Supplement to The Wireless & Electrical Trader, November 27, 1948

"TRADER" SERVICE SHEET

888

REGENTONE 358

Covering A.C. Models A358, RG358, ARG358 and A.C./D.C. Models U358, RG358U

THE following information is based on the Regentone A358 table receiver, run 3 only; it does not cover runs 1 and 2, which are different in a number of respects and of which not very many chassis were distributed. The receiver is a 4-valve (plus rectifier) 3-band superhet designed to operate from A.C. mains of 100-250 V, 50-100 c/s.

Run 3 models can be recognised by the insulating band between the electrolytic capacitor unit and its clip. In runs 1 and 2 the case is connected to chassis.

The RG358 and the ARG358 are two A.C. radiograms employing a slightly modified A358 chassis, the differences being explained under "Radiogram Modifications" overleaf.

The U358 table receiver and RG358U radiogram are A.C./D.C. versions of the A358 and are fully covered by explanatory notes throughout this *Service Sheet*, and particularly under "A.C./D.C. Versions" overleaf.

Release dates and original prices: A358, December 1947, £22 1*s.*; *RG358, January* 1948, £57 15*s.*; *ARG358, September* 1948, £61 19*s.*; *U358, July* 1948, £22 1*s.*; *RG358U, July* 1948, £57 15*s. Purchase tax extra.*

CIRCUIT DESCRIPTION

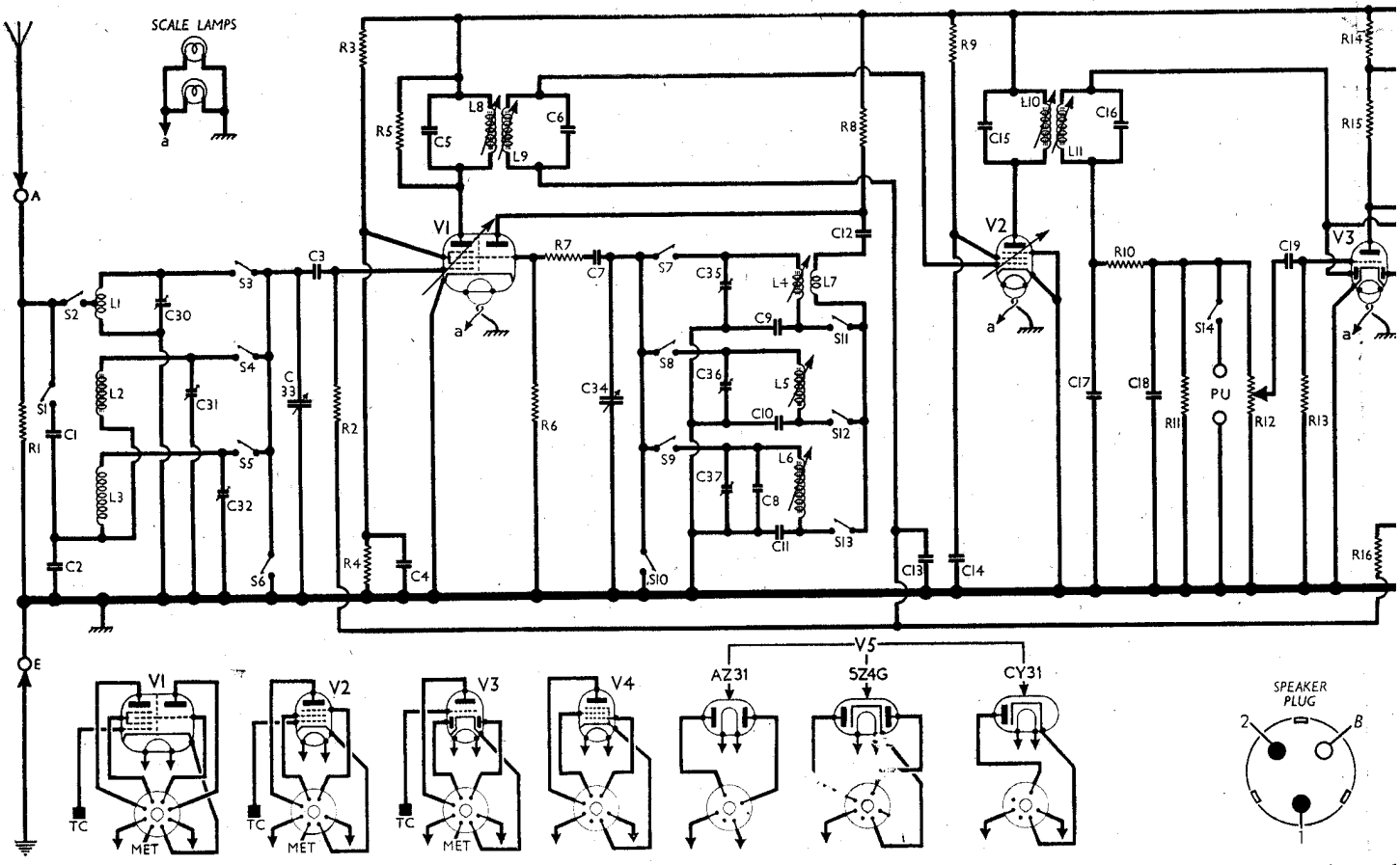
Aerial input is directly coupled, via a tapping, to single-tuned circuit **L1, C33** on S.W., and bottom coupled by the capacitative potential divider **C1, C2** to single-tuned circuits **L2, C33** (M.W.) and **L3, C33** (L.W.). A resistor **R1** shunts the input circuit to prevent modulation hum.

First valve **(V1, Mullard metallized ECH35)** is a triode-hexode operating as frequency changer with internal coupling. Triode oscillator grid coils **L4** (S.W.), **L5** (M.W.) and **L6** (L.W.) are tuned by **C34** with parallel trimming by **C35** (S.W.), **C36** (M.W.) and **C8, C37** (L.W.) and series tracking by **C9** (S.W.), **C10** (M.W.) and **C11** (L.W.). Capacitative reaction coupling, via **C12,** due to the common impedance of the tracking capacitors in grid and anode circuits, is employed on all bands, with additional inductive coupling on S.W. by **L7.**

Second valve **(V2, Mullard metallized EF39)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings **C5, L8, L9, C6** and **C15, L10, L11, C16.**

Intermediate frequency 465 kc/s.

Diode second detector is part of double diode triode valve **(V3, Mullard metallized EBC33).** Audio frequency component in rectified output is developed across load resistor **R11** and passed via manual volume control **R12,** A.F. coupling capacitor **C19** and C.G. resistor **R13,** to grid of triode section, which operates as A.F. amplifier. I.F. filtering by **C17, R10, C18** in diode



Circuit diagram of the Regentone A358 A.C. table superhet, with inset below it a diagram of the speaker plug as seen from the free end
model are explained under "A.C./D.C. Versions" overleaf, while the diagram at the foot of col. 6 on this side shows the A.C./D.C. p
radiograms are explained under "Radiogram Modifications" overleaf. Diagrams for the two alternative A.C. rectifiers and the A.C./D

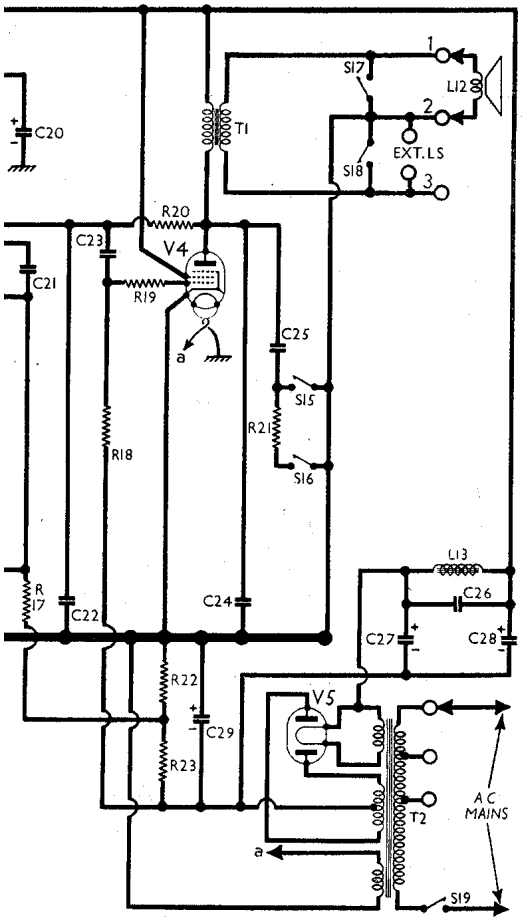
circuit and **C22** in triode anode circuit. Provision for the connection of a gramophone pick-up across **R12,** via **S14.**

Second diode of **V3,** fed from **L11** via **C21,** provides D.C. potential which is developed across load resistor **R17** and fed back through a decoupling circuit **R16, C13** as G.B. to F.C. and I.F. valves, giving automatic gain control.

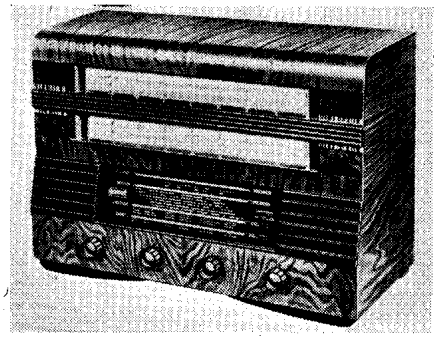
Resistance-capacitance coupling by **R15, C23, R18,** via grid stopper **R19,** between **V3** triode and pentode output valve **(V4, Mullard EL33).** Negative voltage feedback between **V4** anode and **V3** anode is provided by **R20,** with fixed tone correction by **C24,** and three-position tone control by **C25, R21, S15, S16.**

Sockets and a three-position switch **S17, S18** enable a low-impedance external speaker to be operated from **T1** secondary winding. **S18** closes to mute the external speaker, or **S17** closes to mute the internal speaker; when both switches are open, the internal and external speakers are connected in series across **T1** secondary.

H.T. current is supplied by full-wave rectifying valve **(V5, Mullard AZ31** or **5Z4G).** Smoothing by iron-cored choke **L13,** tuned to the ripple frequency by **C26,** and electrolytic capacitors **C27, C28.** Fixed G.B. for **V1, V2** and **V4,** and A.V.C. delay voltage, is obtained from the drop across **R22, R23** in the H.T. negative lead to chassis.



s of the pins. The differences in the A.C./D.C. ower supply circuit. The differences in the .C. rectifier are inset with the valve diagrams.



The appearance of the table models A358 and U358.

COMPONENTS AND VALUES

	CAPACITORS	Values (μF)	Locations
C1	Aerial coupling capacitors	0·01	J4
C2		0·00375	H4
C3	V1 hex C.G.	0·0001	H4
C4	V1 S.G. decoup.	0·1	H5
C5	1st I.F. trans. tun.	0·0001	A2
C6		0·0001	A2
C7	V1 osc. C.G.	0·0001	H4
C8	Osc. L.W. trim.	0·00003	G4
C9	Osc. S.W. tracker	0·00375	G4
C10	Osc. M.W. tracker	0·0004	G4
C11	Osc. L.W. tracker	0·00013	G4
C12	Osc. anode coup.	0·0001	G4
C13	V2 C.G. decoup.	0·1	G5
C14	V2 S.G. decoup.	0·1	F5
C15	2nd I.F. trans. tun.	0·0001	B2
C16		0·0001	B2
C17	I.F. by-pass cap.	0·0001	B2
C18		0·0001	B2
C19	A.F. coupling	0·01	E3
C20*	V3 H.T. decoup.	4·0	E4
C21	A.G.C. coupling	0·0001	E5
C22	I.F. by-pass	0·0001	D5
C23	A.F. coupling	0·01	D5
C24	Tone corrector	0·01	C5
C25	Tone control	0·01	D4
C26	H.T. choke tune	0·5	E4
C27*	H.T. smoothing capacitors	16·0	A1
C28*		16·0	A1
C29*	G.B. by-pass	25·0	F3
C3	Aerial S.W. trim.	0·00005	J4
C31‡	Aerial M.W. trim.	0·00005	J4
C3	Aerial L.W. trim.	0·00005	J5
C33	Aerial tuning	0·000412	A1
C34†	Oscillator tuning	0·000412	A1
C35‡	Osc. S.W. trim.	0·00005	G3
C36‡	Osc. M.W. trim.	0·00005	G4
C37‡	Osc. L.W. trim.	0·00005	G4

* Electrolytic. † Variable. ‡ Pre-set.

	RESISTORS	Values (ohms)	Locations
R1	Aerial shunt	5,000	J6
R2	V1 hex. C.G.	500,000	H5
R3	V1 S.G. potential divider resistors	56,000	G5
R4		47,000	G5
R5	I.F. stabilizer	100,000	G5
R6	V1 osc. C.G.	50,000	H6
R7	Osc. stabilizer	100	H5
R8	Osc. anode load	47,000	G5
R9	V2 S.G. feed	100,000	F5
R10	I.F. stopper	47,000	B2
R11	Sig. diode load	330,000	E5
R12	Volume control	2,200,000	E3
R13	V3 triode C.G.	4,700,000	E6
R14	V3 H.T. decoup.	51,000	E5
R15	V3 triode load	100,000	D5
R16	A.G.C. decoupling	1,200,000	F5
R17	A.G.C. diode load	1,200,000	E5
R18	V4 C.G. resistor	100,000	D5
R19	V4 C.G. stopper	10,000	D5
R20	F.-B. coupling	1,200,000	E5
R21	Part tone control	5,000	C3
R22	Fixed G.B., and A.V.C. delay, resistors	47	F3
R23		75	F3

	OTHER COMPONENTS	Approx. Values (ohms)	Locations
L1	Aerial tuning coils	Very low	J4
L2		2.25	J4
L3		86.0	J5
L4	Oscillator tuning coils	Very low	G3
L5		2.2	G4
L6		12.0	G4
L7	Osc. react. coil	0.5	G3
L8	1st I.F. trans. Pri.	7.0	A2
L9	1st I.F. trans. Sec.	7.0	A2
L10	2nd I.F. trans. Pri.	7.0	B2
L11	2nd I.F. trans. Sec.	7.0	B2
L12	Speech coil	2.5	—
L13	Smoothing choke	190.0	B1
T1	Output trans. Pri.	900.0	D4
	Output trans. Sec.	0.4	D4
T2	Main trans. Pri., total	27.0	B1
	Main trans. Heat. sec.	Very low	B1
	Main trans. Rect. heat. sec.	Very low	B1
	Main trans. H.T. sec., total	430.0	B1
S1-S14	W/band switches	—	H3
S15,16	Tone switches	—	C3
S17,18	Speaker switches	—	D6
S19	Mains sw., g'd R12	—	E3

If the component numbers given in the foregoing tables are used when ordering replacement parts, dealers are advised to mention the fact on the order, as these numbers may differ from those used in the manufacturers' diagram.

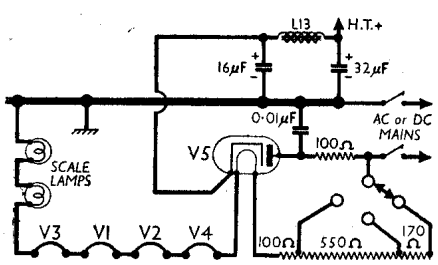
VALVE ANALYSIS

Valve voltages and currents given in the tables below are those measured in our receivers when they were operating on 220V A.C. mains, using the 200-220V mains tappings. The receivers were tuned to the lowest wavelengths on the M.W. band, and the volume controls were at maximum, but there was no signal input.

Voltages were measured on the 400V scale of a model 7 Avometer, chassis being the negative connection.

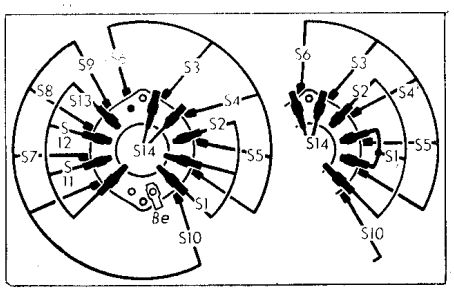
Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
	A.C. Model			
V1 ECH35	253 Oscillator 57	3.9 3.3	86	1.4
V2 EF39	253	5.9	85	1.6
V3 EBC33	46	1.4	—	—
V4 EL33	218	34.0	253	4.3
V5 AZ31	267†	—	—	—
	A.C./D.C. Model			
V1 CCH35	226 Oscillator 68	1.8 3.5	65	1.5
V2 EF39	226	4.9	82	1.4
V3 EBC33	106	0.9	—	—
V4 CL33	184	43.0	226	5.6
V5 CY31	*	—	—	—

† Each anode, A.C.
* Cathode to chassis 233 V.D.C.



Mains input and power supply circuit in the A.C./D.C. models. The values of added components are indicated. The lowest tapping on the ballast resistor is for .100V mains.

Waveband Switch Unit



Left.—Diagram of the waveband switch unit, drawn as seen from the rear of an inverted chassis. *Right.*—The right-hand section only, viewed from the same position, as it may be found in some chassis. It may be recognised by the "strap" between the two tags forming part of **S1**. The waveband switch table is given below.

Switch	L.W.	M.W.	S.W.	Gram
S1	C	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	—	—	—
S14	—	—	—	C

DISMANTLING THE SET

The cabinet is fitted with a small detachable bottom cover, upon removal of which (four round-head wood screws) access may be gained to the trimmer capacitors and tuning coils. The dismantling operations should be carried out in the order described below, the speaker being removed first.

Removing Speaker.—Withdraw the speaker connecting plug from its socket on the chassis deck;
remove the two round-head wood screws, securing the speaker chassis to the sub-baffle, loosen the nuts of the speaker retaining clamps and swivel the clamps aside, and lift out the speaker.

When replacing, the connecting tags should point to the top right-hand corner of the cabinet.

Removing Chassis.—Remove the four control knobs (pull off) and felt washers; from the underside of the cabinet remove the four hexagon head machine screws (with large metal washers) securing the chassis, and slide it out of the cabinet.

GENERAL NOTES

Switches.—**S1** to **S14** are the waveband and radio/gram change-over switches, ganged in a single rotary unit beneath the chassis. This unit is indicated in our under-chassis view, and shown in detail as it was in our chassis in the left-hand diagram in col. 1, where it is drawn as seen from the rear of an inverted chassis.

The right-hand diagram shows the right-hand half of the unit only as it may appear in some chassis, where the arrangement is slightly different. It can most readily be identified by the short-circuit connection betwen the tags at 3 o'clock and 4 o'clock on the face of the unit.

The table (col. 1) gives the switch positions for the four control settings, starting from the fully anti-clockwise position of the control knob, and is the same for either type of unit. A dash indicates open, and **C**, closed.

S15, S16 are the tone control switches, in a small 3-position rotary unit on the front chassis member. It is indicated in our under-chassis view, and shown in detail in the right-hand diagram in col. 3 where it is drawn as seen from the rear of an inverted chassis.

In the anti-clockwise position of the control knob, both switches are open for "Brilliant" tone; in the centre position, **S16** closes for "Normal" tone; and in the clockwise position, **S15** closes for "Mellow" tone.

S17, S18 are the speaker circuit switches, in a small 3-position rotary unit on the rear chassis member. This is indicated in our under-chassis view, and shown in detail in the left-hand diagram in col. 3, where it is drawn as seen from the underside of a chassis which is standing on its rear member.

In the anti-clockwise position of the control knob **S17** closes, short-circuiting the internal speaker sockets, so that the external speaker only is in circuit; in the centre position, both switches are open, and the two speakers operate, connected in series; in the clockwise position, **S18** closes, muting the external speaker.

S19 is the Q.M.B. mains switch, ganged with the volume control **R12.**

Scale Lamps.—These are two Ever Ready M.E.S. type lamps, with small clear spherical bulbs, rated at 6.5 V, 0.3 A. They are the same in the A.C. and the A.C./D.C. versions.

External Speaker.—Two sockets are provided at the rear of the chassis for a low impedance (about 4Ω) external speaker. Switching permits either the internal or external speaker to be muted, or both to be operated together, so that the external speaker may be left permanently connected.

In the A.C./D.C. version, if the isolating capacitor between the speech coil circuit and chassis is not fitted, it is advisable on A.C. mains that the "earthy" mains lead goes to chassis, as otherwise the sockets may become "live."

Capacitors C27, C28.—These are two dry electrolytics in a tubular metal container mounted in a clip on the chassis deck. The unit is rated at 16+16μF, 450 V D.C. working. The case is the common negative connection, and in the A.C. version it is insulated from its clip. The red-spotted tag is the positive connection of the reservoir section, **C27.**

In the A.C./D.C. version, the two sections are connected in parallel to form **C28,** and an additional unit, rated at 16μF, 450 V D.C. working, 550 V surge, is fitted as **C27.**

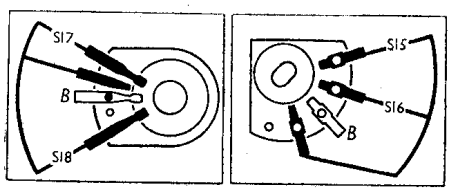
Chassis Divergencies.—In addition to the different switch unit described earlier, there may be a 5Z4G valve as rectifier instead of the AZ31. Care should be exercised here, as the heater conditions are different, while the base connections are similar.

In some cases, the chassis using the 5Z4G can be recognized by the special transformer associated with it, a Parmeko product with plastic-insulated connecting leads beneath the chassis, and a shroud enclosing the upper side on the chassis deck. In other cases, however, a 5Z4G transformer might be of the same type as the AZ31 transformer: no shroud above the deck and the connections below brought out to two rows of tags.

With the latter type, the heater voltage is marked beside the two tags concerned (they are the right-hand pair on the rear row, when viewed from the rear). This provides a means of identification (4 V, 1.1 A for AZ31, or 5 V, 2 A for 5Z4G), but necessitates removing the chassis from the cabinet. Another method is to measure the voltage at the holder (pins 2 and 8), using an AC voltmeter.

Unless the old valve is available it is important to ascertain which is the correct valve before supplying or fitting a new one, particularly if this is an AZ31.

Other Switch Units



Left.—Diagram of the speaker circuit switch unit **S17, S18** drawn as seen from the under side of a chassis standing on its back. *Right.*—Diagram of the tone control switch unit **S15, S16,** drawn as seen from the rear of an inverted chassis. ***B*** indicates a blank tag.

A.C./D.C. Versions

Apart from the usual series heater circuit, the principal difference in the U358, as compared with the latest A358, is the inclusion of self-biasing resistors in the cathode circuits of the four receiving valves in place of the common bias resistors **R22, R23** in the negative H.T. lead to chassis.

The valves used in the U358, together with their cathode resistors and by-pass capacitors, with their chassis locations, are as follows: **V1,** CCH35, 220Ω and 0.1μF (found in chassis location H6); **V2,** EF39, 330Ω (F5) and 0.1μF (F6); **V3,** EBC33, 4,700Ω (E6) and 25μF (E4); **V4,** CL33, 180Ω (C6) and 25μF (D4).

The power circuit is shown in col. 6 overleaf, where added component values are indicated. **C28** becomes 32μF, the two sections originally **C27** and **C28** being connected in parallel, and **C27** is replaced by an additional 16μF unit located at (C4), beneath the chassis.

The following isolated changes occur at various points of the receiver circuit, the locations being given in brackets

A 0.01μF capacitor (J6) is inserted between the junction of the aerial socket and **R1** and the junction of **S1** and **S2.** A 1,200,000Ω resistor (J6) shunts **S1, C1, C2.**

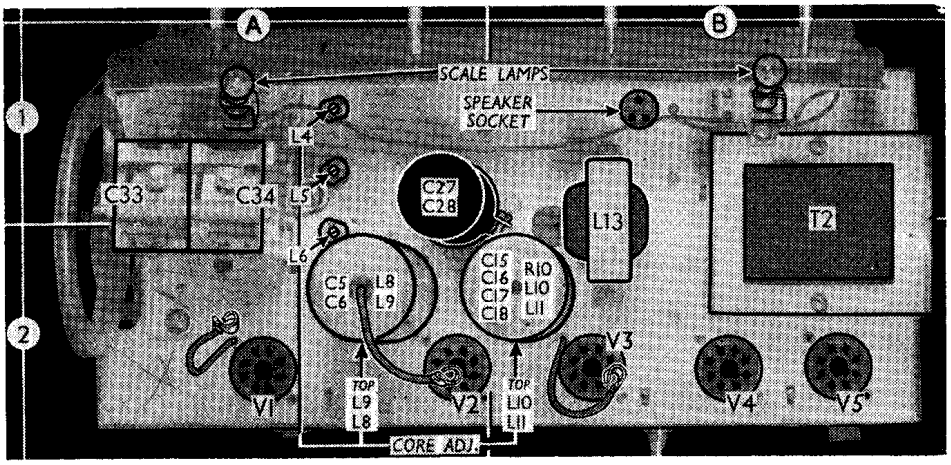
A 0.01 capacitor (J6) is inserted in the lead from the earth socket to chassis.

A 0.1μF capacitor is inserted between the "earthy" pick-up socket and chassis (G5). and a 0.01μF goes in series with the other pick-up socket (G6).

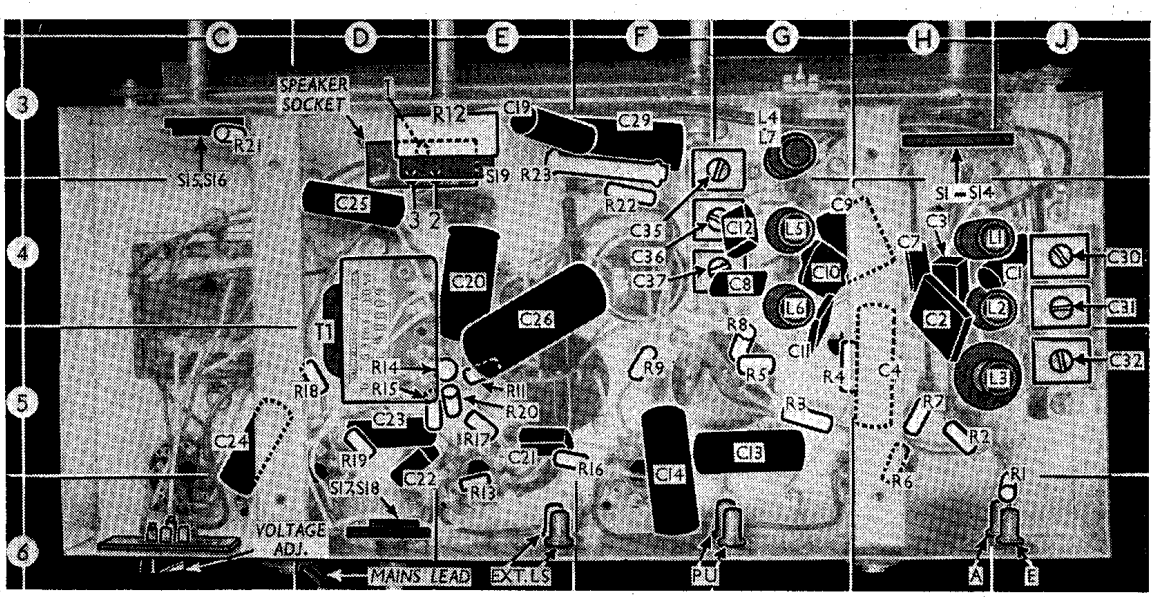
A 0.01μF capacitor will in some chassis be inserted in the lead from **T1** secondary to chassis.

The 0.01μF capacitor and 100Ω resistor associated with the rectifier anode lead are located at (C4) and (C5) respectively.

Under "Valve Analysis," two tables are given, one for the A358 and one for the U358.



Plan view of the chassis, in which all the core adjustments are indicated. In the A.C./D.C. versions, the place of the mains transformer **T2** is taken by an adjustable heater ballast resistor.



Under-chassis view. The three switch units **S1-S14**; **S15, S16**; and **S17, S18** indicated here are shown in detail in the diagrams at the head of cols. 1 and 3. The pins of the speaker socket, which is partially obscured by the volume control **R12**, are identified. In the A.C./D.C. model, an isolating capacitor is mounted near the **E** socket, and an additional electrolytic is found to the left of **T1**.

RADIOGRAM MODIFICATIONS

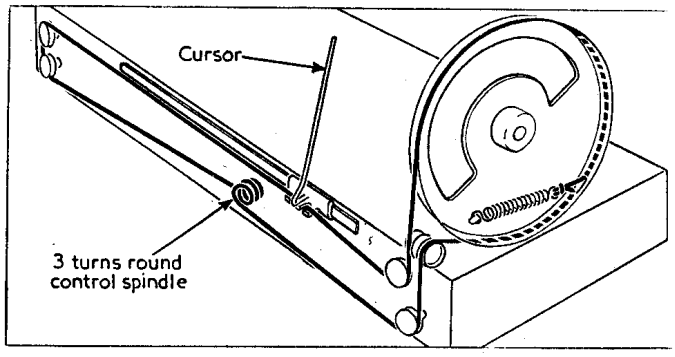
In the RG358, the ARG358 and the **RG358U**, the speaker switch unit **S17, S18** is mounted on the rear of the cabinet and is connected to chassis via the 3-pin plug which is used in the table model as the speaker connecting-plug. The external speaker sockets and the speaker, which is a 10in model in the radiograms, are connected to the switch unit.

In the pick-up circuit, a 100,000Ω resistor is inserted in the lead to **S14**, and a 250,000Ω shunts the P.U. input between **S14** and chassis.

The mains frequency on the autoradiogram ARG358 is limited to 50c/s. The gramophone motor units used are: in the RG358, a Garrard type AC7 or a Collaro type AC47; in the ARG358, a Garrard RC70 automatic record changer; in the RG358U a universal Garrard motor unit is used.

DRIVE CORD REPLACEMENT

Five feet of waxed fishing line is required for the drive cord, including ample surplus for tying off. The sketch below shows the complete system as seen from the front right-hand corner of the chassis when the gang is at maximum capacitance.



Sketch showing the tuning drive system, viewed from the front right-hand corner of the chassis when the gang is at maximum capacitance.

The whole cord can be made up as a complete loop, the ends being tied together round the ring on the tension spring. The loop is then threaded through the entry slot in the groove on the gang drum, from inside to out so as to leave the spring inside, when the cord can be run as shown in the sketch. It is finally pulled up by engaging the grip in the pointer carriage and by hooking the tension spring to its anchor. The inside length of our loop, stretched between two pins, was 28¼ inches.

If preferred, however, one end only can be tied to the tension spring while the cord is run, the other end being tied to the spring again at the end of its run. The pointer should be set to coincide with the double calibration marks at the bottom ends of the four scales when the gang is at minimum capacitance.

CIRCUIT ALIGNMENT

If the small detachable bottom cover is removed (four round-head wood screws), these operations can be carried out with the chassis in position in the cabinet.

I.F. Stages.—Switch set to M.W., turn gang capacitor and volume control to maximum, short-circuit **C34** (location reference A1), and connect signal generator, via an 0.1μF capacitor in the "live" lead, to control grid (top cap) of **V1** and the **E** socket. Feed in a 465 kc/s (645.16m) signal, and adjust the cores of **L11, L10, L9** and **L8** (B2, A2) for maximum output.

R.F. and Oscillator Stages.—With the gang at minimum capacitance the cursor should be coincident with the parallel lines at the low wavelength ends of the four scales. It may be adjusted in position by rotating the drive drum on its spindle, after slackening the grub screw. Transfer "live" signal generator lead to **A** socket, via suitable dummy aerial.

L.W.—Switch set to L.W., tune to 1,000m on scale, feed in a 1,000m (300 kc/s) signal, and adjust **C37** (G4) and **C32** (J5) for maximum output. Tune to 1,875m on scale, feed in a 1,875m (160 kc/s) signal, and adjust the core of **L6** (A2) for maximum output, while rocking the gang. Repeat these operations until no improvement results.

M.W.—Switch set to M.W., tune to 214.3m on scale, feed in a 214.3m (1,400 kc/s) signal, and adjust **C36** (G4) and **C31** (J4) for maximum output. Tune to 500m on scale, feed in a 500m (600 kc/s) signal, and adjust the core of **L5** (A1), while rocking the gang, for maximum output. Repeat these operations until no improvement results.

S.W.—Switch set to S.W., tune to 18 Mc/s on scale, feed in an 18 Mc/s (16.67m) signal, and adjust **C35** (G3) and **C30** (J4) for maximum output, choosing the peak for **C35**, which involves the lesser trimmer capacitance. Tune to 50m on scale, feed in a 50m (6 Mc/s) signal, and adjust the core of **L4** (A1), while rocking the gang, for maximum output. Repeat these operations until no improvement results.

Service Short-cuts

Philips 617L

I came across a mystifying fault in one of these receivers recently. Having successfully completed a repair on it, I boxed up the set and switched it on to enjoy my handiwork. As is my usual practice, I watched the valve heaters begin to glow, which I think is a good indication that nothing very serious is going to happen, then I returned to the front of the set and awaited audible signs of life.

At the first few notes of music, however, the signal faded rapidly away. At this rebuff it was observed also that the scale lamps had failed to light up, but after a short interval the signal reappeared, only to die away again as before. This went on quite regularly, and the scale lamps still did not light.

The solution was extremely simple, but diagnosis required a certain vital piece of "local" knowledge. This set is of the A.C./D.C. variety, and in order to protect the scale lamps, which are in series with the heaters, against the initial surge, they are short-circuited by a relay-operated switch, which opens only when the H.T. current is flowing well. It might be well to note for future reference when dealing with one of these receivers, that this kind of behaviour is merely the symptom of a faulty scale lamp (*"Trader" Service Sheet* 627).

What happens is that when the valves are beginning to work, the relay opens the switch, but if one of the scale lamps is open circuited, then so is the series-connected heater circuit. As the heaters cool down, however, the H.T. current falls, so the relay closes, and the cycle starts all over again. Presumably I had handled the scale lamps clumsily when refitting the chassis.—**E. A. W. S.**, Pinner.

E.M.I. Control Spindles

All service engineers will have found the need occasionally to replace an E.M.I. control with a slotted spindle.

If the correct type of control with the slotted spindle is not available, it is quite a simple matter to make the necessary cut in an ordinary solid spindle if *two* blades are used in the hacksaw to provide the required width.—**R. C. B.**, Ambleside.

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