



REGENTONE Service

BULLETIN NO. 104

Model P.21

CIRCUIT DESCRIPTION.—Four-valve plus Rectifier superheterodyne. The aerial is isolated from the chassis, which may be live, by C.2. R.2 from aerial to true earth prevents the formation of a charge on the aerial. The chassis is earthed by C.1, a high working voltage condenser. L.1 offers a low impedance path to chassis to mains frequency voltages induced in the aerial, thereby eliminating modulation hum.

An internal plate aerial is fitted and is formed by metal foil on the base cover and sides of the cabinet. The base cover must be screwed tightly to the cabinet, so that good contact is made to the foil on the sides.

The aerial is transformer coupled to the grid tuned circuit on short wave, but on medium and long waves bottom end capacitive coupling is used.

The oscillator functions as a Colpitts with an additional tickler winding, and operates 470 Kc/s above the signal on all wavebands. Close tolerance padding condensers are used on all wavebands to maintain accurate tracking.

The oscillator and aerial voltages are mixed by V.1, and the first I.F. transformer T.1 selects the 470 Kc/s signal from the several frequencies produced.

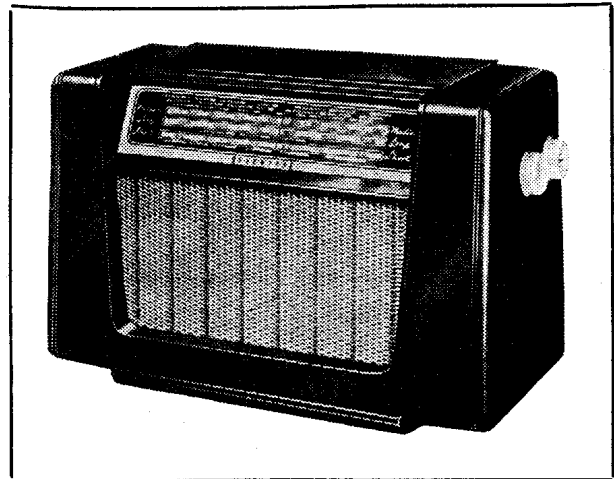
The secondary winding of T.1 is damped by R.5, thereby increasing the pass band. The voltage across this secondary is applied to the grid of V.2, where further amplification takes place.

T.2 also is tuned to the I.F. frequency, and the signal induced into the secondary winding is fed to the signal diode anode of V.3 for demodulation. The I.F. pulses are filtered from the detected signal by C.15 and R.8, and the audio voltage is developed across the volume control V.R.1, from which it is fed to the grid of V.3.

The triode section of V.3 acts as an audio amplifier, with leaky grid bias provided by R.9 and C.18.

A.V.C. is developed by the signal diode. When no signal is applied to the second diode anode, a small amount of current flows and a voltage drop occurs across R.11, making the anode some 1.5 V. negative with respect to the cathode. This negative voltage provides a bias for V.1 and V.2 under no signal conditions. When a signal is applied to the signal diode, the anode voltage drops by an amount dependant upon signal strength. The I.F. is filtered from this negative voltage by R.11 and C.12. The fixed bias and the A.V.C. voltage are applied to the grid of V.1 via the coils and to the grid of V.2 via the secondary of T.1. R.2 and C.12 prevent I.F. voltages feeding back to V.1 and causing instability.

The audio voltage across R.10 is fed to the grid of V.4 by C.19. V.4 is a beam tetrode power amplifier with cathode bias. R.13, the bias resistor, is not decoupled, so that a degree of negative feedback is obtained. C.20 is fitted in the absence of an adjustable tone control, to give some top cut.



WAVEBANDS

Long Wave ... 1,000—2,000 metres; 300—150 Kc/s
Medium Wave ... 180— 550 metres; 1,665—545 Kc/s
Short Wave ... 16.6— 50 metres; 18— 6 Mc/s

INTERMEDIATE FREQUENCY.—470 Kc/s.

POWER SUPPLY.—100-120 volts; 200-250 volts D.C. or A.C. 40-100 c.p.s.

POWER CONSUMPTION.—46 Watts apparent.

Half wave rectification is used to provide H.T., EC1C being the reservoir condenser and R.15 and EC1B the smoothing circuit.

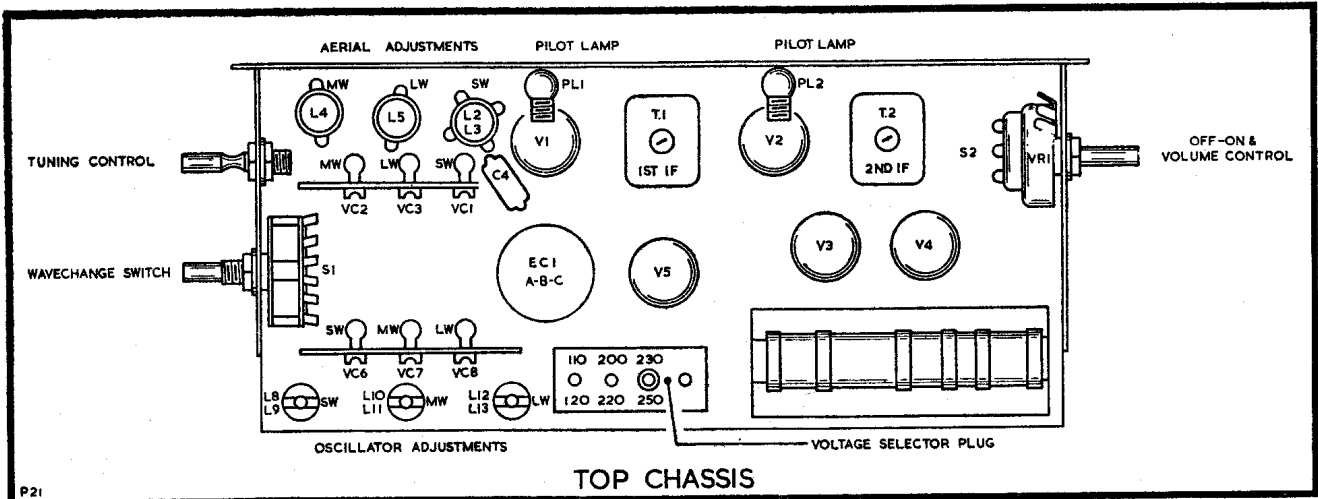
A subsidiary H.T. line of lower voltage, which is smoothed by EC1A, is provided by R.14.

A hash filter, consisting of R.17 and C.21, is fitted in the anode circuit of V.5. This filter removes interference from the mains, and also prevents modulation hum by filtering off R.F. voltages.

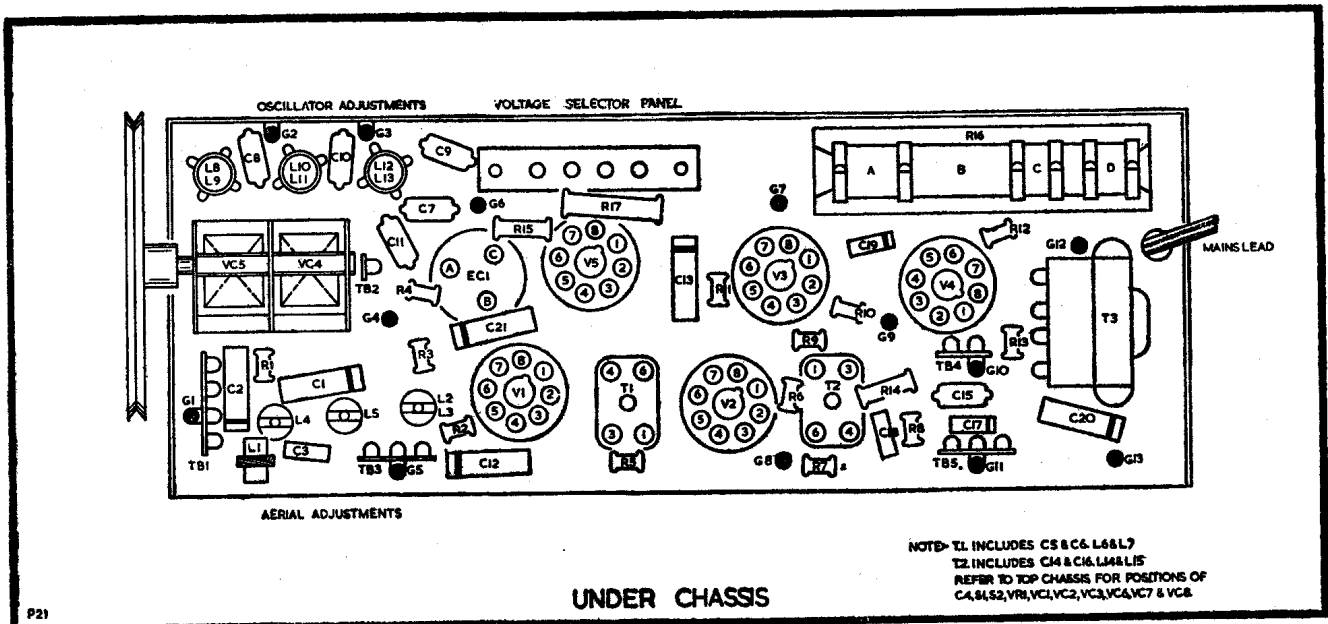
The valve heaters are all wired in series with the mains dropper R.16A, B and C, which is tapped for mains supplies of different voltages. R.16D is in parallel with the pilot lamp bulbs, to prevent damage by switching surges, and so that bulb failure does not open circuit the mains supply to the set.

Spun glass sleeving is used on all wires to the mains dropper, so that the insulation from the wires to the chassis does not deteriorate with heat.

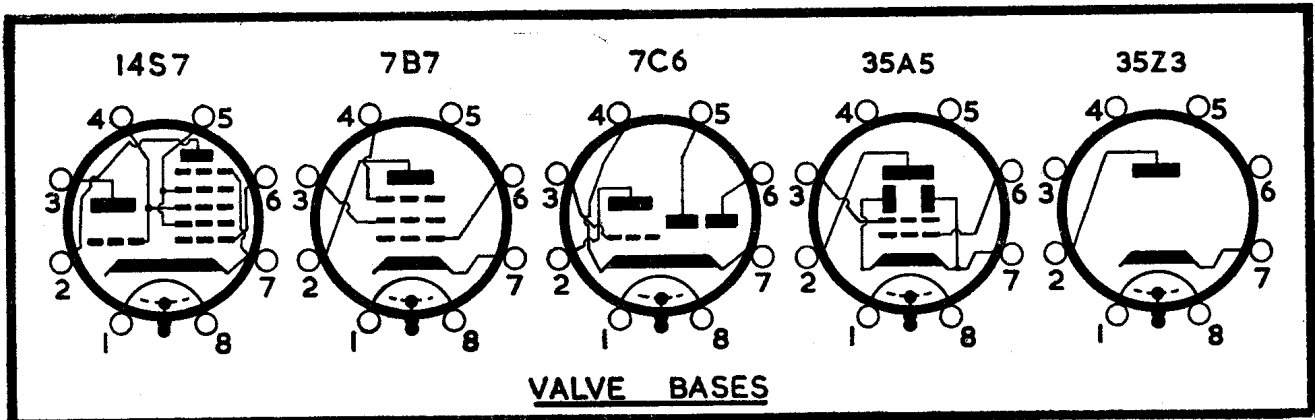
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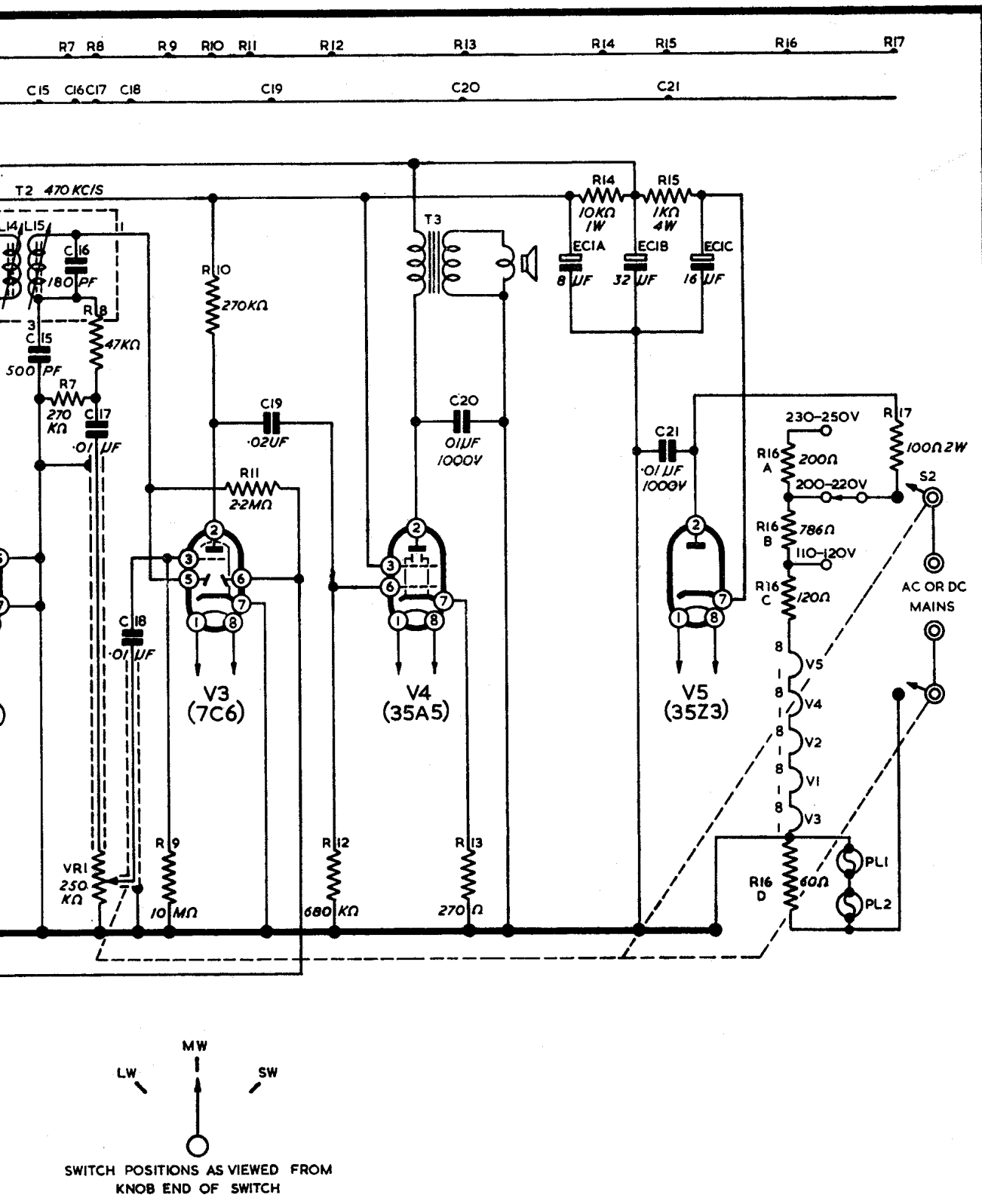
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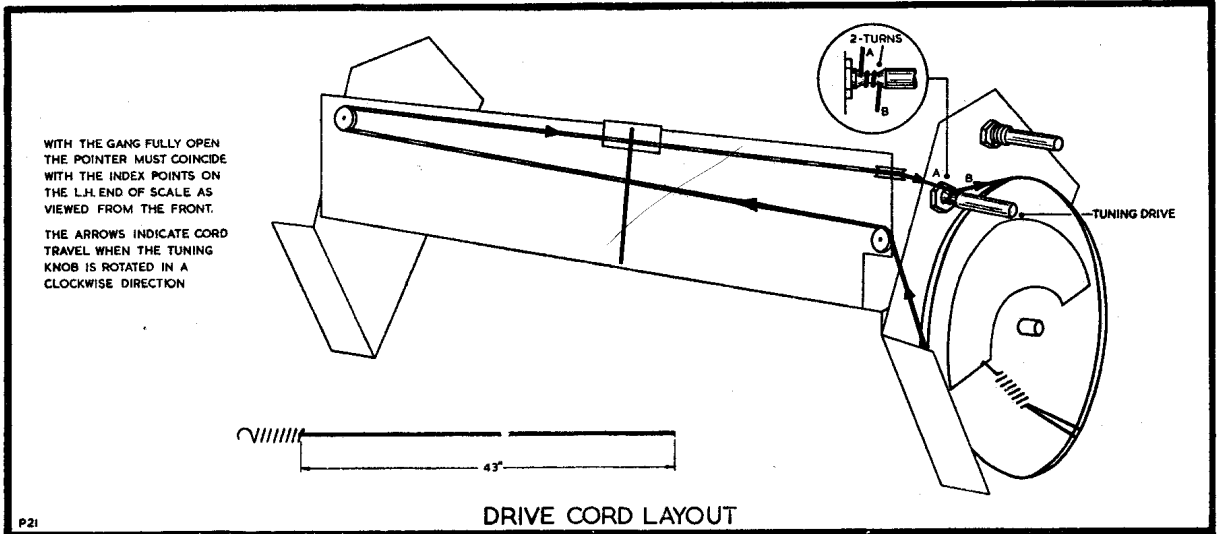


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NOTE.—The information contained in this bulletin is in accordance with initial production receivers. Due to uncertainty of supplies, substitute components may have to be used, and the values of these may vary from the published information. Wherever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

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REPLACEMENTS PARTS LIST.

The following list is limited to the principal components used in this receiver. Components available from trade suppliers are not listed, but in cases of difficulty the Regentone Service Department will assist. When ordering replacements the receiver model number and component part number MUST be quoted, to enable the order to be correctly executed. Claims for free replacement under guarantee must be accompanied by the defective component. The model number, serial number and date of sale of the receiver must also be quoted.

R.114568	Back.	R.127618	Condenser Tuning.
R.119528	Baffle Speaker.	M.73000	Cord Drive (Specify 48").
R.114569	Base cover.	R.128557	Drum Drive 4 1/4".
R.148574	Bracket chassis mounting L.H.	R.192822	Grille.
R.148573	Bracket chassis mounting R.H.	R.880014	Heat Deflector.
R.148577	Bracket gang mounting.	R.187800	Holder Pilot lamp double tag.
R.148587	Bracket mains dropper mounting.	R.187808	Holder Pilot lamp single tag.
R.201502	Bulb Pilot Lamp.	R.169513	Knob volume and tuning.
R.113511	Cabinet moulded (brown).	R.178851	Knob wavechange.
R.113513	Cabinet moulded (Cream).	R.173979	Leaflet instructions.
R.173624	Card Station Guide.	R.132817	Mains Dropper.
RA.430080	Choke aerial.	R.138876	Panel voltage selector.
R.142548	Clip cabinet back mounting.	M.96002	Plate aerial.
R.142538	Clip coil mounting.	R.151810	Plate chassis mounting.
R.142503	Clip elect. cond. mounting.	R.138524	Plug voltage selector.
R.142502	Clip idler pulley retaining.	RA.407013	Pointer tuning.
R.142504	Clip knob mounting.	R.128506	Pulley idler.
R.142547	Clip scale glass mounting.	R.132822	Resistor 1,000 ohms 4 watts ± 10%.
RA.430000	Coil L.W. Aerial.	RO1.10110	Resistor 100 ohms 2 watts ± 10%.
RA.430084	Coil M.W. Aerial.	R.126610	Scale glass, brown and cream.
RA.430239	Coil S.W. Aerial.	R.126615	Scale glass, cream and maroon.
RA.430242	Coil L.W. Oscillator.	R.190823	Speaker 8" P.M.
RA.430240	Coil M.W. Oscillator.	R.128867	Spindle drive.
RA.430241	Coil S.W. Oscillator.	R.122803	Spring cord tension.
R.129507	Condenser 3,750 pF. ± 2%.	R.153551	Switch wavechange.
R.129542	Condenser 2,700 pF. ± 2%.	RA.415006	Transformer 1st I.F.
R.129689	Condenser 410 pF. ± 1%.	RA.415007	Transformer 2nd I.F.
R.129686	Condenser 98 pF. ± 1%.	R.159585	Transformer Output.
R.129528	Condenser 50 pF. ± 10%.	R.128516	Trimmer 3-bank.
R.129565	Condenser 50 pF. ± 2%.	R.121509	Valve holder loctal.
R.129583	Condenser 500 pF. ± 20%.	R.185560	Volume control and switch.
R.131577	Condenser Elect. 16 × 32 × 8μF. 450 V.	R.168505	Washer felt.

MTRS. MEDIUM
LONG
SHORT

MTRS. MEDIUM
LONG
SHORT

MTRS. MEDIUM
LONG
SHORT

200
1000
15

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ALIGNMENT PROCEDURE.

If re-alignment is necessary, the following sequence of operations should be followed carefully. A tuneable signal generator giving a modulated signal should be used, and its output should always be limited so that the receiver output is just audible, i.e., insufficient signal to cause the A.V.C. to come into operation. The signal should be fed to the receiver via a dummy aerial. For I.F. use a .05 μ F. condenser ; for S.W. a 400 ohms resistor and 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 25 μ H inductance in series.

INTERMEDIATE FREQUENCY.—Switch to M.W., turn volume control fully clockwise, and with the tuning condenser fully closed set the pointer on the index points of the scale facsimile, or so that the pointer is just visible within the clear portion at the right hand end of the scale.

Inject a 470 Kc/s signal between the signal grid of the frequency changer and the receiver chassis, and adjust the cores of the I.F. transformers for maximum output as shown by an output meter. The correct peak is that at which both cores are furthest from the base pins.

LONG WAVE.—Turn wavechange switch to L.W. position and tune to 1,000 metres. Inject a signal of 300 Kc/s between aerial and earth, and adjust oscillator and aerial trimmers for maximum output.

MEDIUM WAVE.—Switch to M.W. and tune to 200 metres. Inject a signal of 1,500 Kc/s and adjust oscillator and aerial trimmers for maximum output.

SHORT WAVE.—Switch to S.W. and tune to 15 Mc/s. Feed in a signal of this frequency and adjust oscillator trimmer for the second signal heard from "tight". Adjust aerial trimmer for maximum output. Rotate the gang very slightly and re-adjust the aerial trimmer for maximum output. Repeat this "rocking" of the gang until maximum output, for a given input is obtained.

COIL RESISTANCE TABLE.

Ref.	Function.	Section.	Resistance.
L1	Choke anti. mod. hum		13 ohms
L2	Coil S.W. Aerial	Aerial	Less than 1 ohm
L3	Coil S.W. Aerial	Grid	Less than 1 ohm
L4	Coil M.W. Aerial		2.6 ohms
L5	Coil L.W. Aerial		33 ohms
L6	Coil 1st I.F.T.	Primary	6.5 ohms
L7	Coil 1st I.F.T.	Secondary	6.5 ohms
L8	Coil S.W. Osc.	Grid	Less than 1 ohm
L9	Coil S.W. Osc.	Anode	Less than 1 ohm
L10	Coil M.W. Osc.	Grid	5 ohms
L11	Coil M.W. Osc.	Anode	1.4 ohms
L12	Coil L.W. Osc.	Grid	14.5 ohms
L13	Coil L.W. Osc.	Anode	3.3 ohms
L14	Coil 2nd I.F.T.	Primary	7.3 ohms
L15	Coil 2nd I.F.T.	Secondary	5.3 ohms
	Output Transformer	Primary	400 ohms
	Output Transformer	Secondary	Less than 1 ohm

VOLTAGE AND CURRENT TABLE.

The following readings are approximate only, and were obtained with the receiver connected to a 230 V. 50 cycles per second mains supply. The Volume Control

was set to minimum, the wavechange switch in the M.W. position, and the tuning condenser fully meshed. A 500 ohms per volt meter was used.

Ref.	Valve.	Function.	Electrode.	Volts.	mA.	Electrode.	Volts	mA.
V1	14S7	Frequency Changer	Hexode Anode	181	2.2	Screen	87	3.3
V1	14S7	Frequency Changer	Triode Anode*	106	3.1	Triode Anode†	67	4.7
V2	7B7	I.F. Amplifier	Anode	181	7.3	Screen	87	1.8
V3	7C6	Det. & A.F. Amp.	Anode	44	0.16			
V4	35A5	Power Amp.	Anode	167	34	Screen	107	1.4
V4	35A5	Power Amp.	Cathode	8.7	35.4			
V5	35Z3	Rectifier	Anode	2.2		Cathode	226	52

Smoothed H.T. 182.

H.T. Subsidiary 107 volts at 7.1 mA.

Total Mains Current 200 mA.

* Triode Oscillating.

† Triode not Oscillating.

ERRATUM.

V5 3523 RECTIFIER ANODE.

VOLTS SHOULD READ 230.