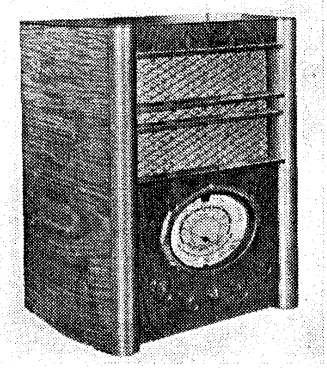
Supplement to The Wireless & Electrical Trader, January 7, 1939

"TRADER" SERVICE SHEET

376

BURNDEPT 290, 303, AND VIDOR 300



The Burndept 290 table model AC superhet. A push-pull output stage is used.

SHORT-WAVE ranges of 13·5-50 m (referred to below as SW1) and 50-180 m (SW2) are covered by the Burndept 290 7-valve (plus rectifier) 4-band AC superhet. The receiver is suitable for mains of 200-260 V, 50-100 C/S, and has a cathode-ray tuning indicator and provision for both a gramophone pick-up and an extension speaker.

A very similar chassis is used in the 303 radio-gramophone and the differences are explained under "Radiogram 303 Modifications," while the chassis of the Vidor 300 is identical to that of the 290. This *Service Sheet* was prepared on a 290.

Release date for all models: August, 1938.

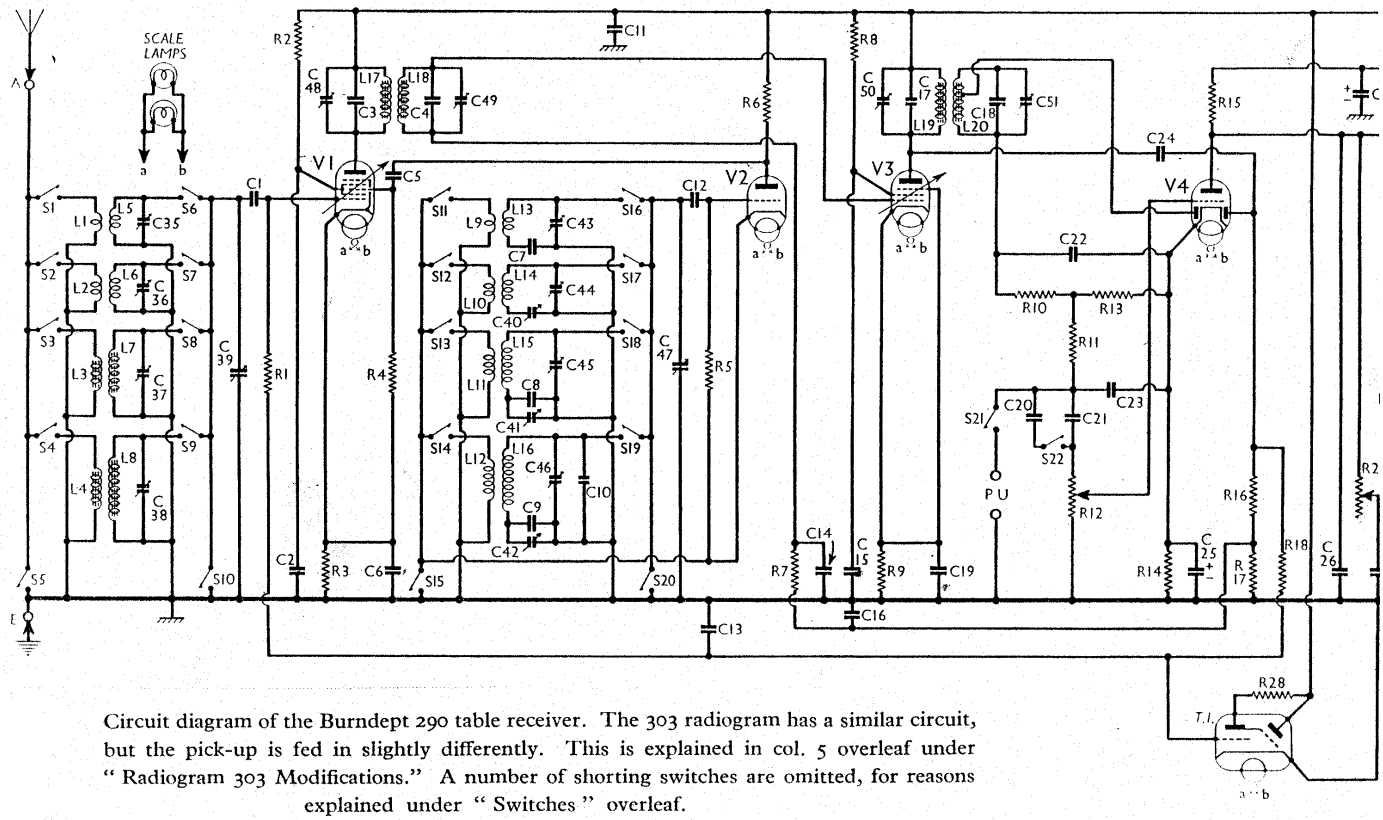
CIRCUIT DESCRIPTION

Aerial input via coupling coils **L1** (SW1), **L2** (SW2), **L3** (MW) and **L4** (LW) to single tuned circuits **L5, C39** (SW1), **L6, C39** (SW2), **L7, C39** (MW) and **L8, C39** (LW) which precede heptode valve (**V1, Tungsram 6L7G**) operating as frequency changer with separate triode oscillator valve (**V2, Tungsram 6J5G** or **6C5G**). Triode grid coils **L13** (SW1), **L14** (SW2), **L15** (MW) and **L16** (LW) are tuned by **C47**; parallel trimming by **C43** (SW1), **C44** (SW2), **C45** (MW) and **C10, C46** (LW); series tracking by **C7** (SW1), **C40** (SW2), **C8, C41** (MW) and **C9, C42** (LW). Reaction by coils **L9** (SW1), **L10** (SW2), **L11** (MW) and **L12** (LW) connected in cathode circuit. Oscillator coupling by **R6** and **C5** between **V2** anode and **V1** injector grid.

Third valve (**V3, Tungsram 6K7G**) is a variable-mu RF pentode operating as intermediate frequency amplifier with tuned-primary tuned-secondary iron-cored transformer couplings **C48, C3, L17, L18, C4, C49** and **C50, C17, L19, L20, C18, C51.**

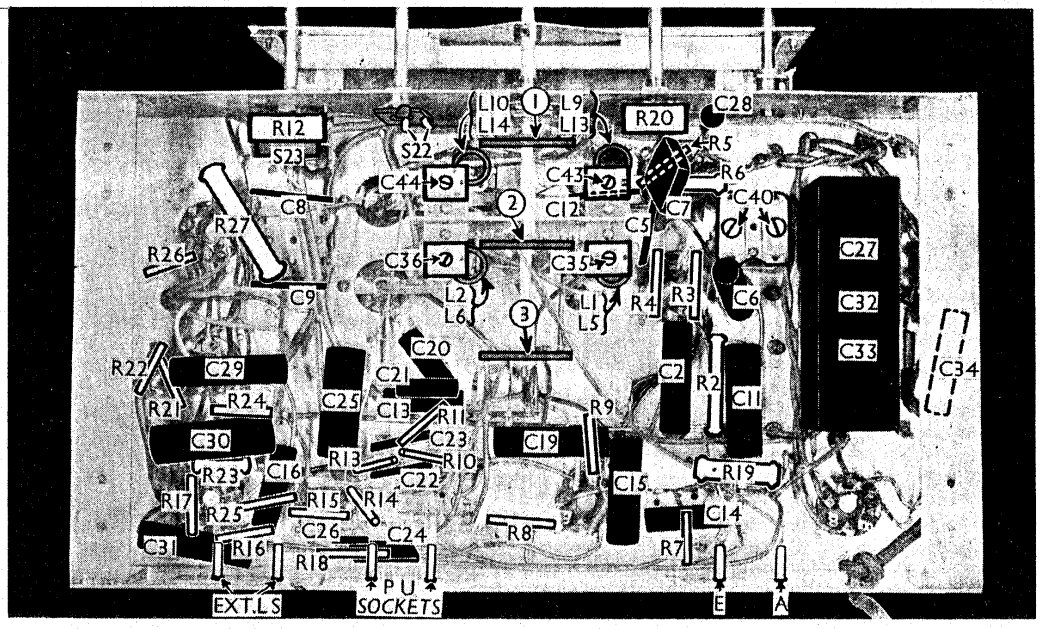
Intermediate frequency 473 KC/S.

Diode second detector is part of double-diode triode valve (**V4, Tungsram 6Q7G**). Audio frequency component in rectified output is developed across load resistances **R10, R13,** that at their junction being tapped off and passed via IF stopper **R11,** treble-boost AF coupling condenser **C21** and manual volume control **R12** to CG of triode section, which operates as AF amplifier. When the bass-treble switch **S22** is in the bass-boost position, **C20** is connected, via **S22,** in parallel with **C21.** IF filtering by **C22, R11** and **C23** in diode circuit and **C26** in triode anode circuit. Provision for connection of gramophone pick-up, via switch **S21,** between junction of **C20** and **C21,** and chassis. Variable tone control by **R20, C28** in triode anode circuit.

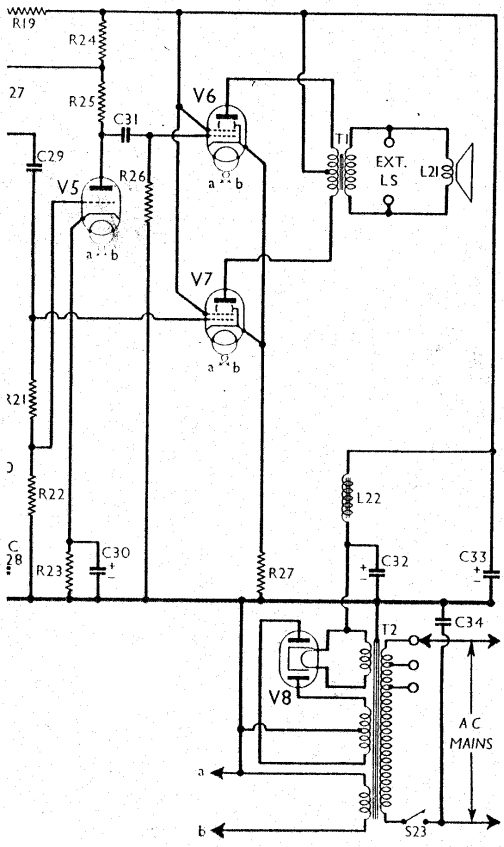


Circuit diagram of the Burndept 290 table receiver. The 303 radiogram has a similar circuit, but the pick-up is fed in slightly differently. This is explained in col. 5 overleaf under "Radiogram 303 Modifications." A number of shorting switches are omitted, for reasons explained under "Switches" overleaf.

Under-chassis view. Diagrams of the switch units are given overleaf. **C40** consists of two pre-set condensers in parallel. **S22** operates as the bass/treble boost switch.



Second diode of **V4**, fed from **V3** anode via **C24**, provides DC potentials which are developed across load resistances **R16, R17** and fed back through decoupling circuits as GB to FC and IF valves, giving automatic volume control.



Operating potential for tuning indicator (**T.I., Tungsram 6G5**) is applied to CG from AVC line controlling **V1**.

Resistance-capacity coupling by **R15, C29** and **R21, R22** between **V4** triode and one side (**V7**) of push-pull output stage comprising two valves (**V6, V7, Tungsram 6L6G's**). The second valve of the output stage (**V6**) is fed by a phase reversing valve (**V5, Tungsram 6J5G** or **6C5G**) which in turn obtains its input from the junction of **R21, R22**. Coupling between **V5** and **V6** is effected by **R25, C31** and **R26**. Provision for connection of low impedance external speaker across secondary of **T1**.

HT current is supplied by IHC full-wave rectifying valve (**V8, Tungsram 5Z4G**). Smoothing by iron-cored choke **L22** and dry electrolytic condensers **C32, C33**. Mains RF filtering by **C34**.

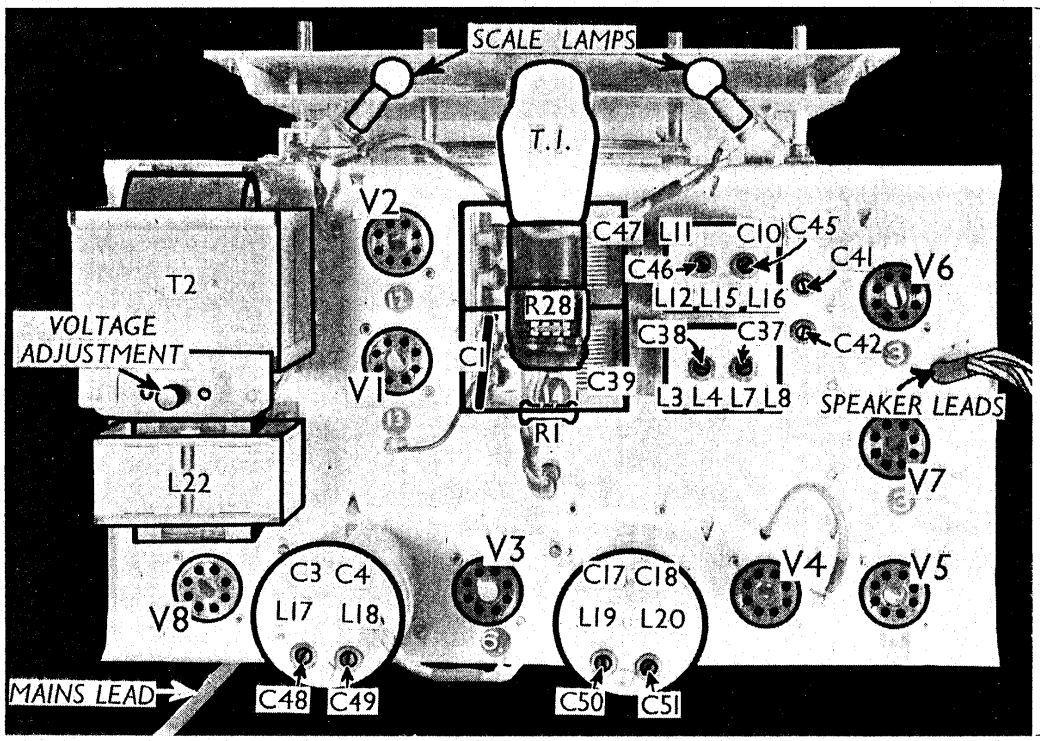
COMPONENTS AND VALUES

	RESISTANCES	Values (ohms)
R1	V1 CG resistance	500,000
R2	V1 SG HT feed	30,000
R3	V1 fixed GB resistance	300
R4	V1 injector grid resistance	50,000
R5	V2 CG resistance	50,000
R6	V2 anode load	5,000
R7	V3 CG decoupling	100,000
R8	V3 SG HT feed	50,000
R9	V3 fixed GB resistance	250
R10	Part V4 signal diode load	250,000
R11	IF stopper	50,000
R12	Manual volume control	500,000
R13	Part V4 signal diode load	250,000
R14	V4 GB resistance	2,000
R15	V4 triode anode load	100,000
R16, R17	V4 AVC diode load resistances	1,000,000, 500,000
R18	AVC line decoupling	1,000,000
R19	V1, V2, V3 and T.I. HT feed	1,500
R20	Variable tone control	250,000
R21, R22	V5 CG input potential divider resistances	250,000, 20,000
R23	V5 GB resistance	2,500
R24	V4, V5 anodes HT feed	20,000
R25	V5 anode load	50,000
R26	V6 CG resistance	250,000
R27	V6, V7 GB resistance	200
R28	T.I. anode HT feed	1,000,000

	CONDENSERS	Values (μF)
C1	V1 CG condenser	0·0001
C2	V1 SG decoupling	0·1
C3, C4	1st IF trans. fixed trimmers	0·0001, 0·0001
C5	V1 to V2 osc. coupling	0·0001
C6	V1 cathode by-pass	0·1
C7	Osc. circuit SW1 tracker	0·009
C8	Osc. circuit MW fixed tracker	0·0005
C9	Osc. circuit LW fixed tracker	0·00015
C10	Osc. circuit LW fixed trimmer	0·00004
C11	HT circuit RF by-pass	0·25
C12	V2 CG condenser	0·0001
C13	AVC line decoupling	0·05
C14	V3 CG decoupling	0·05
C15	V3 SG decoupling	0·1
C16	AVC line decoupling	0·05
C17, C18	2nd IF trans. fixed trimmers	0·00008, 0·0001
C19	V3 cathode by-pass	0·1
C20	Base-boost AF coupling	0·02
C21	Treble-boost AF coupling	0·0005
C22, C23	IF by-pass condensers	0·0001, 0·0001
C24	Coupling to V4 AVC diode	0·0001
C25*	V4 cathode by-pass	25·0
C26	V4 anode IF by-pass	0·0005
C27*	V4 triode and V5 anodes decoupling	4·0
C28	Part of variable tone control	0·01
C29	AF coupling to V5 and V7	0·1
C30*	V5 cathode by-pass	25·0
C31	V5 to V6 AF coupling	0·1
C32*, C33*	HT smoothing condensers	8·0, 16·0
C34	Mains RF by-pass	0·01
C35‡	Aerial circuit SW1 trimmer	—
C36‡	Aerial circuit SW2 trimmer	—
C37‡	Aerial circuit MW trimmer	—
C38‡	Aerial circuit LW trimmer	—
C39‡	Aerial circuit tuning	—
C40‡	Osc. circuit SW2 tracker §	—
C41‡	Osc. circuit MW tracker	—
C42‡	Osc. circuit LW tracker	—
C43‡	Osc. circuit SW1 trimmer	—
C44‡	Osc. circuit SW2 trimmer	—
C45‡	Osc. circuit MW trimmer	—
C46‡	Osc. circuit LW trimmer	—
C47†	Oscillator circuit tuning	—
C48‡	1st IF trans. pri. tuning	—
C49‡	1st IF trans. sec. tuning	—
C50‡	2nd IF trans. pri. tuning	—
C51‡	2nd IF trans. sec. tuning	—

* Electrolytic. † Variable. ‡ Pre-set.

§ Two units in parallel.



Plan view of the chassis. **L22** is the HT smoothing choke. **R28** is inside the tuning indicator holder. Note that **C41** and **C42** are reached through holes in the chassis, while there are eight further trimmers shown, two at the top of each coil can.

	OTHER COMPONENTS	Approx. Values (ohms)
L1	Aerial SW1 coupling coil	0·6
L2	Aerial SW2 coupling coil	0·4
L3	Aerial MW coupling coil	1·25
L4	Aerial LW coupling coil	90·0
L5	Aerial SW1 tuning coil	0·05
L6	Aerial SW2 tuning coil	0·35
L7	Aerial MW tuning coil	2·0
L8	Aerial LW tuning coil	9·0
L9	Oscillator SW1 reaction coil	0·45
L10	Oscillator SW2 reaction coil	43·0
L11	Oscillator MW reaction coil	60·0
L12	Oscillator LW reaction coil	1·5
L13	Osc. circuit SW1 tuning coil	0·05
L14	Osc. circuit SW2 tuning coil	0·3
L15	Osc. circuit MW tuning coil	5·6
L16	Osc. circuit LW tuning coil	4·6
L17, L18	1st IF trans. Pri.	4·8
	1st IF trans. Sec.	4·8
L19, L20	2nd IF trans. Pri.	4·8
	2nd IF trans. Sec., total	4·8
L21	Speaker speech coil	2·6
L22	HT smoothing choke	200·0
T1	Speaker input trans. Pri., total	220·0
	Speaker input trans. Sec.	0·3
T2	Mains trans. Pri., total	13·5
	Mains trans. Heater sec.	0·05
	Mains trans. Rect. heat. sec.	0·1
	Mains trans. HT sec., total	130·0
S1 S20	Waveband switches	—
S21	Gramophone pick-up switch	—
S22	Bass-treble boost switch	—
S23	Mains switch, ganged R12	—

DISMANTLING THE SET

A detachable bottom is fitted to the cabinet and upon removal (four countersunk-head wood screws) gives access to some of the components beneath the chassis.

Removing Chassis.—If it is necessary to remove the chassis from the cabinet, remove the five control knobs (recessed grub screws) and the four bolts (with washers, lock washers, rubber washers and distance pieces) holding the chassis to the bottom of the cabinet, and free the speaker leads from the cleat on the side of the cabinet. The chassis can now be withdrawn to the extent of the speaker leads, which is sufficient for normal purposes. *When replacing*, see that there is a rubber and metal washer on each of the fixing bolts, between the chassis and the bottom of the cabinet, and note that the pointer knob goes on the centre control spindle.

To free the chassis entirely, unsolder the speaker leads and *when replacing*, connect them as follows, numbering the tags from bottom to top:—1, orange; 2, blue; 3, red; 4, yellow; 5, green. The black lead goes to the tag on the speaker frame.

Removing Speaker.—The speaker can be removed from the cabinet by unsoldering the leads and removing the nuts and lock washers from the four screws holding it to the sub-baffle. *When replacing*, see that the transformer is on the right and connect the leads as follows, numbering the tags from bottom to top:—1, orange; 2, blue; 3, red; 4, yellow; 5, green. The black lead goes to the soldering tag on the speaker frame.

VALVE ANALYSIS

Valve voltages and currents given in the table (col. 3) are those measured in our receiver when it was operating on mains of 226 V, using the 230 V tapping on the mains transformer. The receiver was tuned to the lowest wavelength on the medium band and the volume control was at maximum, but there was no signal input.

Voltages were measured on the 400 V scale of a model 7 Universal Avometer, chassis being negative.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 6L7G	237	2·0	88	4·0
V2 6J5G	172	11·0	—	—
V3 6K7G	237	9·8	110	2·2
V4 6Q7G	100	0·8	—	—
V5 6J5G	105	1·9	—	—
V6 6L6G	276	43·0	282	2·2
V7 6L6G	276	48·0	282	2·2
V8 5Z4G	305†	—	—	—
T.I. 6G5	20	0·2	—	—
	Target			
	237	2·8		

† Each anode, AC.

GENERAL NOTES

Switches.—**S1-S20** are the waveband switches, and **S21** the pick-up switch, ganged in three rotary units beneath the chassis. These are indicated in our underchassis view, and shown in detail in the diagrams in col. 6, where they are as seen from the *front* of the underside of the chassis.

In addition to the twenty wave change switches shown, the backs of the first and second switch units (the sides seen from the *rear* of the underside of the chassis) carry a number of shorting switches, which are not shown in our circuit diagram, as they might prove rather confusing. In all, there are sixteen of these extra switches.

Actually, there is one shorting switch across each coil, so arranged that all coils not actually in use are shorted. On any waveband, four of the switches (across the

coils in use) are open, and the other twelve closed. On gram. all the sixteen switches are closed.

The table (col. 5) shows the positions of **S1-S21** for the five control settings, starting from fully anti-clockwise. A dash indicates *open*, and **C** *closed*.

S22 is the bass/treble boost switch, behind the front member of the chassis. It is open in the anti-clockwise position of the control.

S23 is the QMB mains switch, ganged with the volume control **R12.**

Coils.—**L1, L5 ; L2, L6 ; L9, L13** and **L10, L14** are in four unscreened tubular units beneath the chassis. They are mounted vertically close to the switch units.

L3, L4, L7, L8 ; L11, L12, L15, L16 and the IF transformers **L17, L18** and **L19, L20** are in four screened units on the chassis deck. Each unit contains two associated trimmers, while the oscillator unit also contains **C10,** and the IF units contain **C3, C4** and **C17, C18** respectively.

The HT smoothing choke **L22** is mounted on the chassis deck.

Scale Lamps.—These are two Tre-Vita MES types, rated at 6·5 V, 0·5 A each.

External Speaker.—Two sockets are provided at the rear of the chassis for a low impedance (about 3 O) external speaker.

Condensers C27, C32, C33.—These are three dry electrolytics (350 V peak working) in a single carton beneath the chassis, having a common negative (black) lead. The green lead is the positive of **C27** (4 μF), the yellow lead is the positive of **C32** (8 μF) and the red lead the positive of **C33** (16 μF).

Tracker C40.—This consists of a double pre-set condenser unit, the two sections being wired in parallel.

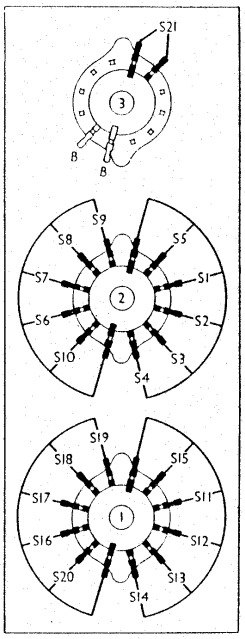
Resistance R27.—This is a 3 W 200 O wire-wound resistor.

Resistance R5.—This is returned to cathode of **V2** in our receiver, and not to chassis, as in the makers' diagram.

TABLE AND DIAGRAMS OF THE SWITCH UNITS

Switch	Gram	SW1	SW2	MW	LW
S1	—	C	—	—	—
S2	—	—	C	—	—
S3	—	—	—	C	—
S4	—	—	—	—	C
S5	C	—	—	—	—
S6	—	C	—	—	—
S7	—	—	C	—	—
S8	—	—	—	C	—
S9	—	—	—	—	C
S10	C	—	—	—	—
S11	—	C	—	—	—
S12	—	—	C	—	—
S13	—	—	—	C	—
S14	—	—	—	—	C
S15	C	—	—	—	—
S16	—	C	—	—	—
S17	—	—	C	—	—
S18	—	—	—	C	—
S19	—	—	—	—	C
S20	C	—	—	—	—
S21	C	—	—	—	—

Switch diagrams, as seen from the front of the underside of the chassis. The extra shorting switches, on the backs of the units, are omitted for clarity. See under "Switches."



RADIOGRAM 303 MODIFICATIONS

The main difference in the radiogram model (apart from the addition of a pick-up and motor) is that the pick-up is connected in a different manner. Across the pick-up sockets is connected a 100,000 O potentiometer. One pick-up socket goes to chassis, while the slider of the potentiometer goes, via **S21,** to the top of the radio volume control **R12.**

The extra potentiometer is mounted at the rear of the chassis, and is intended to be pre-set for gramophone gain. Volume control is adjusted normally by **R12.**

Note that in the model 303 the bass/treble boost control works on radio only ; in the 290 it will work on radio and gramophone, though it is not meant to be used for the latter.

CIRCUIT ALIGNMENT

IF Stages.—Short-circuit **C47,** and connect a 250,000 O resistance between control grid (top cap) of **V1** and chassis. Connect signal generator across this resistance, and feed in a 473 KC/S signal.

Adjust **C51, C50, C49** and **C48,** in that order, for maximum output. Re-check, then remove the short from **C47** and the 250,000 O resistance.

RF and Oscillator Stages.—With gang at maximum, pointer should cover the horizontal lines on the scale. Connect signal generator to **A** and **E** sockets via a suitable dummy aerial.

LW.—Switch set to LW, tune to 750 m on scale and feed in a 750 m (400 KC/S) signal. Adjust **C46,** then **C38,** for maximum output. Feed in a 2,000 m (150 KC/S) signal, tune it in, and adjust **C42** for maximum output, while rocking the gang for optimum results. Repeat the 750 m adjustments, then the 2,000 m adjustment until no further improvement results.

MW.—Switch set to MW, then adopt same procedure as for LW, but adjust **C45** and **C37** at 200 m (1,500 KC/S) and **C41** at 550 m (545 KC/S).

SW2.—Switch set to SW2, then adopt same procedure, but adjust **C44** and **C36** at 50 m (6 MC/S) and **C40** at 170 m (1·765 MC/S).

SW1.—Switch set to SW1, then adopt same procedure, but adjust **C43** and **C35** at 13·5 m (22·2 MC/S). Tracking is fixed on this band. When adjusting **C43,** use the peak involving least trimmer capacity.

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