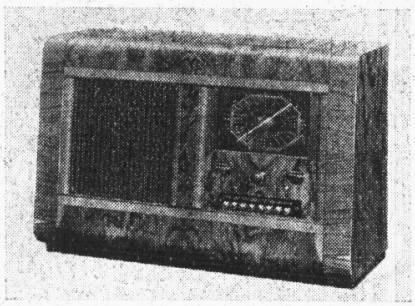
Supplement to The Wireless & Electrical Trader, April 1, 1939

"TRADER" SERVICE SHEET

394

DECCA PT/AW

PC/AW AND PG/AW



The Decca PT/AW table receiver.

PRESS-BUTTON tuning of the trimmer type for five stations is included in the Decca PT/AW 4-valve (plus rectifier) AC 3-band superhet, and press-button switches are also used for wave-changing. The receiver covers a short-wave range of 19-60 m and has provision for both a gramophone pick-up and an extension speaker. Model PC/AW is a console, with an identical chassis, while the modifications for the PG/AW radiogram are given under "PG/AW Modifications."

Release dates: PT/AW, August, 1938; PC/AW and PG/AW, September, 1938.

CIRCUIT DESCRIPTION

All the switches in the diagram, excepting the mains switch, have been given numbers with suffix letters to indicate their functions. All switches bearing the same number are operated by the same press-button; a suffix **a,** or **b,** indicates that the switch closes when its button is pressed; an **x** indicates that it opens when the button is pressed.

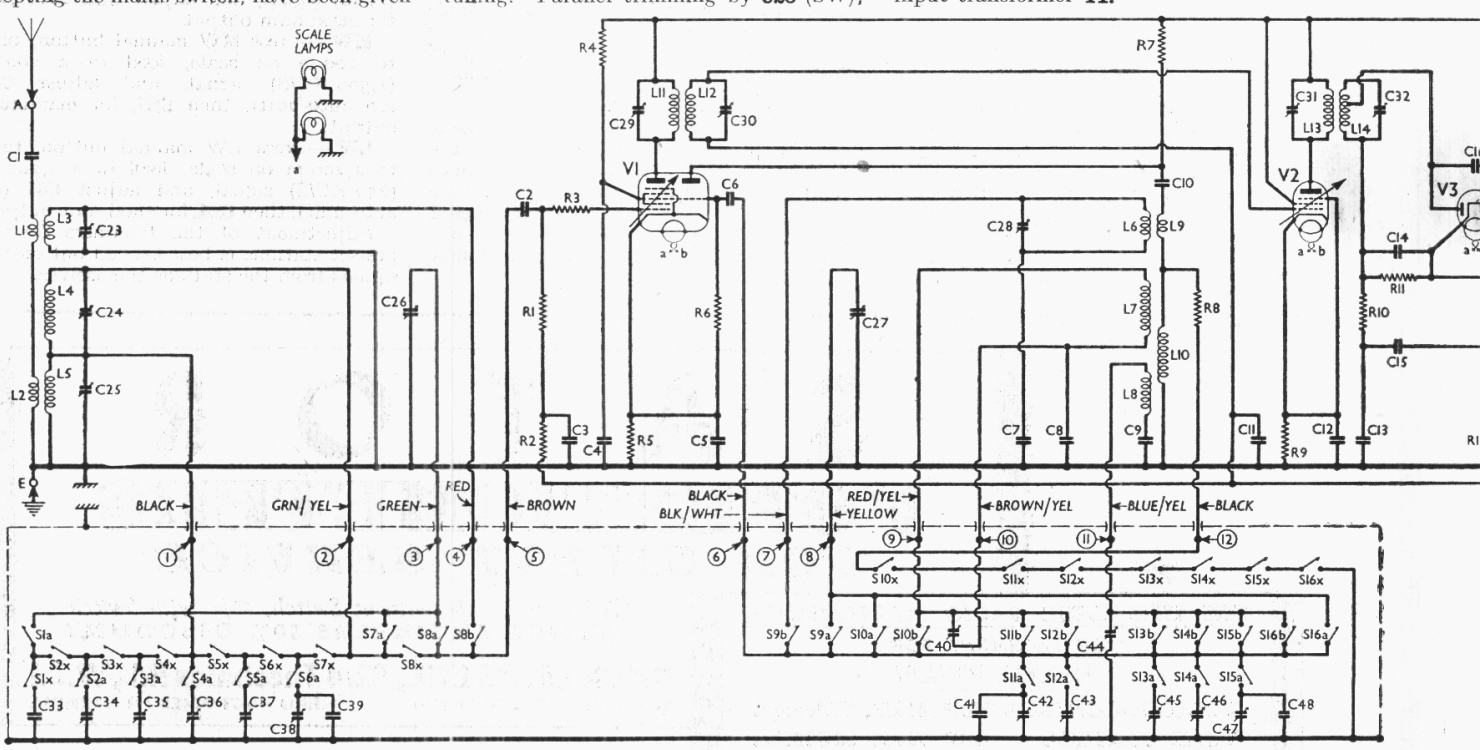
Aerial input is via coupling coils **L1** (SW) and **L2** (MW and LW) to single-tuned circuits comprising coils **L3** (SW), **L5** (MW) and **L4** (LW) tuned by **C26** via switches **S8a, S8b** (SW), **S1a** (MW) or **S7a** (LW) for manual tuning, or by pre-set condensers **C34** to **C39** via selector switches **S2a** to **S6a** for automatic tuning. During MW operation, manual or automatic, **S5x, S6x** and **S7x** are closed to short-circuit **L4**, whereas on LW, one of these will be open and **S1x** to **S4x** will be closed to connect **C33** across **L5; L5, C33** then form part of the aerial coupling to **L4.**

First valve (**V1, Mazda metallised AC/TH1**) is a triode pentode operating as frequency changer with internal coupling. Triode oscillator grid coils **L6** (SW), **L8** (MW) and **L7** (LW) are tuned by **C27** via switches **S9a, S9b** (SW), **S16a, S16b** (MW) or **S10a, S10b** (LW) for manual tuning, or by pre-set condensers **C41, C42, C43** and **C45** to **C48** via selector switches **S11a** and **S11b** to **S15a** and **S15b** for automatic tuning. Parallel trimming by **C28** (SW), **C44** (MW) and **C40** (LW). As **C40** and **C44** are located physically on the press-button assembly, they are shown there in our diagram. Series tracking by condensers **C7** (SW), **C9** (MW) and **C8** (LW). Reaction by coils **L9** (SW) and **L10** (MW and LW). During MW and LW operation, one of the series switches **S10x** to **S16x** is open, but on SW all are closed so that **R8** is connected across **L10,** between **L9** and chassis.

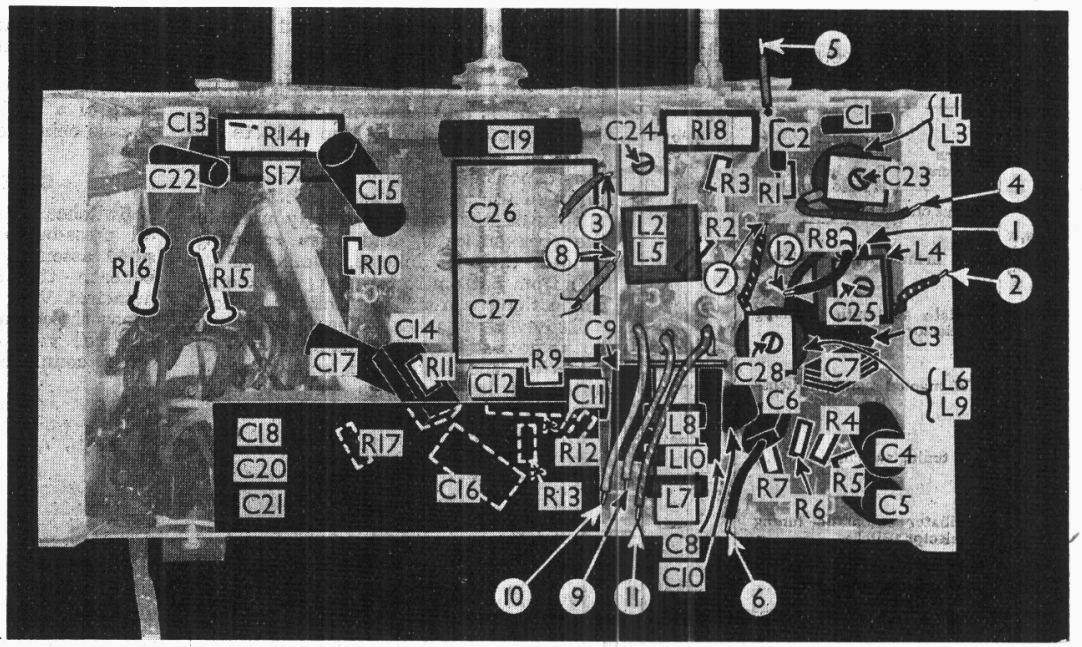
Second valve (**V2, Mullard metallised VP4B**) is a variable-mu RF pentode operating as intermediate frequency amplifier with tuned-primary tuned-secondary transformer couplings **C29, L11, L12, C30,** and **C31, L13, L14, C32.**

Intermediate frequency 465KC/S.

Diode second detector is part of separate double diode valve (**V3, Mullard metallised 2D4A**). Audio frequency component in rectified output is developed across load resistance **R11** and passed via IF stopper **R10,** AF coupling condenser **C15** and manual volume control **R14** to CG of beam tetrode output valve (**V4, Mazda AC5/Pen**). Provision for connection of gramophone pick-up across **R14.** Fixed tone correction by **C17** in anode circuit; variable tone control by **C19, R18,** also in anode circuit. Provision for connection of high impedance external speaker across primary of internal speaker input transformer **T1.**



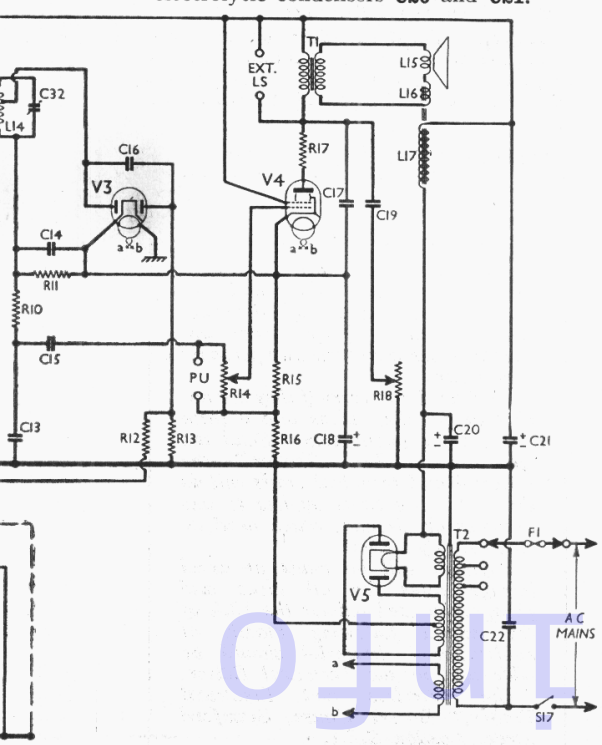
Circuit diagram of the Decca PT/AW 3-band press-button superhet. The PC/AW console is identical, while the modifications for the PG/AW MW coils are below the LW coils.



Under-chassis view, with the press-button tuning unit removed. The connections to this unit are numbered to agree with the circuit diagram, and the view of the unit overleaf. **S17** is the only switch apart from those in the press-button unit.

Second diode of **V3,** fed from tap on **L14** via **C16,** provides DC potential which is developed across load resistance **R13** and fed back through decoupling circuits as GB to FC and IF valves, giving automatic volume control. Delay voltage is obtained from drop along resistances **R15, R16** in **V4** cathode lead to chassis.

HT current is supplied by IHC full-wave rectifying valve (**V5, Brimar R2**). Smoothing by speaker field **L17** and dry electrolytic condensers **C20** and **C21.**



the PG/AW radiogram are given overleaf. Note that the

COMPONENTS AND VALUES

	CONDENSERS	Values (μF)
C1	Aerial series condenser	0·0004
C2	V1 pentode CG condenser	0·0001
C3	V1 pentode CG decoupling	0·02
C4	V1 SG decoupling	0·1
C5	V1 cathode by-pass	0·1
C6	V1 osc. CG condenser	0·0001
C7	Osc. circuit SW tracker	0·0043
C8	Osc. circuit LW tracker	0·00028
C9	Osc. circuit MW tracker	0·000565
C10	V1 osc. anode coupling	0·0002
C11	V2 CG decoupling	0·02
C12	V2 cathode by-pass	0·1
C13	IF by-pass condensers	0·0001
C14		0·0001
C15	AF coupling to V4	0·02
C16	Coupling to V3 AVC diode	0·0001
C17	Fixed tone corrector	0·006
C18*	V4 cathode by-pass	50·0
C19	Part of variable tone control	0·05
C20*	HT smoothing condensers	8·0
C21*		8·0
C22	Mains RF by-pass	0·006
C23‡	Aerial circuit SW trimmer	—
C24‡	Aerial circuit LW trimmer	—
C25‡	Aerial circuit MW trimmer	—
C26†	Aerial circuit manual tuning	—
C27†	Osc. circuit manual tuning	—
C28‡	Osc. circuit SW trimmer	—
C29‡	1st IF trans. pri. tuning	—
C30‡	1st IF trans. sec. tuning	—
C31‡	2nd IF trans. pri. tuning	—
C32‡	2nd IF trans. sec. tuning	—
C33	Aerial LW coupling	0·00125
C34‡	Aerial circuit MW automatic tuning trimmers	—
C35‡		—
C36‡		—
C37‡	Aerial circuit LW automatic tuning trimmers	—
C38‡		—
C39		0·0002
C40‡	Osc. circuit LW trimmer	—
C41	Oscillator circuit LW automatic tuning trimmers	0·0002
C42‡		—
C43‡		—
C44‡	Osc. circuit MW trimmer	—
C45‡	Oscillator circuit MW automatic tuning trimmers	—
C46‡		—
C47‡		—
C48		0·00003

* Electrolytic. † Variable. ‡ Pre-set.

	RESISTANCES	Values (ohms)
R1	V1 pentode CG resistance	500,000
R2	V1 pentode CG decoupling	500,000
R3	V1 pentode CG stopper	40
R4	V1 SG HT feed	15,000
R5	V1 fixed GB resistance	200
R6	V1 osc. CG resistance	50,000
R7	V1 osc. anode HT feed	30,000
R8	Osc. SW reaction damping	75
R9	V2 fixed GB resistance	200
R10	IF stopper	70,000
R11	V3 signal diode load	300,000
R12	AVC line decoupling	500,000
R13	V3 AVC diode load	500,000
R14	Manual volume control	500,000
R15	V4 GB and AVC delay resistances	140
R16		160
R17	V4 anode RF stopper	150
R18	Variable tone control	50,000

	OTHER COMPONENTS	Approx. Values (ohms)
L1	Aerial SW coupling coil	0·2
L2	Aerial MW and LW coupling	13·0
L3	Aerial SW tuning coil	Very low
L4	Aerial LW tuning coil	12·0
L5	Aerial MW tuning coil	2·5
L6	Osc. circuit SW tuning coil	Very low
L7	Osc. circuit LW tuning coil	3·3
L8	Osc. circuit MW tuning coil	1·6
L9	Oscillator SW reaction	0·4
L10	Osc. LW and MW reaction	5·3
L11	1st IF trans. Pri.	5·5
L12	1st IF trans. Sec.	5·5
L13	2nd IF trans. Pri.	5·5
L14	2nd IF trans. Sec., total	5·5
L15	Speaker speech coil	1·5
L16	Hum neutralising coil	0·2
L17	Speaker field coil	1,000·0
T1	Speaker input trans. Pri.	250
	Speaker input trans. Sec.	0·25

Continued overleaf

	OTHER COMPONENTS *Continued*		Approx. Values (ohms)
T2	Mains trans.	Pri, total ..	30·0
		Heater sec. ..	0·05
		Rect. heat. sec.. .	0·2
		HT sec., total ..	550·0
F1	Mains circuit fuse		—
S1a, x and S16a, b, x	MW manual tuning switches		—
S2a, x to S6a, x	Aerial automatic tuning selector switches		—
S7a, x and S10a, b, x	LW manual tuning switches		—
S8a,b, x and S9a, b	SW tuning switches		—
S11a, b, x to S15a, b, x	Oscillator automatic tuning selector switches		—
S17	Mains switch, ganged R14 ..		—

DISMANTLING THE SET

A detachable bottom is fitted to the cabinet and upon removal (four countersunk-head wood screws) gives access to the station trimmers.

Removing Chassis.—If it is desired to remove the chassis from the cabinet, remove the three control knobs (recessed grub screws) and the two bolts (with claw and spring washers) holding the chassis to the bottom of the cabinet. Now remove the aerial, earth and pick-up socket panel (three round-head wood screws), when the chassis can be withdrawn to the extent of the speaker leads, which should be sufficient for normal purposes.

Before access can be gained to the components beneath the chassis it is necessary to remove the press-button unit. This is done by unsolding ing the twelve leads and removing the four self-tapping screws holding the unit to the chassis. *When replacing*, consult the illustrations of the under-chassis and the press-button unit for the connections.

To free the chassis entirely unsolder the speaker leads, and *when replacing*, connect them as follows, numbering the tags from bottom to top :—1, no external connection ; 2, red ; 3, black ; 4, yellow.

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, no external connection ; 2, two red leads ; 3, two black leads ; 4, yellow.

VALVE ANALYSIS

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 AC/TH1	238	3·2	112	8·6
	Oscillator			
	95	5·1		
V2 VP4B	238	8·4	238	2·9
V3 2D4A	—	—	—	—
V4 AC/5Pen	220	39·0	238	7·1
V5 R2	302†	—	—	—

† Each anode, AC.

Valve voltages and currents given in the table above are those measured in our receiver when it was operating on mains of 230 V, using the 240 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.

GENERAL NOTES

Switches.—**S1a,x** to **S16a, b, x** are all press-button switches, in a double-sided assembly in the auto-tuning unit beneath the chassis, and a separate detached view of this is given. This shows the contacts of all the switches, and also the various pre-set condensers and other components associated with this unit.

There are eight press-buttons, three for wavechanging and five for station selection. Each controls two series of switches, one on each side of the switch bank. Thus the left-hand button (looking at the front of the cabinet) controls **S1a, x** and **S16a, b, x,** the second controls **S2a, x** and **S15a, b, x,** and so on.

The suffixes **a, b, x,** have the usual significance. When a button is pressed, **a** and **b** switches close, while the **x** switches open, and vice versa.

S17 is the QMB mains switch, ganged with the volume control **R14.**

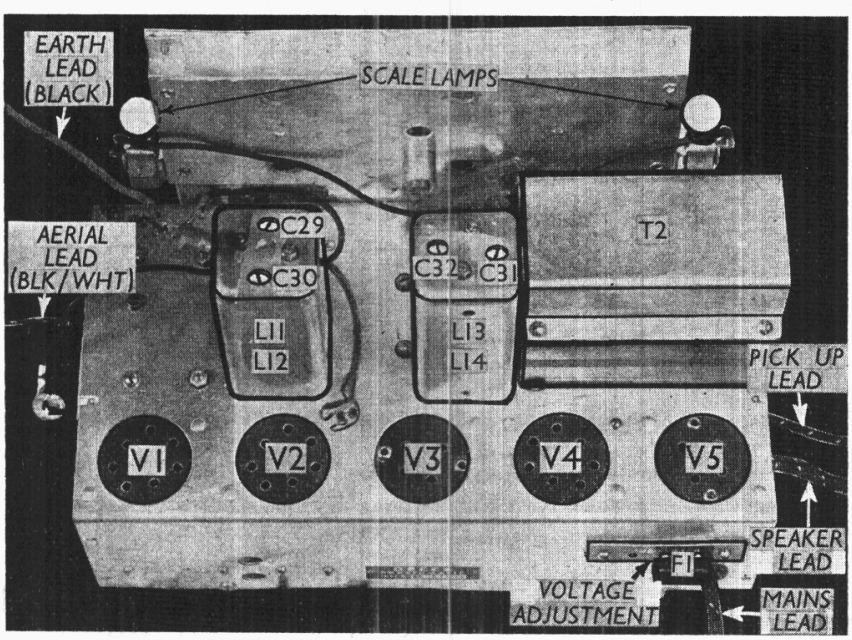
Coils.—**L1, L3 ; L2, L5 ; L4 ; L6, L9 ;** and **L7, L8, L10** are in five unscreened units beneath the chassis. The IF transformers **L11, L12** and **L13, L14** are in two screened units on the chassis deck, with their associated trimmers.

Fuse F1.—This is combined with the mains voltage adjustment plug, a piece of 2A wire being connected between the two pins.

Scale Lamps.—These are two MES types, rated at 6·0 V, 0·3 A.

External Speaker.—Two sockets are provided at the rear of the cabinet for a high impedance (8,000 O) external speaker. The sockets are not isolated from the HT supply.

Condensers C18, C20, C21.—These are three dry electrolytics in a single carton



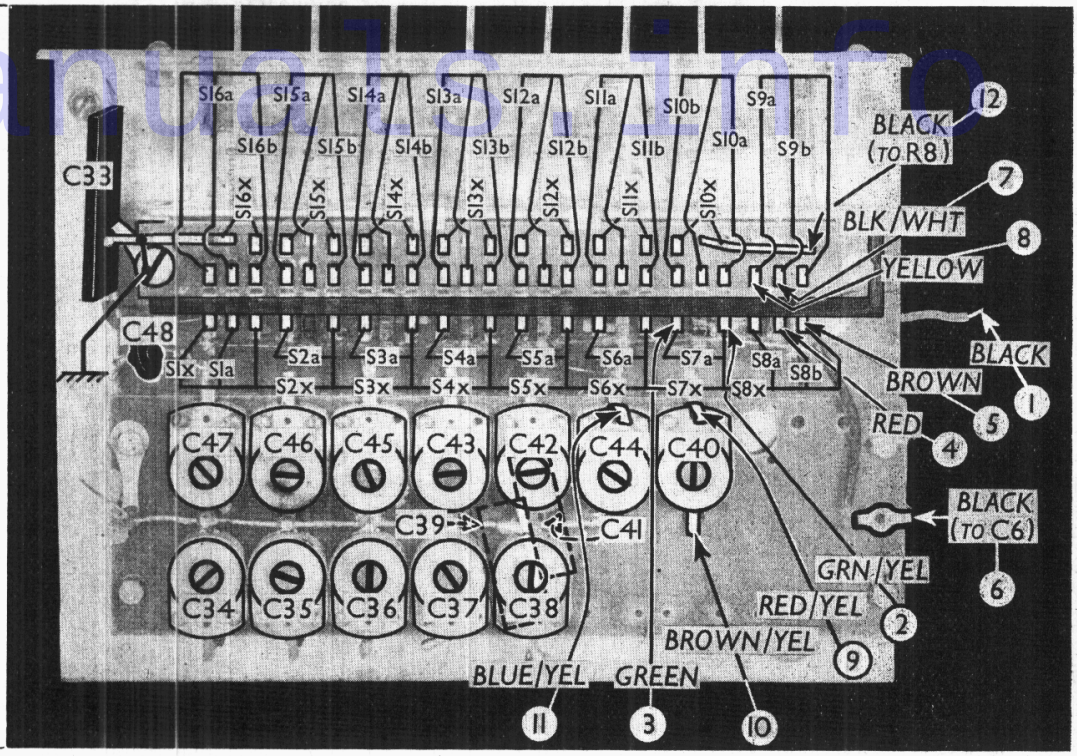
Plan view of the chassis. **F1** is a fuse incorporated in the mains voltage adjustment plug.

Service Hints Wanted

Service engineers are invited to submit hints regarding the maintenance of all kinds of domestic electrical, radio and television apparatus—based on their own personal experiences.

They need not worry if they are not able to put their ideas into a form suitable for publication. Send the ideas to "The Trader"—the editorial and technical staffs will do the rest. The same applies to any sketches or circuits, which need be only roughly drawn.

Payment will be made at usual lineage rates for all ideas and paragraphs used—about the 10th of the month following month of publication. Material should be addressed to the Technical Editor, "The Wireless and Electrical Trader," Dorset House, Stamford Street, London, S.E.1.



View of the press-button tuning unit as seen from the underside of the chassis. The tags of all the switches are indicated, and the connections to the main chassis are numbered and colour-coded to agree with the circuit and the under-chassis view.

beneath the chassis, having a common negative (black) lead. The yellow lead is the positive of **C18** (50 μF, 15 peak volts); the blue lead is the positive of **C20** (8μF, 525 PV) and the red lead the positive of **C21** (8μF, 450 PV).

Auto-Tuning Unit.—All the inter-connecting leads (of which there are twelve) are indicated and colour-coded on the circuit diagram, and on the under-chassis view and auto-tuning unit illustration.

The auto-unit contains all the press-button switches, twelve Tempa trimmers (of which ten are for the pre-tuned stations, and two are the MW and LW oscillator trimmers), three extra fixed trimmers (**C39, C41** and **C48**), and the aerial LW coupling condenser **C33.**

Note that in the circuit diagram the MW coils are below the LW coils, a reversal of the usual practice. Thus **L4** and **L7** are LW coils and **L5** and **L8** are MW coils.

PG/AW MODIFICATIONS

The radiogram model is very similar, except for the addition of a gramophone motor, and a pick-up. The pick-up is switched into circuit by a single-pole changeover switch, which either connects the upper pick-up socket to the top of **R14,** on gram., or vice-versa on radio.

CIRCUIT ALIGNMENT

IF Stages.—According to the makers, the IF trimmers are adjusted at the factory for the correct response curve with an oscilloscope, and should not be touched unless they have been tampered with, or a new transformer has been fitted. The IF is 465 KC/S, and alignment follows the usual practice.

RF and Oscillator Stages.—See that pointer is vertical when gang is at maximum. Connect signal generator to **A** and **E** sockets, via a suitable dummy aerial.

SW.—Press SW manual button, tune to 15 MC/S on scale, feed in a 15 MC/S (20 m) signal, and adjust **C28,** then **C23,** for maximum output.

MW.—Press MW manual button, tune to 200 m on scale, feed in a 200 m (1,500 KC/S) signal, and adjust **C44** (on auto-unit), then **C25,** for maximum output.

LW.—Press LW manual button, tune to 1,200 m on scale, feed in a 1,200 m (250 KC/S) signal, and adjust **C40** (on auto-unit), then **C24,** for maximum output.

Adjustment of the trimmers for the pre-set stations is best carried out on the signals from the stations themselves.

Printed in Great Britain by Sanders Phillips & Co., Ltd., The Baynard Press, Chryssell Road, London, S.W.9.