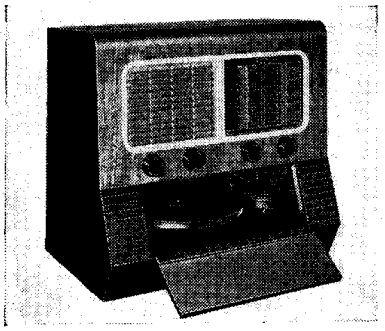
"TRADER" SERVICE SHEET

910

REGENTONE 99

Three-Band Table Radiogram



AN unusual feature of the Regentone 99 is the provision of two scales for the M.W. band, one calibrated in metres and the other in kilocycles. The S.W. scale is calibrated only in megacycles, but a finely graded scale in the centre of the scale panel is divided into 100 divisions for logging.

The receiver is a 4-valve (plus rectifier) 3-band superhet table radiogram designed to operate from A.C. mains of 100-250 V, 50 c/s, but when voltage adjustments are made, the gramophone motor connections must be adjusted in addition to those of the receiver. Instructions are given under "General Notes."

Release date and original price: October 1948; *£27 4s. 3d. plus purchase tax.*

CIRCUIT DESCRIPTION

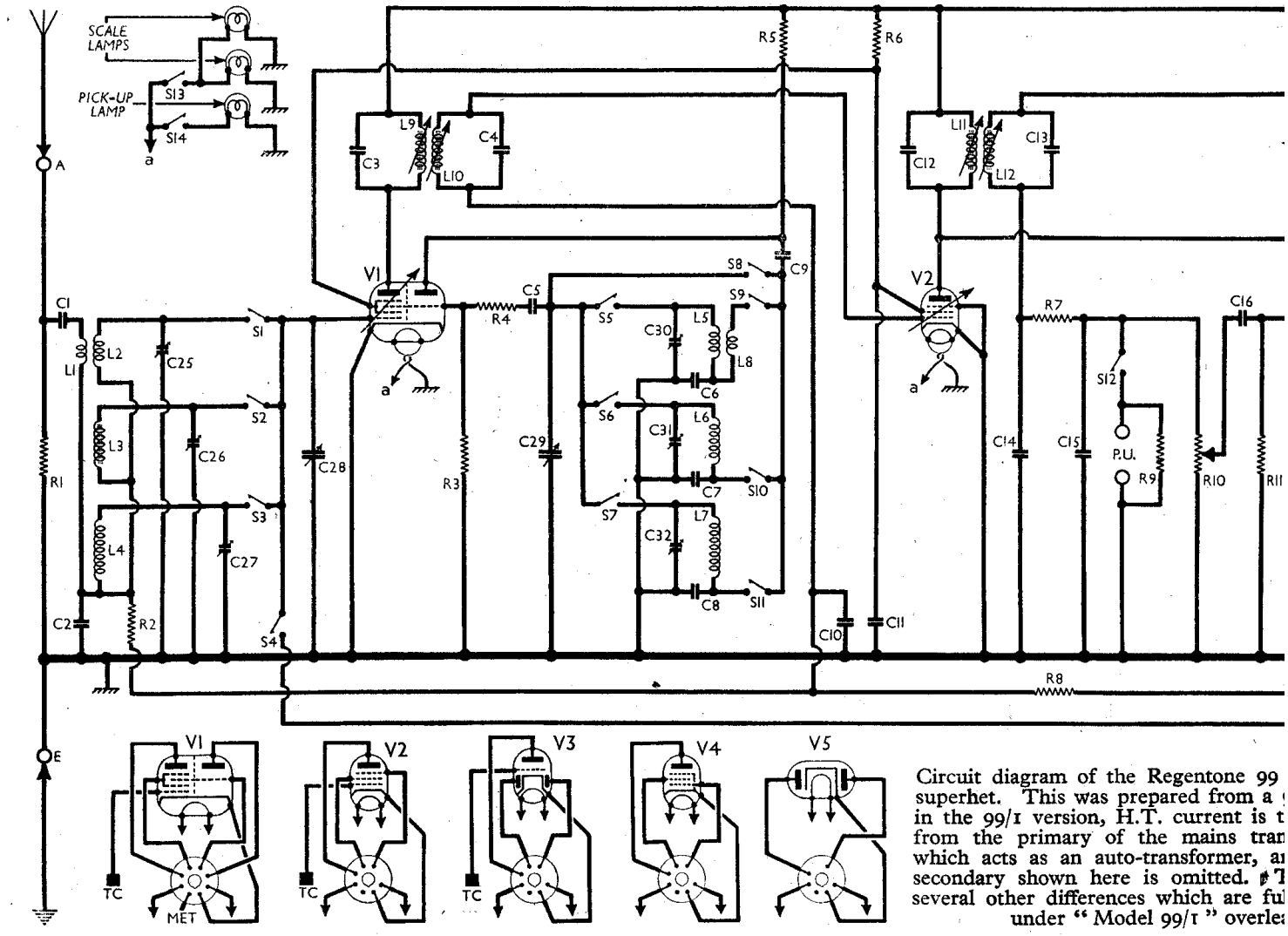
Aerial input is inductively coupled by **L1** on S.W., and bottom coupled by the capacitative potential divider **C1, C2** on M.W. and L.W., to single-tuned circuits **L2, C28** (S.W.), **L3, C28** (M.W.), and **L4, C28** (L.W.), which precede a triode hexode valve **(V1, Mullard metallized ECH35)** operating as frequency changer with internal coupling. Resistor **R1** shunts the input circuit to prevent modulation hum.

Triode oscillator grid coils **L5** (S.W.), **L6** (M.W.), **L7** (L.W.) are tuned by **C29,** with parallel trimming by **C30** (S.W.), **C31** (M.W.), **C32** (L.W.), and series tracking by **C6** (S.W.), **C7** (M.W.), **C8** (L.W.). Capacitative reaction coupling, due to the common impedance of trackers in grid and anode circuits, is employed on all bands, with additional inductive coupling on S.W. by **L8.**

Second valve **(V2, Mullard 6K7G)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned-transformer couplings **C3, L9, L10, C4** and **C12, L11, L12, C13** in which the tuning capacitors are fixed and alignment is effected by varying the positions of the iron-dust cores.

Intermediate frequency 465 Kc/s.

Diode second detector is part of double diode triode valve **(V3, Mullard metal-**



Circuit diagram of the Regentone 99 superhet. This was prepared from a in the 99/1 version, H.T. current is t from the primary of the mains tran which acts as an auto-transformer, a secondary shown here is omitted. T several other differences which are ful under "Model 99/1" overle

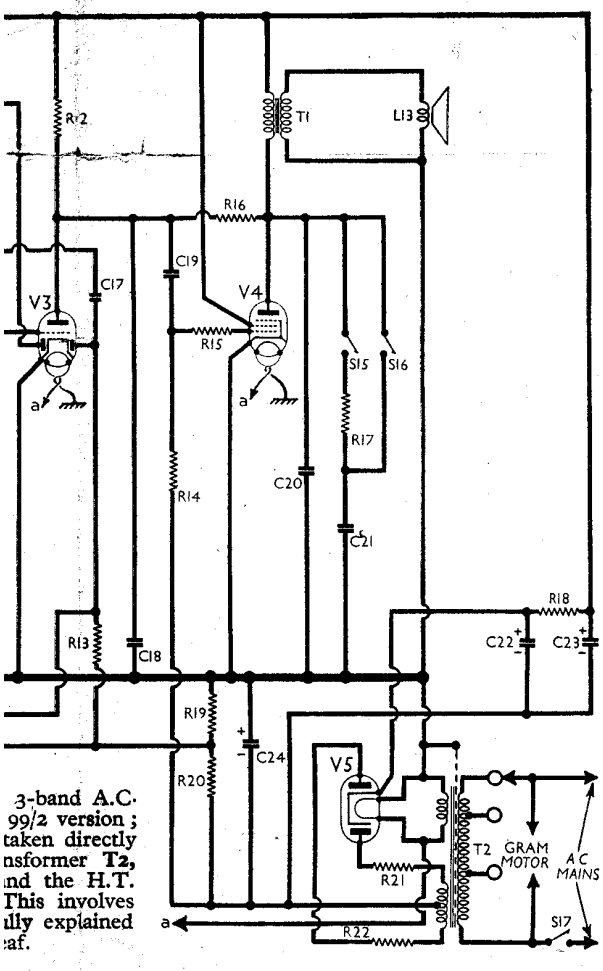
lized EBC33). Audio frequency component in rectified output is developed across manual volume control **R10,** which is the diode load resistor, and passed via A.F. coupling capacitor **C16** and C.G. resistor **R11** to grid of triode section, which operates as A.F. amplifier. I.F. filtering by **C14, R7, C15** and **C18** in diode and triode anode circuits respectively.

The gramophone pick-up output is applied across **R10** via **S12.** A tone correcting resistor **R9** is shunted across the pick-up.

Second diode of **V3,** fed from **V2** anode via **C17,** provides D.C. potential which is developed across load resistor **R13** and fed back through decoupling circuits as G.B. to F.C. and I.F. valves, giving automatic gain control.

Resistance-capacitance coupling by **R12, C19, R14,** via grid stopper **R15,** is employed between **V3** triode and pentode output valve **(V4, Mullard EL33).** Fixed tone correction by **C20,** and three-position tone control by **S15, S16, R17, C21** in anode circuit. Voltage negative feedback, to improve the quality of reproduction, is obtained by the inclusion of **R16.**

H.T. current is supplied by I.H.C. full-wave rectifying valve **(V5, Mullard 6X5GT),** with smoothing by resistor **R18,** and electrolytic capacitors **C22, C23.**



3-band A.C. 99/2 version; taken directly nsformer **T2,** nd the H.T. This involves ully explained :af.

Fixed G.B. for **V1-V4,** and A.G.C. delay voltage, is obtained from the drop across **R19, R20** in the H.T. negative lead to chassis. The heaters of all valves, and the scale lamps, are fed from a single earthed winding on the mains transformer **T2.**

COMPONENTS AND VALUES

	CAPACITORS	Values (μF)	Locations
C1	Aerial coupling	0·01	K5
C2	Aerial coupling	0·00375	K5
C3	1st I.F. transformer tuning	0·0001	A2
C4	1st I.F. transformer tuning	0·0001	A2
C5	V1 osc. C.G.	0·0001	J5
C6	Osc. S.W. tracker	0·0035	H5
C7	Osc. M.W. tracker	0·00042	G4
C8	Osc. L.W. tracker	0·00013	H4
C9	Osc. anode coup.	0·0001	K4
C10	A.G.C. decoup.	0·1	G3
C11	S.G.'s decoupling	0·1	H6
C12	2nd I.F. transformer tuning	0·0001	A1
C13	2nd I.F. transformer tuning	0·0001	A1
C14	I.F. by-passes	0·0001	G4
C15	I.F. by-passes	0·0001	F4
C16	A.F. coupling	0·01	F3
C17	A.G.C. coupling	0·00005	G4
C18	I.F. by-pass	0·0001	F4
C19	A.F. coupling	0·01	F5
C20	Tone corrector	0·01	F6
C21	Tone control	0·05	C3
C22*	H.T. smoothing	30·0	B1
C23*	H.T. smoothing	30·0	B1
C24*	G.B. by-pass	50·0	D4
C25‡	Aerial S.W. trim.	0·00005	J5
C26‡	Aerial M.W. trim.	0·00005	J4
C27‡	Aerial L.W. trim.	0·00005	J4
C28†	Aerial tuning	0·00049§	A2
C29†	Oscillator tuning	0·00049§	A1
C30‡	Osc. S.W. trim.	0·00005	H5
C31‡	Osc. M.W. trim.	0·00005	H4
C32‡	Osc. L.W. trim.	0·00005	H4

* Electrolytic. † Variable. ‡ Pre-set. § Swing value, min. to max.

	RESISTORS	Values (ohms)	Locations
R1	Aerial shunt	4,700	J6
R2	V1 Hex. C.G. decoup.	500,000	H5
R3	V1 osc. C.G.	47,000	J5
R4	Osc. stabilizer	100	J5
R5	Osc. anode load	47,000	J5
R6	V1, V2 S.G.'s feed	22,000	G5
R7	I.F. stopper	47,000	G4
R8	A.G.C. decoupling	1,200,000	F4
R9	P.U. shunt	10,000	G6
R10	Volume control	250,000	E3
R11	V3 C.G. resistor	4,700,000	F3
R12	V3 triode load	250,000	F5
R13	A.G.C. diode load	1,200,000	F4
R14	V4 C.G. resistor	100,000	F5
R15	V4 grid stopper	10,000	F5
R16	Feed-back coup.	470,000	F5
R17	Tone control	5,000	D3
R18	H.T. smoothing	1,000	C4
R19	V1-V4 G.B. potential divider	47	E4
R20	V1-V4 G.B. potential divider	75	E5
R21	V5 surge limiters	100	E5
R22	V5 surge limiters	100	F5

	OTHER COMPONENTS	Approx. Values (ohms)	Locations
L1	Aerial S.W. coup.	0·1	K5
L2	Aerial tuning coils	Very low	K5
L3	Aerial tuning coils	2·2	K4
L4	Aerial tuning coils	34·0	K4
L5	Oscillator tuning coils	Very low	H5
L6	Oscillator tuning coils	5·0	H4
L7	Oscillator tuning coils	13·0	H4
L8	Osc. S.W. reaction	0·1	H5
L9	1st I.F. trans. Pri.	7·5	A2
L10	1st I.F. trans. Sec.	7·5	A2
L11	2nd I.F. trans. Pri.	7·5	A1
L12	2nd I.F. trans. Sec.	7·5	A1
L13	Speech coil	2·5	—
T1	Output trans. Pri.	290·0	B1
T1	Output trans. Sec.	0·1	B1
T2	Mains trans. Pri., total	41·0	B2
T2	Mains trans. Heat, sec.	Very low	B2
T2	Mains trans. H.T. sec., total	500·0	B2
S1-S14	W/band switches	—	K3
S15, S16	Tone switches	—	D3
S17	Mains s.w., g'd R10	—	E3

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on mains of 232 V, using the 230-250 V tapping on the mains transformer. The receiver was tuned to the lowest wavelength on the M.W. band, and the volume control was at maximum, but there was no signal input. Voltages were measured on the 400 V scale of a model 7 Avometer, chassis being the negative connection.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 ECH35	200	4·7	103	1·5
	Oscillator			
	66	2·7		
V2 6K7G	200	10·5	103	2·5
V3 EBC33	46	1·1	—	—
V4 EL33	195	17·0	200	2·0
V5 6X5GT	236†	—	—	—

† Each anode, A.C.

DISMANTLING THE SET

Removing Chassis.—Pull off the four control knobs (with felt washers), unplug the pick-up leads, and unsolder the speaker leads at the speech coil tags and lift them from their soft-metal cleat;

from the underside of the gramophone compartment remove the bottom cover (five round-head wood screws and metal washers), disconnect the mains leads at the motor terminals, and draw them back into the chassis compartment;

from inside the gramophone compartment unscrew the pick-up lamp on the underside of the receiver chassis and, with a short box-spanner, withdraw the three hexagon-head screws (with metal washers) securing the chassis to its shelf;

the chassis may now be lifted from the cabinet by tilting it forward to enable the top of the tuning scale to clear a batten inside. If it is desired to operate

it on the bench the bare ends of the motor mains leads should be suitably insulated.

When replacing, the motor mains leads should be reconnected to the two terminals marked "mains" on the motor panel, and the plug joined to the pick-up lead braiding should be inserted in the right-hand P.U. socket on the receiver chassis.

Removing Speaker.—Remove chassis as previously described; remove the four nuts (with spring washers and one soft-metal cleat) securing the speaker to the sub-baffle, and lift it out.

When replacing, the connecting tags should be on the left, and the soft-metal cleat should be fitted beneath the upper right-hand fixing nut.

Removing Gramophone Motor. — The gramophone motor may be reached for such purposes as inspection, voltage adjustment and lead connection, upon removal of the cover on the underside of the cabinet, as previously explained, but if it is desired to remove the motor, remove the nuts from the three 4BA screws which hold it to the motorboard. These are accessible from the underside of the motor only.

The cleat holding the sleeved and braided pick-up lead should be released from its screw on the motorboard, when the motor and pick-up may be withdrawn through the opening at the front of the cabinet, care being taken not to scratch the woodwork.

When replacing, thread the braided pick-up lead through the hole provided for it in the motorboard, arranging the sleeving to cover the exposed portion which is clipped under the cleat.

Slip the motor into place, first fitting a plain washer on to each fixing screw. Another plain washer goes on to each screw, beneath the nut. The connections are shown in the diagrams in col. 4.

GENERAL NOTES

Switches.—S1-S11 are the waveband and radio muting switches, **S12** is the gramophone pick-up switch, and **S13, S14** are the scale lamp and playing desk lamp switches. These are all ganged in a single rotary 4-position unit mounted beneath the chassis, on the front member.

Waveband Switch Diagram and Table

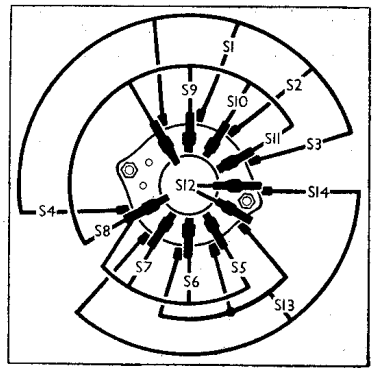


Diagram of the waveband switch unit, drawn as seen when viewed from the rear of an inverted chassis. The associated table is on the right of the diagram, in col. 3.

Switch	Gram	S.W.	M.W.	L.W.
S1	—	C	—	—
S2	—	—	C	—
S3	—	—	—	C
S4	C	—	—	—
S5	—	C	—	—
S6	—	—	C	—
S7	—	—	—	C
S8	C	—	—	—
S9	—	C	—	—
S10	—	—	C	—
S11	—	—	—	C
S12	C	—	—	—
S13	—	C	C	C
S14	C	—	—	—

The unit is indicated in our under-chassis view, and shown in detail in the diagram above, where it is drawn as seen from the rear of an inverted chassis. The table (col. 3) gives the switch positions for the four control settings, starting from the fully anti-clockwise position of the control knob. A dash indicates open, and **C**, closed.

S15, S16 are the tone control switches, ganged in a 3-position rotary unit beneath the chassis, on the front member. In the "Brilliant" position (control knob fully anti-clockwise), both switches are open. In the "Normal" position (knob central), **S15** is closed, and in the third position, "Mellow," **S16** is closed.

S17 is the Q.M.B. mains switch, ganged with the volume control **R10.**

Scale and Playing Desk Lamps.—The two scale lamps are mounted in clip-on holders at the top of the scale assembly to give edge lighting, and the playing desk lamp is mounted on a bracket bolted to the underside of the chassis deck, where it illuminates the pick-up compartment below it.

All the lamps are of the same type, with M.E.S. bases and small, clear spherical bulbs, rated at 6.5 V, 0.3 A.

External Speaker.—No provision is made for the connection of an external speaker, but one of low impedance (about 3-4 Ω) could be connected to the speech coil tags of the internal speaker.

Capacitors C22, C23.—In our sample these were two dry electrolytics in a single tubular unit mounted on the chassis deck. The unit was a Daly type RC40-10-3 rated at 30+30 μF, 350 V maximum working, 425 V surge. In the earlier model, the values were 16 μF each.

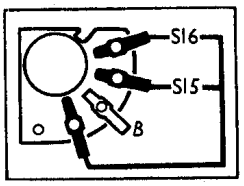


Diagram of the tone control switch unit, drawn as seen from the rear of an inverted chassis.

As the case is not isolated, and the common negative terminal goes to H.T. negative, which is below earth potential, the case is isolated from its clip by a strip of plastic material.

Smoothing Resistor R12.—This is a wire-wound vitreous enamelled unit rated at 1,000 Ω, 6 W. It is mounted directly upon the positive tags of the **C22, C23** unit.

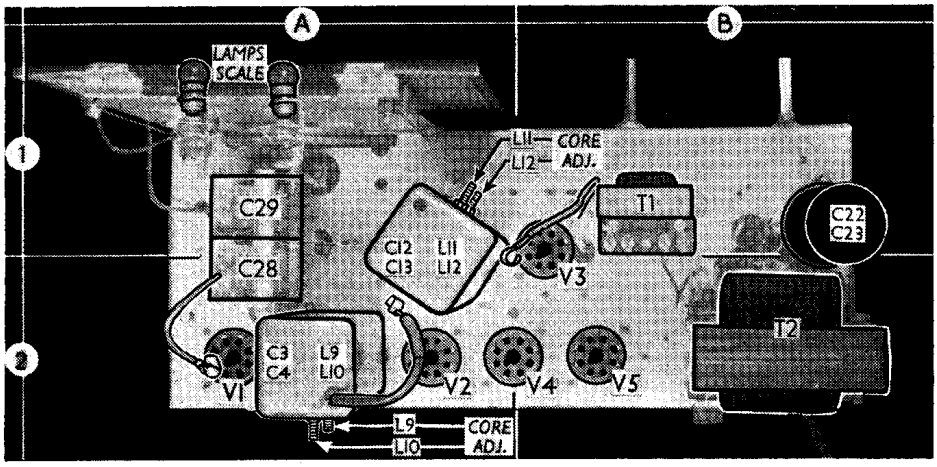
Gramophone Motor.—This is a Collaro AC49 rim-driven unit, with its own pick-up, suitable for A.C. mains of 100-120 V or 200-250 V, 50 c/s. It has a fixed axle in place of the spindle used in the centre-driven type of motor, the turntable turning on this axle. A cooling fan is fitted above the motor.

Two-position voltage adjustment is achieved by connecting the two windings in parallel for 100-120 V mains or in series for 200-250 V mains. The method by which this is done is shown in the diagram in col. 4.

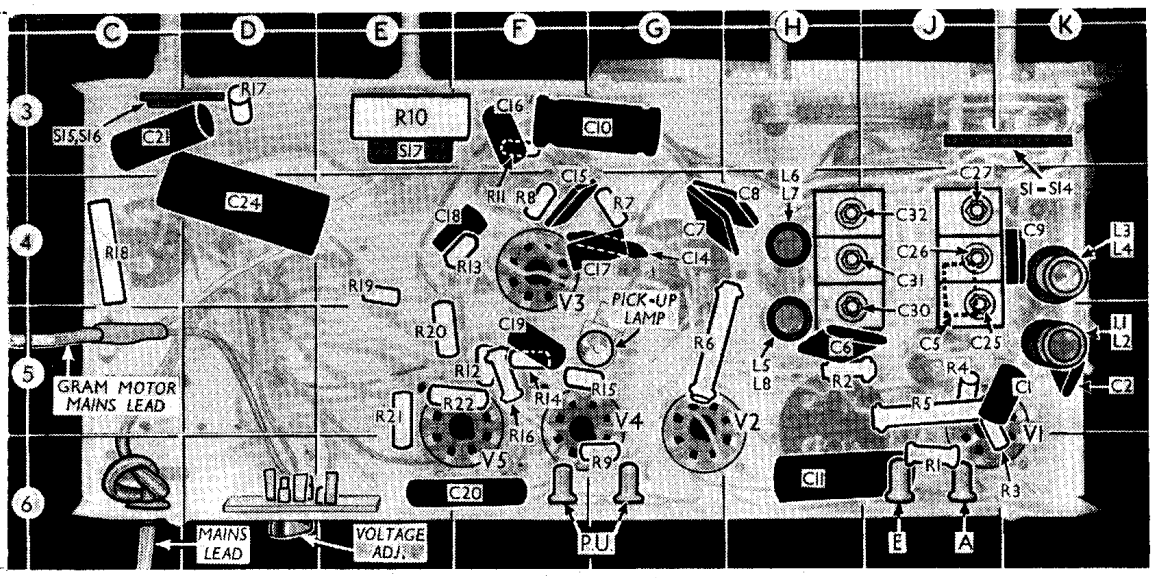
MODEL 99/1

There are two versions of the Regentone 99, distinguished from each other by the suffixes 1 and 2. Our sample was a 99/2, and our *Service Sheet* is based on that version, but the differences in the 99/1 are summarized in the following paragraphs.

The principal difference in the 99/1 lies in the use of a different mains transformer **T2,** which has no H.T. secondary winding, and only a single low-voltage secondary



Plan view of the chassis, showing the positions of the valve holders and identifying the I.F. core adjustments.



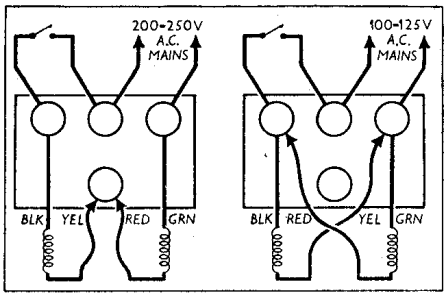
Under-chassis view. Diagrams of the waveband switch unit **SI-SI4** (indicated here at upper right - hand corner) and tone control switch unit **S15, S16** (indicated at upper left-hand corner) appear in cols. 2 and 3 respectively, where the units are shown in detail.

from which all the valve heaters and the scale lamps are run. The rectifier anodes are strapped together and fed via a 100 Ω current limiting resistor from the 230/250 V tapping on the primary winding, and the valve becomes a halfwave rectifier, and is shunted by an 0.01 μF R.F. by-pass capacitor (between anode and cathode).

As a result of this method of H.T. supply, the chassis is "live" to the mains, and a double-pole mains switch replaces our single-pole type. The aerial socket as seen in our circuit diagram is isolated from **R1, C1** by a 0.01 μF capacitor, and the earth socket is isolated from the position in which we show it by a 0.1 μF capacitor. A 1,000,000 Ω resistor is then connected between the aerial and earth sockets.

An 0.1 μF capacitor isolates the earthy pick-up socket from chassis, and an 0.01 μF capacitor isolates the "live" socket from **S12. R9** remains connected directly between the two sockets. All metal work in the pick-up compartment is connected to the earth socket.

Additional decoupling is introduced in the H.T. feed to **V1, V2, V3** and the screen of **V4** in the form of an 820 Ω resistor and a 32 μF capacitor, but the values of **C22** and **C23** drop down to 16 μF each.



Diagrams showing (left) the gram motor connections for 200-250 V. mains and (right) for 100-125 V. mains, as seen from beneath the cabinet.

All pre-set trimmer capacitors are rated at 60 pF (0.00006 μF) each.

CIRCUIT ALIGNMENT

For these operations the chassis must be removed from the cabinet.

I.F. Stages.—Switch set to M.W., turn gang and volume control to maximum, connect signal generator, via an 0.1 μF capacitor in the "live" lead, to control grid (top cap) of **V1** and the **E** socket, feed in a 465 kc/s (645.16 m) signal, and adjust the cores of **L12, L11, L10** and **L9** (location references A1, A2) for maximum output.

R.F. and Oscillator Stages.—With the gang at maximum capacitance the cursor should coincide with the dots at the high wavelength ends of the M.W. scales. It may be adjusted in position by rotating the drive drum on its spindle after slackening the two grub screws. Transfer "live" signal generator lead to **A** socket, via a suitable dummy aerial.

M.W.—Switch set to M.W., tune to 214.3 m on scale, feed in a 214.3 m (1,400 kc/s) signal, and adjust **C31** (H4) and **C26** (J4) for maximum output. Tune to 500 m on scale, feed in a 500 m (600 kc/s) signal, and check calibration.

L.W.—Switch set to L.W., tune to 1,000 m on scale, feed in a 1,000 m (300 kc/s) signal, and adjust **C32** (H4) and **C27** (J4) for maximum output.

S.W.—Switch set to S.W., tune to 18 Mc/s on scale, feed in an 18 Mc/s (16.67 m) signal, and adjust **C30** (H5) and **C25** (J5) for maximum output.

DRIVE CORD REPLACEMENT

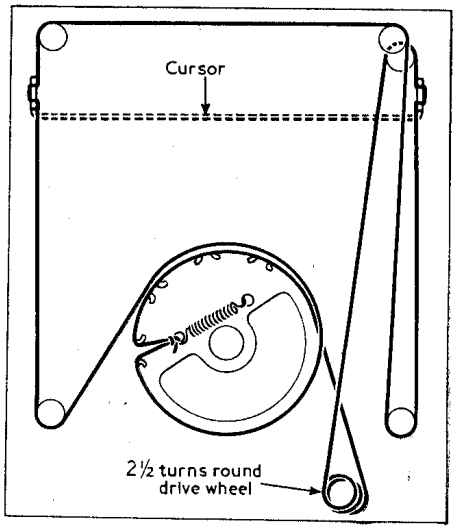
The whole of the cord drive system is run on the rear of the scale assembly, and it is unnecessary to remove the glass scale panel when fitting a new cord. For this reason our sketch (col. 6) shows the drive system as seen from the rear. In the position shown, the gang is at maximum.

It may be considered expedient to remove the scale panel, however, in order to dispose of the cursor during the operation, as it tends to get in the way. Alternatively, the cursor may be tied to the brackets at the top of the assembly.

Sixty inches of cord is required for the drive, including a few inches for tying off. A convenient method of running the cord is to tie one end to the tension spring and start by making an anti-clockwise turn round the gang drum, pulling the gang round to maximum capacitance as shown in the sketch, then continuing the run until the tension spring is again reached, when the end is tied off.

The horizontal run at the top of the assembly may go over or under the scale lamp brackets, where it will rub them lightly in either case. In our sample the cord ran under the brackets.

The cursor can be slipped on to the cord afterwards and eased up or down the vertical cord runs until the correct position is reached, when the cursor should be level with the calibration spots at the tops of the two M.W. scales.



Sketch of the cord driven tuning system, drawn as seen from the rear when the gang is at maximum capacitance.

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