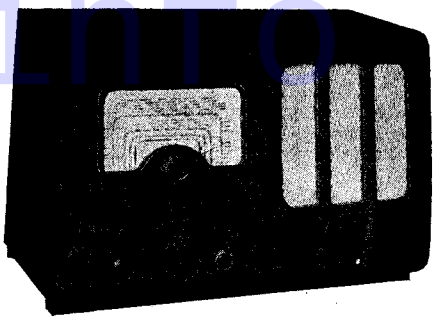
# ALBA 330 BATTERY FOUR-BAND FOUR



**A four-valve battery superhet, the 330 by A. J. Balcombe uses a thoroughly modern valve arrangement and operates on four bands.**

**CIRCUIT.**—In this receiver single coupled circuits are used on the two short bands, but on medium and long there is bandpass input. These circuits are applied, through a special switching arrangement, to the grid of V1, an octode.

This valve is provided with an orthodox oscillator section, each winding having a series-connected control resistance. The anode circuit contains the primary of the first intermediate frequency transformer. This is trimmer tuned, with top-capacity coupling.

For intermediate amplification use is made of an H.F. pentode, V2, which is controlled by A.V.C. The second I.F.T. is connected to one diode of V3, a double diode triode. The other diode is used for A.V.C., provided with the usual decoupling networks for the first two valves.

Signal voltages are taken through an H.F. filter to the grid of the triode section of V3, the anode of which is resistance coupled to V4, the output pentode.

An unusual feature is the control of the output valve for volume purposes instead of the usual control on the grid of the preceding triode.

For the whole set, bias is derived from a series resistance network. A tapping on the network provides bias for the triode, delay volts on the A.V.C. diode and also bias on V1 for the two short-wave ranges.

**Chassis Removal.**—Removal of this chassis is very simple. First of all release the control knobs from the front of the cabinet. These are held by large grub screws. Then remove the four chassis-fixing bolts from the bottom, and the chassis can be withdrawn from the cabinet.

To remove it completely the two speaker leads can be unsoldered from the strip, or, alternatively, the speaker can be removed from the baffle to which it is attached by four nuts.

**Special Notes.**—All the components can be easily identified with the exception of R16, which is inside a small length of sleeving. Our chassis showed considerable variation from the makers' specification regarding the heterodyne voltage control resistances on the oscillator section. It should be noted that R11 was found to be 5,000 ohms, R15 2,000 ohms, R16 100 ohms, and R17 40 ohms.

It will be seen that the volume control is on the output valve and not on the grid of the triode—an arrangement which is a little unusual and might lead to confusion in testing routine if it were not realised.

Another unusual feature is the use of a

## VALVE READINGS

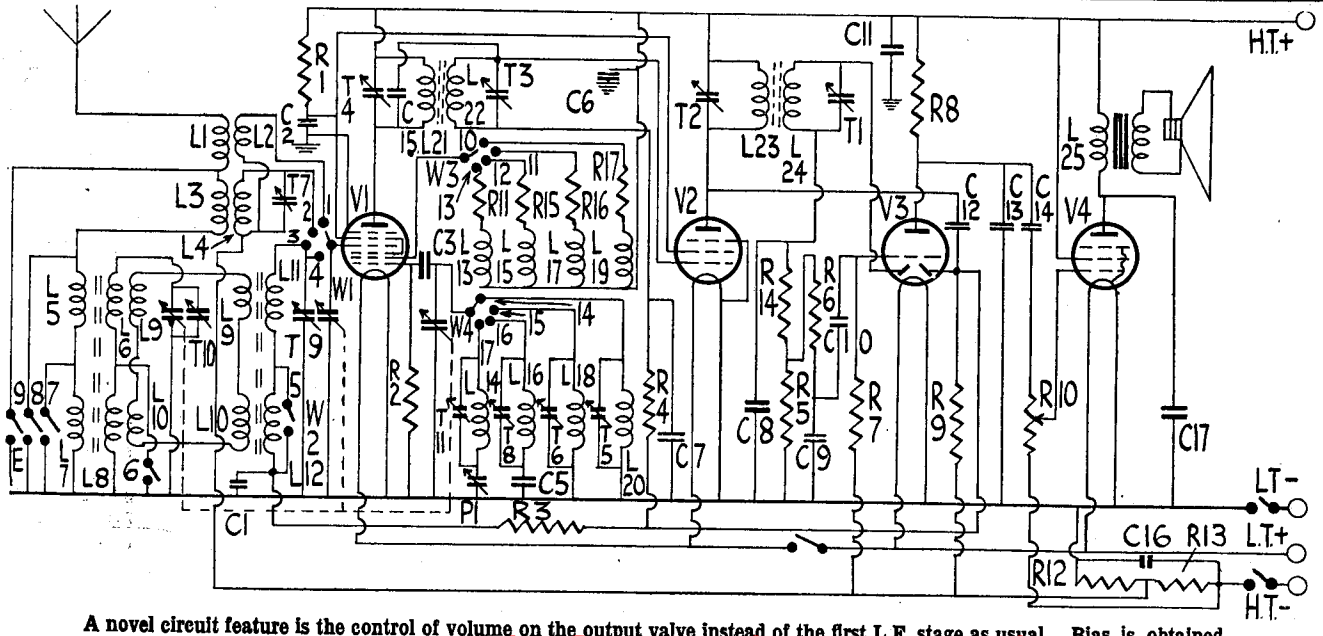
| V. | Type. | Electrode. | Volts. | Ma. |
|---|---|---|---|---|
| | *All Mullard.* | | | |
| 1 | FC2A. . .. | Anode .. | 131 | 0.4 |
| | | Screen .. | 45 | 0.8 |
| | | Osc. Anode | 131 | 2.3 |
| 2 | VP2B .. | Anode .. | 131 | 2.0 |
| | | Screen .. | 45 | 0.9 |
| 3 | TDD2A .. | Anode .. | 42.5 | 1.3 |
| 4 | PM22D .. | Anode .. | 127 | 3.2 |
| | | Screen .. | 131 | 0.5 |

## RESISTANCES

| R. | Purpose. | Ohms. |
|---|---|---|
| 1 | V1 and V2 screen feed .. | 50,000 |
| 2 | V1 osc. grid leak .. .. | 50,000 |
| 3 | V1 A.V.C. decoupling .. | 1,000,000 |
| 4 | V2 A.V.C. decoupling .. | 250,000 |
| 5 | Signal diode load (part) .. | 250,000 |
| 6 | H.F. filter .. .. .. | 50,000 |
| 7 | V3 grid leak .. .. .. | 500,000 |
| 8 | V3 anode load .. .. | 20,000 |
| 9 | A.V.C. diode load .. .. | 500,000 |
| 10 | Volume control .. .. | 500,000 |
| 11 | L.W. het. volt control .. | 16 |
| 12 | Bias pot. part .. .. | 80 |
| 13 | Bias pot. part .. .. | 100 |
| 14 | Signal diode load (part) .. | 250,000 |
| 15 | M.W. het. volt control .. | 100 |
| 16 | S.W.2 het. volt control .. | 2,000 |
| 17 | S.W.1 het. volt control .. | 5,000 |

## CONDENSERS

| C. | Purpose. | Mfd. |
|---|---|---|
| 1 | V1 A.V.C. decoupling .. | .1 |
| 2 | V1 and V2 screen decoupling | .1 |
| 3 | Oscillator grid .. .. | .0001 |
| 5 | M.W. fixed padder .. .. | .002 |
| 6 | Osc. anode decoupling .. | .1 |
| 7 | V2 A.V.C. decoupling .. | .1 |
| 8 | H.F. bypass .. .. | .0002 |
| 9 | H.F. bypass .. .. .. | .0002 |
| 10 | L.F. coupling .. .. | .001 |
| 11 | H.T. bypass .. .. .. | 8 |
| 12 | A.V.C. coupling .. .. | .0001 |
| 13 | V3 anode shunt .. .. | .0001 |
| 14 | L.F. coupling .. .. | .002 |
| 15 | I.F.T.1 top coupling .. | .000025 |
| 16 | Bias pot. shunt .. .. | 50 |
| 17 | Tone correction .. .. | .002 |




**A novel circuit feature is the control of volume on the output valve instead of the first L.F. stage as usual. Bias is obtained by the resistors R12, R13 in the negative H.T. lead.**

top-capacity coupling on the first I.F. transformer. The condenser for this is not in the can but will be found on the chassis, the grid-anode connection being made by means of an extended tag for the grid connection on the base of the transformer.

On the two short-wave bands it should be noted that the grid of the frequency changer is given a fixed bias from the common bias potentiometer, no A.V.C. being used. On the medium and long bands the circuits are normal.

Owing to the unusual coil and switching system, the method of measuring inductances is different from usual, since rotation of the wave switch does not progressively select the separate coils. All tags are visible below the coil cans, and tests can be made there.

If, however, it is desired to check coils progressively, measurements can be made, for example, between aerial and earth, and the resistance of a particular coil computed by subtracting the previous measurement.

Battery lead colours and connections are: red plug, H.T.+135v.; black plug, H.T.−; red lead, L.T.+; black lead, L.T.−. The space for batteries measures 13¼ in. by 5½ in. by 7½ in.

**Wavechange Switches.**—The switching in this set is rather unusual, and may give rise to a little confusion unless it is carefully studied. There are two wafers, the one nearer the "click" plate controlling the aerial circuits. The other is devoted exclusively to the oscillator section. This wafer carries W3 and W4, together with the two sets of contacts for the oscillator coils and needs no explanation.

The complicated change from direct coupled short-wave coils to bandpass medium and long-wave coils is carried out on a single wafer with two wipes, W1 and W2, together with a special earthing U on the disc rotor.

In the first short-wave position the medium and long bandpass coils are shorted to earth through W2 and contact 6. In addition, contacts 7, 8 and 9 go to earth through the shorting U.

In the second short-wave position contact 9 opens. As the switch advances, contact 8 opens, W1 having then moved down to contact 3 to pick up the medium-wave bandpass coil, which is inductively coupled to the aerial tuned circuit.

Finally, contacts 5, 6 and 7 open the long-wave inductances, which are constituted in part by the medium-wave coils.

## *Alignment Notes*

**I.F. Circuits.**—Connect a signal generator to the grid of V1 and short circuit the oscillator section of the gang. Connect an output meter across the speech coil, or a high-impedance meter across the speaker transformer primary, and switch the receiver to M.W.

Inject a frequency of 117.5 kc., and adjust T1, T2, T3 and T4 in that order for maximum, reducing the input as the circuits come into line.

Re-check the operations in the same order. Use an input below the A.V.C. value.

(*Continued on page 32.*)

# Alba 330 on Test

MODEL 330.—For battery operation, requiring a 2-volt accumulator and a 135-volt H.T. battery. Price, 8½ gns., without batteries.

DESCRIPTION. — Four-valve, four-band table superhet for battery operation.

FEATURES.—Full-vision scale calibrated in names and wavelengths. Controls for volume, range and tuning. Moving-coil speaker mounted by side of chassis. Space for batteries. Sockets for aerial and earth only.

LOADING.—L.T., .7 amp.; H.T., 11.4 ma.

### Selectivity and Sensitivity

SHORT WAVES (19-50 and 70-200 metres).—Good gain for a battery set on both bands, with easy tuning. Performance well maintained over whole of both ranges.

MEDIUM WAVES (200-550 metres). —Excellent gain and selectivity, with a good background. Small local station spread and sensitivity well maintained.

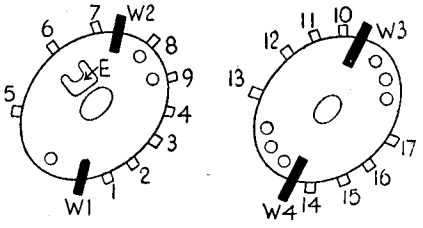
LONG WAVES (800-2,000 metres).—Excellent selectivity and high gain. Deutschlandsender received with only small side splash. Good background.

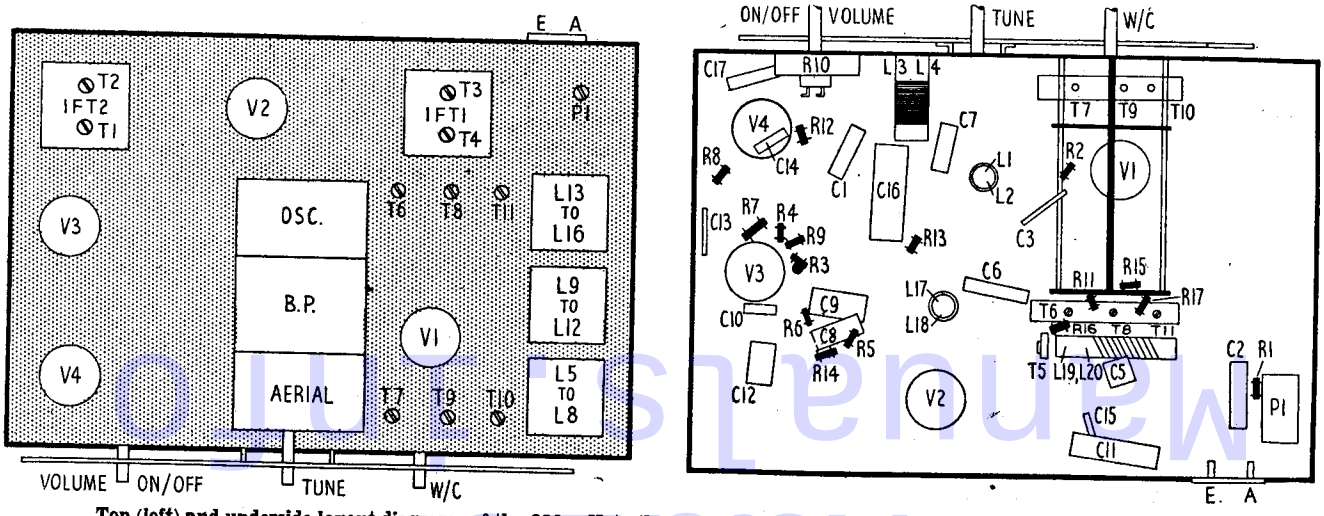
### Acoustic Output

Well balanced tone with good high note response and pleasing speech. Excellent balance on music.

## WINDINGS (D.C. Resistances)

| L. | Ohms. | Range. | Where measured. | L. | Ohms. | Range. | Where measured. |
|---|---|---|---|---|---|---|---|
| 1 | 0.8 | S.W.1 | On tags. | 14 | 12.5 | L.W. | H.T.+ and R15. |
| 2 | 0.1 | S.W.1 | On tags. | 15 | 65.0 | M.W. | H.T.+ and R16. |
| 3 | 2.5 | S.W.2 | On tags. | 16 | 3.5 | M.W. | H.T.+ and R17. |
| 4 | 0.6 | S.W.2 | On tags. | 17 | 60.0 | S.W.2 | On tags. |
| 5 | 60.0 | M.W. | Contact 8 and earth. | 18 | 0.5 | S.W.2 | On tags. |
| 6 | 1.75 | M.W. | Across T11. | 19 | 1.4 | S.W.1 | On tags. |
| 7 | 10.0 | L.W. | Contact 7 and earth. | 20 | Very low | S.W.1 | On tags. |
| 8 | 19.0 | L.W. | Contact 6 and earth. | | | | |
| 9 | 50.0 | — | On tags. | 21 | 35.0 | — | H.T.+ and V1 anode. |
| 10 | 2.5 | — | On tags. | 22 | 35.0 | — | V2 grid and R4+C7. |
| 11 | 1.75 | M.W. | W1 and contact 5. | 23 | 35.0 | — | H.T.+ and V2 anode. |
| 12 | 20.0 | L.W. | W2 and contact 5. | 24 | 35.0 | — | R14+C8 and V3 diode. |
| 13 | 150.0 | L.W. | H.T.+ and R11. | 25 | 800.0 | — | H.T.+ and V4 anode. |




**Top (left) and underside layout diagrams of the 330. Note there are no aerial trimmers on first short- or long-wave bands. Top, right, are the switch banks with the one nearer the "click" plate on left.**

# Cossor 398 A.C. Six

(*Continued from page* 31)

The first wafer carries W1 and W2 and these control the aerial input to the tuned circuits through the suppression valve. The next wafer is very inaccessible, being located by the side of the first internal screening compartment. This carries three wipes which control the tuned and untuned input coils and also remove the gang for press-button operation.

The next wafer is similarly mounted against the side of the next screen and carries the corresponding wipes for the oscillator circuits. Finally there is the fourth wafer carrying W11 and W12. This controls the various pilot lamps and the wafer is easily identified against the "click" plate.

There is also another wafer not ganged with the main assembly. This carries W9 and W10, which are used for setting up the push-button controls as explained under that heading.

## Press-button Adjustment

Adjustment of both aerial and oscillator circuits is by means of inductances fitted with iron cores. These must be adjusted by a non-metallic screw-driver.

Tune in the desired station in the normal manner with the set switched to the correct waveband. Adjacent to the trimming screws is a series of numbered indications corresponding to the buttons, which read from left to right and start at No. 1. The wave-range which the button will embrace is shown adjacent to each button.

Turn the setting switch to position 1 and hold it there while the upper trimmer screw is adjusted for maximum. Then allow the setting switch to return to normal and turn the selector switch to the AT position and adjust the corresponding lower trimmer of the same number. This is the oscillator adjustment and care must be taken to tune in the correct station.

Finally, make a slight adjustment of the first or upper trimmer. If this adjustment appears to be unduly flat, turn the setting switch to position 2, which will facilitate the adjustment.

## Alignment Notes

**I.F. Circuits.**—It is only necessary to trim an I.F. transformer when one has been replaced, as the transformers are permeability adjusted, there being no trimmer condensers. Should adjustment be necessary, proceed as follows :—

Connect an output meter to the set, turn to the M.W. range, tune the gang to maximum and connect the generator to the grid of V2.

Adjust the generator to 465 kc. and adjust the cores of I.F.T.2 and then I.F.T.1 for maximum response and seal them with wax compound.

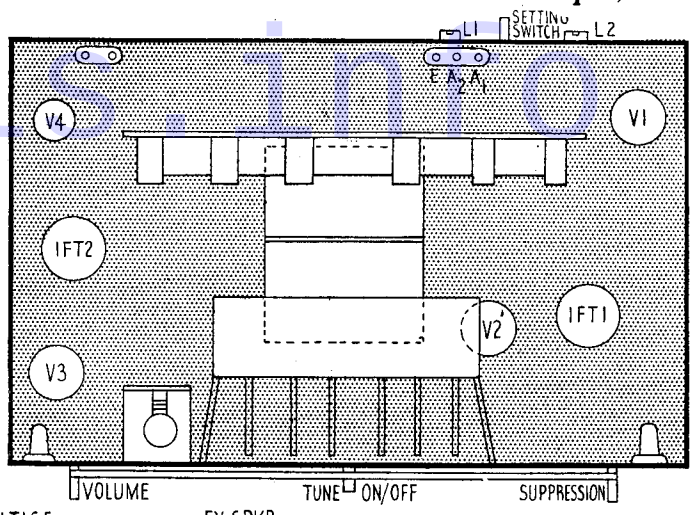
Use a low input below the A.V.C. value.

**Medium Waves.**—Connect the generator to the aerial and earth sockets and turn the suppression control to the mid position, using the lowest possible input.

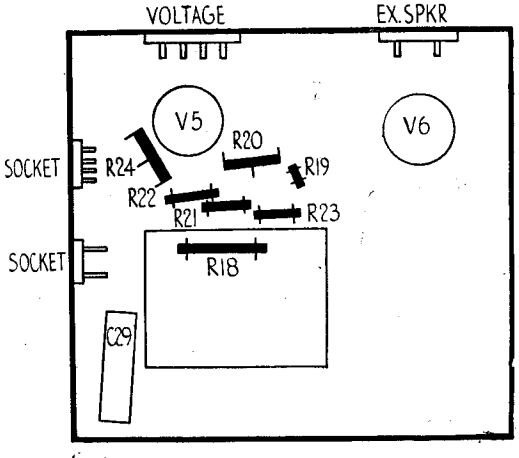
Tune set and generator to 214 metres (1,400 kc.) and adjust T3 and then T4 for maximum.

**Long Waves.**—Tune set and generator to 1,200 metres (250 kc.) and adjust T5 and then T6 for maximum output.

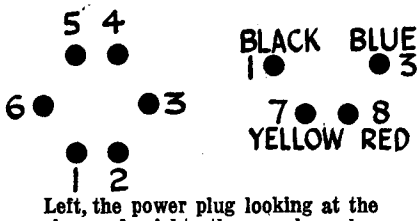
(*Continued in column* 3.)




**Right, top-of-chassis layout diagram of the Cossor 398. Press-button tuning is by permeability-tuned aerial and oscillator coils which are switched into signal and oscillator circuits of V2, which, in effect, is the first valve.**




**Left, the underside lay out diagram for the separate power supply chassis (see circuit on page 30). Of the two plugs, the six pin is for power supplies and the four pin for the speaker connections.**




**Left, the power plug looking at the pins and, right, the speaker plug looking at the back of the pins.**

## WINDINGS (D.C. Resistances)

| L. | Ohms. | Range. | Where measured. |
|---|---|---|---|
| 1 | 3 | — | On tags. |
| 2 | 3 | — | On tags. |
| 3 | 130 | L.W. | C3 and chassis. |
| 4 | 23 | M.W. | C3 and chassis. |
| 5 | Very low. | S.W. | C3 and chassis. |
| 6 | 15 | L.W. | V2 grid and C10+R7. |
| 7 | 2 | M.W. | V2 grid and C10+R7. |
| 8 | Very low. | S.W. | V2 grid and chassis. |
| 9 | 13 | L.W. | W7 and P1. |
| 10 | 6 | M.W. | W7 and C16. |
| 11 | Very low. | S.W. | W7 and chassis. |
| 12 | 6 | — | Chassis and contact 10 W8. |
| 13 | 2.5 | M.W. | C16 and contact 11 W8. |
| 14 | Very low. | S.W. | Chassis and contact 12 W8. |
| 15 | 4 | — | V2 anode and H.T.+ |
| 16 | 3.3 | — | V3 grid and C22 + R26. |
| 17 | 17 | — | V3 anode and R11+C23. |
| 18 | 9(c.t.) | — | V4 diode and R12+C25. |
| 19 | 167 | — | Pins 7 and 8 on speaker socket. |
| 20 | 1,000 | — | Pins 1 and 3 on speaker socket. |
| 21 | 23 | — | Mains plug. |

(*Continued from column* 1)

Tune set and generator to 1,875 metres (160 kc.) and adjust P1 for maximum, simultaneously rocking the gang. Repeat both operations.

**Short Waves.**—Tune set and oscillator to 18 megacycles and adjust T1 and T2. There are no padding operations.

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(*Continued from page* 29.)

**Short Waves (Band One).**—Unshort the oscillator section, connect oscillator to aerial and earth through a dummy aerial, and tune the set and generator to 31 metres.

Adjust T5 for maximum output.

**Short Waves (Band Two).**—Tune set and generator to about 100 metres, and adjust T6 for resonance and then T7 for maximum output.

**Medium Waves.**—Tnne set and generator to 250 metres, and adjust T8 for resonance and then T9 and T10 for maximum output in that order.

Check the adjustment of T9 and T10.

**Long Waves.**—Tune set and generator to 1,500 metres, and adjust T11 for resonance. Do not adjust either T9 or T10.

Tune set and generator to the region of 1,750 metres and adjust P1 for maximum, simultaneously rocking the gang.

Re-check the trimming at 1,500 metres, and repeat the padding operation if necessary.

**Replacement Condensers** are available from A. H. Hunt, Ltd., for C11, unit 3479, 1s. 9d., and for C16, unit 2915, 1s. 9d.