PHILIPS Model 681A

General Description : Nine-valve (including rectifier), four-waveband superheterodyne receiver with special facilities for bandspread tuning on eight S.W. broadcast bands. The circuit possesses a number of features not normally encountered in broadcast receivers, and can best be considered as : (*a*) a four-waveband superheterodyne receiver, with an R.F. amplifying stage and a push–pull output stage ; and (*b*) a double-conversion superheterodyne bandspread receiver.

Power Supply : A.C. mains, 100–250 volts, 50–100 c/s.

Wavebands : (*a*) S.W.2 11·1–34·2 m. ; S.W.3 34·2–110·5 m. ; M.W. 192–560 m. ; L.W. 900–2000 m. ; (*b*) Bandspread 11, 13, 16, 19, 25, 31, 41, 49 m. Each band covers 0·5 Mc/s.

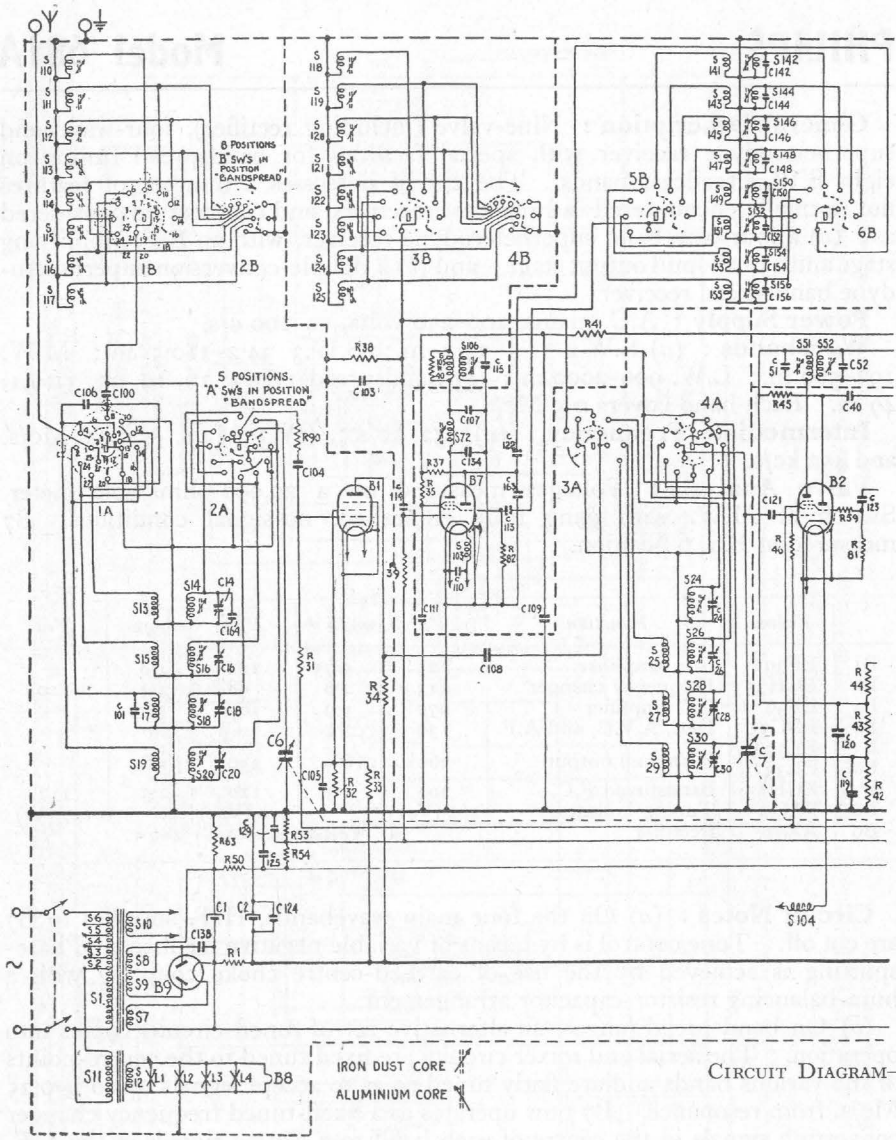
Intermediate Frequency : (*a*) 452 kc/s. ; (*b*) 3 Mc/s. ± 0·25 Mc/s. and 452 kc/s.

Valve Analysis : Voltages measured on a 20,000-ohms/volt meter. Switch at M.W. with gang fully enmeshed, no-signal conditions. B7 measured at B.S. 6 position.

	Valves	*Function*	*Va*	*Ia*	*Vg2*	*Ig2*	*Vat*
B1	EF39	R.F. amplifier	125	5·75	102	1·8	—
B2	ECH35	Frequency changer	213	2·6	98	2·4	110
B3	EF39	I.F. amplifier	270	5·9	105	1·75	—
B4	EBC33	Det., A.V.C. and A.F.	130	2·2	—	—	—
B5	EL33 }	Push–pull output	260	16	230	1·8	—
B6	EL33 }						
B7	ECH35	Bandspread F.C.	202	2·3	110	2·3	117
B8	EM34	Tuning indicator	202 (Va1)	—	110 (Va2)	—	117 (Vt)
B9	AZ31	Rectifier	Voltage across C1 280 v.				

Circuit Notes : (*a*) On the four main wavebands, H.T. supplies to B7 are cut off. Tone control is by means of variable negative feedback. Phase-splitting is achieved by the use of earthed-centre choke coupling with a hum-balancing resistor-capacitor arrangement.

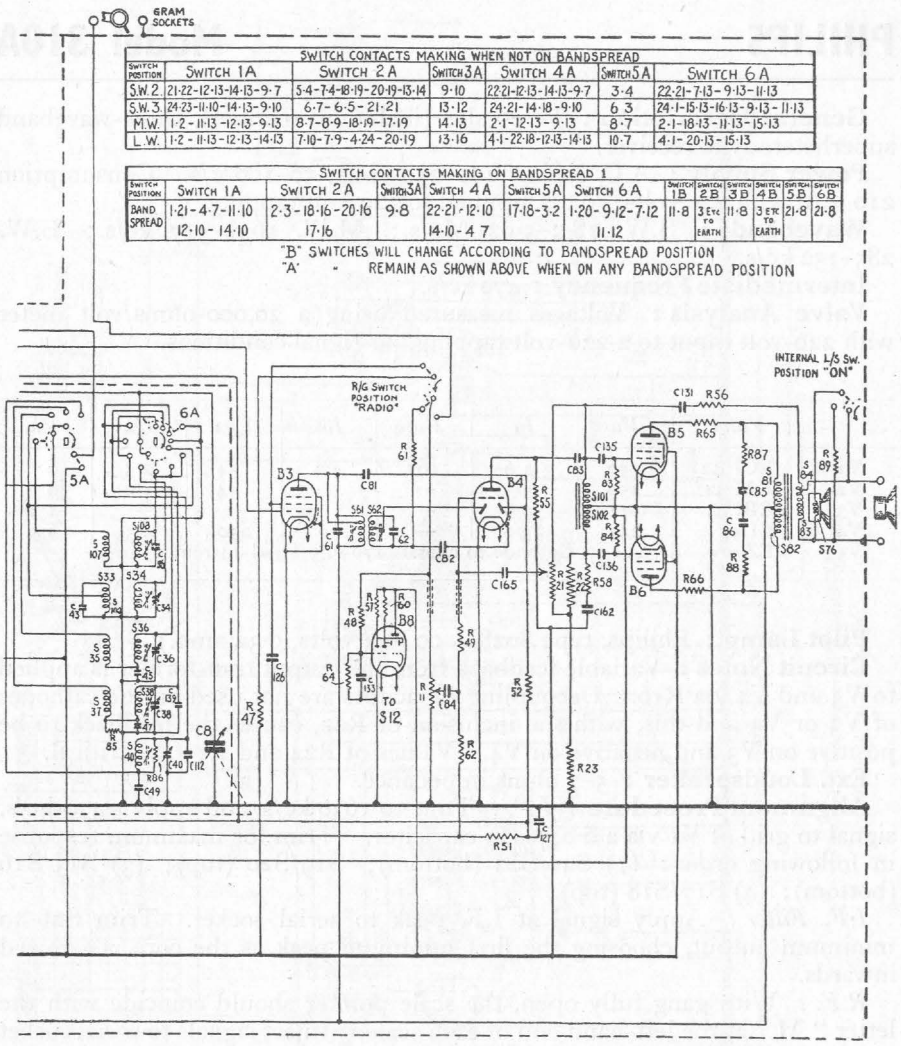
(*b*) On bandspread ranges, an alternative set of tuned circuits comes into operation. The aerial and mixer circuits are fixed tuned to the centre-points of the various bands and are flatly tuned so as to accept signals up to ±0·25 Mc/s. from resonance. B7 now operates as a fixed-tuned frequency changer converting signals in the centre of each band to 3 Mc/s., signals at the L.F. end to 3·25 Mc/s. and signals at the H.F. end to 2·75 Mc/s. The converted signals between 2·75 and 3·25 Mc/s. appear across the fixed-tuned grid circuit of B2, which acts as a second frequency changer by means of a fifth oscillator tuned circuit with a range of approximately 2·30–2·80 Mc/s. The remaining stages of the receiver function in the same manner as for (*a*). On bandspread ranges only one section (osc. section) of the triple-ganged tuning capacitor is used.



CIRCUIT DIAGRAM—

Capacitors.

C1	45 (350 v.)	C18	3–30 pF.	C40	3–30 pF.	C81	8·2 pF (± 1 pF.)
C2	47 (330 v.)	C20	3–30 pF.	C43	82 pF. (5%)		
C6, C7, C8	10–490 pF.	C24	3–30 pF.	C45	2,750 pF. (2%)	C82	100 pF.
		C26	3–30 pF.	C47	540 pF. (1%)	C83	0·18
		C28	3–30 pF.	C49	135 pF. (1%)	C84	22,000 pF.
C14	3–30 pF.	C30	3–30 pF.	C51	103 pF.	C85	2,200 pF.
C16	3–30 pF.	C34	3–30 pF.	C52	97 pF.	C86	2,200 pF.
		C36	3–30 pF.	C61	103 pF.	C100	22 pF. (10%)
		C38	3–30 pF.	C62	103 pF.	C101	82 pF. (10%)



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C103	6·8 pF. (± 1 pF.)	C119	47,000 pF.	C138	22,000 pF.
C104	220 pF.	C120	10,000 pF.	C139	15 pF. (10%)
C105	47,000 pF.	C121	220 pF.	C140	100 pF. (10%)
C106	82 pF. (10%)	C122	100 pF. (10%)	C142	100 pF. (5%)
C107	100 pF. (10%)	C123	68 pF. (10%)	C144	150 pF. (5%)
C108	220 pF.	C124	10,000 pF.	C146	150 pF. (5%)
C109	10,000 pF.	C125	68,000 pF.	C148	150 pF. (5%)
C110	10,000 pF.	C126	47,000 pF.	C150	150 pF. (5%)
C111	10,000 pF.	C127	47,000 pF.	C152	150 pF. (5%)
C112	39 pF. (10%)	C129	47,000 pF.	C154	150 pF. (5%)
C113	68 pF. (10%)	C131	15,000 pF. (10%)	C156	150 pF. (5%)
C114	220 pF.	C133	47,000 pF.	C162	47,000 (10%)
C115	1,270 pF. (2%)	C134	22 pF. (10%)	C163	15 pF. (5%)
C116	920 pF. (1%)	C135	6,800 pF.	C164	10 pF. (10%)
		C136	6,800 pF.	C165	270 pF. (10%)

Resistors.

R1	1·5k (3 W. 5%)
R11	500k
R21	500k
R22	100k (¼ W. 5%)
R23	8·2k (¼ W. 5%)
R31	470k (¼ W.)
R32	68k (½ W. 10%)
R33	39k (½ W. 10%)
R34	18k (1 W. 10%)
R35	39k (¼ W. 10%)
R37	18k (½ W. 10%)
R38	18k (¼ W. 10%)

(*continued on p.* 103)

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R39	820k (½ W. 10%)	R52	820k (¼ W. 10%)	R65	47 (¼ W. 10%)
R40	8·2k (¼ W. 10%)	R53	390k (¼ W. 5%)	R66	47 (¼ W. 10%)
R41	2·2k (⅓ W. 10%)	R54	820k (¼ W. 5%)	R81	47k (¼ W.)
R42	33k (1 W. 10%)	R55	47k (½ W. 10%)	R82	47k (¼ W.)
R43	22k (1 W. 10%)	R56	180k (¼ W. 10%)	R83	470k (¼ W.)
R44	1·5k (½ W. 10%)	R57	1M (¼ W.)	R84	470k (¼ W.)
R45	22k (¼ W. 10%)	R58	47k (¼ W. 10%)	R85	2·7k (¼ W. 10%)
R46	470k (¼ W.)	R59	56 (¼ W. 10%)	R86	47k (¼ W. 10%)
R47	82k (¼ W. 10%)	R60	1M (¼ W.)	R87	1k (¼ W.)
R48	1·5M (¼ W.)	R61	47k (1 W.)	R88	1k (¼ W.)
R49	47k (¼ W.)	R62	1·5M (¼ W.)	R89	22 (1 W.)
R50	270k (¼ W. 10%)	R63	150 (¼ W. 5%)	R90	47 (¼ W. 10%)
R51	2·2M (¼ W. 10%)	R64	6·8M (¼ W.)		