE speaker, power pack, and output valve and circuits were checked, and found to be in order, and all valves were lighting. The set was of the three-valve and rectifier type of superhet, and when checking voltages the resistance feeding the oscillator anode of the frequency changer was found to be burnt out, and was replaced. This cured both faults, as the oscillator section of the frequency changer was in use, on records, as a first AF amplifier.—L.H.

Don't forget, if you experience an unusual and interesting fault, that your fellow engineers will all be interested too. Write a short note to ELECTRICAL AND RADIO TRADING, 189, High Holborn, London, WC1.