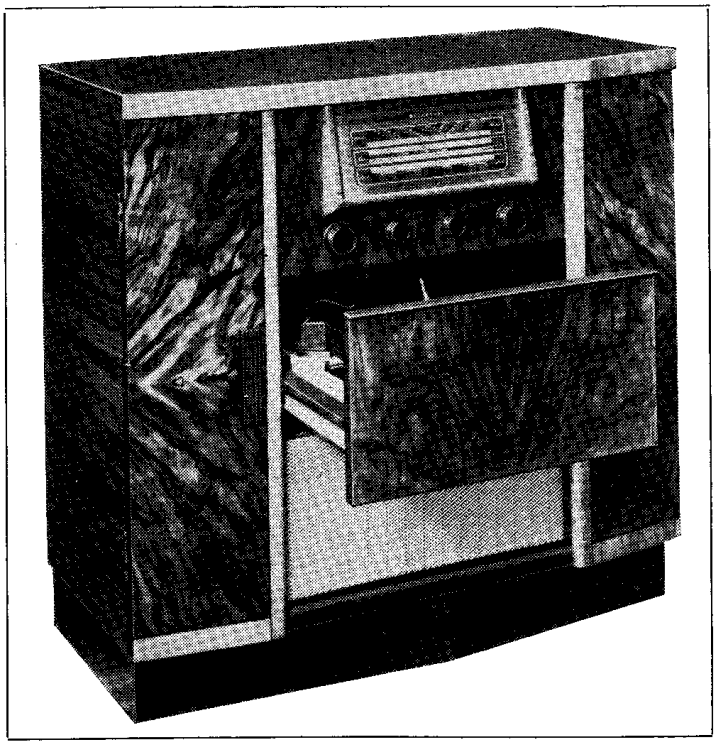
REGENTONE Service

BULLETIN NO. 106

Model ARG.69/3



Wavebands : Long Wave, 150-300 Kc/s ; 2000-1000 metres.
Medium Wave, 545-1665 Kc/s ; 550-180 metres.
Short Wave, 6-18 Mc/s ; 50-16.6 metres.

Power Supply : 110–120V., 200–250V. A.C., 40–100 c.p.s.

Power Consumption : 30 Watts apparent (Radio only).

Intermediate Frequency : 470 Kc/s.

Record Changer : Garrard R.C. 75. Record changer for 7″, 10″ and 12″ records—not mixed. Three speeds—33 r.p.m., 45 r.p.m. and 78 r.p.m. Turnover head crystal pick-up type G.P.29. For Service Instructions, see manufacturer's leaflet.

Output Power : 2.5 watts.

Pilot Lamp : (One) 6.5V. 0.3a.

Loudspeakers : Two 3Ω speech coils wired in series. Provision is made for the connection of an external speaker.

Fitted Terminals, etc. : Aerial and Earth sockets and Extension Loudspeaker sockets on back. A plate aerial is available by means of a pig-tail connection terminated in a plug, adjacent to the Aerial socket.
The Mains tapping adjustment is at the rear of the chassis. It is necessary to remove the back of the cabinet for this adjustment.

Mains Transformer Specification :
Primary, 0.115.210.240, 50 cycles.
H.T. Secondary, 260–0–260 65 m/A.
Heaters, 6.3V. 3a.
Rectifier Heater, 6.3V. 1a.

Circuit Description

The aerial signal is transformer coupled on Short Waves and "bottom end" coupled on Medium and Long Waves to the grid of the hexode section of the frequency changer valve V.1 (ECH 42). The triode section of this valve is operated as a grid tuned oscillator with grid leak bias, and operates at a frequency of 470 K/cs. higher than the signal frequency.

Wavebands and gramophone reproduction are selected by Oak-type switches. On each band aerial and oscillator trimmers are provided, and each aerial and oscillator coil is fitted with an iron dust core, which ensures accurate tracking and calibration.

When switched to gramophone, the pick-up output, via a simple correction filter, is switched via the volume control to the grid of the triode amplifier valve V3 (EBC 41).

With the waveband switch in the Long, Medium or Short Wave position, the 470 Kc/s signal from the mixer valve is fed via the 1st I.F.T. to the grid of the I.F. Amplifier Valve V2 (EF 41) in the anode circuit of which is the primary of the 2nd I.F.T. The secondary of the 2nd I.F.T. feeds the detector diode V3 (EBC 41), and the audio-frequency currents are developed across the volume control, R.F. filtering being provided by means of the usual R.C. network.

The second diode of V3 rectifies part of the anode signal of V2 and provides an A.V.C. voltage which is applied via the normal filters to the grids of V1 and V2. Delay voltage is arranged by returning the A.V.C. rectifier diode load to chassis, which is approximately 1.5 volts negative in respect of cathode.

Audio amplification takes place in the triode section of V3, and the resulting signals are fed to the grid of the output valve V4 (EL 41). This valve provides an output at the secondary of the O.P.T. of 3 watts with negligible distortion, and, besides feeding the two loudspeakers, is also fed via a resistance network into the grid circuit of V3, providing 11.0 dbs. of negative feedback.

H.T. supply is derived from a full wave rectifier valve V5 (EZ 40). A choke-capacity filter feeds the screen and anode of V4, and a further resistance-capacity filter provides an H.T. supply for V1, 2 and 3.

ALIGNMENT PROCEDURE

If alignment is necessary, the following sequence of operations should be followed carefully. A tuneable signal generator should be used and *its output must always be limited, so that the Receiver output is just audible.* The signal should be fed to the Receiver via a dummy aerial. For I.F. use a 0.1 mfd. Condenser, for S.W. a 400-ohms resistor and a 400 pF Condenser in series, and for M.W. and L.W. circuits a standard dummy aerial. This may consist of a 200 pF condenser, 25 ohms resistor, and a 25 micro-henrys inductance in series.

INTERMEDIATE FREQUENCY. Switch receiver to M.W., turn volume control fully clockwise and gang fully open. Apply signal generator output via a 0.1 mfd. condenser to fixed vanes of R.F. section of gang condenser V.C.1 and chassis, and inject a signal of 470 Kc/s. Adjust the dust cores of the I.F. transformers L6, 7, 12, 13, using a non-inductive screwdriver, for *maximum* output, as shown by an output meter. Each core will peak in two positions. The correct positions are those at which both cores are furthest from the base pins.

INTERMEDIATE FREQUENCY TRAP, L.7. Apply signal generator output via dummy aerial to aerial and earth sockets of receiver. The gang must be fully open, with receiver switched to M.W. Inject a signal of 470 Kc/s and adjust the core of the I.F. Trap L1 for *minimum* output.

RADIO FREQUENCY :

Notes.

1. Signal Generator to be connected via dummy aerial to aerial and earth sockets of Receiver.
2. Switch Receiver to required band and adjust signal generator to desired frequency.
3. Load the output transformer secondary with 6.0 ohms.
4. Set Volume Control to maximum.
5. With gang fully closed, set pointer to 100 degree position on scale.

Long Wave :

1. Set pointer on 1,900 metres calibration mark. Inject 157.9 Kc/s and adjust oscillator L8, then aerial L3, *cores* for *maximum* output.
2. Set pointer to 1,000 metres. Inject 300 Kc/s and adjust oscillator T.C.4, then aerial T.C.1 *trimmers* for *maximum* output.
3. Repeat (1).
4. Repeat (2).
5. Repeat (1).
6. Check calibration on stations.

Medium Wave :

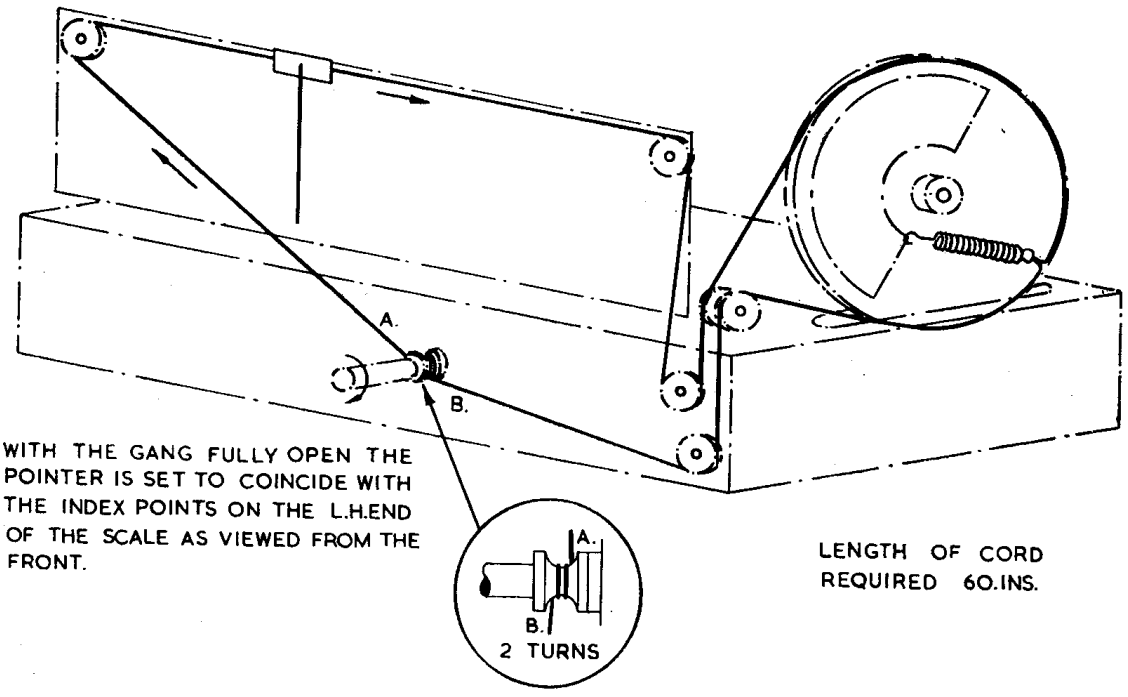
1. Set pointer to 525 metres calibration point. Inject 571·4 Kc/s and adjust oscillator L9, then aerial L4 *cores* for *maximum* output.
2. Set pointer to 200 metres. Inject 1,500 Kc/s and adjust oscillator T.C.5, then aerial T.C.2 *trimmers* for *maximum* output.
3. Repeat (1).
4. Repeat (2).
5. Repeat (1).
6. Check calibration on stations.

Short Wave :

1. Set pointer to 7.5 Mc/s calibration mark. Inject this frequency and adjust oscillator L10, 11, then aerial L2, 3 *cores* for *maximum* output.
2. Set pointer to 15.0 Mc/s calibration mark. Inject this frequency and adjust oscillator T.C.6, then aerial T.C.3 *trimmers* for *maximum* output.
3. Repeat (1).
4. Repeat (2).
5. Repeat (1).
6. Check sensitivity and calibration.

Note.—In order to counteract the slight tendency to " pulling " the gang should be " rocked " when adjusting the aerial trimmer T.C.3 at 15.0 Mc/s.

Final. Re-seal all trimmers with suitable compound.



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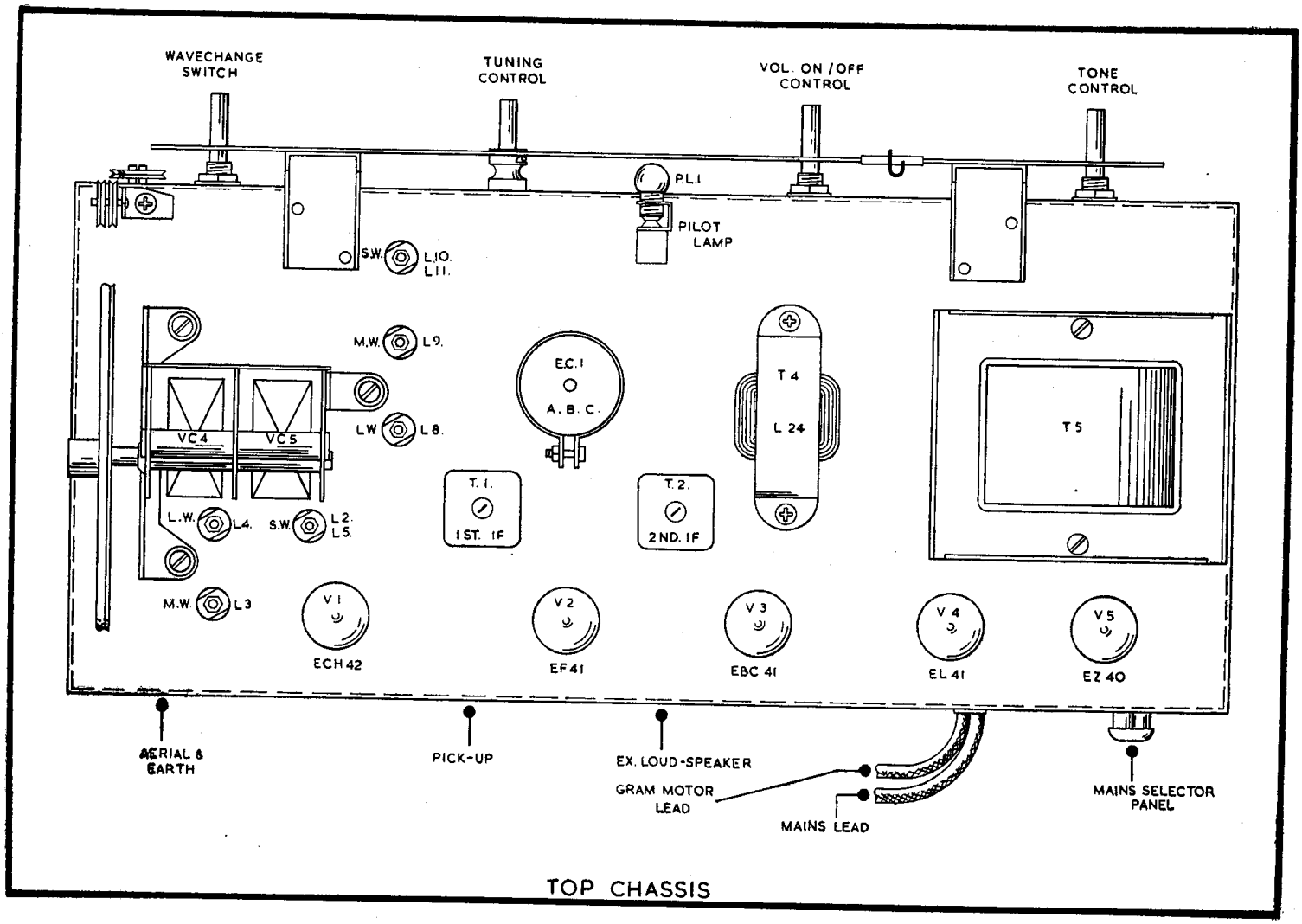
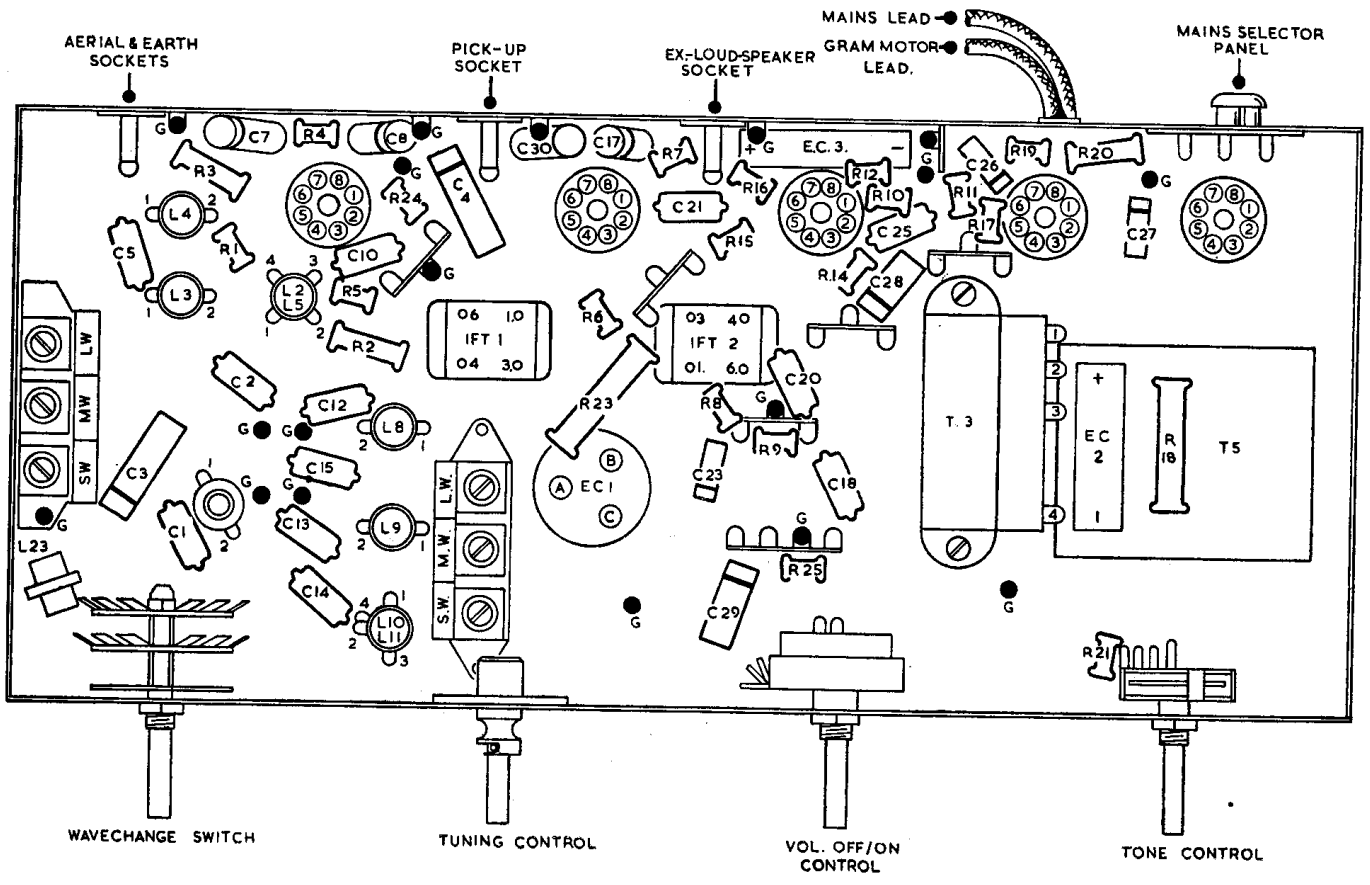
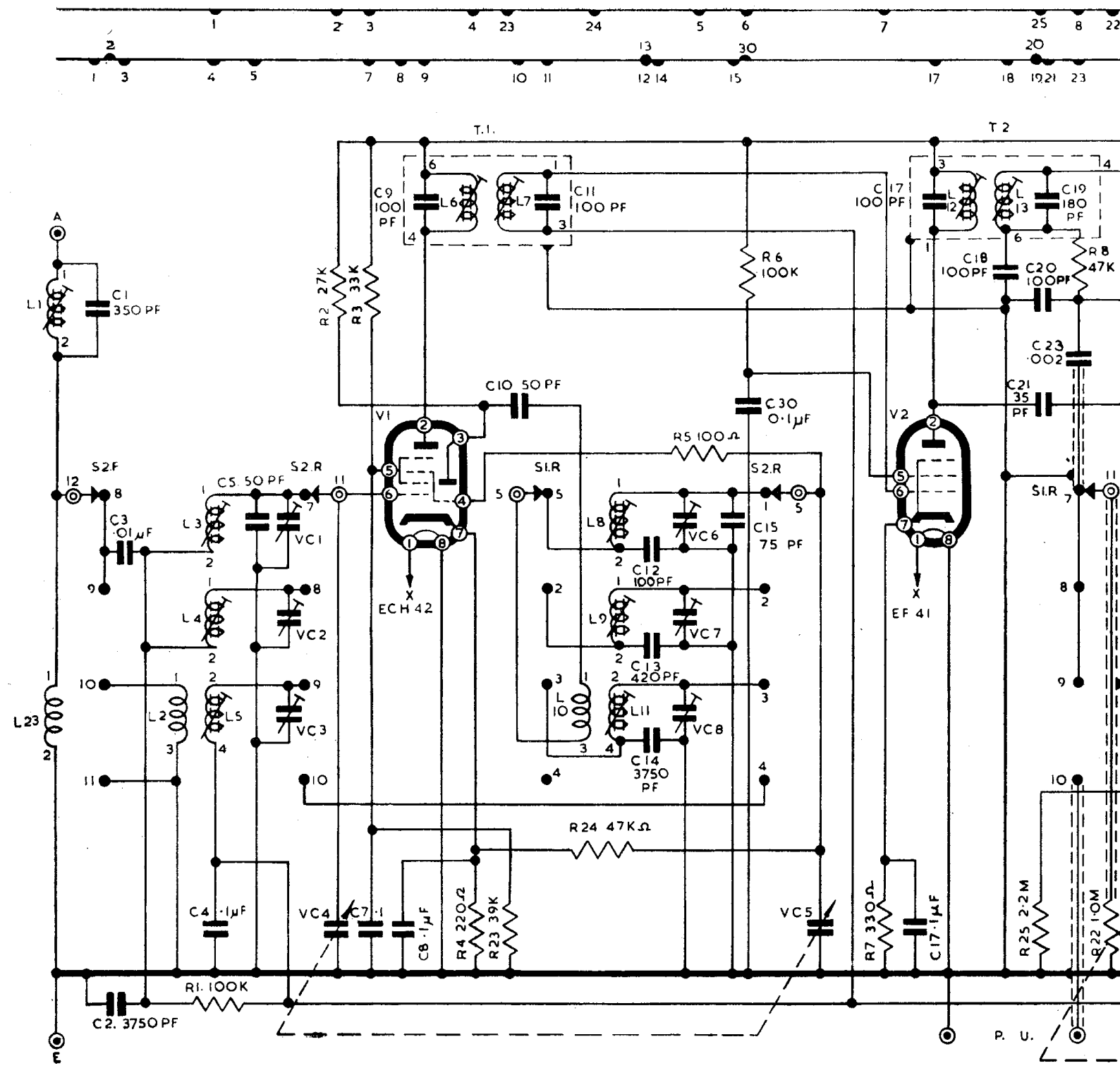
CORD DRIVE LAYOUT

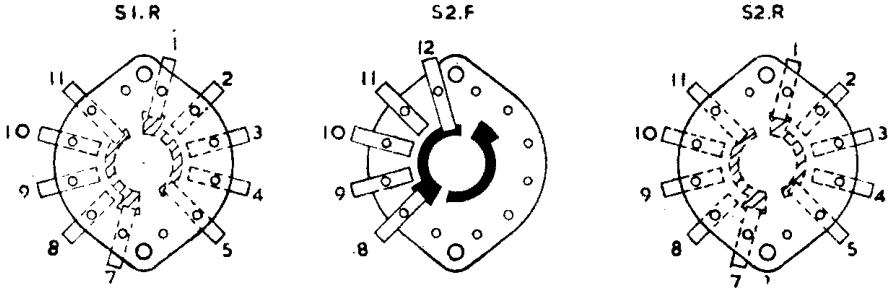


TOP CHASSIS

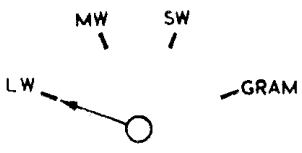


UNDER CHASSIS



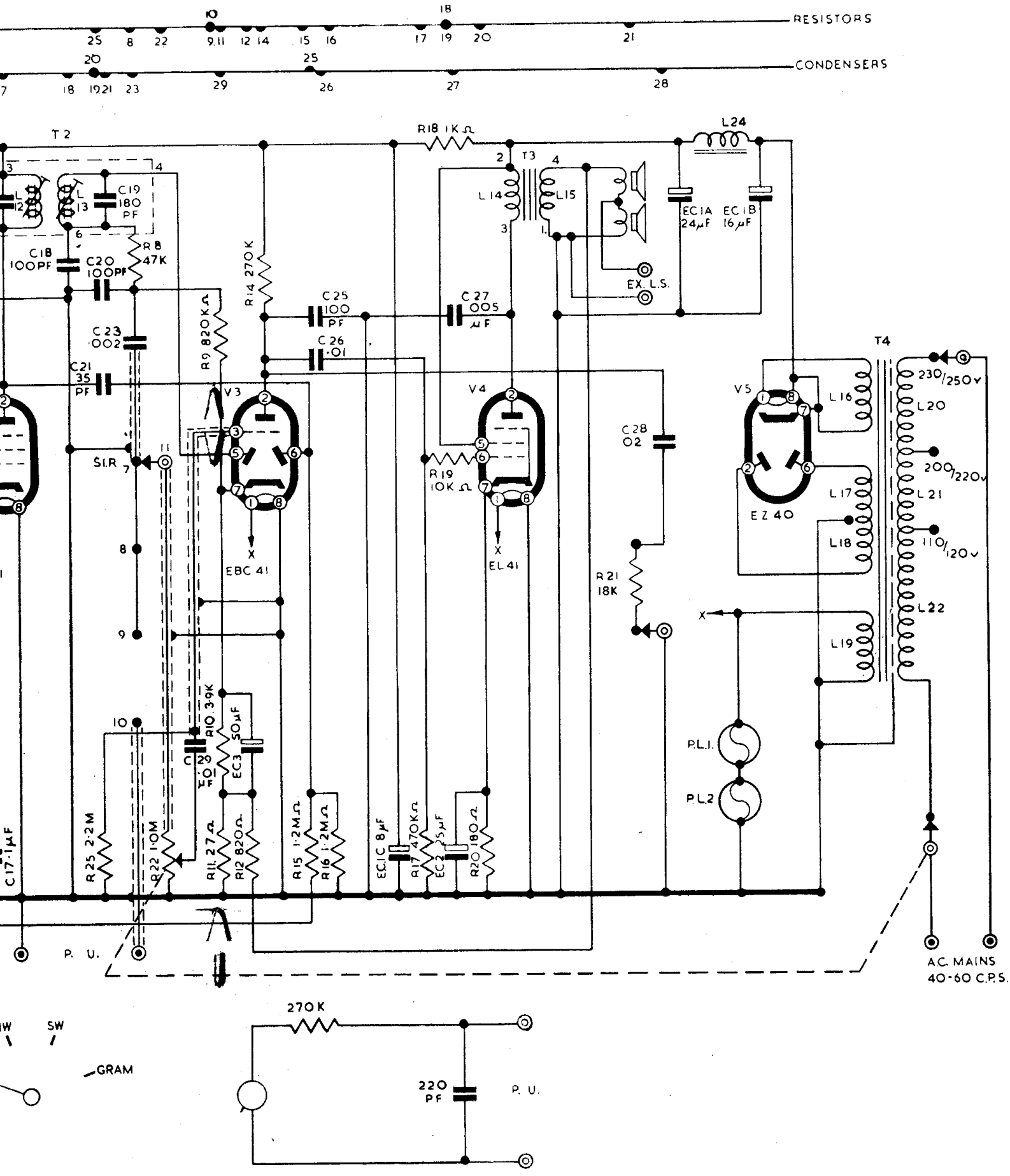


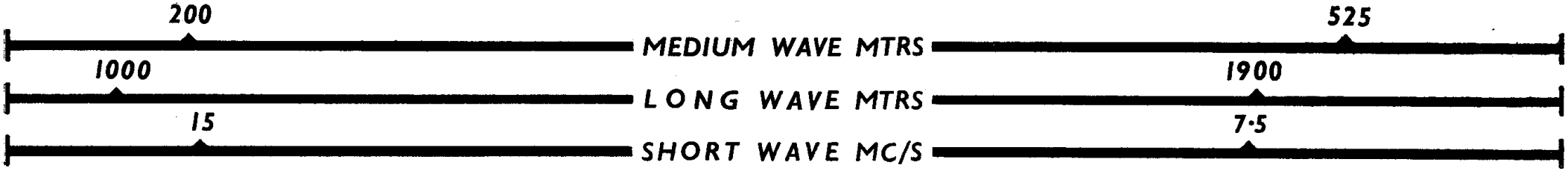
SWITCH WAFERS VIEWED FROM KNOB ON UNDERSIDE OF CHASSIS



SWITCH POSITION FROM KNOB

A.R.G. 69/3


RESISTORS
CONDENSERS
T2
T3
T4
L24
R18 1K Ω
L14
L15
EC1A EC1B
24μF 16μF
EX. L.S.
C19 180 PF
C18 100PF
C20 100PF
R8 47K
R14 270K
R9 820KΩ
C25 100 PF
C26 ·01
C27 005 μF
C23 ·002
C21 35 PF
V3
V4
V5
EBC 41
EL 41
EZ 40
R19 10K Ω
C28 02
R21 18K
L16
L20
L17
L21
L18
L19
L22
230/250v
200/220v
110/120v
S1.R
R10 3·9K
C29 ·01
EC3 50μF
R25 2·2M
R22 1·0M
R11 27Ω
R12 820Ω
R15 1·2MΩ
R16 1·2MΩ
EC1C 8μF
R17 470KΩ
EC2 25μF
R20 180Ω
C17 1μF
P.L.1.
P.L.2
P. U.
A.C. MAINS
40-60 C.P.S.
GRAM
270K
220 PF
P. U.
PICK-UP SHUNT A.R.G 69/3


200
525
MEDIUM WAVE MTRS
1000
1900
LONG WAVE MTRS
15
7·5
SHORT WAVE MC/S

COIL AND INDUCTANCE TABLE

Ref.	Function	Resistance (OHMS)	Ref.	Function	Resistance (OHMS)
L.1	I.F. Trap	5	L.13	2nd I.F.T. Secondary ...	9.0
L.2	S.W. Ae. Primary	0.3	L.14	O.P.T. Primary	170
L.3	L.W. Aerial	31.0	L.15	O.P.T. Secondary	Less than 1.0
L.4	M.W. Aerial...	3.1	L.16	Mains Trans. Rectifier heater winding	Less than 0.5
L.5	S.W. Ae. Secondary ...	Less than 0.5			
L.6	1st I.F.T. Primary	11.5	L.17. } L.18. }	H.T. Secondary "C.T.J ...	170 each half
L.7	1st I.F.T. Secondary ...	11.5	L.19	6.3V. Secondary	Less than 0.5
L.8	L.W. Oscillator	12.5	L.20	230/250V. Tap.	7
L.9	M.W. Oscillator	2.4	L.21	200/220V. Tap.	7
L.10	S.W. Osc. Primary	0.4	L.22	110/120V. Tap.	3.5
L.11	S.W. Osc. Secondary ...	Less than 0.5	L.23	Anti. Mod. Hum Choke ...	0.4
L.12	2nd I.F.T. Primary	11.0	L.24	Smoothing Choke ...	250

VOLTAGE AND CURRENT TABLE

The following figures were obtained on a stock chassis under the following conditions :—

Mains Supply input : 234V. 50 cycles.
Mains Selector Plug at : 230–250V. Tap.
Meter used : Model 7 Avo. Ranges 10V.—400V.
Chassis taken as negative.
Volume Control at minimum.
Tuning Gang at Maximum.
Waveband : Medium—no aerial connected.

Ref.	Valve	Function	Electrode	Pin No.	Volts	m/A.	Electrode	Pin No.	Volts	m/A.
V1	ECH 42	Frequency Changer	Hexode Anode	2	235	3.4	Screen	5	75	4.5
		,, ,,	Triode Anode (Oscillating)	3	73	5.3	Cathode	7	2.1	
		,, ,,	Triode Anode (Non-Osc.)	3	98	5.35	—	—	—	—
V2	EF 41 or EAF 42	I.F. Amplifier ,, ,,	Anode	2	235	4.8	Screen	5	90	1.4
			Cathode	7	1.95	—	—	—	—	—
V3	EBC 41	Detector, A.F. Amp. A.V.C.	Anode	2	83	0.44	Cathode	7	1.2	—
V4	EL 41	Output Power Amp.	Anode	2	249	33	Screen	5	253	5
		,, ,, ,,	Cathode	7	6.5	38	—	—	—	—
V5	EZ 40	Rectifier	Anode (each)	2.6	250 A.C.	—	Cathode	7	269 D.C.	—

Smoothed Voltage = 254 D.C. Subsidiary Smoothed Voltage = 235 D.C.
,, Current= 57 m/A. ,, ,, Current=19 m/A.

FAULT FINDING TABLES

The following notes are suggested as a guide to rapid fault finding and are not intended as a complete work on Servicing.

CLASS I FAULTS : Weak or No Signals

Table I shows the simplest test which can be made without instruments to isolate the section in which the receiver is defective, and frequently is sufficient to spot the fault itself, thus saving time.

With set switched on, note that all valve filaments light up.
Turn volume control to maximum.
Use a screwdriver or metal prod and touch the grid circuit points are outlined :—

TABLE I

Test Point	Valve	Pin No.	Normal Result	"No Result" Indicates Faulty :
1	4	6	Hum	V4, T3, V5, EC1, C27, L24, Speech Coils O/C
2	3	3	Loud Hum	V3, R14, C26, R19, C25.
3	—	Centre tap on Volume Control	Loud Hum	C29 O/C.
4	2	6	A click followed by hum level increase	V2, C21, T1, C18, 20, 23, R6, C30.
5	1	6	Loud click	R2, R3, T2, L8–11, VC6–8, C12–15.
6	—	Aerial	Loud click	L1, C1, C3, L2–5, C5, VC1–3.

TABLE 2

Voltages should be checked at the following points in conjunction with the Voltage and Current Table. A voltage within ± 10% can be considered as normal. For resistance tests, switch receiver off before taking readings, and refer to Coil and Inductance Table where applicable. In the following table the abbreviations read : L/R—low resistance ; H/R—high resistance ; O/C—open circuit ; S/C—short circuit. The initial surge showing L/R on electrolytic condensers can be ignored providing the resistance rises to normal as soon as the condenser has become charged. All valvepins and sockets should be checked for perfect contact, or voltage tests will be misleading.

Check Point	If Volts are Low, or Zero	Remarks
V5. Pin 7	Check for L/R to chassis. This should be not less than about 50K. If normal, replace V5. If low, check EC1A–C, C25, 27.	
V4. Pin 5	Check EC1.C27 for L/R.	High Volts indicate L14 O/C.
V4. Pin 2	C27 S/C or L/R.	
V4. Pin 7	R20. EC2 S/C or L/R V4 loss of emission.	R20 O/C.
V4. Pin 6	Should be zero. NEGATIVE indication.	If positive volts, C26 S/C.
V3. Pin 2	R14 H/R C25 S/C or L/R. R18 O/C or H/R EC1C S/C.	
V3. Pin 7	EC3, R11, R10, S/C or L/R, V3 faulty.	
V2. Pin 5	R6 O/C or H/R C30 S/C.	
V2. Pin 2	L12 O/C.	
V2. Pin 7	R7 S/C C17 S/C, V2 faulty.	
V1. Pin 2	L6 O/C.	
V1. Pin 3	R2 O/C or H/R.	
V1. Pin 5	R3 O/C C7 S/C R 23 L/R.	
V1. Pin 7	R4 L/R C8 S/C, V1 low emission.	

Notes.—1. A frequent cause of low voltage is H/R, which may be traced to dry joints, etc.
Also L/R may be caused by a breakdown in insulation between wires and components.

I.F. STAGES

At this stage, should the source of the trouble remain undetected, use can be made of a signal generator and output meter. The I.F. 470 Kc/s should be injected into V2 Grid (Pin 6). Use modulated signal.

A signal of up to 4 millivolts for a 50 milliwatt output would indicate a satisfactory stage. Inject the I.F. into V1 Grid (Pin 6). The input required for a 50 M.W. output should be less than 100μV.

A result differing widely from these would indicate :—

2nd I.F.—faulty windings—Replace I.F.T.
faulty C17, C19.

1st I.F.—faulty windings— ,, ,,
faulty C9, C11.

AERIAL AND OSCILLATOR STAGES

These may be checked stage by stage, and band by band, by the injection of the output from the signal generator ; also the use of the Coil and Inductance Table will prove of help here, and it should be remembered that any reading which differs widely from normal can be better checked by disconnecting one end of the component. Types of fault which may occur are : Trimmer condensers S/C, Padders S/C or O/C ; gang condenser plates fouling, Coils O/C, and dry joints or faulty connections on wavechange switch wafers. Reference should be made to the Circuit Diagram.

CLASS 2 FAULTS

Receiver working, but developing one or more of the following symptoms :—

1. Intermittent Signals.
2. Instability.
3. Noise.
4. Hum.
5. Tone incorrect.
6. Overloading and poor quality generally.
7. Microphony.

1. **INTERMITTENT SIGNALS** are due to : Dry joints and poor connections, short circuited components, open circuited inductances, resistors and condensers, mechanical failures (e.g. Gang condenser plates touching), and faulty valves. Methods of location are by careful observation of voltage readings, and by such mechanical means as tapping components and moving the wiring with a non-metallic prod.

2. **INSTABILITY** may be caused by such faults as outlined in 1, and particularly with regard to Condensers. Check EC1–C. C25, 30, 7, for open circuit. Valves may also offend in this respect, particularly V2.

3. **NOISE.** All the above faults can be accompanied by noise of one type or another, and the best method of location is to " short " each grid to chassis in turn, starting at V4. Usually it is possible to discover a stage where this has no effect. Thus it may be concluded that the noise is generated in that particular stage and its components. By means of light taps, all valves and components may be encourage to produce a change in the noise ratio.

4. **HUM.** Types of hum may be recognised as follows :—

Type of Hum	Indication	Cause
Smoothing	Not affected by position of Volume Control	EC1–A–C O/C.
Modulation	Only apparent when set is tuned in to station.	L23 O/C. Electrostatic screen disconnected from chassis.
Grid ...	Affected by Volume Control unless in final stage.	R22 O/C. Grid connections disconnected or H/R.
Other forms of mains hum	Usually incurable by control manipulation. Often intermittent.	Cathode to heater S/C, probably V4. L24 S/C turns. Grid and A.E. leads in proximity to mains leads.

5. **TONE.** **Radio :** Faults in tone may be due to C28 O/C R21 O/C R12, E.C.2, E.C.3. O/C faulty V3, V4.
Gram : Pick-up shunt—220 pF O/C.

6. **OVERLOADING AND POOR QUALITY GENERALLY.** Electrical faults which have not been located by the foregoing voltage tests, etc., can usually be found by inserting a milliammeter in the anode lead of each valve in turn, when overload on peak signals will be observed in the stage in which it occurs. Mechanical faults, such as cabinet resonance and loose components and fixtures, must not be overlooked. Finally, such a circumstance as wrong reconnection of speakers so that they become out of phase will give rise to poor quality. See also note under " Tone " regarding Feedback network. It is imperative that this is connected to the correct side of the output transformer secondary, i.e. *not* the earthed side.

7. **MICROPHONY.** This may show up from various causes, common amongst which are : Valves, Gang Mounting inflexible, and mechanical fixtures, such as autochanger, becoming susceptible to vibration.

REPLACEMENT PARTS LIST

When ordering replacements the receiver *model* and *serial* numbers and component part number must be quoted, to enable the order to be executed correctly and with the least possible delay. Claims for free replacement under guarantee must also be accompanied by the defective component, and the date of sale of the receiver must also be quoted.

REPLACEMENT PARTS LIST

Part No.	Description.	Circuit Ref.
M.93020	Bolts Shoulder Gang Mtg.	
R.148523	Bracket Gang Mtg. Front.	
R.148580	,, Lamp Holder.	
RA.450008	,, Pulley Idler.	
R.159553	Choke Smoothing, 250Ω D.C.	L.23
R.590022	Cleat Fibre.	
R.142506	Clip Electrolytic Condenser $1\frac{3}{8}$.	
R.142523	,, Lead Tie Down.	
R.142504	,, Control Knob Retaining.	
R.142542	,, Scale Glass Top (Small).	
R.142541	,, ,, ,, Bottom (Large).	
R.127513	Condenser 2 Gang.	
RA.450344	Coil I.F. Trap.	L.1
RA.430204	,, L.W. Aerial.	L.3
RA.430208	,, M.W. Aerial.	L.4
RA.430206	,, S.W. Aerial.	L.2. 5
RA.430080	,, Aerial Choke.	L.22
RA.430205	,, L.W. Oscillator.	L.8
RA.430209	,, M.W. Oscillator.	L.9
RA.430207	,, S.W. Oscillator.	L.10, 11
M.73000	Cord Drive.	
R.301518	Core Iron Dust (4BA Stud).	
R.301508	,, ,, ,, (I.F. Trap).	
R.139508	Diffuser Illuminating Gram.	
R.164502	Grommet (Chassis Mtg.).	
R.164501	,, (Gang Mtg.).	
R.189562	Head P.U. G.P.29.	
R.189521	,, ,, Case only.	
R.189553	,, ,, Insert G.P.29.	
R.121511	Holder Valve B8A.	
R.157500	,, Pilot Lamp.	
R.175545	Knob Wavechange.	
R.169510	,, Tone Control.	
R.169511	,, Volume On/Off. Tuning.	
R.201500	Lamp Pilot, 6.5V. 0.3a.	
R.138504	Panel Socket A & E.	
R.138503	,, ,, P.U.	
R.138502	,, ,, L.S.	
R.138500	,, ,, Voltage Selector.	
R.138585	Panel A.E & Ext. L.S.	
R.151508	Plate Valve Holder Mtg.	
R.138501	Plug Voltage Selector.	
R.138524	Plug Plain	
R.139480	Plug Wander Black.	
R.139482	Plug Wander Red.	
RA.407010	Pointer & Carriage.	
R.139521	Reflector Illuminating Scale.	
R.126593	Scale Glass.	
R.138512	Socket 2BA with locknut.	
R.190529	Speaker 8" 10,000 lines, R & A.	
R.125563	Spindle Drive, 2 sp.	
R.153538	Switch Wavechange.	
R.153540	Switch Tone.	
R.138510	Tag Strip E.C.E.	
R.138509	,, ,, E.F.E.	
R.138559	,, ,, 2 E.C.E.	
R.159556	Transformer Mains.	
RA.415020	,, 1st I.F.T.	L.6, 7
RA.415021	,, 2nd I.F.T.	L.12, 13
R.159588	,, Output.	L.14, 15
R.128516	Trimmer 3 x 4–40 pF.	
R.165504	Washer Felt (Large).	
R.165505	,, ,, (Small).	

CAPACITORS

Circuit Ref.	Value	Tolerance ± %	Working Volts	Part No.
C1	350 pF	2	—	R.129546
2	3750 pF	2	—	R.129531
3	0.01 μF	—	500	R.129728
4	0.1 μF	—	350	R.129718
5	50 pF	10	—	R.129527
6	—	—	—	—
7	0.1 μF	—	350	R.129718
8	0.1 μF	—	350	R.129718
9	100 pF	Part of 1st I.F.T.	—	—
10	50 pF	10	—	R.129527
11	100 pF	Part of 1st I.F.T.	—	—
12	100 pF	1	—	R.129608
13	420 pF	2	—	R.129541
14	3750 pF	2	—	R.129531
15	75 pF	5	—	R.129694
16	—	—	—	—
17	100 pF	Part of 2nd I.F.T.	—	—
18	100 pF	20	—	R.129558
19	150 pF	Part of 2nd I.F.T.	—	—
20	100 pF	20	—	R.129558
21	35 pF	5	—	R.129554
22	—	—	—	—
23	0.002 μF	—	500	R.129746
24	—	—	—	—
25	100 pF	20	—	R.129558
26	0.01 μF	—	500	R.129701
27	0.005 μF	—	1000	R.129743
28	0.02 μF	—	500	R.129734
29	0.01 μF	—	500	R.129728
30	0.1 μF	—	350	R.129718
EC1 A–C	16–24–8 or 16–32–8	—	450	R.131578 or R.131577
EC2	25 μF	—	25	R.131549
EC3	50 μF	—	12	R.131542
P.U. Shunt	220 pF	10	—	R.129570

RESISTORS

Circuit Ref.	Value	Wattage	Tolerance ± %	Part No.
R 1	100K	$\frac{1}{4}$	20	R09.10420
2	27K	$\frac{1}{2}$	10	R08.27310
3	33K	1	10	R02.33310
4	220Ω	$\frac{1}{4}$	10	R09.22110
5	100Ω	$\frac{1}{4}$	20	R09.10120
6	100K	$\frac{1}{4}$	10	R09.10410
7	330Ω	$\frac{1}{4}$	10	R09.33110
8	47K	$\frac{1}{4}$	20	R09.47320
9	820K	$\frac{1}{4}$	20	R09.82420
10	3.9K	$\frac{1}{4}$	10	R09.39210
11	30Ω	$\frac{1}{4}$	10	R09.30010
12	820Ω	$\frac{1}{4}$	10	R09.82110
13	—	—	—	—
14	270K	$\frac{1}{4}$	20	R09.27420
15	1.2M	$\frac{1}{4}$	20	R09.12520
16	1.2M	$\frac{1}{4}$	20	R09.12520
17	470K	$\frac{1}{4}$	20	R09.47420
18	1K.W/W.	4	10	R.132534
19	10K	$\frac{1}{4}$	20	R09.10320
20	180Ω	$\frac{1}{2}$	10	R08.18110
21	18K	$\frac{1}{4}$	20	R09.18320
22	1M.Pot.LOG.S.P.S.T. VOL. CONTROL			R.158584
23	39K	$\frac{1}{2}$	10	R08.39310
24	47K	$\frac{1}{4}$	10	R09.47310
25	2.2M	$\frac{1}{4}$	20	R09.22520
P.U. Shunt	270K	$\frac{1}{4}$	20	R09.27420

NOTE.—The information contained in this bulletin is in accordance with initial production Receivers. Owing to the uncertainty of supplies, substitute components may have to be used, and the values of these may vary from the published information. Wherever possible, such substitutions will be controlled within permissible tolerances and will have no adverse effect on the performance of the Receiver.