91 & 92

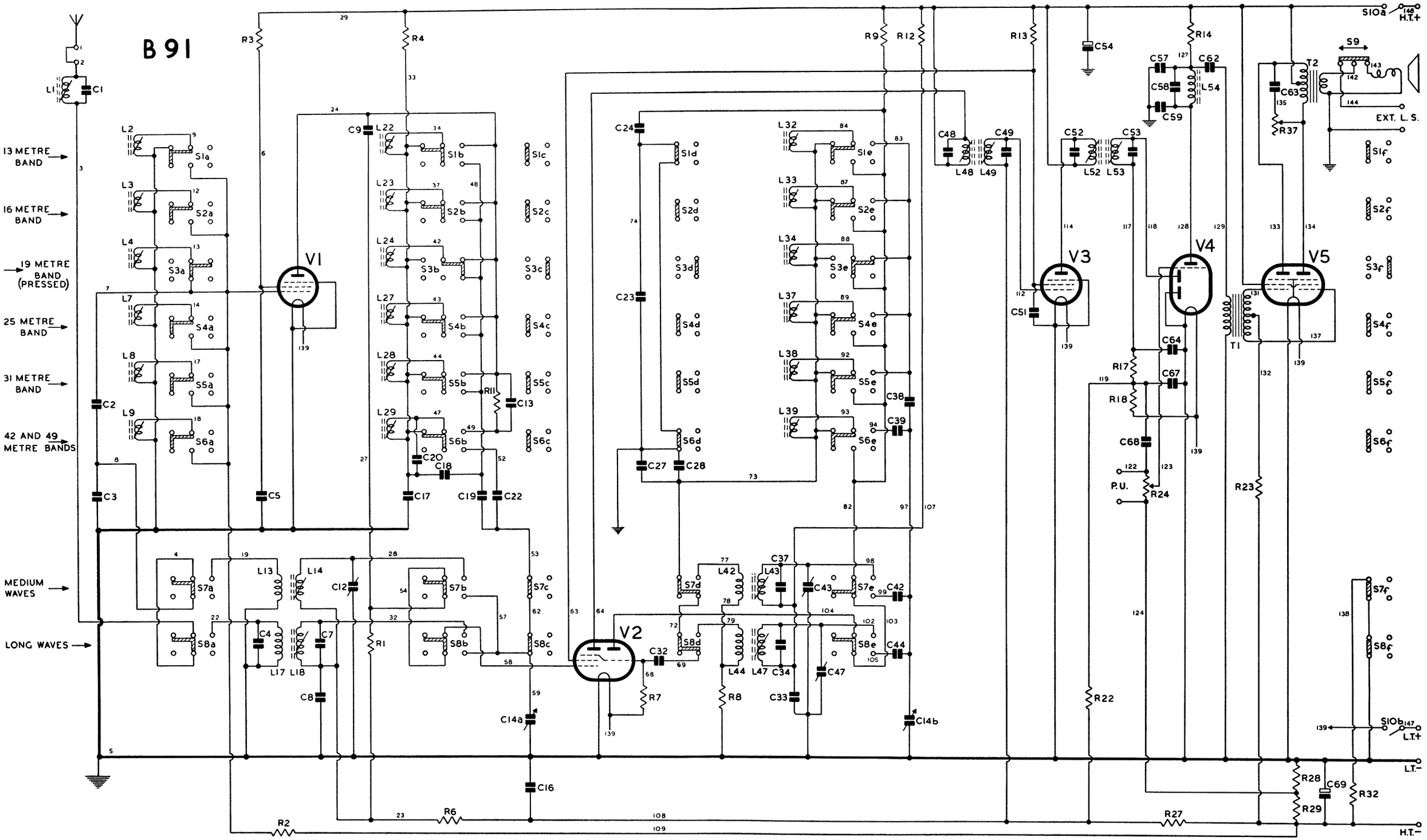
MURPHY RADIO SERVICE INSTRUCTIONS

91 & 92

SUPPLY	A92:	200-250 volts, 50-100 cycles.
	B91:	L.T. 2 volts; H.T. 120 volts.
WAVE RANGES		13, 16, 19, 25, 31, 42, and 49 metre bands. 190-550 metres. 970-2000 metres.
INTERMEDIATE FREQUENCY		465 Kc/s.
VALVES	A92:	Mazda SP41, TH41, VP41, HL41DD, PEN45, UU6.
	B91:	Mazda VP23, TP25, VP23, HL23DD, QP25.
PILOT LAMPS	A92:	6.2 volt 0.3 amp. Globular Clear.
	B91:	3.5 volt 0.15 amp. Globular Clear.
SPEECH COIL IMPEDANCE		3 ohms.
TOTAL WEIGHT	A92:	35 lb.
	B91:	31 lb. (without batteries)
CONSUMPTION	A92:	60 watts.
	B91:	10 mA. approx. on LW and MW. 14 mA. on S.W. L.T. 0.65 amps.
CABINET DIMENSIONS		$20\frac{3}{8}'' \times 19\frac{7}{8}'' \times 8\frac{5}{8}''$.

ISSUED BY
MURPHY RADIO LTD, WELWYN GARDEN CITY
TELEPHONE: WELWYN GARDEN 800

B 91



B91 TABLE OF COMPONENTS B91

Code	Value	Test	Pts
C1	500 pf.	2	3
C2	20 pf.	7	8
C3	45 pf.	5	8
C4	500 pf.	5	22
C5	·05 Mf.	5	6
C7	92 pf.	23	32
C8	·01 Mf.	5	23
C9	500 pf.	24	27
C12	5-35 pf.	5	28
C13	58 pf.	24	49
C14a	Gang	5	59
C14b	Gang	5	97
C16	·05 Mf.	5	108
C17	·001 Mf.	5	33
C18	30 pf.	33	48
C19	20 pf.	48	53
C20	20 pf.	33	47
C22	58 pf.	52	53
C23	139 pf.	5	74
C24	139 pf.	74	82
C27	123 pf.	5	73
C28	16 pf.	5	73
C32	200 pf.	68	69
C33	·01 Mf.	5	107
C34	220 pf.	102	107
C37	20 pf.	98	107
C38	83 pf.	97	83
C39	310 pf.	97	94
C42	662 pf.	97	99
C43	5-35 pf.	5	98
C44	414 pf.	97	105
C47	5-35 pf.	5	102
C48	92 pf.	29	64
C49	92 pf.	108	112
C51	·05 Mf.	5	63
C52	92 pf.	29	114
C53	92 pf.	117	118
C54	8 Mf. 175v.	5	29
C57	·002 Mf.	5	127
C58	300 pf.	127	128
C59	·002 Mf.	5	128
C62	·05 Mf.	127	129
C63	·01 Mf.	133	135
C64	50 pf.	5	117
C67	50 pf.	5	119
C68	·01 Mf.	119	122
C69	50 Mf. 12v.	5	109
R1	220,000	23	27
R2	680,000	7	109
R3	100,000	6	29
R4	2,700	33	29
R6	10,000	23	108
R7	22,000	68	139
R8	470	5	78
R9	8,200	29	82
R11	22,000	24	49
R12	47,000	29	107
R13	39,000	29	63
R14	82,000	29	127
R17	47,000	117	119
R18	1·5MΩ	119	139
R22	1·5MΩ	108	119
R23	150,000	109	132
R24	2 MΩ	122	124
R27	10 MΩ	108	109
R28	920	5	124
R29	36	109	124
R32	2,700	109	138
R37	150,000	134	135
L1	2·5	2	3
L2	*	5	9
L3	*	5	12
L4	*	5	13
L7	*	5	14
L8	*	5	17
L9	*	5	18
L13	*	5	19
L14	2·5	23	28
L17	25	5	22
L18	15	23	32
L22	*	33	34
L23	*	33	37
L24	*	33	42
L27	*	33	43
L28	*	33	44
L29	*	33	47
L32	*	73	84
L33	*	73	87
L34	*	73	88
L37	*	73	89
L38	*	73	92
L39	*	73	93
L42	*	77	78
L43	1·75	98	107
L44	1	78	79
L47	2·25	102	107
L48	7	29	64
L49	7	108	112
L52	7	29	114
L53	7	117	118
L54	350	127	128
T1 Pri.	180	5	129
Sec.	710	132	131
	+910	132	137
T2 Pri.	175	29	133
	+195	29	134
Sec.	*	5	142
Speech Coil	3	5	144

No top and underside diagrams of the B91 are included, but the general layout of the components is similar. In particular, the positions of the trimming condensers and coils are the same and the "92" diagrams can therefore be used when re-aligning the B91 receiver.

B91 TABLE OF VOLTAGES B91

Valves	Type	Electrode	Test Point	Voltage
V1	Mazda VP23	Anode Screen	24 6	**65** **42**
V2	Mazda TP25	Pentode Anode Pentode Screen Triode Anode	64 63 104	**120** **60** **85**
V3	Mazda VP23	Anode Screen	114 63	**120** **60**
V4	Mazda HL23DD	Anode	128	**65**
V5	Mazda QP25	Anode 1 Anode 2 Screen	133 134 29	**115** **115** **120**

All the readings are taken from the chassis, with the set switched to the 49 metre band, using a 0-500, 0-50 volt meter 1,000 ohms per volt and a 120 volt High Tension Battery.

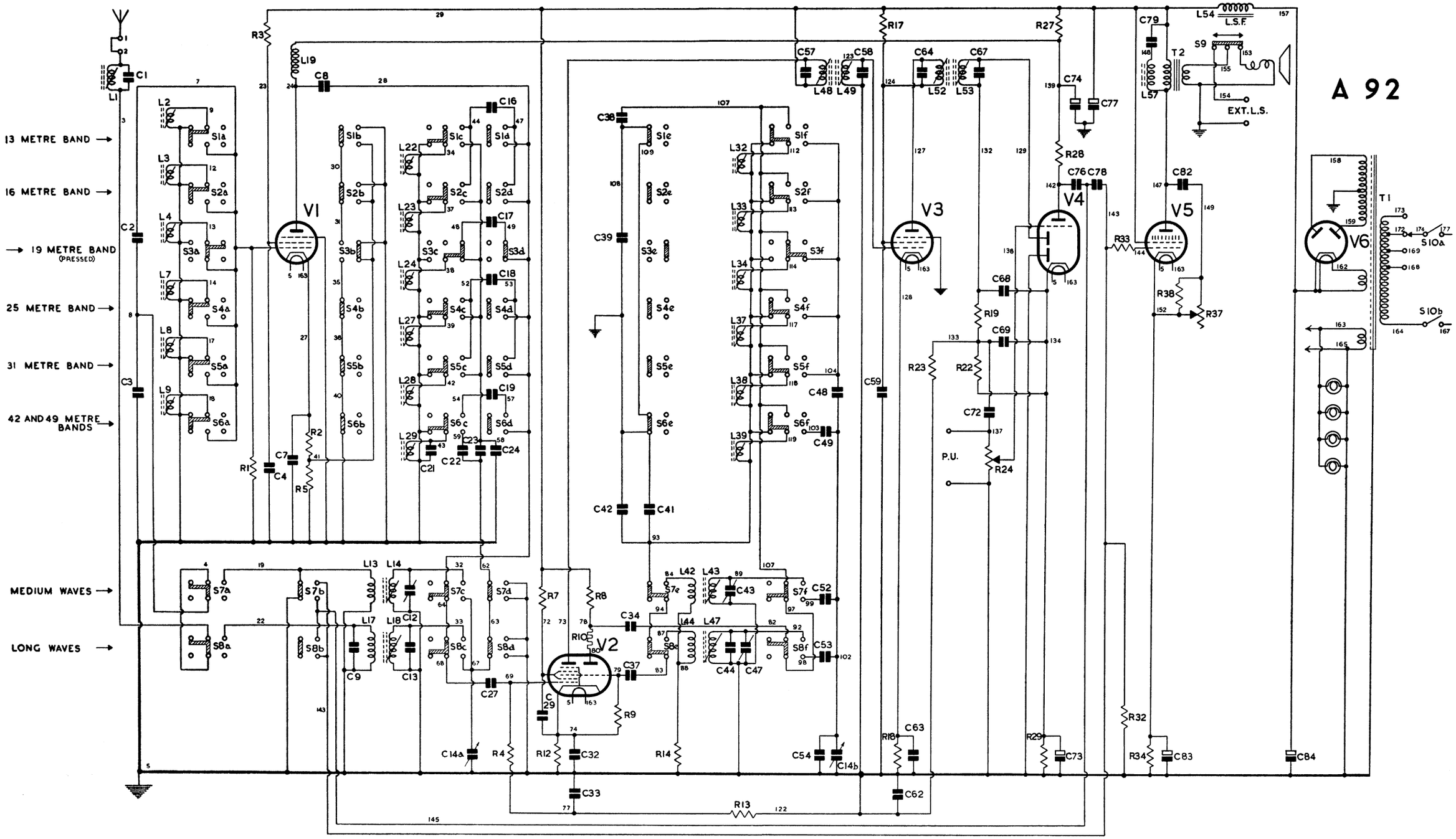
A92 TABLE OF VOLTAGES A92

Valve	Type	Electrode	Test Point	Square	Voltage
V1	Mazda SP41	Anode Screen Cathode	24 23 27	28 D 28 D 28 D	**250** **190** **2·5**
V2	Mazda TH41	Hexode Anode Hexode Screen Triode Anode Cathode	73 72 80 74	28 G 28 G 28 G 28 G	**240** **100** **100** **4**
V3	Mazda VP41	Anode Screen Cathode	**127** 124 128	24 H 24 H 24 J	**200** **200** **4**
V4	Mazda HL41DD	Anode Cathode	142 134	21 H 21 J	**100** **1·5**
V5	Mazda PEN45	Anode Screen Cathode	147 29 152	18 H 18 H 18 J	**240** **250** **8**
V6	Mazda UU6	Cathode	157	2 E	**360**

All readings are taken from chassis using a 0-500, 0-50 volt meter, 1,000 ohms per volt.

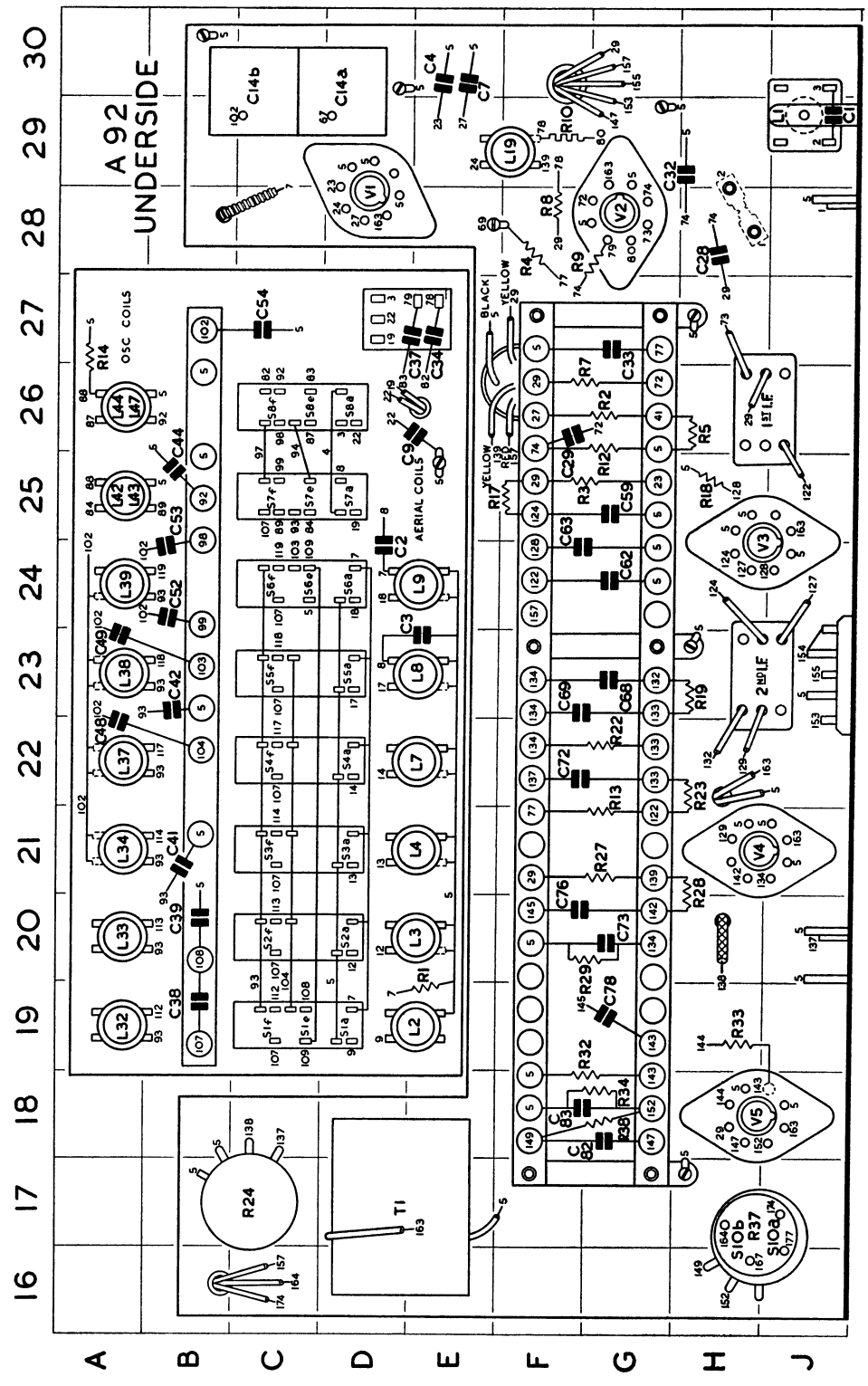
A 92

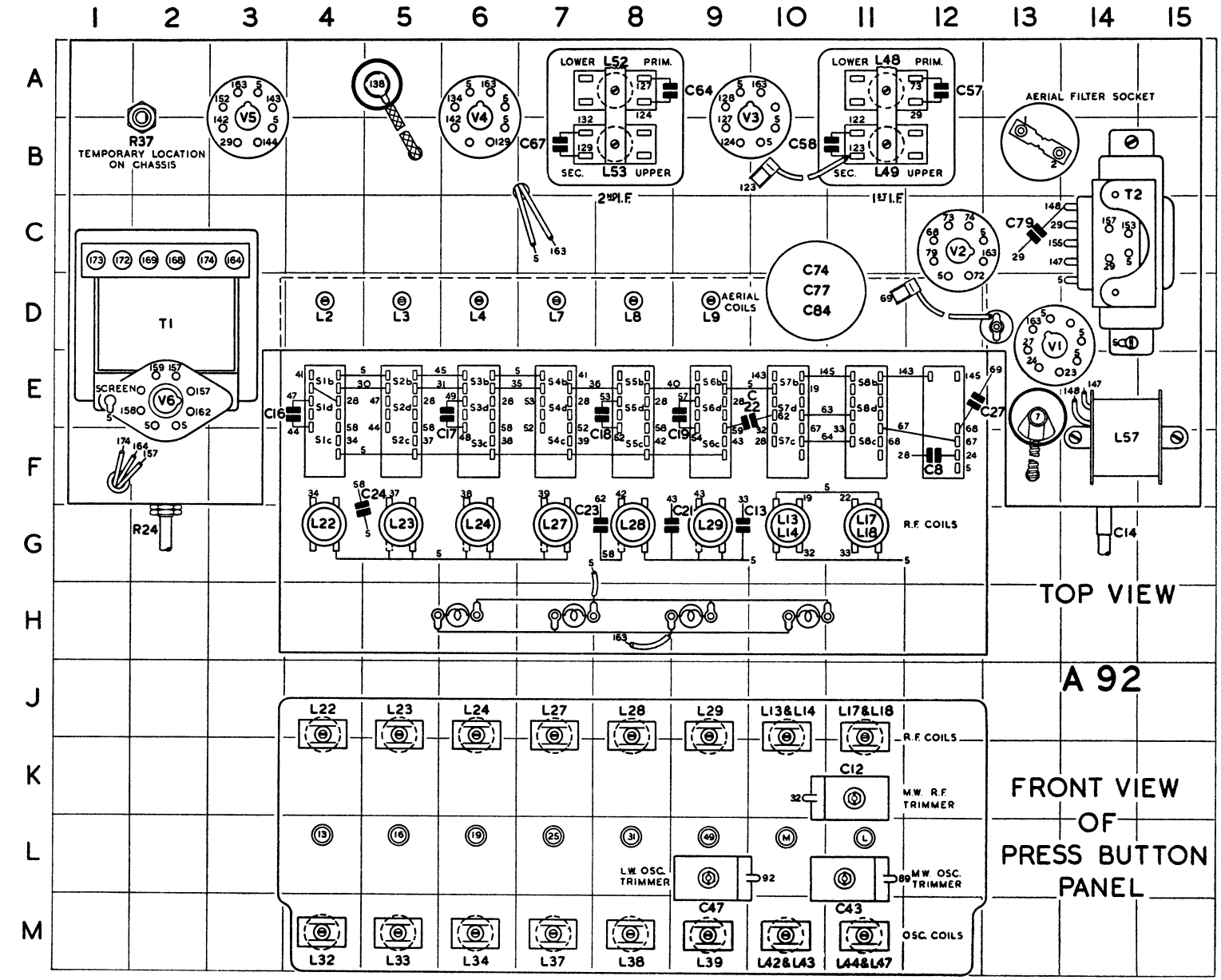
13 METRE BAND →
16 METRE BAND →
→ 19 METRE BAND (PRESSED)
25 METRE BAND →
31 METRE BAND →
42 AND 49 METRE BANDS →
MEDIUM WAVES →
LONG WAVES →



A92 TABLE OF COMPONENTS A92

Code	Value	Test	Pts	Square
C1	500 pf.	2	3	29 J
C2	20 pf.	7	8	24 D
C3	45 pf.	5	8	23 E
C4	·01 Mf.	5	23	30 E
C7	·01 Mf.	5	27	30 E
C8	100 pf.	24	28	12 F
C9	500 pf.	5	22	26 E
C12	5-35 pf.	5	32	11 K
C13	100 pf.	5	33	9 G
C14a	Gang	5	67	30 D
C14b	Gang	5	102	30 C
C16	16 pf.	44	47	4 E
C17	22 pf.	48	49	6 E
C18	33 pf.	52	53	8 E
C19	125 pf.	54	57	9 E
C21	200 pf.	5	43	9 G
C22	175 pf.	59	62	9 E
C23	18 pf.	58	62	8 G
C24	30 pf.	5	58	5 G
C27	200 pf.	68	69	12 E
C29	·05 Mf.	72	74	26 F
C32	·05 Mf.	5	74	29 H
C33	·05 Mf.	5	77	27 G
C34	100 pf.	78	82	27 E
C37	200 pf.	79	83	27 D
C38	200 pf.	107	108	19 B
C39	200 pf.	5	108	20 B
C41	100 pf.	5	93	21 B
C42	100 pf.	5	93	23 B
C43	5-35 pf.	5	89	11 L
C44	230 pf.	5	92	25 B
C47	5-35 pf.	5	92	9 L
C48	125 pf.	104	102	22 A
C49	626 pf.	103	102	23 A
C52	662 pf.	99	102	24 B
C53	414 pf.	98	102	24 B
C54	10 pf.	5	102	27 C
C57	139 pf.	29	73	12 A
C58	150 pf.	122	123	11 B
C59	·05 Mf.	5	124	25 G
C62	·05 Mf.	5	122	24 G
C63	·05 Mf.	5	128	24 F
C64	139 pf.	124	127	8 A
C67	150 pf.	129	132	7 B
C68	100 pf.	134	132	23 G
C69	100 pf.	134	133	23 F
C72	·01 Mf.	133	137	22 F
C73	50 Mf. 12V	5	134	20 G
C74	8 Mf.	5	139	10 C
C76	·025 Mf.	142	145	20 F
C77	8 Mf.	5	29	10 D
C78	·003 Mf.	143	145	19 G
C79	850 pf.	29	148	13 C
C82	·08 Mf.	147	149	18 G
C83	50 Mf. 12V	5	152	18 F
C84	16 Mf.	5	157	10 D
R1	100,000	5	7	19 E
R2	220	41	27	26 G
R3	22,000	23	29	25 F
R4	1 MΩ	69	77	28 F
R5	820	5	41	26 H
R7	27,000 l.w.	29	72	26 F
R8	33,000 l.w.	29	78	28 F
R9	22,000	74	79	28 G
R10	20	78	80	29 F
R12	330	5	74	26 G
R13	4,700	77	122	21 G
R14	470	5	88	27 A
R17	4,700	29	124	25 F
R18	470	5	128	25 H
R19	100,000	132	133	23 H
R22	470,000	133	134	22 G
R23	1 MΩ	122	133	22 H
R24	1 MΩ	5	137	17 C
R27	4,700	29	139	21 G
R28	47,000	139	142	21 H
R29	680	5	134	20 G
R32	150,000	5	143	18 G
R33	47,000	143	144	19 H
R34	200 ¼ w.	5	152	18 G
R37	50,000	149	152	17 H
R38	10,000	149	152	18 G
L1	2·5	2	3	29 J
L2	*	5	9	19 E
L3	*	5	12	20 E
L4	*	5	13	21 E
L7	*	5	14	22 E
L8	*	5	17	23 E
L9	*	5	18	24 E
L13	*	5	19	10 G
L14	2·25	5	32	10 G
L17	25	5	22	11 G
L18	15	5	33	11 G
L19	5	24	139	29 F
L22	*	5	34	4 G
L23	*	5	37	5 G
L24	*	5	38	6 G
L27	*	5	39	7 G
L28	*	5	42	8 G
L29	*	5	43	9 G
L32	*	93	112	19 A
L33	*	93	113	20 A
L34	*	93	114	21 A
L37	*	93	117	22 A
L38	*	93	118	23 A
L39	*	93	119	24 A
L42	*	84	88	25 A
L43	1·25	5	89	25 A
L44	*	87	88	26 A
L47	1·7	5	92	26 A
L48	5·5	29	73	11 A
L49	5·5	122	123	11 B
L52	5·5	124	127	8 A
L53	5·5	129	132	8 B
L54	1,600	29	157	L.S.F.
L57	250	147	148	14 F
T1 Pri. 200-205	17	164	168	2 D
210-220	18	164	169	
230-240	20	164	172	
250	22	164	173	
H.T. Sec.	215	5	158	
	+230	5	159	
T2 Pri.	290	147	29	14 C
Sec.	*	5	155	14 C
L.S. Sp. Coil	3	5	153	





Trimming

ALTHOUGH the trimming of the "91" and "92" receivers is critical, it should remain very constant in normal use and unless a fault develops in any of the tuned circuits, necessitating the replacement of a component, only very small readjustments need be made from time to time to maintain the optimum performance of the receiver.

APPARATUS REQUIRED

The following equipment is required for carrying out trimming adjustments:

1. Service Oscillator, with modulated output and accurately calibrated scales on I.F., L.W., M.W., and S.W. ranges.

2. Output Meter. A rectifier type A.C. voltmeter with a range of 0.3 or 0.5 volts is suitable for this purpose.

3. Trimming screwdriver.

4. Damping Unit, for I.F. trimming, consisting of an 0.1 condenser and a 20,000 ohms (¼-watt) resistor, wired in series, with a crocodile clip at each end for connecting to the receiver.

THE I.F. CIRCUITS—465 Kc/s.

Unless an oscilloscope is used for the adjustment, it is essential to damp one of each pair of tuned circuits while the other is being adjusted, otherwise an uneven "double humped" resonance curve is likely to be obtained.

The I.F. circuits are tuned by variable inductances, and the following procedure should be adopted for making the adjustment.

1. Connect the oscillator, tuned to 465 Kc/s, between V3 control grid (square 10B test pt 123 —B91 Test pt 112) and chassis. Connect the output meter across the L.S. terminals.

2. Connect the damping unit between V3 anode (square 24H test pt 127—B91 test pt 114) and chassis, and adjust L53 (square 8B) for maximum reading in the output meter.

3. Connect the damping unit between V4 diode anode (square 21H test pt 129—B91 test pt 118) and chassis, and adjust L52 (square 8A) for maximum reading in the output meter.

4. Connect the service oscillator to V2 Control grid (square 11D, test pt 69—B91 test pt 58) and the damping unit between V2 hexode anode (square 28G test pt 73—B91 test pt 64) and chassis. Adjust L49 (square 11B) for maximum gain.

5. Connect the damping unit between V3 control grid and chassis (square 10B test pt 123—B91 test pt 112) and adjust L48 (square 11A) for maximum gain.

THE I.F. FILTER—465 Kc/s

This filter is adjusted to give minimum signal at 465 kc/s and the adjustment can be judged more accurately by ear.

1. Connect the service oscillator, tuned to 465 Kc/s, to the aerial and earth terminals of the receiver.

2. Reduce the output from the oscillator until the signal is only just audible.

3. Adjust L1 (square 29J) until the signal is at minimum.

R.F. AND OSCILLATOR CIRCUITS

The R.F. and oscillator circuits have trimming condensers in addition to variable inductances. The condensers are trimmed at the low (wavelength) end of the band, and the inductances are adjusted to correct any tracking errors at the top end of the band. In practice, it will be found that the inductances very rarely require adjustment.

M.W. BAND

1. Connect the service oscillator through a dummy aerial between the aerial and earth terminals, and the output meter to the L.S. terminals. Tune the oscillator and the receiver to 230 metres.

2. Adjust C43 (square 11L) to correct any calibration errors and C12 (square 11K) for maximum gain.

3. Tune the receiver and the oscillator to 500 metres and adjust L43 (square 10M) and L14 (square 10J) to correct any errors in alignment. If these inductances are varied appreciably it will be necessary to re-align the condensers at the bottom end of the band.

L.W. BAND

1. Connect the service oscillator between the aerial and earth terminals, and the output meter to the L.S. terminals. Tune the oscillator and the receiver to 1000 metres.

2. Adjust C47 (square 9L) to correct any calibration errors.

3. Tune the receiver and the oscillator to 1900 metres and adjust L47 (square 11M) and L18 (square 11J) to correct any errors in alignment. If these inductances are varied appreciably it will be necessary to re-adjust the condenser at the bottom end of the band.

SHORT WAVES

The short wave trimming on this receiver is extremely critical, and is carried out in the factory with the aid of crystal controlled oscillators. It is therefore advisable to correct small calibration errors, which may develop over a period of time, by adjusting the tuning scale to a station of known wavelength and then carefully adjusting the appropriate oscillator inductance until the station is accurately tuned; then lining up the R.F. circuits for maximum gain with the aid of the oscillator.

To do this, connect the oscillator, adjusted to a suitable wavelength, to the aerial and earth terminals of the receiver. Then tune the receiver until the signal is received at maximum volume. The R.F. tuned circuits can then be adjusted until the optimum setting is reached. The table below gives the wavelength used for the adjustment of each band in the factory, together with the location of the appropriate variable inductances. On no account must the oscillator inductance be touched again.

Band	Wavelength at which receiver is trimmed in factory	Oscillator inductance		Grid inductance		Aerial inductance	
		Code	Location	Code	Location	Code	Location
13	13·96	L 32	4 M	L 22	4 J	L 2	4 D
16	16·87	L 33	5 M	L 23	5 J	L 3	5 D
19	19·66	L 34	6 M	L 24	6 J	L 4	6 D
25	25·3	L 37	7 M	L 27	7 J	L 7	7 D
31	31·2	L 38	8 M	L 28	8 J	L 8	8 D
49	49·18	L 39	9 M	L 29	9 J	L 9	9 D

In the early models of the A92, the anode stopper R10, was 10 or 12 ohms. To avoid parasitic oscillation which would cause no signals on the 13 and 16 metre bands, it has been increased to 20 ohms.

A small modification to prevent the possibility of I.F. instability in the A92, has been made. The choke L19 is now wired to the junction of R27 and C74, instead of to the H.T. line as indicated in the circuit diagram.