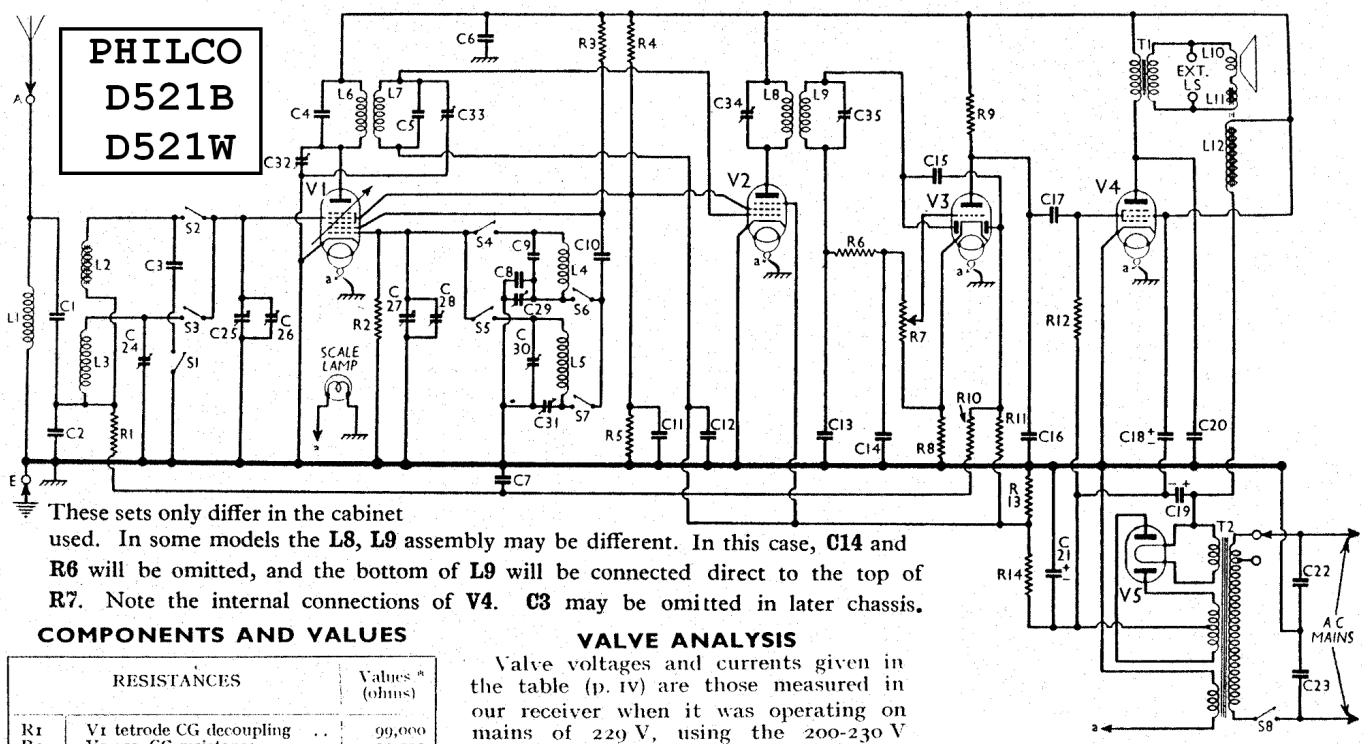
PHILCO D521B D521W



These sets only differ in the cabinet used. In some models the **L8, L9** assembly may be different. In this case, **C14** and **R6** will be omitted, and the bottom of **L9** will be connected direct to the top of **R7**. Note the internal connections of **V4**. **C3** may be omitted in later chassis.

COMPONENTS AND VALUES

	RESISTANCES	Values * (ohms)
R1	V1 tetrode CG decoupling	99,000
R2	V1 osc. CG resistance	99,000
R3	V1 osc. anode HT feed	20,000
R4	V1, V2 SG's HT potential divider	51,000
R5		160,000
R6	IF stopper	51,000
R7	Manual volume control	500,000
R8	V3 GB ; part AVC delay	6,000
R9	V3 triode anode load	100,000
R10	AVC line decoupling	1,500,000
R11	V3 AVC diode load	1,500,000
R12	V4 CG resistance	500,000
R13	V1 fixed, V2, V4 auto. GB and part AVC delay resistances	63
R14		200

* Many of the resistors have alternative values. See under Chassis Divergencies.

	CONDENSERS	Values (μF)
C1	Aerial coupling condensers	0·006
C2		0·00225
C3	MW aerial coil LW shunt	0·00025
C4	1st IF trans. pri. fixed trimmer	0·000115
C5	1st IF trans. sec. fixed trimmer	0·00005
C6	HT circuit RF by-pass	0·25
C7	AVC line decoupling	0·05
C8	Osc. circuit MW fixed tracker	0·00025
C9	Osc. circuit MW fixed trimmer	0·000015
C10	V1 osc. anode coupling	0·0008
C11	V1, V2 SG's decoupling	0·05
C12	V2 CG decoupling	0·01
C13	IF by-pass condensers	0·00011
C14		0·00011
C15	Coupling to V3 AVC diode	0·00011
C16	V3 triode anode IF by-pass	0·0065
C17	V3 triode to V4 AF coupling	0·03
C18*	HT smoothing	8·0
C19*		8·0
C20	Fixed tone corrector	0·0025
C21*	Auto GB by-pass	35·0
C22	Mains RF by-pass condensers	0·015
C23		0·015
C24‡	Aerial circuit LW trimmer	0·00011
C25†	Aerial circuit tuning	—
C26‡	Aerial circuit MW trimmer	—
C27†	Oscillator circuit tuning	—
C28‡	Osc. circuit MW trimmer	—
C29‡	Osc. circuit MW tracker	0·0001
C30‡	Osc. circuit LW trimmer	0·00011
C31‡	Osc. circuit LW tracker	0·0001
C32‡	1st IF trans. pri. trimmer	—
C33‡	1st IF trans. sec. trimmer	—
C34‡	2nd IF trans. pri. trimmer	—
C35‡	2nd IF trans. sec. trimmer	—

* Electrolytic. † Variable. ‡ Pre-set.

	OTHER COMPONENTS		Approx. Values (ohms)
L1	Modulation hum suppressor		25·0
L2	Aerial MW tuning coil		3·0
L3	Aerial LW tuning coil		30·0
L4	Osc. circuit MW tuning coil		3·5
L5	Osc. circuit LW tuning coil		25·0
L6	1st IF trans.	Pri.	8·0
L7		Sec.	12·0
L8	2nd IF trans.	Pri.	12·0
L9		Sec.	8·0
L10	Speaker speech coil		2·0
L11	Hum neutralising coil.		0·1
L12	Speaker field coil		1,140·0
T1	Speaker input trans.	Pri.	500·0
		Sec.	0·2
T2	Mains trans.	Pri., total	20·0
		Heater sec.	0·1
		Rect. heat. sec.	0·1
		HT sec., total	330·0
S1-S7	Waveband switches		—
S8	Mains switch, ganged R7		—

VALVE ANALYSIS

Valve voltages and currents given in the table (p. IV) are those measured in our receiver when it was operating on mains of 229 V, using the 200-230 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.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 6A7E	282	2·6	90	2·0
	Oscillator			
	190	3·6		
V2 78E	282	3·6	90	0·9
V3 85	40	2·4	—	—
V4 42E	262	40·0	282	8·9
V5 80	345†	—	—	—

† Each anode, AC.

GENERAL NOTES

Switches.—**S1-S7** are the waveband switches in a single rotary unit beneath the chassis. They are indicated in our under-chassis view and shown in detail in the diagram below.

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

Switch	LW	MW
S1	C	—
S2	—	C
S3	C	—
S4	—	C
S5	C	—
S6	—	C
S7	C	—

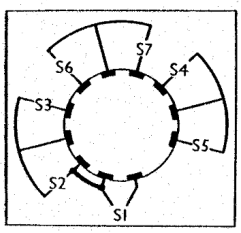


Diagram of the switch unit, drawn as seen when looking from the rear of the underside of the chassis.

S8 is the QMB mains switch, ganged with the volume control, **R7**.

Coils.—**L1, L2, L3** and **L4, L5**—the aerial and oscillator coils—are on three unscreened tubular formers beneath the chassis, while **L6, L7** and **L8, L9**—the IF transformers—are in two screened units on the chassis deck, together with their associated trimmers. The **L6, L7** unit also contains **C4** and **C5**, while the **L8, L9** unit contains **R6, C13** and **C14**.

Scale Lamp.—The scale lamp is a Tung-Sol type with a miniature bayonet cap (centre contact) and is rated at 6·3 V, 0·35 A. The Philco part number is 34-2141.

External Speaker.—Two sockets are provided on the terminal panel of the transformer for the internal speaker (**T1**) for a low resistance extension speaker of 2-3 O.

Condensers C18, C19.—These are two dry electrolytics in a single carton beneath the chassis, both with a working voltage rating of 475 V. The black lead is the common negative, the yellow lead is the positive of **C18** and the red lead is the positive of **C19.**

Condensers C7, C11 and C22, C23.—Each of these pairs of condensers are in a single unit, with a common connection which is taken to chassis *via* the mounting bolt.

Condensers C13, C14 and C35.—These three condensers are housed in the **L8, L9** unit on the chassis deck and are formed by four plates, one being common to both **C13** and **C35,** while another is common to **C13** and **C14.**

Trimmers and Trackers.—These are all reached through holes in the chassis deck. **C29** and **C31** are in a dual unit, the screw adjusting **C29** and the nut **C31.**

Chassis Divergencies.—Alternative values are given in the makers' list of replacement components for most of the resistances. Thus **R1** and **R2** may be 100,000 O, **R3** may be 25,000 O, **R4** may be 40,000 O, **R5** may be 150,000 O, **R8** may be 6,500 O, **R10** and **R11** may be 1 MO, **R12** may be 400,000 O and **R13** may be 65 O.

C3 was only fitted in early chassis, and later models will not have it.

In some chassis an alternative assembly for the second IF transformer (**L8, L9**) is fitted. This omits **C14** and **R6,** the bottom of the **L9** being connected direct to **R7.**

AUTOMATIC DIAL

A special tool is supplied for adjusting the buttons, for which operation both hands must be used. In the event of any difficulty being experienced at any stage of the procedure described below, tighten the button and start again.

First turn the wave-change switch to the appropriate band, tune in the required station and prise out the station name-tab from the button nearest to the bottom by inserting a pin in the hole in the centre of the tab.

Then insert the prongs of the tool in the two holes in the button, press the button, rotate the dial until a click is heard and give the tool one turn in an anti-clockwise direction, to loosen the button, but do not unscrew beyond this point.

Next, holding the button depressed with the finger and thumb of the free hand, insert the blade of the tool in the screw head in the centre of the button, turn the screw (and thus the dial) until the required station is properly tuned in and keeping the blade of the tool pressed in and steady, tighten the button itself by clockwise rotation with the finger and thumb of the other hand.

Now complete the tightening of the button by inserting the prongs of the tool in the two holes and giving a final twist, check the setting by tuning the dial, pressing the button and swinging the button towards the bottom until a click is heard and, if satisfactory, insert the appropriate name-tab, a selection of which is supplied with the set.

CIRCUIT ALIGNMENT

IF Stages.—Connect an output meter across the primary of the speaker input transformer, **T1** (green and white leads), turn the wave-change switch to MW and the volume control to maximum (fully clockwise).

Connect a signal generator *via* a dummy aerial to the grid of **V1** (top cap), keeping the grid connection in place, and chassis. Feed in a 475 KC/S (631·6 m) signal and adjust **C34, C35, C33** and **C32** for maximum output.

RF and Oscillator Stages.—Turn the gang condenser to minimum, insert a 0·006 in. feeler gauge under the heel of the rotor vanes and close the gang on the gauge. Check that the indicator is in line with the index mark under the letter "A" in "Leningrad." If not, slip the dial on the gang spindle. Remove the gauge.

MW.—Connect the signal generator via a dummy aerial to the **A** socket, and chassis. Tune the set to the black dot at 214 m, feed in a 214 m (1,400 KC/S) signal and adjust **C28** and **C26** in that order for maximum output.

Feed in a 500 m (600 KC/S) signal, tune the set to it and adjust **C29** (screw) for maximum output, while rocking the gang. Then readjust **C28** at 214 m, and repeat the adjustments until no further improvement results.

LW.—With the wave-change switch still in the MW position feed in a 285·7 m (1,050 KC/S) signal and tune the set to it. Keep the dial in this position, switch the set to LW, feed in a 1,293 m (232 KC/S) signal and adjust **C30** and **C24** for maximum output, while rocking the gang.

Tune the set to the blue dot under the letter "T" in Budapest, feed in an 1,875 m (160 KC/S) signal and adjust **C31** (nut) for maximum output, while rocking the gang.

Repeat the adjustments at 285·7 and 1,293 m, then at 1,875, 285·7 and 1,293m until no further improvement results. Check the calibration.

The set can be aligned in a simpler manner on LW, but if the MW and LW pre-set stations are to coincide properly the procedure described should be adopted.