'TRADER' SERVICE SHEET

225

DECCA 55 AND 66

DESIGNED so that it can easily be carried about, the Decca 55 is a 4-valve (plus rectifier) A.C./D.C. 3-band superhet with a short-wave range of 19-49 metres, and suitable for mains of 200-250 V, 50-60 C/S. It has sockets for connecting a gramophone pick-up and a pair of phones, while there is also a switch for cutting out the internal speaker. A length of wire is supplied for use as an aerial.

The chassis fitted in the 66 receiver is identical but that model has a large walnut finished table type cabinet.

This *Service Sheet* was prepared on a 55 model.

CIRCUIT DESCRIPTION

Aerial input via series condenser **C1** and coupling coils **L2** (S.W.), **L4** (M.W.) and (via 342 metre rejector circuit **L1, C3**) **L6** (L.W.) to single tuned circuits **L3, C30** (S.W.), **L5, C30** (M.W.) and **L7, C30** (L.W.).

First valve (**V1, Mazda metallised TH2320**) is a triode-hexode operating as frequency changer with internal coupling. Oscillator anode coils **L9** (S.W.), **L11** (M.W.) and **L13** (L.W.) are tuned by **C36**; parallel trimming by **C31** (S.W.), **C32** (M.W.) and **C33, C11** (L.W.); series tracking by **C9** (S.W.), **C10, C34** (M.W.) and **C35** (L.W.). Oscillator grid reaction coils **L8** (S.W.), **L10** (M.W.) and **L12** (L.W.).

Second valve, a variable-mu R.F. pentode (**V2, Mullard metallised VP13C**), operates as intermediate frequency amplifier with tuned-primary tuned-secondary transformer couplings **C37, L14, L15, C38** and **C39, L16, L17, C40.**

Intermediate frequency 465 KC/S.

Diode second detector is part of separate double diode valve (**V3, Brimar 10D1**). Audio frequency component in rectified output is developed across load resistance **R11** and passed via stopper resistance **R10,** A.F. coupling condenser **C17** and manual volume control **R12** to C.G. of pentode output valve (**V4, Brimar 7D6**). Fixed tone correction in anode circuit by **C21.** Provision for connection of low impedance external speaker across secondary of internal speaker input transformer **T1.** Switch **S19** permits internal speaker speech coil circuit to be broken. Provision for connection of gramophone pick-up across **R12.**

Second diode of **V3,** fed from tapping on **L17** via **C18,** provides D.C. potential which is developed across load resistance **R13** and fed back through decoupling circuits as G.B. to F.C. and I.F. valves, giving automatic volume control. Delay voltage is obtained from drop across **V4** cathode resistances **R14, R15.**

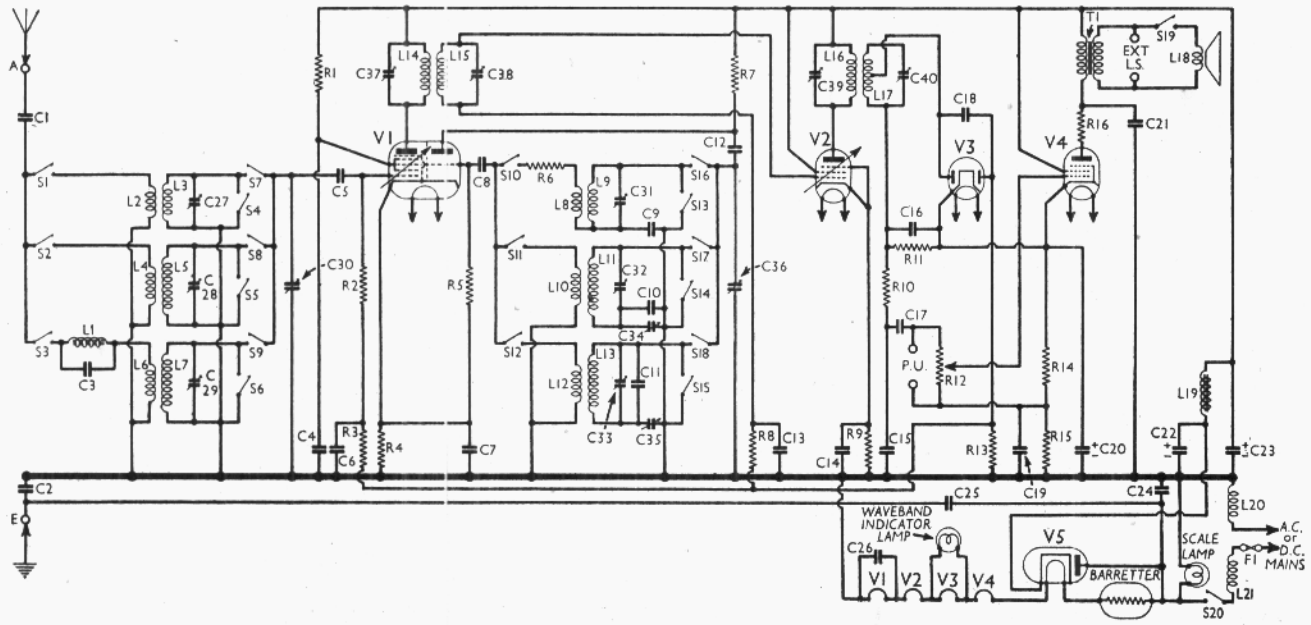
When the receiver is used with A.C. mains H.T. current is supplied by a half-wave rectifier (**V5, Mullard UR1C**) which, with D.C. supplies, behaves as a low resistance. Smoothing is effected by iron-cored choke **L19** and dry electrolytic condensers **C22, C23.**

Valve heaters are connected in series together with current regulating barretter (**Philips C1**), across mains input. One scale lamp, which illuminates the waveband indicator coloured slide, is connected across the heater of **V3.** Another lamp, which floodlights the tuning scale, is connected across the mains input. Filter comprising chokes **L20, L21** and condensers **C24, C25** suppresses mains-borne interference.

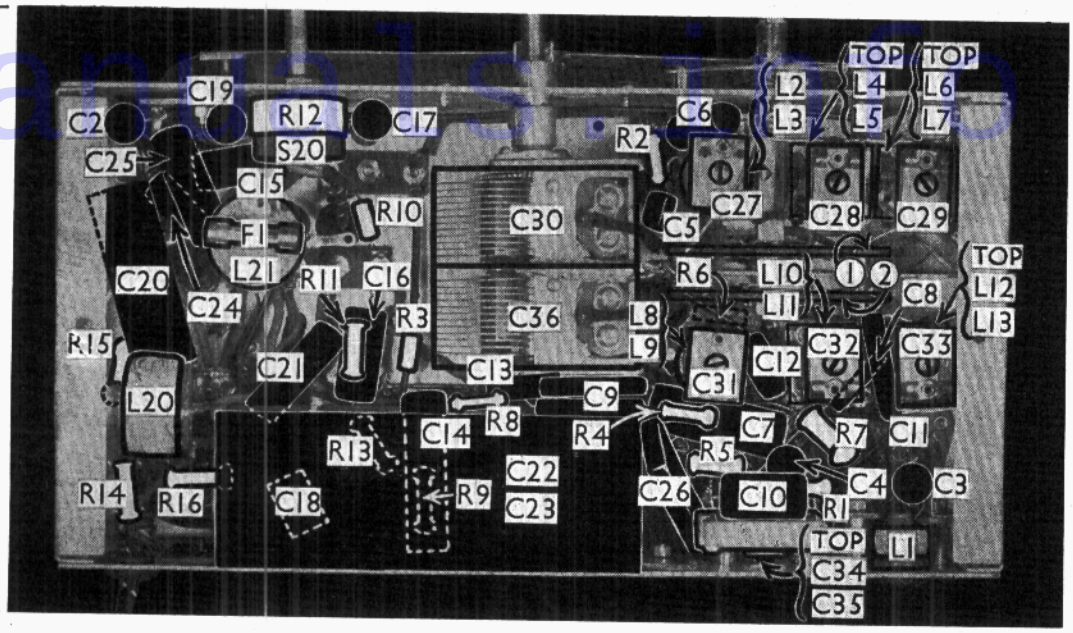
COMPONENTS AND VALUES

	CONDENSERS	Values (μF)
C1	Aerial series condenser	0·0005
C2	Earth blocking condenser	0·02
C3	Aerial circuit 342 m. rejector tuning	0·000012
C4	V1 S.G. decoupling	0·1
C5	V1 hexode C.G. condenser	0·0001
C6	V1 hexode C.G. decoupling	0·02
C7	V1 cathode by-pass	0·1
C8	V1 osc. C.G. condenser	0·0002
C9	Osc. circuit S.W. fixed tracker	0·003
C10	Osc. circuit M.W. fixed tracker	0·0003
C11	Osc. circuit L.W. fixed trimmer	0·00005
C12	V1 osc. anode coupling	0·0001
C13	V2 C.G. decoupling	0·02
C14	V2 cathode by-pass	0·1
C15	I.F. by-passes	0·0001
C16	I.F. by-passes	0·0001
C17	A.F. coupling to R12	0·02
C18	V3 A.V.C. diode feed	0·0001
C19	V4 C.G. decoupling	0·1
C20*	V4 cathode by-pass	25·0
C21	V4 anode tone corrector	0·006
C22*	H.T. smoothing	8·0
C23*	H.T. smoothing	16·0
C24	Mains R.F. filter condensers	0·006
C25	Mains R.F. filter condensers	0·02
C26	V1 heater R.F. by-pass	0·01
C27‡	Aerial circuit S.W. trimmer	—
C28‡	Aerial circuit M.W. trimmer	—
C29‡	Aerial circuit L.W. trimmer	—
C30†	Aerial circuit tuning	—
C31‡	Osc. circuit S.W. trimmer	—
C32‡	Osc. circuit M.W. trimmer	—
C33‡	Osc. circuit L.W. trimmer	—
C34‡	Osc. circuit M.W. tracker	0·00022
C35‡	Osc. circuit L.W. tracker	0·00022
C36†	Osc. circuit tuning	—
C37‡	1st I.F. trans. pri. tuning	—
C38‡	1st I.F. trans. sec. tuning	—
C39‡	2nd I.F. trans. pri. tuning	—
C40‡	2nd I.F. trans. sec. tuning	—

* Electrolytic. † Variable. ‡ Pre-set.



Circuit diagram of the Decca 55 A.C./D.C. superhet receiver. Note the arrangements for the scale and waveband indicator lamps.



Under-chassis view. Most of the trimmers are mounted at the ends of the individual coil units. The two switch units are indicated by numbers in circles, and the arrows show the directions in which they are viewed in the diagrams on this page.

RESISTANCES		Values (ohms)
R1	V1 S.G. H.T. feed	25,000
R2	V1 hexode C.G. resistance	500,000
R3	V1 hexode C.G. decoupling resistance	500,000
R4	V1 fixed G.B. resistance	200
R5	V1 osc. C.G. resistance	50,000
R6	Osc. circuit S.W. stabiliser	75
R7	V1 osc. anode H.T. feed	40,000
R8	V2 C.G. decoupling resistance	500,000
R9	V2 fixed G.B. resistance	200
R10	I.F. stopper	70,000
R11	V3 signal diode load	300,000
R12	Manual volume control	500,000
R13	V3 A.V.C. diode load	500,000
R14	A.V.C. delay voltage and	140
R15	V4 G.B. resistances	160
R16	V4 anode circuit stabiliser	150

OTHER COMPONENTS		Approx. Values (ohms)
L1	Aerial circuit 342m. rejector coil	6·0
L2	Aerial circuit S.W. coupling coil	0·4
L3	Aerial circuit S.W. tuning coil	0·1
L4	Aerial circuit M.W. coupling coil	14·5
L5	Aerial circuit M.W. tuning coil	3·5
L6	Aerial circuit L.W. coupling coil	75·0
L7	Aerial circuit L.W. tuning coil	17·5
L8	Osc. circuit S.W. grid coil	0·5
L9	Osc. circuit S.W. tuning coil	Very low
L10	Osc. circuit M.W. grid coil	0·5
L11	Osc. circuit M.W. tuning coil	2·0
L12	Osc. circuit L.W. grid coil	5·5
L13	Osc. circuit L.W. tuning coil	4·5
L14	1st I.F. trans. Pri.	8·0
L15	1st I.F. trans. Sec.	8·0
L16	2nd I.F. trans. Pri.	8·0
L17	2nd I.F. trans. Sec. total	8·0
L18	Speaker speech coil	3·0
L19	H.T. smoothing choke	400·0
L20	Mains filter chokes	2·0
L21	Mains filter chokes	2·0
T1	Speaker input trans. Pri.	580·0
	Speaker input trans. Sec.	0·4
S1-S18	Waveband switches	—
S19	Internal speaker switch	—
S20	Mains switch, ganged R12	—
F1	Mains circuit fuse, 750 m/a	—

DISMANTLING THE SET

Removing Chassis.—If it is desired to remove the chassis from the cabinet, remove the three control knobs (recessed grub screws) and remove the two bolts (with washers and lock washers) holding the chassis to the bottom of the cabinet.

Next remove the panel carrying the aerial, earth and pick-up sockets (three round-head wood screws), and the scale lamp and its holder (two round-head wood screws), and unsolder the speaker leads.

The chassis can now be withdrawn from the cabinet and *when replacing*, connect the speaker leads to the two outer tags and do not forget to replace the felt washers over the chassis fixing bolts.

Removing Speaker.—To remove the speaker from the cabinet, remove the panel carrying the sockets for phones (two round-head wood screws) and the switch (nut), unsolder the leads coming from the chassis and remove the nuts and washers from the four screws with ornamental heads holding the speaker to the cabinet. *When replacing*, see that the transformer is pointing to the back of the top of the cabinet.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on A.C. mains of 230 V. 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 1,200 V scale of an Avometer, chassis being negative.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 TH2320*	230	2·6	90	6·4
V2 VP1;C	230	15·0	230	6·0
V3 1oD1	—	—	—	—
V4 7D6	210	28·0	230	5·5
V5 UR1C‡	—	—	—	—

* Oscillator anode, 80V, 3·5 mA.
‡ Cathode to chassis, 255 V D.C.

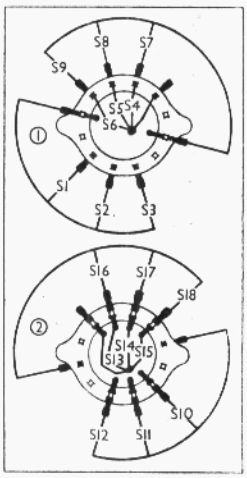
GENERAL NOTES

Switches.—S1-S18 are the waveband switches, ganged in two rotary units beneath the chassis. The units are indicated in our under-chassis view and are shown in detail in the diagrams below, as seen looking in the directions of the arrows in the under-chassis view.

The table below gives the switch positions for the three control settings, starting from fully clockwise. O indicates open and **C** closed.

Switch	S	M	L
S1	C	O	O
S2	O	C	O
S3	O	O	C
S4	O	C	C
S5	C	O	C
S6	C	C	O
S7	C	O	O
S8	O	C	O
S9	O	O	C
S10	C	O	O
S11	O	C	O
S12	O	O	C
S13	O	C	C
S14	C	O	C
S15	C	C	O
S16	C	O	O
S17	O	C	O
S18	O	O	C

Switch diagrams, as seen looking at the underside of the chassis in the direction of the arrows in the under-chassis view above.



S19 is the Q.M.B. internal speaker switch, mounted on the rear of the cabinet.

S20 is the Q.M.B. mains switch, ganged with the volume control **R12.**

Continued overleaf

DECCA 55—*Continued*

Coils.—All the R.F. and oscillator coils are in pairs on six tubular or wood formers in two screened compartments beneath the chassis, with their parallel pre-set trimmers mounted above them. There is one trimmer to each pair of coils, which are indicated in our under-chassis view. In the case of the S.W. band the two coils on each former are interwound but in each case the tuned coil is of thick bare copper wire.

The rejector circuit coil **L1** is iron-cored and, tuned by **C3,** is included to prevent break-through on L.W. from the London Regional transmitter.

The I.F. transformers, **L14, L15** and **L16, L17,** are in two screened units on the chassis deck with their associated trimmers.

Scale Lamps.—The tuning scale is flood-lit by a high voltage lamp with a large bulb and an M.E.S. base which is fixed to the front of the cabinet. It is a Bulgin lamp rated at 250 V 15 W, and is connected across the mains input.

The second lamp has a smaller bulb with an M.E.S. base, and is rated at 6 V, 0·04 A. This lamp is connected across the heater of **V3.**

Fuse F1.—This is a one-inch glass tubular type rated at 750 mA.

External Speaker.—Two sockets are provided on a panel mounted at the rear of the cabinet for a low impedance (about 3O) external speaker or high impedance headphones. A switch mounted beside the panel permits the internal speaker speech coil circuit to be broken.

Gramophone Pick-up.—Another panel at the rear of the cabinet carries a pair of sockets for connecting a pick-up. This must be disconnected when the receiver is used on radio.

Condensers C22, C23.—These are two dry electrolytics in a single carton beneath the chassis, having a common negative (black) lead. The red lead is the positive of **C22** (8μF) and the yellow the positive of **C23** (16μF).

Condenser C9.—This consists actually of two moulded bakelite condensers connected in parallel. The capacity (0·003 μF) is the total capacity of the pair and is marked only on one of them.

Condenser C20.—This was a 25 μF electrolytic condenser in our chassis but the capacity may be 50 μF in others.

Valve V5.—This is a half-wave rectifier and in our receiver is a **Mullard URIC.** An alternative is the **Brimar 1D5.**

Chassis Divergencies.—In the maker's diagram the trimmer **C11** is shown connected between the low potential end of **L13** and the high potential end of **L12,** but in our chassis it is connected directly across **L13.**

CIRCUIT ALIGNMENT

I.F. Stages.—Connect across **C36** a 0·01 μF swamp condenser and turn volume control to maximum. Remove top cap from **V1** and connect one lead of the signal generator in its place, the other lead being connected to chassis.

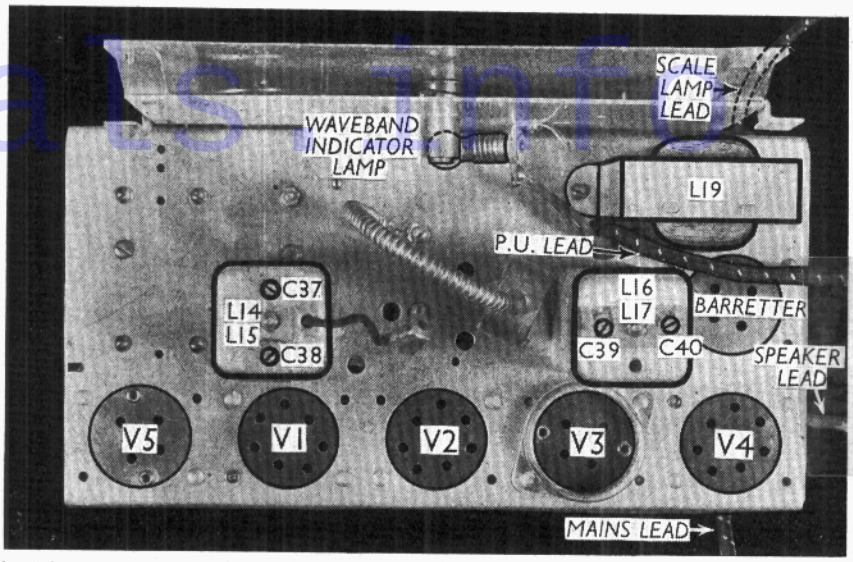
Feed in a 465KC/S signal and adjust **C40, C39, C38** and **C37** in that order for maximum output, keeping the generator output as low as possible consistent with an adequate reading on the meter. Repeat the process until the maximum peak is obtained on the meter. Remove swamp condenser and replace cap on **V1.**

R.F. and Oscillator Stages.—Tune to 220 m. on the scale, feed in a 220 m. signal to **A** and **E** sockets *via* a 0·0002 μF condenser, with the receiver switched to M.W., and adjust **C32** and **C28** for maximum output. Next tune to 500 m. on the scale, feeding in a 500 m. signal and adjust M.W. tracker **C34** for maximum output whilst rocking the gang. Return to 220 m. and adjust **C32** and **C28** accurately.

Switch receiver to L.W., tune to 1,200 m. on scale, feed in a 1,200 m. signal and adjust **C33** and **C29** for maximum output. Tune to 1,875 m. and adjust L.W. tracker **C35** whilst rocking the gang, finally returning to 1,200 m. and accurately adjusting **C33** and **C29.**

Switch to S.W., tune to 19 m. on scale, feed in a 19 m. signal and accurately adjust **C31** and **C27.**

Whilst alignment of any stage is carried out the volume control must be kept at maximum and the input from the signal generator progressively reduced as the circuits come into line, so that the output is no greater than is necessary to give an adequate reading on the meter, in order to avoid overloading in the receiver.



Plan view of the chassis. The two I.F. transformers and their trimmers are shown, but all the other tuning coils are beneath the chassis.

MAINTENANCE PROBLEMS

I.F. Transformers in Philips V5

TWO Philips V5 receivers were in at the same time for fading, which I find is quite a common complaint with modern receivers.

The first could be "brought back to life" by snapping on extra electrical equipment and the trouble was traced to an intermittent break in the lead out wire from the first I.F. primary where the coil had been inserted into the bakelite holders.

The second set faded after about half an hour but as soon as a meter "as much as looked inside," the set came back to normal. A careful check of all resistances, and so on was made and while testing the first I.F. coil for resistance it was noticed that the resistance of the secondary varied considerably. So the coil was removed and the black wax cleaned off.

As service engineers will know, these coils are wound astatically, the inner of one coil being connected to the outer of the other. The wires are soldered and held down with wax but in this case they had not been soldered. Soldering cured the complaint and the set is still O.K.—A. E. LOVELL, BEDFORD.

Trouble with E.M.I. Auto Brakes

I HAVE several times had to deal with a difficulty experienced with the auto switch brake type 230 E, and others, in H.M.V. and Marconiphone radio-grams.

It would seem that the two friction washers (Part No.'s 298 and 299) are prone to absorb moisture from the atmosphere with the consequence that they become swollen and sticky, causing the brake lever to resist the movement transmitted from the pick-up arm, with the result that the needle will remain tracking in one groove. Incidentally the metal work adjacent to the two washers invariably becomes corroded.

The remedy adopted for this complaint is thoroughly to clean off the corrosion and fit two new washers that have been well dried beforehand. This remedy never fails to effect a cure but doubtless the trouble will recur at varying intervals according to the dampness of the air surrounding the particular model.

A better plan would be for the manufacturers to produce friction washers of a non-absorbent material.—J. JONES, MERTHYR.