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STATION, RADIO, A510

TECHNICAL HANDBOOK - TECHNICAL DESCRIPTION

This Part 2 contains fault-finding and repair data in tabular and diagrammatic form. Part 1 of the EMER contains a general description of this equipment. Tels F 563 and F 564 deal with repairs.

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Table 2501 - Component schedule

Circuit ref	Value (Ω)	Grid reference			
		Fig 2503	Fig 2504	Fig 2506	Fig 2507
RESISTORS					
R1	470k		D6		E1,2
R2	10k		E2		G3,4
R4	470k		GH6		E2,3
R5	100k		H6		E4
R6	1.5k		G2		G4
R7	2.2M		N8		G2
R8	10k		L2		B3,4
R9	10k		J2		A3,4
R10	470k		P2,3		F3,4
R11	150k		P1,2		FG3
R12	47k		MN4,5		H5
R13	18k		O2,3		GH3
R14	2.2M		O7		H5
R15	6.8M		O7		G2
R17	47k		O4,5		G1,2
R18	6.8M		Q3		H1,2
R19	47k		Q7		G2,3
R20	10k		M5		E2
R21	10k		P7		H3
R101	220k	E4		B5	
R103	470k	F5,6			
R104	680	F4			
R105	3.9k	E2		B4,5	
R106	47k	F4			
R107	15k	J5			
R108	100k	N4			
R109	150k	B2		B3	
R110	470k	B2		A2	
R111	3.9k	J6			
R112	470	J7			
R113	360k	G4			
R114	5.6k	G6			
R115	470k	CD7			
R116	150	K7			
R117	220k	M1		D1	
RV1	1M		O5		

Note: All fixed resistors are 1/2W, 10%, insulated, composition

Table 2501 - (cont)

Circuit ref	Value (F)	Rating (V)	Type	Grid reference			
				Fig 2503	Fig 2504	Fig 2506	Fig 2507
CAPACITORS - FIXED							
C3	0.4μ	200	Paper ins		G7		G2
C5	100p		Ceramic ins		D3,4		DE1
C6	0.1μ	200	Paper ins		E7		F3
C10	0.1μ	200	Paper ins		G7		G4
C11	100p		Ceramic ins		G3		E2,3
C12	0.1μ	200	Paper ins		L7		G2
C14	1800p				L6		
C15	900p				K6		
C16	12p		Ceramic ins		J6		D4
C17	100p		Ceramic ins		H4		D4,5
C18	150p		Silver-mica		H2		
C19	150p		Silver-mica		J2		
C22	0.1μ	200	Paper ins		F2		F4
C23	150p		Silver-mica		L2		
C24	150p		Silver-mica		MN2		
C25	470p		Mica		E3		G3,4
C26	0.1μ		Paper ins		Q2		G3
C27	470p		Mica		Q2		G1,2
C28	5000p		Paper ins		O5		
C29	0.1μ		Paper ins		C6		G3
C30	150p		Silver-mica		N2		
C31	150p		Silver-mica		O2		
C32	100p		Ceramic ins		O4		G2,3
C33	100p		Ceramic ins		PQ4		
C34	220p		Silver-mica		P5		
C35	470p		Silver-mica		Q5		
C36	5p		Ceramic		B6		A2
C37	0.1μ	200	Paper ins		Q6		F3
C38	470p		Silver-mica		O5		
C39	0.01μ	200	Paper ins		B7		
C40	12p				Q6		F2
C41	12p				P6		H2
C42	4.7p		Ceramic bead		P6		J5
C101	5000p	200	Paper ins	A6		BC5	
C102	0.01μ	200	Paper ins	K2			
C103	0.01μ	200	Paper ins	FG7			
C104	1000p	350	Paper ins	F3		CD5	
C105	5000p	200	Paper ins	H3		DE4	
C107	33p	200	Silver-mica	E4		B5	
C108	0.01μ	200	Paper ins	F2		EF5	
C109	5000p	200	Paper ins	C2			
C110	0.01μ	200	Paper ins	E7			
C112	1000p	350	Paper	C5,6		A2	

Table 2501 - (cont)

Circuit ref	Value (F)	Rating (V)	Type	Grid reference			
				Fig 2503	Fig 2504	Fig 2506	Fig 2507
CAPACITORS FIXED - (cont)							
C113	5000p	200	Paper	E2		GD4,5	
C114	15p	500	Mica	M5		E3	
C115	22p	500	Mica	M5		E3	
C116	33p	500	Mica	L5		E3	
C117	57p	500	Mica	L5		DE3	
C118	82p	500	Mica	KL5		D3	
C119	150p	500	Mica	K5		D3	
C120	800p	500	Mica	K2		E3	
C121	470p	500	Mica	KL2		E3	
C122	300p	500	Mica	L2		DE3	
C123	180p	500	Mica	L2		D3	
C124	100p	500	Mica	M2		D3	
C125	68p	500	Mica	M2		D3	
C126	0.01 μ	200	Paper ins	J2		F2,3	
C127	0.01 μ	200	Paper ins	C3			
C128	1000p	200	Paper ins	D7			
C129	5000p	200	Paper ins	B6		BC5	
CAPACITORS - VARIABLE							
C1	3-30p					C5	
C2	3-30p					C6	BC1,2
C4	10-225p					D6	BC2
C7	10-225p					E6	
C8	3-30p					G6	BC3
C9	3-30p					G5	BC3,4
C13	10-225p					J6	
C20	3-30p					KL4	BC5
C21	3-30p					K4	BC4
C106	10-225p			H4			

Notes: (a) All variable capacitors have air dielectric.

(b) C4, C7 and C13 are sections of a 3-gang capacitor.

Table 2501 - (cont)

Circuit ref	Function	Grid reference				
		Fig 2503	Fig 2504	Fig 2506	Fig 2507	
SWITCHES - (cont)						
SD1Fa)	A-B-NET switch	(N3		ABC3		
SD1Fb)		(MN4		ABC3		
SD1Fc)		(J6		ABC3		
SD1Ba)		(G6		ABC3		
SD1Bb)		(JK4		ABC3		
SD1Bc)		(D6		ABC3		
SE1Ba)		CRYSTAL switch	D3		DEF2	
SE1Bb)		CRYSTAL switch	D2		DEF2	
SF1F		Aerial MATCHING switch	L4		DEF2	
SF1B		Aerial MATCHING switch	L3		DEF3	
SG	Dial lamp press switch	MN7				
Circuit ref	Type	Function	Grid reference			
			Fig 2503	Fig 2504	Fig 2506	Fig 2507
VALVES						
V1	CV785	R.F. amplifier		E3,4		EF1,2
V2	CV782	Frequency changer		H3,4		EF3,4
V3	CV785	1st i.f. amplifier		LM3,4		G5
V4	CV785	2nd i.f. and reflex a.f. amplifier		N3,4		HJ3,4
V5	CV784	Heterodyne oscillator and diode detector		P3,4		HJ1,2
V6	CV785	Modulator and c.w. sidetone oscillator	B3,4		AB4,5	
V7	CV807	Master oscillator	EF3,4		BC4,5	
V8	CV807	Power amplifier	G3,4		D4,5	
V9	CV807	Power amplifier	GH3,4		EF4,5	
RECTIFIERS						
MR1		Signal and noise limiter	F4	P2		
MR5		P.A. bias control				
MR6		Tuning indicator rectifier	J5			
Note: All rectifiers are germanium, type CV448						
MASTER OSCILLATOR CRYSTALS						
XL1			C3			
XL2			D3			
XL3			D3			
XL4			E3			

Table 2501 - (cont)

Circuit ref	Function		Grid reference	
			Fig 2503	Fig 2504
PLUGS AND SOCKETS				
PL1 PL2 PL3 SKT1 SKT2 SKT3	Cable connector L.T. battery plug H.T. and bias battery plug Cable connector Head/handset socket Keying socket		P4-7 B8 LM2	C9 A4-7 DE8,9
Circuit ref	Voltage (V)	Function	Grid reference	
			Fig 2503	Fig 2504
LAMPS				
ILP1 ILP2	1.5 1.5	Dial lamp Dial lamp	N7	D7
Circuit ref	F.S.D.	Function	Grid reference	
			Fig 2503	
METER				
M1	500µA	Tuning indicator and l.t./h.t. voltage check	J7	

Table 2502 - Current consumption

Switch positions		L.T. current (mA)	H.T. current (mA)
SC	SD		
CW (key down)	A or B	650 ±10%	50
R	Net	200 ±10%	16
VOICE	A or B	650 ±10%	25

Table 2503 - Receiver voltages and fault-finding

Conditions: (a) System switch at R.
 (b) A-B-NET switch at A or B unless otherwise stated.

Test point	D.C. range (V)	AVO 8 reading (V)	Possible fault	
			Low reading	High reading
TR2 pin 2	100	89	H.T.+ low voltage SC3Ba bad contact Dry joint Faulty connecting cable	
V1 pin 2	100	87	TR2 pin 2 low voltage V1 pin 3 high voltage R6 high resistance V1 faulty C10 leaking C7 shorting C8,C9,L4,L5 earthing SA3,SA4 bad contact	V1 pin 7 low voltage V1 pin 3 low voltage TR 3 pin 2 high voltage R6 low resistance
V1 pin 3	100	61	TR2 pin 2 low voltage V1 or V3 pin 2 high voltage V1 or V3 faulty TR3 pin 2 +ve voltage R2 high resistance C6 leaking C7 shorting	V1 or V3 faulty R2 low resistance
V1 pin 7	10	1.45	L.T.+ low voltage SC1Fc bad contact Faulty connecting cable Dry joint	H.T.+ shorting to L.T.+
V2 pin 2	100	61	TR2 pin 2 low voltage TR3 pin 2 incorrect voltage V2 faulty L6,L7,L8,L9 faulty R8 or R9 high resistance C14 or C15 shorting C13 or C16 shorting C17 low capacitance SA5 bad contact TR1 faulty	V2 pin 7 low voltage V22 faulty L6, L7, L8, L9 faulty R8 or R9 low resistance C20 or C21 leaking
V2 pin 3	100	62	As for V2 pin 2	As for V2 pin 2
V2 pin 4	10	-4.5	As for V2 pin 2	As for V2 pin 2

Table 2503 - (cont)

Test point	D.C. range (V)	AVO 8 reading (V)	Possible fault	
			Low reading	High reading
V2 pin 7	110	1.4	V2 and/or V3 faulty L13 faulty C3 leaking V1 pin 7 low voltage	V2 and/or V3 faulty H.T.+ leaking to L.T.+
V3 pin 2	100	89	TR2 pin 2 low voltage TR2 faulty V3 faulty	
V3 pin 3	100	64	V1 or V3 faulty and as for V1 pins 2 and 3 and V3 pin 2	V1 or V3 faulty and as for V1 pins 2 and 3 and V3 pin 2
V3 pin 7	10	1.4	As for V2 pin 7	As for V2 pin 7
V4 pin 2	100	86	TR2 pin 2 low voltage V4 faulty TR3 or TR4 faulty V4 leaking R13 low resistance	
V4 pin 3	100	62	TR2 pin 2 low voltage V4 faulty C29 leaking R13 high resistance TR3 pin 2 incorrect voltage	V4 faulty R13 low resistance TR3 pin 2 incorrect voltage
V4 pin 7	10	1.4	As for V1 pin 7	As for V1 pin 7
V5 pin 4 or 5	100 100	29 59(NET)	V5 faulty R18 low resistance C33, C34, C37 leaking L10 faulty R19 high resistance R117 (A or B only) high resistance Faulty connecting cable Faulty keying socket connections (A or B only) SC3Bc bad contact	V5 faulty R18 high resistance R19 low resistance R117 (A or B only) low resistance V5 pin 7 low voltage
V5 pin 6	10 10	0.1 -1.8(NET)	As for V5 pins 4 and 5	As for V5 pins 4 and 5

Table 2503 - (cont)

Test point	D.C. range (V)	AVO 8 reading (V)	Possible fault	
			Low reading	High reading
V5 pin 7	10	1.45	As for V1 pin 7	As for V1 pin 7
TR3 pin 2	10 10	-0.7 -3(NET)	As for V5 pins 4 and 5 C34 open circuited TR1, TR3 faulty C11, C12, C32, C38 leaking	As for V5 pins 4 and 5
Junction of R14 & R15	10 10	-0.03 -0.1(NET)	TR3 pin 2 incorrect voltage TR2 faulty V4 faulty R15 high resistance R14 low resistance C25 leaking	TR3 pin 2 incorrect voltage R15 low resistance R14 high resistance C28 leaking TR2 faulty V4 faulty
Junction of R10 & R11	100	68	TR2 pin low voltage MR1 faulty R11 high resistance R10 low resistance	MR1 faulty R10 high resistance R11 low resistance C26 leaking
L2 pin 2	10	-7.7(NET)	Faulty connecting cable L2 faulty C39 shorting	H.T.+ leaking to L2 pin 2

Table 2504 - Transmitter voltages

Conditions: System switch at CW, 2000Ω dummy load connected. A-B-NET switch at A, key down and transmitter tuned for maximum output at 2Mc/s

Test point	D.C. range (V)	Avo 8 reading (V)
SC1Fa4	100	89
SD1Bc1	10	-7.7
V6 pin 2	100	45
pin 3	100	26
pin 6	10	-0.5
pin 7	10	1.45
V7 pin 2	100	61
pin 3	100	61
pin 4	10	-4.1
pin 5	10	1.45
V8 pin 2 & pin 3	100	88
V9 pin 4	10	-8.5
pin 1 or 7	10	1.45

Table 2505 - Transmitter fault-finding

Test point	Symptom	Possible fault
GENERAL CHECKS		
SC1Fa4	Low or no d.c. voltage	Faulty connecting flex. Dry joint. SC3Ba bad contact
SD1Bc1	Low or no d.c. voltage	Faulty connecting flex. Dry joint
V6 pin 2	No d.c. voltage	H.T. disconnected. R109 open-circuited. C112 shorted
	Low d.c. voltage	H.T. voltage low. R109 high resistance. C112, C127 leaking.
V6 pin 3	No d.c. voltage	H.T. disconnected. R110 open-circuited. SC1Fa open-circuited. C108, C109, C129 shorted.
	Low d.c. voltage	H.T. voltage low. R110 high resistance. V6 faulty. C108, C109, C129 leaking.
V6 pin 7	No d.c. voltage	L.T. disconnected. TR5 primary earthed. Faulty connecting cable. Dry joint. SC2Fc open-circuited.
	Low d.c. voltage	L.T. voltage low. Microphone shorted. TR5 primary partially earthed.
V7 pins 2, 3 & 6	No d.c. voltage	H.T. disconnected. C108 shorted. SC1Fa open-circuited. R105 open-circuited.
	Low d.c. voltage	H.T. voltage low. C108 leaking. R105 high resistance. V7 faulty. Faulty key connection
	High d.c. voltage	R105 low resistance. V7 faulty V7 pin 5 no voltage
V7 pin 5	No d.c. voltage	L.T. disconnected. SC2Bc open circuited. Faulty connecting cable. ILP2 and SG shorted.
	Low d.c. voltage	L.T. voltage low.
	No oscillation	V7 faulty. Crystal faulty (ie incorrect fitting or low activity) (If crystal is inactive, check C113 for leakage before replacing crystal). SE open-circuited or bad contact. R101 open-circuited. C107 shorted.

Table 2505 - (cont)

Test point	Symptom	Possible fault
	Low output	V7 faulty. Cystal faulty. R101 incorrect resistance. C107 leaking.
V8 pin 2 V9	No d.c. voltage	H.T. disconnected. L11 or L12 open-circuited. C108 shorted. Faultymkey connections (CW only). SC1Fa open-circuited.
	Low d.c. voltage	H.T. voltage low. SC1Fa bad contact: V8 or V9 faulty. C105 leaking or shorted.
V8 pin 3 V9	No d.c. voltage	H.T. disconnected. C108 shorted. Faulty key connections (CW only). SC1Fa open-circuited.
	Low d.c. voltage	H.T. voltage low. V8 or V9 faulty. SC1Fa bad contact.
V8 pin 7 V9	No d.c. voltage	L.T. disconnected. ILP2 and SG shorted. SC2Fc open-circuited
	Low d.c. voltage	L.T. voltage low.
Aerial	No r.f. output	V8 and V9 faulty. C106 and C114-C119 shorted. R108 shorted. SF1B, SC2Fa, SD1Fb open-circuited or bad contact. C102 C126 open-circuited.
	Low r.f. output	V8 or V9 faulty. R108 low resistance. C104 leaking (check voltage on V8 pin 4).
Meter	No r.f. indication	MR6 faulty. R107 open-circuited. R116 shorted. M1 open-circuited (check by reading battery voltage).
SIDETONE CHECKS		
CW sidetone	No oscillation on CW with key down	V6 faulty. TR5 secondary open-circuited. C109, C128 leaking or shorted. C112, C127, C110 leaking or shorted. R115 shorted or open-circuited.
VOICE sidetone	No sidetone on VOICE	V6 faulty. MR6 faulty. SC1B open-circuited. R111 open-circuited. R112 shorted. TR5 faulty. Headset or handset faulty.

Table 2505 - (cont)

Test point	Symptom	Possible fault
MODULATION CHECKS		
V8/V9 pin 4 (-2.1V on Avo 8)	Low d.c. voltage with system switch at OFF	Bias battery voltage low. R106, R103 high resistance.
(-8.5V on Avo 8)	Incorrect d.c. voltage with system switch at CW and key down	V7 faulty
(-14V on Avo 8)	Incorrect d.c. voltage with system switch at VOICE, no modulation	C104, C112 leaking. R103 open-circuited. MR5 shorted or open-circuited.
(-16.5V on Avo 8)	Incorrect d.c. voltage on VOICE with 100% modulation, between 300c/s and 3kc/s	V6 faulty. C112 shorted.

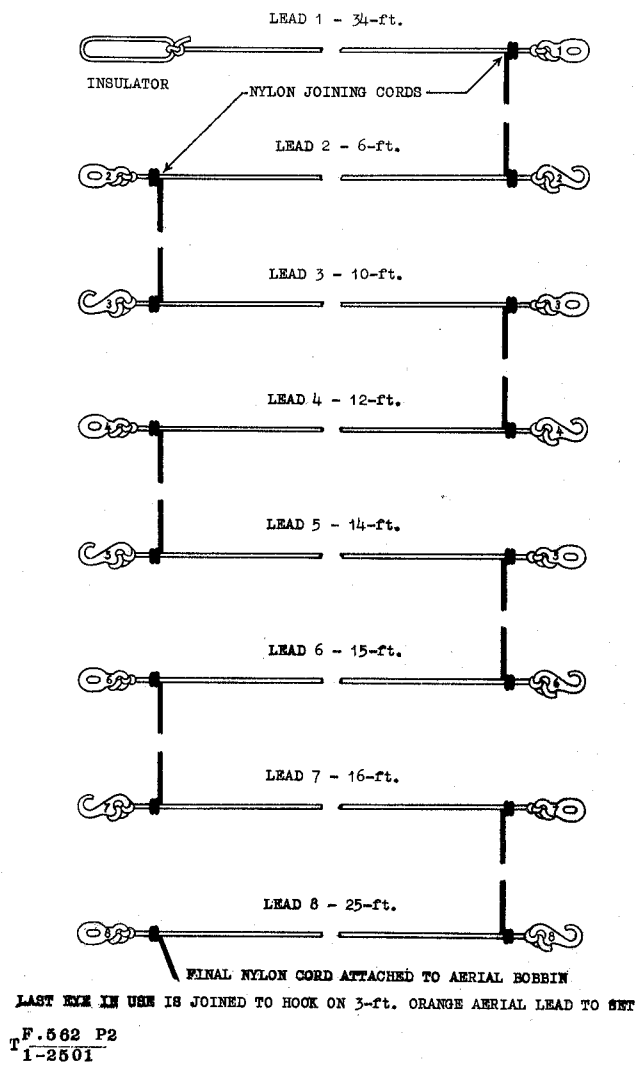
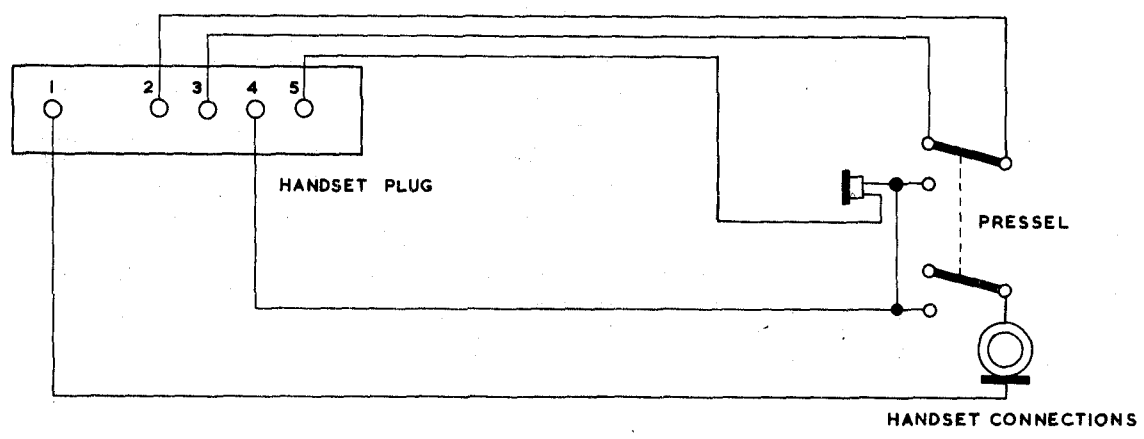
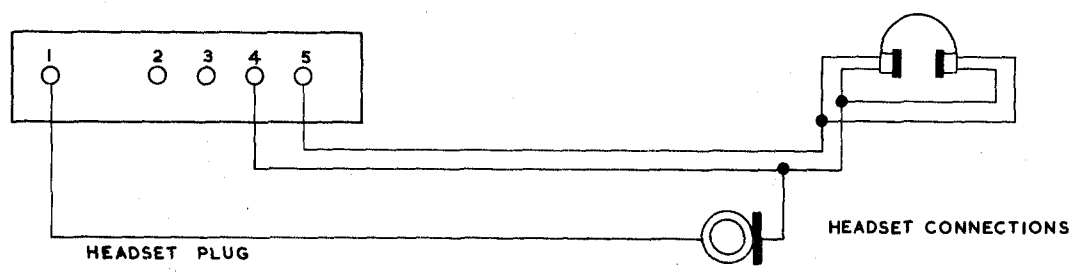
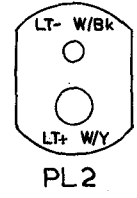
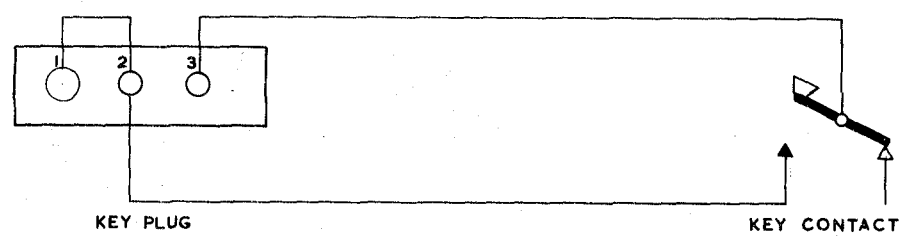
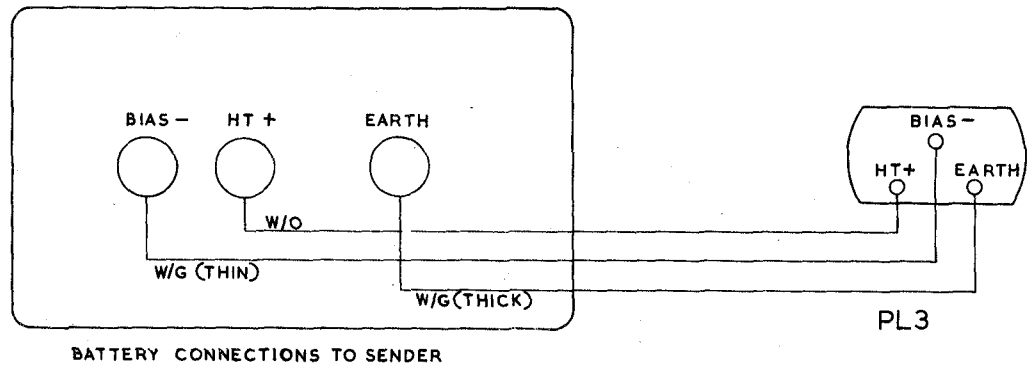


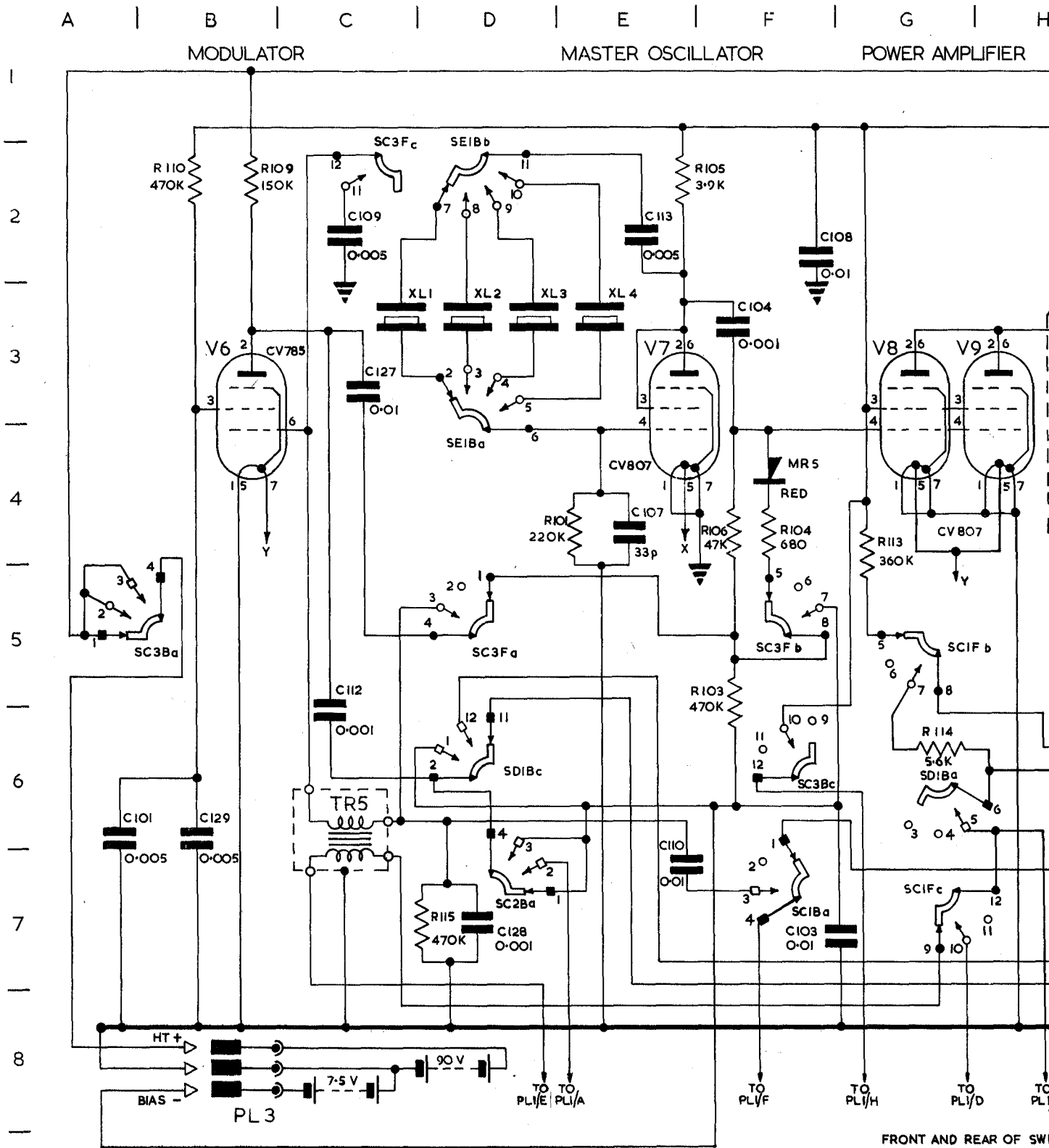
Fig 2501 - End-fed aerial sections



NOTE: ALL PLUGS VIEWED FROM PIN SIDE

T F.562 P2
1-2502

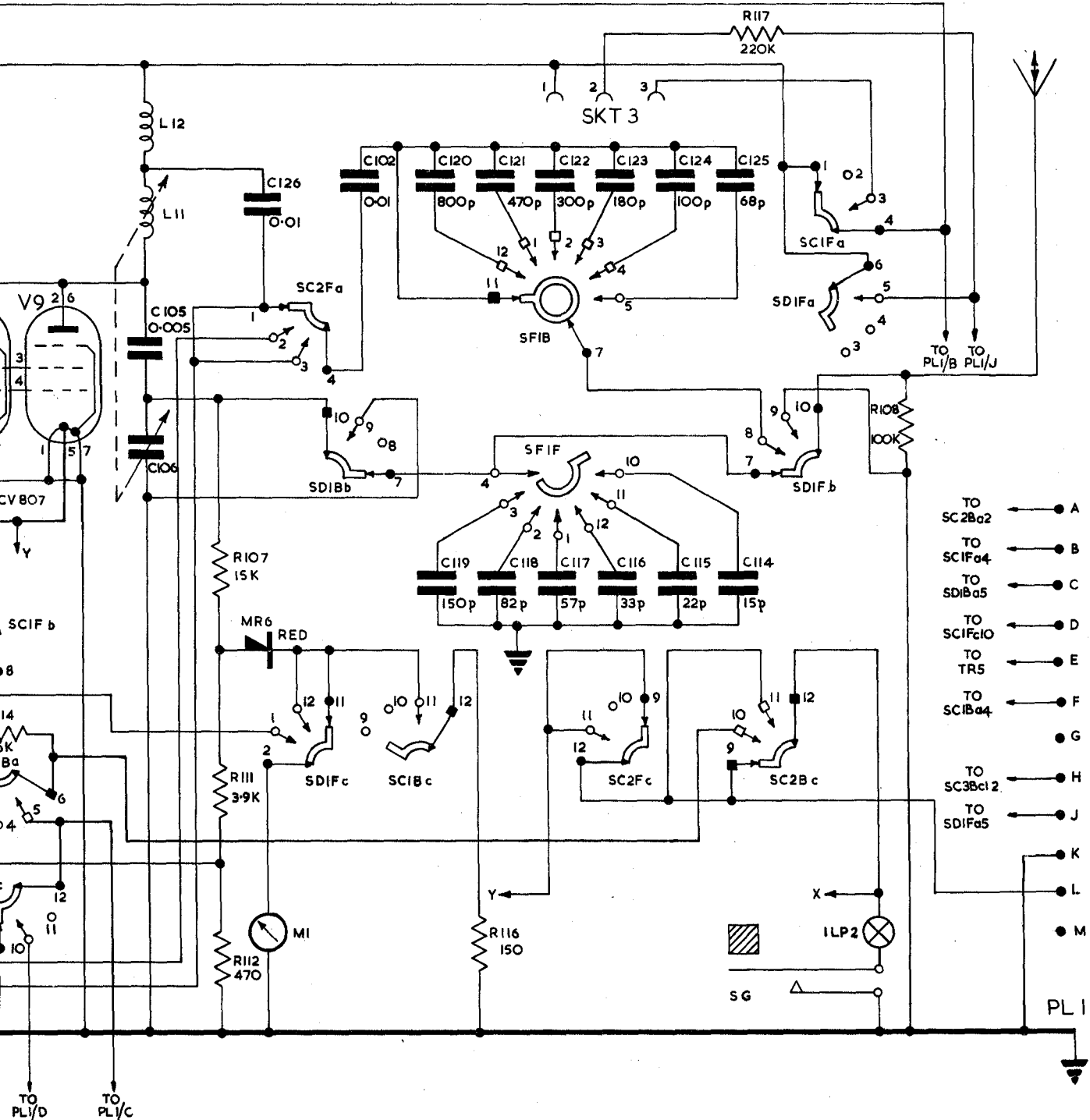
Fig 2502 - Plug connections



FRONT AND REAR OF SWITCH
 □ INSULATED CONTACT

F-562 P2
 T-2503

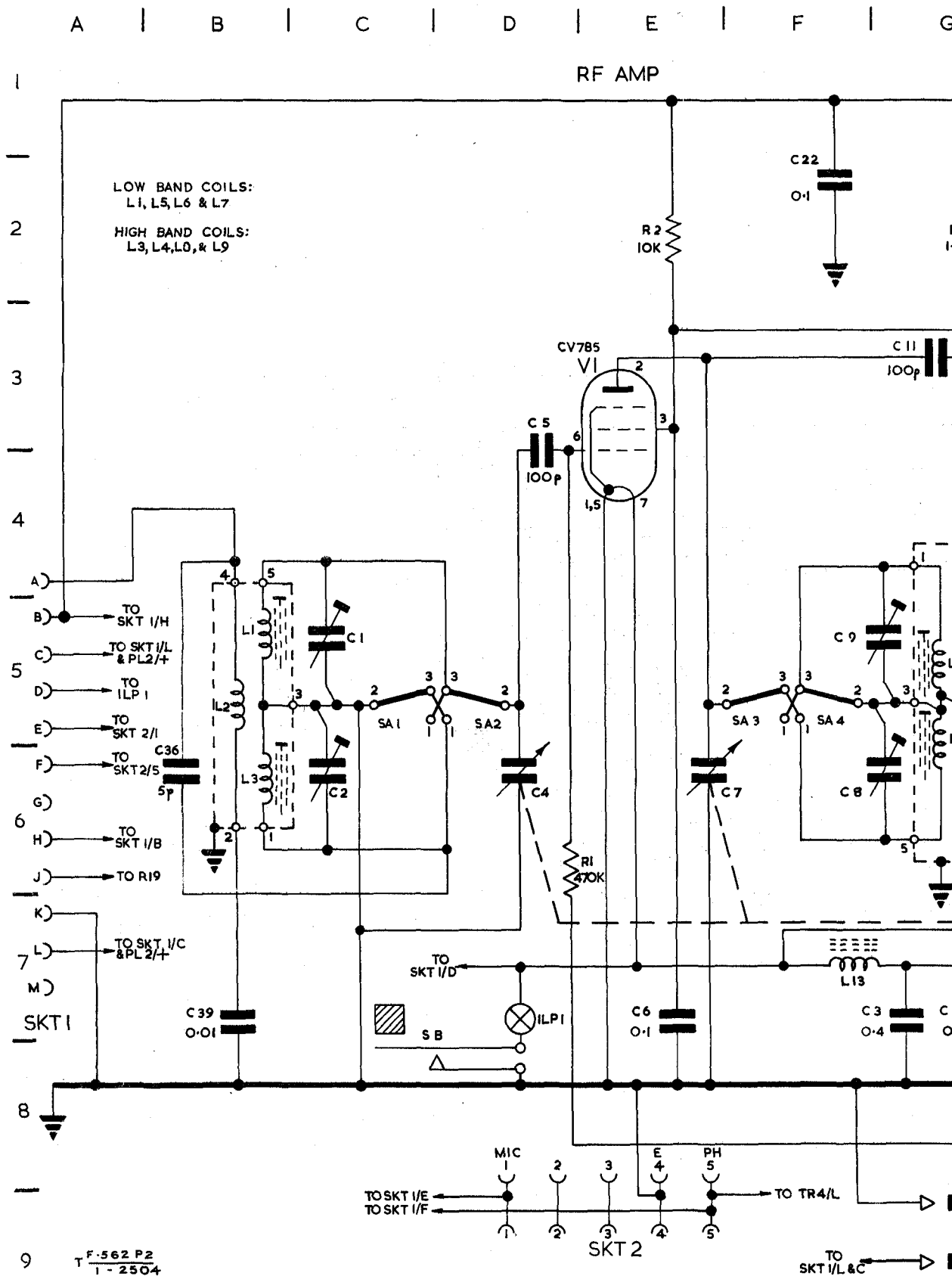
H | J | K | L | M | N | P



FRONT AND REAR OF SWITCH SECTIONS VIEWED FROM FRONT PANEL
RELATED CONTACTS SEE FIG 2505

- SC OFF-CW-R-VOICE SHOWN IN 'VOICE' POSITION
- SD A-B-NET SHOWN IN 'A' POSITION
- SE CRYSTAL 1234 SHOWN IN '1' POSITION
- SF AERIAL MATCHING SHOWN IN 'O' POSITION

ELECTRICAL AND MECHANICAL
ENGINEERING REGULATIONS



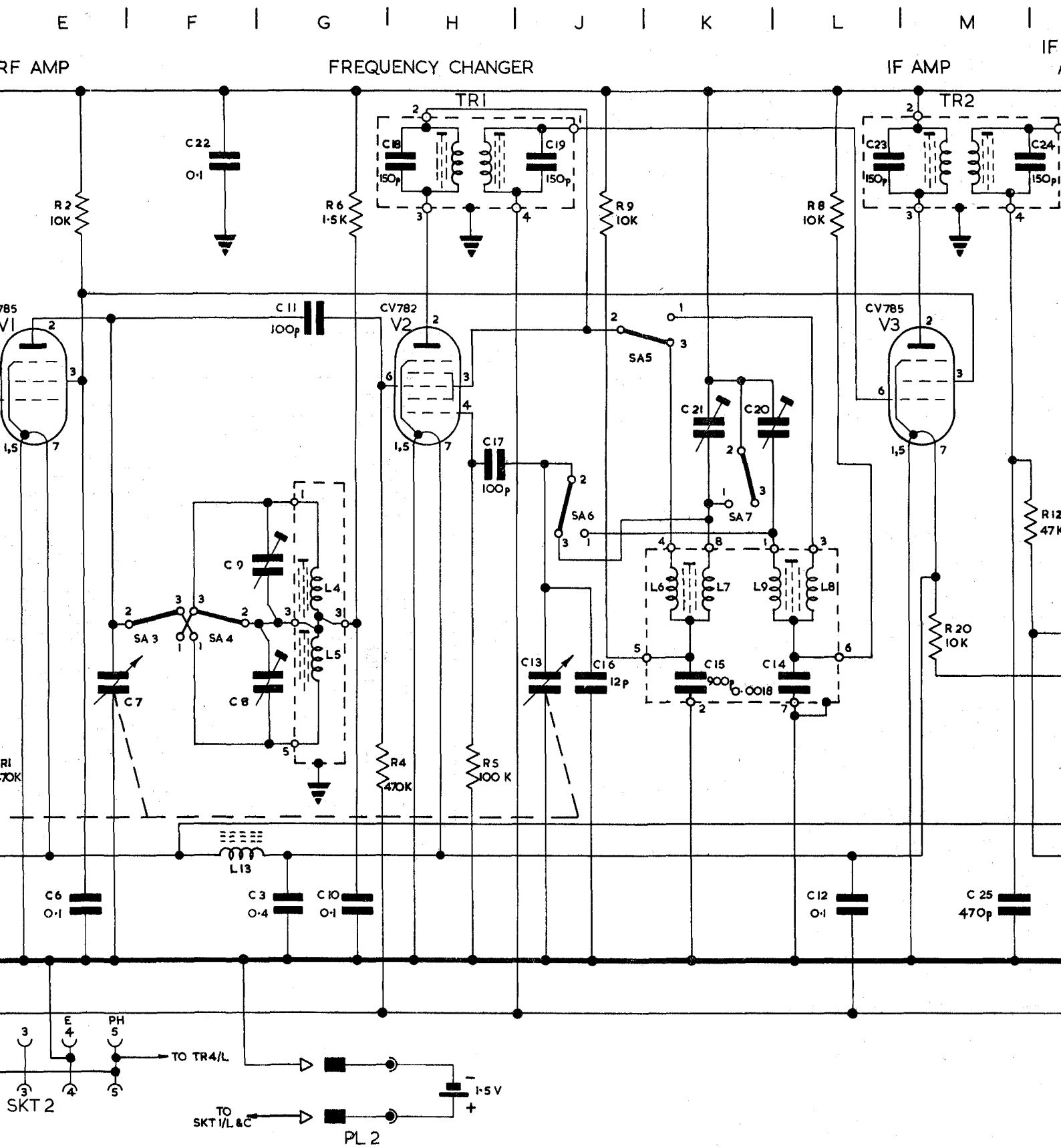
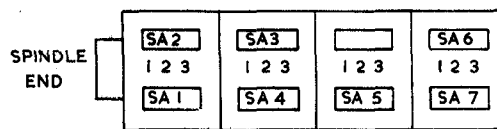
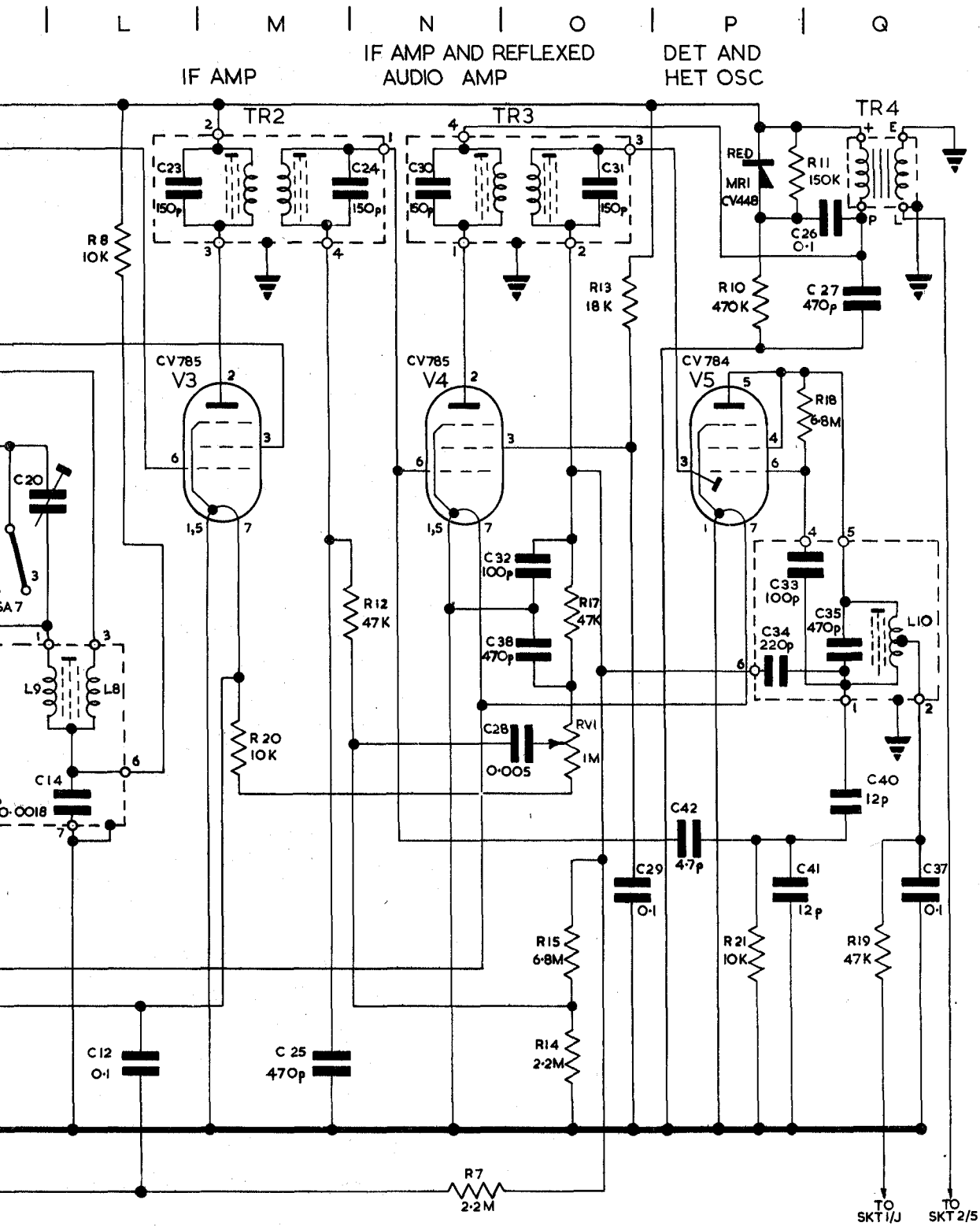
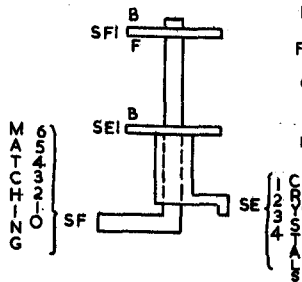
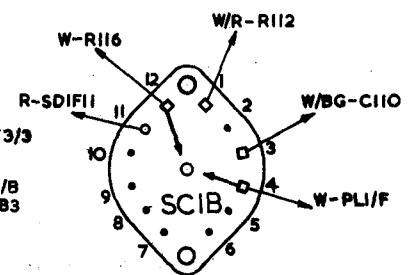
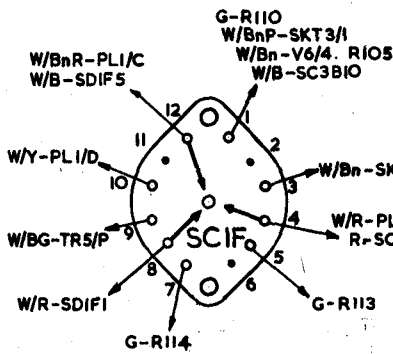
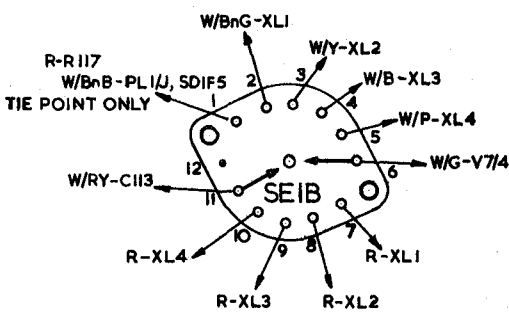
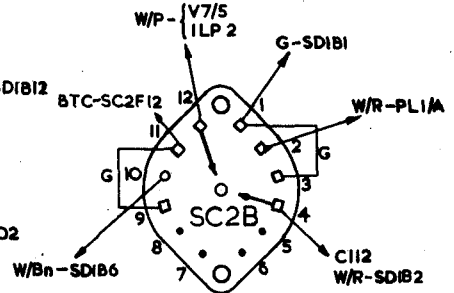
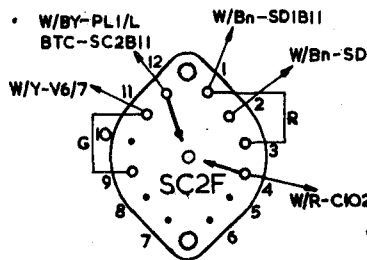
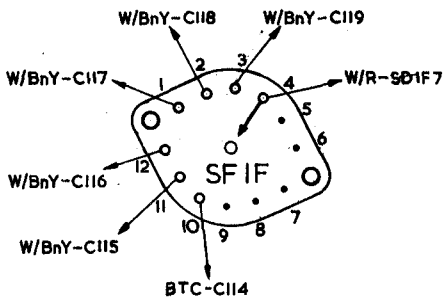
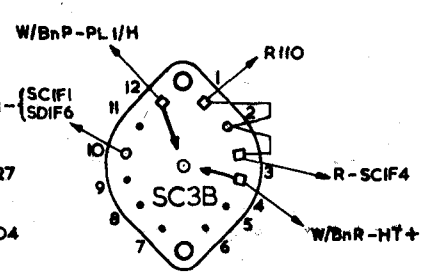
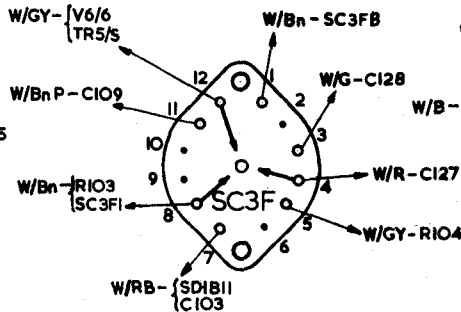
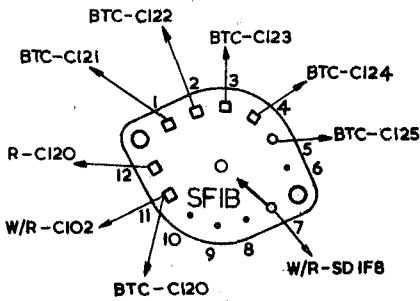
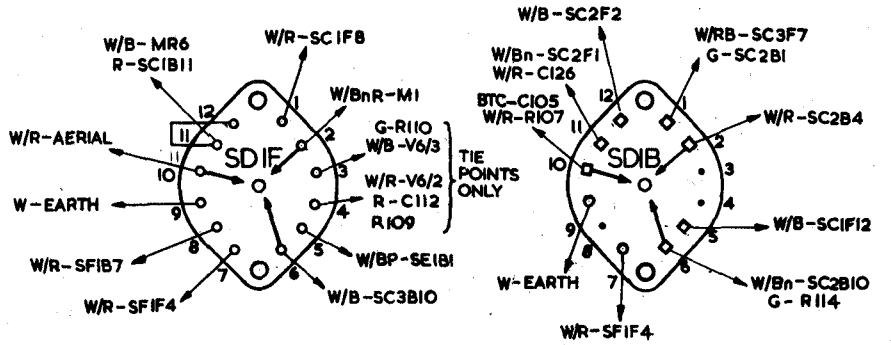


Fig 2504 - Receiver circuit diagram

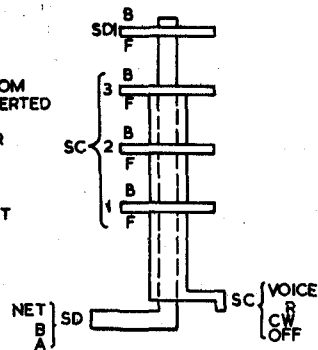


SA VIEWED FROM UNDERNEATH

BTC	BARE TINNED COPPER
W/	WHITE WITH TRACER
Bk	BLACK
Bn	BROWN
R	RED
Y	YELLOW
G	GREEN
B	BLUE
P	PURPLE

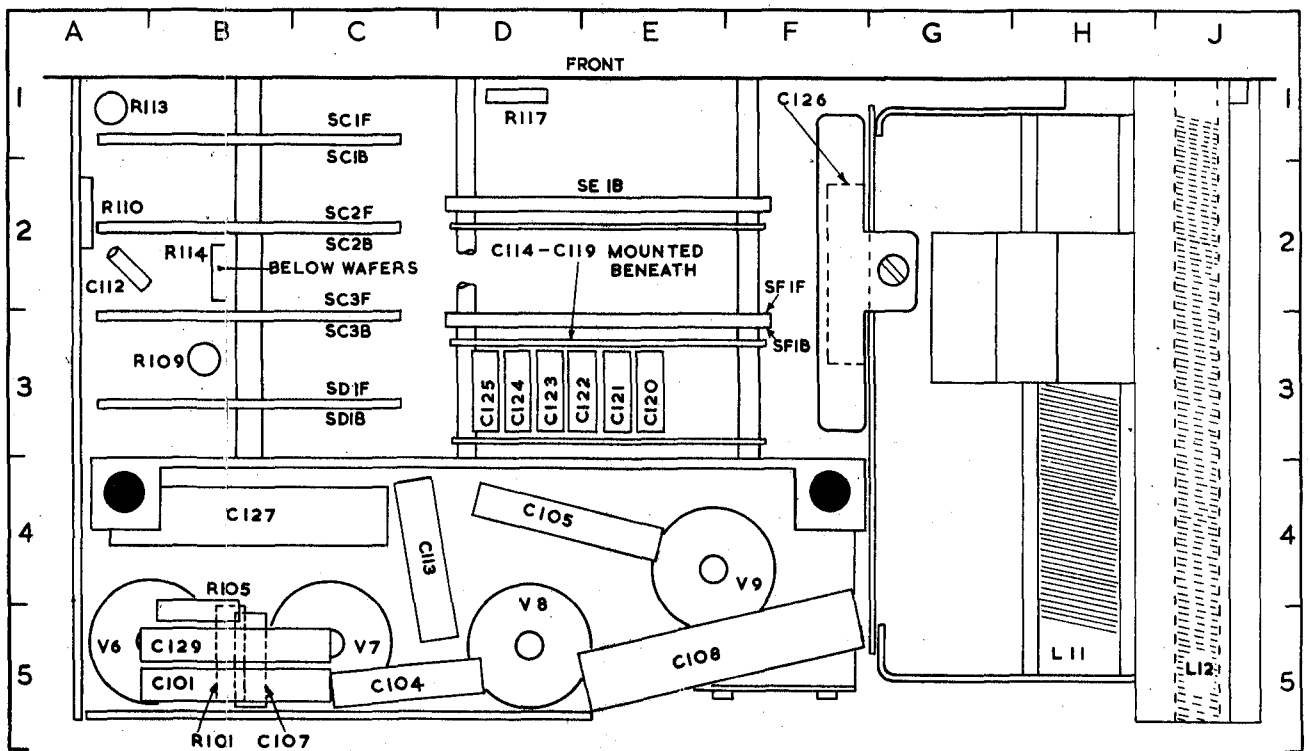


NOTE:
 ALL WAFERS VIEWED FROM FRONT PANEL WITH SET INVERTED
 ○ FRONT AND BACK WAFER CONTACTS COMMON
 □ BACK WAFER CONTACT INSULATED FROM FRONT CONTACT.



F-562 P2
 1-2503

Fig 2505 - Rotary switch colour coding



F-562 P2
T-2506

Fig 2506 - Transmitter chassis component layout - underside

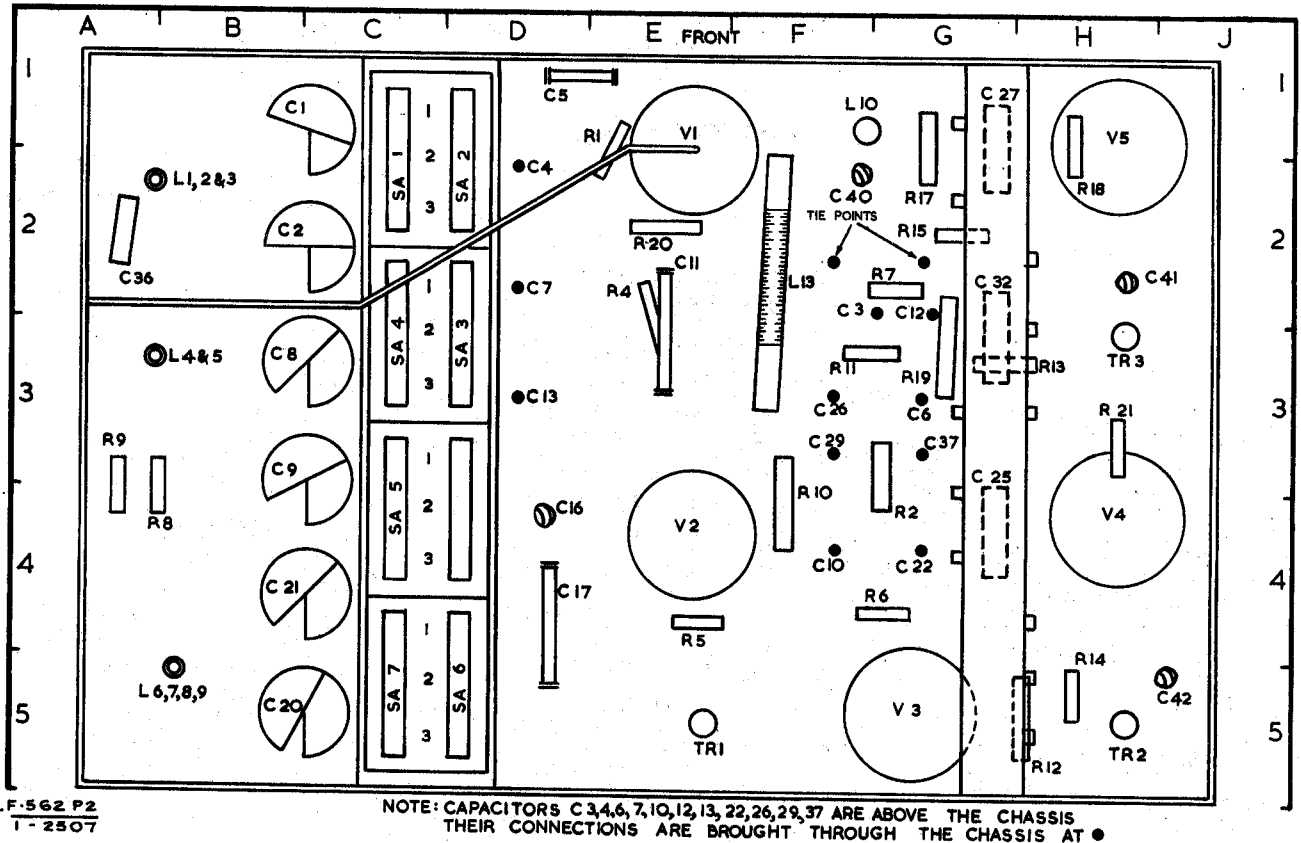
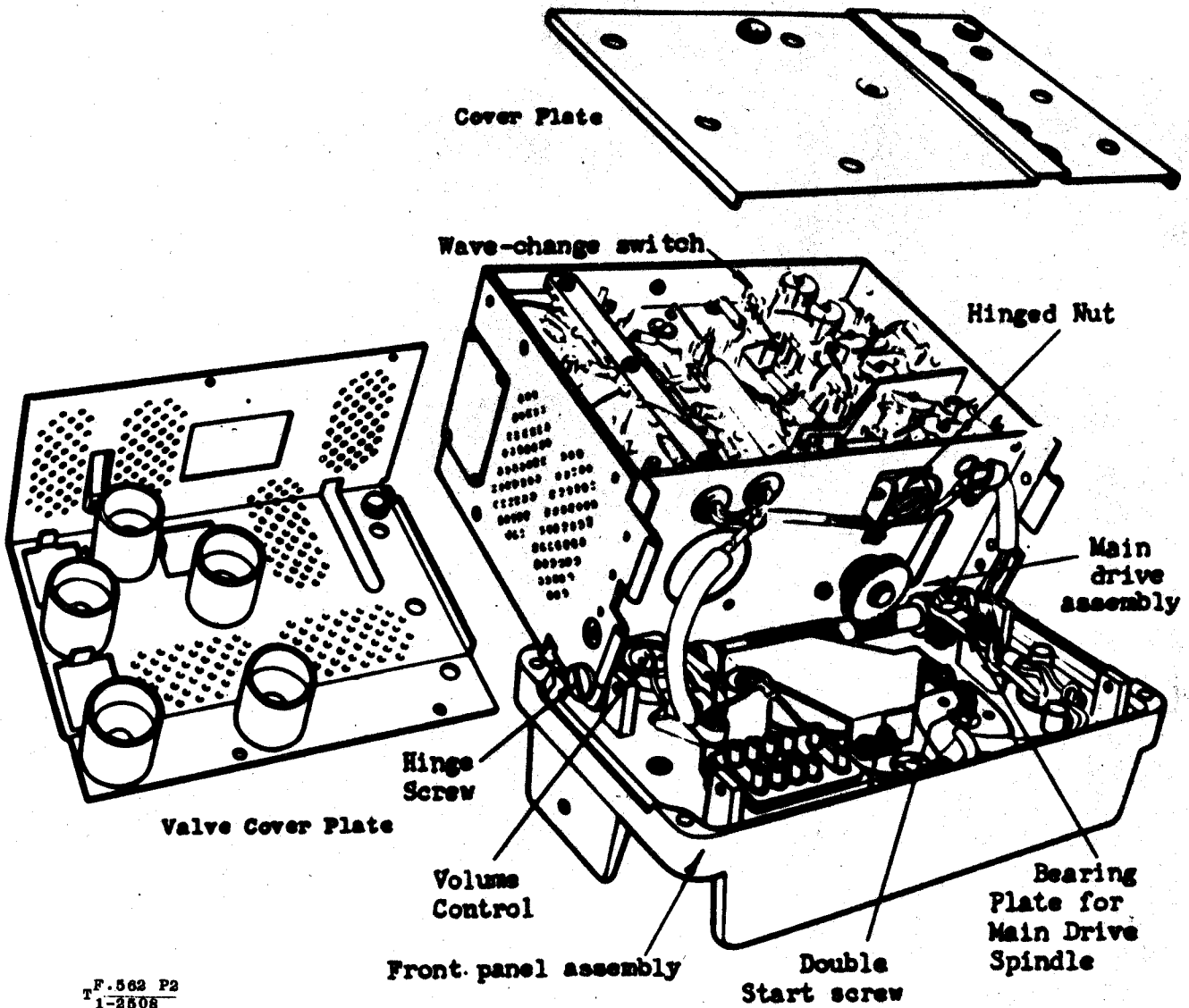


Fig 2507 - Receiver chassis component layout - underside



F. 562 P2
1-2508

Fig 2508 - Receiver chassis and cover plates

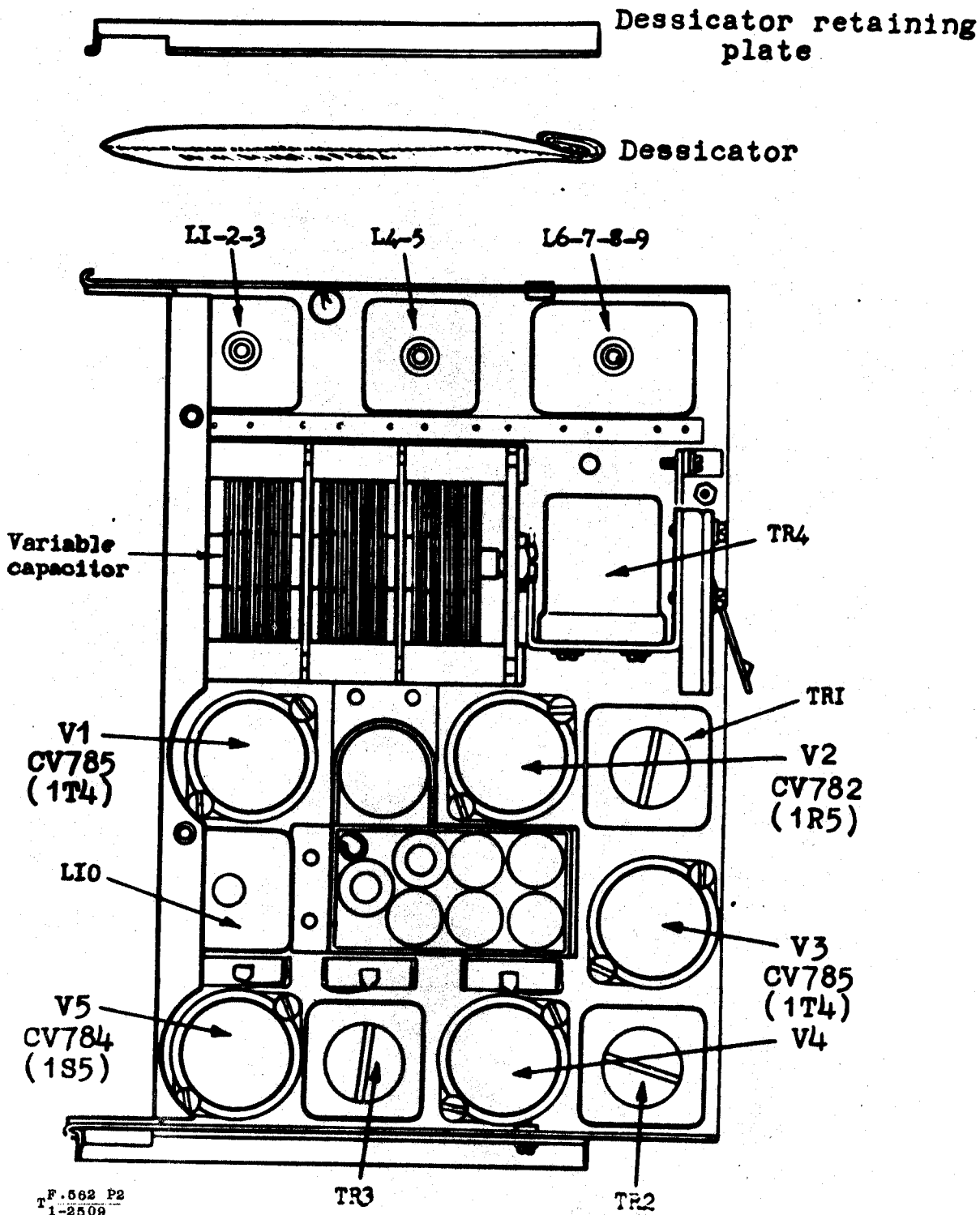


Fig 2509 - Receiver chassis layout

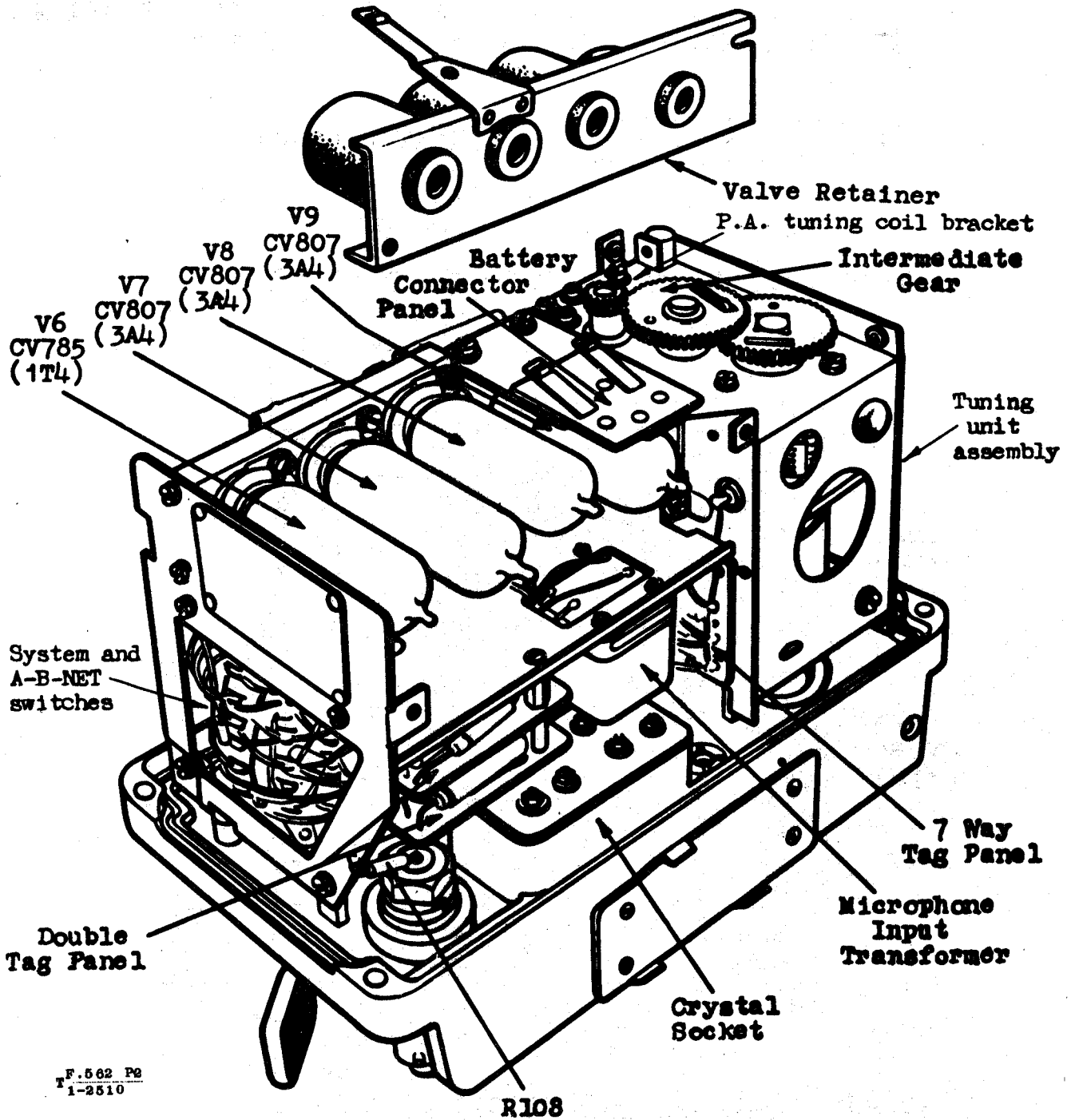


Fig 2510 - Transmitter chassis layout

EME8c/835

END