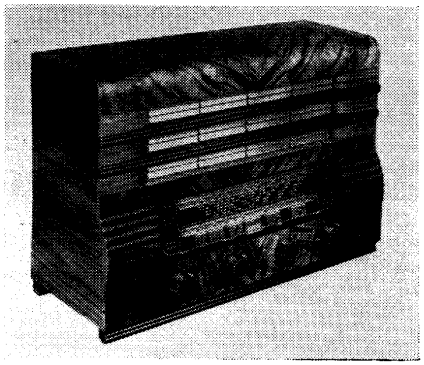
"TRADER" SERVICE SHEET

997

REGENTONE 353

Covering A353, U353, A353/2 & U353/2



THERE are two versions of the Regentone 353 Series, the A.C. model A353/2, which has a double-wound mains transformer, and the A.C./D.C. model U353/2. The following information was prepared from sample models of each, but it is written mainly on the A.C. model, the differences in the A.C./D.C. model being mentioned as they occur throughout.

The 353 receivers are 4-valve (plus rectifier) 3-band superhets covering 16-50 m, 180-550 m and 1,000-2,000 m. The A.C. models operate from mains of 100-250 V, 50-100 c/s, and the A.C./D.C. models from mains of 200-250 V, 50-100 c/s. Both have twin speakers, and provision is made for the connection of a gramophone pick-up and external speaker in each case.

Differences in an early version using a different range of valves are explained under "Chassis Divergencies" overleaf.

Release date and original price, both models: November, 1949; £20 11s 10d. Purchase tax extra.

CIRCUIT DESCRIPTION

Aerial input is inductively coupled on S.W. by **L2,** and bottom-capacity coupled on M.W. and L.W. by **C2,** to single-tuned circuits **L3, C33** (S.W.), **L4, C33** (M.W.) and **L5, C33** (L.W.). R.F. choke **L1** shunts the input to prevent modulation hum. In the A.C./D.C. model **L1** is replaced by shunt resistor **R25** and isolating capacitors **C38, C39** are added.

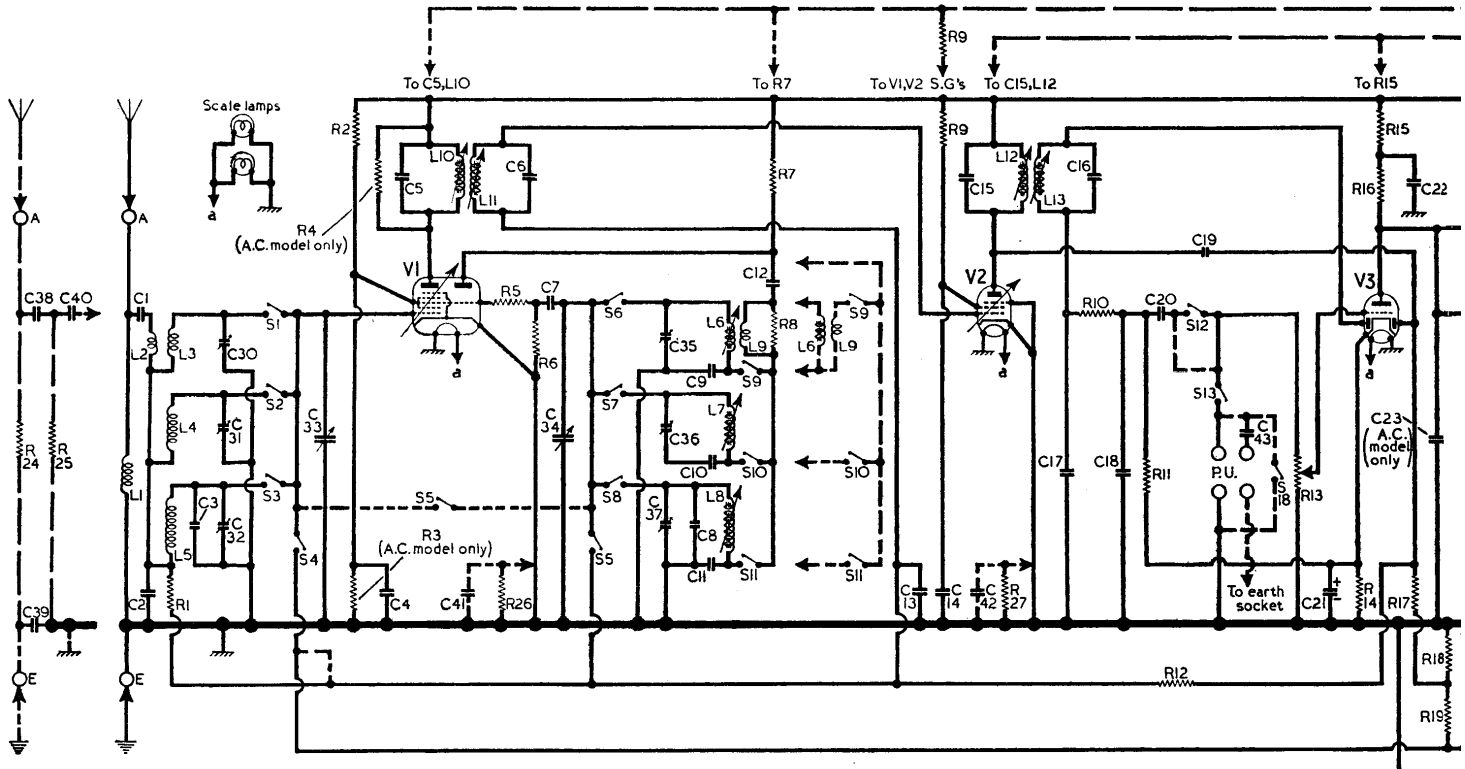
First valve **(V1, Mazda 6C9** (A.C. model) or **10C1** (A.C./D.C. model)**)** is a triode-heptode operating as frequency changer with internal coupling. Triode oscillator grid coils **L6** (S.W.), **L7** (M.W.) and **L8** (L.W.) are tuned by **C34.** Parallel trimming by **C35** (S.W.), **C36** (M.W.) and **C8, C37** (L.W.); series tracking by **C9** (S.W.), **C10** (M.W.) and **C11** (L.W.). Reaction coupling from the anode across the common impedance of the trackers, with additional inductive coupling on S.W. by **L9.**

Second valve **(V2, Mazda 6F15** (A.C. model) or **10F9** (A.C./D.C. model)**)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings **C5, L10, L11, C6** and **C15, L12, L13, C16.**

Intermediate frequency 465 kc/s.

Diode signal detector is part of double diode triode valve **(V3, Mazda 6LD20** (A.C. model) or **10LD11** (A.C./D.C. model)**).** Audio frequency component in rectified output is developed across load resistor **R11** and passed via **C20** and volume control **R13** to grid of triode section, which operates as A.F. amplifier. I.F. filtering by **C17, R10, C18** in diode circuit and **C23** in triode anode circuit.

Provision is made for the connection of a gramophone pick-up across **R13** via **S13.** In the gram. position of the waveband switch **S4, S5** close and **S12** opens muting



Circuit diagram of the Regentone A353/2 (drawn in solid line) with the differences in the U353/2 indicated by broken line.

Other differences between these two versions and the A353 and U353, which used Mullard valves, are explained overleaf under "Chassis Divergencies." **R3** is omitted in the U353/2, and so is **C23.** In the A.C. model, grid bias is obtained from a pair of resistors

radio signals. In the A.C./D.C. model, **S12** is not used and **S18** is added to short-circuit the pick-up sockets on radio.

Second diode of **V3**, fed from **V2** anode via **C19**, provides a D.C. potential which is developed across load resistor **R17** and fed back as bias to F.C. and I.F. stages giving automatic gain control. Delay voltage, together with G.B. for triode section, is obtained from the drop along **R14.**

Resistance-capacitance coupling by **R16, C24** and **R21** between **V3** triode and pentode output valve **(V4, Mazda 6P25** (A.C. model) or **10P14** (A.C./D.C. model)**).** Fixed tone correction by negative feed-back between **V4** and **V3** anodes via **R20,** and three-position variable tone control by **C26, C27, R23, S14** and **S15.** Provision is made for the connection of a low impedance type external speaker across **T1** secondary.

In the A.C. model, H.T. current is supplied by full-wave rectifying valve **(V5, Mazda UU9).** Smoothing by electrolytic capacitors **C28, C29** and choke **L16.** The voltage dropped across **R18, R19** in the H.T. negative lead to chassis is fed to **V4** control grid as bias, and a proportion of it, that dropped across **R18,** is added to the A.G.C. delay voltage and is fed back with the A.G.C. voltage as fixed bias to **V1** and **V2.**

In the A.C./D.C. model, H.T. current is supplied by I.H.C. rectifying valve **(V5, Mazda U404).** H.T. smoothing by electrolytic capacitors **C28, C29, C47,** choke **L16** and resistor **R32.** Bias for all the valves is developed across their individual cathode resistors. The valve heaters, together with scale lamps and ballast resistor **R30,** are connected in series across the mains input. R.F. filtering by **C45.**

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	100kΩ	G4	470kΩ	L6
R2	27kΩ	F4	—	—
R3	47kΩ	F4	—	—
R4	270kΩ	F4	—	—
R5	100Ω	G4	100Ω	L6
R6	33kΩ	G4	33kΩ	L6
R7	47kΩ	F4	27kΩ	K6
R8	3·3kΩ	F3	—	—
R9	100kΩ	F4	15kΩ	K6
R10	47kΩ	B2	47kΩ	B2
R11	220kΩ	E4	270kΩ	J6
R12	1·2MΩ	E4	1·2MΩ	J6
R13	250kΩ	E3	250kΩ	J5
R14	3·3kΩ	E4	2·2kΩ	J5
R15	100kΩ	E4	27kΩ	J6
R16	270kΩ	E4	47kΩ	J6
R17	1·2MΩ	E4	1·2MΩ	J6
R18	47Ω	F3	—	—
R19	100Ω	F3	—	—
R20	1·2MΩ	E4	1·2MΩ	J6
R21	470kΩ	D4	270kΩ	J6
R22	10kΩ	E4	10kΩ	J6
R23	4·7kΩ	D3	4·7kΩ	H5
R24	—	—	1·2MΩ	L6
R25	—	—	4·7kΩ	L6
R26	—	—	220Ω	K6
R27	—	—	330Ω	K6
R28	—	—	180Ω	H6
R29	—	—	47Ω	H6
R30	—	—	1,100Ω†	C1
R31	—	—	75Ω	C1
R32	—	—	1kΩ	K5

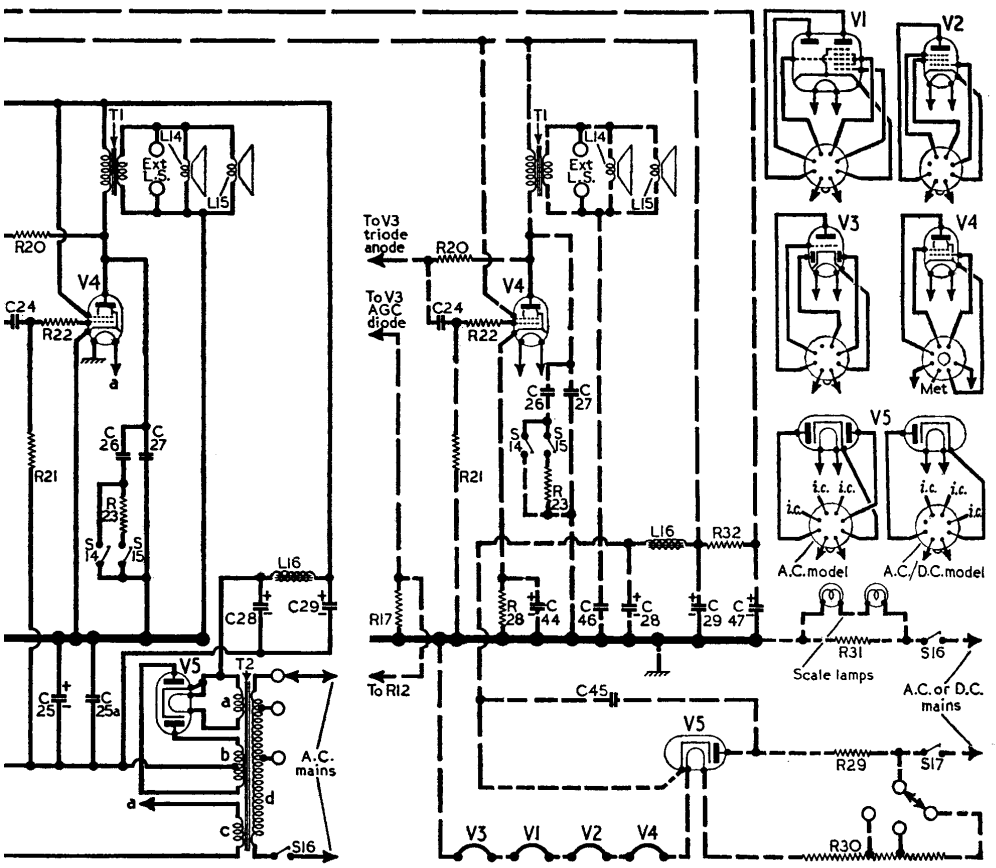
† Tapped at 700Ω + 200Ω + 200Ω+ from V5.

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	—	—
C2	0·00375μF	G4	0·00375μF	L5
C3	50pF	G3	50pF	L5
C4	0·1μF	G4	0·1μF	L6
C5	100pF	B2	100pF	B2
C6	100pF	B2	100pF	B2
C7	100pF	G3	100pF	L5
C8	50pF	F3	30pF	K5
C9	0·0027μF	F3	0·0027μF	K5
C10	400pF	F3	410pF	K5
C11	130pF	F4	130pF	K5
C12	100pF	F3	100pF	K5
C13	0·1μF	F4	0·1μF	J6
C14	0·1μF	F4	0·1μF	K6
C15	100pF	B2	100pF	B2
C16	100pF	B2	100pF	B2
C17	100pF	B2	100pF	B2
C18	100pF	B2	100pF	B2
C19	50pF	E4	50pF	J6
C20	0·01μF	E3	0·005μF	J5
C21*	25μF	E4	50μF	J5
C22	0·1μF	E4	8μF	J5
C23	100pF	E4	—	—
C24	0·01μF	E4	0·01μF	J6
C25*	25μF§	F3	—	—
C26	0·05μF	E3	0·05μF	H6
C27	0·01μF	D4	0·01μF	H6
C28*	16μF	B1	16μF	B1
C29*	32μF	B1	16μF	B1
C30‡	—	G4	—	L6
C31‡	—	G4	—	L6
C32‡	—	G3	—	L5
C33†	—	A1	—	A1
C34†	—	A1	—	A1
C35‡	—	F3	—	K5
C36‡	—	F3	—	K5
C37‡	—	F3	—	K5
C38	—	—	0·01μF	L6
C39	—	—	0·01μF	L6
C40	—	—	0·01μF	L6
C41	—	—	0·1μF	L6
C42	—	—	0·1μF	K6
C43	—	—	0·02μF	K6
C44*	—	—	25μF	H5
C45	—	—	0·01μF	H6
C46	—	—	0·01μF	J6
C47*	—	—	16μF	B1

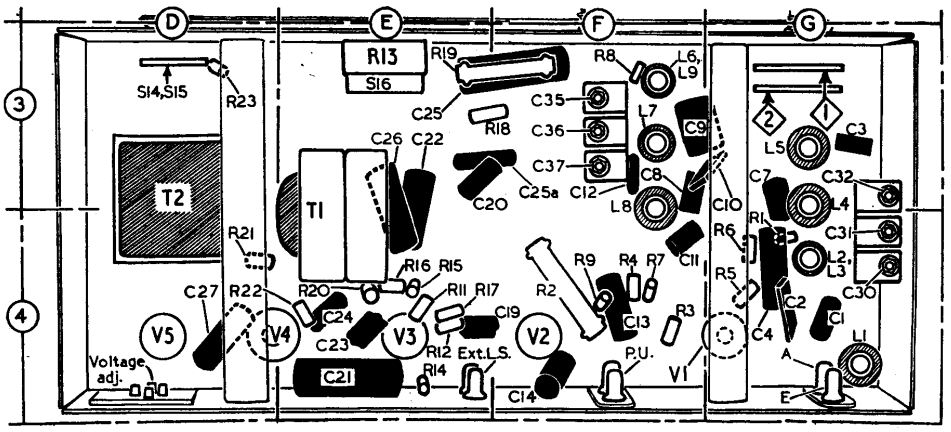
* Electrolytic. † Variable. ‡ Pre-set. § Shunted by 0·001μF capacitor C25a.

OTHER COMPONENTS		Approx. Values (ohms)	Locations
	A.C. Model		
L1	R.F. choke ...	11·0	G4
L2	S.W. coupling coil	0·3	G4
L3	Aerial tuning coils	Very low	G4
L4		2·6	G3
L5		30·0	G3
L6	Oscillator tuning coils	Very low	F3
L7		2·5	F3
L8		12·5	F3
L9	S.W. reaction coil	0·7	F3
L10	1st I.F. trans. Pri.	7·5	B2
L11	1st I.F. trans. Sec.	7·5	B2
L12	2nd I.F. trans. Pri.	7·5	B2
L13	2nd I.F. trans. Sec. ...	7·5	B2
L14	Speech coil ...	2·8	—
L15	Speech coil ...	2·8	—
L16	Smoothing choke ...	250·0	B1
T1	Primary	450·0	E3
	Secondary ...	0·3	
T2	Mains Trans. a ...	Very low	C1
	Mains Trans. b, total	330·0	
	Mains Trans. c ...	Very low	
	Mains Trans. d, total	24·0	
S1-S13	Waveband switches	—	G3
S14, S15	Tone switches ...	—	D3
S16	Mains sw., g'd R13	—	E3

(*For A.C./D.C. model, see overleaf*)



ors in the negative H.T. lead to chassis, but in the A.C./D.C. model, cathode resistors are used.



Underside view of model A353/2. The two waveband switch units, coded **1** and **2** in diamonds, are shown in detail in the diagrams in col. 4.

	OTHER COMPONENTS	Approx. Values (ohms)	Locations
	A.C./D.C. Model		
L2	S.W. coupling coil	0·3	L6
L3	Aerial tuning coils	Very low	L6
L4		2·6	L5
L5		30·0	L5
L6	Oscillator tuning coils	Very low	K5
L7		2·5	K5
L8		12·5	K5
L9	S.W. reaction coil	0·7	K5
L10	1st I.F. trans. Pri.	7·5	B2
L11	1st I.F. trans. Sec.	7·5	B2
L12	2nd I.F. trans. Pri.	7·5	B2
L13	2nd I.F. trans. Sec.	7·5	B2
L14	Speech coil	2·8	—
L15	Speech coil	2·8	—
L16	Smoothing choke	250·0	B1
T1	Primary	400·0	J5
	Secondary	0·2	
S1-S13	Waveband switches		
S18	P.U. muting	—	L5
S14, S15	Tone Switches	—	H5
S16, S17	Mains sw., g'd R13	—	J5

VALVE ANALYSIS

Valve voltages and currents given in the tables below are those measured in our receivers while they were operating from A.C. mains of 230 V. The volume controls were at maximum, and the receivers were tuned to the highest wavelength end of M.W., but there was no signal input.

Voltage readings were measured with an Avo Electronic TestMeter, and as this instrument causes no appreciable voltage drop, allowances must be made for the current drawn by other meters. Chassis was the negative connection in every case.

A.C. Model

Valves	Anode V	Anode mA	Screen V	Screen mA	Cath. V
V1 6C9	250 Oscillator 60	1·3 3·6	84	4·0	—
V2 6F15	250	6·0	94	1·5	—
V3 6LD20	56	0·5			2·4
V4 6P25	240	33·0	250	5·8	—
V5 UU9	240†	—	—	—	270·0

† A.C. volts, each anode.

A.C./D.C. Model

Valves	Anode V	Anode mA	Screen V	Screen mA	Cath. V
V1 10C1	194 Oscillator 66	1·3 4·0	94·0	4·5	2·5
V2 10F9	206	7·2	94·0	2·2	2·2
V3 10LD11	115	1·4	—	—	3·3
V4 10P14	197	44·0	206·0	10·0	10·0
V5 U404	218†	—	—		230·0

† A.C. volts.

GENERAL NOTES

Switches.—**S1-S13** are the waveband and radio/gram change-over switches. In the A.C. version these are ganged in two rotary units beneath the chassis, but in the A.C./D.C. version they are ganged in a single unit. In the latter case **S12** is omitted, and another switch **S18** is added.

The units are indicated in our underchassis drawings by the numbers **1, 2** and **3** in diamonds, with arrows which show the direction in which they are viewed in the diagrams in col. 4, where they are shown in detail.

The table below them gives the switch positions for the four control settings, starting from the fully clockwise position of the control knob. A dash indicates open, and **C,** closed.

S14, S15 are the tone control switches, in a simple three-position beneath the chassis. Tone is deepest when the control knob is turned fully clockwise.

Scale Lamps.—There are two of these in each version of the receiver, and they have M.E.S. bases and small clear spherical bulbs. In the A.C. version they are rated at 6.5 V, 0.3 A; in the A.C./D.C. version they are rated at 3.5 V, 0.15 A.

External Speaker.—Two sockets are provided at the rear of each chassis for the connection of a low-impedance (about 3Ω) external speaker.

A.C./D.C. Version

Apart from the usual series heater circuit, the principal differences in the U353 as compared with the A353 are in the H.T. feed circuits to the valves and the provision of separate bias resistors in the cathode circuits of all the receiving valves.

Isolating capacitors are inserted in appropriate places, and the S.W. reaction circuit suffers a slight change. **R3** in the H.T. feed to **V1** screen is omitted, as is also the shunt resistor **R4** across the primary of the first I.F. transformer.

All except these last two items are shown in our circuit diagram by drawing the A.C. diagram complete in solid line, then adding in broken line the differences in the A.C./D.C. version. The output stage and mains input circuit on the right of the circuit replace those two parts of the A.C. circuit entirely.

DISMANTLING THE SET

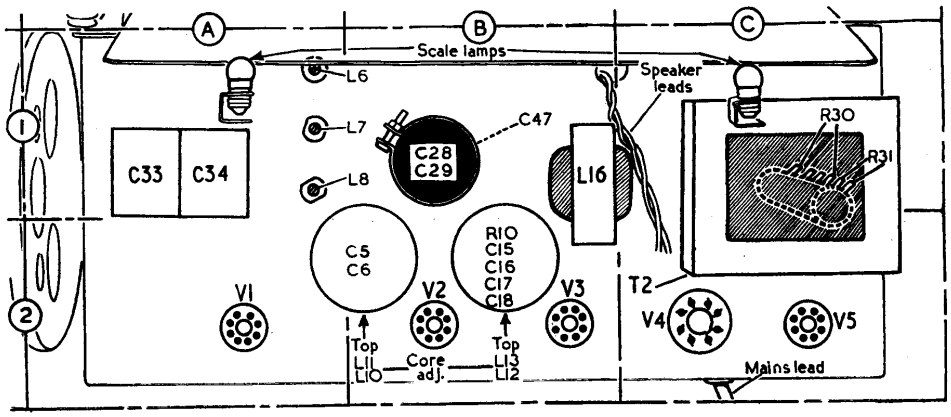
The cabinet is fitted with a small detachable bottom cover, upon removal of which (four round-head wood screws) access may be gained to the trimmer capacitors and tuning coils.

Removing Chassis.—Remove the four control knobs (pull off) with felt washers;

unsolder the two chassis leads from the right-hand side of the speaker (viewed from the rear);

remove the four Phillips-type chassis fixin screws (with washers) and withdraw chassis.

If the speakers are removed from the cabinet (secured by four Phillips-type screws each) care should be taken to ensure correct phasing when reconnecting them. When replacing the speakers the speech coil tags should face one another, the top tag on one speaker being connected to the bottom tag on the other, and vice versa.



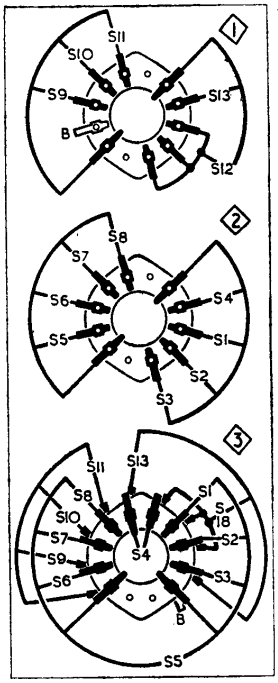
Plan view of the 353 A.C. version, In the A.C./D.C. version, **T2** is replaced by the ballast resistor **R30, R31** and the electrolytic unit contains **C47** in addition to **C28, C29.**

CIRCUIT ALIGNMENT

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 (pin 6) of **V1,** and the **E** socket. Feed in a 465 kc/s (645.16 m) signal, and adjust the cores of **L13, L12, L11** and **L10** (B2) for maximum output.

R.F. and Oscillator Stages.—With the gang at minimum capacitance the cursor should be coincident with the zero mark on the 0-100 tuning scale. It may be adjusted in position by rotating the drive drum on its spindle, after slackening the fixing screws. Transfer "live" signal generator lead to **A** socket, via suitable dummy aerial.

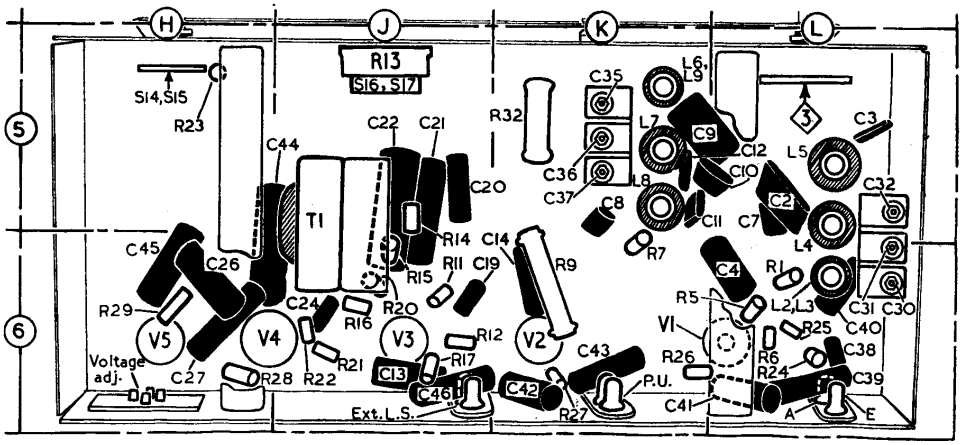
L.W.—Switch set to L.W., tune to 1,000 m on scale, feed in a 1,000 m (300 kc/s) signal, and adjust **C37** (F3) and **C32** (G3) for maximum output. Tune to 1,875 m on scale, feed in a 1,875 m (160 kc/s) signal, and adjust the core of **L8** (A1) for maximum output, while rocking the gang. Repeat these operations until no improvement results.



Diagrams of the two waveband switch units in the A.C. version (above) and the single one in the A.C./D.C. version (below). Underneath is the associated table

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
S18	C	C	C	—

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 the core of **L8** (A1) for maximum output, while rocking the gang. Repeat these operations until no improvement results.



Underside view of model U353/2. The single waveband switch unit, coded **3** in a diamond surround, is shown in detail in the bottom diagram in col. **4.**

kc/s) signal, and adjust **C36** (F3) and **C31** (G4) for maximum output. Tune to 521.7 m on scale, feed in a 521.7 m (575 kc/s) signal, and adjust the core of **L7** (A1), while rocking the gang, for maximum output. Repeat these operations until no improvement results.

S.W.—Switch set to S.W., tune to 15Mc/s on scale, feed in a 15 Mc/s (20 m) signal, and adjust **C35** (F3) and **C30** (G4) for maximum output, choosing the peak for **C35,** which involves the lesser trimmer capacitance. Tune to 40 m on scale, feed in a 40 m (7.5 Mc/s) signal, and adjust the core of **L6** (A1), while rocking the gang, for maximum output. Repeat these operations until no improvement results.

CHASSIS DIVERGENCIES

There may be minor inconsistencies throughout the circuit in component values in some chassis, according to availability of supply at the time of manufacture, but the values given in our tables are correct.

There was, however, an early chassis that was different in many respects, principally because it employed a different range of valves. These were Mullard valves, and their type numbers were as follows: A.C. model, ECH35, EF39, EBC33, 6V6G (not Mullard), AZ31; A.C./D.C. model, CCH35, EF39, EBC33, CL33, CY31.

In the A.C. model, **L1** was originally a 4.7 kΩ resistor, and **C1** was 0.02μF connected directly in the lead from the aerial socket. **R2** was 56 kΩ, **R4** was omitted, and **R7** was 47 kΩ, while **R11** and **R16** were both 220 kΩ. **R19** was 150 Ω, and **R20** was omitted. Radio muting was omitted in the pick-up switching.

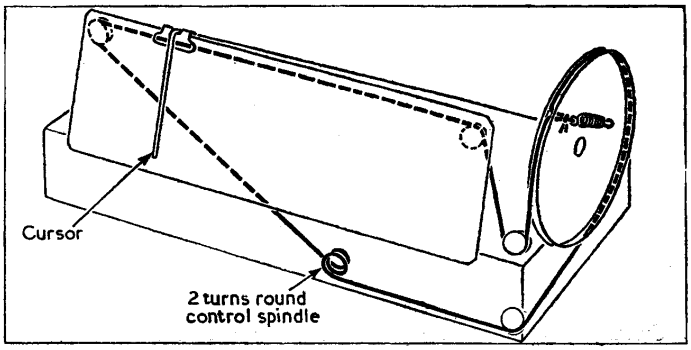
In the A.C./D.C. model, **R24** and **C38** were omitted, and **R1** went to **V1** hexode C.G. instead of to the coils, a 100 pF capacitor isolating the C.G. from the gang. **R7** was 47 kΩ, and **R32, C47** were omitted. **R2** was 47 kΩ, and **R3** was present, as in the A.C. version. **R11** was 330 kΩ, **R27** was 330 Ω, and **R15** was 47 kΩ. **R13** was 200 kΩ, **R21** was 470 kΩ, and the ballast resistor sections, reading from **V5** heater, were 172 Ω, 550 Ω, 100 Ω, presumably to provide a tapping at about 100 V.

Our chassis were distinguished from the earlier ones by the type number, which was rubber-stamped in large lettering on one end chassis member, with the suffix 2. Our chassis, therefore, were models A353/2 and U353/2, whereas the earlier types were A353 and U353.

DRIVE CORD REPLACEMENT

Six feet of high-grade flax fishing line, plaited and waxed, is sufficient for a new tuning drive cord, and this leaves ample 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 minimum capacitance.

If one end of the cord is tied to the spring and anchored, the cord can be run conveniently as shown in our sketch, pulling at the minimum gang stop. The cursor, whose carriage slides along the upper edge of the scale backing plate, can be slipped on afterwards and adjusted as explained under "Circuit Alignment."



Sketch of the drive cord system, drawn as seen from the front right-hand corner of the chassis with the gang at minimum capacitance.

Printed in England by Cornwall Press Ltd., Paris Garden, London, S.E.1.