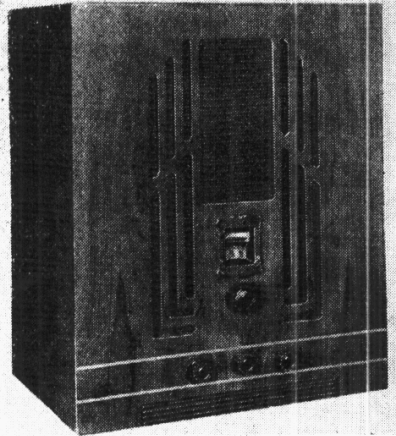


"TRADER" SERVICE SHEET
696

PHILCO 263

COVERING 263E, 263F, 1263E, 1263F



The appearance of the Philco 263.

AN isolated chassis, to which only the RF circuits are returned, is employed in the Philco 263, a 4-valve (plus rectifier) 2-band superhet designed for use with AC or DC mains (25-100 c/s in the case of AC). Model 263E is designed for mains of 200-245 V, and model 263F for mains of 240-260 V, a special resistor being added.

Model 1263 employs an identical chassis, but it is housed in a different style of

table cabinet, or in a console cabinet. All models are available with the "E" or "F" suffix.

Release date, all models, 1934.

Original prices: 263, £15 15s.; 1263 table, £16 16s.; 1263 console, £19 19s.

CIRCUIT DESCRIPTION

The chassis of this receiver is isolated from the HT circuit, and only the RF and oscillator circuits are returned to it. The base-line in our circuit diagram, therefore, is formed by the HT negative line, which is indicated by name, and the chassis line appears beneath it. One isolating capacitor, C3, holds the HT negative line at chassis RF potential, while another, C1, holds the line at the RF potential of the earth terminal.

Aerial input via coupling coils L2, L3 to mixed coupled band-pass filter. Primary coils L4 (MW) and L5 (LW) are tuned by C24; secondary coils L8, L9 are tuned by C26. Inductive coupling is effected on MW by L7 (via S4), and on LW by a few turns at the bottom of L9 which are common with the bottom of L5. Capacitative coupling is provided across the impedance of C2, C3 which are common to both circuits.

Aerial top coupling is effected by L6, which consists of a small number of turns. Image rejection by coil L1, which is in circuit with V1 cathode on MW only, via S3; on LW, S3 opens and the cathode

is returned directly to the HT negative line via S2.

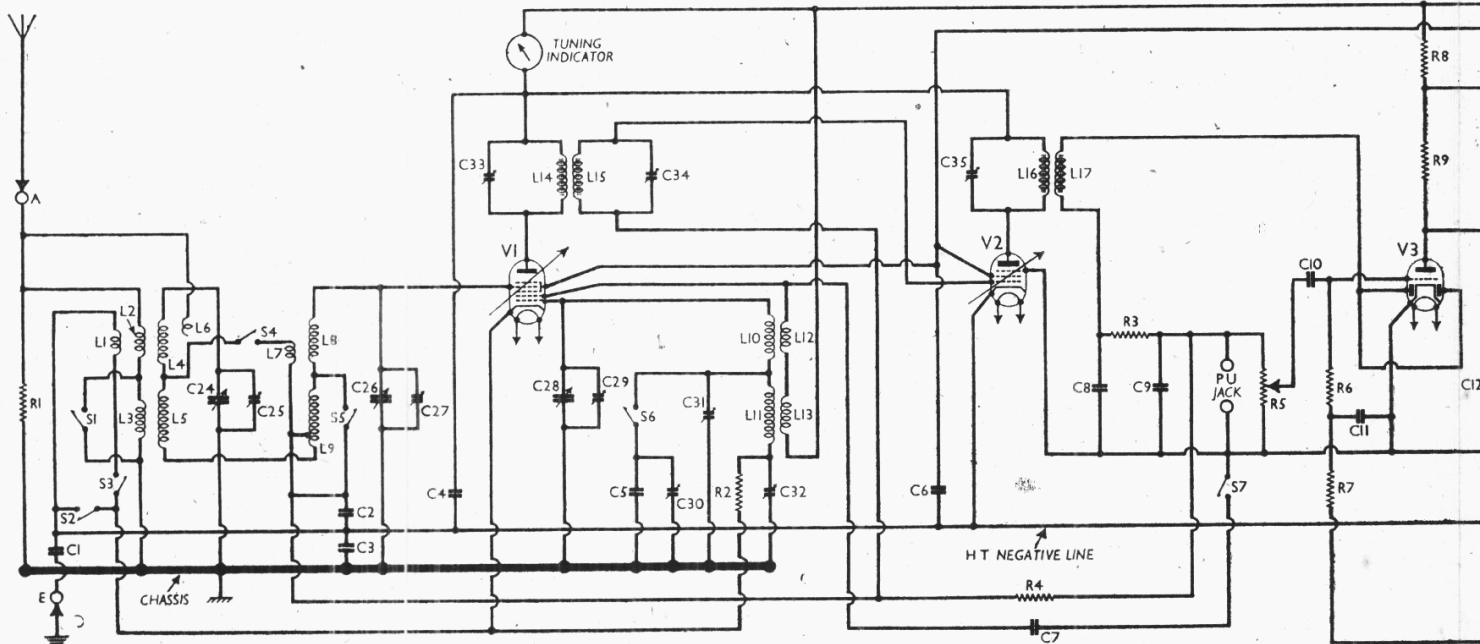
First valve (V1, Philco 6A7) is a heptode operating as frequency changer with electron coupling. Oscillator grid coils L10 (MW) and L11 (LW) are tuned by C28. Parallel trimming by C29 (MW) and C31 (LW); series tracking by C5, C30 via S6 (MW) and C32 (LW). The grid circuit is returned to V1 cathode via resistor R2. Reaction coupling from anode by coils L12, L13.

Second valve (V2, Philco 78E) is a variable-mu RF pentode operating as intermediate frequency amplifier with tuned-primary, tuned-secondary input, and tuned-primary output, transformer couplings C33, L14, L15, C34 and C35, L16, L17.

Intermediate frequency 125 kc/s.

A meter-type instrument operated by the anode current of V1 pentode and V2, acts as a tuning indicator, its armature controlling a shutter which throws a vertical shadow on to a horizontal screen illuminated by the tuning indicator lamp. Increased current broadens the shadow, and the optimum tuning position coincides with the narrowest shadow breadth. At zero current the shadow is a fine vertical line.

Diode second detector is part of a double diode triode valve (V3, Philco 75), in which the two diode anodes are



Circuit diagram of the Philco 263E and 1263E. It becomes that of the 263F and 1263F if a 67Ω resistor is inserted in series with the r lead at the point marked "X" in the diagram, when it is suitable for 240-260V mains. The HT negative line forms the base line of circuit, and the chassis is isolated from it. L1 is the image receptor coil, and is connected via S3 in series with V1 cathode lead on MW only to negative line. L19, R12, R13, R14, R15 form a potential divider connected directly across the HT output from the rectifier V5.

strapped together. Audio frequency component in rectified output is developed across load resistor **R5**, which also operates as manual volume control, and passed via AF coupling capacitor **C10** to control grid of triode section, which operates as AF amplifier.

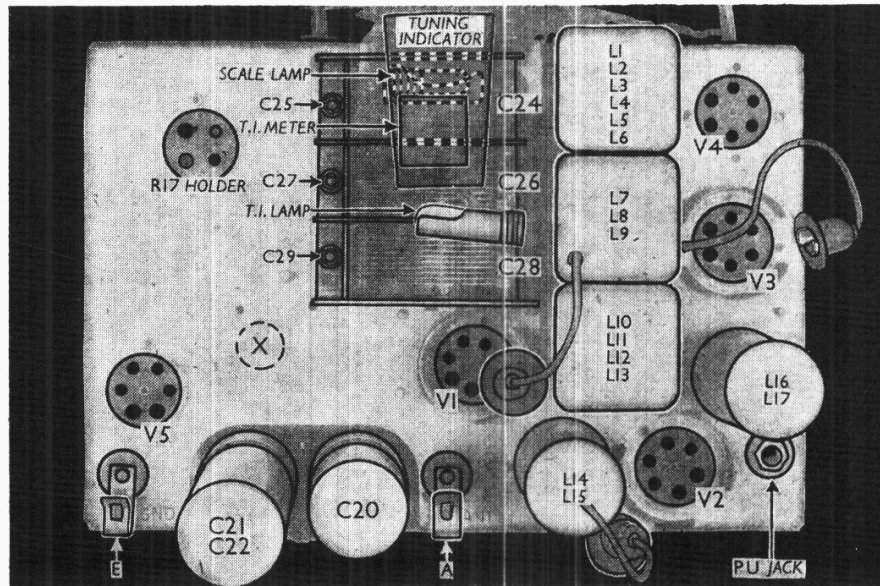
If filtering by **C8**, **R3** and **C9** in diode circuit, and by **C12** in triode anode circuit. Provision is made by means of a switched jack for the connection of a gramophone pick-up across **R5**, and when the plug is inserted, switch **S7** closes and connects **C7** between the oscillator anode of **V1** and **V3** cathode to mute radio signals.

DC potential appearing across **R5** is tapped off and fed back via a decoupling circuit as GB to FC and IF valves, giving automatic volume control.

Resistance-capacitance coupling by **R9**, **C14** and **R10** between **V3** triode and pentode output valve (**V4**, Philips 18E). Fixed tone correction by **C16** in anode circuit, and, across **C16**, a special tone control unit comprising capacitors **C17**, **C18**, **C19** and a four-position switch **S8**, **S9**, **S10**. No provision is made for connecting an external speaker.

When the receiver is used with AC mains HT current is supplied by a rectifier of the voltage-doubler type whose two halves are strapped in parallel to operate as a half-wave type; with DC mains it behaves as a low resistance. Smoothing is effected by iron-cored choke **L20** (in the HT positive lead) and the potential divider **R13**, **R14**, **R15** (in the HT negative line, in conjunction with electrolytic capacitors **C20**, **C21** and **C22**. The rectifier is by-passed by **C23**.

The speaker field coil **L19** is connected in series with **R12** across the HT circuit,



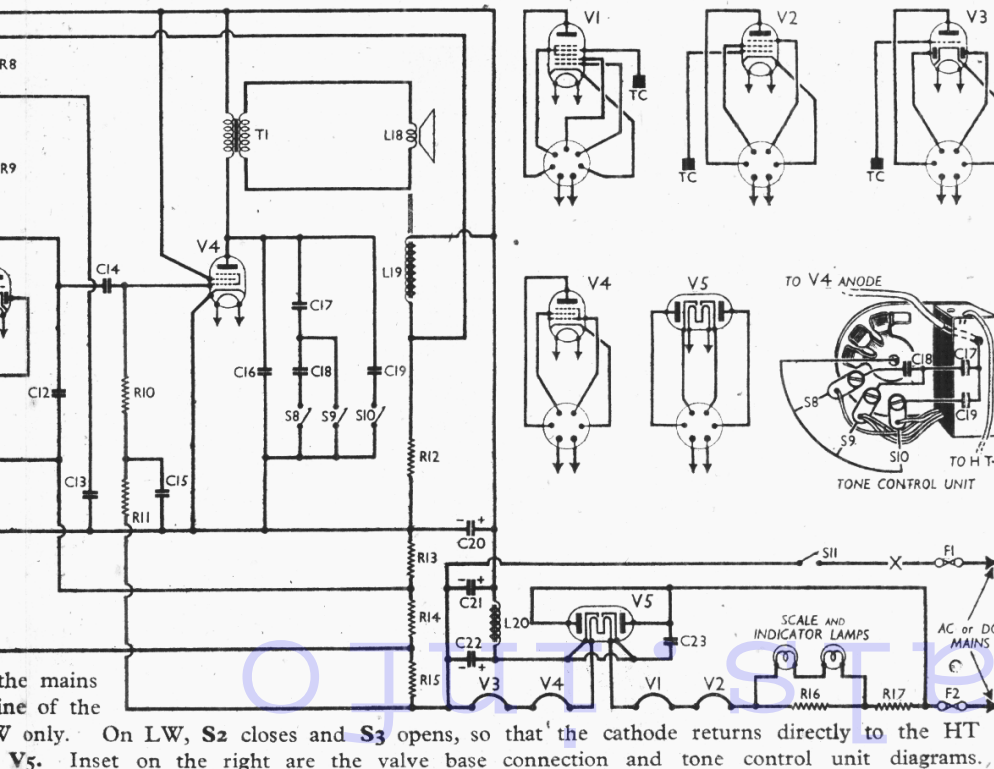
Plain view of the chassis. "X" marks the position of the additional ballast resistor in the "F" models. The main heater ballast resistance unit **R17** plugs in to the holder indicated. Only the two black sockets are used.

from which it draws its energising current, and the screen feed for **V1** and **V2** is taken from the potential divider so formed.

GB potentials for **V1**, **V2** and **V4**, whose cathodes are connected to the HT negative line, are obtained from the potential divider **R13**, **R14**, **R15** in the HT lead to the negative HT line. GB for **V3**, whose cathode goes to a tapping on the potential divider, is obtained by returning

the control grid circuit to the next tapping below that of the cathode lead.

Valve heaters, together with scale and indicator lamps (and their shunt resistor **R16**), and ballast resistor **R17**, are connected in series across the mains input. In "F" models, an additional 67 Ω resistor is inserted at the point marked X in the circuit diagram; in "E" type chassis X is omitted, and its position is short-circuited. Fuses **F1**, **F2** protect the input circuit against accidental short-circuit.



COMPONENTS AND VALUES

CAPACITORS		Values (μF)
C1	Earth isolator	0.2
C2	B-P capacitive coupling	0.05
C3	Chassis isolator	0.5
C4	V1, V2 anodes decoupling	0.15
C5	Osc. MW fixed tracker	0.00041
C6	V1, V2 SG's decoupling	0.25
C7	Radio muting shunt	0.01
C8	IF by-pass capacitors	0.00025
C9		0.01
C10	V3 triode AF coupling	0.3
C11	V3 triode CG decoupling	0.00025
C12	IF by-pass	0.5
C13	V3 triode anode decoupling	0.01
C14	AF coupling to V4	0.05
C15	V4 CG decoupling	0.003
C16	Fixed tone corrector	0.015
C17		0.01
C18	Tone control capacitors	0.01
C19		0.01
C20*	HT smoothing capacitors	12.0
C21*		8.0
C22*		8.0
C23	Rectifier RF shunt	0.05
C24†	Band-pass pri. tuning	—
C25‡	B-P pri. MW trimmer	—
C26†	Band-pass sec. tuning	—
C27†	B-P sec. MW trimmer	—
C28†	Oscillator circuit tuning	—
C29‡	Osc. circ. MW trimmer	—
C30‡	Osc. circ. MW tracker	—
C31‡	Osc. circ. LW trimmer	—
C32‡	Osc. circ. LW tracker	—
C33‡	1st IF trans. pri. tuning	—
C34‡	1st IF trans. sec. tuning	—
C35‡	2nd IF trans. pri. tuning	—

* Electrolytic. † Variable. ‡ Pre-set.

RESISTORS		Values (ohms)
R1	Aerial circuit shunt	10,000
R2	V1 osc. CG resistor	50,000
R3	IF stopper	50,000
R4	AVC line decoupling	2,000,000
R5	Manual volume control	350,000
R6	V3 triode CG resistor	500,000
R7	V3 triode CG decoupling	500,000
R8	V3 triode anode decoupling	70,000
R9	V3 triode anode load	160,000
R10	V4 CG resistor	500,000
R11	V4 CG decoupling	45,000
R12	V1, V2 SG and auto GB	1,800
R13	potential divider	18
R14	sistors	18
R15		125
R16	Scale lamp shunt	65
R17	Heater circuit ballast	530

OTHER COMPONENTS		Approx. Values (ohms)
L1	Image rejector coil	0.1
L2		23.0
L3	Aerial coupling coils	100.0
L4		6.0
L5	Band-pass primary coils	50.0
L6	Aerial "top" coupling	—
L7	B-P MW coupling	0.1
L8		6.0
L9	Band-pass primary coils	50.0
L10	Osc. MW tuning coil	5.5
L11	Osc. LW tuning coil	22.0
L12	Oscillator reaction coils,	—
L13	total	7.0
L14	1st IF trans. { Pri. ...	250.0
L14	{ Sec. ...	250.0
L16	2nd IF trans. { Pri. ...	150.0
L17	{ Sec. ...	75.0
L18	Speaker speech coil	1.2
L19	Speaker field coil	3,000.0
L20	HT smoothing choke	260.0
T1	Speaker input { Pri. ...	430.0
	{ Sec. ...	0.1
T.I.	Tuning indicator winding	1,000.0
F1, F2	Mains input fuses, 1A	—
S1-S6	Waveband switches	—
S7	Radio mute (jack-switch)	—
S8-S10	Tone control switches	—
S11	Mains switch, ganged R5	—

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our sample "E" type chassis when it was operating from AC mains of 237 V, using a complete set of new valves.

The receiver was tuned to the lowest wavelength on the MW band, the volume control was at maximum and the tone-control fully anti-clockwise, but there was no signal input.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 6A7	190	1.0	62	2.5
	Oscillator			
V2 7SE	195	5.4	62	1.0
	190	3.75		
V3 75	77	0.3	—	—
V4 18E	192	25.0	195	4.0
V5 25RE*	—	—	—	—

* Cathode to HT negative line, 224 V, DC.

Voltages were measured on the 400 V scale of a model 7 Avometer, the HT negative line (as marked in the circuit diagram) being the negative meter connection.

DISMANTLING THE SET

Removing Chassis.—Remove the four control knobs (pull-off) from the front of the cabinet;

remove the four hexagon self-tapping screws (with flat steel washers and rubber washers) holding the chassis to the bottom of the cabinet.

If the speaker leads are freed from the cleat holding them to the sub-baffle, the chassis may now be withdrawn to their full extent, which is sufficient for normal purposes, but to free chassis en-

tirely, unsolder the leads from the tags on the speaker assembly.

When replacing, connect the speaker leads as follows, viewing the speaker from the rear: White lead to upper left-hand tag on transformer (together with black lead from speaker field); green lead to upper right-hand tag; green/white lead to tag on lower left-hand of transformer (together with yellow lead to speaker field).

A rubber washer should be fitted on each fixing bolt, between the chassis and the cabinet.

Removing Speaker.—Free the leads from the cleat on the sub-baffle and remove the four square nuts holding the speaker to the sub-baffle.

When replacing, the transformer goes at the top. If the leads have been unsoldered, they should be connected as described previously.

GENERAL NOTES

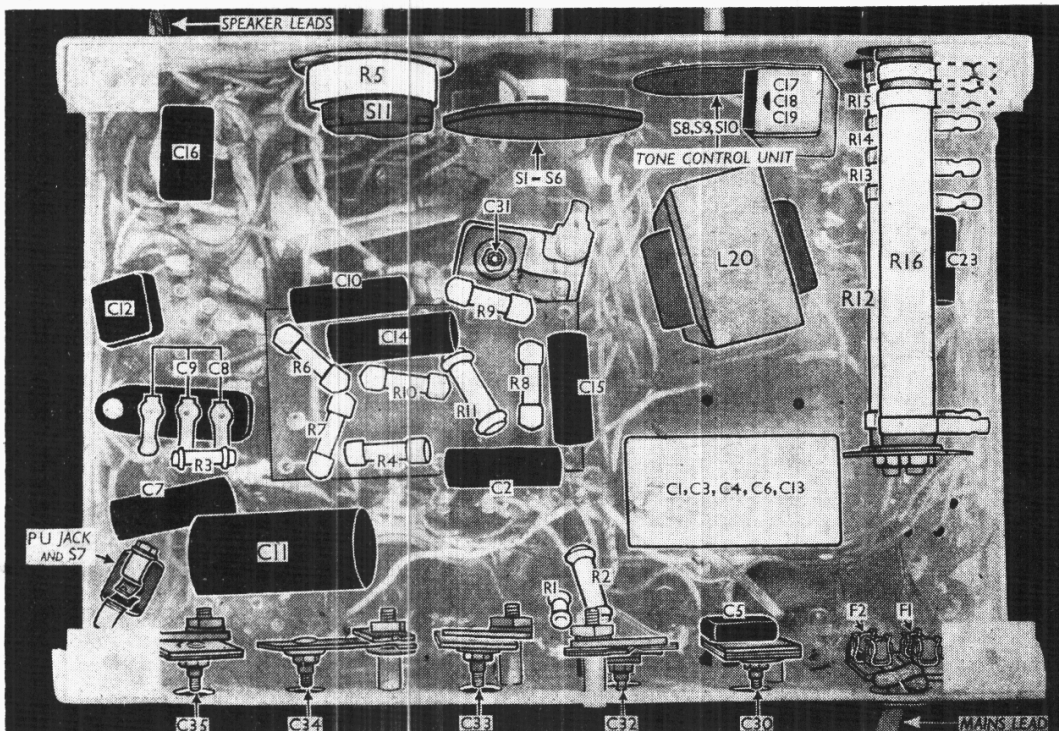
Switches.—S1-S6 are the waveband switches, ganged in a single rotary unit beneath the chassis. The unit is indicated in our under-chassis view, and shown in detail in the diagram in col. 4, where it is drawn as seen when viewed from the rear of the underside of the chassis.

All the switches except S2 close on MW and open on LW. S2 opens on MW and closes on LW.

S7 is the radio muting switch, which closes upon insertion of the pick-up plug, short-circuiting to RF the oscillator output via C7.

S8-S10 are the tone control switches. They form part of the tone control unit as explained later.

S11 is the QMB mains switch, ganged with the volume control R5.



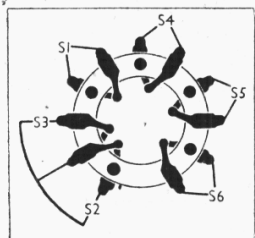
Under-chassis view, which is the same for all six models. The waveband switch and tone control units are indicated here, but are shown in detail in diagrams inset in the circuit overleaf and col. 4 on this side. C30, C32, C33, C34 and C35 are adjusted through holes in the rear chassis member, while C31 is reached through a hole in the base of the cabinet.

Coils.—The RF and oscillator coils **L1-L6**; **L7-L9** and **L10-L13** are in three screened units on the chassis deck, together with two further screened units which contain the IF transformers **L14**, **L15** and **L16**, **L17**. The tuning capacitors for the two transformers are fitted externally beneath the chassis, and their adjustments are reached through holes in the rear member.

Scale and Indicator Lamps.—These are two MES type lamps, with tubular bulbs, rated at 6.3 V. Their measured current at this voltage was 0.15 A. The lamps are fitted with small metal shields, with which spherical lamps could not be used, and they are shunted by **R16**.

Gramophone Pick-up.—A switched jack is provided for connecting a gramophone pick-up, and is mounted in one corner at the rear of the chassis deck. Of the two switches on the jack, only one, **S7**, is used, and this closes when the plug is inserted to mute radio.

External Speaker.—No provision is made for the connection of an external speaker, but one of low impedance (about 2.4 Ω) could be connected to the secondary connections of the internal speaker input



Sketch showing the waveband switch unit in detail. It is drawn as seen from the rear of the underside of the chassis.

transformer **T1**. Alternatively, a high impedance speaker (about 7,000-10,000 Ω) could be connected to the primary connections provided that suitable isolating capacitors were used.

Capacitors C1, C3, C4, C6, C13.—These are five paper insulated capacitors in a single container mounted beneath the chassis. Five connecting leads emerge from one end of the unit, and of these the brown lead is common to one side of each capacitor and is connected to the HT negative line.

The remaining four are connected internally to the "live" ends of four of the capacitors and are colour coded as follows: green to **C1**; white with black tracer to **C4**; white to **C6**; pink to **C13**. The "live" side of **C3** goes to the metal casing, which in turn is in contact with the chassis pressing.

Capacitors C20, C21, C22.—These are three electrolytics in two tubular metal containers mounted in a clip on a projection from the rear chassis member. The clip is in metallic contact with the chassis, but the metal containers are isolated from the clip by waxed cardboard tubes. Both units contain two capacitors each, and have three connections, one in each case being a common negative connection.

The **C20** unit contains a 4 μ F and an 8 μ F capacitor whose connections are brought out to three tags mounted on the base. The black tag is the common negative; the green and red tags are the two positives, and are joined together to connect the two sections in parallel, making a total capacitance of 12 μ F.

The **C21, C22** unit has only two tags on its base, and these are the two positive connections of the two capacitors, which are each rated at 8 μ F. The common negative connection is made to a tag clamped to the side of the case, the common negative internally being taken to the case.

Trimmer Covers.—Of the five pre-set trimmer adjustments which are reached through holes in the rear chassis member, two of these are covered by dome-shaped spring-on caps, possibly to remove the temptation to the user to adjust them, or for more complete screening. These are fitted over the adjustments of **C33** and **C35**. They are easily removed by prising them with a screwdriver blade.

Insulated Chassis.—The aerial and earth connections consist of two clips bolted to, but insulated from, the chassis. Although the chassis is isolated from the HT circuit the earth clip is isolated from chassis and is coupled via **C1** to the HT negative line. For the same purpose, the fixing bush of the tone control unit, whose metal frame is connected to the HT negative line, is insulated from chassis by non-conducting washers. The spindle is thus "live" to the mains, but its control knob protects the user from shock.

Tone Control Unit.—This consists of a four-position switch and a block of three capacitors made up as a self-contained unit. In the first position of the control (fully anti-clockwise) all switches are open; in the second position, **S8** closes, connecting **C17** and **C18** in series between **V4** anode and cathode; in the third position, **S8** and **S9** close, short-circuiting **C18**; in the fourth position, **S8, S9** and **S10** close, adding **C19** in parallel with **C17**.

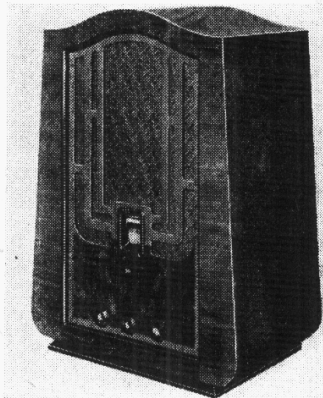
A sketch showing the unit as seen from the rear of the underside of the chassis is inset to the right of the circuit diagram overleaf. A bunch of four un-coded leads connects the block to the switch contacts, while two further leads provide the external connections. As the case is connected to HT negative line, the fixing bush is isolated from chassis. Superimposed on the sketch is a diagram showing the internal connections.

Models 263F and 1263F.—Models 263E and 1263E are designed for use on AC or DC mains of 200-245 V, while models 263F and 1263F are designed for AC or DC mains of 240-260 V. The makers emphasise that these receivers should not be used on mains that are outside their respective ranges, either above or below them.

The only modification in the "F" models as compared with the "E" models is the inclusion of an additional ballast resistor to drop the applied voltage from the mains to a value near the mean of the "E" range. The added resistor is rated at 67 Ω , and is inserted in the opposite mains lead to that to which **R16** is connected, between **S11** and

the flexible mains cord; it is indicated in our circuit diagram by an "X." Both the HT and the heater current flow through it.

The resistance unit is a Philco product, part number 67EF. It is mounted vertically on the chassis deck in the position indicated in our plan view by "X."



The appearance of the 1263 table model, whose chassis is identical with that in the 263.

CIRCUIT ALIGNMENT

IF Stages.—Connect the signal generator leads to the control grid (top cap) of **V1** and the chassis pressing, leaving the usual top cap connector off the cap. Connect a 1,000,000 Ω resistor between the signal generator leads and turn the volume control to maximum.

Feed in a 125 kc/s (2,400 m) signal, and adjust **C33, C34** and **C35** for maximum output.

RF and Oscillator Stages.—With the gang at maximum or minimum the ends of the scales should be about the same distance from the light-slit indicator. The scale can be adjusted upon slackening the grub screw in the boss. Note that the scale is calibrated in tens of kilocycles: i.e. kc/s with the final nought omitted.

MW.—Switch set to MW, leaving signal generator connected as for the IF stages. Tune to 1,400 kc/s (140 on scale), feed in a 1,400 kc/s (214 m) signal, unscrew **C29** fully, and then screw it up slowly until the first peak is reached. Adjust it accurately for maximum output.

Transfer the signal generator lead on **V1** to aerial clip, replacing normal top cap connector and removing 1,000,000 Ω resistor. Now adjust **C27** and **C25** for maximum output.

Feed in a 600 kc/s (500 m) signal, tune it in, and adjust **C30** and the gang in turn for maximum output until no further improvement can be obtained.

LW.—With signal generator connected to aerial clip and chassis, switch set to LW, feed in a 2,000 m (150 kc/s) signal, and adjust **C32** for maximum output while rocking the gang for optimum results, as in the case of **C30** on MW. Tune to 300 kc/s (marked 30 on scale), feed in a 300 kc/s (1,000 m) signal, and adjust **C31** (through a hole provided in the base of the cabinet) for maximum output.