

# TRADER SERVICE SHEETS

## RECEIVER SERIES (NUMBER THIRTEEN)

# K-B 666

### A.C. SUPERHET

THE K-B Model 666 receiver is one of the "Rejectostat" series and can be used with or without the Rejectostat aerial system, according to local conditions. Actually there are four models numbered 666, having identical chassis.

Models 666 and 666A are standard types, for use on 200-250 and 100-130 V A.C. mains respectively. These have medium toned cabinets with black fittings. Models 666B and 666C are similar, but are fitted in de luxe natural walnut cabinets, with chromium-plated edgings and fittings.

The receivers employ a modern super-heterodyne circuit, with A.V.C., continuously variable tone control and automatic tone compensation for various volume levels. There are five receiving valves, including a double diode triode, and one rectifier valve.

### CIRCUIT DESCRIPTION

Aerial input to initial variable-mu pentode H.F. amplifier (V1, Micromesh metallised 9A1) by way of special transformer. Primary, L1, has a high impedance; secondary, L2, L3, is tuned by C23. There is no chassis connection to the coil as it has been designed for use with the K-B "Rejectostat" system. Tuned-secondary H.F. transformer coupling to pentode detector-oscillator (V2, Cossor metallised MS/Pen). Primary L4; secondary L5, L6 tuned by C25. Oscillator coils L8, L9 tuned by C27; coupling coils L7 in cathode circuit. One variable-mu pentode intermediate frequency amplifier (V3, Micromesh metallised 9A1) with tuned transformer couplings L10, L11 and L12, L13. I.F. 130 KC/S. Full-wave diode second detector forming part of double diode triode (V4, Micromesh metallised 11A2). Rectified voltage developed across potentiometer R5, R6 is fed to triode section of V4 by way of radio-gramophone switch S1, S2, coupling condenser C16, and tapped manual volume control R30, R31. Voltage is also fed back as G.B. to V1 and V3, thus giving automatic volume control. Special automatic tone compensation circuit comprising R29, C17,

C22 and L14 in grid circuit of V4. This is a series tuned circuit resonating at approximately 1,000 c.p.s. and it has the effect of attenuating the middle register more quickly than the high or the low, with the result that reproduction remains well balanced throughout the range of volume control. R.C. coupling between V4 and I.H.C. output pentode (V5, Micromesh 7A2). Variable tone control by means of variable condenser C36 in grid circuit. Usual by-pass condenser, C13 in anode circuit.

H.T. current supplied by I.H.C. full-wave rectifier (V6, Micromesh R2). Smoothing by R14 and speaker field L15 in H.T. negative lead, and dry electrolytic condensers C19, C20, C21. G.B. voltage for V4 obtained by means of potentiometer R7, R8 across L15.

### DISMANTLING THE SET

**Removing Chassis.**—First of all, remove control knobs. All modern chassis are now fitted with knobs having springs pressing on flats on the spindles. To remove these, pass a strip of cloth between the knob and the cabinet, twist it round the knob, and pull. Certain early chassis were fitted with knobs having the usual set screws.

After removing knobs, unscrew four screws underneath base of cabinet, which hold chassis in position. Unplug speaker plug from the chassis. Chassis can now be withdrawn. There is a sheet of tinned iron between chassis and cabinet.

The 4-way speaker lead is long enough to enable most service work to be performed without removing speaker. In any case, set must not be switched on unless the speaker and its field are connected by plugging into the chassis.

**Removing Speaker.**—Should this be necessary, undo the two bolts holding the vertical wooden speaker support to

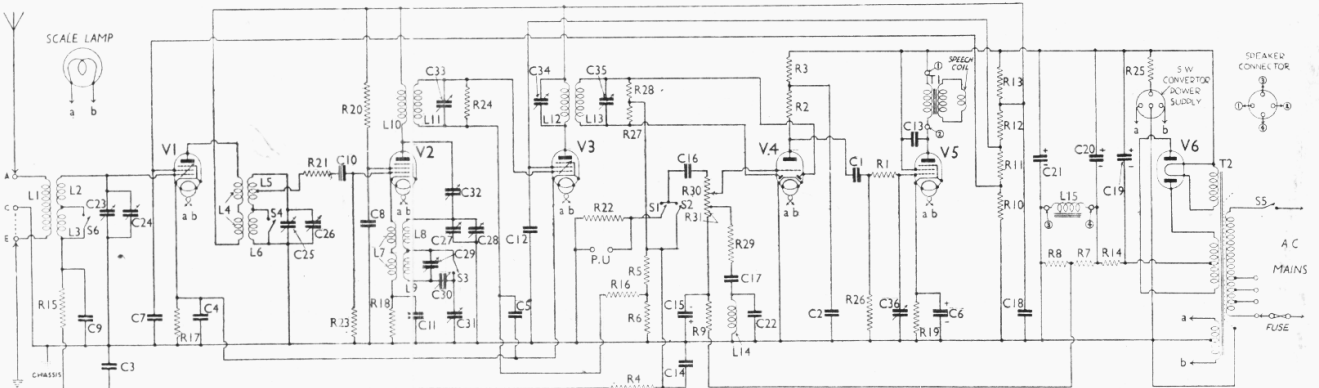
the fillets on the top and bottom of the cabinet. Speaker can then be withdrawn with the support.

### COMPONENTS & VALUES

| Condensers |   | Values (μF) |
|------------|---|-------------|
| C1         | V5 grid condenser                       | 0.006       |
| C2         | V4 anode decoupling                     | 0.1         |
| C3         | A.V.C. circuit decoupling               | 0.0005      |
| C4         | V1 and V3 cathodes by-pass              | 0.5         |
| C5         | V3 grid decoupling                      | 0.1         |
| C6         | V5 G.B. resist. by-pass, electrolytic   | 25.0        |
| C7         | V1 S.G. by-pass                         | 0.1         |
| C8         | V2 S.G. by-pass                         | 0.1         |
| C9         | V1 grid decoupling                      | 0.1         |
| C10        | V2 grid condenser                       | 0.0001      |
| C11        | V2 cathode by-pass                      | 0.01        |
| C12        | V3 S.G. by-pass                         | 0.5         |
| C13        | Fixed tone compensator                  | 0.001       |
| C14        | Diode reservoir                         | 0.0002      |
| C15        | V4 grid decoupling, electrolytic        | 25.0        |
| C16        | V4 grid condenser                       | 0.02        |
| C17        | Part of auto. tone comp. circuit        | 0.05        |
| C18        | V1, V2, V3 anodes decoupling            | 1.0         |
| C19        | H.T. smoothing condensers, electrolytic | 6.0         |
| C20        |   | 6.0         |
| C21        |   | 6.0         |
| C22        | Part of auto. tone comp. circuit        | 0.01        |
| C23        | Aerial circuit tuning                   | —           |
| C24        | Aerial circuit trimmer, pre-set         | —           |
| C25        | H.F. trans. tuning                      | —           |
| C26        | H.F. trans. trimmer, pre-set            | —           |
| C27        | Oscillator tuning                       | —           |
| C28        | Oscillator trimmer, pre-set             | —           |
| C29        | Oscillator L.W. trimmer, pre-set        | —           |
| C30        | Oscillator L.W. tracker, pre-set        | —           |
| C31        | Oscillator M.W. tracker, pre-set        | —           |
| C32        | 1st I.F. pri. tuning, pre-set           | —           |
| C33        | 1st I.F. sec. tuning, pre-set           | —           |
| C34        | 2nd I.F. pri. tuning, pre-set           | —           |
| C35        | 2nd I.F. sec. tuning, pre-set           | —           |
| C36        | Tone control condenser, variable        | *0.0025     |

\* Maximum.

(Continued overleaf)



The circuit diagram of the K-B 666 A.C. superhet. Note that the chassis is not earthed unless the sockets C and E are joined. The connections of the speaker plug and socket and also those of the S.W. convertor power socket are indicated. The mains transformer T2 has an electrostatic screen between primary and secondaries, connected to chassis.

**KOLSTER-BRANDES MODEL 666**  
(cont'd)

| Resistances |   | Values (ohms) |
|-------------|---|---------------|
| R1          | V5 grid H.F. stopper  | 100,000       |
| R2          | V4 anode resistance   | 70,000        |
| R3          | V4 anode decoupling   | 70,000        |
| R4          | A.V.C. circuit decoupling   | 250,000       |
| R5          | Diode load  | 250,000       |
| R6          | G.B. pot. div. across L15   | 100,000       |
| R7          |   | 250,000       |
| R8          | V4 grid decoupling  | 10,000        |
| R9          |   | 30,000        |
| R10         | Potential divider across H.T. supply, providing anode and S.G. voltages for V1, V2 and V3 | 15,000        |
| R11         | Part of H.T. smoothing  | 10,000        |
| R12         |   | 25,000        |
| R13         | V1 grid decoupling  | 3,600         |
| R14         | V3 grid decoupling  | 250,000       |
| R15         | V3 grid decoupling  | 250,000       |
| R16         | V1 and V3 fixed G.B. resistance   | 300           |
| R17         | V2 G.B. resistance  | 3,000         |
| R18         | V5 G.B. resistance  | 400           |
| R19         | V2 S.G. voltage-dropping resistance   | 500,000       |
| R20         |   | 500           |
| R21         | V2 grid stabiliser  | 250,000       |
| R22         | Shunt across pick-up  | 2,000,000     |
| R23         | V2 grid resistance  | 500,000       |
| R24         | Shunt across L11  | 5,000         |
| R25         | H.T. feed to S.W. convertor   | 250,000       |
| R26         | V5 grid resistance  | 250,000       |
| R27         | Potentiometer across L13  | 250,000       |
| R28         | Part of auto. tone comp. circuit  | 5,000         |
| R29         |   | 425,000       |
| R30         | Tapped manual volume control  | 75,000        |
| R31         |   |               |

| Other Components (cont'd) |  | Values (ohms) |
|---------------------------|--|---------------|
| L14                       | Tone comp. choke   | 1150·0        |
| L15                       | Speaker field  | 1500·0        |
| T1                        | Speaker input trans. { Pri. total 420·0<br>Sec. 0·2  |               |
| T2                        | Mains transformer { Pri. total 21·5<br>Heater sec. 0·08<br>Rect. fil. sec. 0·12<br>H.T. sec. 550·0 |               |
| S3-S4                     | Waveband switches, ganged  | —             |
| S6                        |  | —             |
| S1-S2                     | Radio-gramophone switch  | —             |
| S5                        |  | —             |
|                           | Mains switch (ganged R30, R31)   | —             |

\*Centre-tapped.

**ALTERNATIVE VALVES**

| Posi-tion | Micro-mesh | Mazda     | Mullard | Cossor  | Osram |
|-----------|------------|-----------|---------|---------|-------|
| V1        | 9A1        | —         | VP4     | MVS/Pen | —     |
| V2        | 8A1        | AC/S2Pen  | SP4     | MS/Pen  | —     |
| V3        | 9A1        | —         | VP4     | MVS/Pen | —     |
| V4        | 11A2       | —         | TDD4    | DDT     | MHD4  |
| V5        | 7A2        | AC/Pen    | Pen 4VA | MP/Pen  | MPT4  |
| V6        | R2         | UU120/350 | DW3     | 442BU   | U12   |

**VALVE ANALYSIS**

The voltage and current readings given in the table (col. 3) were taken with no signal input to the aerial socket of the receiver. Anode and screen voltages were measured with a high-resistance voltmeter having its negative side returned to chassis. The anode and

screen currents of V1, V2 and V3 were measured with a milliammeter inserted in the low H.F. potential ends of the circuits to prevent instability. The figures listed are average for the valve types indicated and will not necessarily be exactly the same when alternative valves are used.

| Valve     | Anode Volts | Anode Current (mA) | Screen Volts | Screen Current (mA) |
|-----------|-------------|--------------------|--------------|---------------------|
| V1 9A1    | 200         | 0·8                | 44           | 0·4                 |
| V2 MS/Pen | 200         | 0·8                | 30           | 0·3                 |
| V3 9A1    | 200         | 4·0                | 80           | 1·5                 |
| V4 11A2   | 100         | 1·0                | —            | —                   |
| V5 7A2    | 220         | 30·0               | 230          | 4·0                 |
| V6 R2     | *300        | —                  | —            | —                   |

\*Each anode, A.C.

**GENERAL NOTES**

**Aerial and Earth.**—Although the receiver is designed for use with the Rejocostat aerial system, it can be employed with an ordinary aerial and earth. In this case the sockets marked C and E must be connected together, and to earth, otherwise only the primary of the aerial transformer will be earthed.

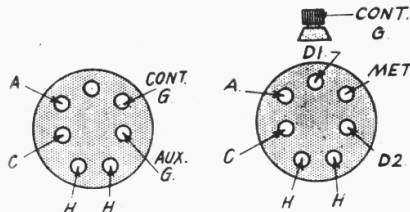
**Loud-speaker Terminal Board.**—This is fitted with three sockets, marked A, G and B, and a plug on a flying lead, connected to A. The speech coil of the internal speaker is joined to A and B, and the secondary of the input transformer to G and B. To use the internal speaker alone, the plug is inserted in G. To use an external speaker alone, the plug is placed in A (i.e., disconnected) and the low impedance external speaker is plugged into G and B. To use both speakers together, leave the plug in G, and plug the external speaker into A and B.

The external speaker should have an impedance of about 1 ohm.

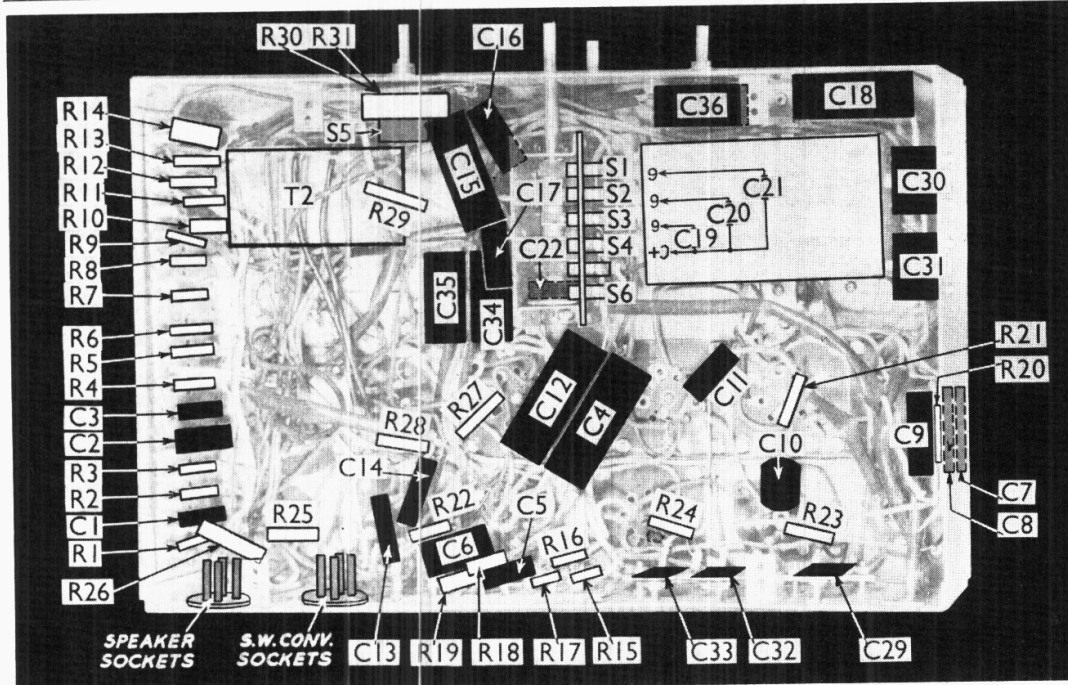
The above remarks apply to any K-B 666 receiver, except those fitted with Rola speakers.

**Fuse.**—This is fitted inside the plug used for adjusting the mains transformer

| Other Components |                              | Values (ohms) |
|------------------|------------------------------|---------------|
| L1               | Aerial transformer primary   | 19·5          |
| L2               | Aerial transformer secondary | 4·6           |
| L3               |                              | 20·0          |
| L4               | H.F. transformer primary     | 10·8          |
| L5               | H.F. transformer secondary   | *4·6          |
| L6               |                              | 20·0          |
| L7               | Oscillator coupling coils    | 3·7           |
| L8               | Oscillator tuning coils      | 3·7           |
| L9               | 1st I.F. transformer         | 13·5          |
| L10              |                              | 62·0          |
| L11              | 2nd I.F. transformer         | 62·0          |
| L12              |                              | 62·0          |
| L13              |                              | 62·0          |



Underside connections of the V5 (left) and V4 (right) valve-holders.



Under-chassis view. Many of the condensers and resistances are drawn horizontally for clarity, though only end-on views are actually seen. This applies chiefly to those at the left of the illustration which are mounted vertically on the inside of the end of the chassis. Note that the fifth set of contacts of the ganged switch is not used. C22 is beneath the switch assembly. R20, C8 and C7 are vertically below C9.



to the correct voltage. Pull the two halves apart, when the fuse can be withdrawn. Its rating is 1,200 m.A.

**Scale Lamp.**—This is in a holder fitted with a clip. The bulb is rated at 5.5 V, 0.3 A.

**Mains Transformer.**—If this has to be replaced, cut all the leads a short distance from their soldered ends and remove the four nuts holding transformer (T2) to chassis. When refitting, do not forget the lead strips, and tighten the nuts thoroughly. The colour of the remaining ends of the original connections will ensure that the new connections are made correctly.

**Condenser Drive.**—If slip should develop, increase the tension of the cord by hooking the helical spring (inside drum) to another of the three pegs on the spoke. When the limit is reached shorten the cord, and hook the spring on the first peg.

**Coils.**—These are all mounted within non-removable screens on the top of the chassis. Each coil assembly is held to the chassis by four nuts and bolts, while the coil connections are made to tags projecting through holes in the paxolin bases.

**Switches.**—S1-S4 and S6 are ganged, and perform the waveband and pick-up switching. Note that the fifth set of contacts from the front of the chassis is not connected in circuit, but its contacts are joined to chassis. S5 is the Q.M.B. mains switch ganged with the tapped volume control (R30, R31).

The table below indicates the positions of the wavechange and pick-up switches :

| Switch | M.W.   | L.W.   | Gram.  |
|--------|--------|--------|--------|
| S1     | Open   | Open   | Closed |
| S2     | Closed | Closed | Open   |
| S3     | Closed | Open   | Open   |
| S4     | Closed | Open   | Open   |
| S6     | Closed | Open   | Open   |

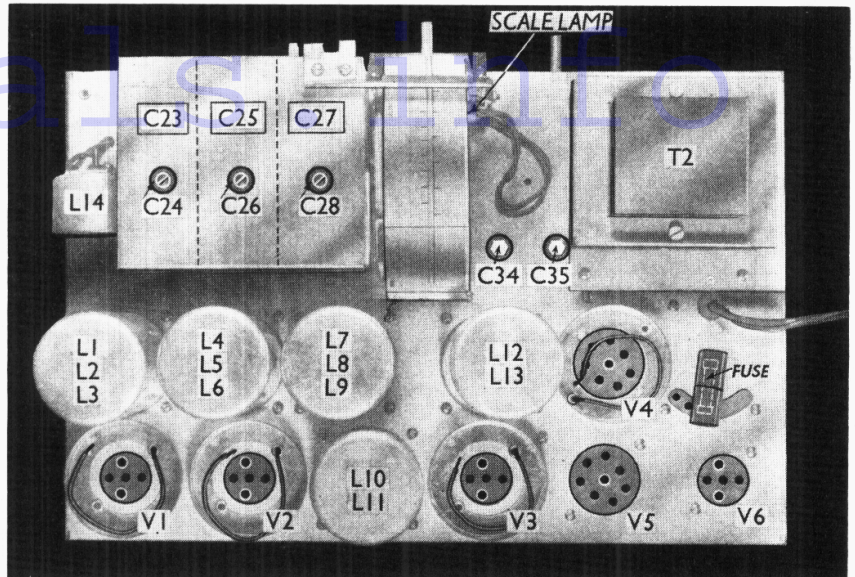
**Speaker Plug.**—The speaker is plugged into the chassis by means of a 4-pin plug and socket arrangement. The primary of the speaker transformer is connected to the "filament" pins of the plug, and the field (L15) to the "grid" and "anode" pins. This is indicated on the circuit diagram, which also shows the points in the circuit where the corresponding sockets are connected.

**S.W. Converter Sockets.**—These are also indicated on the circuit diagram. The K-B 357 short wave converter, designed for use with the set, is fitted with a corresponding plug.

**Shielded Wires.**—Some of the cables are shielded by large diameter "spaghetti," in which the usual plaited wire shield is embedded.

**Valve Top Terminals.**—The leads to these are fitted with circular black fibre discs (which have been removed in our plan view of the chassis). These serve to centralise the valves inside their screening cans.

**Coded Wiring.**—The following wiring colour code is employed: Red, H.T. supply circuits; Blue, anode circuits; Green, control grid circuits; Orange, auxiliary grid circuits; Dark Brown,



Plan view of the chassis. The valve screens of V1 to V4 have been removed. The fuse and voltage adjuster are combined.

heater circuits; Light Brown, cathode circuits; Yellow, A.V.C. circuits; Black and Red Tracer, negative side of smoothing circuits; Black, earth connections.

**CIRCUIT ALIGNMENT**

It is essential that the operations of "lining up" the receiver be carried out strictly in the order indicated, and, unless otherwise stated, it is detrimental to go back to an earlier adjustment after subsequent operations have been made.

First adjust the signal generator to deliver a considerable output at the intermediate frequency of 130 KC/S and switch on the receiver with the output meter connected to the loud-speaker. Turn the wave-change switch to "long waves," the volume control to maximum, and the tone control fully clockwise. Set the gang condenser to maximum capacity, verifying that the scale pointers are in line with the datum line, and take leads from the signal generator output to :

- (a) The chassis (centre socket of panel marked A.C.E.) and
- (b) Through a condenser of capacity 0.1 μF to the end of C10 which is not connected to the grid V2. Stop the oscillation by temporarily short-circuiting L7.
- (1) Unscrew all the four I.F. trimmers (C32-35) till they are quite loose and the minimum capacity is reached.
- (2) Screw clockwise C35 until a maximum output is indicated.
- (3) Adjust C34 in exactly the same way.
- (4) Repeat for C33.
- (5) Repeat for C32. No deviation from this order is allowable, and once any trimmer has been set it must be left.
- (6) Remove the short circuit on L7.
- (7) Adjust the signal generator to 1,400 KC/S and apply the output to the sockets marked "A" and "E" of the triple socket panel.
- (8) Turn the wave-switch to "medium waves" and the gang condenser so that the scale pointer is in line with the mark "S.W. Converter."
- (9) Fully unscrew (counter clockwise)

the oscillator trimmer C28 and fully screw up (clockwise) the high frequency and aerial trimmers, C26 and C24.

(10) Now screw down C28 until a signal is received and adjust for the greatest output.

**CAUTION.**—Care must be taken when screwing down that a weak signal is not missed, as it is possible to receive a signal in two positions of this trimmer, the first reached when screwing clockwise is the required beat; the other is the "second channel."

(11) Unscrew C26 to give the highest output.

(12) Adjust C24 similarly.  
(13) Return to C28 and attempt to improve the output by a small readjustment of this.

(14) Adjust the signal generator to 600 KC/S and tune in to this by the tuning control of the receiver.

(15) Adjust the medium wave tracking condenser C31 for the best output, at the same time moving the tuning control of the receiver to get a final reading. Set the pointer so that 500 metres is indicated.

(16) Repeat adjustments (7) to (13) and attempt to get an improvement by a final adjustment.

(17) Switch to "long waves" and turn tuning control until 1,000 metres is indicated.

(18) Adjust the signal generator to 300 KC/S and tune in to this by means of the long wave trimmer, C29.

(19) Adjust the signal generator to 175 KC/S and tune in to this by means of the receiver tuning control.

(20) Adjust for highest output by the long wave tracking condenser C30, at the same time rocking the tuning control to and fro to find the best position. Make an adjustment of the pointer if necessary.

(21) Adjust the signal generator to 300 KC/S and see whether an improvement may be made to the adjustment of the long wave trimmer, C29.