

Test Report

DECCALIAN RADIOGRAMS

Models 91
and 92

R.23

GENERAL

These are high-fidelity instruments employing a superhet circuit and covering wavebands of 13-50, 190-550, and 1000-2000 metres. The models differ only in respect of gramophone equipment; the 91 having a special Decca dual-speed transcription-quality single record player for 33½ and 78 r.p.m. while the 92 is fitted with an automatic changer, which may be a two-speed Decca unit, or in later production models a three-speed Garrard RC72A. Neither should be confused with the Model 90, which, although of similar appearance, has a different circuit, and is equipped with a 78 r.p.m. only record changer.

An interesting feature of design is the use of a gramophone pre-amplifier stage, incorporated to permit the use of Decca high-fidelity magnetic pick-up heads. Both models require an external aerial and earth, and are for use on 200-250 volts A.C. 50 c.p.s. Consumption is: Radio, 60 watts; Gramophone, 75 watts.

Made by Decca Radio and Television, 1-3 Brixton Road, London, S.W.9, these models are priced at £67 4s. for the 91, and £79 11s. 2d. for the 92 (including tax).

CIRCUIT DESCRIPTION

The aerial input includes tuned I.F. rejection by an acceptor circuit (L11/C1) in parallel with the aerial coils. Aerial coupling by C2 and S1 to L1 (S.W.) or L2 (M. and L.W.). C3 provides additional top coupling on Medium and Long Waves, while C4, shunted across L2 on Long Waves only, reduces M.W. break-through. On Gramophone, the aerial input is taken to earth.

V1 (6K8G or ECH35) is a triode-hexode, hexode-grid tuning components being L3 and C8 (S.W.), L3, L4, C6 and C8 (M.W.) and L3, L4, L5, C7 and C8 (L.W.). C10 provides a loose coupling between L4 and the oscillator to neutralise oscillator voltages which may otherwise reach the control grid. A tuned anode oscillator is used, the oscillator circuit consisting of L6, L7, and C15 on S.W. and of L8 and L9, together with their associated padders and trimmers on M.W. and L.W., C20 being the main oscillator tuning condenser. R4 and R6 are included to improve oscillator stability. V1 has no fixed bias, but is AVC controlled via R2.

The I.F. signal at 465 kc/s is taken to grid of V2 (6B8G) by IFT1, which has variable-capacity tuning. IFT2 is similar in design, but has a tapped secondary, the centre-tap of which feeds the diodes,

one providing signal rectification by means of R10 and C26, and the other an AVC voltage developed across the load resistor R13. The A.F. voltages appearing across R10 are fed via the I.F. filter R9/C27 and coupling condenser C28 to the top of the volume control, which is in the grid circuit of V3B, one half of a double-triode valve, 6SL7. The amplified output of this valve is taken via C31 to the grid of the output valve, V4 (6V6G). R22 in the anode circuit of this valve is an anode stopper, and the series combination, C37/R24, form the tone control.

The other triode of the 6SL7, V3A, is used as a gramophone pre-amplifier. A resistance-capacity network in the grid feed provides different bass compensation for 33½ and 78 r.p.m. records; R17, R18 and C33 being in use in both cases, with an additional condenser, C42, being brought into circuit for 78 r.p.m. constants, the changeover being made by a connecting link actually inside the 78 r.p.m. pick-up head, which has a three-pin plug connection. C32 is the gram. coupling condenser to the volume control.

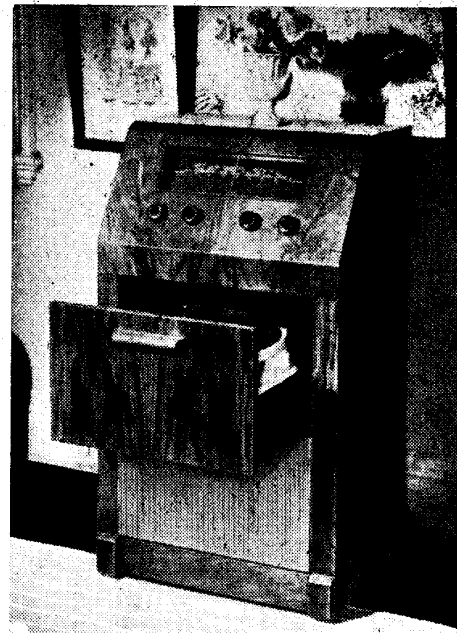
A full-wave rectifier, V5 (5Z4G) supplies H.T. to the set via the smoothing choke L10. C38, C39A and C39B are the smoothing capacitors. A mains input filter consisting of C40 and C41 is connected across the primary of the mains transformer, which is tapped for three voltage ranges.

CIRCUIT REALIGNMENT

A signal generator covering frequencies of 250, 465, and 1500 kc/s, and 6 and 15 mc/s is needed. The output meter may be connected across the speech coil at the Extension L.S. sockets. Care should be taken to keep the output of the signal generator low in order to avoid AVC action.

I.F. Alignment. Switch the set on and allow a few minutes for the valves to reach a stable operating temperature before attempting any trimmer adjustment. Prevent oscillator from working by shorting out C20, the oscillator section of the gang condenser. Set the signal generator to 465 kc/s and inject a signal directly to the grid (top cap) of V2. Adjust C25 and C24 for maximum output. Transfer generator output to grid (top cap) of V1 and adjust C12 and C11 for maximum, rocking the gang to check the shape of the peak. Repeat above adjustments, if necessary, to obtain an even response.

I.F. Trap. Still feeding in a 465 kc/s signal, apply the signal generator output to aerial socket of the receiver via a dummy aerial. Switch to M.W. and



remove short circuit from C20. Adjust slug of L11 (under aerial socket) for minimum output.

R.F. Alignment. With gang fully closed the tuning pointer should coincide with the 550 metre mark on the scale. If this is not so, the pointer should be moved along the cord until it is set correctly. Still feeding in a signal at the aerial socket, adjust as follows:—

S.W. Tune receiver to 50 metres and generator to 6 mc/s. Adjust core of L7 for maximum output.

M.W. Tune receiver to 200 metres and generator to 1500 kc/s. Adjust C19 and C6 for maximum output.

L.W. Tune receiver to 1200 metres and generator to 250 kc/s. Adjust C18 and C7 for maximum output.

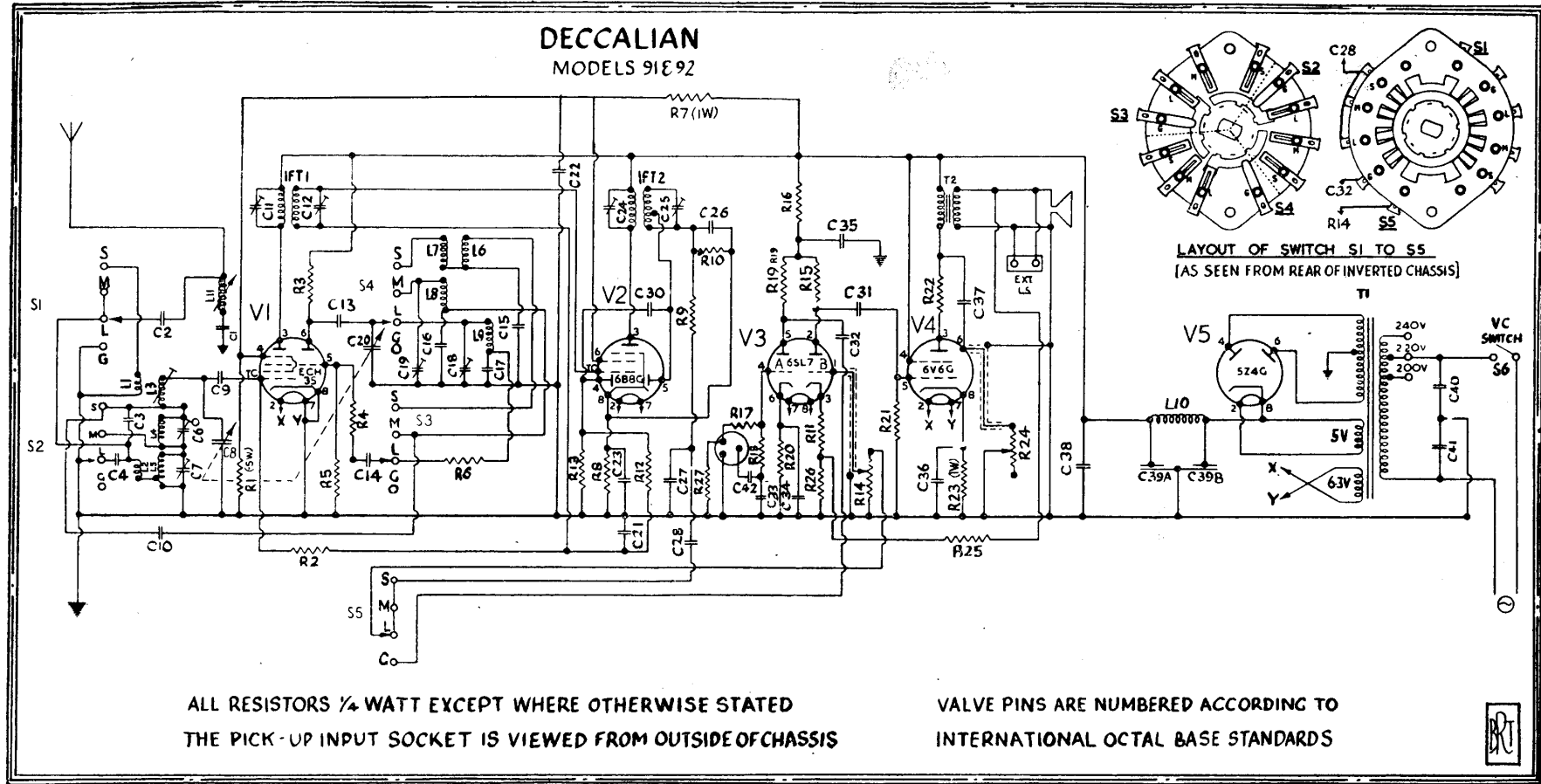
Repeat above operations in the same order. As fixed padding is used, no further adjustment should be required, and alignment is therefore complete.

GRAMOPHONE EQUIPMENT

The transcription-quality unit used in Model 91 has a constant-speed induction motor, change of turntable speed being achieved by drive gearing operated by a two-position lever on the motor plate. No automatic brake is provided, the motor circuit being made or broken by a toggle switch.

The Decca automatic changer fitted on earlier versions of Model 92 has two speeds—33½ and 78 r.p.m. It has a loading capacity of ten records, mixed, 10in. or 12in. Later models are fitted with the Garrard RC 72A mechanism,

(continued on page 2)



ALL RESISTORS 1/4 WATT EXCEPT WHERE OTHERWISE STATED
THE PICK-UP INPUT SOCKET IS VIEWED FROM OUTSIDE OF CHASSIS

VALVE PINS ARE NUMBERED ACCORDING TO
INTERNATIONAL OCTAL BASE STANDARDS



(continued from page 1)

which has turntable speeds of 33½, 45, and 78 r.p. .

On both models, Decca high-fidelity magnetic pick-up heads are used, these being easily removed by pulling them out from a three-pin socket. The Long-Playing head, Decca Type D, is coloured red, while the 78 r.p.m. head, Type C, may be white or brown. Both have sapphire styli, the L.P. tip having a radius of .001in. and the 78 r.p.m. point one of .0025in. Needle pressure is approximately 8 grams on L.P. and 25 grams on standard records, weight compensation being automatic. Circuit compensation for both types of records is arranged by using the three pins on the pick-up connecting plug to bring

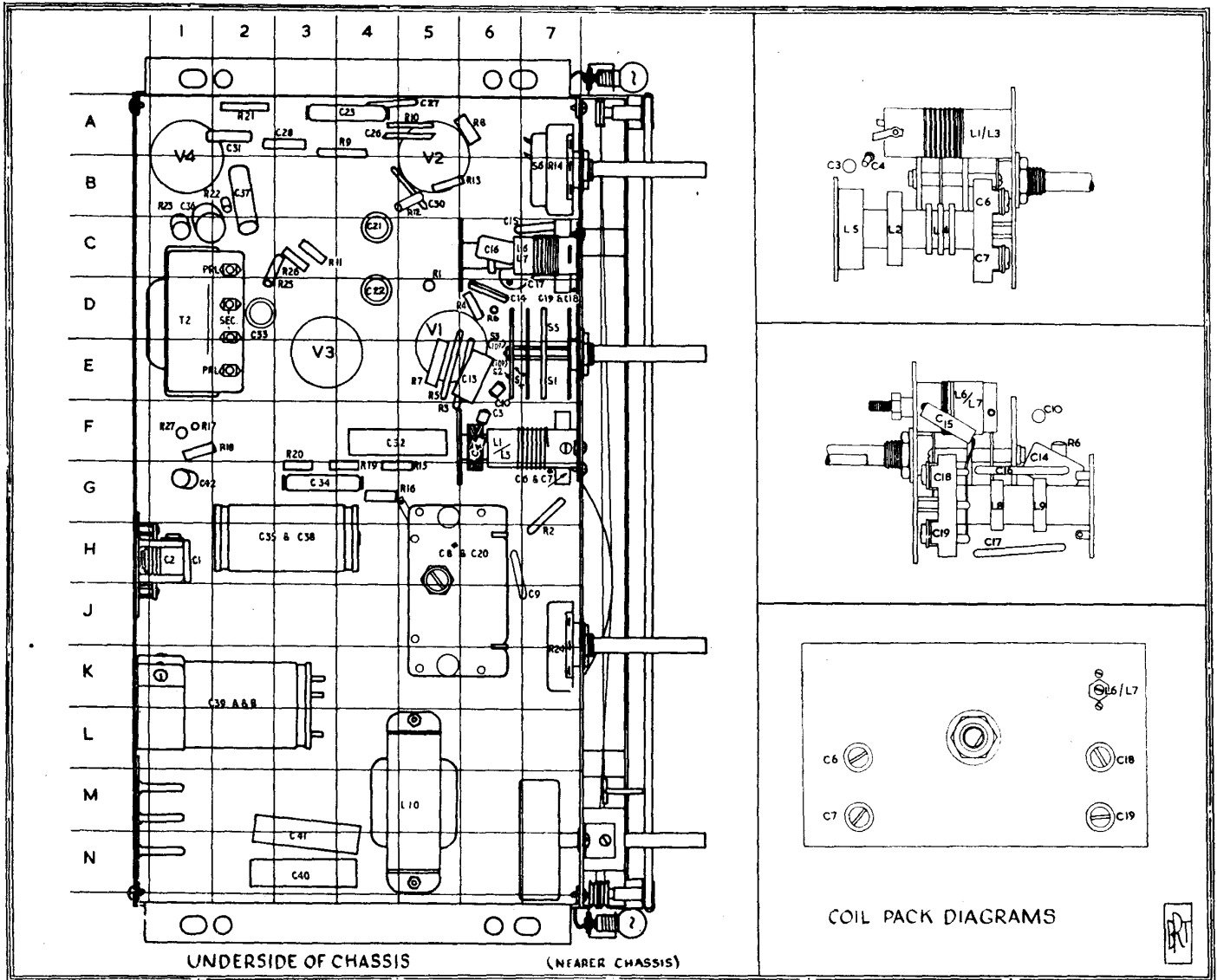
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CATHODE READINGS		H.T. VOLTAGE READINGS	
(Taken with Model 7 Avometer on 10V./100V. D.C. range)		(Taken with a Model 7 Avometer on 400V. D.C. range)	
Valve	Voltage	Rectifier heater to chassis	300 Volts
V2	1.4	Across C38	275 "
V3A	1.5	Anode of V4 to chassis	250 "
V3B	1.4	Across C35	230 "
V4	13.5	Anode of V3B to chassis	90 "
		Anode of V3A to chassis	90 "
		Across C22	70 "
		Oscillator anode to chassis	90-100 (working)
		(Switched to M.W.)	50 (not working)

REMOVING THE COIL PACK
(See diagrams of coil pack and switch S1 to S5)

- (1) Disconnect the screened aerial lead at S1.
- (2) Disconnect the red lead to C28, at C28.
- (3) Disconnect the brown/white lead to C32, at C32.
- (4) Disconnect the black/white lead to R14 (volume control) at R14.
- (5) Unsolder the black lead from C20 (tuner) at the coil pack.
- (6) Unsolder C13 from the same tag.
- (7) Unsolder the lead from C8 (tuner) to L1, at L1.
- (8) Unsolder R4 from the tag on the panel affixed to L8/L9.
- (9) A tag on the panel affixed to L8/L9 is used as an anchorage for the anode lead of V3. It is necessary to unsolder R15, and the lead to C35 from this tag.
- (10) Unscrew the three S.T. screws securing the coil pack to the chassis.

The coil pack may then be removed.



COMPONENT VALUES

Circuit ref.	Location	Value	Circuit ref.	Location	Value
R1	C5	36 K.ohms/20%	C1	H1	60pF/2%
R2	G7	1 M.ohm/2%	C2	H1	150pF/5%
R3	F5	50 K.ohms/20%	C3	F6	4pF
R4	D6	220 ohms/10%	C4	F6	47pF/2.5%
R5	E5	50 K.ohms/2%	C6	G7	50pF
R6	D6	10 K.ohms/10%	C7	G7	220pF
R7	E5	39 K.ohms/10%	C8	H5	483pF
R8	A6	330 ohms/20%	C9	H6	100pF
R9	A4	100 K.ohms/2%	C10	E6	4pF
R10	A5	100 K.ohms/2%	C11	I.F. can	220pF
R11	C3	2.2 K.ohms/20%	C12	I.F. can	220pF
R12	B5	470 K.ohms/20%	C13	E6	60pF/5%
R13	B6	1.5 M.ohms/20%	C14	D6	500pF
R14	B7	0.5 M.ohms	C15	C7	.005uF
R15	G5	220 K.ohms/20%	C16	C6	515pF/1%
R16	G4	22 K.ohms/20%	C17	D7	275pF/1%
R17	F1	68 K.ohms/20%	C18	D7	50pF
R18	F1	10 K.ohms/10%	C19	D7	50pF
R19	G4	220 K.ohms/10%	C20	H6	483pF
R20	F3	3.2 K.ohms/10%	C21	C4	0.1uF
R21	A2	1 M.ohms/2%	C22	D4	0.1uF
R22	B2	100 ohms/20%	C23	A4	20uF
R23	B1	270 ohms/5%	C24	I.F. can	220pF
R24	K7	50 K.ohms	C25	I.F. can	220pF
R25	D3	5 K.ohms/10%	C26	A4	150pF/5%
R26	C3	500 ohms/5%	C27	A5	150pF/5%
R27	F1	470 K.ohms/20%	C28	A3	.01uF

C30	B5	60pF/5%
C31	A2	.01uF
C32	F4	0.1uF
C33	D2	.02uF
C34	G3	20uF
C35	H2	12uF
C36	B1	25uF
C37	B2	.05uF
C38	H3	12uF
C39	K2	81 + 6uF
C40	N3	.005uF
C41	N3	.005uF
C42	G1	.03uF

RESISTANCE READINGS

Components	Resistance
L1	0.5 ohms
L2	14 ohms
L3	Negligible
L4	2.5 ohms
L5	14.5 ohms
L6	0.5 ohms
L7	Negligible
L8	2.5 ohms
L9	6 ohms
L10	275 ohms
L11	7.5 ohms
I.F.T.1 Primary	5.5 ohms
I.F.T.1 Secondary	5.5 ohms
I.F.T.2 Primary	5.5 ohms
I.F.T.2 Diode portion of secondary	3 ohms
T.2 Primary	400 ohms
T.2 Secondary	Negligible
T.1 Full H.T. secondary	370 ohms
T.1 Primary	22 ohms
L.S. Speech coil	+3.5 ohms +4 ohms 3 ohms

(continued from page 2)

into circuit on 78 r.p.m. an additional condenser which alters the bass boost characteristic.

DRIVE CORD REPLACEMENT

An exceptionally long tuning cord is used in these models, the actual length being 7ft. 3½in. No great difficulty should be experienced in replacing this, however, providing that the following instructions are followed and the sketch below is studied. Nylon-glass cord should be used, and before the cord replacement is attempted, it must be seen that the gang condenser is fully meshed, and that in this position the two cord anchorages, E and F, are in line at an angle of 90 degrees to the tuning scale—that is also 90 degrees to the position shown on the sketch.

Pass one end of the cord through the hole in the rim of the drum. Make a loop in this and hook it over anchorage E. Pull the cord fairly taut and winp clockwise round the drum, keeping the cord tight. Take the cord under the left-hand dial supporting bracket and over pulley C. Still holding the cord taut, carry it across, under the dial brackets and under pulley D1 (front pulley). Then take the cord diagonally across the dial, under pulley A, and then horizontally to and over pulley B.

Without slackening the cord, lead it down behind the drum already in place directly to the groove in the operating spindle.

Pass round the operating spindle in clockwise direction and then over pulley D2 and back to the drum. Carry on round the drum in a clockwise direction until the hole is reached. Pass the cord through the hole and ensure that there is no play in the drive by rocking the control spindle. Attach the spring to the anchorage F, and by looping the cord through the other end of the spring, stretch this to a length of, approximately, 2in., and tie-off the cord in that position.

DISMANTLING

To remove receiver chassis. If it is not required to remove the chassis completely from the cabinet, it may be taken from its shelf by removing the four control knobs, which are of the push-on type, and the four screws and nuts holding the chassis to the shelf. It will also be necessary to unclean the mains lead from the radio and motor shelves. This allows sufficient freedom for simple servicing operations, but if the chassis has to be removed altogether, proceed as follows:—

Disconnect the motor lead from motor switch and motor terminal board. Access to these is obtained by lifting the motor board. (*Note.*—The motor board is not fixed firmly for normal operation, as it is meant to be freely suspended on spring mounting. Should the transit nuts still be in position, they will prevent the board from lifting, and should be removed. In this connection it should be remembered that the transit nuts *must* be replaced when the instrument has to be transported.)

Unscrew the Aerial and EXT. L.S. sockets from the side walls of the cabinet, unsolder the speaker leads, disconnect the pick-up lead from the radio chassis, and this will now be free to come out. To refit, simply reverse the above procedure.

Removal of Gramophone unit. Remove the transit nuts and lift the unit clear of the cabinet. The power lead must be disconnected from the underside of the unit, and the pick-up leads from the radio chassis, taking off the P.U. plugs so that the lead may be drawn free.

LOUDSPEAKER

This is an 8in. high-flux P.M. type. Provision for a low-impedance extension is made, and this should have a speech coil impedance of 3 ohms.

CHASSIS DIVERGENCIES

Some models are fitted with an ECH35 as frequency-changer, and some with a 6K8G. This does not affect performance in any way and does not entail any modification to the receiver. In some chassis, the positions of C18 and C19 may be reversed.

REPLACEMENT PARTS LIST

(Excluding Record-Changer and Record-Player)

Description	Part No.
Chassis end plate	50189
Fuse plug	1702
Mains adjustment panel	1748
Cover plate	1748A
Screen can (valve)	1658
Screen base	37002
Scale assembly (less cord, pointer and dial lights)	50190
Scale with 7in. wire pointer	59180
Drive disc assembly including flywheel, 4 scale springs and 2 pointer clips	50191
Dial light holder	55546
Bracket (scale assembly support under flywheel spindle)	50086
Drive cord and spring	52037
Mains transformer	56160
Output transformer	51141
Smoothing choke	1258
Tuning condenser	58020
Condenser clips (for C39)	51046
Condenser clips (for C35, C38)	51049
Volume control and on/off switch	59174
Tone control	59173
Special screws (V3 base)	53274
Valve-holder (except V3)	2082
Valve-holder (V3)	55160
Coil panel	51348
Switch	59177
Short wave aerial coil, L1/L3	56165
Short wave osc. coil, L6/L7	56062
Brass core	53179
Coil clamp	56042
Special nut (L6/L7 core)	53175
Medium and long wave aerial coil, L2/L4/L5	56167
Medium and long wave osc. coil, L8/L9	56168
Bracket (support for L1/L3)	51127
Special nuts (fixing C6/C7 and C18/C19)	53145
Trimmer 50pF/50pF (C18/C19)	58024
Trimmer 50pF/220pF (C6/C7)	58023
Panel (I.F. trap)	55105
Special nuts (I.F. trap)	53216
Dust core (I.F. trap)	53147
I.F. trap coil, L11	56169
I.F. can	1709
I.F. can feet	45089
I.F. coil (465 Kc/s), I.F.T.1	56161
I.F. coil (465 Kc/s), I.F.T.2	56162
Wood insert	480
Trimmer (220pF/220pF)	58025

