

NUMBER FIFTY-SIX

'TRADER' SERVICE SHEETS

K-B MODEL 427 A.C. SUPERHET

THE K-B Model 427 A.C. superhet is a 4-valve (plus valve rectifier) receiver employing three A.C./D.C. valves running from a 13 V heater-winding, an ordinary 4 V A.C. output pentode, and a 4 V rectifier. The receiver is adaptable to the Rejectostat aerial-earth system, and employs the "Foto-tune" type of tuning scale. Model 427A is similar but is for use with 100-130V mains.

CIRCUIT DESCRIPTION

Aerial coupling by coil **L1** to primary of mixed-coupled band-pass filter. Primary **L2, L3**, tuned by **C21**; secondary **L4, L5**, tuned by **C24**; inductive coupling by **L6**, capacity coupling by **C1**.

First valve (**V1, Brimar 15D1**) is a heptode operating as frequency changer with electron coupling. Oscillator grid coils **L7, L8** tuned by **C27**; anode coils **L9, L10**; tracking by condensers **C30 (L.W.)** and **C31, C6 (M.W.)**.

Second valve, a variable-mu H.F. pentode (**V2, Brimar 9D2**) operates as intermediate frequency amplifier with tuned-primary tuned-secondary transformer couplings **L11, L12** and **L13, L14**.

the control turned to its fully counter-clockwise position, coupling between **L13** and **L14** is at maximum, with the result that the high-note response is greatly improved while selectivity is not so high.

Intermediate frequency 130 KC/S.

Diode second detector forms part of double diode valve (**V3, Brimar 10D1**). Second diode, fed by small condenser **C13**, provides D.C. potential which is developed across **R13** and fed back via decoupling circuits as G.B. to F.C. and I.F. valves, thus giving automatic volume control. Delay voltage is obtained from drop along **V4 G.B. resistance R14**.

Audio-frequency component in output from **V3** rectifier diode is developed across **R9** and passed by way of coupling condenser to manual volume control **R10**, which forms grid resistance of output pentode (**V4, Mullard Pen4VB**). Provision for connection of high-output gramophone pick-up directly in grid circuit across **R11**, which, on radio, is S.C. by special link plug. On gram., plug connects control grid of **V2** to earth, thus eliminating radio break-through.

A separate pick-up volume control is necessary. Tone compensation in **V4** anode circuit by fixed condenser **C15** and impedance-limiting filter **R15, C16**.

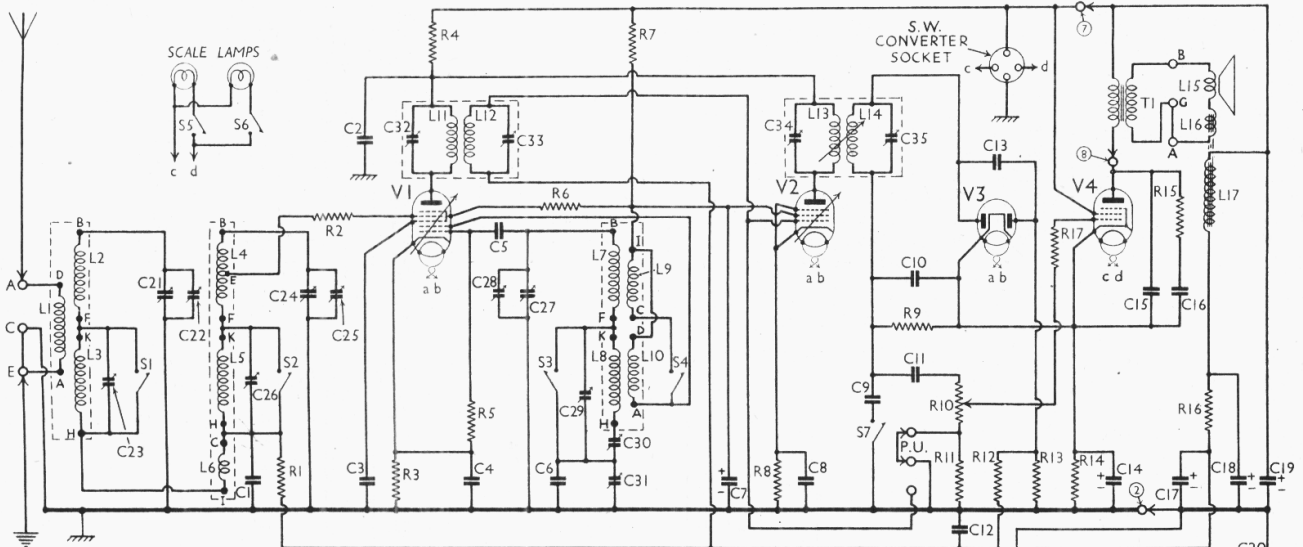
H.T. current is supplied by I.H.C. full-wave rectifying valve (**V5, Micromesh** or **Brimar R3**). Smoothing by speaker field winding **L17**, resistance **R16**, and dry electrolytic condensers **C17, C18** and **C19**. Mains H.F. disturbance by-passing by condenser **C20**.

COMPONENTS AND VALUES

Resistances		Values (ohms)
R1	V1 tet. cont. grid decoupling ..	100,000
R2	V1 tet. cont. grid stabiliser ..	400
R3	V1 fixed G.B. resistance ..	150
R4	V1 tet. and V2 anodes decoupling ..	5,000
R5	V1 osc. grid resistance ..	25,000
R6	V1 S.G.'s decoupling ..	15,000
R7	V1 and V2 S.G.'s H.T. feed ..	25,000
R8	V2 fixed G.B. resistance ..	300
R9	V3 rectifier diode load ..	500,000
R10	Manual volume control ..	500,000
R11	Part of pick-up circuit ..	250,000
R12	A.V.C. circuit decoupling ..	100,000
R13	V3 A.V.C. diode load ..	500,000
R14	V4 G.B. resistance ..	140
R15	Part of tone comp. circuit ..	20,000
R16	H.T. smoothing ..	600
R17*	V4 grid I.F. stopper ..	7,000

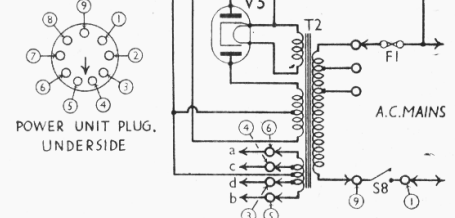
* May not appear in some chassis.

Condensers		Values (µF)
C1	Band-pass capacity coupling ..	0.02
C2	V1 tet. and V2 anodes decoupling ..	0.1
C3	V1 S.G.'s by-pass ..	0.1
C4	V1 cathode by-pass ..	0.1
C5	V1 osc. grid condenser ..	0.0001
C6	Oscillator M.W. tracker, fixed ..	0.001
C7*	V2 S.G. by-pass ..	10.0



Continuously variable selectivity by means of mechanical arrangement which varies coupling between primary and secondary coils of second transformer. When the "Selectivity-tone" control knob is turned fully clockwise, selectivity is at maximum, and switch **S7** associated with condenser **C9** is automatically closed, thus attenuating still further the high-note response of the receiver. With

Circuit diagram of the K-B Model 427. The coils are lettered to correspond with the base diagram on p. VIII. The power unit plug is numbered, and the numbered plugs and sockets are shown on the circuit diagram.

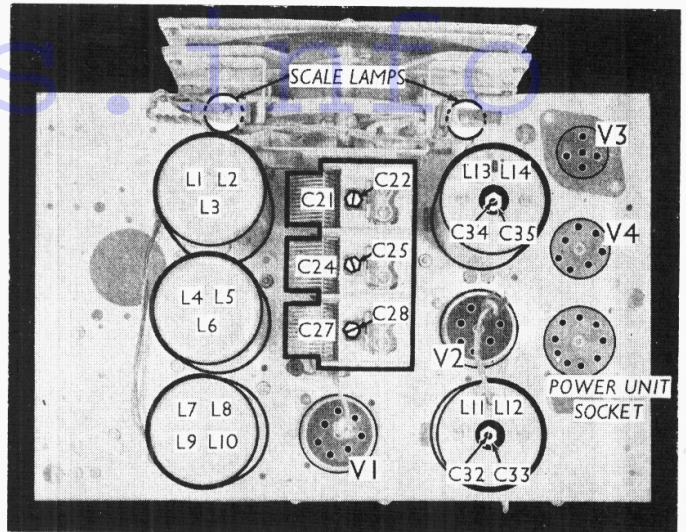


Component	Values (μF)	
C8	V2 cathode by-pass	0.1
C9	High-note attenuator	0.001
C10	I.F. by-pass	0.0005
C11	L.F. coupling to V4	0.02
C12	A.V.C. circuit decoupling	0.1
C13†	Coupling to V3 A.V.C. diode	0.000012
C14*	V4 cathode by-pass	25.0
C15	Parts of tone compensation circuit	0.0005
C16		0.01
C17*		8.0
C18*	H.T. smoothing	8.0
C19*		8.0
C20	Mains disturbance by-pass	0.01
C21	Band-pass primary tuning	0.0005
C22‡	Band-pass primary trimmer	—
C23‡	Band-pass primary L.W. trimmer	—
C24	Band-pass secondary tuning	0.0005
C25‡	Band-pass secondary trimmer	—
C26‡	Band-pass secondary L.W. trimmer	—
C27	Oscillator tuning	0.0005
C28‡	Oscillator main trimmer	—
C29‡	Oscillator L.W. trimmer	—
C30‡	Oscillator L.W. tracker	—
C31‡	Oscillator M.W. tracker	—
C32‡	1st I.F. trans. pri. tuning	—
C33‡	1st I.F. trans. sec. tuning	—
C34‡	2nd I.F. trans. pri. tuning	—
C35‡	2nd I.F. trans. sec. tuning	—

* Dry electrolytic.
 ‡ Pre-set condenser.
 † Formed by twisted wires.

Component	Values (ohms)	
L1	Aerial coupling coil	11.0
L2		5.0
L3	Band-pass primary coils	20.0
L4		5.0
L5	Band-pass secondary coils	20.0
L6		20.0
L7	Band-pass coupling coil	0.25
L8	Oscillator grid coils	4.0
L9		13.0
L10	Oscillator anode coils	2.0
L11		9.0
L12	1st I.F. trans.	70.0
L13		70.0
L14	2nd I.F. trans.	70.0
L15		70.0
L16	Speaker speech coil	2.0
	Hum neutralising coil	0.1

Plan view of the chassis. Note the dual I.F. trimmer adjustments.



Component	Other Components (contd.)	Values (ohms)
L17	Speaker field winding	1,300
T1	Output trans.	430.0
	Pri.	0.4
	Sec.	25.0
T2	Mains trans.	0.4
	Heater sec. total	0.05
	Rect. heat. sec.	—
	H.T. sec.	150.0
S1-S4	Waveband switches	—
S5	Scale lamp switch (M.W.)	—
S6	Scale lamp switch (L.W.)	—
S7	High-note attenuator switch	—
S8	Mains switch, ganged R10	—
F1	Mains circuit fuse (1.5A)	—

DISMANTLING THE SET

The detachable bottom of the cabinet allows most repairs to be carried out without removing the chassis. The right-hand base rail (viewed from the back)

slightly overlaps the cut-away portion of the cabinet and, if desired, can be removed by taking out two wood screws.

Removing Chassis.—Should it be necessary to remove the chassis, take off the back and remove the three control knobs at the front (recessed grub screws). Remove the two bolts with lock washers and claw washers which allow the chassis to float on its rubber mounting, and detach the two base rails (two wood screws each). Remove four bolts (with lock washers, large washers and distance pieces) holding chassis, heads underneath base rails. Remove o-pin plug connecting to power pack. Chassis can now be withdrawn.

When replacing, do not forget to replace the rubber washers between the chassis and the cabinet bottom. Also note that the screws holding the chassis should be tightened up and then slackened three complete turns to allow the chassis to float.

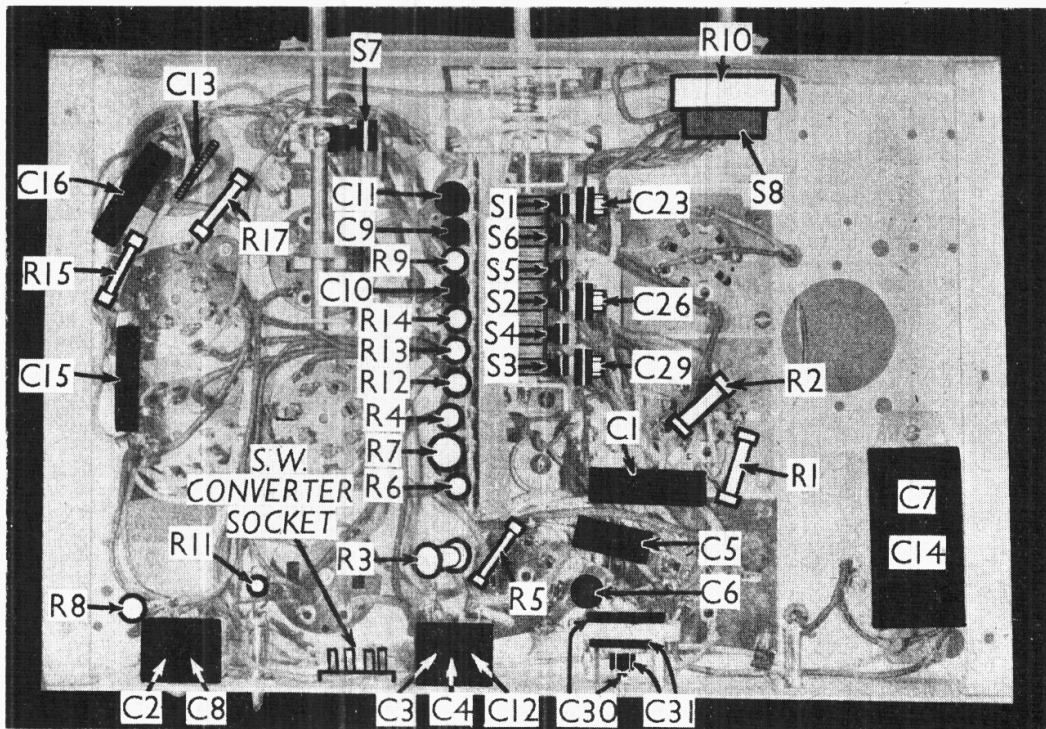
Removing Power Pack and Speaker.

To remove the power pack and speaker, remove the four bolts passing through the wooden battens (two lock washers and two large washers on each). Remove the two metal clips at the right-hand side of the cabinet, which hold the leads from the power pack (three wood screws). When replacing, note that the larger clip is nearer the front of the cabinet.

Separating Speaker from Power Pack.

Should this be necessary, unsolder the leads to the speaker terminal panel and the earthing lead, and remove the two

(Continued overleaf)



Under-chassis view. Separate diagrams of the small condenser blocks are given overleaf. C13 is a very small fixed condenser.

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bolts on the underside of the baseboard, holding the speaker. When replacing, the colour code to follow, numbering the tags from left to right when viewing the speaker from the back is: 1, red; 2, black; 3, yellow; 4, yellow; 5, green.

VALVE ANALYSIS

The voltages and currents listed in the table were obtained from an average production chassis working under "no signal" conditions (aerial and earth sockets S.C.), with a 235 V 50 c.p.s. A.C. mains supply. Following the instructions given by the makers, the voltage adjustment plug was inserted in the 225 position.

All voltages were measured on the 1,200 V scale of a Universal Avometer with chassis as negative. In some instances when measuring currents it may be necessary to stabilise V1 and V2 in the usual way with 0.1 µF condensers connected between anodes and chassis. The readings given for V1 were taken under normal working conditions with the oscillator section operating.

Valve	Anode Volts	Anode Current (mA)	Screen Volts	Screen Current (mA)
V1 15D1*	175	5.2	70	2.3
V2 9D2 ..	175	8.2	100	1.8
V3 10D1 ..	—	—	—	—
V4 Pen4VB	240	34.0	255	4.0
V5 R3 ..	310†	—	—	—

* Osc. anode (G2) 100 V 2.0 mA.
† Each anode, A.C.

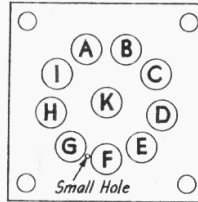
GENERAL NOTES

Switches.—S1-S4 are the waveband switches, and S5, S6 the M.W. and L.W. scale lamp switches. All these are ganged on the main switch spindle, which is rotated by pushing in the tuning knob and turning it, thus eliminating one control knob. The switches are all closed on the M.W. band, except S6, which is open. On the L.W. band they are all open, except S6, which is closed.

S7 is the high note attenuator switch, normally open, but closed when the combined selectivity and tone control is rotated fully clockwise. It is seen in the under-chassis view.

S8 is the Q.M.B. mains switch, ganged with the volume control R10.

Coils.—The signal frequency and oscillator coils are in three screened units on the chassis deck, containing L1-L3, L4-L6 and L7-L10 respectively. The connections to these coils are taken to tags on the special bases underneath the chassis, and the tags are coded according to the lettered diagram on this page, with corresponding letters on the circuit diagram. Note the small hole in the paxolin bases which indicate the F and G tags.

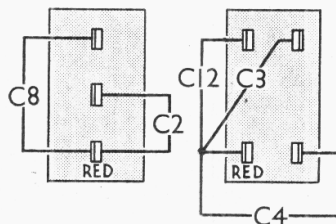


Coil base coding.

The I.F. transformers L11, L12 and L13, L14 are in two more screened cans, holes in the tops permitting the trimmers to be reached. These are shown in the plan chassis view. The primary winding is the lower one in each case. The second I.F. transformer has variable coupling between primary and secondary.

Trimmers C32-C35.—These are the I.F. trimmers, which can be adjusted from the tops of the I.F. screens. In each case the central grub screw adjusts the primary, and the hexagonal nut the secondary winding.

Condenser C13.—This is a very small condenser, seen in the under-chassis view,



Condenser block diagrams.

formed by a wire winding over a central thick insulated wire.

Scale Lamps.—These are of the Osram M.E.S. type, rated at 6.2 V, 0.3 A.

Fuse.—This is enclosed in the split moulded 2-pin plug used for mains voltage adjustment. The fuse is rated

at 1.5 A, and is of the standard 1 1/4 in. length. The K-B part number is 21210.

Condensers C7, C14.—These electrolytics are in a single block in our chassis, but may be separate in some cases.

Condensers C17, C18, C19.—These are three 8 µF dry electrolytics, with a common negative (black lead) and three separate positives (red).

Resistance R17.—This may not be included in some chassis.

External Speaker.—The speaker transformer T1 has three tags marked A, B, and G, A and G being bridged by a wire. An external low resistance speaker may be connected across A and B, or across G and B, in which case an on-off switch replacing the wire between A and G would enable the internal speaker to be switched off when necessary.

The speech coil resistance of the speaker should be about 1.5 Ω. K-B 435 is the recommended external speaker.

CIRCUIT ALIGNMENT

See that the tuning pointer is horizontal when the gang condenser is fully open. At the same time the line seen in the station name aperture with the set switched on must coincide with the pointer (adjust station name disc if necessary by loosening screws in its central bush). Verify that the two small marks, one at each inside end of station name aperture, line up with pointer when it is horizontal. (Correct by moving the dial itself if necessary.)

Adjust signal generator to the I.F., 130 KC/S, connect output meter, switch on set (L.W.), and turn volume control to maximum, and selectivity control fully clockwise. Set tuning condenser to maximum, and connect one signal generator lead to chassis and the other through a 0.1 µF condenser to control grid (top cap) of V1.

Adjust all four I.F. trimmers to minimum. Adjust C35 for maximum output, then C34, C33 and C32.

Adjust generator to 1,200 KC/S, and connect to A and E sockets. Switch set to M.W., and turn tuning knob so that pointer is in line with small mark at 250 m. NOTE.—Early models were aligned at 1,400 KC/S, and on these the small mark is at 214 m.

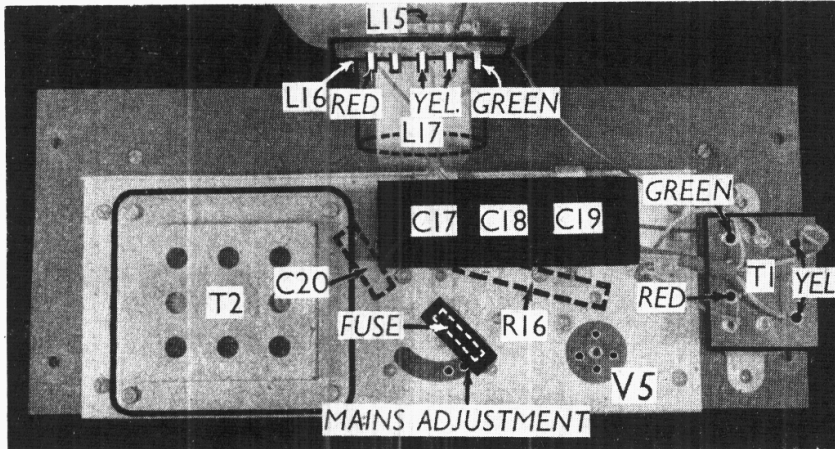
Unscrew C28 fully, and screw in C25 and C22 fully. Now screw down C28 until greatest output is obtained. NOTE.—The signal comes in at two positions. The first reached when screwing C28 down is the correct one.

Now adjust C25, then C22 for maximum output. Return to C28 and attempt to improve output.

Set generator at 600 KC/S, and tune to this by the tuning control. Adjust C31 for maximum output, at the same time rocking the tuning control slightly to get best results. Set the pointer to 500 m., by loosening the two screws on the main spindle behind back dial plate bush. Repeat adjustments of I.F. trimmers and tuning condenser trimmers in an attempt to improve results.

Adjust signal generator to 175 KC/S and tune receiver to this. Adjust C30 for maximum output, rocking tuning control.

Adjust signal generator to 300 KC/S, and set tuning pointer to 1,000 m. Adjust C26, C23 and C29 for maximum output.



Plan view of power unit chassis. C20 and R16 are beneath the chassis.