

MAINTENANCE

SECTION 5

- (4) Check that the outputs corresponding to +1dB and -1dB internal meter indications are 112mV and 89mV respectively.
- (5) With the SET OUTPUT control set fully clockwise, sweep through the entire frequency range of the instrument. If necessary, adjust the coupling of the appropriate oscillator coils so that the minimum output on each range is not greater than 130mV.
- (6) Tune the instrument to 180MHz CW i.e. set frequency controls to 180MHz, set the FUNCTION switch to CW, and adjust the SET OUTPUT control until the internal meter indication is 'SET'.
- (7) Check that the millivoltmeter indication is within the range 89mV to 112mV. If necessary, readjust the setting of RV14 to obtain this reading.

NOTE: In the following procedures the RF OUTPUT socket must remain correctly terminated. The instruction 'Tune' shall be interpreted as defined in para. 5.3 (c) (6).

(d) R.F. calibration

- (1) Tune the instrument to 100MHz CW and connect the output to a suitable frequency calibrator.
- (2) Adjust the core of L6A until the indicated output is 100MHz.
- (3) Tune the instrument to 230MHz CW and adjust C12 until the indicated output is 230MHz.
- (4) Repeat the operations detailed in para. 5.3 (d) (1) to (3) until optimum settings are obtained, then check the calibration at each main point in this frequency band.
- (5) Carry out the procedures detailed in para. 5.3 (d) (1) to (4) in the other frequency bands of the instrument as detailed in Table 5.2.

BAND	TUNED FREQUENCY	ADJUST
A	100MHz 230MHz	L6 C12
B	50MHz 100MHz	L1 C2
C	25MHz 50MHz	L2 C6
D	13MHz 25MHz	L3 C7
E	7.5MHz 13MHz	L4 C8
F	4MHz 7.5MHz	L5 C9

Table 5.2 R.F. Calibration Adjustments

- (6) Carry out the R.F. output level check procedure detailed in para. 5.3 (c).
- (e) 5MHz oscillator accuracy
 - (1) Set the FUNCTION switch to XTAL CHECK and using a timer counter (e.g. Advance TC4A) terminated with a loop, examine the frequency at coil L7.
 - (2) If the frequency is not within the range 4.999MHz to 5.001MHz replace the crystal XL1.
- (f) Amplitude modulation
 - (1) Set the FUNCTION switch to 30% AM and connect a timer counter across C24.
 - (2) The output indicated on the counter should be 1000Hz \pm 80Hz. If necessary adjust the setting of C24 to obtain this frequency.
 - (3) Disconnect the counter and connect a modulation depth meter to the output.
 - (4) Tune the instrument to a suitable frequency and check that the modulation depth is
 - (5) between 20% and 50%. If necessary adjust the setting of RV20 to obtain this level.

5.1 ACCESS TO COMPONENTS

(a) Removal of Case (Fig. 2)

Access to the internal components is obtained by placing the instrument face downwards and by removing the four securing screws at the rear and removing the case rearwards.

Replacing the case is the reverse of the procedure detailed above.

(b) Removal of R.F. Screening Cans (Fig. 2)

To gain access to the components associated with the r.f. oscillatory circuits two screening cans must be removed. Extract the self-tapping screws and detach the appropriate plates.

NOTE: When the oscillator screens are removed a shift in frequency calibration of the order of 1% will occur. To ensure efficient screening, ALL screws must be used to refit the screening cans in place.

5.2. INTRODUCTION OF RECALIBRATION PROCEDURE

After a considerable period of service the instrument may require recalibration to meet the requirements of the specification detailed in Section 2. The recalibration procedure is detailed in para. 5.3.

5.3 RECALIBRATION PROCEDURE

(a) Preliminary procedure

Before proceeding with the recalibration procedure the instrument should be checked to ensure that it is suitable for operating from the a.c. supply available. The instrument should then be removed from its case (para 5.1(a)) and connected to the a.c. supply ready for operation. Switch the instrument on and check that the power ON indicator is illuminated.

(b) D.C. voltage checks

- (1) Set the FREQUENCY RANGE switch to position C, the FREQUENCY control for 35 MHz and the MAINS FM control to 200 kHz.
- (2) Adjust the setting of the SET OUTPUT control until the meter indicates 'SET'.
- (3) Using an Avometer model 8, or similar instrument, check that the voltages at the test points indicated on the circuit diagram, Fig. 3, for the various settings of the FUNCTION switch, are within $\pm 7\%$ of the readings detailed in Table 1.

Test Point	FUNCTION Switch Position				
	XTAL CHECK	FM/CW	150kHz	45MHz	30%AM
A	300V under all conditions				
B	230V under all conditions				
C	5.2V	5.2V	5.2V	5.4V	5.0V
D	4.5V	4.5V	12.5V	7.0V	13.0V
E	3.0V	3.0V	2.1V	2.7V	2.1V
F	125.0V	115.0V	117.0V	46.0V	130.0V
K	140V to 145V as set by SET OUTPUT control				
L	145V \pm 2V under all conditions				
M	115V \pm 2V under all conditions				

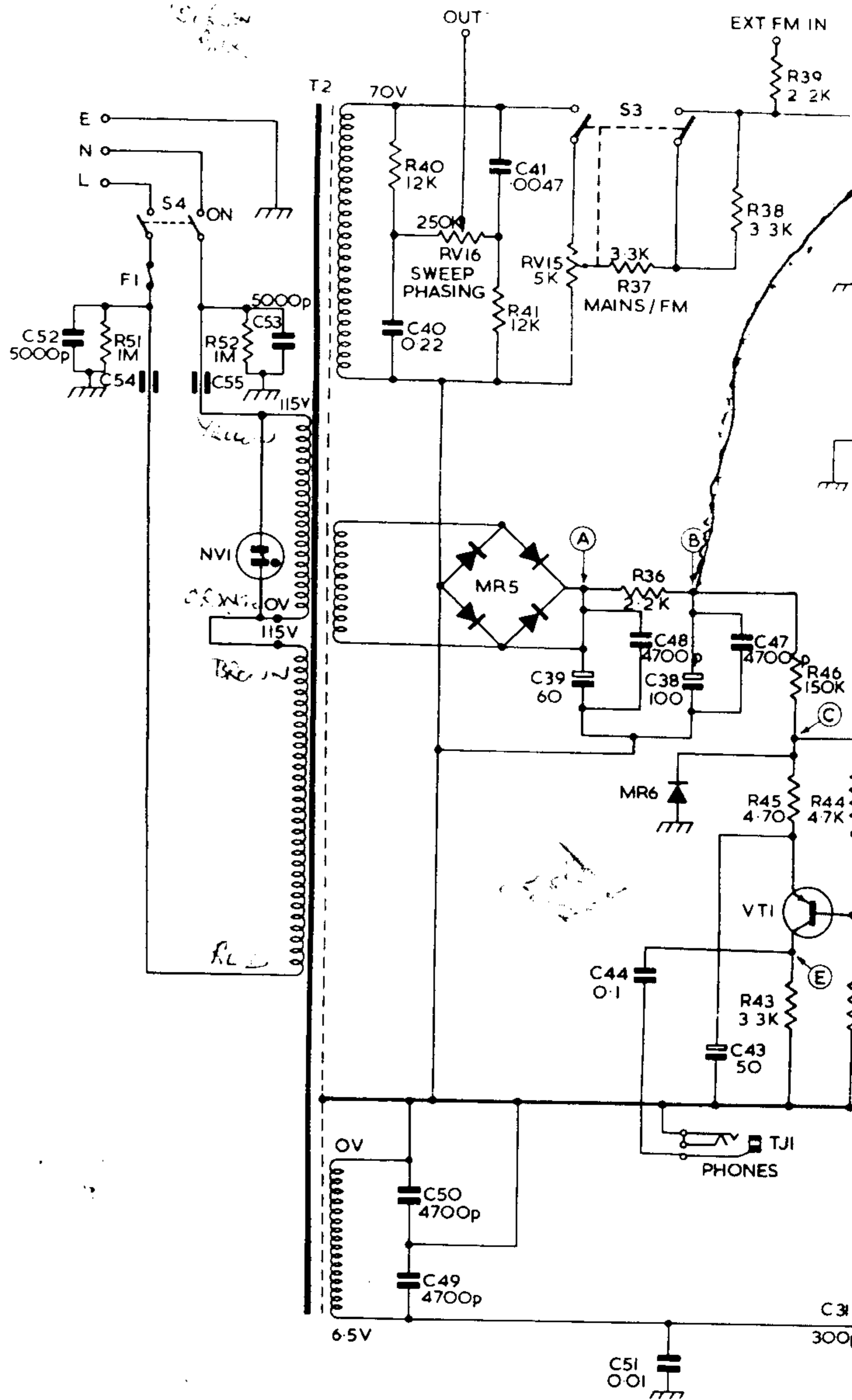
Table 5.1 D.C. Voltage Levels

(c) R.F. Output level

- (1) Set the FUNCTION switch to CW, the frequency controls to 40MHz and the attenuators to 0dB.
- (2) Connect the RF OUTPUT socket to an r.f. millivoltmeter (e.g. Advance Type VM79) via the appropriate termination unit. (TP2A for 75 Ω model.)
- (3) Adjust the SET OUTPUT control to obtain a reading of 100mV on the millivoltmeter. Adjust the preset potentiometer RV14 until the internal meter indication is 'SET'.

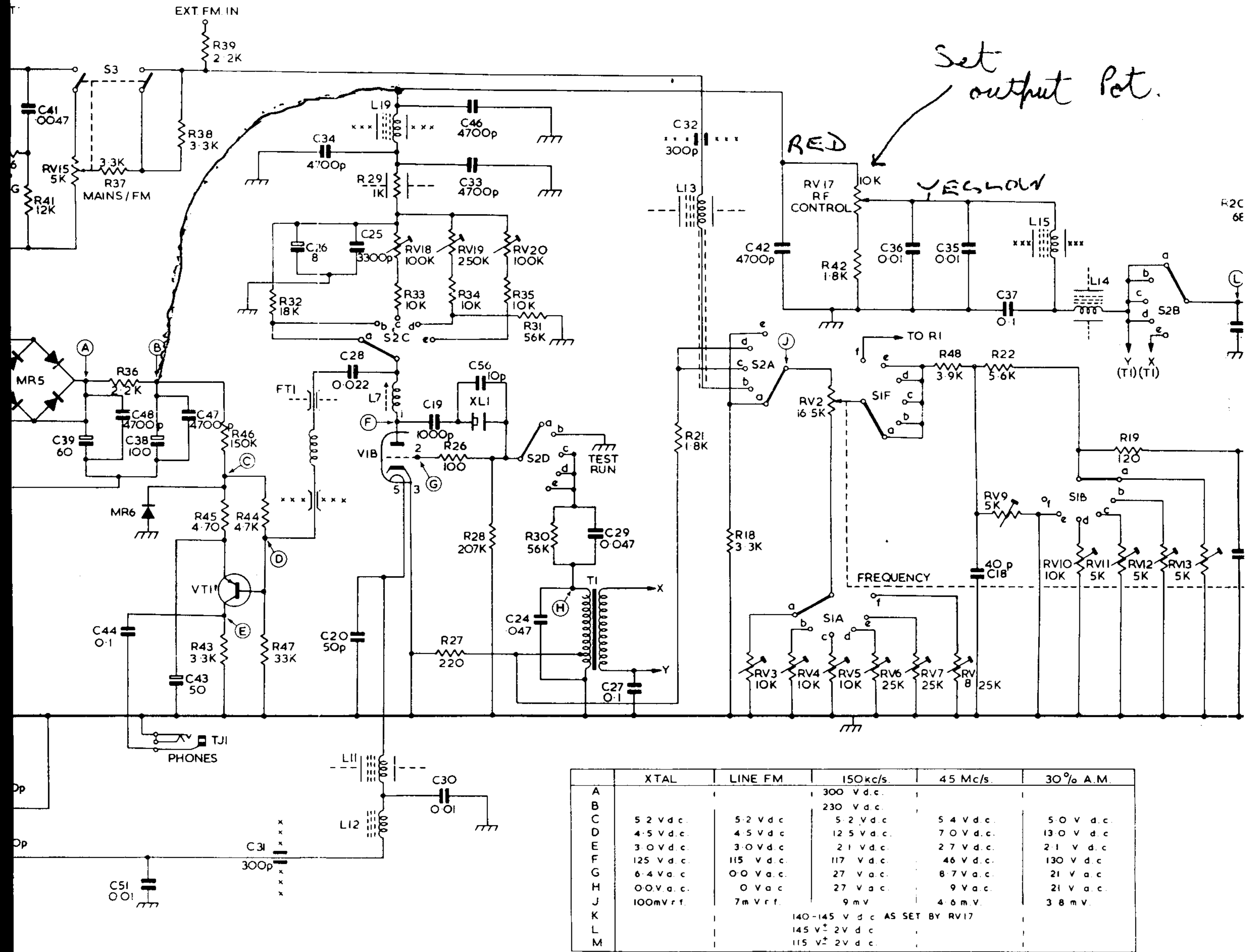
MISCELLANEOUS

Ref.	Description	Part No.
FS1	Fuse 1A	4732
FT1, FT2	Feed thro' Cambion	3412
L1	Osc. coil 4-7.5MHz	RF641
L2	" " 7.5-13MHz	RF633
L3	" " 13-25MHz	RF632
L4	" " 25-50MHz	RF631
L5	" " 50-100MHz	RF630
L6	" " 100-230MHz	10377
L7	Xtal Calibration coil	RF619
L8	1mH choke Cambion	
	3635/37	3404
L9 to L15, L19	Choke Ferroxcube	
	Mullard FX1898	C173
L16 to L18	Not used	
M1	Meter 25 μ A	A16509
MR1	Diode Mullard OA91	2490
MR2, MR3	BTH C646/H	5871
MR4	BTH CS2A	7110
MR5	Siemens B250/C125	12783
MR6	Zener Brush ZB6-2	4225
NV1	Neon Indicator	1165
S1	Frequency Range switch	A12349
S2	Function switch	A10606
S3	DPST switch (part of RV15)	
S4	Supply ON/OFF switch	539
S5		
T1	Modulation transformer	MT356
T2	Supply transformer	MT415
TJ1	Jack Igranic P72	10805
V1	Valve 6BQ7A	12339
VT1	Transistor Mullard OC71	340
XL1	Crystal Quartz 5MHz	12343



NOTES.

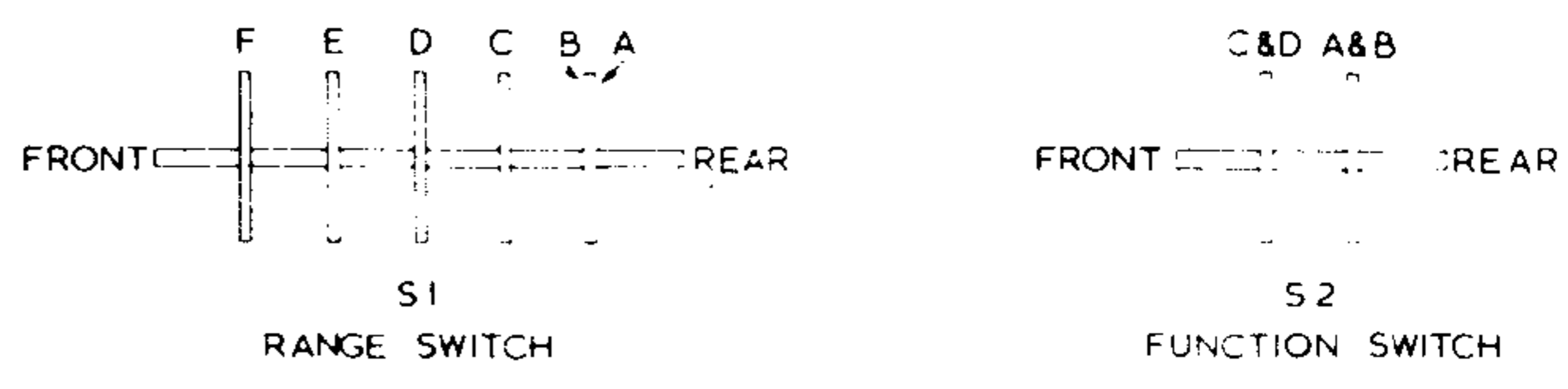
S2 (FUNCTION SWITCH) SHOWN IN CRYSTAL CHECK POSITION
 S1 (FREQUENCY RANGE SWITCH) SHOWN IN RANGE 'A' POSITION
 --- DENOTES INNER SCREEN
 * * * * * DENOTES OUTER SCREEN
 RESISTOR VALUES IN OHMS
 CAPACITOR VALUES IN μ F



	XTAL	LINE FM	150kc/s	45 Mc/s	30% A.M.
A			300 V d.c.		
B			230 V d.c.		
C	5.2 V d.c.	5.2 V d.c.	5.2 V d.c.	5.4 V d.c.	5.0 V d.c.
D	4.5 V d.c.	4.5 V d.c.	12.5 V d.c.	7.0 V d.c.	13.0 V d.c.
E	3.0 V d.c.	3.0 V d.c.	2.1 V d.c.	2.7 V d.c.	2.1 V d.c.
F	125 V d.c.	115 V d.c.	117 V d.c.	46 V d.c.	130 V d.c.
G	6.4 V a.c.	0.0 V a.c.	27 V a.c.	8.7 V a.c.	21 V a.c.
H	0.0 V a.c.	0 V a.c.	27 V a.c.	9 V a.c.	21 V a.c.
J	100mV r.f.	7mV r.f.	9mV	4.6mV	3.8mV
K			140-145 V d.c.	AS SET BY RV17	
L			145 V ± 2V d.c.		
M			115 V ± 2V d.c.		

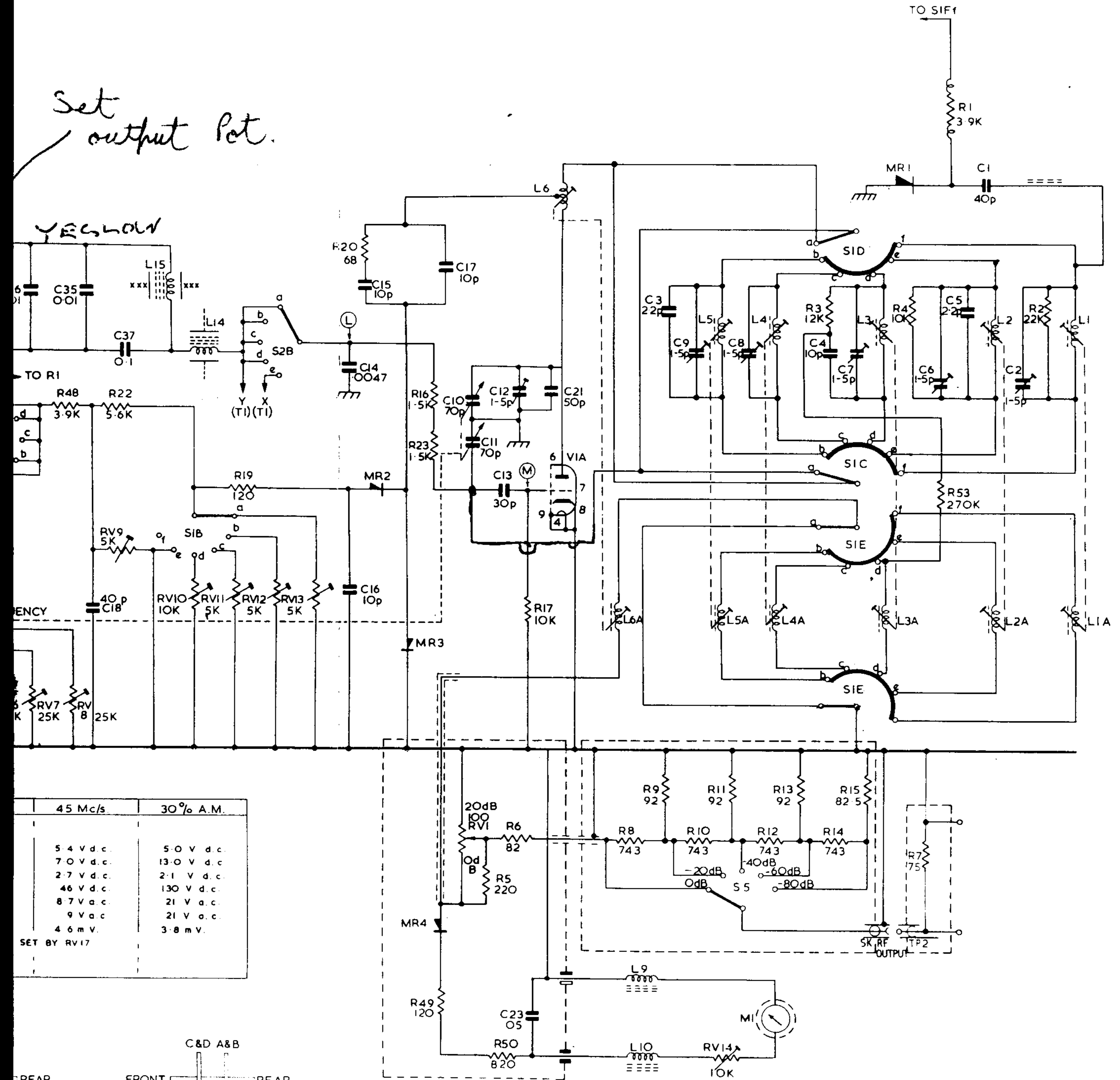
SWITCH) SHOWN IN POSITION
 RANGE SWITCH) SHOWN IN
 ON
 INNER SCREEN
 OUTER SCREEN
 IN OHMS
 IN UF

VOLTAGES SHOWN ARE WITH 'S2' WIPER
 IN POSITION 'b', WHICH IS THE LINE FM/CW POSITION.
 VOLTAGE FIGURES TAKEN ON
 'C' BAND POINTER AT 35 Mc/s
 'LINE FM' SET TO 200 kc/s
 O/P METER AT 'SET' LEVEL
 D.C. VOLTAGES READ ON AVO 8
 A.C. VOLTAGES READ ON VM 77
 R.F. VOLTAGES READ ON VM 79 WITH 75Ω LOAD



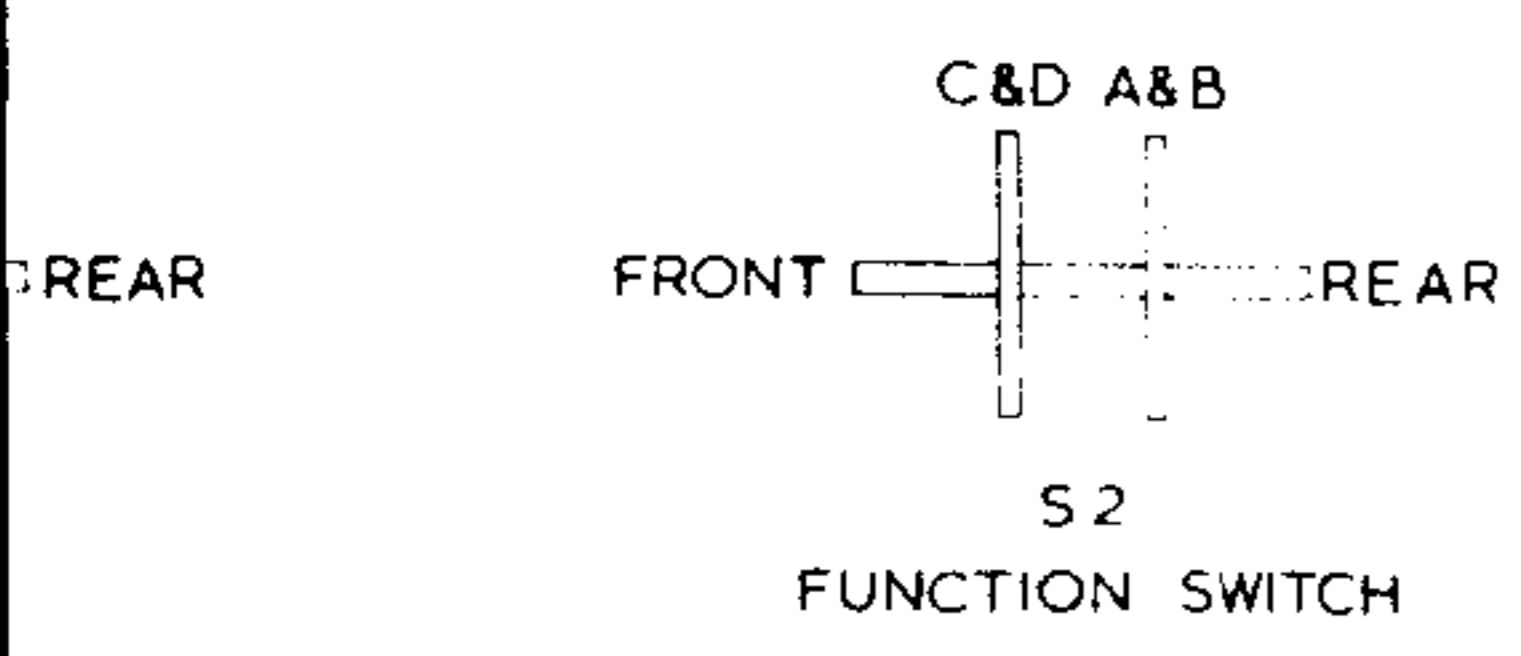
Set output pot.

YELLOW



45 Mc/s	30% A.M.
5.4 V d.c.	5.0 V d.c.
7.0 V d.c.	13.0 V d.c.
2.7 V d.c.	2.1 V d.c.
46 V d.c.	130 V d.c.
8.7 V a.c.	21 V a.c.
9 V a.c.	21 V a.c.
4.6 mV.	3.8 mV.

SET BY RV17



COMPONENTS LIST AND CIRCUIT DIAGRAM

SECTION 6

Ref.	Description	Part No.	Ref.	Description	Part No.	
RESISTORS (RC7K 10% unless specified)			CAPACITORS (Wima M 400V unless specified)			
R1	3.9K	3426	RV14	10K Preset	3447	
R2	22K	3433	RV15	5K Lin Plessey CR161002/S.	10766	
R3	12K	3429	RV16	250K Lin Plessey 003/SER QC.	11078	
R4	10K	1069	RV17	10K Colvern CLR4239/11	1213	
R5	220	3418	RV18	100K Preset	3445	
R6	82	3414	RV19	250K Preset	3443	
R7	75	3439	RV20	100K Preset	3445	
R8	743	1% Welwyn C20	6249			
R9	92	1% Welwyn C20	6250			
R10	743	1% Welwyn C20	6249			
R11	92	1% Welwyn C20	6250			
R12	743	1% Welwyn C20	6249			
R13	92	1% Welwyn C20	6250			
R14	743	1% Welwyn C20	6249			
R15	82.5	1% Welwyn C20	6251			
R16	1.5K	10% 108	591			
R17	10K		1069			
R18	3.3K		3425			
R19	120		3417			
R20	68		3415			
R21	1.8K		3420			
R22	5.6K		3428			
R23	1.5K	10% Erie 108	591			
R24,R25	Not used					
R26	100		3416			
R27	220		1272			
R28	207K		3437			
R29	1K		3424			
R30,R31	56K		3435			
R32	18K		3432			
R33,R34,						
R35	10K		1069			
R36	2.2K	5% LG75 RWV4-J	599			
R37,R38	3.3K	10% RC7H	7704			
R39	2.2K	10% RC7H	6781			
R40,R41	12K		3429			
R42	1.8K	5% LG75 RWV4-J	3394			
R43	3.3K		3425			
R44	4.7K		3427			
R45	470		3419			
R46	150K		3436			
R47	33K		3434			
R48	3.9K		3426			
R49	120	5% RRC 5SWD18	735			
R50	820	5% RRC 5SWD18	1637			
R51,R52	1M	10% Erie 16	1171			
R53	270K		3437			
POTENTIOMETERS (Welwyn P345, unless specified)			C1	40p Ceramicon	3395	
RV1	100	Plessey Type 'E'	10374	C2	1-5p Trimmer Erie 3116A	8770
RV2	16.5K	Cont. pot. mod.	A15680	C3	2.2p Lemco S/M 1106R	815
RV3	} 10K	Preset	3447	C4	10p 5% Lemco S/M 1106R INSUL.	4504
RV4				C5	2.2p Lemco S/M 1106R	815
RV5				C6 to C9	1-5p Trimmer Erie 3116A	8770
RV6	} 25K	Preset	3446	C10,C11	70 x 70p Tuning Capacitor	8807
RV7				C12	1-5p Trimmer Erie 3116A	8770
RV8				C13	30p Ceramic Erie	3448
RV9	5K	Preset	3444	C14	.0047μ 400V. Wima 'F'	3778
RV10	10K	Preset	3447	C15-C17	10p 5% Lemco S/M 1106R INSUL.	4504
RV11	} 5K	Preset	3444	C18	40p Erie 'Y'	3395
RV12				C19	1000p Wima 'F'	3397
RV13				C20,C21	50p Ceramic Erie 'A'	3699
				C22	Not used	
				C23	.05μ Plessey cascap	2793
				C24	.047μ 125V. Wima 'M'	3779
				C25	3300p Wima 'F'	3396
				C26	8μ Electrolytic Hunts JE553/T	10760
				C27	0.1μ	2385
				C28	0.022μ	4243
				C29	0.047μ	3398
				C30	0.01μ	3399
				C31,C32	300p TCC LT3	7099
				C33,C34	4700p Erie K350081	4212
				C35,C36	0.01μ	3399
				C37	0.1μ	2385
				C38	100μ (60-100μ 350V. Elect. Plessey)	2072
				C39	60μ	
				C40,C41	0.22μ 125V Wima 'M'	2601
				C42	4700p Erie	4212
				C43	50μ 6V Wima elect.	1746
				C44	0.1μ	2385
				C45	Not used	
				C46-C50	4700p Erie K350081	4212
				C51	0.01μ	3399
				C52,C53	5000p Erie K3500/CD8	1514
				C54,C55	feed thro'ceramicon Erie CFT 3000	18146
				C56	10p 5% Lemco S/M 1106R insul	4504
				C57	0.047μ 150V Wima 'M'	3779

COMPONENTS LIST AND CIRCUIT DIAGRAM

SECTION 6

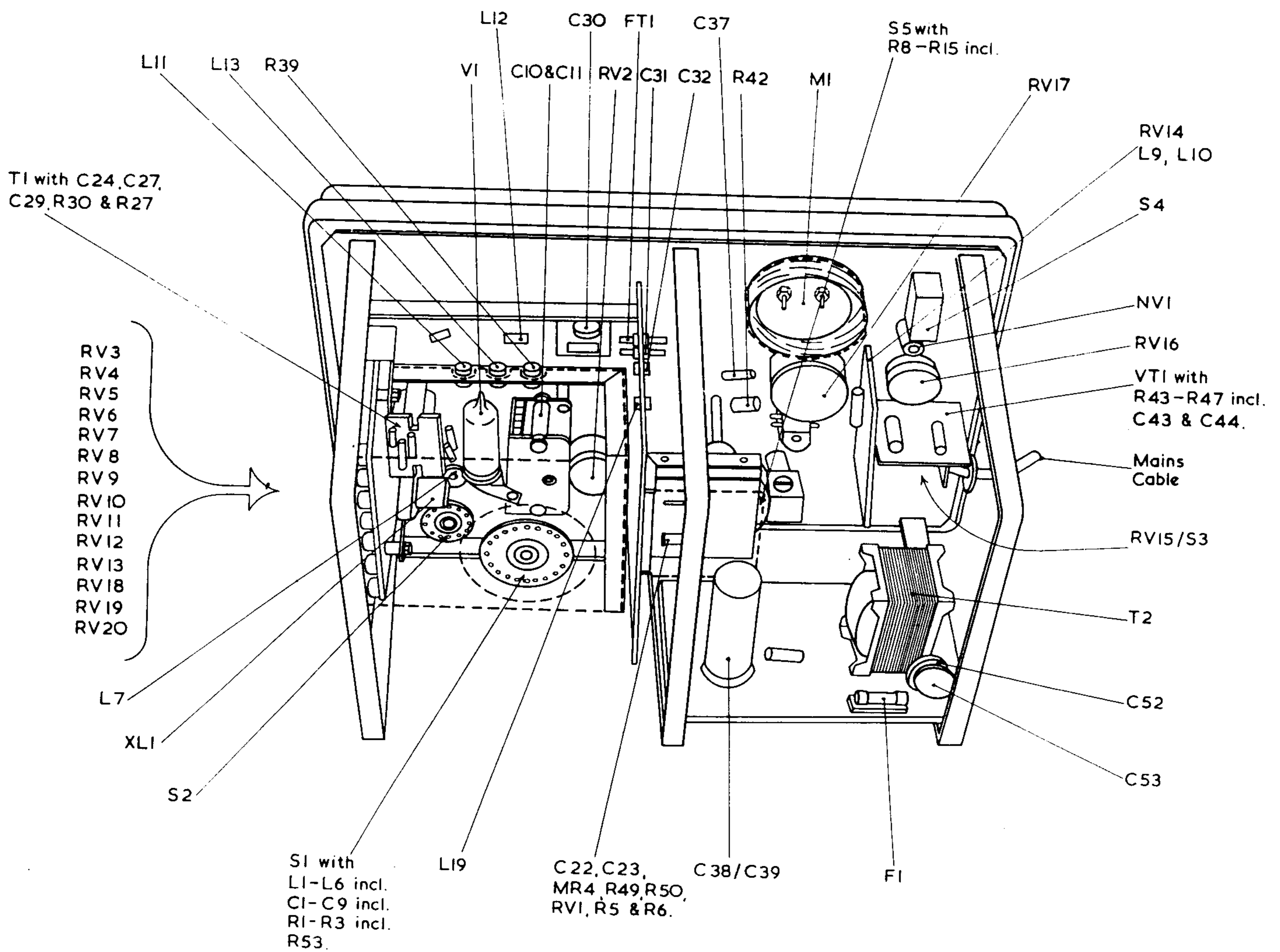


FIG 3. COMPONENT LOCATION DIAGRAM