

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.

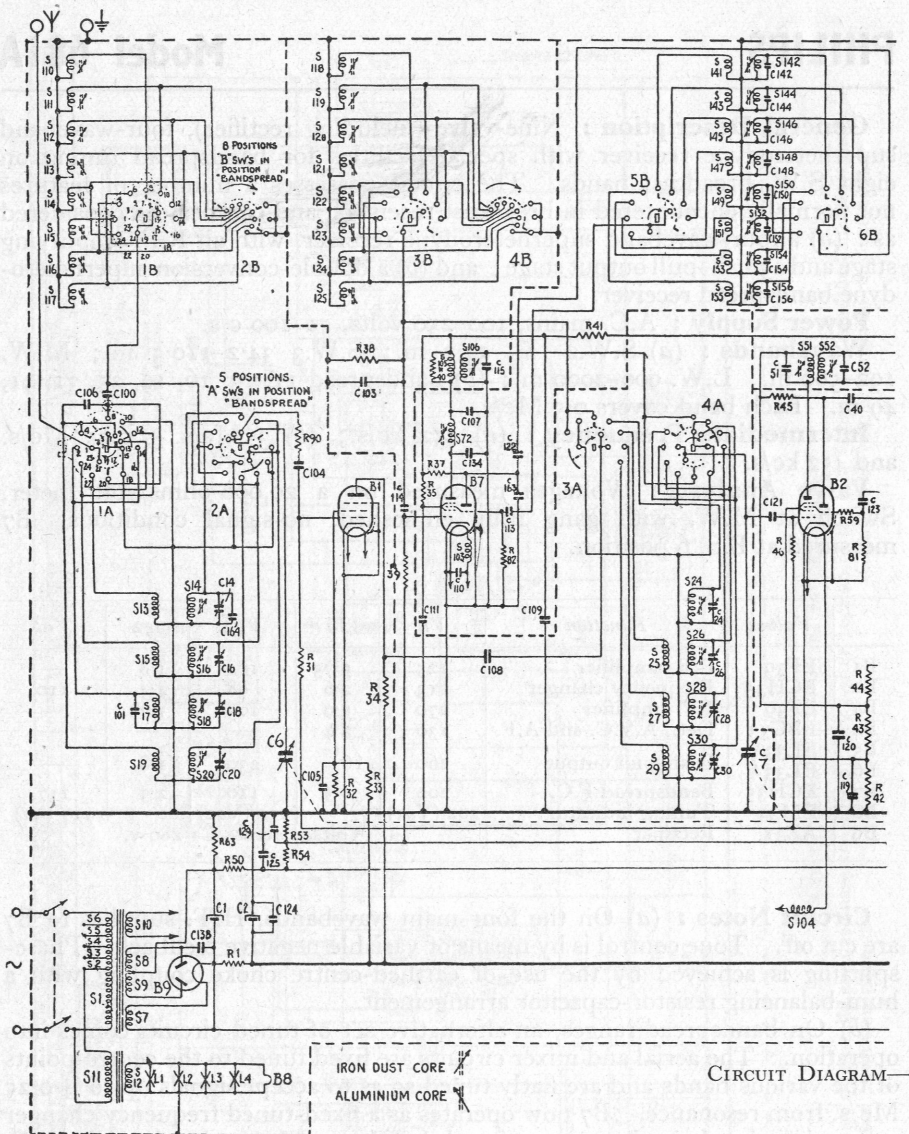
Intermediate Frequency : (a) 452 kc/s.; (b) 3 Mc/s. \pm 0.25 Mc/s. and 452 kc/s.

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 \pm 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.



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%)	C82	100 pF.
C6		C24	3-30 pF.	C45	2,750 pF. (2%)	C83	0.18
C7	10-490 pF.	C26	3-30 pF.	C47	540 pF. (1%)	C84	22,000 pF.
C8		C28	3-30 pF.	C49	135 pF. (1%)	C85	2,200 pF.
C14	3-30 pF.	C30	3-30 pF.	C51	103 pF.	C86	2,200 pF.
C16	3-30 pF.	C34	3-30 pF.	C52	97 pF.	C100	22 pF. (10%)
		C36	3-30 pF.	C61	103 pF.	C101	82 pF. (10%)
		C38	3-30 pF.	C62	103 pF.		

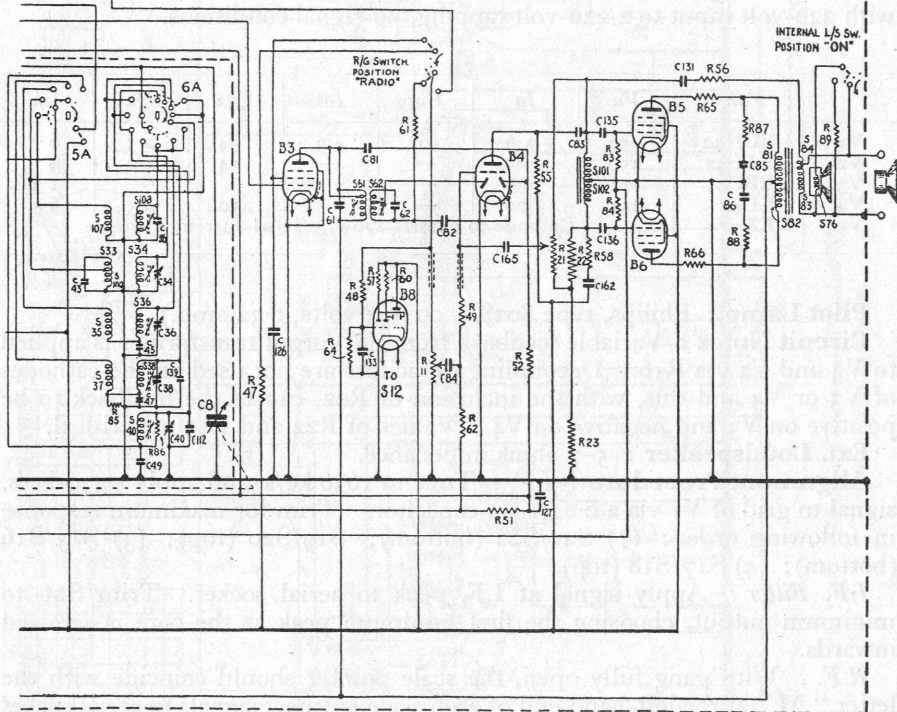
GRAM SOCKETS

SWITCH CONTACTS MAKING WHEN NOT ON BANDSPREAD						
SWITCH POSITION	SWITCH 1A	SWITCH 2A	SWITCH 3A	SWITCH 4A	SWITCH 5A	SWITCH 6A
S.W. 2	21-22-12-13-14-13-9-7	5-4-7-4-18-19-20-19-13-14	9-10	22-21-12-13-14-13-9-7	3-4	22-21-7-13-9-13-11-13
S.W. 3	24-23-11-10-14-13-9-10	6-7-6-5-21-21	13-12	24-21-14-18-9-10	6-3	24-1-15-13-16-13-9-13-11-13
M.W.	1-2-11-13-12-13-9-13	8-7-8-9-18-19-17-19	14-13	2-1-12-13-9-13	8-7	2-1-18-13-11-13-15-13
L.W.	1-2-11-13-12-13-14-13	7-10-7-9-4-24-20-19	13-16	4-1-22-18-12-13-14-13	10-7	4-1-20-13-15-13

SWITCH CONTACTS MAKING ON BANDSPREAD 1												
SWITCH POSITION	SWITCH 1A	SWITCH 2A	SWITCH 3A	SWITCH 4A	SWITCH 5A	SWITCH 6A	SWITCH 1B	SWITCH 2B	SWITCH 3B	SWITCH 4B	SWITCH 5B	SWITCH 6B
BAND SPREAD	1-21-4-7-11-10	2-3-18-16-20-16	9-8	22-21-12-10	17-18-3-2	1-20-9-12-7-12	11-8	3 ETC TO EARTH	11-8	3 ETC TO EARTH	21-8	21-8
	12-10-14-10	17-16		14-10-4-7		11-12						

'B' SWITCHES WILL CHANGE ACCORDING TO BANDSPREAD POSITION

'A' - REMAIN AS SHOWN ABOVE WHEN ON ANY BANDSPREAD POSITION



PHILIPS MODEL 681A

- C103 6.8 pF. (± 1 pF.)
- C104 220 pF.
- C105 47,000 pF.
- C106 82 pF. (10%)
- C107 100 pF. (10%)
- C108 220 pF.
- C109 10,000 pF.
- C110 10,000 pF.
- C111 10,000 pF.
- C112 39 pF. (10%)
- C113 68 pF. (10%)
- C114 220 pF.
- C115 1,270 pF. (2%)
- C116 920 pF. (1%)

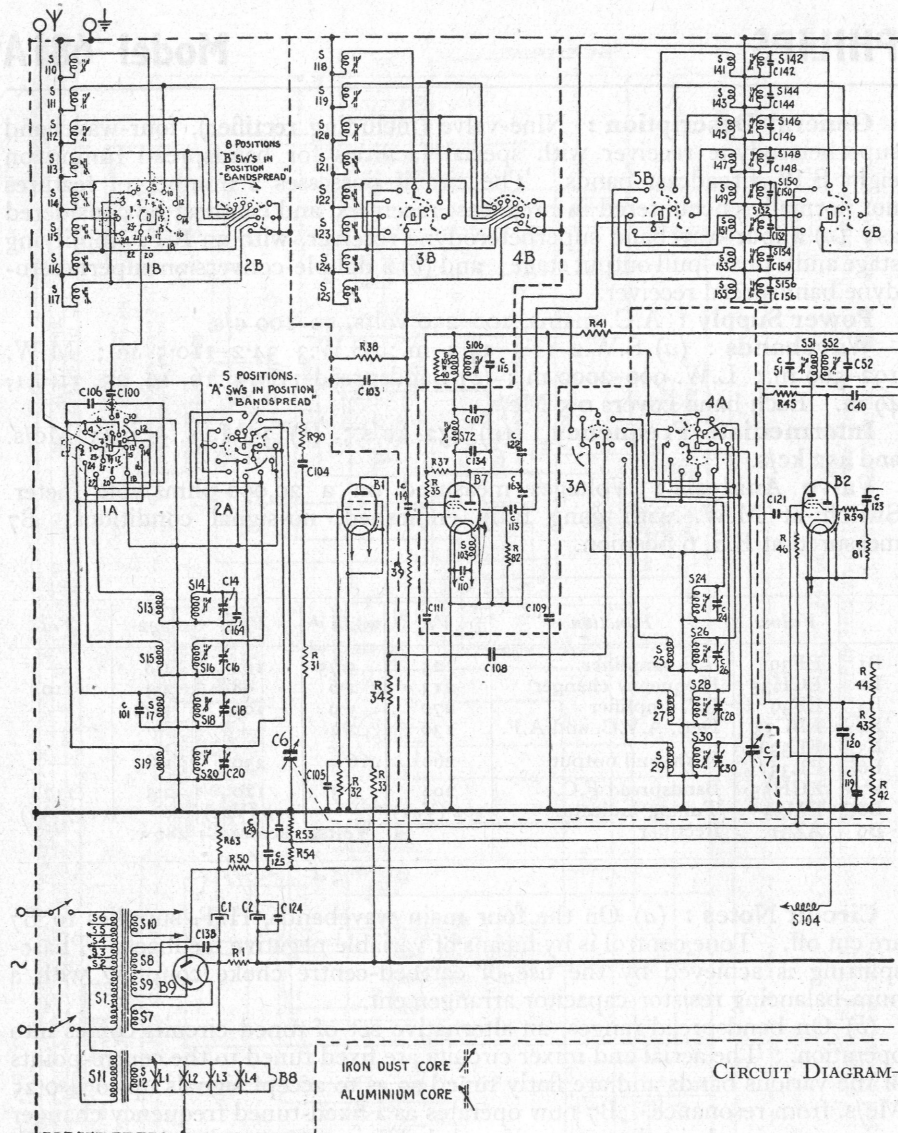
- C119 47,000 pF.
- C120 10,000 pF.
- C121 220 pF.
- C122 100 pF. (10%)
- C123 68 pF. (10%)
- C124 10,000 pF.
- C125 68,000 pF.
- C126 47,000 pF.
- C127 47,000 pF.
- C129 47,000 pF.
- C131 15,000 pF. (10%)
- C133 47,000 pF.
- C134 22 pF. (10%)
- C135 6,800 pF.
- C136 6,800 pF.

- C138 22,000 pF.
- C139 15 pF. (10%)
- C140 100 pF. (10%)
- C142 100 pF. (5%)
- C144 150 pF. (5%)
- C146 150 pF. (5%)
- C148 150 pF. (5%)
- C150 150 pF. (5%)
- C152 150 pF. (5%)
- C154 150 pF. (5%)
- C156 150 pF. (5%)
- C162 47,000 (10%)
- C163 15 pF. (5%)
- C164 10 pF. (10%)
- C165 270 pF. (10%)

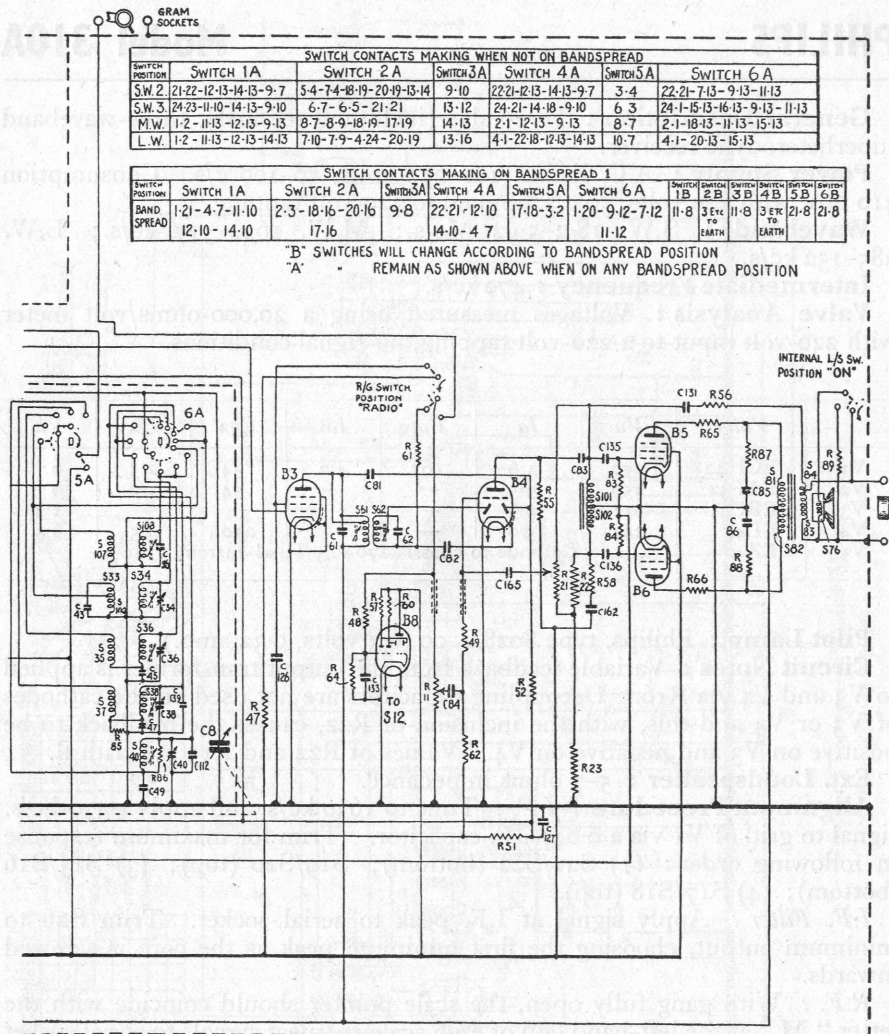
Resistors.

- 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 (¼ W. 10%)
- R33 39k (¼ W. 10%)
- R34 18k (¼ W. 10%)
- R35 30k (¼ W. 10%)
- R37 18k (¼ W. 10%)
- R38 18k (¼ W. 10%)

(continued on p. 103)



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|--------------------|--------------|--------------------|----------------------|
| Capacitors. | C18 3-30 pF. | C40 3-30 pF. | C81 8.2 pF (± 1 pF.) |
| C1 45 (350 v.) | C20 3-30 pF. | C43 82 pF. (5%) | C82 100 pF. |
| C2 47 (330 v.) | C24 3-30 pF. | C45 2,750 pF. (2%) | C83 0.18 |
| C6 47 | C26 3-30 pF. | C47 540 pF. (1%) | C84 22,000 pF. |
| C7 10-40 pF. | C28 3-30 pF. | C49 135 pF. (1%) | C85 2,200 pF. |
| C8 103 pF. | C30 3-30 pF. | C51 103 pF. | C86 2,200 pF. |
| C14 3-30 pF. | C34 3-30 pF. | C52 97 pF. | C100 22 pF. (10%) |
| C16 3-30 pF. | C36 3-30 pF. | C61 103 pF. | C101 82 pF. (10%) |
| | C38 3-30 pF. | C62 103 pF. | |



SWITCH CONTACTS MAKING WHEN NOT ON BANDSPREAD						
SWITCH POSITION	SWITCH 1A	SWITCH 2A	SWITCH 3A	SWITCH 4A	SWITCH 5A	SWITCH 6A
S.W. 2	21-22-12-13-14-13-9-7	5-4-7-4-B-19-20-19-13-14	9-10	22-21-12-13-14-13-9-7	3-4	22-21-7-13-9-13-11-13
S.W. 3	24-23-11-10-14-13-9-10	6-7-6-5-21-21	13-12	24-21-14-18-9-10	6-3	24-1-15-13-16-13-9-13-11-13
M.W.	1-2-11-13-12-13-9-13	8-7-8-9-18-19-17-19	14-13	2-1-12-13-9-13	8-7	2-1-18-13-11-13-15-13
L.W.	1-2-11-13-12-13-14-13	7-10-7-9-4-24-20-19	13-16	4-1-22-18-12-13-14-13	10-7	4-1-20-13-15-13

SWITCH CONTACTS MAKING ON BANDSPREAD 1						
SWITCH POSITION	SWITCH 1A	SWITCH 2A	SWITCH 3A	SWITCH 4A	SWITCH 5A	SWITCH 6A
BAND SPREAD	1-21-4-7-11-10	2-3-18-16-20-16	9-8	22-21-12-10	17-18-3-2	1-20-9-12-7-12
	12-10-14-10	17-16		14-10-4-7		11-12

'B' SWITCHES WILL CHANGE ACCORDING TO BANDSPREAD POSITION
'A' REMAIN AS SHOWN ABOVE WHEN ON ANY BANDSPREAD POSITION

PHILIPS MODEL 681A

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|------------------------|-----------------------|--------------------|-------------------|
| C103 6.8 pF. (± 1 pF.) | C119 47,000 pF. | C138 22,000 pF. | Resistors. |
| 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%) | |

(continued on p. 103)

PHILIPS—MODEL 681A (continued from p. 115).

R39	820k ($\frac{1}{2}$ W. 10%)	R52	820k ($\frac{1}{4}$ W. 10%)	R65	47 ($\frac{1}{4}$ W. 10%)
R40	8.2k ($\frac{1}{4}$ W. 10%)	R53	390k ($\frac{1}{4}$ W. 5%)	R66	47 ($\frac{1}{4}$ W. 10%)
R41	2.2k ($\frac{1}{2}$ W. 10%)	R54	820k ($\frac{1}{4}$ W. 5%)	R81	47k ($\frac{1}{4}$ W.)
R42	33k (1 W. 10%)	R55	47k ($\frac{1}{2}$ W. 10%)	R82	47k ($\frac{1}{4}$ W.)
R43	22k (1 W. 10%)	R56	180k ($\frac{1}{4}$ W. 10%)	R83	470k ($\frac{1}{4}$ W.)
R44	1.5k ($\frac{1}{2}$ W. 10%)	R57	1M ($\frac{1}{4}$ W.)	R84	470k ($\frac{1}{4}$ W.)
R45	22k ($\frac{1}{4}$ W. 10%)	R58	47k ($\frac{1}{4}$ W. 10%)	R85	2.7k ($\frac{1}{4}$ W. 10%)
R46	470k ($\frac{1}{4}$ W.)	R59	56 ($\frac{1}{4}$ W. 10%)	R86	47k ($\frac{1}{4}$ W. 10%)
R47	82k ($\frac{1}{4}$ W. 10%)	R60	1M ($\frac{1}{4}$ W.)	R87	1k ($\frac{1}{4}$ W.)
R48	1.5M ($\frac{1}{4}$ W.)	R61	47k (1 W.)	R88	1k ($\frac{1}{4}$ W.)
R49	47k ($\frac{1}{4}$ W.)	R62	1.5M ($\frac{1}{4}$ W.)	R89	22 (1 W.)
R50	270k ($\frac{1}{4}$ W. 10%)	R63	150 ($\frac{1}{4}$ W. 5%)	R90	47 ($\frac{1}{4}$ W. 10%)
R51	2.2M ($\frac{1}{4}$ W. 10%)	R64	6.8M ($\frac{1}{4}$ W.)		