'TRADER' SERVICE SHEETS

RECEIVER SERIES (NUMBER FOUR)

The McMichael "TWIN SUPERVOX"

(A.C. MODEL)

THE McMichael "Twin Supervox" is a de luxe table receiver employing a "straight" 4-valve circuit with two S.G. H.F. stages. It is notable for its dual-matched energised M.C. speakers.

CIRCUIT DESCRIPTION

Two alternative aerial connections (one by way of very small series condenser **C1**) to capacity potential divider **C2, C3,** across first tuned circuit **L1, L2, C4,** which forms primary of band-pass input filter. Capacity coupling by **C5** and **C6** to secondary, **L3, L4, C8,** which precedes first S.G. H.F. amplifier (**V1, Osram** "**Catkin**" **MS4B**). Tuned-anode coupling (**L5, L6, C11**) to second S.G. H.F. amplifier (**V2, Osram** "**Catkin**" **MS4B**). Volume controlled by potentiometer (**R17**), which varies G.B. applied to **V1** and **V2.** Aperiodic coupling by H.F. choke **L7** to grid-leak detector (**V3, Osram** "**Catkin**" **MH4**), with provision for gramophone pick-up in grid circuit. **V3** coupled to IHC pentode (**V4, Mazda AC/Pen** or **Catkin MPT4**) by parallel-fed auto-transformer **T1.** Voltage limiting filter **R14, C24,** in plate circuit with additional parallel tone compensating condensers **C23** and **C25. C23** connected in circuit by tone control switch **S5.** Provision for external speaker across primary of transformer **T2,** feeding the dual matched speakers.

H.T. current supplied by Westinghouse metal rectifier working on voltage-doubler system with condensers **C28** and **C29.** Smoothing by one speaker field winding **L10** and electrolytic condensers **C27, C30.** Other speaker field **L9,** in series with **R19,** across main H.T. supply.

DISMANTLING THE SET

Removing Chassis.—Remove back of cabinet by taking out the six screws. Remove knobs. Those on the extreme left and right have grub screws, while the switch lever in the centre is held by a screw in front passing down the axis of the spindle. Remove this, and pull off the lever. The spindle is flatted, and the lever has a moulded hole to fit. If tight, carefully ease it off with a screw-driver or wedge between it and the metal back-plate screwed to the cabinet. There is a spring washer between them.

Now remove the six screws and large washers which can be seen beneath the cabinet. There are four more to be removed, which are concealed in holes in the thick wood strips serving as feet. The holes are covered with pieces of felt, which must be pierced or removed to obtain access to the screws.

The chassis can now be withdrawn. It is a fairly close fit, and should be eased out gently. The two speakers are mounted on the chassis, and come away with it.

Removing Speakers.—Should it ever be necessary to remove the speakers, they are each held to the vertical panel of the chassis by four bolts. One or two of the lower ones are rather inaccessible, and a box spanner will help matters here. There is a number of connections to each speaker, and before removing it it is advisable to draw a sketch showing the various wires and their colour-coding, otherwise incorrect connections may be made on replacing the speakers. Note that the speaker carrying the input transformer is on the *left* of the panel, looking from the rear of the chassis.

COMPONENTS AND VALUES

	Condensers	Value (μF)
C1	Series aerial condenser	—
C2	Capacity potential divider	0·000011
C3	Capacity potential divider	0·00003
C4	Band-pass primary tuning	—
C5	Band-pass coupling condensers	0·0000006
C6	Band-pass coupling condensers	0·000011
C7	V1 grid decoupling	0·1
C8	Band-pass secondary tuning	—
C9	V1 S.G. by-pass	0·1
C10	Safety blocking condenser	0·1
C11	V1 anode tuning	—
C12	V1 anode decoupling	1·0
C13	V2 S.G. by-pass	1·0
C14	Coupling to V2	0·0002
C15	V2 grid decoupling	1·0
C16	V2 anode decoupling	1·0
C17	Part of filter in V2 anode circuit	0·0002
C18	V3 grid condenser	0·00005
C19	V3 anode decoupling	1·0
C20	Parallel feed condenser to T1	0·5
C21	V3 anode by-pass	0·002
C22	V4 grid decoupling	1·0
C23	Tone-control condenser	0·01
C24	Part of voltage-limiting circuit	0·01
C25	Tone-control condenser	0·002
C26	V4 aux. grid by-pass	0·1
C27	H.T. smoothing (electrolytic)	8·0
C28	Voltage-doubler condensers	4·0
C29	Voltage-doubler condensers	4·0
C30	H.T. smoothing (electrolytic)	8·0
C31	Mains disturbance by-pass	0·01

NOTE.—The above table includes all the condensers in the circuit, except the trimmers of the tuning condensers.

	Resistances	Value (Ohms)
R1	V1 grid decoupling	500,000
R2	V1 anode decoupling	10,000
R3	V1 S.G. decoupling	500
R4	V1 and V2 S.G. potential divider	20,000
R5	V1 and V2 S.G. potential divider	20,000
R6	V2 grid resistance	2,000,000
R7	V2 anode decoupling	10,000
R8	V3 grid-leak	500,000
R9	V3 anode resistance	30,000
R10	V3 anode decoupling	20,000
R11	V2 grid decoupling	500,000
R12	V4 grid decoupling	100,000
R13	V4 H.F. stopper	500,000
R14	Part of voltage-limiting circuit	20,000
R15	Tapped G.B. resistance	30
R16	Tapped G.B. resistance	300
R17	Variable potentiometer volume control	5,000
R18	Centre-tapped potentiometer across heaters	50
R19	Part of V4 aux. grid pot. divider	1,500

(Continued overleaf)

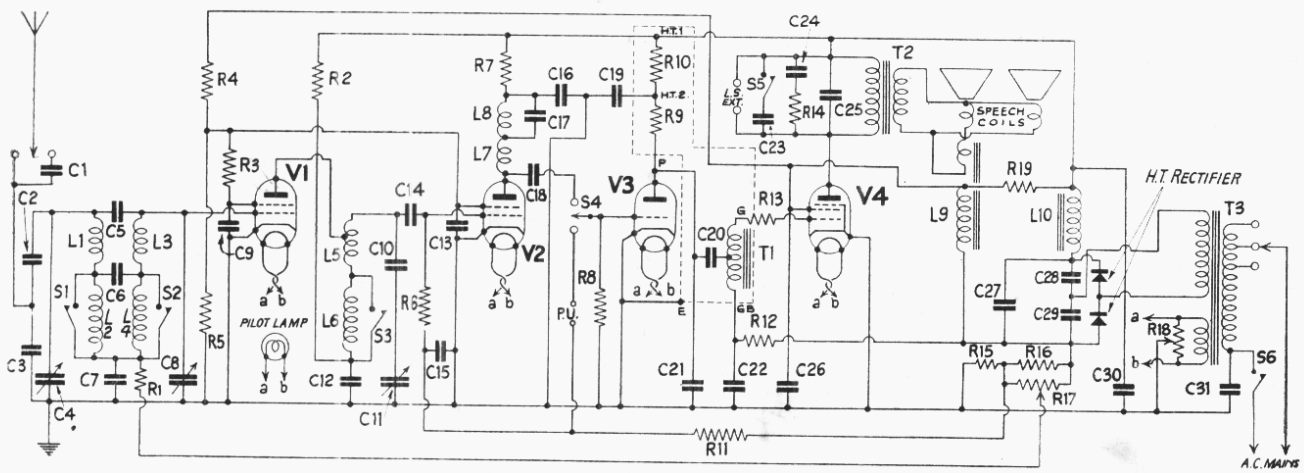

Fig. 1.—The circuit of the "Twin Supervox." The trimmers of the tuning condensers are not shown. The components in the dotted enclosure form the L.F. coupling unit, shown in Fig. 2.

The "TWIN SUPERVOX" (contd.)

	Components		Value (ohms) (approx.)
L1	Pri. band-pass coils	..	1·4
L2			14·0
L3	Sec. band-pass coils	..	1·4
L4			14·0
L5	Tuned-anode coils	..	1·4
L6			14·0
L7	Aperiodic coupling H.F. choke		18·0
L8	Part of filter circuit	.. ..	30·0
L9	Speaker field	.. .. ..	7,500
L10	Speaker field	.. .. ..	1,500
T1	Intervalve auto-transformer, total winding	.. ..	3,000
T2	Speakers input transformer.	Pri.	390
		Sec.	0·1
T3	Mains transformer	Pri. (total)	36·0
		Heater sec.	05
		H.T. sec.	74·0
S1-S3	Waveband ganged switches	..	—
S4	Radio-gramophone switch	..	—
S5	Tone-control switch	.. ..	—
S6	Mains switch (with R17)	..	—

VALVE ANALYSIS

All values given below are approximate only and indicate roughly the figures to be expected with a receiver in good working order. The voltages were measured with a high-resistance voltmeter and were taken with the chassis as negative, the volume control being in the maximum position.

Valve	Anode Volts	Anode Current (mA)	Screen Volts	Screen Current (mA)
V1 MS4B	220	4·5	112	1·25
V2 MS4B	215	4·5	112	1·25
V3 MH4	90	3·5	—	—
*V4 AC/Pen	240	24·0	205	4·0

*In some sets a Catkin MPT4 is used.

GENERAL NOTES

Switches.—Five of the switches, **S1-S5,** are arranged along the length of the chassis, and ganged by means of a sliding metal bar, operated by the lever switch. **S6** is the mains switch, ganged with the volume control **R17.**

Of the five switches, **S1, S2** and **S3** are for waveband switching, **S4** is the pick-up switch and **S5** brings in the tone control condenser on the two extreme positions of the lever switch (M.W. or L.W.). The tone control does not operate on pick-up. The switch positions are given below.

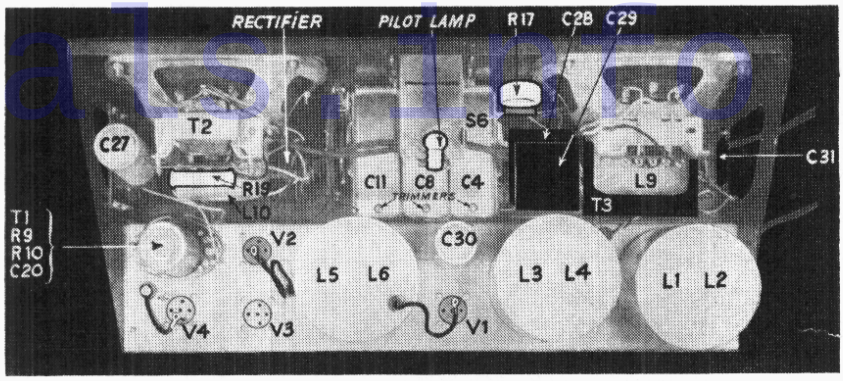

Fig. 2.—Plan view of the chassis. C29 is mounted above C28. S6 is the mains switch ganged with R17.

Position	S1	S2	S3	S4	S5
Pick-up	Open	Open	Open	Pick-up	Open
MW (normal)	Closed	Closed	Closed	Radio	Open
MW (controlled)	Closed	Closed	Closed	Radio	Closed
LW (normal)	Open	Open	Open	Radio	Open
LW (controlled)	Open	Open	Open	Radio	Closed

Extension Speaker.—This is connected to sockets across the primary of the output transformer, and must therefore be of the high impedance type.

Pick-up.—An external volume control is essential.

Tone Control.—**S5** and **C23** in our sample were transposed in relation to **R14** and **C24,** but this, of course, does not affect the results.

Coil Screens.—These are each held on by one screw near the chassis, and can easily be removed for attention to the coils.

Tuning Scale.—This is of the vertical full-vision type, with a pointer on a moving cord driven from a pulley on the condenser spindle, *via* suitable guides.

Re-ganging.—This should be a fairly easy matter, involving only the adjustment of the three tuning condenser trimmers (not shown in the circuit diagram). A service oscillator should preferably be employed as the signal source, or, alternatively, a weak station. Do not attempt to re-gang on the local stations.

Series Aerial Condenser.—**C1** is a very small condenser made by twisting the wire from A1 socket round that from A2.

Volume Control.—If this is badly graded and sudden in action, it is not necessarily the fault of **R17.** It is more likely due to an unsuitable MS4B valve in the V1 socket.

"**Motor-boating**" with the volume control in certain positions is probably due to a faulty output pentode or unsuitable H.F. valves.

Output Valve.—Some receivers are fitted with a Catkin MPT4 output pentode, while others have a Mazda AC/Pen. The valve analysis in column 1 is not greatly altered, and results are similar. It should be noted, however, that the metal bulb of the Catkin, if this valve is employed, will run at a fairly high temperature.

S.G. Valves.—Take care that the tags of the leads going to the anode terminals are well clear of the metal casings of the valves. Otherwise the H.T. supply may be shorted to the chassis.

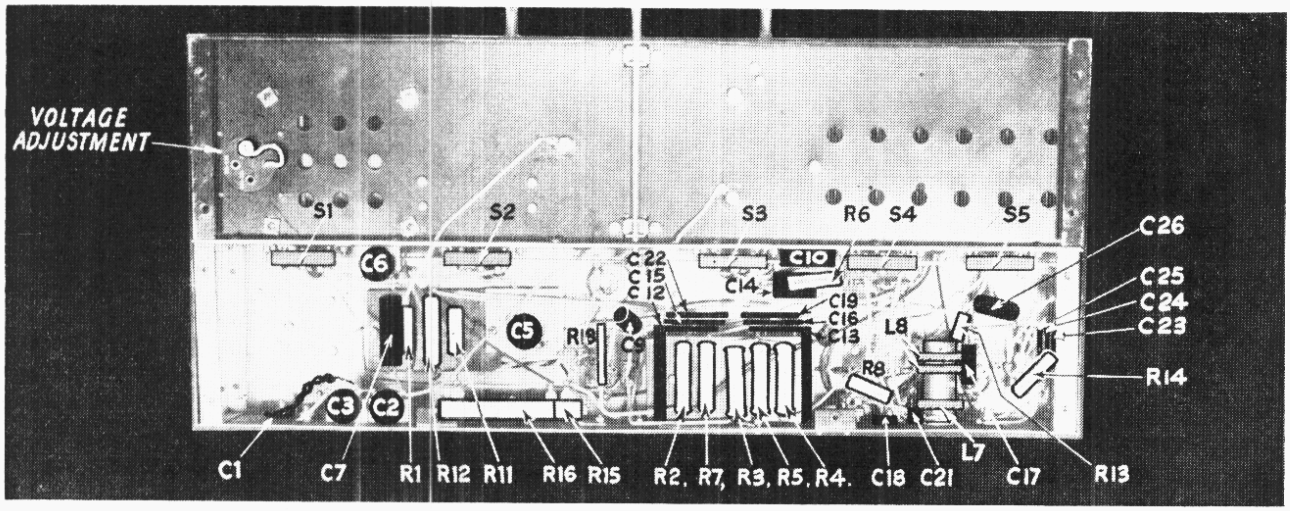

Fig. 3.—Under-chassis view. C12 is above C15 and C22, C13 is above C16 and C19, and C23 is above C24 and C25. L8 consists of two coils in series.