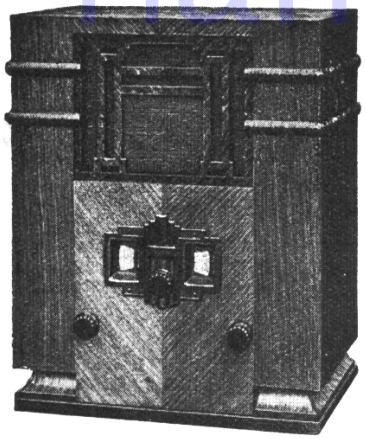
A. J. BALCOMBE'S "ALBA" SUPERHET FIVE FOR A.C. MAINS



A point to remember when testing the Alba Superhet Five is that the coating on the chassis is an excellent insulator. Care has to be taken therefore to obtain a good connection with the test prods.

Circuit.—The combined detector oscillator SP4 clear (V1) is preceded by a single tuned aerial circuit which incorporates a special I.F. trap and a parallel trap across the long-wave coil to prevent break-through of London National. Reaction is employed in the cathode circuit by coupling with the osc. coil, which is in series with I.F.T.I.

The intermediate-frequency valve, VP4 Met. (V2) has an I.F. transformer, with tuned secondary, and a small amount of predetermined reaction is obtained between the second detector anode through a small trimming condenser.

A screen grid second detector, S4VB (V3) works as an anode bend detector, and has the pick-up fed to the grid through the secondary of the second I.F. transformer. It should be noted that the screen of this valve is fed through a voltage dropping resistance of 2 megohms, and not from a potentiometer. The anode circuit is adequately decoupled and straight resistance coupling is used to the next valve.

The output pentode, PM24M (V4) has a grid stopper, R11, and is tone compensated by C11 between the anode and earth. Bias is obtained from a potentiometer in the common negative lead, and the grid circuit is properly decoupled.

Full wave rectification with a DW3 is followed by the speaker field in the negative H.T. lead, with two electrolytic condensers for smoothing.

Alternative Valves.—An AC/SG may be used for V1, and the rectifier may be a DW3 or a IW3.

Special Notes.—The coating on the metal chassis is an excellent insulator, and in taking voltage readings the negative prod or clip must be scraped into the metal or contact made with the heads of one of the many bolts. The lay-out of the valves is straightforward in the order in which we have given them, beginning from the left (looking from back).

Pilot Lamps.—These are across only half of the set filament winding, and are 2.5 v. .2 amp. types. The small black knob at the back adjusts the I.F. reaction condenser. This assists the sensitivity of the set considerably, though the control is not sharp in action.

Quick Tests.—The terminals on the output transformer are shrouded, and the only convenient tests are the voltages on the valve anodes. (See table.)

Removing the Chassis.—Remove control knobs (grub screws). Remove one wood screw from underneath and two from side of platform, on which chassis stands. Undo four nuts holding speaker to baffle and slide the chassis out on its platform.

Remove platform by undoing four holding screws.

General Notes.—The dry electrolytic smoothing condensers are held to the chassis by a clamp with two bolts at one side. Except C8 and C10, which are in one container in the middle of the chassis, all the components are suspended in the wiring near their relative valves or coils.

(Continued on next page.)

VALVE READINGS

(V.C. at maximum)

Valve.	Type.	Purpose.	Electrode.	Volts.	M.A.
V 1...	SP4 plain	1st det. osc.	anode	250	1.1
			screen	65	
V 2...	VP4 Met.	I.F. ...	anode	250	2.5
			screen	65	
V 3...	S4VBMet.	2nd det.	anode	80–90	.2
			screen*		
V 4...	P.M.24M.	Pentode output	anode	240	32
			aux. grid	255	6
	DW3 ...	Rectifier	anodes.	A.C. 340 v.	each —

* There is a 2 megohm resistance in the H.T. lead to this electrode and an entirely erroneous reading will be obtained even with the best moving coil meter.

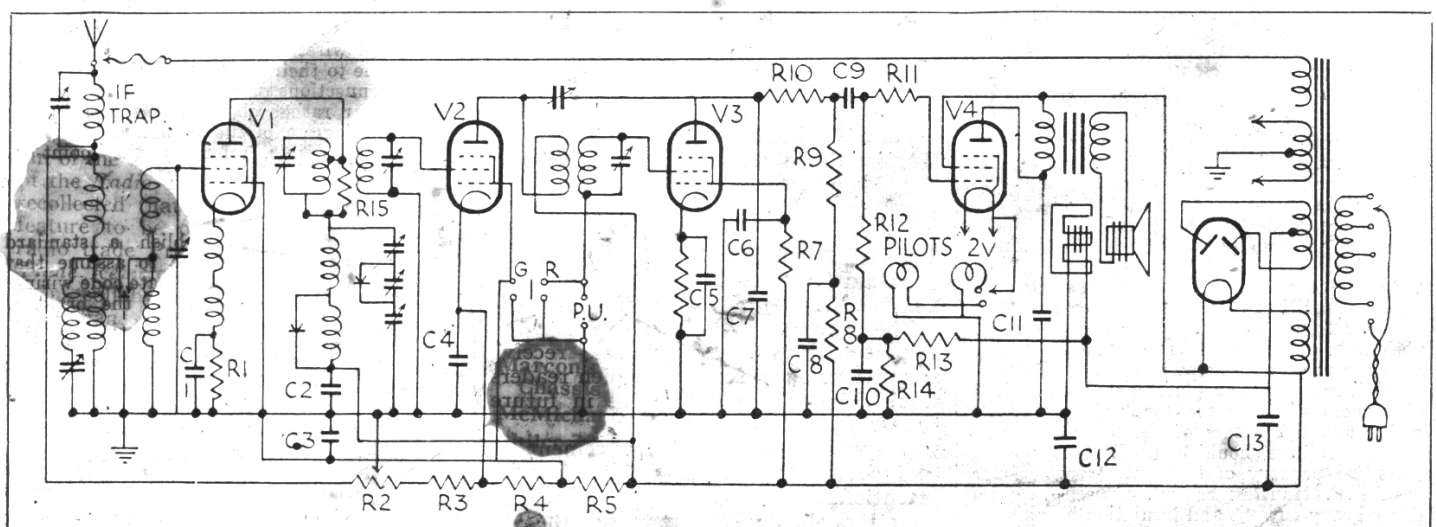
CONDENSERS

C.	Purpose.	Mfd.
1	V1 cathode bias	.0025*
2	Low A.C. potential end of osc. coil	.1
3	V1 and V2 screens	.05
4	V2 cathode	.01
5	V3 cathode (electrolytic) ...	25
6	V3 screen	.05
7	V3 anode by-pass	.0005
8	V3 anode decoupling	.5
9	L.F. coupling, V3 to V4 ...	.001
10	V4 grid decoupling	.5
11	Pentode anode compensator ...	.001
12	H.T. smoothing, electrolytic (in block)	6
13	H.T. smoothing, electrolytic (in block)	4

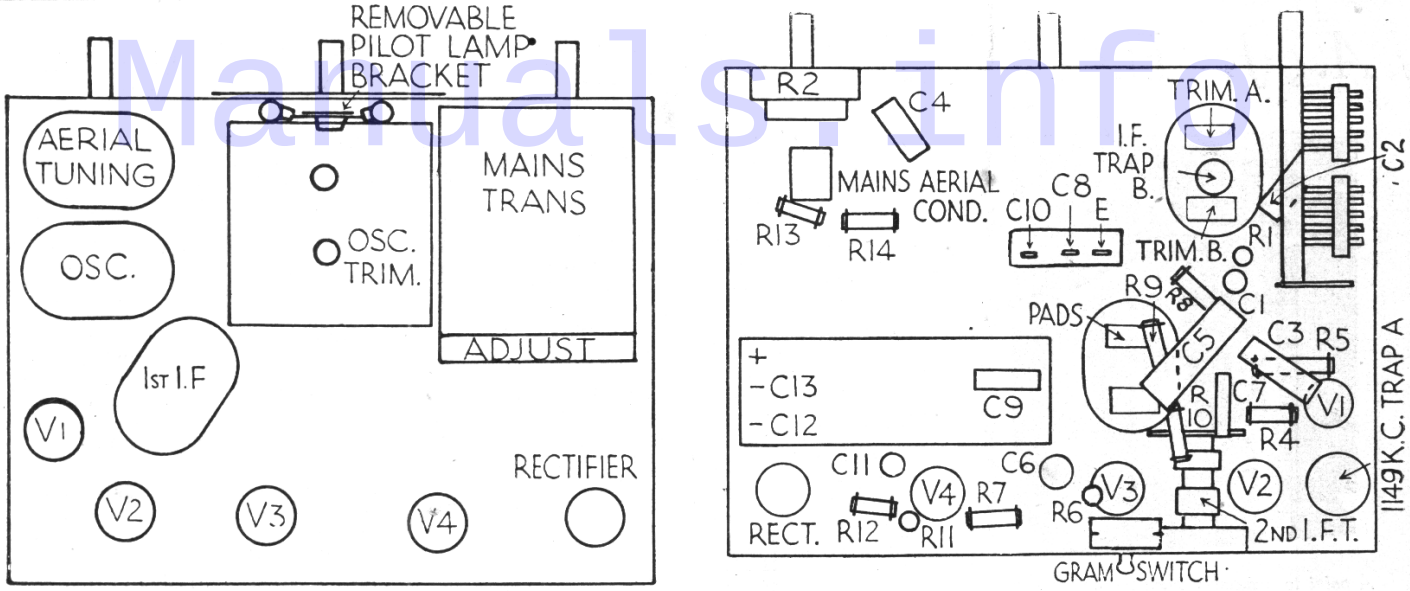
*In our model this was .001 mfd.

RESISTANCES

R.	Purpose.	Ohms.
1	V1 cathode bias	7,000
2	Var. volume-control	15,000
3	Part of bias ptr. of V2 ...	280
4	Part of screen ptr. V1 and V2	30,000
5	Part of screen ptr. V1 and V2	50,000
6	V3 cathode bias	5,000
7	Voltage dropping to screen V3	2 meg.
8	V3 anode decoupling	50,000
9	V3 anode coupling to V4 ...	250,000
10	H.F. stopper, anode V3 ...	50,000
11	H.F. stopper, grid V4	250,000
12	V4 grid leak	.5 meg.
13	Bias ptr. for V4...	2 meg.
14	Bias ptr. for V4...	.25 meg.
15	Across part of primary 1st I.F.T.	50,000
—	Field coil	2,500
—	Primary of output transformer...	475



Two special traps, one in series with the first coil and one in parallel with the long-wave section are an unusual feature of the Alba Superhet Five. The first is a rejector trap tuned to the I.F. frequency and the second is an absorption type designed to prevent break-through by the London National transmitter.



Here are the top (left) and bottom (right) views of the chassis of A.J. Balcombe's Superhet Five. It will be noted that all the valves are very easily got at while the twin pilot lamps are also particularly accessible.

(*Continued from previous page.*)

Switch contacts are easily cleaned by turning switch to L.W. position, and wiping with a duster. Connections to the mains transformer are :—From bobbin, two thick leads from outsides, to set filaments; two thin leads to rectifier filaments. The thick one in the middle is the centre tap of the set filament winding.

On the terminal strip the terminals are labelled.

Replacing the Chassis.—Replace platform on chassis (grooved sides of holes outwards), and slide platform into cabinet. The L.S. leads are sufficiently long to allow the speaker to lie outside while doing this.

Replace speaker and two wood screws holding platform to bottom of cabinet.

Replace the wood screw underneath, and fix the control knobs.

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by increasing the bias on variable-mu valves, and in these sets the readings given are with the control at maximum to allow minimum bias and maximum current. In one or two instances with straight three-valve sets employing reaction, the reaction condenser is ganged with the variable bias resistance in such a way that the vanes do not mesh till the resistance is at minimum position. As a safeguard it is advisable to have the control adjusted so that the set is just below the oscillating point.

With sets employing A.V.C. the circuits must be tuned away from signals to allow measurements to be taken under static conditions. Where the inclusion of the meter leads causes instability, it is usually sufficient to short circuit the aerial and earth terminals of the set (except with earthed positive D.C. mains).

Seven-pin Pentodes

In the case of output pentodes with seven-pin bases it is sometimes difficult to take the current reading in the absence of suitable adaptors, but this can be done by disconnecting the anode lead from the speaker and connecting the meter between the terminal and the anode lead (+ to terminal). This terminal is usually indicated in "Quick Tests."

As the correct operation of the set depends on the condition of the resistances and condensers, I give the tables for each of these with a brief note on the purpose for which they are used—this helps in locating them.

In all cases where replacements are required resistances of the same (or higher) wattage rating and condensers of the same type and working voltage should be used.

As the primary of the output transformer (and L.F. transformer when used) carries fairly heavy current and insulation breakdown between windings is sometimes caused by surges due to a valve being withdrawn or a sudden break in a cathode or grid circuit, I give the resistance reading.

A measurement of less than 90 per cent. of that given indicates the possibility of such a fault. Another confirmatory symptom is high-pitched reproduction and, possibly, heating of the transformer. In a few instances manufacturers change the type of speaker, and whenever new values of components are used details will be published in Service Engineer.

There is some doubt as to the desirability of giving the resistances of I.F. transformers and H.F. and oscillator coils in superhets. A slight inaccuracy in an ohm-meter or an economy drive in the factory that results in a wire of narrower gauge being used may cause entirely misleading results. The straight continuity test with an ohm-meter, battery flash-lamp or neon lamp is adequate.

As the superhet or its equivalent has almost become a necessity, manufacturers are beginning to produce reasonably inexpensive equipment with which an intelligent engineer can gang a superhet with every confidence. With the proper apparatus it is not much more difficult than was ganging a band-pass three. Without equipment, however, ganging a superhet should never be attempted.

Owing to the fact that the chassis and the casings of nearly all components are at low A.C. potential, it cannot be emphasised too strongly that the wiring of H.F. or I.F. tuned circuits should not be disturbed any more than is necessary, and that when the job is finished wires should be replaced as closely as possible to their original positions.

The connections of the components in some sets appear rather obscure, and in this case I give a diagram of the terminals and leads, or, where possible, refer to the point in "General Notes."

Haphazard Wiring

Unless manufacturers publish a standard wiring code it is never safe to assume that differently coloured wires indicate code wiring. In many sets the colouring of the braid or systoflex is quite haphazard.

Whenever a set shows some distinctive tendency or special use of any particular component, details are given, and where alternative connections or components are used in different models the data for each is provided.

In some cases the chassis is replaced in exactly the reverse order to that in which it was withdrawn from the cabinet, but there are so many exceptions that it is considered necessary to give a brief note on the most convenient method and the safeguards (if any) that must be taken.

WATCH FOR THESE REVIEWS

IN preparation for the next issue of Service Engineer, are reviews on the following receivers :—

Atlas	334 receiver.
Beethoven ..	4 valve battery transportable.
Blue Spot ..	4-valve table model.
General Electric Co.	M.C. Three.
Murphy Radio ..	A-4 receiver.
Orr Radio ..	Model S.F.
Regentone ..	Quadradyne A.C. Four.
Standard Telephones	Model 40 receiver.
Sunbeam	U 35 Universal.
Telsen	464 A.C. Four.

The Broadcaster Technical Service Department will be pleased to receive suggestions as to receivers which readers would like to see dealt with in future issues.

Suggestions for the improvement of of the articles will also receive careful attention.

Letters should be sent to the Broadcaster and Wireless Retailer, 29, Bedford Street, Strand, London, W.C.2. 'Phone number, Temple Bar 2468.