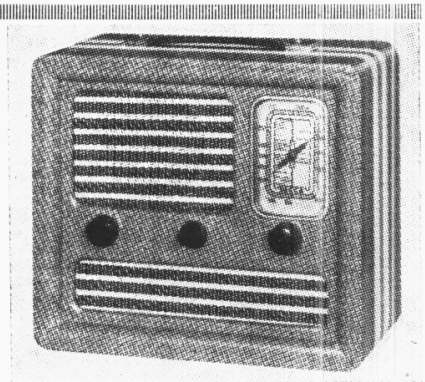
Supplement to The Wireless & Electrical Trader, Dec. 23, 1939.

"TRADER" SERVICE SHEET 441

DECCA MLD/3, MLD/5

BRUNSWICK 43D, 42D



The Decca MLD/3

BOTH Decca models are 4-valve all-dry battery portables, which differ only in the cabinet styles, the makes of valves used, and in the frame aerial construction and disposition. Otherwise they are practically identical, and this *Service Sheet* covers both. Some models are fitted with Mazda valves (see Valve Analysis).

In addition, the Brunswick 42D corresponds with the Decca MLD/5, while the Brunswick 43D corresponds with the Decca MLD/3, the only difference being in the cabinet finish.

Release Date: August, 1939.

CIRCUIT DESCRIPTION

Tuned frame aerial input **L1** (MW) and **L2** (LW) precedes a heptode valve **(V1 Brimar** or **Tungsram 1A7G),** which operates as frequency changer with electron coupling. The two frames are connected in series, and the LW frame is short-circuited by **S1** for MW operation.

V1 oscillator grid coils **L3** (MW) and **L4** (LW) are tuned by **C20**; parallel trimming by **C21** (MW) and **C6, C22** LW; series tracking by fixed condensers **C4** (MW) and **C5** (LW). Reaction coupling from oscillator anode by coils **L5** (MW) and **L6** (LW).

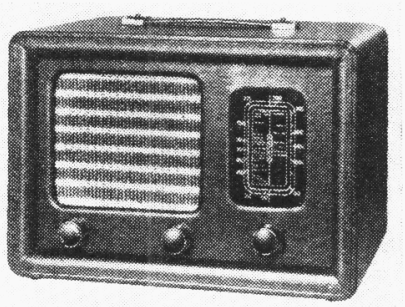
Output from **V1** pentode is coupled via tuned-secondary iron-cored transformer **L7, L8, C23** to variable-mu RF pentode valve **(V2, Brimar** or **Tungsram 1N5G),** which operates as intermediate frequency amplifier, and whose output is fed via a tuned-primary turned-secondary air-cored transformer to the second detector.

Intermediate frequency 370 KC/S.

Diode second detector is part of single diode triode valve **(V3, Brimar** or **Tungsram 1H5G).** Audio frequency component in rectified output is developed across manual volume control **R7,** which also operates as load resistance, and passed via AF coupling condenser **C13** and CG resistance **R8** to control grid of triode section, which operates as AF amplifier. IF filtering by **C11, R6** and **C12.**

DC potential developed across **R6** and **R7** appears also across a potential divider comprising resistances **R4** and **R5** from whose junction the voltage there is tapped off and fed back through decoupling circuit as GB to FC and IF valves, giving automatic volume control.

Resistance-capacity coupling by **R9, C14** and **R10** between **V3** triode and pentode output valve **(V4, Brimar** or **Tungsram 1C5G).** Fixed tone correction in anode circuit by **C16.** GB for this valve is obtained automatically from drop along resistance **R11** in negative HT lead to chassis. **R11** is by-passed by an electrolytic condenser **C15,** while a second electrolytic condenser **C8** forms an HT reservoir.

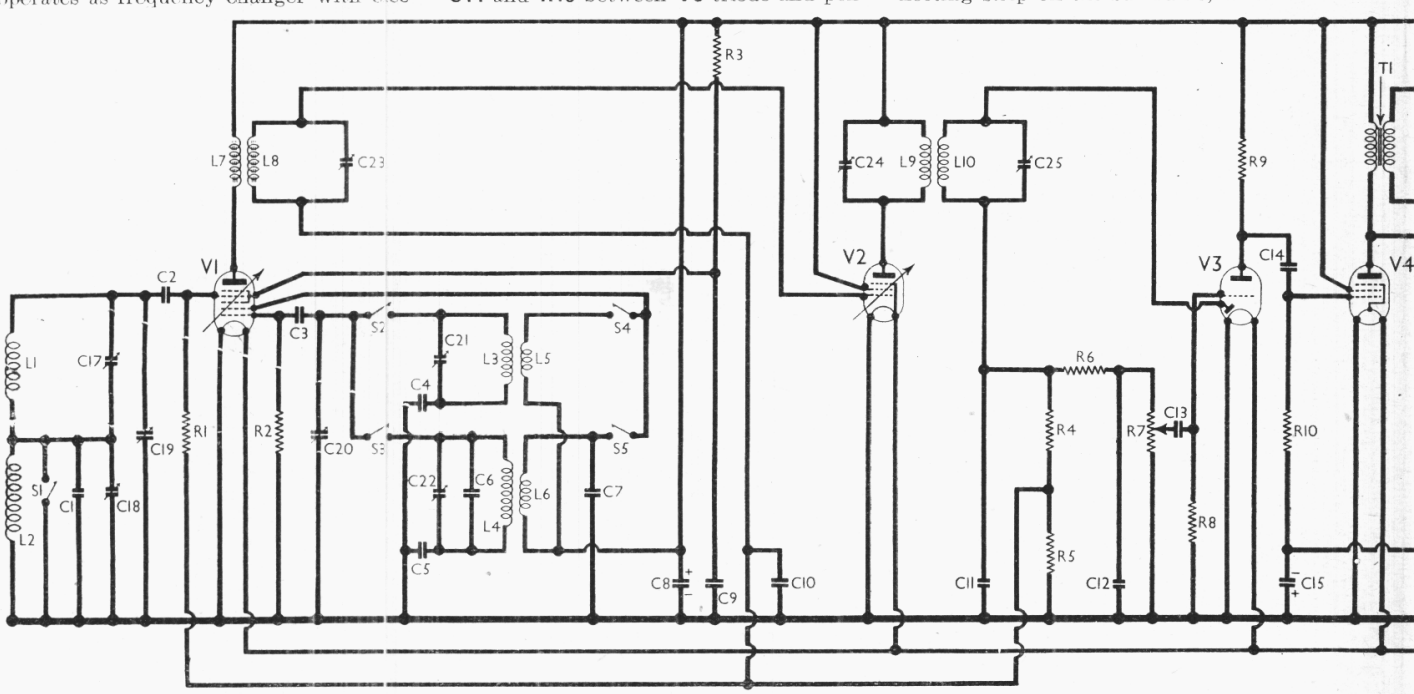


The Decca MLD/5

DISMANTLING THE SET

Removing MLD/3 Chassis.—Remove the three control knobs (recessed grub screws) and four instrument head wood screws holding the back cover, on which are mounted the frame aerials and their trimmers.

Then remove the back cover with the frame leads still connected, free the brackets securing the chassis shelf to the side of the case and unsolder the three chassis leads from the speaker connecting strip on the sub-baffle, when the



shelf, on which the chassis is mounted, can be withdrawn from the casing with the frame aerial still connected.

Since the shelf is cut away to give access to the components beneath the chassis, it need not be separated from the chassis.

To free the chassis from the frame aerials, unsolder the three frame leads from the aerial connecting panel on the left of the chassis deck.

When replacing, connect these leads as follows, numbering from left to right: 1, black lead from top left tag of the frame trimmer panel; 2, black/white lead from top right tag of trimmer panel; 3, black lead from bottom left tag of trimmer panel.

The chassis leads to the speaker connecting strip should be connected as follows, numbering the tags from left to right: 1, yellow; 2, black; 3, red. A felt washer should be fitted to each control spindle, between the knob and the cabinet.

Removing MLD/5 Chassis.—Remove the three control knobs (recessed grub screws), unsolder the four leads from the three tags on the aerial connecting panel at the left-hand end of the chassis deck, and remove the four counter-sunk head screws (with counter-sunk washers and lock washers) holding the chassis to the bottom of the case.

Now draw the chassis aside and unsolder the three leads from the speaker connecting strip on the sub-baffle, when the chassis can be withdrawn from the case.

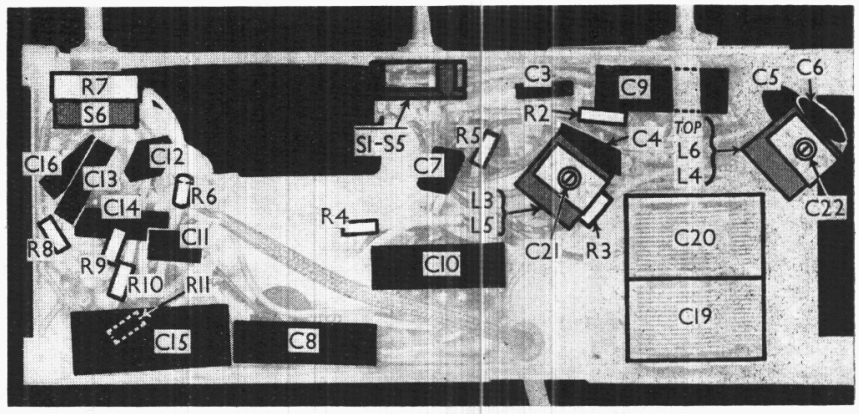
When replacing, connect the speaker leads to the connecting strip as follows, numbering from left to right: 1, yellow; 2, black; 3, red.

Connect the frame aerial leads as follows, numbering the tags from left to right: 1, black lead from left-hand frame trimmer; 2, one black/white lead from each of the two trimmers; 3, black lead from right-hand frame trimmer. A felt washer should be fitted to each control spindle, between the knob and the cabinet.

When fitting the chassis fixing bolts, a metal clip, which holds the right-hand frame leads in place, should be slipped on to each of the two rear bolts, between the chassis and the cabinet.

Removing Speaker (both models).—Remove the round head wood screw holding the connecting strip to the top right-hand corner of the sub-baffle, and the two nuts holding the speaker to the sub-baffle.

When replacing, the transformer should point towards the connecting strip, and do not forget to replace the earthing wire, with its tags beneath the wood screw and lower speaker fixing nut.



Under-chassis view. A diagram of the **S1-S5** switch unit is in column one overleaf.

COMPONENTS AND VALUES

	RESISTANCES	Values (ohms)
R1	V1 pentode CG resistance	500,000
R2	V1 osc. CG resistance	100,000
R3	V1 SG HT feed	75,000
R4	AVC feed potential divider resistances	8,000,000
R5		3,000,000
R6	IF stopper	100,000
R7	Manual volume control; V3 signal diode load	500,000
R8	V3 triode CG resistance	8,000,000
R9	V3 triode anode load	1,000,000
R10	V4 CG resistance	2,000,000
R11	V4 auto GB resistance	850

	CONDENSERS	Values (μF)
C1	Frame aerial LW fixed trimmer	0·000025
C2	V1 pentode CG condenser	0·0001
C3	V1 osc. CG condenser	0·0002
C4	Osc. circuit MW tracker	0·000041
C5	Osc. circuit LW tracker	0·000445
C6	Osc. circuit LW fixed trimmer	0·0002
C7	Oscillator LW reaction shunt	0·0002
C8*	HT reservoir condenser	8·0
C9	V1 SG decoupling	0·1
C10	AVC line decoupling	0·1
C11	IF by-pass condensers	0·00005
C12		0·00005
C13	AF coupling to V3 triode	0·001
C14	V3 triode to V4 AF coupling	0·006
C15*	V4 CG decoupling	50·0
C16	Fixed tone corrector	0·001
C17‡	Frame aerial MW trimmer	—
C18‡	Frame aerial LW trimmer	—
C19†	Frame aerial tuning	—
C20†	Oscillator circuit tuning	—
C21‡	Osc. circuit MW trimmer	—
C22‡	Osc. circuit LW trimmer	—
C23‡	1st IF trans. sec. tuning	—
C24‡	2nd IF trans. pri. tuning	—
C25‡	2nd IF trans. sec. tuning	—

* Electrolytic. † Variable. ‡ Pre-set

	OTHER COMPONENTS		Approx. Values (ohms)
L1	Frame aerial coils		2·0
L2			30·0
L3	Osc. circuit MW tuning coil		2·0
L4	Osc. circuit LW tuning coil		3·4
L5	Oscillator MW reaction		0·5
L6	Oscillator LW reaction		6·5
L7	1st IF trans.	Pri.	18·0
L8		Sec.	6·5
L9	2nd IF trans.	Pri.	9·0
L10		Sec.	9·0
L11	Speaker speech coil		2·5
T1	Speaker input trans.	Pri.	650·0
		Sec.	0·3
S1-S5	Waveband switches		—
S6	LT circuit switch		—

VALVE ANALYSIS

Voltages and currents given in the table below are those measured in our MLD/5 when it was operating with a new 100 V HT battery reading 100 V on load. The gang was turned to minimum, the volume control was at maximum, and the receiver was switched to MW, but the frame aerials were disconnected.

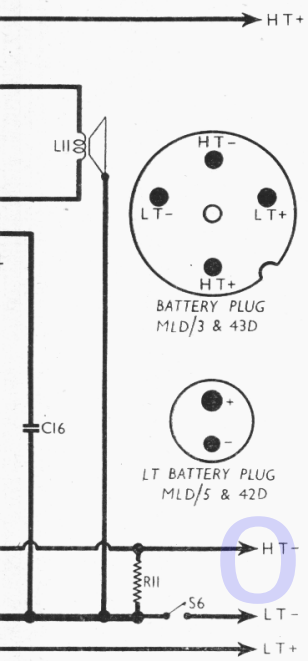
Voltages were measured on the 400 V scale of a Model 7 Universal Avometer, chassis being negative.

If **V2** should become unstable when its screen current is being measured, it can be stabilised by a condenser of about 0.1μF connected between the grid (top cap) and chassis.

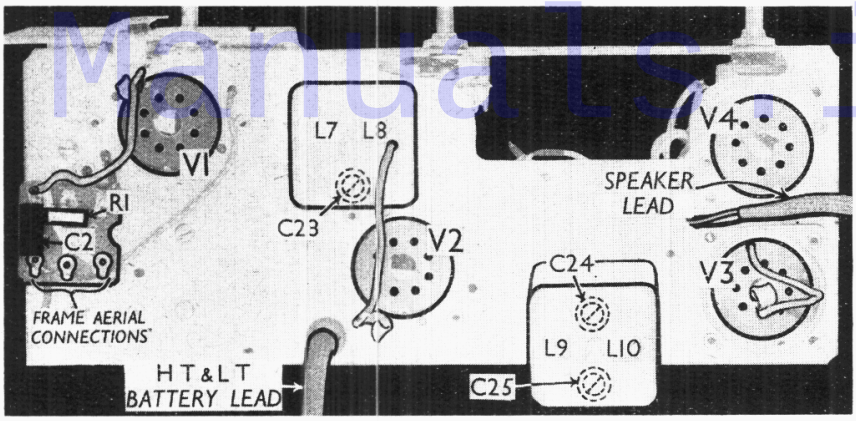
Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 1A7G	90	0·52	39	0·6
	Oscillator			
	90	1·56		
V2 1N5G	90	1·2	90	0·26
V3 1H5G	13	0·025	—	—
V4 1C5G	86	5·5	90	0·4

The values in the following table are those taken in a model MLD/3 receiver fitted with Mazda valves, under the same conditions as those in the table above, except that the 90 V section of the battery was reading 95 V on load.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 FC41	88	0·3	35	0·6
	Oscillator			
	88	1·7		
V2 SP41	88	1·2	88	0·6
V3 H41D	15	0·025	—	—
V4 Pen41	85	5·0	88	1·5



Circuit diagram of the four models. There are no divergencies in the actual chassis, but the frame aerials and battery connections are different. This is fully explained in General Notes.



Plan view of the chassis. Note that the first IF transformer has only one trimmer. The frame aerial connection tags are indicated.

GENERAL NOTES

Switches.—**S1—S5** are the waveband switches, in a single rotary unit beneath the chassis. The unit is indicated in our under-chassis view, and shown in detail in the diagram below, where it is drawn as seen looking from the rear of the underside of the chassis. The table below gives the switch positions for the two control settings, starting from the anti-clockwise position. A dash indicates open, and **C** closed.

S6 is the LT circuit switch, of the QMB type, ganged with the manual volume control **R7.**

Coils.—**L1** and **L2** are the frame aerial windings. In the MLD/3 model, these are wound concentrically on frames mounted inside the back of the cabinet, the MW frame **(L1)** being the outer one. Associated with the frames is a trimmer unit containing three pre-set condensers. The upper one of these is **C17**, while the lower two in parallel form **C18**. Across their tags the small disc condenser **C1** is wired. The trimmers are adjustable through holes in the back of the cabinet.

SWITCH TABLE

SWITCH	MW	LW
S1	C	—
S2	C	—
S3	—	C
S4	C	—
S5	—	C

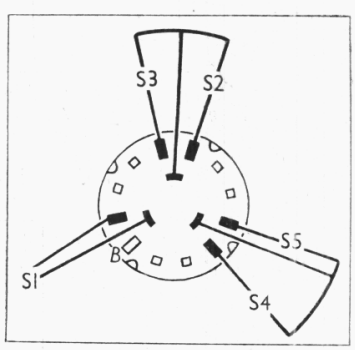


Diagram of the **S1-S5** switch unit, seen from the rear of the underside of the chassis.

In some models these holes are in a horizontal line instead of a vertical one, in which case **C17** is on the left, and **C18** in the centre and on the right, looking at the outside of the back of the cabinet.

In the MLD/5 the frame aerials are wound flat and mounted inside the cabinet on the left and right. Looking into the back of the set, **L1** is on the left, with **C17** mounted on it, and **L2** is on the right, with **C18** and **C1** mounted on it. **C18** is a single trimmer in this set.

L3, L5 and **L4, L6** are in two unscreened tubular units beneath the chassis, with their associated trimmers. The IF transformers **L7, L8** and **L9, L10** are in two screened units on the chassis deck. Note that the primary **(L7)** of the first IF transformer has no capacitative tuning, so there is only one trimmer in this unit.

MLD/3 Batteries.—Our model had a G.E.C. Blue Label combined 90 V HT and 1.5 V LT dry battery, fitted with four sockets to take the 4-pin connector on the end of the battery lead. The connections, looking at the free ends of the pins, are indicated at the right of the circuit diagram. Earlier models may have different battery arrangements and connections.

MLD/5 Batteries.—Our model was fitted with a Ray-O-Vac Portable A 1.5 V LT dry cell, fitted with two sockets to take the 2-pin plug on the LT cable from the chassis. The thicker plug is the positive. The HT supply was an Ever Ready 100 V standard HT dry battery. The black lead and plug from the chassis is the HT negative, and the red lead and plug from the chassis is the HT positive (100 V). Earlier models may be fitted with a combined LT and HT battery, using a 4-pin plug, as in the MLD/3.

Valve Bases.—Note that the MLD/3 has valves with Mazda octal bases, while the valves in the MLD/5 have American octal bases.

Chassis Divergencies.—Apart from the differences between the MLD/3 and MLD/5 models noted earlier, there are several other possible divergencies.

R4 and **R8** may be 10,000,000 Ω in both models; **R5** may be 4,000,000 Ω in the MLD/3; **R3** may be 68,000 Ω in the MLD/3; **C10** is shown by the makers as 0.02μF, but is 0.1μF in our models. The makers' diagram shows the primary of the first IF transformer tuned by a pre-set condenser, and also a 25μμF fixed condenser between the bottom of **L7** and the top of **L8.** These condensers were not present in our models. **C1** may be 30μμF, not 25μμF.

CIRCUIT ALIGNMENT

NOTE.—Alignment may be performed without removing the chassis from the cabinet.

IF Stages.—In the case of the MLD/3, turn the receiver on its side so that the speaker is above the scale. Remove the back of the receiver (with frame aerials), and the battery, and lay them down outside the set, leaving them connected up, of course.

In the case of the MLD/5, remove the back of the receiver and take out the batteries. Turn the receiver on its side so that the speaker is above the scale.

In the case of both models, switch set to LW and short the oscillator grid circuit by connecting to chassis the tag of **C6** nearest end of chassis. Switch on set, and turn volume control to maximum. Connect signal generator to end of **C2** (on chassis deck) which is connected to top cap of **V1,** and chassis. Feed in a 370 KC/S signal. Adjust **C23, C24** and **C25** for maximum output. Remove short from oscillator grid circuit.

RF and Oscillator Stages.—With gang at maximum, pointer should be vertical. Connect signal generator as for IF alignment.

MW.—Switch set to MW, tune to 215.4 m. on scale (Radio Lyons' wavelength), feed in a 215.4 m. (1,393 KC/S) signal, and adjust **C21** for maximum output (reached through a hole in the base of the cabinet in the case of the MLD/5). Remove signal generator lead, tune to a broadcast signal at the lower wavelength end of the MW scale, and adjust **C17** for maximum output. In the case of the MLD/3, this is reached through the left hand or the upper hole in the back of the cabinet, according to whether the holes are horizontally or vertically disposed. In the MLD/5, **C17** is across the left-hand frame aerial looking into the back of the cabinet.

LW.—Switch set to LW, connect signal generator as before, and feed in a 1,293 m. (232 KC/S) signal. Tune to 1,293 m. on scale, and adjust **C22** for maximum output (reached through a hole in the base of the cabinet of the MLD/5). Remove signal generator lead, tune to a broadcast signal at lower wavelength end of LW scale, and adjust **C18** (either or both of the two condensers in parallel in the case of the MLD/3).