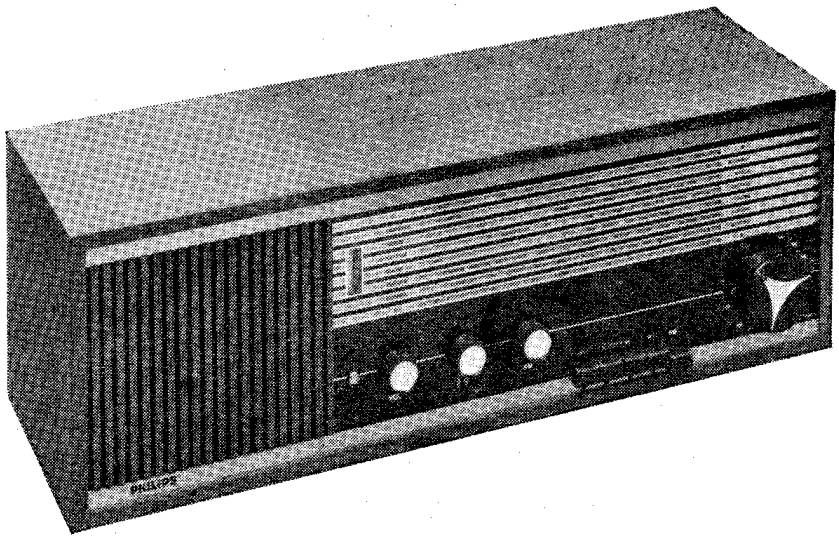
RADIO

SERVICE INFORMATION FOR THE

PHILIPS

TABLE RADIO TYPE B4S51A



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AMALGAMATED ELECTRIC SERVICES LTD.

WADDON FACTORY ESTATE CROYDON SURREY

Telephone : (see back of cover) Telex No.: 262308

APRIL, 1966 Price 3s. 6d.

[Please quote AES 480 when ordering further copies] AES 480

INTRODUCTION

The B4S51A is a Scandinavian designed mains-operated table radio receiver employing six valves (including a thermometer-type tuning indicator), three diodes and a metal rectifier. Long, Medium and Short wavebands are displayed on a large linear scale, but a separate tuning system is used for V.H.F./F.M. This "speed-tuning" arrangement, together with A.F.C., enables F.M. stations to be accurately tuned and includes three adjustable plastic pre-selectors for easy reference.

SPECIFICATION

Power supply	110-127 and 220-240V. 50c/s A.C.
Consumption	42 watts
Wave ranges	Long 1166-2000 metres
	Medium 187-545 metres
	Short 24.2-51.7 metres
	V.H.F./F.M. 87.5-100Mc/s

Valves	Type	Function A.M.	F.M.
V1	ECC85	—	R.F. amp. and mixer/oscillator
V2	ECH81	Oscillator/mixer	I.F. amplifier
V3	EF89	I.F. amplifier	I.F. amplifier
V4	EBC81	Demodulator and A.F. amplifier	A.F. amplifier
V5	EL86	Output	Output
V6	EM84	Tuning indicator	Tuning indicator
Diodes			
X2	OA79	—	Ratio detector
X3	OA79	—	Ratio detector
X4	BA102	—	A.F.C.

Pilot lamps	2×8073D (6.3V 0.1amp.)
I.F.'s	A.M. 468Kc/s
	F.M. 10.85Mc/s
Loudspeaker	6½″ round (5Ω impedance)
Output	2.5 watts
Dimensions	Width 21⅝″. Height 7½″. Depth 6½″

UNCASING

Remove the cabinet backplate which is held by three captive screws. Withdraw the four chassis retaining bolts from underneath the cabinet. Ensure that all push-buttons are in the "up" position. Rotate the three plastic clips retaining the top of the scale to the cabinet. The chassis may now be eased from the cabinet to the extent of the loudspeaker connecting leads.

REPLACING THE DRIVE CORD

Make up the cord to the dimensions shown in Fig. 2. Turn the gang to the fully meshed position, and attach one end of the cord to the tension spring. Pass the cord through the slot in the drum, over to pulley A, then round anti-clockwise and across to the R.H. front pulley B. Wind the cord clockwise round this pulley, then down to the tuning spindle, passing the cord round 2½ turns clockwise from front-to-back. Pass the cord up to the R.H. rear pulley C, round anti-clockwise, then once round the tuning drum and back to the tension spring. Fit the two pointers as shown in Fig. 2.

POINTER SETTING

Turn the tuning gang to the fully meshed position, then align the L.H. pointer to the vertical dots in the centre of the scale, and the R.H. pointer to the two dots on the R.H. side of the scale.

TRIMMING INSTRUCTIONS

Signal generator method (A.M.)

General

Output should be observed with an output meter set for a 5Ω load at a trimming level of 500mW. Alternatively, an A.C. voltmeter (2-3V. range) with a 5Ω 1W resistor in parallel may be used, trimming level 1V. Set volume control to maximum and tone control to maximum treble.

V.H.F. alignment

Connect a high impedance meter (10V range) via a 100KΩ resistor across R43 (+ve lead to chassis). Trim coils to maximum voltage indication on the meter. For the adjustment of L24/L25, connect two matched 220KΩ 5% resistors in series across C49, then connect the voltmeter from the junction of these resistors to R17/C42. Trim coils L24/L25 for zero indication on the meter.

F.M./I.F. alignment (Sweep generator method)

The alignment of the I.F. circuits using a sweep generator, marker generator and oscilloscope may be carried out in the following way.

(*a*) Switch to F.M. and disconnect C49. Set volume control to minimum.
(*b*) Connect the oscilloscope across R43 via a 100KΩ resistor.
(*c*) Connect the F.M. generator via a 47pF capacitor to pin 2 of V3.
(*d*) Trim L22 for maximum response with a 10.85Mc/s marker at the centre of the response curve.
(*e*) Trim L24/L25 for maximum curve width and symmetry.
(*f*) Reconnect C49 and connect the oscilloscope across C42 via a 100KΩ resistor.
(*g*) Check that the response is straight over approximately 200Kc/s. Apply A.M. (modulation 400c/s at 30%). The straight part of the curve should remain unchanged.
(*h*) Transfer the generator to pin 7 of V1b. Disconnect C49 and connect the oscilloscope across R43 via a 100KΩ resistor.
(*i*) Trim L18 and L7/L8 for maximum response at 10.85Mc/s consistent with a symmetrically-shaped curve.
(*j*) Reconnect C49 and transfer the oscilloscope across C42 to check that the response remains straight over 200Kc/s.

COIL RESISTANCES > 1Ω

L7 — 2.5Ω	L27 — 4.5Ω
L8 — 1.5Ω	L28 — 200Ω
L9 — 2.5Ω	L29 — 7Ω
L10 — 12.5Ω	L31 — 38Ω
L18 — 1.5Ω	L33 — 30Ω
L19 — 1.5Ω	L34 — 6.5Ω
L20 — 8.5Ω	L35 — 27Ω
L21 — 4.5Ω	L36 — 7Ω
L22 — 1.5Ω	L38 — 3.5Ω
L26 — 4.5Ω	

ALIGNMENT TABLE

Section	Waveband	Tune to:—	Gen. Freq.	Inject signal to:	Trim	Meter reading
A.M./I.F.	M.W.	Gang at max.	*468Kc/s	Via 2KpF to pin 2 of V2	L27, L26 L21, L20	Across L30 Max. output
Repeat as necessary. Reseal cores.						
A.M./R.F.	M.W.	†Gang at A	600Kc/s	A.M. aerial socket via dummy aerial	L13, L9	,, ,,
,,	,,	†Gang at B	1,500Kc/s	,, ,,	C19, C18	,, ,,
,,	L.W.	†Gang at A	160Kc/s	,, ,,	C27	,, ,,
,,	,,	†Gang at B	250Kc/s	,, ,,	C13, L10	,, ,,
,,	S.W.	†Gang at A	6.1Mc/s	,, ,,	L16	,, ,,
,,	,,	†Gang at B	11.7Mc/s	,, ,,	L12	,, ,,
Repeat as necessary.						
V.H.F./I.F.	V.H.F.	100Mc/s	10.85Mc/s	Via 47pF to pin 7 of V1b	L22, L8 L18, L7	‡Max. output
,,	,,	,,	,,	,, ,,	L24, L25	‡Zero volts
V.H.F./R.F.	,,	94Mc/s	94Mc/s	**F.M. aerial skt.	L4, L5	‡Max. output

* Amplitude modulation at 30%
† See Fig. 2 for gang position

‡ See note under V.H.F. alignment
**Short-circuit C28.
R41—adjust for max. A.M. suppression

L	10. 9. 7. 8. 21. 20. 19. 17. 18. 16. 22. 23. 26. 24. 25. 27. 11. 12. 13. 14. 15.
C	53. 54. 55. 56. 19. 18. 17. 16. 13. 27.

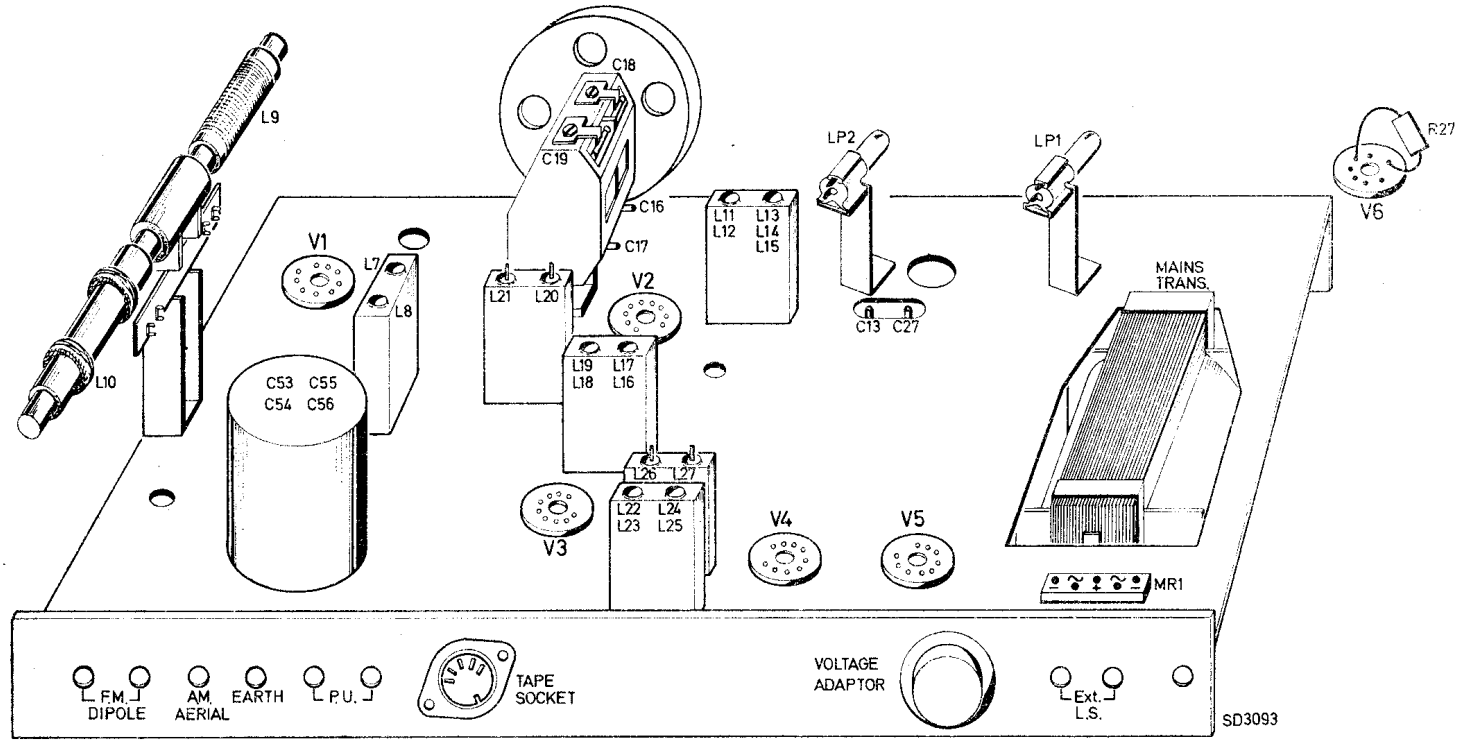


Fig. 1. Chassis—top view

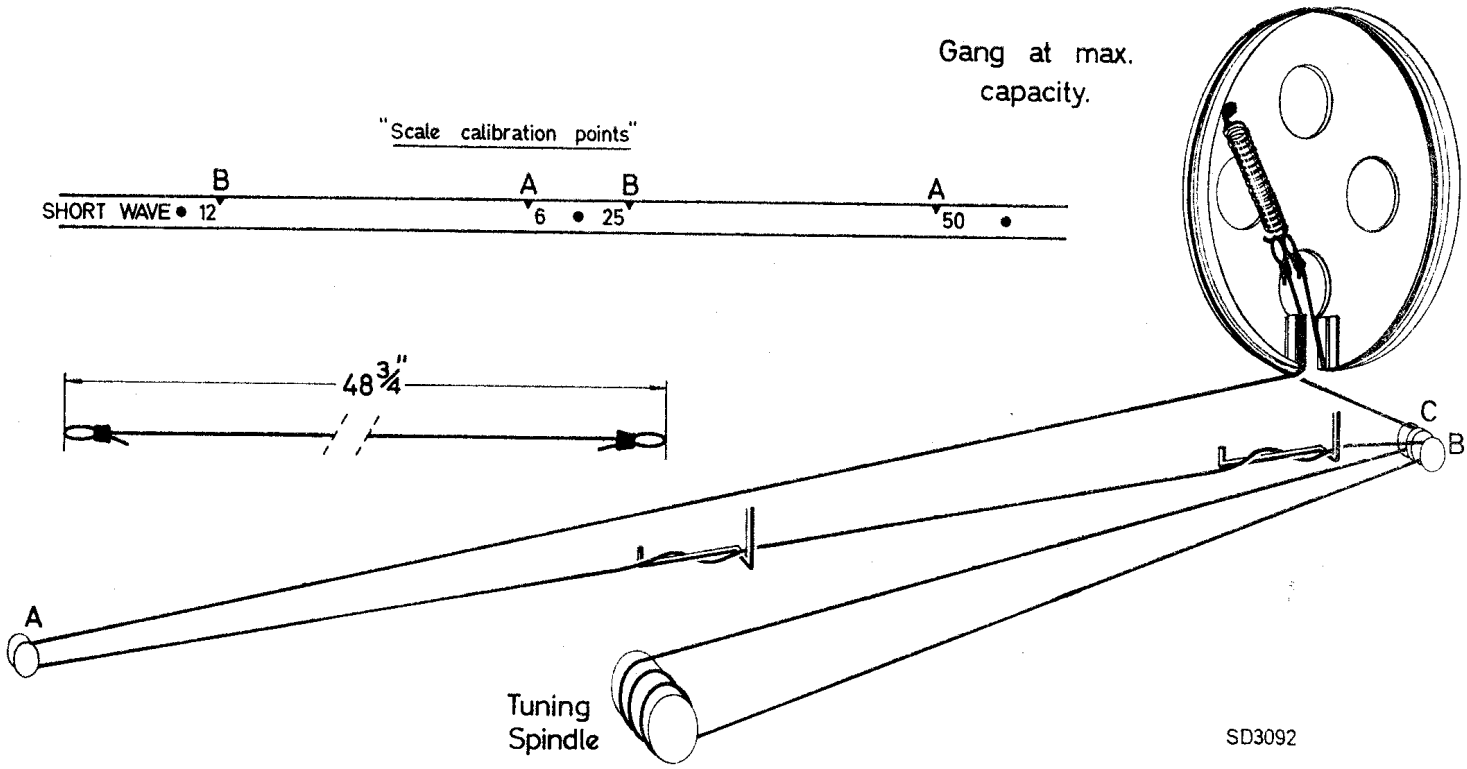


Fig. 2. Drive cord

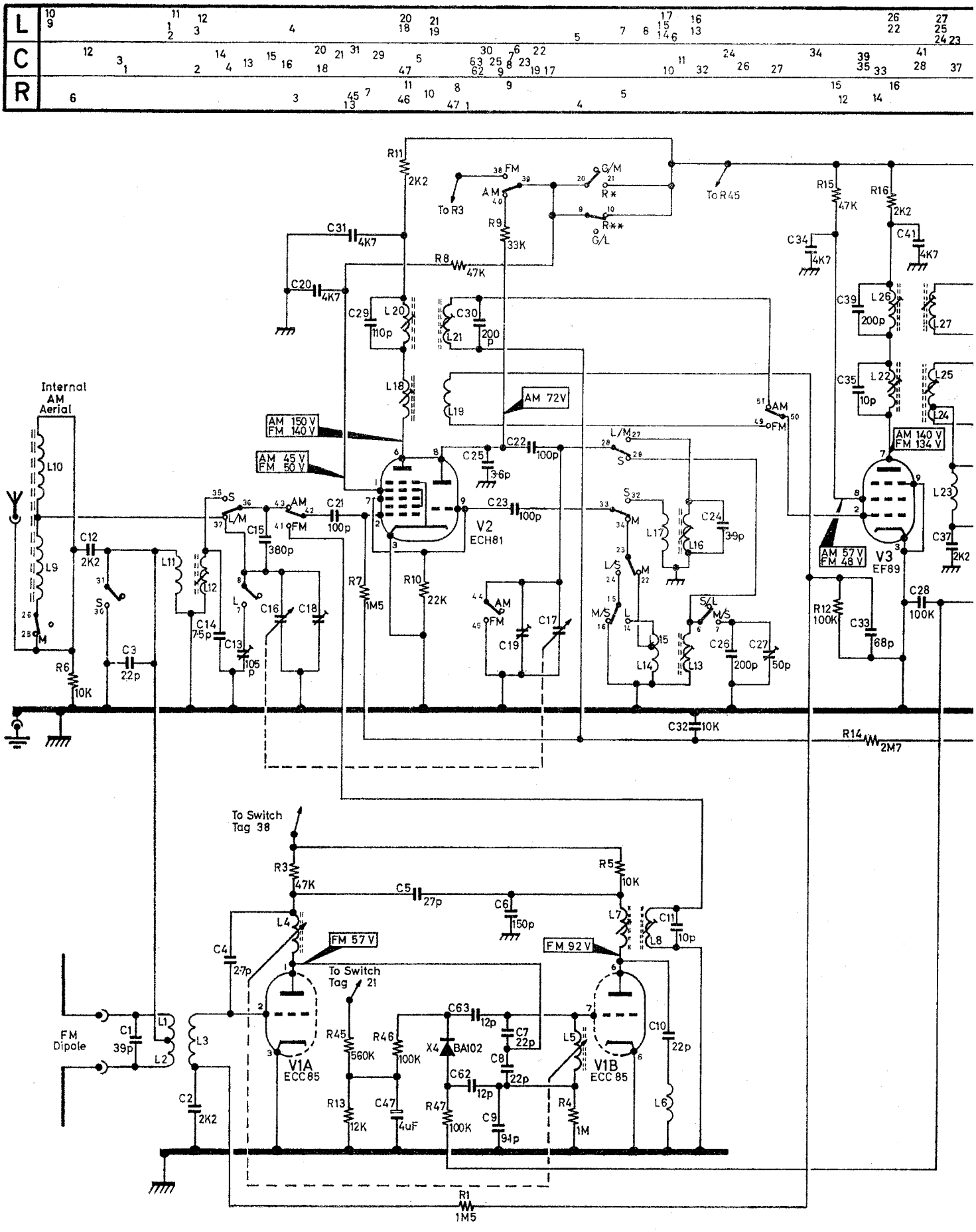
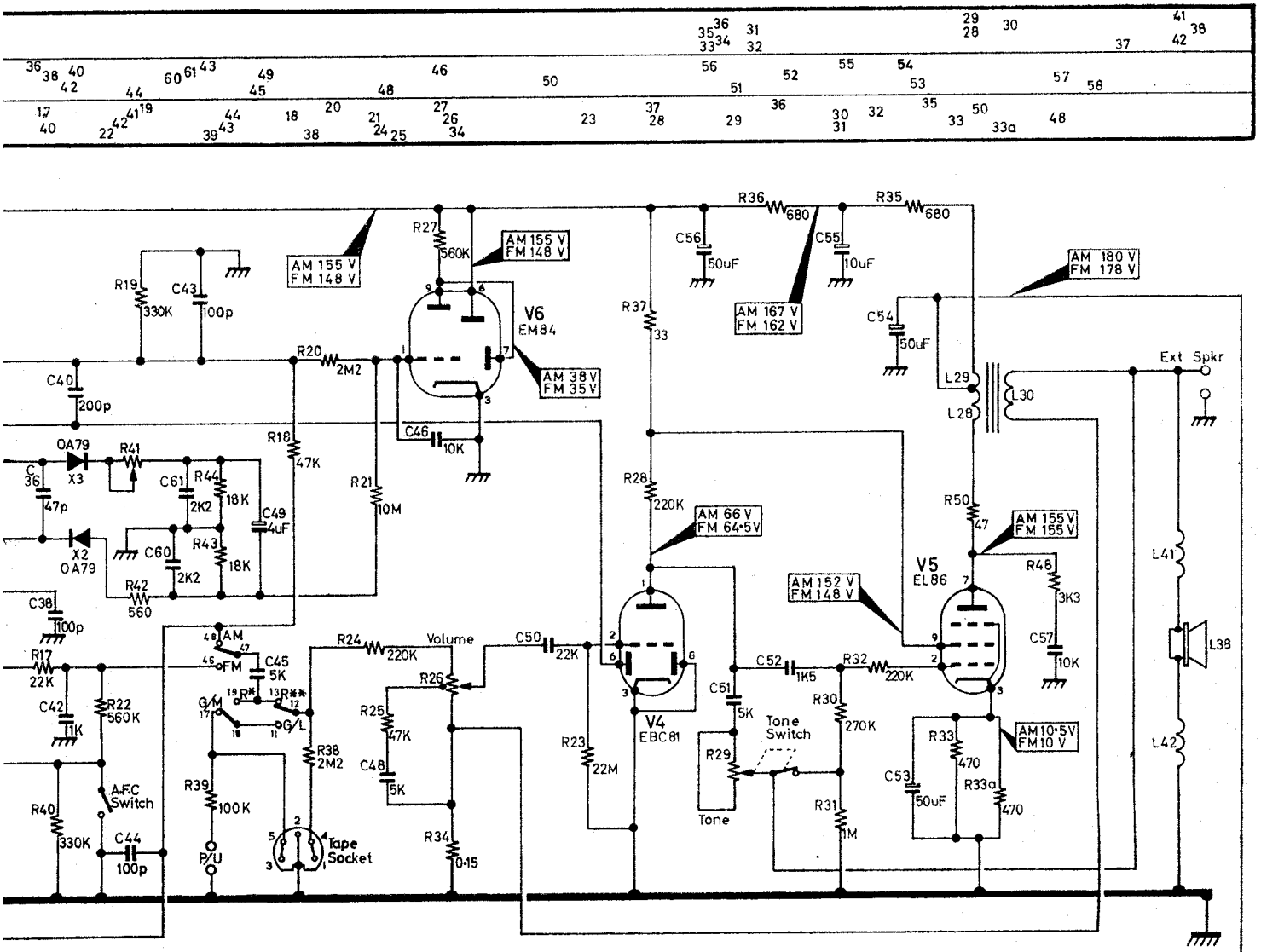
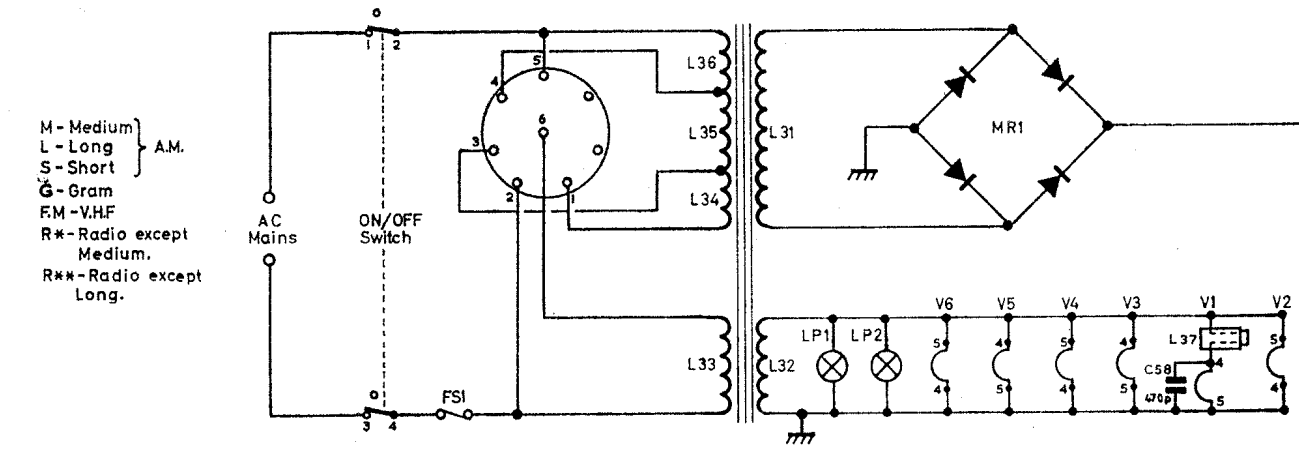

L
C
R
Internal AM Aerial
L10
L9
C12 2K2
S30
C3 22p
R6 10K
L11
L12
C14 75p
C13 105p
C15 380p
C16
C18
L7
S35
L/M37
AM43
FM41
C21 100p
V2 ECH81
R7 1M5
R10 22K
C23 100p
C25 36p
C22 100p
L18
L19
AM 72V
AM 150 V FM 140 V
AM 45 V FM 50 V
C20 4K7
C31 4K7
R11 2K2
R8 47K
R9 33K
To R3
To R45
R* R** G/L
C29 110p
L20
C30
L21 200p
L/M27
S29
S32
M33
L17
C24 39p
L16
L/S24
M22
M/S15
L14
L13
S/L6
M/S7
C26 200p
C27 50p
C19
C17
C32 10K
R14 2M7
R15 47K
R16 2K2
C34 4K7
C41 4K7
C39 200p
L26
L27
C35 10p
L22
L25
L24
AM51 FM49 50
AM 140 V FM 134 V
V3 EF89
AM 57 V FM 48 V
L23
C37 2K2
R12 100K
C33 68p
C28 100K
To Switch Tag 38
R3 47K
R5 10K
C5 27p
C6 150p
L4
L7
C11 10p
L8
C4 27p
FM 57 V
FM 92 V
To Switch Tag 21
FM Dipole
C1 39p
L1
L2
L3
C2 2K2
V1A ECC85
V1B ECC 85
C63 12p
C7 22p
C8 22p
C62 12p
X4 BA102
R45 560K
R46 100K
R13 12K
C47 4uF
R47 100K
C9 94p
L5
R4 1M
C10 22p
L6
R1 1M5

Fig. 3.

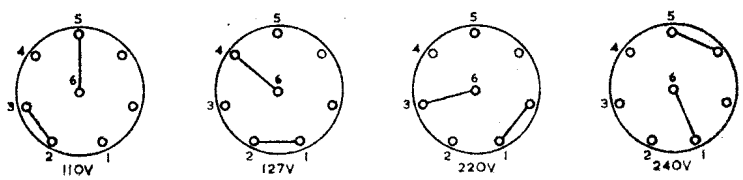




M - Medium
L - Long
S - Short
} A.M.
G - Gram
F.M - V.H.F
R* - Radio except Medium.
R** - Radio except Long.

All voltages taken with respect to chassis using 100KΩ/volt meter, controls at minimum no signal input, 240 A.C. applied.

Switches close for functions indicated shown in M.W. position.



Voltage connections (viewed on pins)

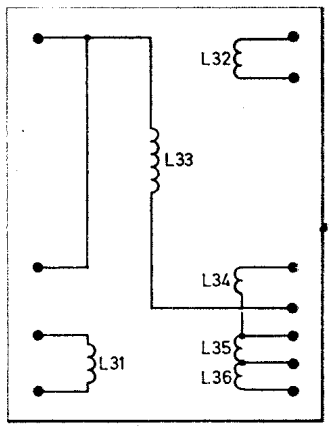
SD3095

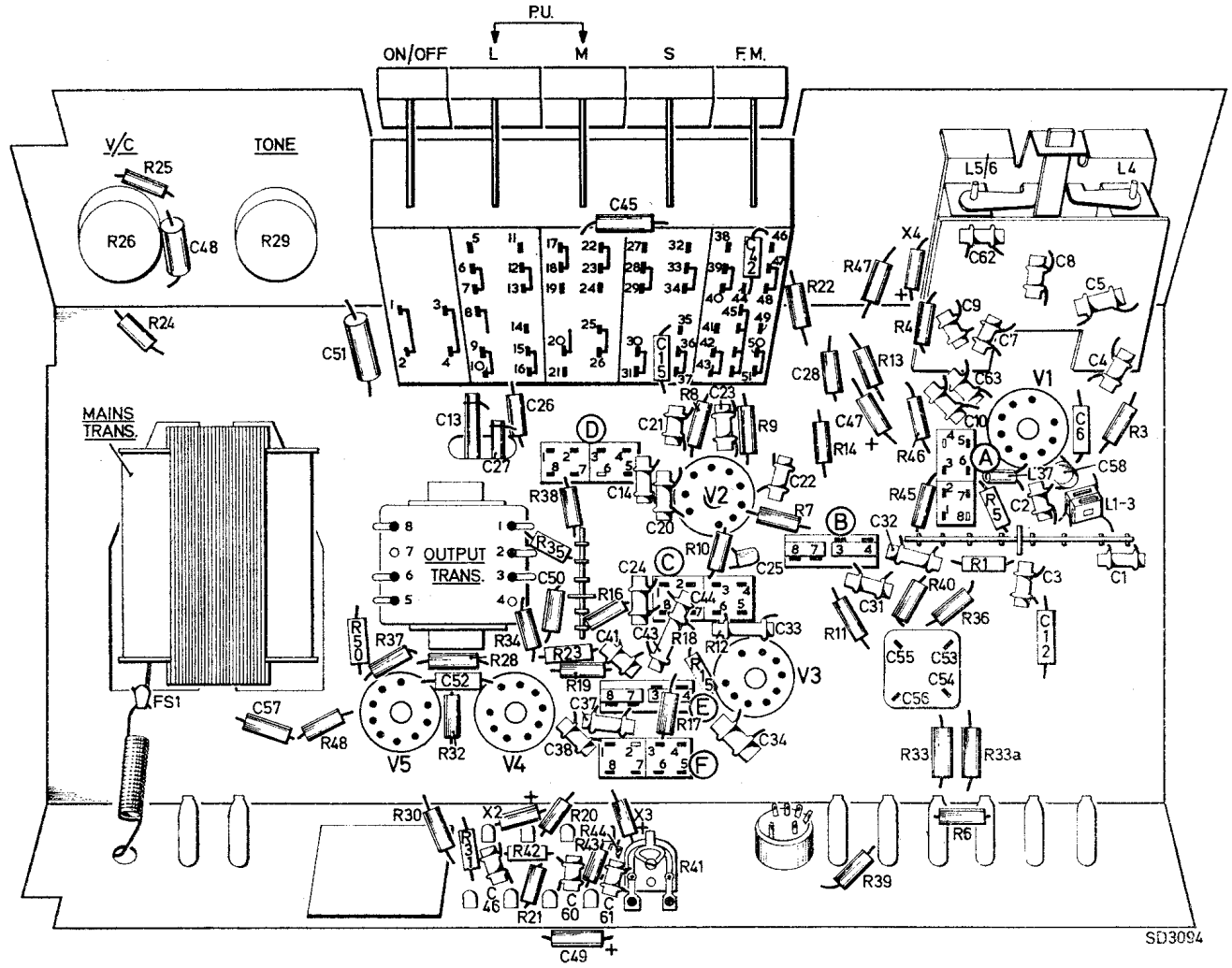
Main circuit

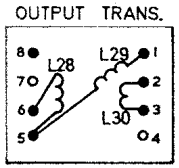
L	28. 31. 29. 30. 33. 32. 34. 35. 36. 8. 7. 20. 21. 16. 17. 19. 18. 15. 13. 14. 11. 12. 5/6. 27. 37. 26. 1-3. 4. 25. 24. 23. 22.
C	11. 48. 57. 29. 51. 30. 13. 27. 26. 52. 46. 50. 38. 45. 41. 14. 15. 37. 24. 21. 61. 43. 20. 23. 42. 44. 25. 33. 22. 34. 28. 47. 31. 55. 32. 53. 9. 54. 10. 62. 7. 63. 2. 39. 8. 3. 12. 5. 6. 4. 1. 58. 56. 40. 36. 35.
R	26. 25. 24. 29. 48. 50. 37. 30. 32. 31. 28. 34. 42. 21. 35. 20. 38. 23. 19. 16. 43. 44. 18. 17. 41. 8. 15. 10. 12. 9. 7. 22. 14. 47. 11. 39. 13. 46. 45. 4. 40. 33. 6. 36. 1. 5. 33a. 3.

Push button switch in M.W. position.

Depress L & M buttons for P.U. position.







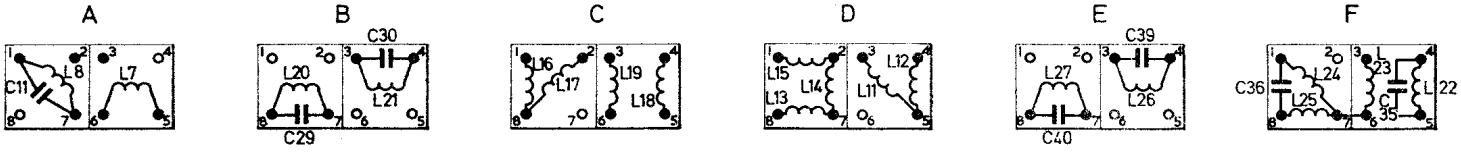


Fig. 4. Chassis—underneath view

SPARE PARTS LIST

IMPORTANT—When ordering spare parts, the description, code and item numbers, together with the type and serial numbers of the receiver MUST be quoted. Failure to do so can result in delay and/or dispatch of wrong components.

CABINET ASSEMBLY

1	Cabinet complete	425.61049
2	Foot (4)	462.70352
3	Ornamental strip—Top	3131.105.10211
4	Ornamental strip—Bottom	3131.105.10201

CABINET SUPPLEMENTARY PARTS

5	Bracket for item 6 (1)	GE.042.76
6	Cover cabinet back	435.30026
8	Station scale	333.50147
9	Screw for item 8	182.00326
10	Spacer for item 49	3131.140.40241
11	Screw for item 6 (3)	RK.852.61

CONTROL KNOBS

12	Button in F.M. knob	3131.121.21841
13	Guide ring with pointers for F.M. knob	125.00406
14	Knob-A.M. tuning	3131.108.00471
15	Knob-F.M. tuning	413.50503
16	Knob-tone	3131.108.00481
17	Knob-volume	3131.108.00471
18	On/off	410.20447
19	Waveband (4)	410.20447

CHASSIS ASSEMBLY

20	Bracket for item 30 – speaker end	3131.121.24181
21	Bracket for item 30 – tuner end	3131.121.61831
22	Bracket for item 35 (2)	3131.121.24191
22a	Bracket for dial screw	GE.030.19
24	Circlip for item 60	985/3
25	Cord for drive	K.299.ZZ/938
26	Clips-cable (3)	GE.245.76
27	Core for F.M. unit	GE.537.55
28	Component tag strip	RK.928.95
29	Drum for drive-A.M.	GE.243.15
30	Diffuser	A9.885.07
31	Escutcheon for tuning indicator	GE.248.19
32	Felt for item 43	A3.564.36
33	Grommet for gang (3)	975/5 × 12.5
34	Holder for tuning indicator	GE.042.95
35	Holder for lamps – LP1 and LP2	A3.311.15
39	Lead-aerial feeder (F.M.)	70/3712
40	Lead-mains input	R909.KA/803.AC1
41	Panel assy. with sockets	3131.128.10051
42	Nut for pots.	MK.927.05
43	Pointer (2)	3131.128.02191
44	Plug for item 39	A3.826.36
45	Plug-A.M. aerial, earth, R/Plr, ext., speaker	978/1 × 4AA
46	Plug-tape socket	978/5 × 180
47	Pulley small rear	528.80241
48	Pulley (2)	182.00165
49	Ring (plastic)-retaining scale (3)	GE.242.35
50	Rotor-plastic-for tone switch	532.20316
51	Switch assy.-tone	3131.128.10011
52	Spring-tension for drive cord	RK.161.56
53	Screw-chassis fixing (4)	2531.005.04022
54	Switch-waveband complete	276.50092
55	Socket for item 28 and 45	JR.302.02
56	Socket, tape	979/5 × 180
57	Spring for item 30 (4)	3131.101.00511
58	Spring for coil cans (6)	921/04
59	Spring for FSI	GE.526.58
60	Spindle tuning A.M.	GE.523.56
61	Spring for switch keys (5)	GE.522.28/Spring
62	Spring for tuning indicator (2)	GE.090.00
63	Spacer for item 13 – plastic	3131.114.13771
64	Valveholder (6)	976/9 × 12
65	Voltage adaptor	272.10015
66	Washer for item 53 (4)	3131.100.42301

VALVES, DIODES & LAMPS

V1	ECC85
V2	ECH81
V3	EF89
V4	EBC81
V5	EL86
V6	EM84
MR1	B250.C100TD
X2	OA79
X3	OA79
X4	BA102
LP1 and LP2	8073D

FUSE

FS1	Thermo-fuse	974/T103

COILS & TRANSFORMERS

L1-3	Aerial coil F.M.	RK.461.54
L4-6	Osc. coil F.M.	157.50313
L7/8	1st I.F.-F.M.	153.90015
L9/10	Rod aerial – M.W./L.W.	158.60191
L11/15	Aerial coil S.W.—Osc. coil – M.W./L.W.	156.70014
L16/19	Osc. coil S.W.—2nd I.F. F.M.	158.60192
L20/21	1st I.F.-A.M.	925/470
L22/25	F.M. detector	153.70011
L26/27	2nd I.F.-A.M.	926/470-2
L28/30	Output transformer	104.40142
L31-36	Mains transformer	146.20255
L37	Choke	56.390.31/4B
L38	Loudspeaker	940/AD3700M
L41	H.F. choke	157.40048
L42	H.F. choke	157.40048
	F.M. tuning unit with components	210.10114

RESISTORS

	Type	Value Ω	
R1		1.5M	902/1M5
R3		47,000	902/47K
R4		1.0M	902/1M
R5		10,000	902/10K
R6		10,000	902/10K
R7		1.5M	902/1M5
R8		47,000	902/47K
R9		33,000	902/33K
R10		22,000	902/22K
R11		2,200	902/2K2
R12		0.1M	See C33
R13		12,000	902/12K
R14		2.7M	902/2M7
R15		47,000	902/47K
R16		2,200	902/2K2
R17		22,000	902/22K
R18		47,000	See C43, 44
R19		0.33M	902/330K
R20		2.2M	902/2M2
R21		10.0M	902/10M
R22		0.56M	902/560K
R23		22.0M	902/22M
R24		0.22M	902/220K
R25		47,000	902/47K
R26	Volume	0.4M+1.6M	E.098.AG/25D.20
R27		0.56M	902/560K
R28		0.22M	902/220K
R29	Tone	4.0M	E.098.ZZ/183
R30		0.27M	902/270K
R31		1.0M	902/1M
R32		0.22M	902/220K
R33		470	901/470E
R33A		470	901/470E
R34		0.15M	RK.375.94
R35		680	901/680E
R36		680	900/680E
R37		33	902/33E
R38		2.2M	902/2M2
R39		0.1M	902/100K
R40		0.33M	902/330K
R41	Preset	500	E.097.AD/500E
R42		560	902/560E
R43		18,000	902/18K
R44		18,000	902/18K
R45		0.56M	902/560K
R46		0.1M	902/100K
R47		0.1M	902/100K
R48		3,300	902/3K3
R50		47	902/K47E

CAPACITORS

	Type	Value pF	
C1	Ceramic	39	904/39E
C2	Ceramic	2,200	904/2K2
C3	Ceramic	22	904/22E
C4	Ceramic	2.7	904/2E7
C5	Ceramic	27	904/27E
C6	Polystyrene	150	905/D150E
C7	Ceramic	22	904/22E
C8	Ceramic	22	904/22E
C9	Ceramic	10	904/10E
C10	Ceramic	22	904/22E
C11		10	In L7/8
C12	Polystyrene	2,200	905/D2K2
C13	Trimmer	105	907/30-175E
C14	Ceramic	7.5	904/7E5
C15	Polystyrene	380	905/D380E
C16-19	Gang		49-002-42
C20	Ceramic	4,700	904/4K7
C21	Ceramic	100	904/100E
C22	Ceramic	100	904/100E
C23	Ceramic	100	904/100E
C24	Ceramic	3.9	904/3E9
C25	Ceramic	3.9	904/3E9
C26	Polystyrene	200	905/D200E
C27	Trimmer	50	907/20E-100E
C28	Polyester	0.1uF	906/L100K
C29		110	In L20/21
C30		200	In L20/21
C31	Ceramic	4,700	904/4K7
C32	Ceramic	10,000	904/10K
C33/R12	Diode filter	68	111.80061
C34	Ceramic	4,700	904/4K7
C35		10	In L22-25
C36		47	In L22-25
C37	Ceramic	2,200	904/2K2
C38	Ceramic	100	904/100E
C39		200	In L26/27
C40		200	In L26/27
C41	Ceramic	4,700	904/4K7
C42	Polystyrene	1,000	905/D1K
C43/R18	Diode filter	100	E553.AA/36+24
C44/R18	Diode filter	100	E553.AA/36+24
C45	Polystyrene	5,000	905/D5K
C46	Ceramic	10,000	904/10K
C47	Elco	4uF	C425.AL/H4
C48	Polystyrene	5,000	905/D5K
C49	Elco	4uF	C425.AL/H4
C50	Polyester	22,000	906/L22K
C51	Polystyrene	5,000	905/D5K
C52	Polystyrene	1,500	905/D1K5
C53-56	Elco	50+50+10+50	RK.334-83
C57	Moulded	10,000	HT.193.10/10K
C58	Ceramic	470	904/P470E
C60	Ceramic	2,200	904/2K2
C61	Ceramic	2,200	904/2K2
C62	Ceramic	12	904/12E
C63	Ceramic	12	904/12E