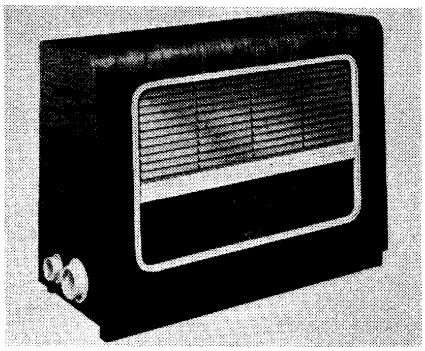
"TRADER" SERVICE SHEET

955

REGENTONE A121 & U121

Covering the Auto 99 Table Autoradiogram



The appearance of the Regentone A121 and U121 superhets, which use similar cabinets

DESIGNED in two versions for A.C. and A.C./D.C. mains, the Regentone 121 chassis is a 4-valve (plus rectifier) 3-band superhet. It has provision for a gramophone pick-up, with switching, and for an external speaker. The waveband ranges are 18-6 Mc/s (16.5-50 m), 200-550 m and 1,000-2,000 m.

The A121 is designed to operate from A.C. mains only of 110-120 V and 200-250 V (three tappings), 50-60 c/s. The U121 covers the same voltage ranges on A.C. or D.C. mains.

Both receivers are fully covered in this *Service Sheet*. The circuit diagram below is that of the A121, small differences in the U121 being indicated in the early stages by a broken line. If the page is folded so that **V2, V3** and **V4** are covered over, a section diagram overleaf converts the A.C. diagram into that of the U121.

The chassis of the A121 is used also in the Auto 99 autoradiogram, which is therefore covered also in this *Service Sheet*, the slight differences being explained under "General Notes."

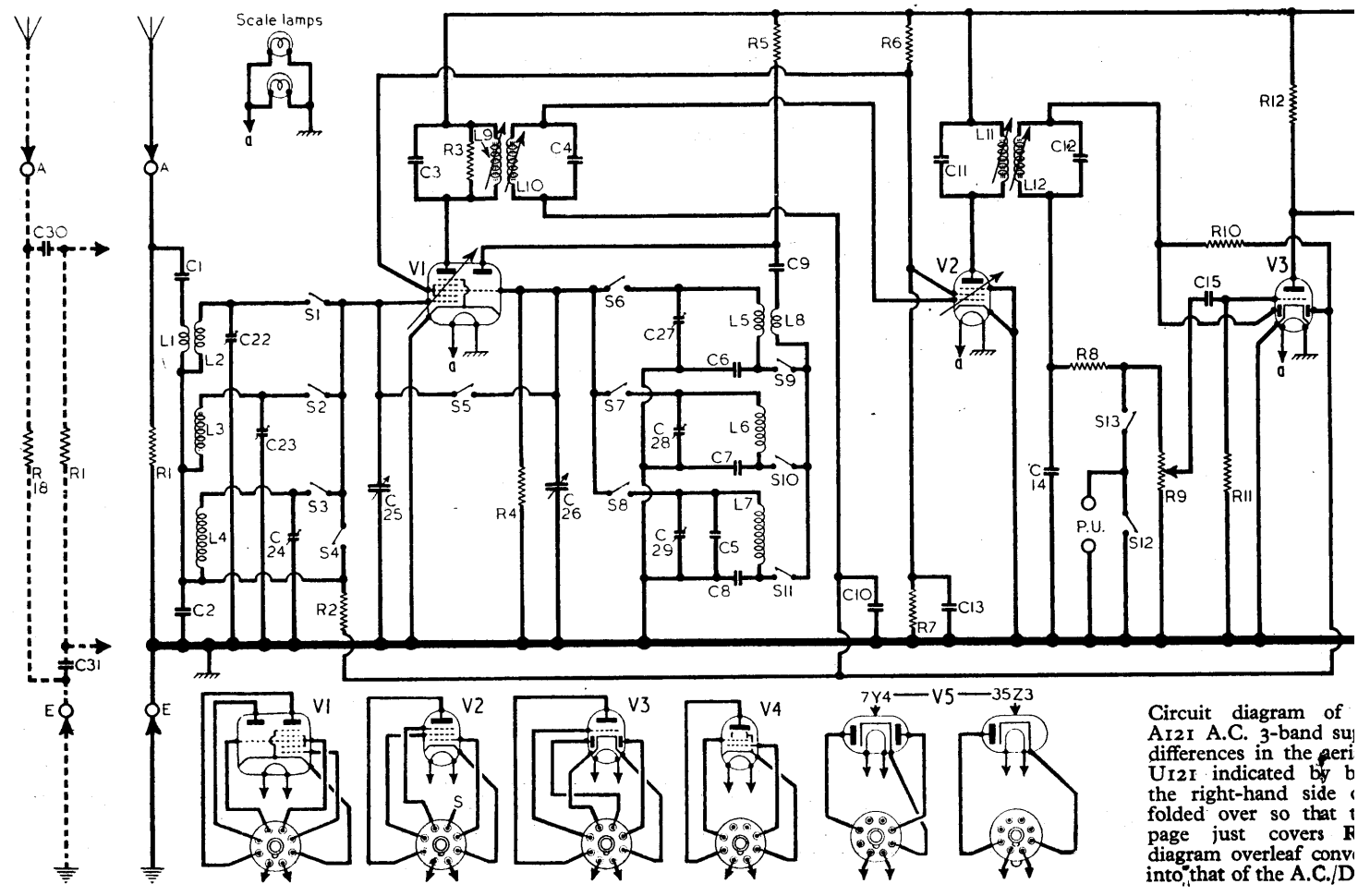
Release date, all models, November 1949. *Original prices: A*121, £14 14*s.; U*121, £15 2*s.* 9*d.; Auto* 99, £28 13*s* 6*d. Purchase tax extra.*

CIRCUIT DESCRIPTION

The aerial is coupled inductively by **L1** (S.W.), and capacitatively "bottom" coupled by **C1, C2** (M.W. and L.W.), to single-tuned circuits **L2, C25** (S.W.), **L3, C25** (M.W.) and **L4, C25** (L.W.) which precede triode-heptode valve **(V1, Cossor 7S7** (A.C. model) or **14S7** (A.C./D.C. model)) operating as frequency changer with internal coupling. In the A.C./D.C. model, the **A** and **E** sockets are isolated by **C30, C31,** but **R18** is connected between them to provide D.C. continuity.

Triode oscillator grid coils **L5** (S.W.), **L6** (M.W.) and **L7** (L.W.) are tuned by **C26.** Parallel trimming by **C27** (S.W.), **C28** (M.W.) and **C5, C29** (L.W.); series tracking by **C6** (S.W.), **C7** (M.W.) and **C8** (L.W.). Reaction coupling from anode via **C9** across the common impedance of the trackers on all wavebands, with the addition of inductive coupling by **L8** on S.W.

Second valve **(V2, Cossor 7B7** (both versions)) is a variable-mu R.F. pentode operating as intermediate frequency am-



Circuit diagram of A121 A.C. 3-band su differences in the seri U121 indicated by b the right-hand side folded over so that t page just covers R diagram overleaf conv into that of the A.C./D

plifier with tuned transformers couplings **C3, L9, L10, C4** and **C11, L11, L12, C12.**

Intermediate frequency 465 kc/s.

The diode signal detector is part of double diode triode valve **(V3, Cossor 7C6** (both versions)**).** Audio frequency component in rectified output is developed across manual volume control **R9,** which is also the load resistor, and passed via **C15** to grid of triode section, which operates as an A.F. amplifier. In the A.C./D.C. model a separate load resistor **R19** is employed. I.F. filtering by **C14, R8** and the screening on the connecting leads.

Provision is made for the connection of a gramophone pick-up across **R9** via **S13,** which closes when the waveband control is turned to Gram. Rectification of P.U. signals by the detector diode is prevented by **R8.** On radio, the P.U. sockets are short-circuited by **S12.** In the A.C./D.C. model the P.U. sockets are isolated by **C32, C33.**

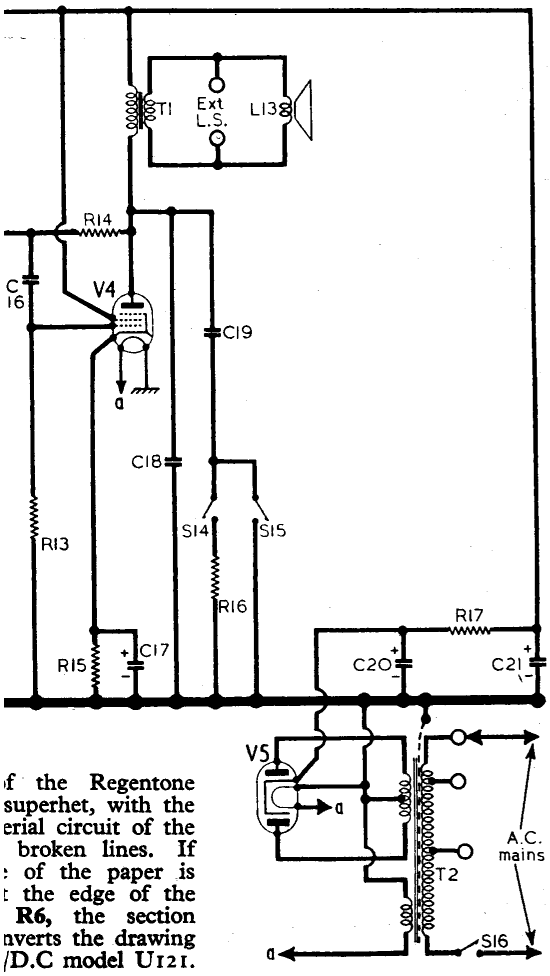
D.C. potential developed across **R8, R9** is fed back via decoupling circuit to F.C. and I.F. valves, giving automatic gain control. The A.G.C. line is connected to the second diode, which prevents it going positive with respect to chassis.

G.B. for triode section of **V3** is obtained from "Contact" potential resulting from the use of a very high value for the grid resistor **R11.**

Resistance-capacitance coupling by **R12, C16,** and **R13** is used between **V3** triode and the pentode output valve **(V4, Cossor 7C5** (A.C. model) or **35A5** (A.C. model)**).** Three degrees of tone control are provided by **C18, C19, R16** and **S14, S15** in the anode circuit of **V4.** Fixed negative feedback by **R14** between the anodes of **V3** triode and **V4.** Provision is made for the connection of a low-impedance speaker.

In the A.C. model, H.T. current is supplied by I.H.C. full-wave rectifying valve **(V5, Cossor 7Y4).** Smoothing by electrolytic capacitors **C20, C21** and resistor **R17.**

In the A.C./D.C. version, H.T. current is supplied by half-wave rectifier **(V5, Cossor 35Z3).** The same smoothing circuit is used, but the screens of **V1, V2** and **V4** are fed from an additional smoothing circuit **R23, C38** and decoupling is added by **R20, C35** in the H.T. feed to **V3** triode anode. The valve heaters, scale lamps and ballast resistor **R21** are connected in series across the mains input. R.F. filtering by **C36** and **C37.**



f the Regentone superhet, with the erial circuit of the broken lines. If : of the paper is t the edge of the **R6,** the section nverts the drawing /D.C model U121.

COMPONENTS AND VALUES

Resistors	A.C. MODEL Values	A.C. MODEL Locations	A.C./D.C. MODEL Values	A.C./D.C. MODEL Locations
R1	4·7kΩ	G4	4·7kΩ	G4
R2	100kΩ	G4	100kΩ	G4
R3	100kΩ	G3	100kΩ	G3
R4	47kΩ	G4	47kΩ	G4
R5	47kΩ	G4	33kΩ	G4
R6	27kΩ	F4	—	—
R7	27kΩ	F3	—	—
R8	47kΩ	F4	47kΩ	F4
R9	250kΩ	D3	250kΩ	D3
R10	2·2MΩ	F4	2·2MΩ	F4
R11	8MΩ	F4	8MΩ	F4
R12	220kΩ	F3	100kΩ	F3
R13	470kΩ	E3	470kΩ	E3
R14	2·2MΩ	E3	2·2MΩ	E3
R15	270Ω	F3	180Ω	F3
R16	4·7kΩ	D4	4·7kΩ	D4
R17	1kΩ	F3	1kΩ	F3
R18	—	—	1MΩ	G4
R19	—	—	270kΩ	F4
R20	—	—	100kΩ	F3
R21	—	—	986Ω†	C2
R22	—	—	100Ω	E4
R23	—	—	10kΩ	E3
R24	—	—	60Ω	C2

† Tapped at 120Ω + 666Ω + 200Ω from V5 heater.

OTHER COMPONENTS			Approx. Values (Ohms)	Locations
L1	S.W. coupling ...		0·3	G4
L2	Aerial tuning coils		0·05	G4
L3			2·8	G4
L4			37·0	G4
L5	Oscillator tuning coils		Very low	G3
L6			2·3	H3
L7			12·0	H3
L8	S.W. reaction ...		0·4	G3
L9	1st I.F. trans.	Pri.	7·5	A1
L10		Sec.	7·5	A1
L11	2nd I.F. trans.	Pri.	7·5	B2
L12		Sec.	5·0	B2
L13	Speech coil ...		2·5	—
T1	O/put trans.	Pri.	300·0	F3
		Sec.	0·5	E3
T2	Mains trans.	Pr., total	40·0	C1
		Heat. sec.	0·1	
		H.T. sec., total	500·0	
S1-S11	Waveband switches		—	H4
S12, S13	P.U. switches ...		—	
S14, S15	Tone control sw.		—	D4
S16, S17	Mains sw., g'd R9.		—	D3

Capacitors	A.C. MODEL Values	A.C. MODEL Locations	A.C./D.C. MODEL Values	A.C./D.C. MODEL Locations
C1	0·01μF	G4	0·01μF	G4
C2	0·00375μF	H4	0·00375μF	H4
C3	100pF	A1	100pF	A1
C4	100pF	A1	100pF	A1
C5	30pF	H3	30pF	H3
C6	0·0027μF	G3	0·0027μF	G3
C7	410pF	H3	410pF	H3
C8	125pF	H3	125pF	H3
C9	100pF	G4	100pF	G4
C10	0·1μF	G3	0·1μF	G3
C11	100pF	B2	100pF	B2
C12	180pF	B2	180pF	B2
C13	0·1μF	G4	0·1μF	G4
C14	500pF	F4	500pF	F4
C15	0·01μF	F4	0·01μF	F4
C16	0·01μF	F3	0·01μF	F3
C17*	25μF	E4	25μF	E4
C18	0·01μF	E3	0·005μF	D4
C19	0·05μF	D4	0·05μF	D4
C20*	32μF	B1	32μF	B1
C21*	32μF	B1	32μF	B1
C22‡	—	A1	—	A1
C23‡	—	A1	—	A1
C24‡	—	A1	—	A1
C25†	—	A2	—	A2
C26†	—	A2	—	A2
C27‡	—	A2	—	A2
C28‡	—	A2	—	A2
C29‡	—	A2	—	A2
C30	—	—	0·01μF	G4
C31	—	—	0·01μF	G4
C32	—	—	0·1μF	G4
C33	—	—	0·1μF	F4
C34	—	—	0·005μF	F4
C35*	—	—	8μF	B1
C36	—	—	0·01μF	E4
C37	—	—	0·01μF	E4
C38*	—	—	8μF	E3

* Electrolytic. † Variable. ‡ Pre-Set.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when they were operating on A.C. mains of 230 V, using the 230-250 V adjustment tappings. The receivers were tuned to the highest wavelength on the M.W. band, and the volume control was at maximum, but there was no signal input. At other tuning points on the three wavebands the anode current of **V1** heptode varied between 0.6 mA and 6.1 mA, and with the oscillator muted this rose to 4.9 mA (in the A.C. model) and 6.9 mA (in the A.C./D.C. model).

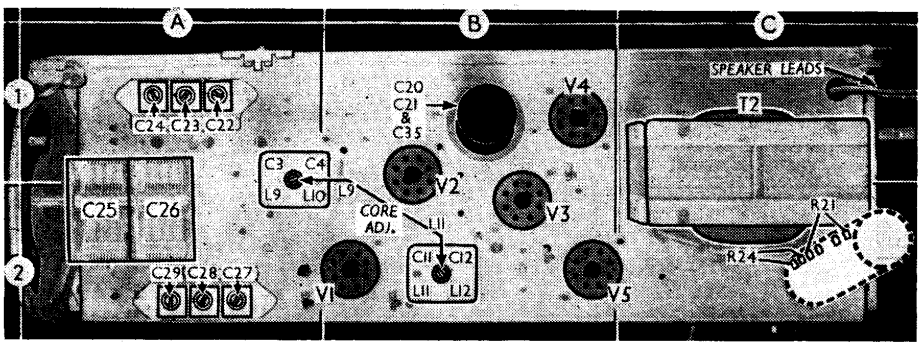
Voltages, with the exception of cathode readings, were measured on the 400 V scale of a Model 7 Avometer, chassis being the negative connection.

Valve		Anode V	Anode mA	Screen V	Screen mA	Cath. V
		A.C. Model				
V1	7S7 ...	230 Oscillator 95	1·2 2·7	65	3·2	—
V2	7B7 ...	230	6·7	65	1·4	—
V3	7C6 ...	80	0·4	—	—	—
V4	7C5 ...	215	36·0	230	3·2	10·0
V5	7Y4 ...	270§	—	—	—	290·0
		A.C./D.C. Model				
V1	14S7 ...	175 Oscillator 55	2·4 2·3	100	5.3	—
V2	7B7 ...	175	12·0	100	2·4	—
V3	7C6 ...	80	0·3	—	—	—
V4	35A5	165	33·0	100	1·3	6·0
V5	35Z3 ...	223§	—	—	—	240·0

§ A.C.

DISMANTLING THE SET

Removing Chassis.—Remove the four control knobs (pull-off) from the sides of the cabinet. If they tend to stick, they



Plan view of the chassis, in which the R.F. and oscillator adjustments are indicated. **C35** is present only in the A.C./D.C. model, and the **R21, R24** unit then replaces the mains transformer.

may be levered off with a screwdriver, using the chassis edge as a fulcrum;
remove the three hexagon self-tapping chassis fixing screws (with washers) from beneath the cabinet.

If the speaker leads are now freed from the soft metal clip on the rim of the speaker, the chassis may be withdrawn to the extent of the speaker leads, which are of ample length to permit most service operations to be carried out.

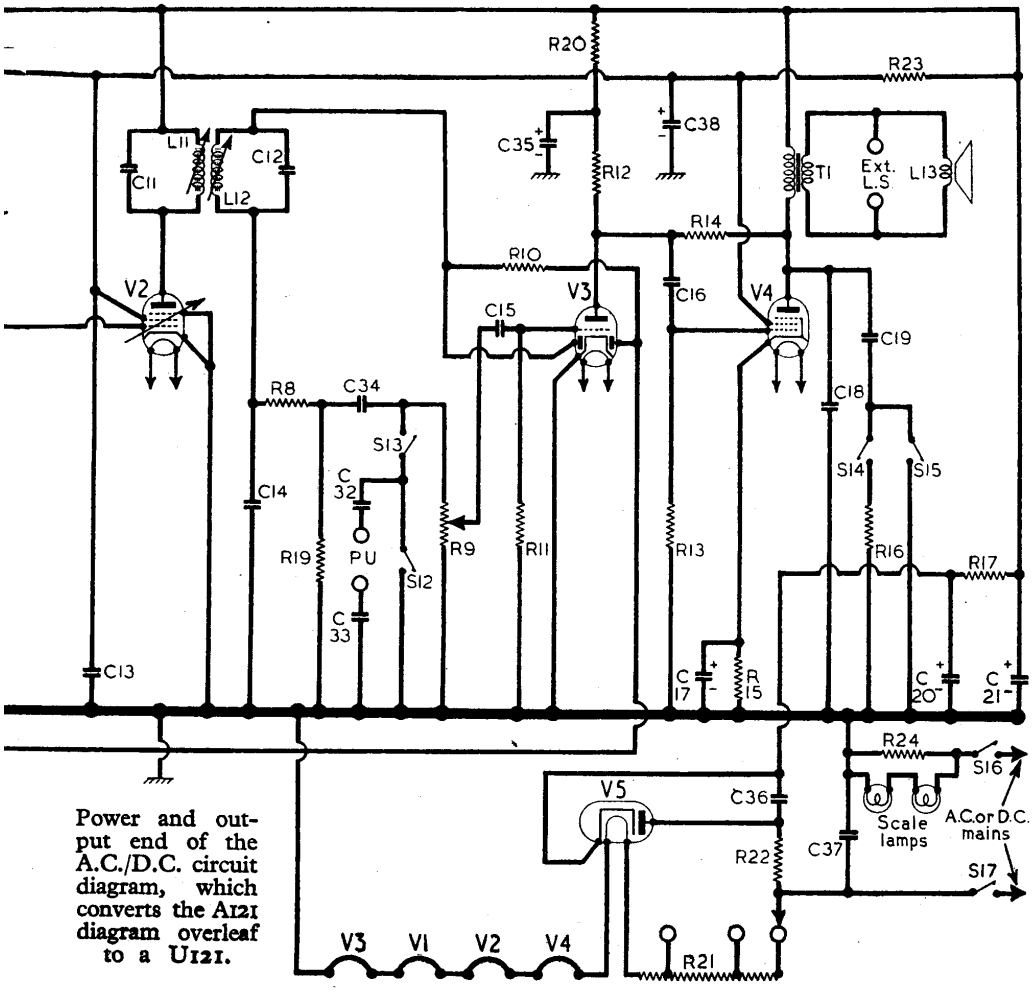
When replacing, see that the four soft rubber plugs are in position in the holes at the corners of the chassis. The chassis rides resiliently on these, and the fixing screws should not be tightened up sufficiently to make the chassis rigid, except when required for transportation.

When inserting the chassis in the cabinet, tilt it so that the scale backing plate slips under the rim of the speaker.

In the A.C./D.C. model, the chassis fixing screw heads should be covered with insulating adhesive tape.

If difficulty is experienced in getting the control knobs on to their spindles, this may be done without forcing them if their spring circlips are first drawn forward a little on their seatings.

Removing Speaker.—The speaker is held to the sub-baffle by four Phillips wood screws (with cross-shaped turnscrew sockets) for which a special tool is required. Under the head of one of them is the soft metal clip for the leads. The speech coil tags are on the right.



Power and output end of the A.C./D.C. circuit diagram, which converts the A121 diagram overleaf to a U121.

GENERAL NOTES

Switches.—S1-S13 are the waveband and radio/gram change-over switches, ganged in a double-sided unit beneath the chassis. This is indicated in our under-chassis view, and shown in detail in the diagrams in col. 4, where the two sides are shown separately. Arrows and numbered diamonds show the direction in which each side is viewed, in an inverted chassis.

The table (col. 4) gives the switch position for the four control settings, starting from the fully anti-clockwise position of the control knob. A dash indicates open and **C**, closed.

S14, S15 are the tone control switches, in a small 3-position rotary unit mounted at one end of the chassis, opposite the waveband switch unit. The tone becomes deeper as the control knob is turned clockwise. In the anti-clockwise position, both switches are open; in the next position, **S14** closes; in the fully clockwise position, **S15** closes.

S16 (in the A.C. model) **or S16, S17** (in the A.C./D.C. model) are the Q.M.B. mains switches, ganged with the volume control **R9.**

Scale Lamps.—These are two Osram lamps, with M.E.S. bases and small clear spherical bulbs. In the A.C. model they are rated at 6.5 V, 0.3 A, and in the A.C./D.C. model they are rated at 3.5 V, 0.15 A.

External Speaker.—Two sockets are provided at the rear of the chassis for the connections of a low impedance (about 2.5 Ω) external speaker.

A.C./D.C. Conversion Features.—Our main circuit diagram and chassis photographs are those of the A.C. model A121, but certain differences between this and the U121 are indicated by a broken line, as in the aerial circuit in the diagram and several components in the underchassis view, and **R21, R24** on the plan view.

In the under-chassis view several components appear twice, such as **T1** and **C18,** broken line indicating the position in the A.C./D.C. chassis, while in one case one component has two numbers, "**R1** or **R18,**" because different components occupy the position in the two versions.

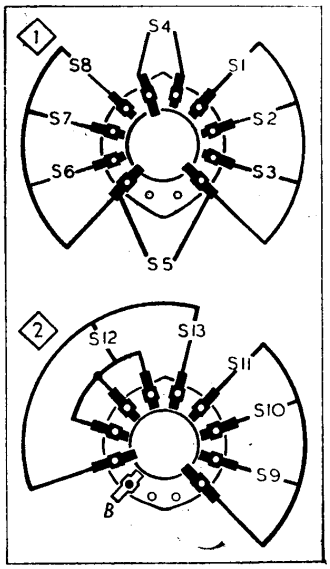
As the differences in the early stages are very small, they are indicated in the circuit diagram as stated, by broken line, but in the later stages they are considerable, and this method would lead to confusion. So, instead we print the diagram of the output half of the A.C./D.C. circuit at the foot of cols. 1 and 2 on this side of the Sheet.

If the paper is folded so that this diagram overlies the main diagram overleaf, and is adjusted so that the edge of the paper just covers **R6** on the A.C. diagram, a complete diagram of the A.C./D.C. model is presented. The differences in component values or positions are indicated in the component tables, as separate columns are given for the two versions.

Radiogram Model Auto 99.—The table radiogram model Auto 99 employs an A121 chassis with only the addition of a 22 kΩ resistor shunted across the pick-up sockets to suit the pick-up used.

The record unit is a Collaro model RC500 record changer, mounted on a slid-

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



Diagrams of the two sides of the waveband switch unit. *B* is a blank tag. Above the diagrams is the associated switch table.

ing drawer. Because of the motor ratings, there is no A.C./D.C. version of the Auto 99, and the standard model is restricted to A.C. mains of 50 c/s. Special models are supplied for 40 c/s and 60 c/s mains.

TV Technical Tips

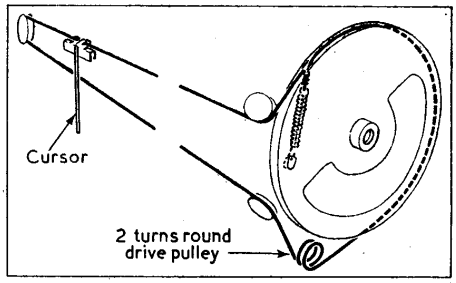
More Contributions Wanted

HINTS and tips on television servicing, interesting experiences in service work, useful "dodges" discovered by television dealers and suggestions by those who have not the opportunity for first-hand experience are required for our new feature "TV Service Forum." Contributions should be addressed to Technical Editor, "The Wireless & Electrical Trader," Dorset House, Stamford Street, London, S.E.1. Payment will be made at our usual rates for all material used.

CIRCUIT ALIGNMENT

I.F. Stages.—Remove the chassis from the cabinet, switch the set to M.W., turn the gang to maximum and the volume control to maximum. Connect signal generator leads via a 0.1 μF capacitor (one in each lead in A.C./D.C. model) to control grid (pin 6) of **V1** and chassis, feed in a 465 kc/s (645.16 m) signal, and adjust the cores of **L12, L11, L10** and **L9** (location references F4, B2, G3, A1) in that order for maximum output, reducing the input as the circuits come into line to avoid A.G.C. action.

R.F. and Oscillator Stages.—It is preferable to carry out this part of the alignment with the receiver in its cabinet, as the scale is fitted to the cabinet. Transfer signal generator leads to **A** and **E** sockets, dispensing with the isolating capacitors but



The tuning drive cord system, drawn as seen from the front right-hand corner of the chassis when the gang is at minimum capacitance.

inserting a suitable dummy aerial in the "live" lead. This may consist of a 0.0002 μF (200 pF) capacitor for M.W. and L.W., and a 400 Ω resistor for S.W.

With the gang at minimum capacitance, the cursor should coincide with the two dots at the low wavelength ends of the scales. For adjustment, the cursor may be slid along the drive cord. Location references are A1, A2.

L.W.—Switch set to L.W., tune to 1,200 m on scale, feed in a 1,200 m (250 kc/s) signal, and adjust **C29,** then **C24,** for maximum output. Check calibration at 2,000 m (150 kc/s).

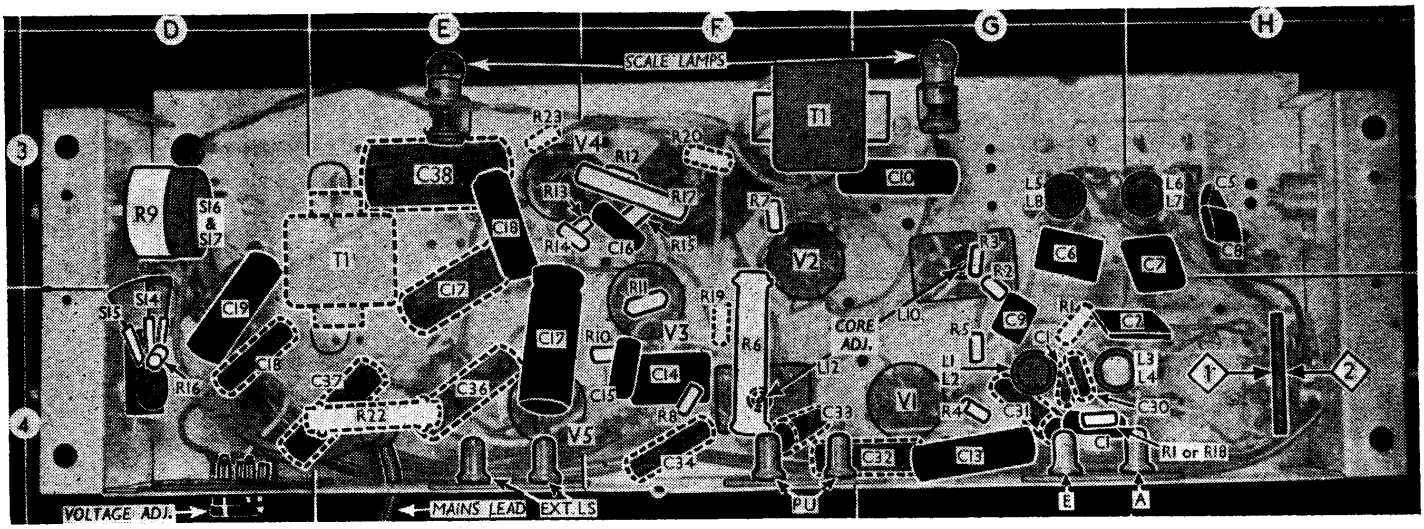
M.W.—Switch set to M.W., tune to 200 m on scale, feed in a 200 m (1,500 kc/s) signal, and adjust **C28,** then **C23,** for maximum output. Check calibration at 500 m (600 kc/s).

S.W.—Switch set to S.W., tune to 18 Mc/s on scale, feed in an 18 Mc/s (16.6 m) signal, and adjust **C27,** then **C22,** for maximum output. Check calibration at 6 Mc/s (50 m).

DRIVE CORD REPLACEMENT

About 4ft 6in of high-quality plaited flax fishing line is required for a new drive cord, which should be run as shown in the sketch above, where the system is drawn as seen from the front right-hand corner with the gang at minimum capacitance.

After fitting the cord, the cursor may be slipped into position, when it should be adjusted as described under "Circuit Alignment."



Under-chassis view. Diamonds numbered 1 and 2 show the directions in which the waveband switch unit is viewed in the diagrams in col. 4 above. Components shown with broken outline occur in the U121 only. Some components, like **T1** and **C18,** appear in different positions in the two versions. **R1** in the A121 becomes **R18** in the U121.

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