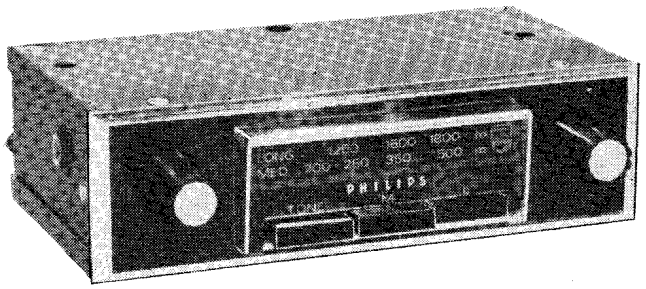
CAR RADIO

SERVICE INFORMATION FOR THE

PHILIPS

13RN283

The 13RN283 is a manually tuned, M.W./L.W., car radio receiver with push button wavechange and push button tone control. It is designed to operate from a 12 volt D.C. electrical system with either battery pole connected to the car chassis, the necessary adjustment being provided by a rotary switch accessible through an aperture in the underside of the outer casing. The receiver employs printed circuit technique and incorporates four transistors and two crystal diodes. It is housed in a dark grey, hammer finished, metal case with silver and black tuning scale and chromium escutcheon. Black moulded knobs and push buttons are fitted and three alternative facia plates are supplied with each receiver.



A—SPECIFICATION

Transistor types		
T1	AF117	Mixer/oscillator
T2	AF117	I.F. amplifier
T3	AC128	Driver
T4	AD149	Output
Diode types		
X1	AA119	A.G.C.
X2	OA90	Detector
Scale lamp		14V. 0.75 watt L.E.S.
Power supply		12 volts D.C. (switchable for +ve or —ve earth operation)
Consumption		610 mA. at 14.5 volts
Fuse rating		2 amps.
Waveband ranges		M.W. 187— 578 metres
		L.W. 1,200—2,000 metres
Intermediate frequency		470kHz
Output		3 watts
Dimensions		Width: 7″. Height: 2″. Depth: $3\frac{7}{8}$″
Weight		2 lbs.
Loudspeaker		Available separately

B—INSTALLATION

Refer to instructions supplied with each receiver.

Note: The receiver, when dispatched, is switched for negative earth operation. Check setting of polarity switch (on underside of receiver casing) with polarity instruction label and, if necessary, re-set switch to suit polarity of car electrical system. See also Section "C" para. 3.

C—MAINTENANCE NOTES

1. Removing outer cover plates

The top and bottom cover plates are each secured by four screws. To remove either cover plate, withdraw the appropriate four screws and ease cover plate free. The top cover plate gives access to the component side of the printed panel and bottom cover plate to the print side.

To obtain access to components located under the tuner assembly, release the tuner unit bracket (held by two screws) from the front panel and move the assembly aside, captive by its connecting leads.

To obtain access to components located under the volume control, remove the front panel assembly as described para. 2 (*ii*) to (*iv*) inclusive. In both cases it will be necessary to re-set the tuning pointer after re-assembly—see para. 6 below.

When re-assembling, note that the outer cover plate carrying the threaded mounting boss and polarity instruction label is the bottom plate.

2. Removing printed panel

(i) Remove top and bottom cover plates as described in para. 1.

(ii) Withdraw volume control and tuning control knobs from their spindles, release the two nuts securing the station scale and remove scale and escutcheon.

ces

COMBINED ELECTRONIC SERVICES LIMITED

604 PURLEY WAY · WADDON · CROYDON · CR9 4DR

TELEPHONES:
Spare part orders: 01-686 3831 General service enquiries: 01-688 7722
After business hours: Recorded messages on both lines Telex 262308

(iii) Release the two screws securing the tuner unit bracket to the front panel and the two screws similarly securing the volume control bracket.

(iv) Remove the two screws securing the front panel to the sides of the outer casing, then ease the front panel (complete with drive cord) forward to clear the volume and tuning control spindles.

(v) Release the three screws on the print side of the printed panel securing the panel to lugs on the back and sides of the outer casing.

(vi) Note connecting leads from the printed panel to components mounted on back of outer casing and to trimmer C1 (mounted on R.H. side of outer casing), then unsolder these leads from the components. The printed panel (with volume control and tuner unit captive by connecting leads) is now free.

Re-assemble in the reverse order. To re-set tuning pointer, refer to para. 6 below.

3. Polarity adjustment

To ascertain the polarity for which the receiver is adjusted, check setting of polarity switch (on underside of receiver casing) with polarity instruction label. To change the polarity, turn red set screw in the direction indicated.

4. Scale lamp replacement

Remove top cover (held by four screws), withdraw lamp holder from tongue of tuner unit bracket and unscrew lamp. Fit replacement lamp and re-assemble in the reverse order.

5. Drive cord replacement

(i) Remove front panel assembly as described para. 2 (i) to (iv) above. Detach pointer and old cord.

(ii) Prepare and fit new cord as illustrated Fig. 1:—With front panel viewed from the rear, wind cord 5½ turns, anti-clockwise from panel bush rearwards, round spindle of tuning control. Lead loop of cord (held taut) across panel (under double pulley, over centre pillar) and loop end round single pulley. Rotate tuning control spindle to position knot in upper run of cord approximately ¼" to the left of single pulley. Ensure that the 5½ turns round tuning control spindle lie flat (not crossed over each other), then slide the turns along the spindle to the rear end. Lift the upper (front) run of the cord to pass over the front groove of the double pulley and the lower (rear) run to pass over the rear groove. Fit pointer on upper run of cord immediately to the left of the knot.

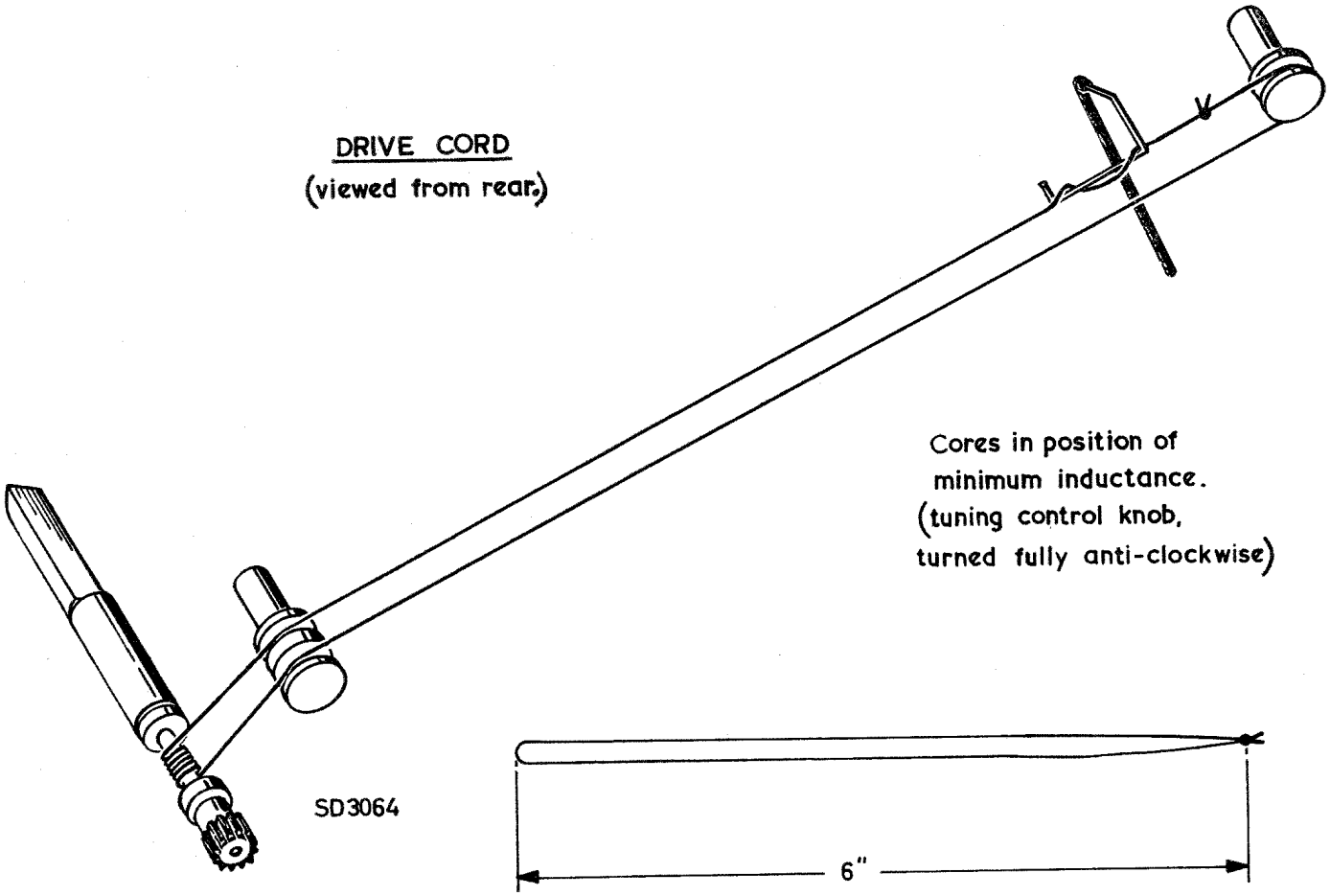


Fig. 1.

(iii) Set tuner to minimum inductance (gear wheel turned fully clockwise). Fit front panel, then secure volume control bracket and tuner unit bracket, ensuring that the tuner drive gear engages with that of the tuning spindle. Fit escutcheon, station scale and volume and tuning control knobs, then align tuning pointer as described para. 6 below.

6. Pointer setting

Turn tuning control knob to its fully anti-clockwise position (tuner at minimum inductance) and adjust pointer so that it is in line with the letter "T" of the word "TONE" above the tone control push button.

D—TRIMMING INSTRUCTIONS

1. General

If either the test equipment and/or the power supply in use is earthed, it is essential that the receiver polarity switch be set for negative earth operation and that the receiver chassis be connected to the negative pole of the D.C. supply. Check that, with the tuning control knob turned fully anti-clockwise, the tuning pointer is aligned at the lower end of the station scale as described in Section "C" para. 6. Output should be observed with an output meter set for a 5 ohm load impedance; trimming level 50 mW. Alternatively, an A.C. voltmeter (1V. range) may be used; trimming level 0.5V.

2. I.F. Circuits

Switch to M.W., tone "normal", turn volume control to maximum and set tuner to minimum inductance (tuning control knob turned to its fully anti-clockwise position). Apply a signal at 470kHz to AE socket via a dummy aerial (see Fig. 2) and trim L13/15, L11/12 and L9/10 in that order for maximum output. If found necessary, L13/15 may first be trimmed with input signal applied to the base of T2.

3. Oscillator and R.F. Circuits

The tuner unit (comprising L3, L6, L7, L8 and mechanical drive) is pre-trimmed as a complete item and the adjustments should not be disturbed. If defective, the complete unit must be replaced.

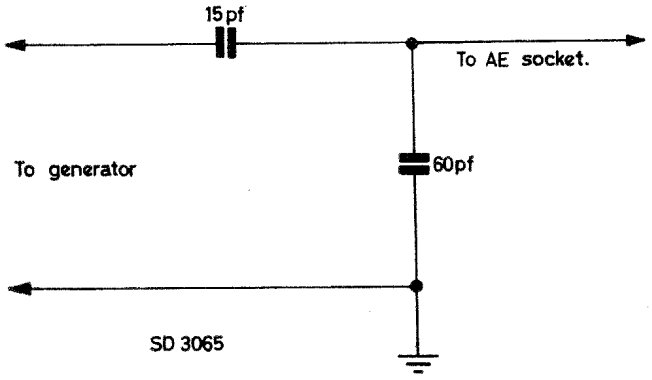


Fig. 2. Dummy Aerial

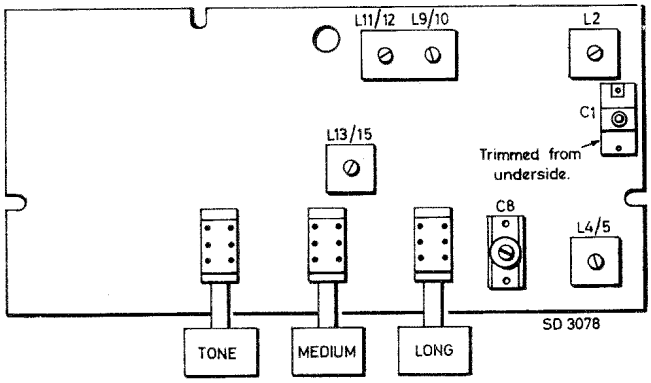


Fig. 3. Trim Plan

(a) Medium wave

Check that receiver is switched to M.W., then set tuner to maximum inductance (tuning control knob turned to its fully clockwise position). Apply a signal at 520 kHz to AE socket via dummy aerial (see Fig. 2) and adjust C8 for maximum output. Change signal generator frequency to 1605 kHz, tune receiver for highest output reading, then adjust C1 for maximum output.

(b) Long wave

Switch to L.W. and set tuner to maximum inductance (tuning control knob turned to its fully clockwise position). Apply a signal at 148 kHz to AE socket via dummy aerial (see Fig. 2) and trim L4/5 for maximum output. Change signal generator frequency to 190 kHz, tune receiver for highest output reading, then trim L2 for maximum output.

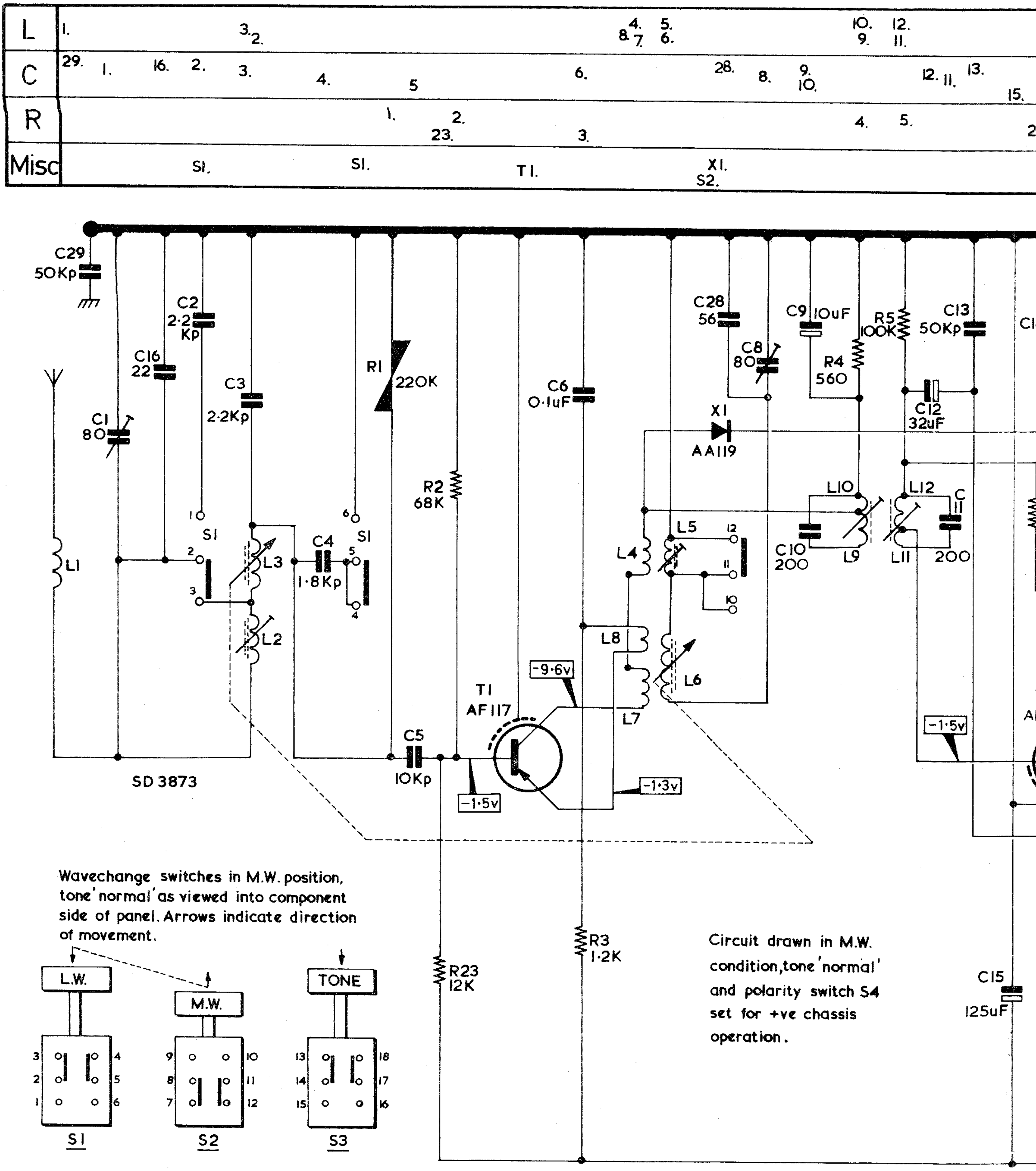
4. R19 Adjustment

Insert a 0—1 amp. meter between the collector of T4 and L18 (see Fig. 5) then, with a supply voltage of 14.5V. and no signal input, adjust R19 for a reading of 0.48 amp. ± 12 mA.

Note: The range of adjustment may be increased or decreased by bringing into circuit or short circuiting R18 (as appropriate) by means of the link provided—see "*" Fig. 5.

D.C. Resistance of coils > 1Ω

Coil No.	Ohms	Coil No.	Ohms
L1	1.1	L10	3.6
L2	6.2	L11	1.9
L3	5.5	L14	1.7
L4	1.1	L16	1.5
L5	8.5	L17	2.3
L6	6.5	L18	550
L9	1.7	—	—

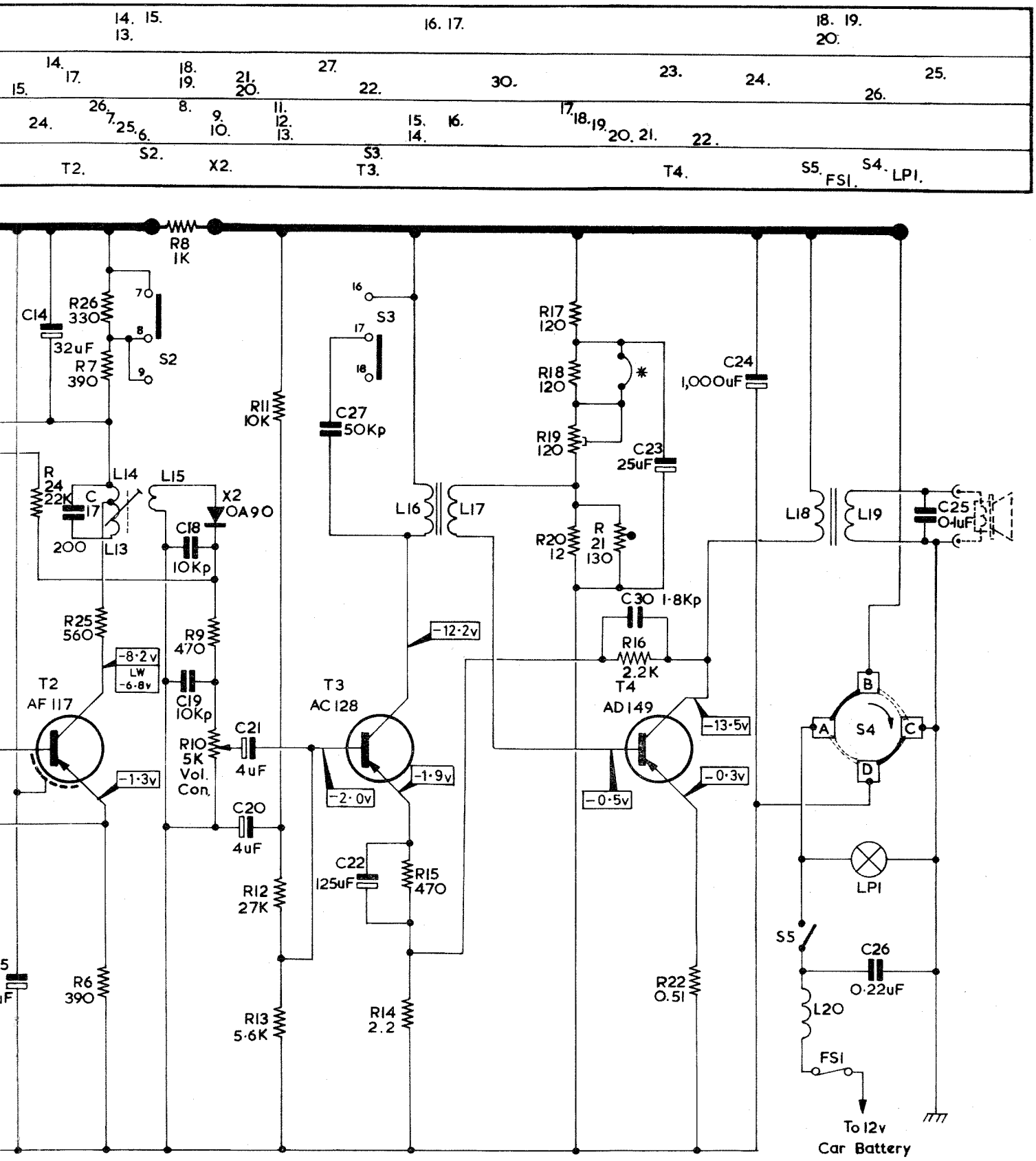


Voltages measured with respect to supply +ve using 100KΩ/V voltmeter. Receiver switched to M.W., volume control at minimum, no signal input, supply voltage 14·5 volts D.C.

✱ Link across R18 to be
or open circuited as ne
See section 'D' para 4.

Fig. 4. CIRCU

In some sets a ferroxcube bead is fitted to connecting lead between L8 and T1 emitter



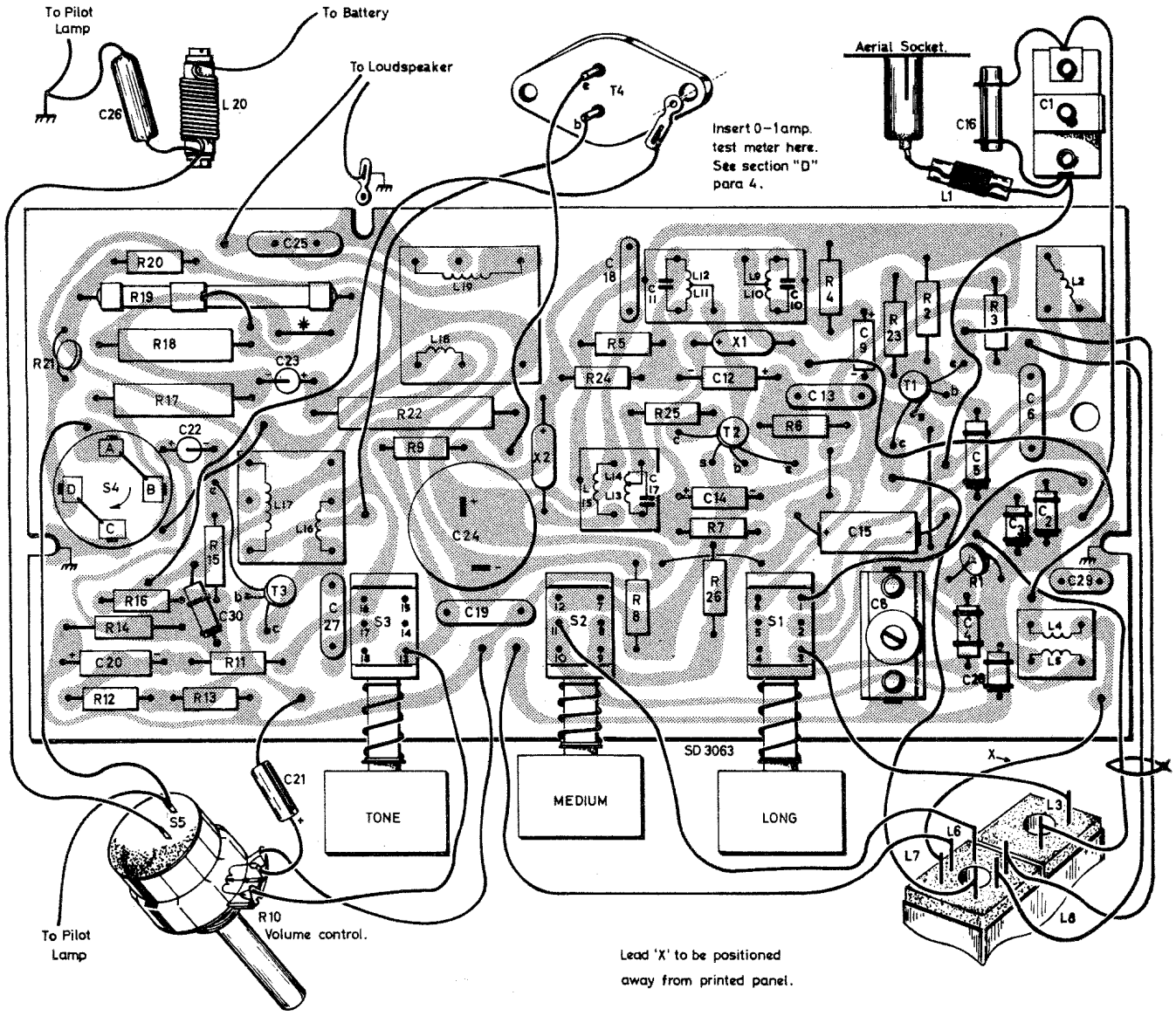
to be in position as necessary. ara 4.

Polarity Switch S4: Solid lines AB-CD for +ve chassis operation. Dotted lines BC-DA for -ve chassis operation.

IRCUIT DIAGRAM

NOTE: L9-12 and L13-15 are fitted inside earthed screening cans

L	20. 17. 16. 19. 18. 15. 14. 13. 12. 11. 9. 10. 1. 7. 6. 2. 4. 3. 5. 8.
C	22. 30. 20. 23. 25. 21. 27. 24. 19. 18. 11. 17. 12. 14. 10. 13. 9. 15. 8. 5. 16. 6. 1. 4. 3. 2. 29. 28.
R	21. 20. 19. 14. 16. 18. 17. 12. 15. 13. 11. 10. 22. 9. 24. 5. 8. 25. 7. 26. 6. 4. 23. 2. 3. 1.
Misc	S4. S5. T3. S3. X2. S2. T4. T2. X1. S1. T1.



Polarity Switch S4

Connections for +ve chassis operation A-B and C-D

Connections for −ve chassis operation B-C and A-D

Circuit drawn in M.W. condition, tone 'normal' and polarity switch S4 set for +ve chassis operation.

* Link across R16 to be in position or open circuited as necessary. See section 'D' para 4.

Fig. 5. PRINTED PANEL (Component side)

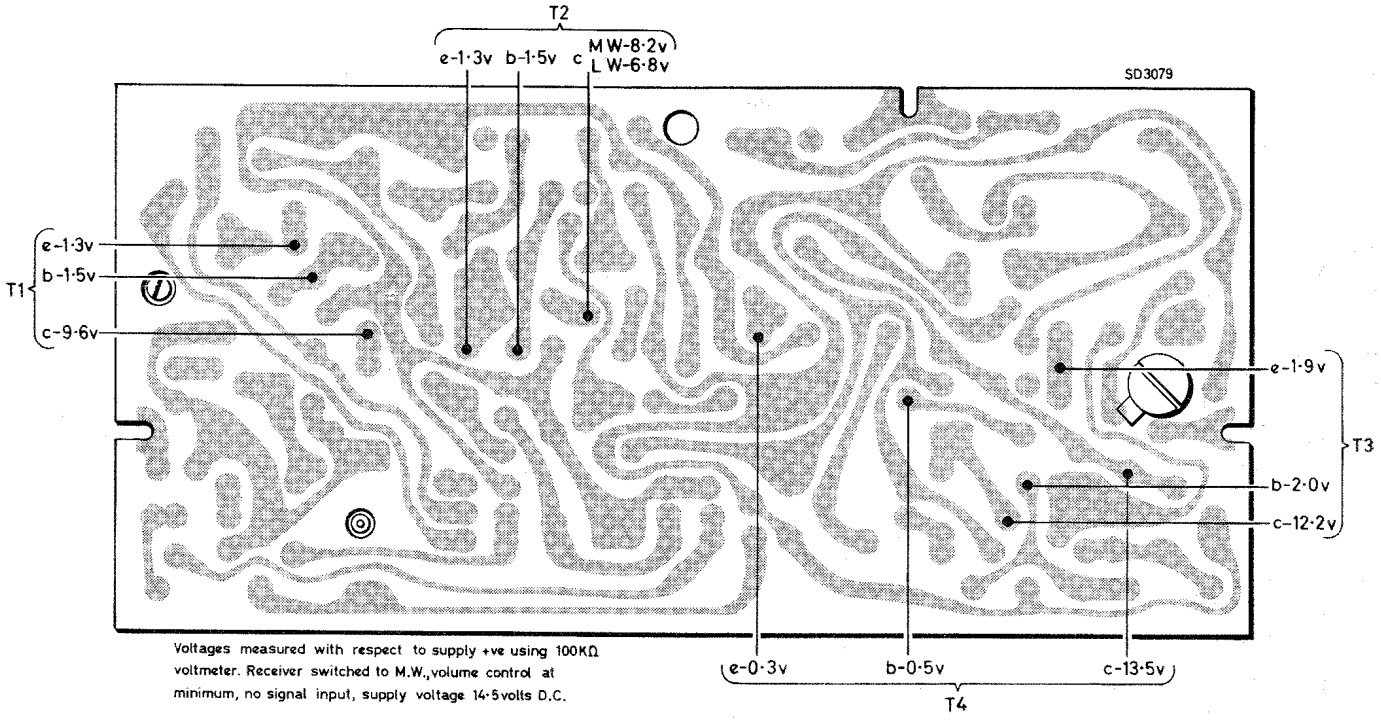


Fig. 6. TRANSISTOR VOLTAGES
(Panel viewed on print side)

SPARE PARTS LIST

SUPPLY OF SPARE PARTS: To ensure correct interpretation of requirements please include the following information on orders for spare parts.

1. The full type number recorded on the type number plate, including any suffix. **Do not use the commercial abbreviation which may be misleading.**
2. Whenever possible, quote the serial number of the receiver. In some models the components have been changed during production.
3. **Always give a brief description** and colour where applicable.
4. Quote part number.

If it is necessary to return components, always include full identification on the accompanying advice note.

Item No.	Description	
	Case Assembly	
1	Cover—bottom	3113.108.04520
2	Cover—top	3113.108.07040
3	Escutcheon for item 7	3113.108.12570
4	Label—identity	A3.596.50
4a	Label—polarity instruction	3113.106.01130
5	Nut for facia plate (2)	505.17001
6	Screw for items 1 and 2 (8) No. 6×¼	B.070.ZZ/861
7	Station scale	331.27001
	Light diffuser	466.77002
	Facia plate (black and silver)	3113.105.11620
	Facia plate (black)	3113.105.11750
	Facia plate (wood grain)	3113.105.11760
	Pointer assembly	450.87004
	Front Panel Assembly	
8	Bracket for item 24	3113.101.21230
9	Bracket for R10	3113.101.21260
10	Bush for item 23	3113.101.60040
11	Bush for R10 spindle	3113.101.60030
12	Circlip for item 23 (2) 4 mm.	B.108.AF/4
13	Cord—drive for item 18	K.299.ZZ/48
14	Holder for scale lamp	MK.957.84
15	Panel assembly —front	3113.108.04450
16	Post for item 13—double pulley	3113.101.60610
17	Post for item 13—single pulley	3113.101.60200
18	Pointer assembly	3113.108.04510
19	Screw securing item 24 to item 8 (2) No. 4×$\frac{3}{16}$	B.070.AD/4×$\frac{3}{16}$
20	Screw securing item 8 to item 15 (2) 3×6 mm.	B.054.ED/3×6
21	Screw for item 9 (2)	B.070.AD/5N×¼
22	Solder tag 3 mm.	B.201.AF/3
23	Spindle—tuning	3113.108.04470
24	Tuner unit—complete	3113.108.50670
25	Washer for item 20 (2)	B.053.BD/3
	Rear Frame Assembly	
26	Bracket for item 1 (2)	3113.101.21280
28	Frame assembly—rear	HY.089.15
29	Insulator for T4 (2)	56201.A
30	Insulator for L20 (2)	3113.104.00050
31	Lead assembly—battery end	3113.108.02300
32	Lead assembly—receiver end	3113.108.70390
33	Lead assembly—loudspeaker	3113.108.70100
34	Nut for L20 and T4 (3) 3 mm.	B.020.ED/3
35	Rivet—tubular for item 41 (2)	B.002.AF/3×0.3×3
36	Rivet—tubular for item 26 (4)	B.002.AF/3×0.3×4
37	Rivet—tubular, outlet for items 32 and 33 (2)	B.002.AF/5×0.4×3
37a	Rivet for C1	B.014.TD/11N×3
38	Screw for L20 3×40 mm.	999/3×40
39	Screw for T4 (2) 3×10 mm.	B.054.ED/3×10
40	Screw for item 28 (2) No. 5×¼	B.070.AD/5N×¼
41	Socket—aerial input	3113.100.20000
42	Solder tag (2) 3 mm.	B.201.AF/3
43	Solder tag (2) 4 mm.	B.201.AF/4

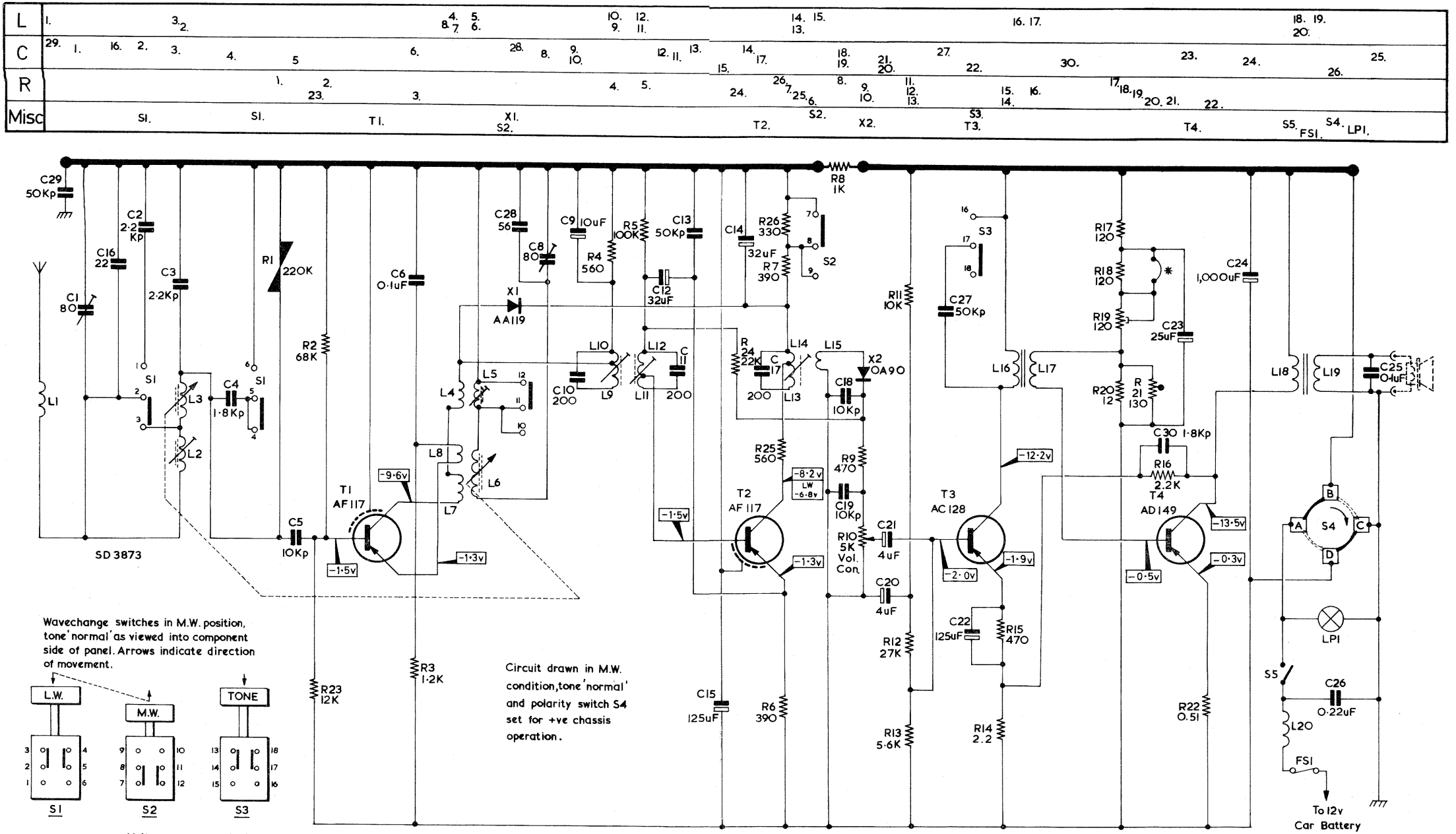
Item No.	Description	
44	Washer for L20 3 mm.	B.050.CD/3
45	Washer—shakeproof for L20 and T4 (3)	B.053.AD/3
46	Washer for T4 3 mm.	B.050.AD/3
47	Washer—mica for T4	56201.B
	Control Knobs	
48	Clip for items 49 and 50 (2)	MK.991.81
49	Tuning	3113.108.05410
49a	Tone	410.27013
50	Volume	3113.108.05410
51	Waveband buttons (2)	410.27013
	Printed Panel	
52	Contact for item 56 (4)	3113.101.60630
53	Knob for item 56	3113.104.02060
54	Plate—spacing item 57 (3)	3113.103.20450
56	Switch—polarity	3113.108.04500
57	Switch—waveband	3113.108.40130
58	Screw—securing printed panel (3)	B.070.AD/5N×¼
	Receiver Mounting	
60	Capacitor—suppressor	MK.207.23
61	Connector—for loudspeaker	P5.172.43/723HA
62	Connector—for battery lead	MK.990.79
63	Envelope of parts	3113.108.70300
65	Nut (4) 4BA	B.801.AF/4N
66	Screw (4) 4BA×⅞	B.801.AD/4N×⅞
67	Screw (2) No. 4×⅜	B.056.AE/4N×⅜
68	Screw (4) No. 5×½	B.070.AD/5N×½
69	Screw (3) 2BA×½	B.812.CD/2N×½
70	Screw (3) No. 8×⅝	B.821.BD/8N×⅝
71	Sleeve	MK.962.62
72	Strip—metal, receiver mounting (2)	3113.101.21300
73	Washer (8) 4BA	B.050.TD/4N
74	Washer—shakeproof (4) 4BA	B.053.TD/4N
75	Washer (3) 2BA	B.050.TD/2N
76	Washer—shakeproof (3) 2BA	B.053.TD/2N
	Semi-conductors	
T1	Transistor	AF117
T2	Transistor	AF117
T3	Transistor	AC128
T4	Transistor	AD149
X1	Diode	AA119
X2	Diode	OA90
LP1	**Scale lamp**	3113.104.90030
FS1	**Fuse 2 amp.**	974/2000
	Coils and Transformers	
L1	Aerial filter choke	A3.115.77
L2	L.W. aerial loading coil	MK.571.41
L3 & L6—8	Tuner unit	3113.108.50670
L4/5	Oscillator coil L.W.	3113.108.20640
L9—12	I.F. transformer	3113.108.20600
L13—15	Detector coil	3113.108.20630
L16—17	Driver transformer	3113.108.30080
L18/19	Output transformer	3113.108.30090
L20	R.F. filter choke	MK.550.31

RESISTORS

Posn. No.	Type	Value Ω	
R1	V.D.R.	220	E.299.DD/P220
R2		68K	902/68K
R3		1.2K	902/1K2
R4		560	902/560E
R5		120K	902/120K
R6		390	902/390E
R7		390	902/390E
R8		1K	902/1K
R9		470	902/470E
R10	Volume	5K	E.098.ZZ/195
R11		10K	902/10K
R12		27K	902/27K
R13		5.6K	902/5K6
R14		2.2	MK.771.28
R15		470	902/470E
R16		2.2K	902/2K2
R17	W/wound	120	B8.301.10/16
R18		120	900/120E
R19	Pre-set pot.	120	MK.818.07
R20		12	902/12E
R21	Varite	130	B8.320.01P/130E
R22	W/wound	0.51	E.104.AA/AE51
R23		12K	902/12K
R24		22K	902/22K
R25		560	110.41101
R26		330	110.41094

CAPACITORS

	Type	Value pF	
C1	Trimmer	80	3113.108.05080
C2	Ceramic	2.2K	C.318.BA/A2K2
C3	Ceramic	2.2K	C.318.BA/A2K2
C4	Ceramic	1.8K	C.318.BA/A1K8
C5	Ceramic	10K	MK.206.10
C6	Foil	0.1uF	MK.199.29
C8	Trimmer	80	MK.211.32
C9	Elco	10uF	C.426.AR/E10
C10		200	In L9-12
C11		200	In L9-12
C12	Elco	32uF	C.426.AR/B32
C13	Foil	50K	MK.199.28
C14	Elco	32uF	C.426.AR/B32
C15	Elco	125uF	C.426.AR/E125
C16	Ceramic	22	C.304.GH/A22E
C17		200	In L13-15
C18	Foil	10K	MK.199.27
C19	Foil	10K	MK.199.27
C20	Elco	4uF	C.426.AR/G4
C21	Elco	4uF	C.426.AR/G4
C22	Elco	125uF	C.426.CB/B125
C23	Elco	25uF	C.426.CE/F25
C24	Elco	1,000uF	MK.185.69
C25	Foil	0.1uF	MK.199.29
C26	Polyester	0.22uF	906/L220K
C27	Foil	50K	MK.199.28
C28	Ceramic	56	C.304.GH/A56E
C29	Foil	50K	MK.199.30
C30	Ceramic	1.8K	C.318.BA/A1K8



Voltages measured with respect to supply +ve using 100KΩ/V voltmeter. Receiver switched to M.W., volume control at minimum, no signal input, supply voltage 14·5 volts D.C.

✱ Link across R18 to be in position or open circuited as necessary. See section 'D' para 4.

Polarity Switch S4: Solid lines AB-CD for +ve chassis operation. Dotted lines BC-DA for −ve chassis operation.

Fig. 4. CIRCUIT DIAGRAM

In some sets a ferroxcube bead is fitted to connecting lead between L8 and T1 emitter

NOTE: L9-12 and L13-15 are fitted inside earthed screening cans