

TRADER ' SERVICE SHEET

195

HALCYON ROYAL COUNTY 3-BAND A.C. SUPERHET

SUITABLE for mains of 200-260 V, S₄₀₋₁₀₀C/S, the A.C. model of the Halcyon Royal County receiver is a 4-valve (plus rectifier) 3-band superhet with a short-wave range of 16-50 metres, and provision for an extension speaker. An identical chassis is fitted in the Royal County (A.C.) console, and there is a radio-gramophone with the same name and a very similar chassis, which, however, is modified to include the pick-up circuit. This *Service Sheet* was prepared on a table model.

It should be noted that there is another A.C. radio-gramophone with the same name which is actually fitted with the A.C./D.C. chassis dealt with in *Service Sheet* 158. It is described as an A.C. model on account of the fact that the motor used is not suitable for D.C.

CIRCUIT DESCRIPTION

Aerial input via C1 and coupling coils L2, L3 to inductively coupled M.W. and L.W. band-pass filter. Primary L4, L5 tuned by C19; secondary L9, L10 tuned by C21; coupling coils L6, L7. On S.W. band input is via C2 to tapping on coil L8, which is tuned by C21.

First valve (V1, Mullard metallised FC4) is an octode operating as electron-coupled frequency changer. Oscillator grid coils L11 (S.W.) and L13, L14

secondary transformer couplings C26, L17, L18, C27 and C28, L19, L20, C29.

Intermediate frequency 130.5 KC/S. Diode second detector is part of double diode triode valve (V3, Mullard metallised TDD4). Audio-frequency component in rectified output is developed across load resistance R6 and passed via C8, manual volume control R5 and I.F. stopper R7 to C.G. of triode section. Tone control by variable condenser C30 which shunts grid circuit.

Second diode of V3, fed from V2 anode via C12, provides D.C. potential which is developed across R11 and fed back through decoupling circuits as G.B. to F.C. and I.F. valves, giving automatic volume control. Delay voltage is obtained from drop along V3 cathode resistance R8.

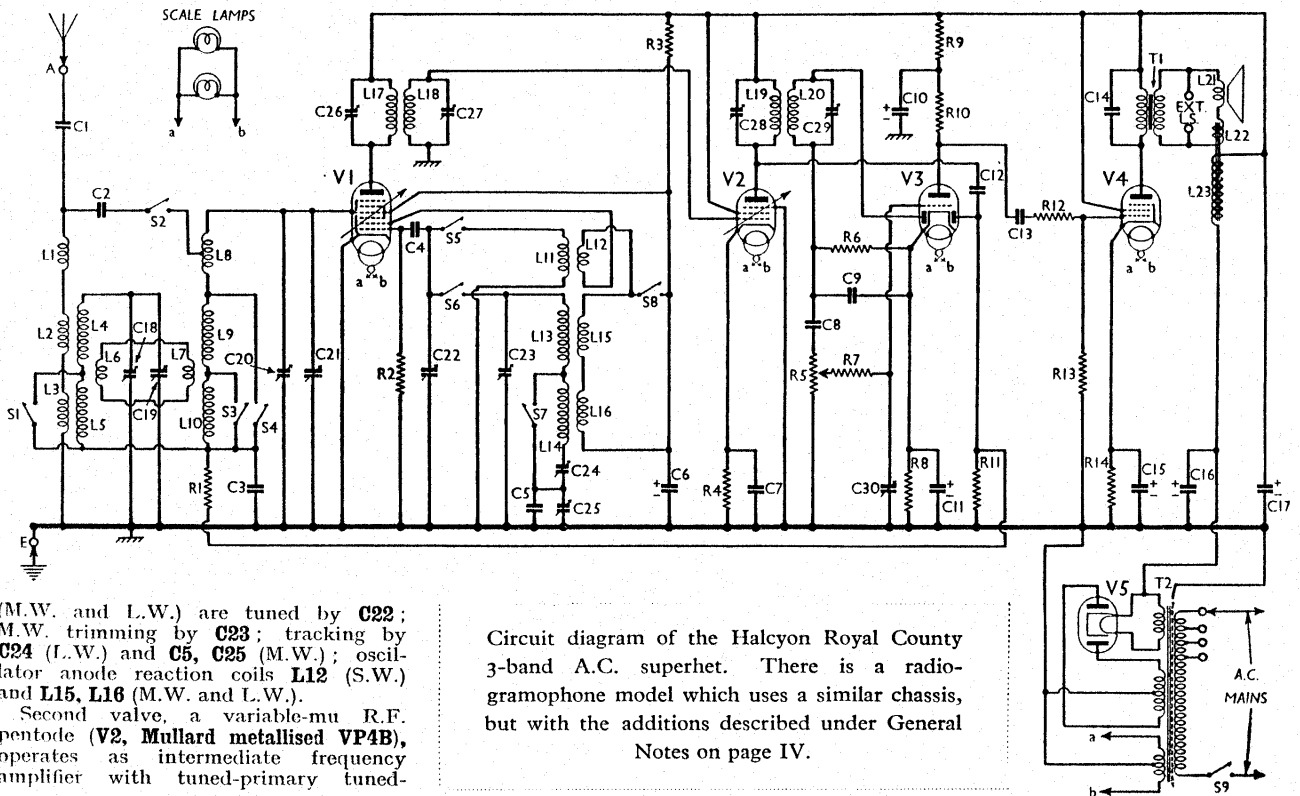
Resistance-capacity coupling by R10, C13, and R13 between V3 triode and pentode output valve (V4, Mullard PenA4). Fixed tone correction by anode condenser C14. Provision for connection of low impedance external speaker across T1 secondary.

H.T. current is supplied by I.H.C. full-wave rectifying valve (V5, Mullard IW4/350). Smoothing by speaker field coil L23 and dry electrolytic condensers C16, C17.

COMPONENTS AND VALUES

RESISTANCES		Values (ohms)
R1	V1 pentode C.G. decoupling	1,000,000
R2	V1 osc. C.G. resistance	50,000
R3	V1 S.G.'s and osc. A decoupling	22,000
R4	V2 fixed G.B. resistance	300
R5	Manual volume control	1,000,000
R6	V3 signal diode load	100,000
R7	V3 C.G. I.F. stopper	250,000
R8	V3 G.B. resistance	1,000
R9	V3 triode anode decoupling	10,000
R10	V3 triode anode load	10,000
R11	V3 A.V.C. diode load	1,000,000
R12	V4 C.G. I.F. stopper	50,000
R13	V4 C.G. resistance	100,000
R14	V4 G.B. resistance	150

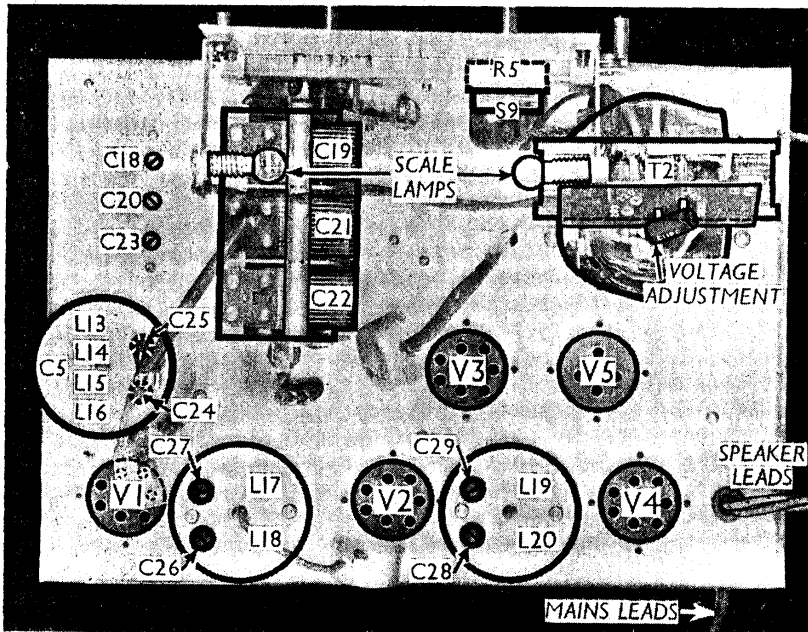
CONDENSERS		Values (μF)
C1	Aerial series condenser	0.0005
C2	Aerial S.W. coupling	0.0005
C3	V1 pent. C.G. decoupling	0.25
C4	V1 osc. C.G. condenser	0.0001
C5	Osc. fixed M.W. tracker	0.0015
C6*	V1 S.G.'s and osc. A. decoupling	2.0
C7	V2 cathode by-pass	0.1
C8	V3 triode A.F. coupling	0.01
C9	I.F. by-pass	0.0001
C10*	V3 triode anode decoupling	2.0
C11*	V3 cathode by-pass	50.0
C12	V3 A.V.C. diode feed	0.0001
C13	V3 to V4 A.F. coupling	0.1
C14	Tone corrector	0.0005
C15*	V4 cathode by-pass	50.0
C16*	H.T. smoothing	8.0
C17*	H.T. smoothing	8.0
C18†	Band-pass primary trimmer	0.000035
C19†	Band-pass primary tuning	0.000456



(M.W. and L.W.) are tuned by C22; M.W. trimming by C23; tracking by C24 (L.W.) and C5, C25 (M.W.); oscillator anode reaction coils L12 (S.W.) and L15, L16 (M.W. and L.W.).

Second valve, a variable-mu R.F. pentode (V2, Mullard metallised VP4B), operates as intermediate frequency amplifier with tuned-primary tuned-

Circuit diagram of the Halcyon Royal County 3-band A.C. superhet. There is a radio-gramophone model which uses a similar chassis, but with the additions described under General Notes on page IV.



Plan view of the chassis. Note the trimmers C18, C20 and C23, reached through holes in the chassis.

CONDENSERS (Continued)		Approx. Values (μF)
C20†	Band-pass secondary trimmer	0.00035
C21†	Band-pass secondary tuning	0.00450
C22†	Osc. circuit tuning	0.00450
C23†	Osc. circuit M.W. trimmer	0.00035
C24†	Osc. circuit L.W. tracker	0.00075
C25†	Osc. circuit M.W. tracker	0.00075
C26†	1st I.F. trans. pri. tuning	0.00175
C27†	1st I.F. trans. sec. tuning	0.00175
C28†	2nd I.F. trans. pri. tuning	0.00175
C29†	2nd I.F. trans. sec. tuning	0.00175
C30†	Variable tone control	0.0005

* Electrolytic. † Variable. ‡ Pre-set.

OTHER COMPONENTS		Approx. Values (ohms)
L1	Aerial choke coil	2.0
L2	Aerial M.W. and L.W. coupling coils, total	4.5
L3		2.6
L4		28.5
L5	Band-pass primary coils	28.5
L6	Band-pass coupling coils	Very low
L7	Aerial S.W. tuning coil	Very low
L8		Very low
L9	Band-pass secondary coils	2.3
L10		28.0
L11	Osc. S.W. tuning coil	Very low
L12	Osc. S.W. reaction coil	0.2
L13	Osc. M.W. and L.W. tuning coils	2.2
L14		20.0
L15	Osc. M.W. and L.W. reaction coils, total	3.5
L16		65.0
L17	1st I.F. trans. Pri.	65.0
L18	1st I.F. trans. Sec.	65.0
L19	2nd I.F. trans. Pri.	65.0
L20	2nd I.F. trans. Sec.	65.0
L21	Speaker speech coil	1.5
L22	Hum neutralising coil	0.1
L23	Speaker field coil	1,750.0
T1	Speaker input trans. Pri.	340.0
	Sec.	0.5
	Pri. total	29.0
	Heater sec.	0.95
	Rect. heat sec.	0.1
	H.T. sec. total	550.0
Sr-S8	Waveband switches	—
S9	Mains switch, ganged R5	—

DISMANTLING THE SET

A detachable bottom is fitted to the cabinet and upon removal (four round-head wood screws) gives access to most of the under-chassis components.

Removing Chassis.—If it is necessary to remove the chassis from the cabinet, first remove the four control knobs (recessed grub screws), and then the four self-tapping bolts (with washers) holding the chassis to the bottom of the cabinet. Now unsolder the earthing lead from the tag on one of the speaker fixing screws, when the chassis can be withdrawn to the extent of the speaker leads, which is sufficient for normal purposes.

To free the chassis entirely, unsolder the leads from the speaker and when replacing, connect the yellow/black lead

to the bottom tag on the right of the transformer and the brown/yellow and green/yellow leads to the top tag. The other end of the brown/yellow lead goes to the top tag on the left of the speaker, and the red/yellow lead to the bottom tag.

Removing Speaker.—To remove the speaker from the cabinet, remove the nuts and lock washers from the three screws holding it to the sub-baffle. When replacing, see that the transformer is on the right and do not forget to place the tag for the earthing lead on the top right-hand screw. Connect the leads from the extension speaker panel to tags 1 and 2 (numbered from bottom to top) on the left of the transformer.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on mains of 230 V, using the 240 V tapping on the mains transformer. The receiver was tuned to the lowest wavelength on the medium band and the volume control was at maximum, but there was no signal input.

Voltages were measured on the 1,200 V scale of an Avometer, with chassis as negative.

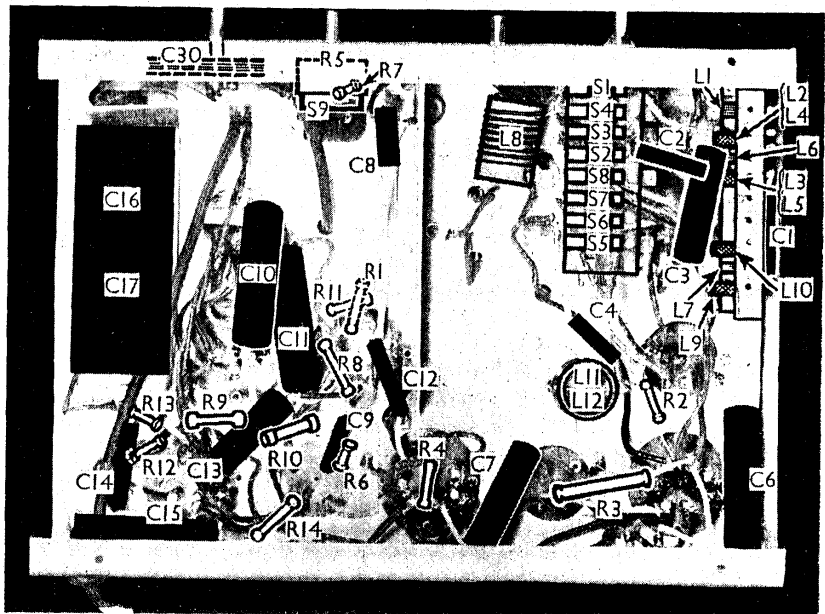
Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 PC4	235	2.5	90	4.1
V2 VP4B	235	9.3	235	3.4
V3 TDD4	150	3.8	—	—
V4 PenA4	220	33.0	235	4.2
V5 IW4/350	205	—	—	—

Oscillator anode 90 V, 2.5 mA. Each anode, A.C.

GENERAL NOTES

Switches.—S1-S8 are the wavechange switches, ganged in a single unit beneath the chassis. The table (p. iv) gives the switch positions for the three control settings, starting from fully anti-clockwise. O indicates open and C closed.

Continued overleaf



Under-chassis view. R1 is inside insulating sleeving. All the switches are clearly marked.