ULTRA SERVICE SHEET

SS 168

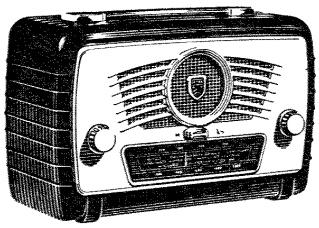
1st Edition

JULY 1957

ULTRA TWIN (R825)

WARNING: CHASSIS LIVE WHEN CONNECTED TO MAINS.

GENERAL DESCRIPTION



The Ultra Twin receiver, Model R825, is a Superheterodyne receiver designed to operate either from self-contained batteries or mains.

Batteries.

L.T.—7·5 v	H.T.—85 v
Drydex H.1186 or Ever Ready AD.39	Drydex 529 or Ever Ready B.129

Mains: 200/250 Volts D.C./A.C., 25-100 cps.

H.T. and L.T. Consumption:

	Mains	Battery.
H.T.	80 v 8·2 mA	85·5 v 7·5 mA*
L.T.	6·5 v 24 mA	7·5 v 28·5 mA*

*measured at B+ terminals.

Valves:

Frequency Changer	Mullard DK96
I.F. Amplifier	Mullard DF96
Detector, A.G.C. Rectifier and A.F. Amplifier	Mullard DAF96
Output	Mullard DL96

Rectifier ... ... Westalite 18.RA 1–1–16–1

Wave Bands:

M/W	190–550 metres.
L/W	1200–2000 metres.

Aerial: Self-contained Frame Aerial.

Intermediate Frequency: 471 Kc/s.

Loudspeaker (755–00–4):

5-in. P.M. moving coil.
Speech coil impedance : 3 ohms.
Speech coil D.C. resistance : 2·6 ohms.

Output Transformer (850–3030) :

Ratio : 62 : 1.
Primary D.C. resistance : 550 ohms approx.
Secondary D.C. resistance : 0·5 ohms approx.

CIRCUIT DESCRIPTION

R.F. INPUT CIRCUIT:

Medium Waves.—Tuned frame aerial (L2), which is adjusted at the L.F. end by a small iron-cored loading coil (L1) and by trimmer "A" at the H.F. end.

Long Waves.—The medium wave frame is used in conjunction with the loading coil (L3) and the fixed shunt capacitor C1.

OSCILLATOR CIRCUIT.

Tuned grid circuit with a conventional feed back winding couples Vg1 and Vg2 of the DK96 pentagrid valve as the oscillator. On long waves the coupling between tuned and feed back winding is such that optimum heterodyne volts over the band are obtained, whilst on medium waves this condition is maintained by switching in circuit the shunt resistor R4. Medium wave tracking is three point, being adjusted at the L.F. end by L5 core and at the H.F. end by trimmer "B". Long wave tracking is single point centred at 210 Kc/s.

I.F. STAGES.

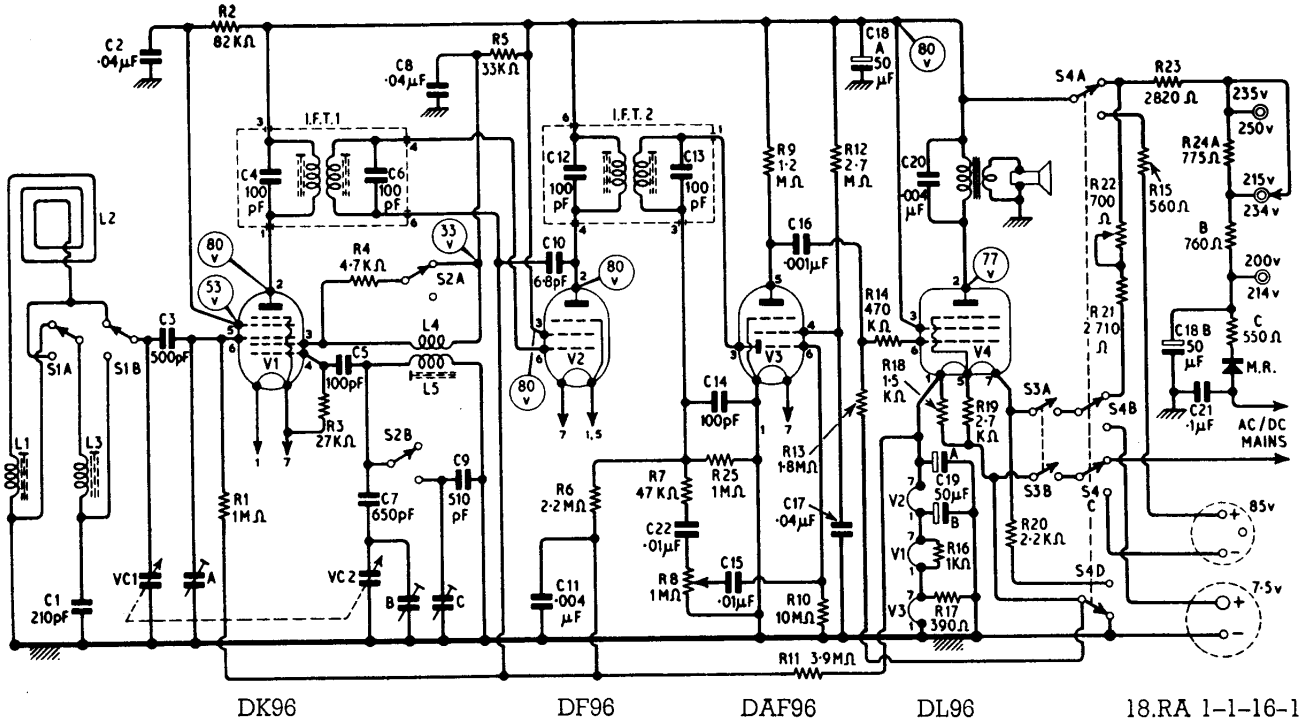
Iron dust core tuned transformers, neutralised by C10.

DIODE PENTODE AND OUTPUT.

The rectified signal is coupled to the grid of the pentode A.F. amplifier and is also fed via R6 to supply an A.G.C. voltage to grid of V1 and V2. Correct bias for V1 and V2 is obtained from the filament supply by the potentiometer R11, R6 and R25.

POWER SUPPLY.

For mains operation a metal rectifier is used in a voltage compensated system, such that the H.T. and valve filament voltages remain sensibly constant on any mains voltage between 200 volts and 250 volts A.C. or D.C. The value of R24C has been chosen so that the rectifier efficiency is regulated to give the same D.C. voltage across C18B, whether the mains input voltage is D.C. or A.C. (of the same R.M.S. value).



Figures in circles refer to the voltages on the various electrodes. All voltages were taken with an Avo 7 meter on the highest permissible range.

CIRCUIT DIAGRAM

Wave change switch shown in the medium wave position, mains/battery switch in mains position.

CAPACITORS

No.	Cap. pf.	Rating or Tol.
1	210	2%
2	·04μF	150v
3	500	20%
4	100	2%
5	100	20%
6	100	2%
7	650	2%
8	·04μF	150v
9	510	2%
10	6·8	±½pF
11	·004μF	150v
12	100	2%
13	100	2%
14	100	10%
15	·01μF	150v
16	·001μF	350v
17	·04μF	150v
18 A/B	50+50μF	350vEL
19 A/B	50+50μF	25vEL
20	·004μF	150v
21	·1μF	300vAC
22	·01μF	150v
A	30	Tr.
B	30	Tr.
C	60	Tr.
VC1/2	520	2-Gang.

SPECIAL NOTE

In order to avoid undue valve failure it is essential that the filament current of the 25mA valves is kept within the limits specified by the makers.

The SLIDER OF R22 MUST NOT BE MOVED, as it has been set in the factory to suit all valves including replacements.

If R22 needs replacement the slider of the new resistor should be set to the same physical position as the one of the original resistor.

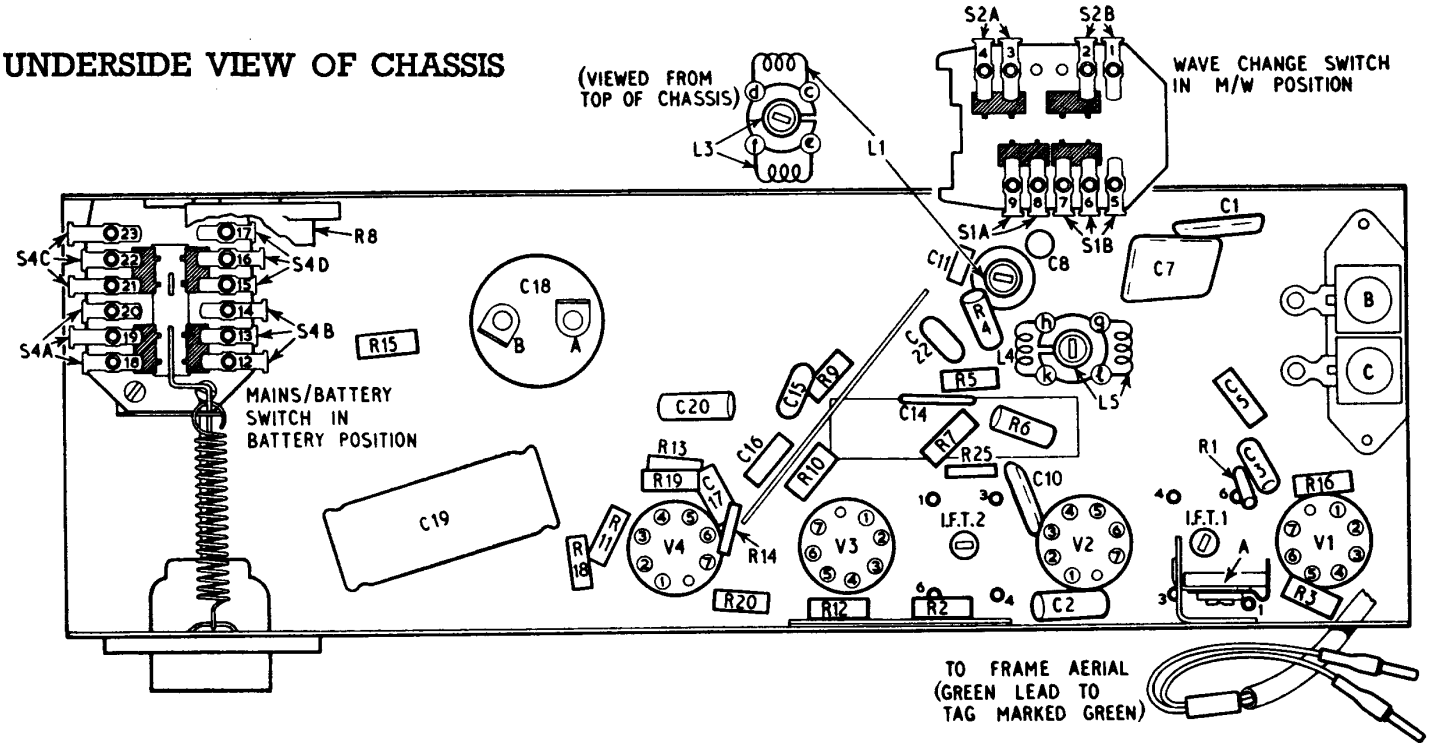
Numbers in brackets after components are part numbers and should be quoted with orders.

RESISTORS

No.	Ohms.	Watts or Current.
1	1 M	¼ 20%
2	82 K	¼ 20%
3	27 K	¼ 10%
4	4·7 K	¼ 10%
5	33 K	¼ 10%
6	2·2 M	¼ 10%
7	47 K	¼ 20%
8	1 M Pot. D.P.SW.	¼
9	1.2 M	¼ 20%
10	10 M	¼ 20%
11	3.9 M	¼ 10%
12	2.7 M	¼ 20%
13	1·8 M	¼ 20%
14	470 K	¼ 20%
15	560	¼ 10%
16	1 K	¼ 10%
17	390	¼ 10%
18	1·5 K	¼ 10%
19	2·7 K	¼ 10%
20	2·2 K	¼ 10%
21	2710	24 mA 1%
22	700 *Pre-set	24 mA
23	2820	32 mA 1%
24A	775	32 mA 5%
B	760	32 mA 5%
C	550	70 mA 5%
25	1 M	¼ 20%

* see 'Special note'

UNDERSIDE VIEW OF CHASSIS



MAINS/BATTERY SWITCH (818-60)

Contact No.	Connected to
12	L.T. Battery +
13	S 3A
14	R 21
15	R 20
16	R13, R18, R19
17	Chassis
18	R15
19	C18A
20	R22, R23
21	H.T. Battery −
22	S 3B
23	Mains Socket

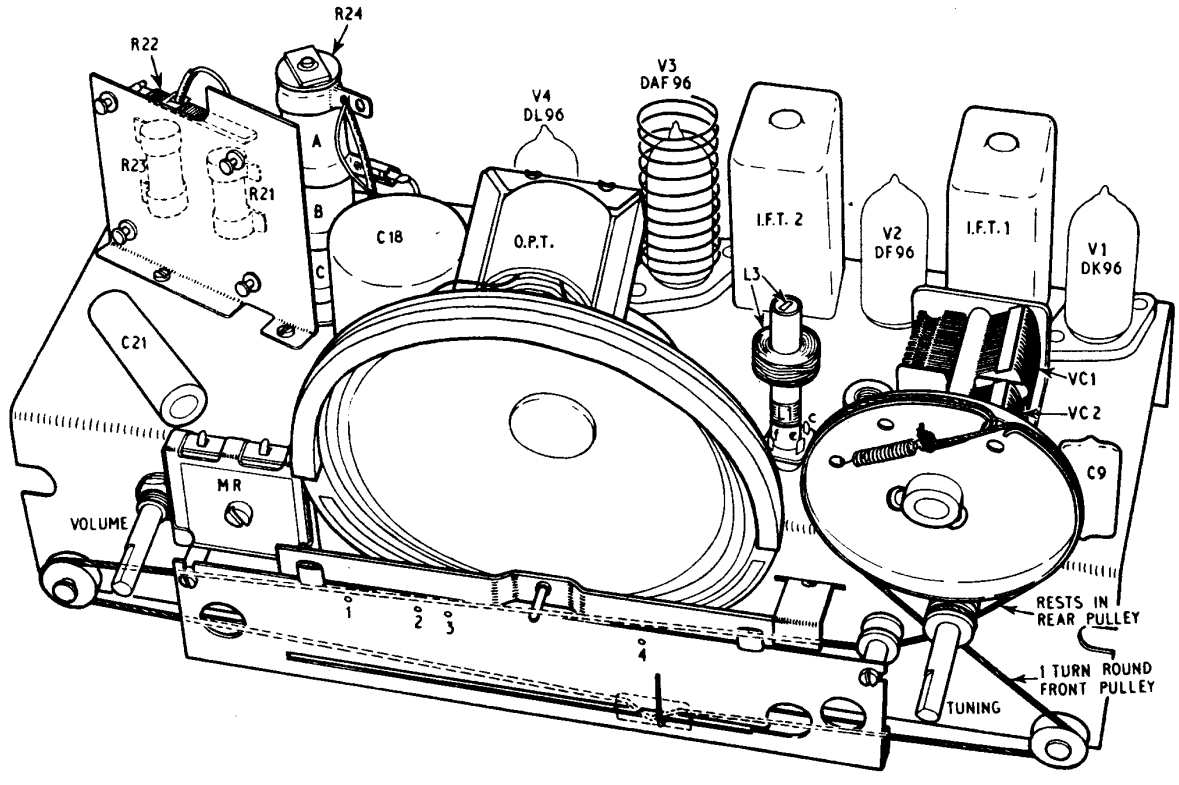
WAVE CHANGE SWITCH (818-92)

Contact No.	Connected to
1	Tr. C
2	C5, C7, L5 tag g
3	C8, R5, L4 tag h
4	R4
5	C1, L3 tag e
6	VC1, C3
7	Frame Aerial
8	L3 tag f
9	Chassis

COIL CONTINUITY

L No.	Coil		Ohms approx
1	M/W Loading Coil	(214–63)	·8
3	L/W Loading Coil		7·5
2	M/W Frame Aerial	(105–11)	1·2
4	Osc. Coil, coupling	(214–64)	1·1
5	Osc. Coil, tuning		1·3

	I.F.T.1 (852–106–1)	I.F.T.2 (852–106–2)
Prim.	6·5 ohms	6·5 ohms
Sec.	6·5 ,,	4·5 ,,



TOP AND FRONT VIEW OF CHASSIS

ALIGNMENT PROCEDURE

Remove chassis from cabinet, connect frame aerial with correct polarity and set pointer to scale end calibration line with gang condenser meshed so that the rotor and stator are flush.

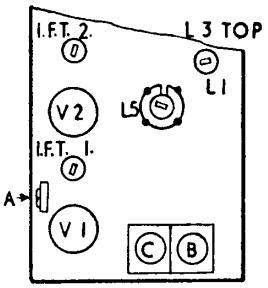
For alignment outside cabinet it is necessary to place the frame aerial in approximately the correct position with respect to chassis.

A dummy aerial is not used for the alignment. For I.F. and R.F. alignment the output from the signal generator is fed into a transmitting coil which is placed about 6 in. from the frame aerial. A suitable transmitting coil for alignment is approximately 14 turns of 18 S.W.G. En. Cu. wire wound on a $\frac{7}{8}$ in. former to a length of $1\frac{1}{8}$ in.

The signal generator output should be modulated 30% and an output meter connected across the speech coil or the output transformer primary. The R.F. input should be limited during alignment, so that an output of 0·5 volts across the speech coil or 31 volts across the primary of the output transformer is not exceeded.

The numbers in brackets next to the wavelengths in the table alignment refer to the calibration points on top of the scale back plate. Two tuning points will be found when adjusting cores, the position nearest to the end of the former (chassis end on oscillator coil) being the correct one.

After any adjustment to the M/W oscillator trimmer or core, the L/W trimmer (C) must also be re-aligned.



Signal Generator Frequency Kc/s.		Receiver Tuned to	Adjust for maximum	
1	471	M/W gang fully meshed	Cores of I.F.T.2 and I.F.T.1 in this order.	
2	600	M/W 500 m (4)	Osc.	Aerial
			Core L5	
3	1,500	200 m (1)	Trimmer B	
4		Repeat operations 2 and 3.		
5	1,000	300 m (2)	Check calibration.	
6	210	L/W 1,429 m (3)	Trimmer C	Core L3
7		Replace chassis in cabinet, insert H.T. battery and close back (see note below).		
8	600	M/W 500 m (4)		Core L1
9	1,500	200 m (1)		Trimmer A
10		Repeat operations 7 and 8.		

NOTE: It is important that the correct relative position of the frame aerial, chassis and H.T. battery is maintained during alignment of core L1 and trimmer A.

REMOVAL OF CHASSIS

After removing the mains plug from its socket and pressing the two buttons on the bottom of the cabinet, the back with the frame aerial will spring open and can be removed by pressing one of the hinges and lifting it out of the cabinet brackets.

After removing the batteries, pulling off the front knobs and the wave change knob and unscrewing two PK screws on the back of the chassis, the chassis can be withdrawn.