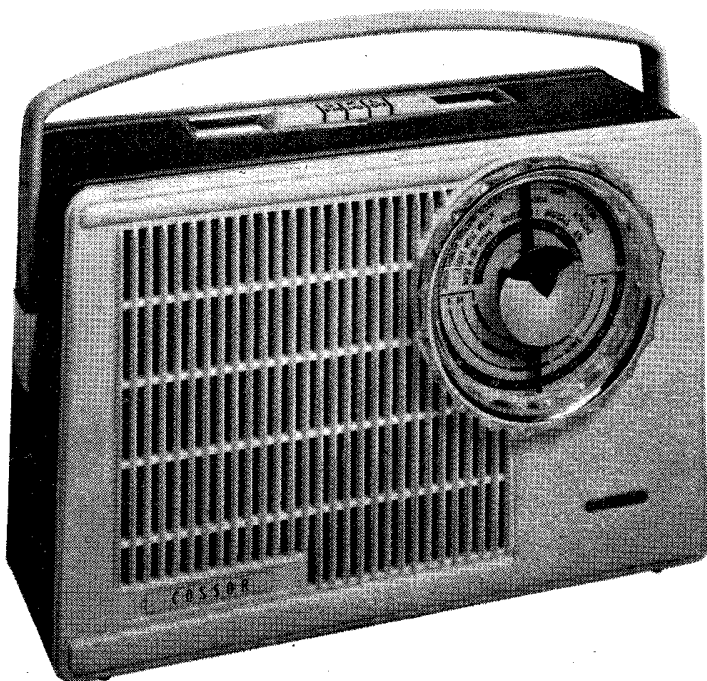


SERVICE INFORMATION FOR THE

COSSOR

PORTABLE RADIO RECEIVER

Type CR7225T



INTRODUCTION

The CR7225T is a fully transistorised portable receiver designed to receive the A.M. transmissions on long and medium wavebands and F.M. transmissions on the V.H.F. waveband. The very compact printed circuit employing 9 transistors and 7 diodes, includes A.G.C. on A.M. and A.F.C. on F.M. The two tone case is available in green and white or red and white. Additional features include a built-in telescopic aerial for V.H.F. reception, a socket for connecting an external aerial and a socket for earphone connection incorporating a loudspeaker muting switch.

SPECIFICATION

Semiconductors	Functions	
	A.M.	F.M.
TS1 AF114	—	R.F. amp.
TS2 AF115	—	Oscillator
TS3 AF116	Mixer/oscillator	1st I.F. amp.
TS4 AF116	1st I.F. amp.	2nd I.F. amp.
TS5 AF116	2nd I.F. amp.	3rd I.F. Amp.
TS6 AC125	A.F. amp.	
TS7 AC125	A.F. driver	
TS8 } AC128	Push-pull output	
TS9 }		
GR1 OA90	—	Mixer
GR2 E25C5	—	A.F.C.
GR3 BA102		
GR4 OA79	A.G.C.	—
GR5 OA79	—	Ratio detector
GR6 OA79		
GR7 OA79	Detector	—
Batteries	Six 1.5V cells, type U11 or equivalent.	
Consumption	No signals	F.M. 29mA A.M. 25mA
Waveband	L.W.	1154—2000 metres
Ranges	M.W.	185— 589 metres
	F.M.	87.5— 100 Mc/s
Dimensions	Width 8 $\frac{3}{4}$ "	Height 6 $\frac{1}{4}$ " Depth 3"
Weight	3 lbs. less batteries	

Replacing Batteries

Slacken the two captive screws and remove the battery cover from the base of the case.

Removing the Case

The case consists of three sections:—Front moulding, rear moulding and moulded centre with detachable battery cover. Both sides of the printed panel are readily accessible with the front and rear mouldings detached.

After removing the battery cover, the four P.K. screws holding the front and rear mouldings are exposed. If it is necessary to remove the front moulding, first detach the tuning knob and pointer.

To remove the printed panel completely, detach the front and rear mouldings, unsolder the loudspeaker leads and remove the V/C knob by extracting the two countersunk screws near the centre of the knob. Release the insulated plate on the V/C spindle and unsolder the aerial, battery and earphone socket leads. Unscrew the four panel retaining screws and draw the

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panel out through the rear of the centre moulding. When re-casing, ensure the plastic W/C operating bar is located in the slot in the W/C lever.

Circuit Features

A.M. Positive A.G.C. voltage developed across C47 is applied via R26, S21 and S11 to the base of TS4. This reduces the base bias on TS4 causing a rise in its input impedance. Less drive current flows and the stage gain falls. The gain of TS4 is therefore directly dependent on the magnitude of the detected signal.

Supplementary A.G.C. is provided by GR4 as follows:

Since the collector current of TS3 is independent of the applied signal strength, the anode of GR4 remains at a constant potential. Under no signal conditions the voltage developed across R22 in TS4 collector circuit is sufficient to bias GR4 beyond "cut off" and its high reverse resistance has negligible effect on the primary winding of the first I.F. transformer S19/S22. When a sufficiently powerful signal is received the collector current of TS4 is reduced by the normal A.G.C. action, until the voltage across R22 is insufficient to "hold off" GR4 which then conducts and its low resistance damps the primary winding of S19/S22, causing additional attenuation of the signal.

F.M. Automatic frequency control (A.F.C.) is employed on F.M. reception.

The circuit functions as follows: When the receiver is correctly tuned to a signal there is zero potential at the junction of R30-R31 in the ratio detector circuit. Detuning the signal will cause this potential to swing either positive or negative with respect to chassis dependent on whether the receiver is tuned on the high or low side. The ratio detector diodes are phased in such a way that detuning on the low side (too much capacity in the tuning gang) causes the potential to go negative, and detuning on the high side (insufficient capacity in the tuning gang) causes the potential to go positive. Thus a D.C. voltage is produced, the amplitude and polarity of which is dependent upon the position of the tuning gang, the total swing being

approx. 1.8V (-0.9V to +0.9V).

This voltage is applied via R9 and R10 to the anode of GR3. The cathode of this diode is stabilized at approx. +1.2V D.C. by the diode GR2:GR3 therefore operates with reverse bias at all times. The properties of GR3 are such that its self capacity varies with the applied bias and consequently it functions as a variable capacitor. This variable capacity is effectively in parallel with the oscillator tuning gang C2 and thus it controls the oscillator frequency.

As described above, if the receiver is detuned by virtue of too much capacity in the tuning gang a negative D.C. voltage is applied to the anode of GR3, its self capacity is reduced and hence the capacity in parallel with the gang C2, which restores the oscillator to its correct frequency.

The reverse action occurs in GR3 if insufficient gang capacity is set and the oscillator frequency is again automatically corrected.

TRIMMING INSTRUCTIONS

A.M.

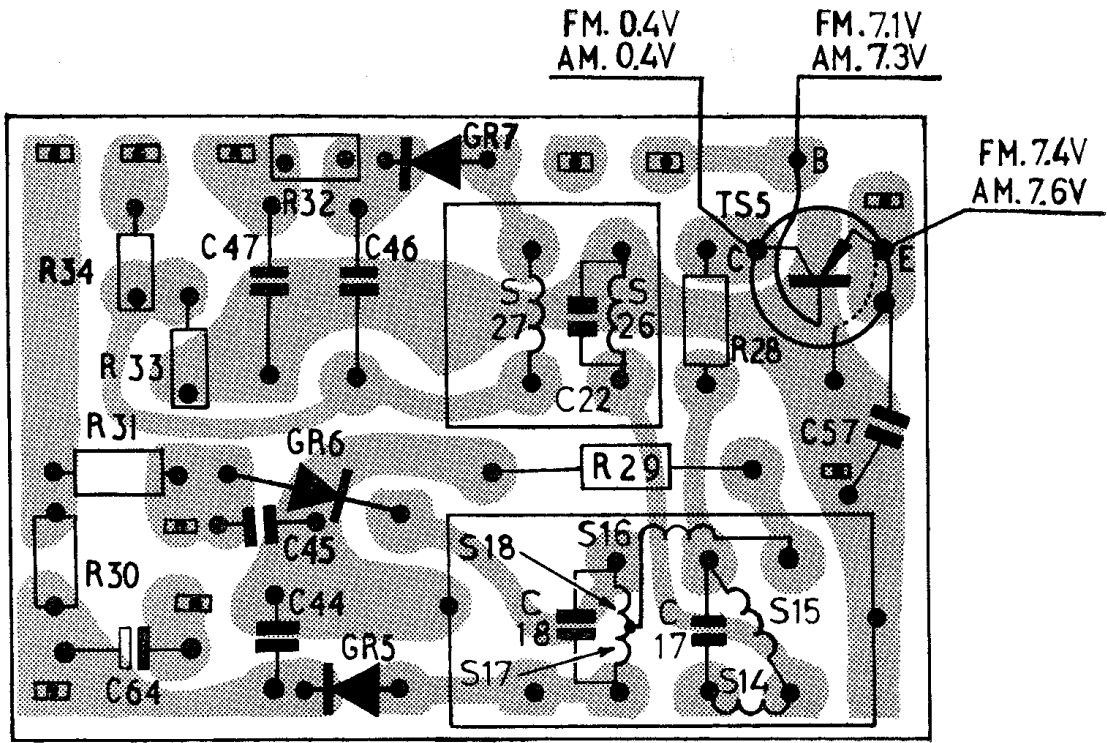
Output should be observed with an output meter set for a 3Ω load, trimming level 50mW. Alternatively an A.C. voltmeter (1V range) with a 3Ω resistor in parallel may be used, trimming level 0.3-0.4V. In either case the L.S. must be disconnected and the meter connected to the receiver output. Set volume control to maximum. Coupling between generator and aerial coil, when trimming R.F. circuits, should be via a single loop placed near the ferrite rod. The generator should be modulated with an audio signal to a depth of approx. 30%.

F.M.

Output should be observed with a D.C. voltmeter set to 10V range, with an impedance of not less than 20KΩ/V, connected across C64 (reading not to exceed 3V). For adjustment of S17/18 connect the voltmeter between the junction of R30/31 and earth. The generator should be unmodulated. Refer to Fig. 5 for generator and meter connection points.

Alignment table

Section	Switch to:-	Gang to	Gen. freq.	Apply to:- (via 47KpF)	Adjust	Ind..
A.M.—I.F.	M.W.	min.	470Kc/s	Base TS3	S26, S23/24, S21/22, S19/20	Max. O/P
A.M.—R.F.	M.W.	max.	510Kc/s	via loop	S28/29, S31/32	Max. O/P
	"	min.	1620Kc/s	" "	C7, C8	" "
	L.W.	max.	150Kc/s	" "	S33/34	" "
	"	min.	260Kc/s	" "	C10	" "
F.M. Ratio Det.	F.M.	min.	10.7Mc/s	Base TS5	S14/15	Max. O/P
	"	"	Unmod. 10.7Mc/s	" "	S17/18 (See trimming notes)	Zero volts
F.M.—I.F.	F.M.	min.	10.7Mc/s	Base TS2	S12, S10, S8/9, S7	Max. O/P
F.M.—R.F.	"	max.	87.2Mc/s	Telescopic F.M. Aerial	S5/6, S3	Max. O/P
	"	min.	100Mc/s	" " "	C6, C5, S1/2	" "



SD 2484

Fig. 1 DETECTOR PANEL—Component side

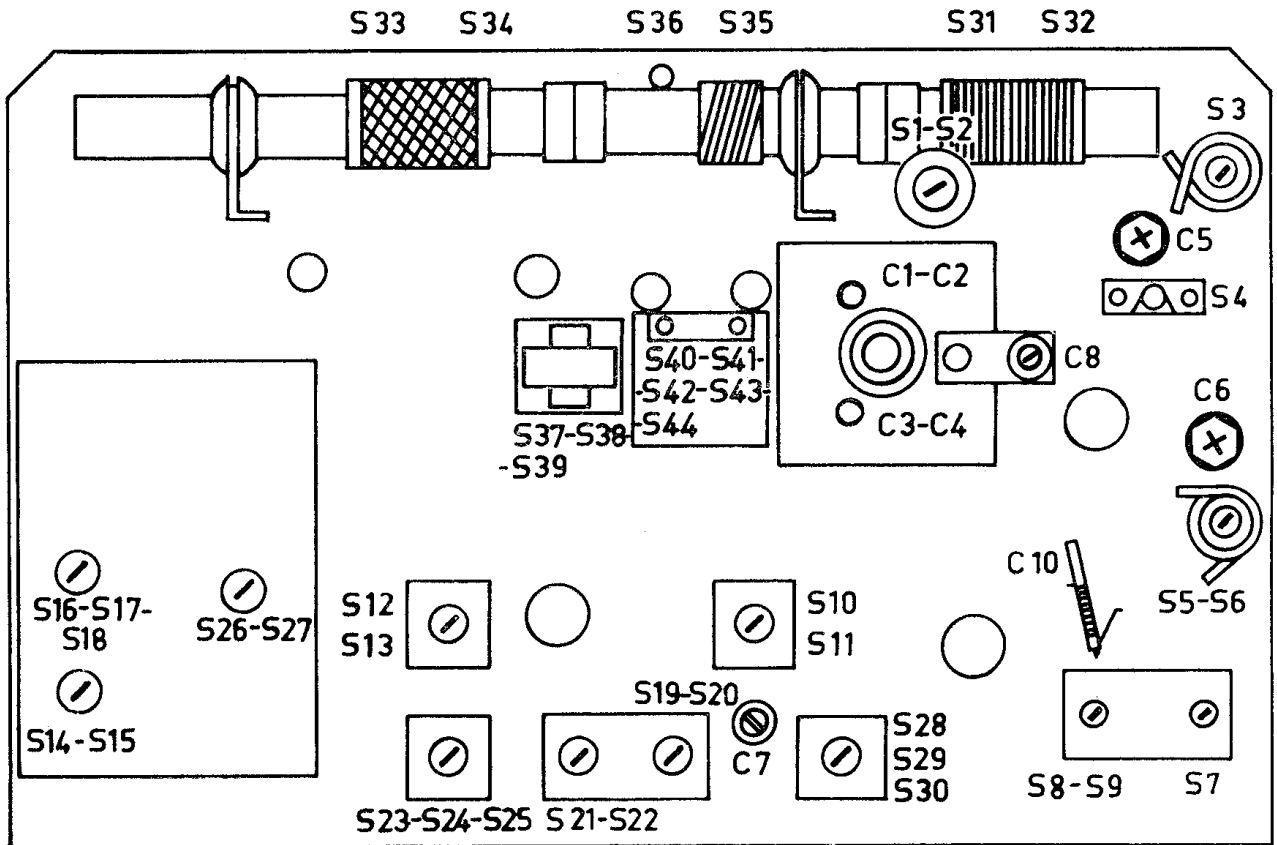
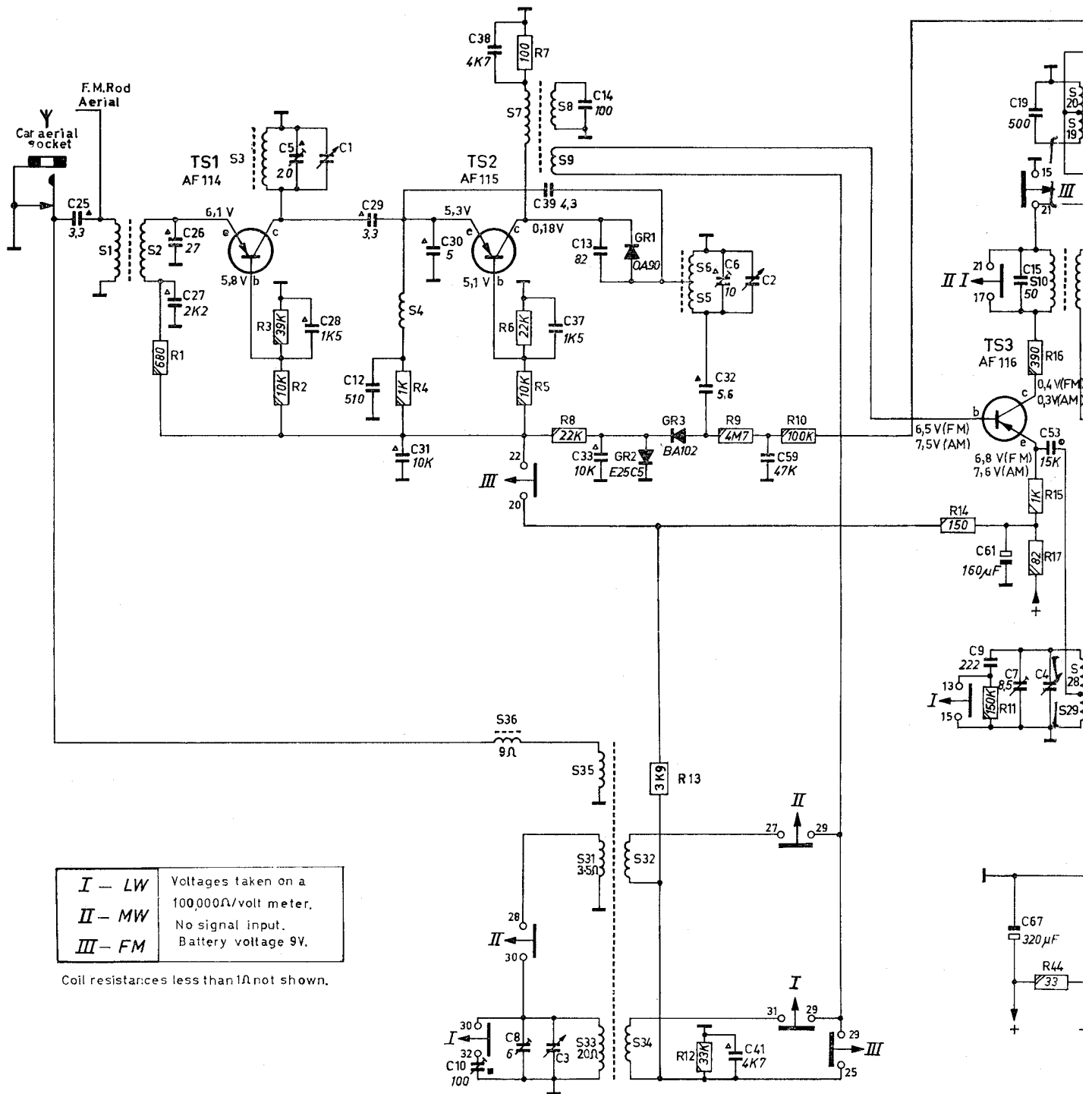


Fig. 2 TRIM PLAN

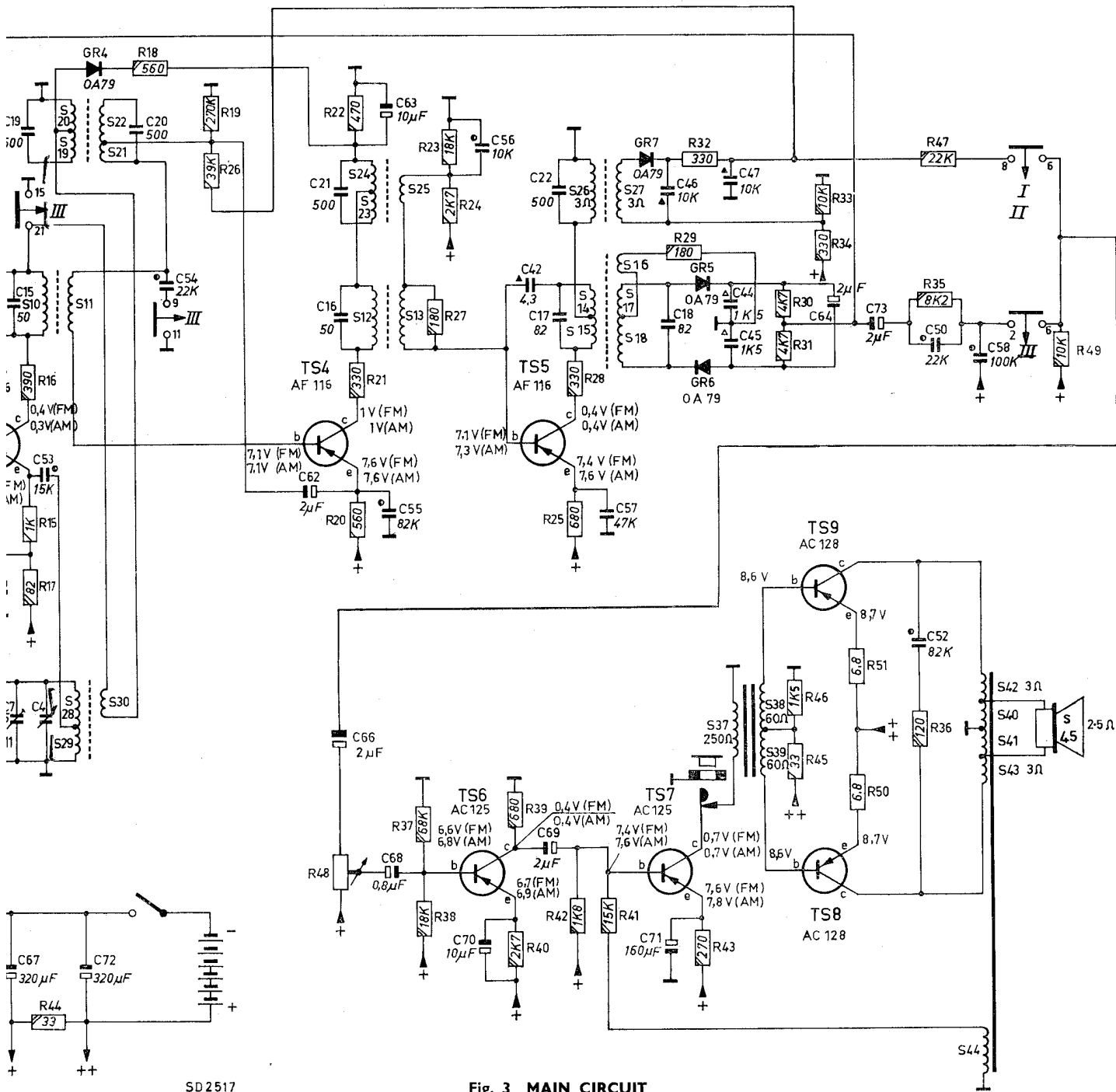
S	1	2	3	4	36,7,8,9,35,31,33,32,34	5	6	10	19	20	29	28																			
C	25	26	27	5,28,1,12	29	31	30	38	10	8	3	39	37	33	13	14	32	41	6	2	59	9	61	15	19	7	4	53	6		
R	1	3	2	4	6	5	7	8	12	13	9	10	14	11,44,16	15	1															
	TS1			TS2			GR2,GR1,GR3						TS3																		



I - LW	Voltages taken on a 100,000Ω/volt meter.
II - MW	No signal input.
III - FM	Battery voltage 9V.

Coil resistances less than 1Ω not shown.

19	20	29	28	11	30	22	21	24	23	12	25	13	14,15,26,17,27,	16	18	37	38,39	40	41	42	43	44	45				
7	4	53	67	72	20	54	62,66,16	216,8,63	55	56	70,69	42	17	22	57	71	18	46	47	44	45	64	73	52	50	58	
44,16	15	17	18	19	26	48,22,	20,21,37,38,23,	27,	24,	39,	40,	25	42	41	28	43,	29	32	46,31	30,45,33	34,	50,51,47,35	36,	49			
GR4				TS4				TS6				TS5				GR7, TS7, GR5, GR6				TS8				TS9			



SD2517

Fig. 3 MAIN CIRCUIT

S	3, 5-6, 4, 31, 32, 1-2, 36, 35, 37-39, 33, 34, 7-9,
C	25, 12, 5, 29, 28, 1, 8, 26, 27, 40-44, 45, 28-30, 72, 19-22, 71, 50, 73, 70, 58, 67, 68, 46,
R	4, 8, 5, 6, 7, 9, 10, 3, 16, 10, 2, 3, 4, 41, 21, 53, 61, 15, 7, 51, 36, 46, 45, 44, 50, 47, 43, 18, 41, 21, 42, 20, 22, 35, 27, 19, 20, 39, 40, 38, 37, 23, 24, 25, 49, 48,

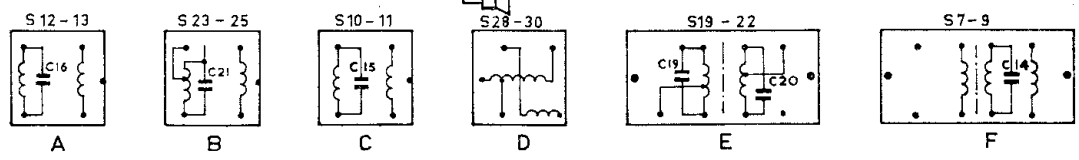
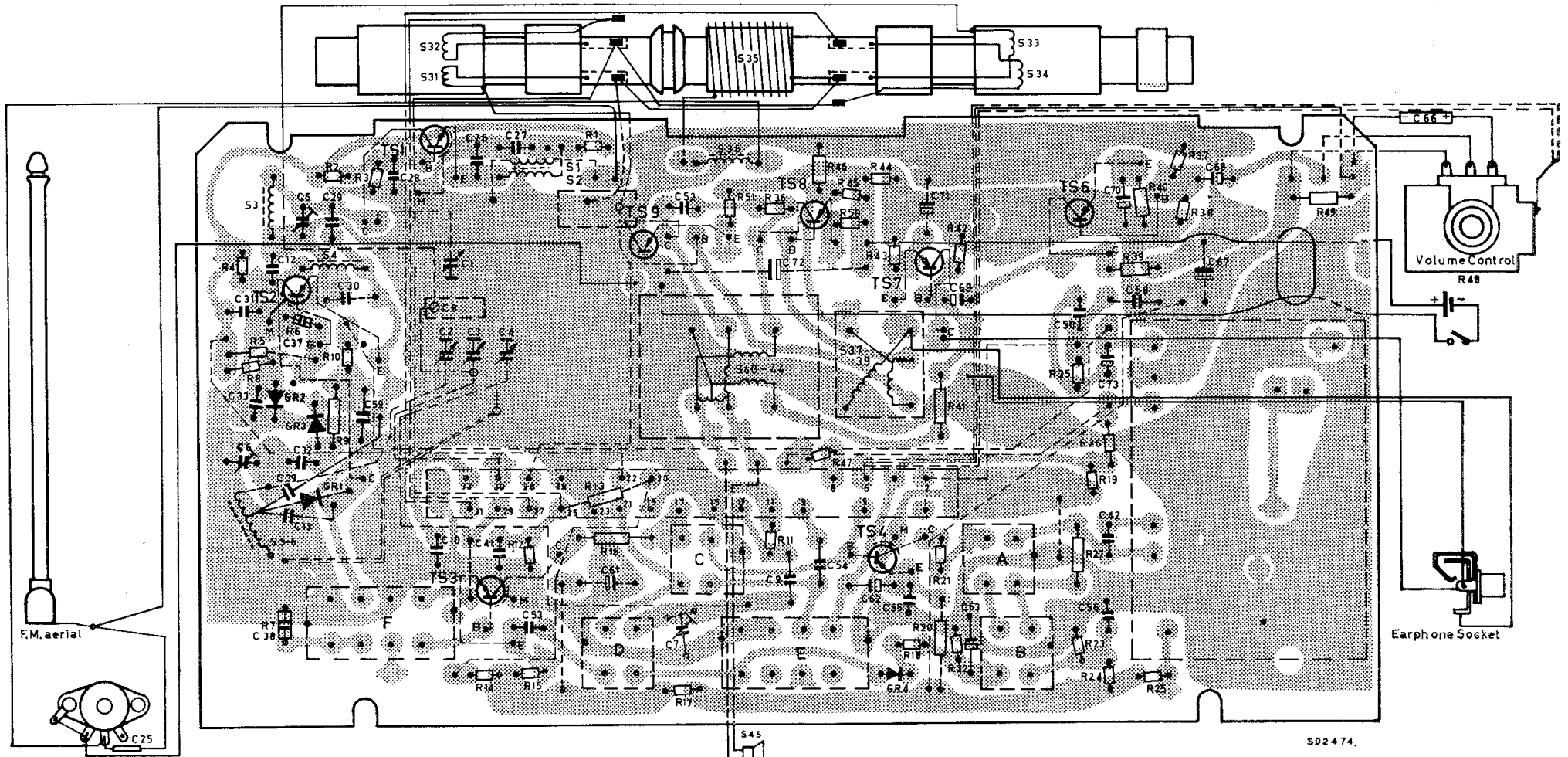


Fig. 4 MAIN PANEL—Print side

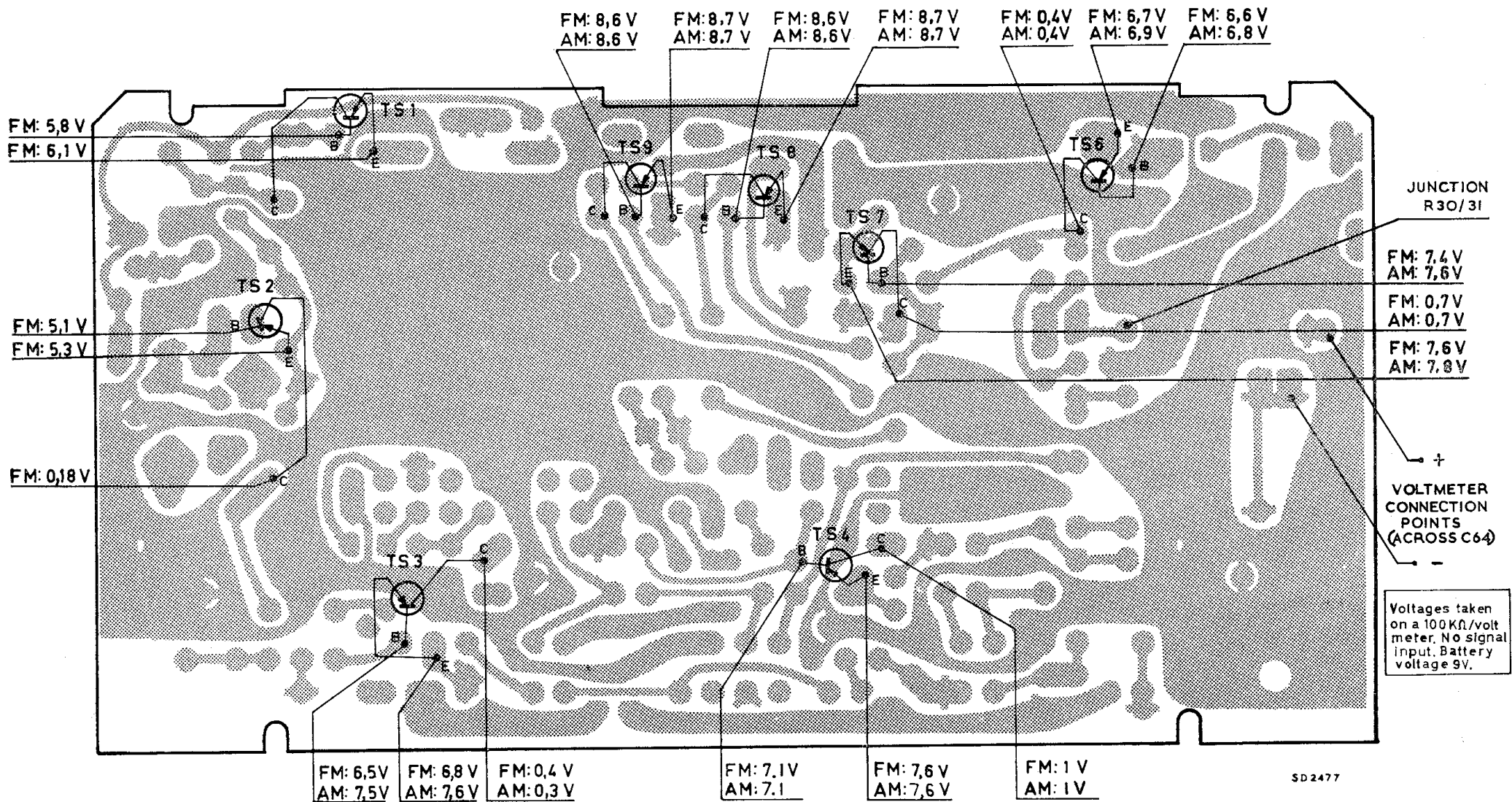


Fig. 5 VOLTAGES

SPARE PARTS LIST

Cabinet Assembly

Cabinet Centre—Red ...	HY.074.76
Backplate—Red ...	HY.065.93
Cabinet Centre—Green ...	HY.074.77
Backplate—Green ...	HY.065.94
Front Moulding ...	HY.114.50
Screw for above (2) ...	B070.AD/5N×5/16
Battery Cover ...	193.00606
Screw (2) } for above	MK.962.50
Circlip (2) }	B108.AF/3.2
Handle ...	193.006.07
Fixing Bracket (2) } for above	193.005.82
Cap (2) }	193.005.83
Escutcheon for wavechange knob	193.005.88
Cossor trade name ...	
Made in Austria Transfer ...	
Foam Pad for battery (4 off × 2")	HY.140.07
Type Label ...	A3.625.55

Control Knobs

Tuning (Window) ...	193.006.69
Fixing Clip for above ...	JR.652.77
Volume ...	193.006.08
Brass Mounting Bush for above	
Wavechange button ...	JR.399.63
Plastic Strip } for above	VT.000.18
Bronze Spring }	
Wavechange switch complete	JR.399.64
Slider only ...	JR.680.50

Station Scale and Pointer Assembly

Station scale ...	193.006.11
Pointer ...	193.006.09
Pointer mounting spring ...	
Tuning gang steadying bracket	

Miscellaneous

Aerial socket ...	A3.966.25
Escutcheon for above ...	193.005.84
Earphone socket ...	A3.966.21
Plug and lead for above ...	A3.814.43
Telescopic aerial ...	193.005.85
Fixing spring, large } for above	JR.648.50
Fixing spring, small }	JR.648.51
Battery contact plate negative	193.005.87
Spring for above ...	193.005.86

Battery contact spring, positive ...	JR.648.45
Chassis fixing screws (4) ...	B070.AD/5N×5/16
Screw (2) } For heat sink	B070.VD/2N×1/2
Spacer (2) }	B002.AF/3×3

Transformers and Coils

S1/2	Aerial coil F.M. ...	JR.133.23
S3	Coupling coil F.M. ...	JR.133.45
S4	I.F. absorption coil F.M. ...	193.005.94
S5/6	Osc. coil F.M. ...	193.006.15
S7-9	1st I.F. coil F.M. ...	193.005.95
S10/11	2nd I.F. coil F.M. ...	193.005.96
S12/13	3rd I.F. coil F.M. ...	193.005.97
S14-18	Ratio Detector ...	JR.122.71
S19-22	1st I.F. coil A.M. ...	193.006.13
S23-25	2nd I.F. coil A.M. ...	JR.122.78
S26/27	3rd I.F. coil A.M. ...	JR.122.59
S28-30	Osc. coil A.M. ...	193.005.99
S31-35	Rod aerial ...	193.006.01
S36	Loading coil A.M. ...	193.006.02
S37-39	Driver transformer ...	193.006.03
S40-44	Speaker transformer ...	193.005.74
S45	Loudspeaker ...	940/LD141HZ

Cores for Coils

S3, S5/6 ...	MK.955.03
Other cores ...	K5.120.00

Transistors and Diodes

TS1 ...	AF.114
TS2 ...	AF.115
TS3 ...	AF.116
TS4 ...	AF.116
TS5 ...	AF.116
TS6 ...	AC.125
TS7 ...	AC.125
TS8 } Matched Pair	2×AC.128
TS9 }	
GR1 ...	OA.90
GR2 ...	E.25C5
GR3 ...	BA.102
GR4 ...	OA.79
GR5 } Matched Pair	2×OA.79
GR6 }	
GR7 ...	OA.79

Detector panel with components	193.006.16
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Condensers

Type	Value pF		
C1-4 Gang ...		193.005.77	
C5 Trimmer ...	20	908/P20E	
C6 Trimmer ...	10	908/P10E	
C7 Trimmer ...	8.5	WHC.999ZZ/02	
C8 Trimmer ...	6	C004.AA/6E	
C9 Ceramic ...	214	069.006727	
C10 Trimmer ...	20-100	907/20E-100E	
C12 Styroflex ...	510	069.00557	
C13 Styroflex ...	82	905/D82E	
C14 ...		In S7-9	
C15 ...		In S10/11	
C16 ...		In S12/13	
C17 ...		In S14-18	
C18 ...			
C19 ...		In S19-22	
C20 ...			
C21 ...		In S23-25	
C22 ...		In S26/27	
C25 Ceramic ...	3.3	904/3E3	
C26 Ceramic ...	27	904/27E	
C27 Ceramic ...	2200	904/P2K2	
C28 Ceramic ...	1500	904/P1K5	
C29 Ceramic ...	3.3	904/P3E3	
C30 Ceramic ...	5	904/P5	
C31 Ceramic ...	10000	904/P10K	
C32 Ceramic ...	5.6	904/5E6	
C33 Ceramic ...	10000	904/P10K	
C37 & R6 Diode Filter ...		E551AA/52+38	
C38 & R7 Diode Filter ...		E551AA/24+44	
C39 Ceramic ...	4.3	904/4E3	
C41 Ceramic ...	4700	904/P4K7	
C42 Ceramic ...	4.3	904/4E3	
C44 Ceramic ...	1500	904/P1K5	
C45 Ceramic ...	1500	904/P1K5	
C46 Ceramic ...	10000	904/10K	

C47 Ceramic ...	10000	904/10K
C50 Polyester ...	22000	906/L22K
C52 Polyester ...	82000	906/L82K
C53 Polyester ...	15000	906/L15K
C54 Polyester ...	22000	906/L22K
C55 Polyester ...	82000	906/L82K
C56 Polyester ...	10000	906/L10K
C57 Ceramic ...	47000	B1.655.09
C58 Polyester ...	0.1uF	906/L100K
C59 Ceramic ...	47000	B1.655.09
C61 Elco ...	160uF	C426.CE/D160
C62 Elco ...	2uF	909/U2
C63 Elco ...	10uF	909/W10
C64 Elco ...	2uF	909/U2
C66 Elco ...	2uF	909/U2
C67 Elco ...	320uF	909/U320
C68 Elco ...	0.8uF	C426.AN/FO.8
C69 Elco ...	2uF	909/U2
C70 Elco ...	10uF	909/W10
C71 Elco ...	160uF	C426.CE/D160
C72 Elco ...	320uF	909/U320
C73 Elco ...	2uF	909/U2

Resistors

Type	Value Ohms	
R1 ...	680	48.426.10/680E
R2 ...	10000	48.426.10/10K
R3 ...	39000	48.426.10/39K
R4 ...	1000	48.426.10/1K
R5 ...	10000	48.426.10/10K
R6 & C37 Diode Filter ...		E551.AA/52+38
R7 & C38 Diode Filter ...		E551.AA/24+44
R8 ...	22000	48.426.10/22K
R9 ...	4.7M	48.426.10/4M7
R10 ...	0.1M	48.426.10/100K
R11 ...	0.15M	48.426.10/150K

R12 ...	33000	901/33K
R13 ...	3900	901/3K9
R14 ...	150	901/150E
R15 ...	1000	901/1K
R16 ...	390	48.426.10/390E
R17 ...	82	48.426.10/82E
R18 ...	560	48.426.10/560E
R19 ...	0.27M	901/270K
R20 ...	560	901/560E
R21 ...	330	48.426.10/330E
R22 ...	470	48.426.10/470E
R23 ...	18000	901/18K
R24 ...	2700	901/2K7
R25 ...	680	48.426.10/680E
R26 ...	39000	901/39K
R27 ...	180	48.426.10/180E
R28 ...	330	48.426.10/330E
R29 ...	180	48.426.10/180E
R30 ...	4700	901/4K7
R31 ...	4700	901/4K7
R32 ...	330	48.426.10/330E
R33 ...	10000	48.426.10/10K
R34 ...	330	48.426.10/330E
R35 ...	8200	48.426.10/8K2
R36 ...	120	48.426.10/120E
R37 ...	68000	48.426.10/68K
R38 ...	18000	48.426.10/18K
R39 ...	680	48.426.10/680E
R40 ...	2700	48.426.10/2K7
R41 ...	15000	48.426.10/15K
R42 ...	1800	48.426.10/1K8
R43 ...	270	48.426.10/270E
R44 ...	33	48.426.10/33E
R45 ...	33	901/33E
R46 ...	1500	901/1K5
R47 ...	22000	48.426.10/22K
R48 Volume ...		E088.DA/20A29
R49 ...	10000	901/10K
R50 W/Wound ...	6.8	938/A6E8
R51 W/Wound ...	6.8	938/A6E8