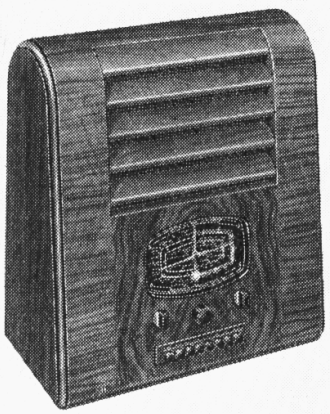
'TRADER' SERVICE SHEET 304

DECCA PT/AC AND PG/AC RADIOGRAM



THE Decca PT/AC Prestomatic receiver is a 4-valve (plus rectifier) AC 3-band superhet with press button tuning for eight pre-determined stations (seven buttons), the buttons switching into circuit trimmers adjusted to the required wavelength. An eighth button switches the set to manual tuning. The receiver has a short-wave range of 19-49 m, and includes provision for both a gramophone pick-up and extension speaker, while it is suitable for mains of 200-250 V, 50-60 C/S.

A very similar chassis is fitted in the PG/AC Prestomatic radiogram but this *Service Sheet* was prepared on a PT/AC. The difference in the PG/AC is explained under "Radiogram Modifications."

CIRCUIT DESCRIPTION

Aerial input via series condenser **C1** and coupling coils **L2** (SW), **L3** (MW), and (via 261 m rejector circuit **L1, C2**) **L4** (LW) to single tuned circuits comprising **L5** (SW), **L6** (MW), **L7** (LW), and **C27** (manual tuning) or one of pre-set trimmers **C35-C45** (auto tuning) according to which button is depressed, auto manual change-over being effected by **S20, S21.**

First valve (**V1, Mazda metallised AC/TH1**) is a triode hexode operating as frequency changer with internal coupling. Triode oscillator grid coils **L8** (SW), **L9** (MW) and **L10** (LW) are tuned by **C28** (manual) or one of pre-set trimmers **C46-C56** (auto tuning) again according to which button is depressed, auto/manual change-over being effected by **S29, S30.** Parallel trimming by **C57** (MW) and **C9, C30** (LW); series tracking by **C10** (SW), **C58** (MW) and **C29** (LW). Reaction by coils **L11** (SW), **L12** (MW) and **L13** (LW).

Second valve (**V2, Mazda metallised AC/VP2**) is a variable-mu RF pentode operating as intermediate frequency amplifier with tuned-primary tuned-secondary transformer couplings **C31, L14, L15, C32** and **C33, L16, L17, C34.**

Intermediate frequency 465 KC/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 **R13** and passed via IF stopper **R12,** AF coupling condenser **C17** and manual volume control **R15** to CG of tetrode output valve (**V4, Mazda AC/Pen**). Provision for connection of gramophone pick-up across **R15.** Fixed tone correction by **C21** and variable tone control by **R18, C19** in anode circuit. Provision for connection high impedance external speaker across primary of internal speaker input transformer **T1.**

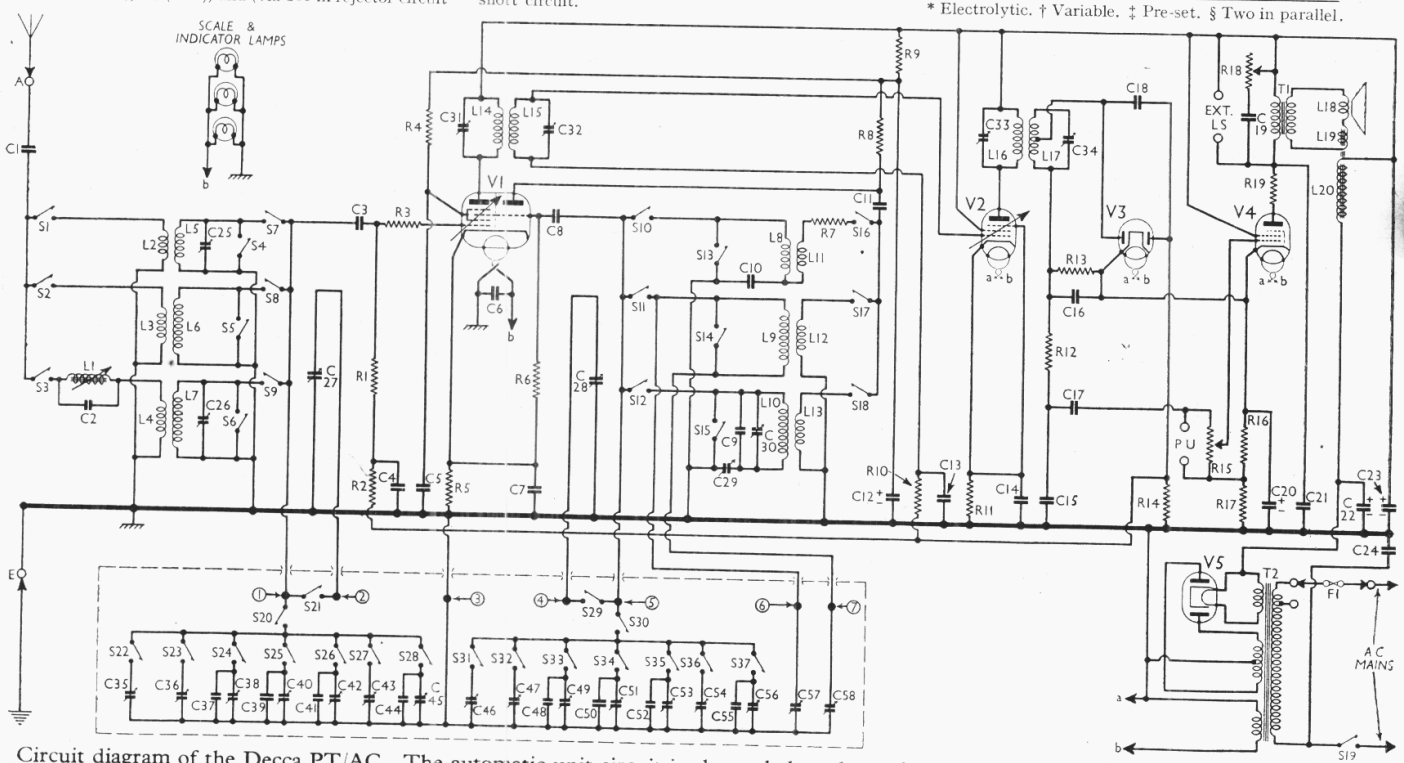
Second diode of **V3,** fed from tapping on **L17** via **C18,** provides DC potential which is developed across load resistance **R14** and fed back through decoupling circuits as GB to FC and IF valves, giving automatic volume control. Delay voltage is obtained from drop along **R16, R17** in **V4** cathode circuit.

HT current is supplied by IHC full-wave rectifying valve (**V5, Mullard 1W4/350** or **Brimar R2**). Smoothing by speaker field **L20** and dry electrolytic condensers **C22, C23.** Mains circuit RF filtering by **C24.** Fuse **F1** protects mains input circuit against accidental short circuit.

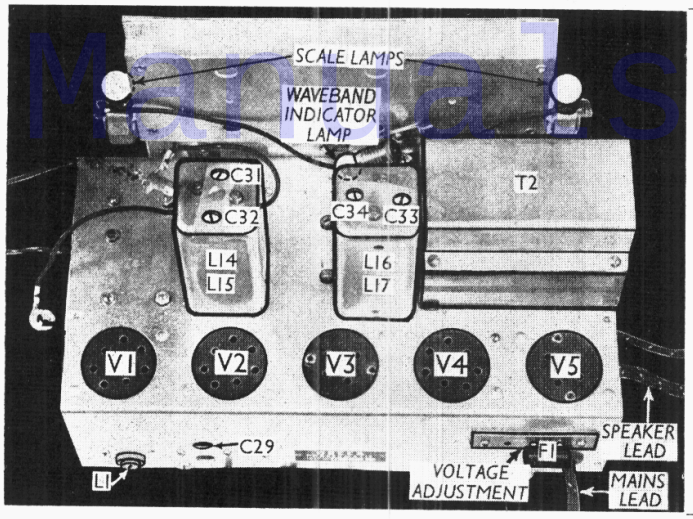
COMPONENTS AND VALUES

	CONDENSERS	Values (μF)
C1	Aerial series condenser	0·0004
C2	LW aerial circuit 261 m rejector tuning	0·0001
C3	V1 hexode CG condenser	0·000012
C4	V1 hexode CG decoupling	0·02
C5	V1 SG RF by-pass	0·1
C6	V1 heater RF by-pass	0·01
C7	V1 cathode by-pass	0·1
C8	V1 osc. CG condenser	0·0001
C9	Osc. circuit LW fixed trimmer	0·00006
C10	Osc. circuit SW tracker	0·003§
C11	V1 osc. anode coupling	0·0002
C12*	V1 SG and osc. anode decoupling	4·0
C13	V2 CG decoupling	0·02
C14	V2 cathode by-pass	0·1
C15	IF by-pass condensers	0·0001
C16	IF by-pass condensers	0·0001
C17	AF coupling to V4	0·02
C18	Coupling to V3 AVC diode	0·0001
C19	Part of variable tone control	0·05
C20*	V4 cathode by-pass	50·0
C21	Fixed tone corrector	0·006
C22*	HT smoothing	8·0
C23*	HT smoothing	8·0
C24	Mains RF by-pass	0·006
C25‡	Aerial circuit SW trimmer	—
C26‡	Aerial circuit LW trimmer	—
C27†	Aerial circuit manual tuning	—
C28†	Oscillator circuit manual tuning	—
C29‡	Osc. circuit LW tracker	—
C30‡	Osc. circuit LW trimmer	—
C31‡	1st IF trans. pri. tuning	—
C32‡	1st IF trans. sec. tuning	—
C33‡	2nd IF trans. pri. tuning	—
C34‡	2nd IF trans. sec. tuning	—

* Electrolytic. † Variable. ‡ Pre-set. § Two in parallel.



Circuit diagram of the Decca PT/AC. The automatic unit circuit is shown below the main circuit, connected up by the seven wires which are numbered to correspond with the same wires in the illustrations of the under-chassis and auto-unit.



Plan view of the chassis. **L1** and **C29** can be adjusted from the rear. **F1** is a fuse incorporated in the mains adjustment plug.

CONDENSERS (*Continued*)		Values (μF)
	AUTO-TUNING UNIT	
C35‡		—
C36‡		—
C37		0·00003
C38‡		—
C39	Aerial circuit automatic tuning trimmers ..	0·00019§
C40‡		—
C41		0·00003
C42‡		—
C43‡		—
C44		0·00003
C45‡		—
C46‡		—
C47‡		—
C48		0·00003
C49‡		—
C50	Oscillator circuit automatic tuning trimmers ..	0·00019§
C51‡		—
C52		0·00003
C53‡		—
C54‡		—
C55		0·00003
C56‡		—
C57‡	Osc. circuit MW trimmer ..	—
C58‡	Osc. circuit MW tracker ..	—

‡ Pre-set. § Two in parallel.

RESISTANCES		Values (ohms)
R1	V1 hexode CG resistance ..	500,000
R2	V1 hexode CG decoupling ..	500,000
R3	V1 hexode CG stabiliser ..	40
R4	V1 SG HT feed	15,000
R5	V1 fixed GB	200
R6	V1 osc. CG resistance ..	50,000
R7	Osc. reaction SW stabiliser ..	40
R8	V1 osc. anode HT feed ..	30,000
R9	V1 SG and osc. anode HT feed	5,000
R10	V2 CG decoupling	500,000
R11	V2 fixed GB	200
R12	IF stopper	70,000
R13	V3 signal diode load	3,000,000
R14	V3 AVC diode load	500,000
R15	Manual volume control ..	500,000
R16	V4 GB and AVC delay resistances	140 160
R17		
R18	Variable tone control ..	50,000
R19	V4 anode RF stopper ..	150

OTHER COMPONENTS		Approx. Values (ohms)
L1	LW aerial circuit 261m rejector coil	5·0
L2	Aerial circuit SW coupling circuit	0·25

OTHER COMPONENTS (*Continued*)		Approx. Values (ohms)
L3	Aerial circuit MW coupling coil	14·0
L4	Aerial circuit LW coupling coil	75·0
L5	Aerial circuit SW tuning coil	0·05
L6	Aerial circuit MW tuning coil	3·5
L7	Aerial circuit LW tuning coil	17·0
L8	Osc. circuit SW tuning coil ..	0·05
L9	Osc. circuit MW tuning coil	2·0
L10	Osc. circuit LW tuning coil ..	4·0
L11	Osc. SW reaction coil ..	0·4
L12	Osc. MW reaction coil ..	1·0
L13	Osc. LW reaction coil. . ..	6·25
L14	1st IF trans. Pri. ..	6·0
L15	1st IF trans. Sec. ..	6·0
L16	2nd IF trans. Pri. ..	6·0
L17	2nd IF trans. Sec., total ..	6·0
L18	Speaker speech coil	1·6
L19	Hum neutralising coil. . ..	0·1
L20	Speaker field coil	1,000·0
T1	Speaker input trans. Pri. ..	290·0
	Speaker input trans. Sec. ..	0·15
T2	Mains trans. Pri., total ..	29·0
	Mains trans. Heater sec. ..	0·1
	Mains trans. Rect. heat sec. ..	0·1
	Mains trans. HT sec., total ..	550·0
F1	Mains circuit fuse	—
S1-S18	Waveband switches ..	—
S19	Mains switch, ganged R15 ..	—
S20, 21	Aerial circuit auto/manual change switches	—
S22-28	Aerial circuit auto selector switches	—
S29, 30	Osc. circuit auto/manual change switches	—
S31-37	Osc. circuit auto selector switches	—

DISMANTLING THE SET

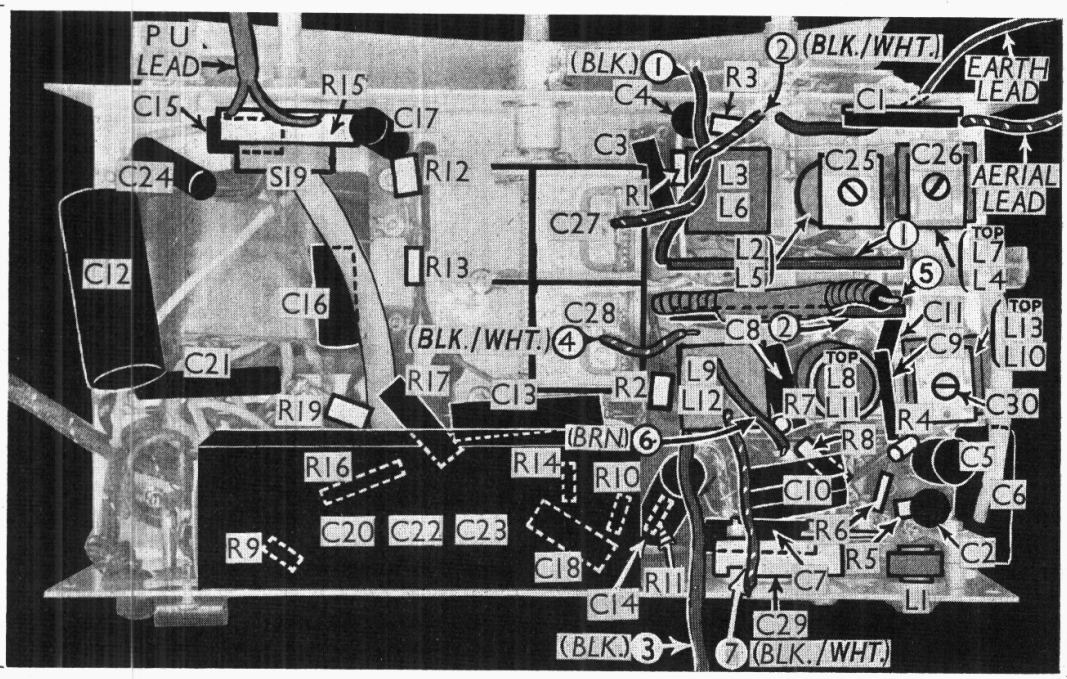
A detachable bottom is fitted to the cabinet and upon removal (four countersunk-head wood screws) gives access to most of the trimmers.

Removing Chassis.—To remove the chassis from the cabinet, remove the three knobs (recessed grub screws) and the two bolts (with claw and lock washers) holding the chassis to the bottom of the cabinet. The chassis can now be withdrawn to the extent of the speaker leads, which is sufficient for normal purposes. *When replacing*, make sure that the chassis is central in the cabinet as otherwsie the push buttons may jam on the escutcheon.

If it is desired to free the chassis entirely, unsolder the aerial, earth, pick-up and speaker leads. *When replacing*, note that the black/white lead goes to the aerial socket and connect the speaker leads as follows, numbering the tags from left to right :—1, no lead to chassis ; 2, red ; 3, no lead to chassis ; 4, black ; 5, blue.

Continued overleaf

Under-chassis view, with the auto-unit removed. The connecting leads are all numbered to correspond with the numbers on the auto-unit on page VIII, and on the circuit diagram.



DECCA PT/AC—*Continued*

Removing Auto-Unit.—Before access can be gained to the components beneath the chassis it will be necessary to remove the auto-unit. To do this unsolder the seven wires connecting it to the main chassis and remove the four self-tapping screws holding it in place. *When re lacing*, refer to the chassis illustrations for the connections.

Removing Speaker.—To remove the speaker from the cabinet, unsolder the leads and remove the nuts (and lock washers) from the four screws holding the speaker to the sub-baffle. *When re lacing*, see that the transformer is at the bottom and connect the leads as follows, numbering the tags from left to right:—1, black lead to tone control and one end of **C19**; 2, red leads to tone control, extension speaker panel and chassis; 3, blank; 4, black leads to extension speaker panel and chassis, and other end of **C19**; 5, blue lead to chassis.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on mains of 232V, using the 220-240 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 as the aerial and earth leads were shorted.

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 AC/TH1	247 Oscillator 63	3·5 — 4·1	92	6·5
V2 AC/VP2	247	11·0	247	3·1
V3 2D4A	—	—	—	—
V4 AC/5Pen	227	42·0	247	7·3
V5 IW4/350	308†	—	—	—

† Each anode, AC.

GENERAL NOTES

Switches.—S1-S18 are the waveband switches, in two rotary units beneath the chassis, which are indicated in our under-chassis view, and shown in detail in the diagrams in col. 3, where they are seen looking from the underside of the chassis, in the directions of the arrows in the under-chassis view.

TABLE AND DIAGRAMS OF THE SWITCH UNITS

Switch	LW	MW	SW
S1	—	—	C
S2	—	C	—
S3	C	—	—
S4	C	C	—
S5	C	—	C
S6	—	C	C
S7	—	—	C
S8	—	C	—
S9	C	—	—
S10	—	—	C
S11	—	C	—
S12	C	—	—
S13	C	C	—
S14	C	—	C
S15	—	C	C
S16	—	—	C
S17	—	C	—
S18	C	—	—

The table above gives the switch positions for the three control settings, starting from fully anti-clockwise. A dash indicates open, and **C** closed.

S19 is the QMB mains switch, ganged with the volume control **R15.**

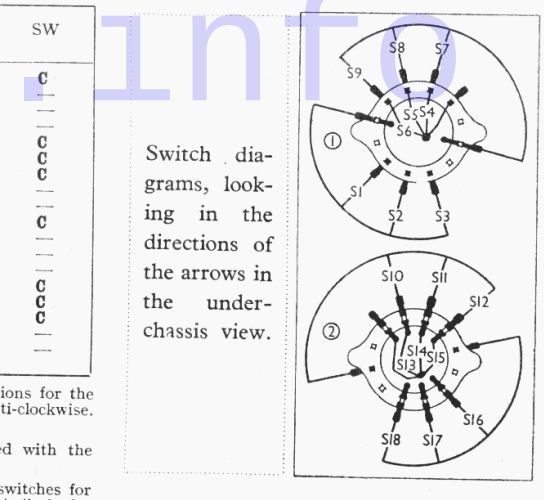
S20, S21 are the auto/manual change switches for the aerial circuit, while **S29, S30** operate similarly for the oscillator circuit. The four together form a double-pole double-throw switch, and are indicated in our view of the auto-unit. On pushing the manual button, **S21** and **S29** are *closed*, and **S20** and **S30** are *open* while with any station button depressed, **S21, S29** are *open* and **S20, S30** *closed*.

S22-S28 and **S31-S37** are the aerial and oscillator station selector switches, there being one of each to each button, as indicated in our view of the auto-unit. When a station button is depressed, its two switches (e.g., **S22** and **S31**) are *closed*, but all the other similar pairs are *open*.

Coils.—L1 is mounted on the rear chassis member. It has a screw-type iron core for adjustment if necessary.

L2-L13 are in pairs on tubular formers beneath the chassis, and are indicated in our under-chassis view.

The IF transformers **L14, L15** and **L16, L17** are in two screened units on the chassis deck, with their associated trimmers (see also "Chassis Divergencies").



Switch diagrams, looking in the directions of the arrows in the under-chassis view.

Scale and Indicator Lamps.—The two scale lamps and the waveband indicator lamp are all MES types, rated at 6 V, 0·3 A. The indicator lamp has a small bulb.

Fuse F1.—This is incorporated in the voltage adjustment plug, and is of the wire type. It should be replaced with 2 A fuse wire if necessary.

External Speaker.—Two sockets are provided at the rear of the cabinet for a high impedance (6,000-10,000 Ω) external speaker.

Components R18, C19.—R18 is mounted at the top of the right-hand side of the cabinet, and **C19** is on the speaker transformer **T1.** They do not therefore appear in our chassis illustrations.

Condensers C20, C22, C23.—These are three dry electrolytics in a single carton beneath the chassis, with a common negative (black) lead. The yellow lead is the positive of **C20** (50 μF, 15 V peak); the blue lead is the positive of **C22** (8 μF, 525 V peak), while the red lead is the positive of **C23** (8 μF, 450 V peak).

Trimmer Condensers.—The normal RF and oscillator trimmers (as distinct from those used for the pre-selected stations) are beneath the main chassis, and are indicated in the under-chassis view. There are two exceptions, however, **C57** and **C58,** the oscillator MW trimmer and tracker, which are both on the auto-unit. **C57** is either a silver-mica scrapable type, or a Tempa pre-set (in late chassis). **C58** is a large Tempa pre-set.

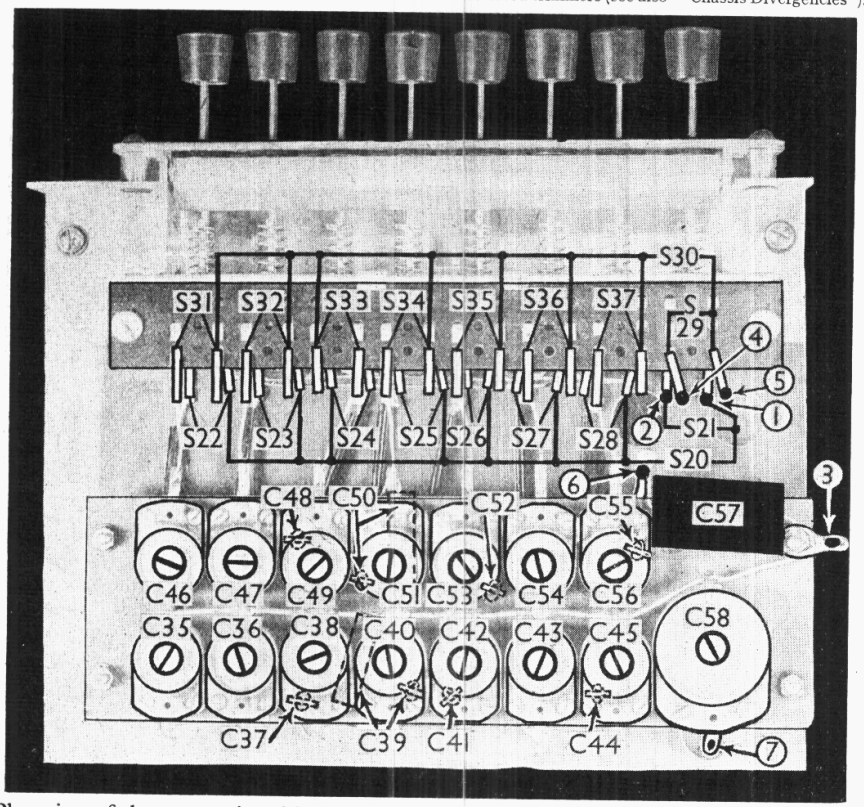
The trimmers for the pre-selected stations comprise fourteen Tempa pre-sets (seven for aerial, and seven for oscillator trimming), some of which incorporate also a fixed trimmer in their base. We do not indicate this in our diagrams, for the sake of clarity. In other cases the required capacity is made up by fixed trimmers connected externally, and situated beneath the paxolin plate carrying the Tempa pre-sets. In the case of **C39** and **C50,** two external fixed trimmers in parallel are used.

Auto-Unit Connections.—There are seven connections to the auto-unit, and these are indicated in the under-chassis view, the auto-unit view, and the circuit diagram, by numbers in circles and arrows.

Chassis Divergencies.—In chassis below serial number 51,100 **C57** is a scrapable silver-mica condenser as in our illustrations), but in later chassis this is replaced by a Tempa pre-set.

In our chassis the two IF transformers are tuned by dual pre-sets (similar to the Tempa types) in the cans. In earlier models the first IF transformer had fixed ceramic trimmers, and was adjusted by movable iron cores. The second transformer had ordinary trimmers and was fairly broadly tuned.

Models issued since the Radio Normandie change to 212·6 m will have different values for **C45** and **C56,** while **C44** and **C55** will not be present. Early models will need these alterations, and new Tempa pre-sets for the **C45** and **C56** positions are obtainable from Decca.



Plan view of the auto-unit, with the connection points to the main chassis indicated and numbered.

RADIOGRAM MODIFICATIONS

The radiogram model, PG/AC, has a similar chassis, but with the addition of a radio-gram change-over switch.

CIRCUIT ALIGNMENT

IF Stages.—Connect signal generator to control grid (top cap) of **V1** and chassis, and feed in a 465 KC/S signal. Adjust **C31, C32, C33** and **C34** for maximum output. In early models, adjust **C33** and **C34,** and the iron cores of **L14** and **L15.**

RF and Oscillator Stages.—Connect signal generator

Continued on page V

Printed in Great Britain as a supplement to *The Wireless & Electrical Trader* by Sanders Phillips & Co., Ltd., The Baynard Press, Chryssell Road, London, S.W.9