Supplement to The Wireless & Electrical Trader, February 14, 1942

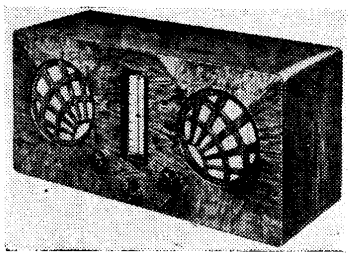
"TRADER" SERVICE SHEET

557

REVISED ISSUE OF SERVICE SHEET No. 4

McMICHAEL TWIN SUPERVOX

TRF AC SUPERHET



TWO speakers connected in parallel are employed in the McMichael Twin Supervox, a 4-valve (plus metal rectifier) 2-band TRF receiver, in which two RF stages are used. Three tuned circuits, including a band-pass input filter, precede an aperiodic RF amplifier. In some cases all four valves may be of the Catkin type.

Release date : 1933.

CIRCUIT DESCRIPTION

Two alternative aerial input sockets are provided. Input from **A1** is via impedance matching condensers **C2, C3** to capacitatively coupled band-pass filter. Primary coils **L1, L2** are tuned by **C29;** secondaries **L3, L4** by **C31.** Bottom coupling by **C4,** and top coupling by **C5, C6.** Input from **A2** is taken via small series condenser **C1** to **A1** socket.

First valve **(V1, Osram Catkin MS4B)** is a tetrode operating as RF amplifier, with tuned anode coupling by **L5, L6, C33** to second tetrode valve **(V2, Osram Catkin MS4B),** which also operates as RF amplifier.

Aperiodic choke-capacity RF coupling by **L7, C14, L8** and **S4** between **V2** and triode valve **(V3, Osram Catkin MH4),** which operates as leaky grid detector with **C15, R8.** Provision for connection of gramophone pick-up, via **S5,** in control of grid circuit.

Parallel-fed auto-transformer coupling by **R10, C18** and **T1** between **V3** and pentode output valve **(V4, Mazda AC/Pen** or **Osram Catkin MPT4).** Provision for connection of high impedance external speaker in anode circuit. Tone control by **S6, C19,** and fixed tone correction by **C20, R13** and **C21.**

HT current is supplied by metal rectifier **(MR1, Westinghouse D31)** operating as voltage-doubler with **C26, C27.** Smoothing by speaker field **L13** and electrolytic condensers **C23, C24.** HT feed to **V1, V2** and **V4** screens is taken from a potential divider comprising **R14** and speaker field **L12,** which are connected in series across the smoothed HT output.

GB potentials for **V4, V3** (gram), **V2** and **V1** gain control are obtained from potential divider **R17** and potentiometer **R16** in negative HT lead to chassis.

VALVE ANALYSIS

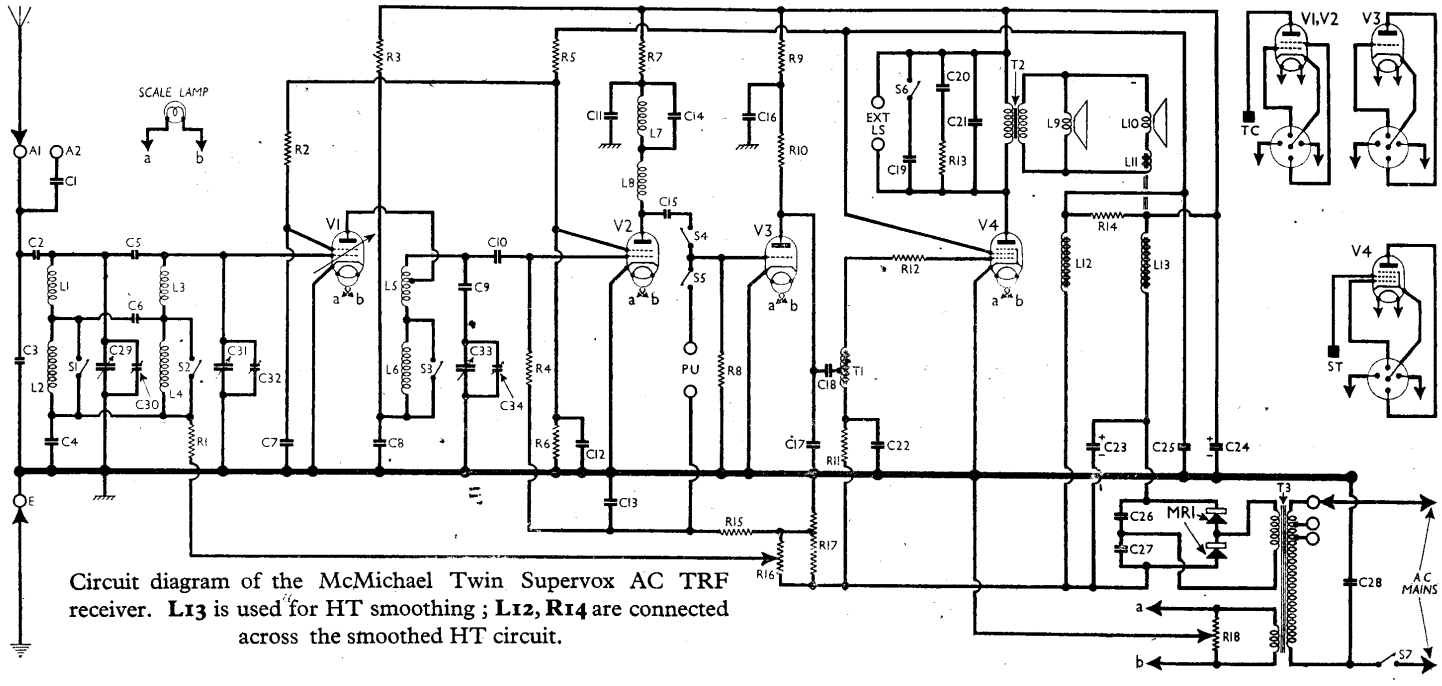
Valve voltages and currents given in the table below may be taken as being representative of the values to be expected in an average receiver. They were measured with the gain control at maximum, but with no signal input. Voltages were measured on a high resistance meter, whose negative lead was connected to chassis.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	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

COMPONENTS AND VALUES

	RESISTANCES	Values (ohms)
R1	V1 CG decoupling ...	500,000
R2	V1 SG HT feed	500
R3	V1 anode decoupling ...	10,000
R4	V2 CG resistance... ...	2,000,000
R5	V1, V2 SG's HT feed potential divider ...	20,000
R6		20,000
R7	V2 anode decoupling ...	10,000
R8	V3 grid leak	500,000
R9	V3 anode decoupling ...	20,000
R10	V3 anode load	30,000
R11	V4 CG decoupling ...	100,000
R12	V4 grid stopper	500,000
R13	Part fixed tone corrector...	20,000
R14	L12 ballast resistance ...	1,500
R15	V2, V3 CG's decoupling ...	500,000
R16	V1 gain control	5,000
R17	Auto. GB resistance, total	330*
R18	Heater circuit pot ...	50

* Tapped at 30 O from chassis.



Circuit diagram of the McMichael Twin Supervox AC TRF receiver. **L13** is used for HT smoothing ; **L12, R14** are connected across the smoothed HT circuit.

	CONDENSERS	Values (μF)
C1	Aerial series condenser ...	Very low
C2	Aerial coupling condensers	0·000011
C3		0·00003
C4	Band-pass coupling condensers	0·1
C5		0·0000006
C6		0·000011
C7	V1 SG decoupling ...	0·1
C8	V1 anode decoupling ...	1·0
C9	HT isolating condenser ...	0·1
C10	V2 CG condenser... ...	0·0002
C11	V2 anode decoupling ...	1·0
C12	V2 SG decoupling ...	1·0
C13	V2, V3 CG's decoupling ..	1·0
C14	Part V2 anode load ...	0·0002
C15	V3 CG condenser... ...	0·00005
C16	V3 anode decoupling ...	1·0
C17	RF by-pass	0·002
C18	AF coupling to T1 ...	0·5
C19	Tone corrector condensers	0·01
C20		0·01
C21		0·002
C22	V4 CG decoupling ...	1·0
C23*	HT smoothing condensers	8·0
C24*		8·0
C25	HT circuit RF by-pass ...	0·1
C26	Voltage and doubler condensers	4·0
C27		4·0
C28	Mains RF by-pass ...	0·01
C29†	Band-pass pri. tuning ...	—
C30‡	B-P pri. MW trimmer ...	—
C31†	Band-pass sec. tuning ...	—
C32‡	B-P sec. MW trimmer ...	—
C33†	V1 anode circuit tuning...	—
C34‡	V1 anode MW trimmer ...	—

* Electrolytic. † Variable. ‡ Pre-set.

	OTHER COMPONENTS	Approx. Values (ohms)
L1	Band-pass primary coils...	1·4
L2		14·0
L3	Band-pass secondary coils	1·4
L4		14·0
L5	V1 anode circuit tuning coils	1·4
L6		14·0
L7	V1 anode circuit coupling chokes	30·0
L8		18·0
L9	Twin speaker speech coils	2·0
L10		2·0
L11	Hum neutralising coil ...	Very low
L12	Parallel-fed speaker field	7,500·0
L13	HT smoothing speaker field	1,500·0
T1	Intervalve auto-trans., total	3,000·0
T2	Twin speaker input trans. Pri. ...	390·0
	Sec. ...	0·1
T3	Mains trans. Pri., total	36·0
	Heater sec.	0·05
	HT sec. ...	74·0
S1-S3	Waveband switches	—
S4,S5	Radio/gram change switches	—
S6	Tone control switch ...	—
S7	Mains switch, ganged R16	—

DISMANTLING THE SET

Removing Chassis.—Remove the right-hand and left-hand control knobs (recessed grub screws) and the switch lever in the centre (coaxial screw at centre) from the front of the cabinet;

remove the six screws (with large metal washers) from beneath the cabinet, and then four further screws, concealed by felt covers which must be pierced, in holes in the wooden battens which serve as feet for the cabinet.

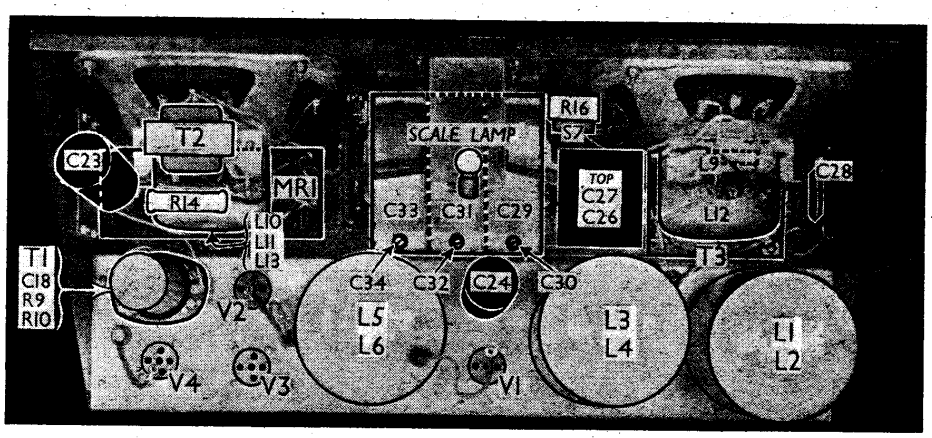
The chassis, complete with both speakers, can now be eased out and withdrawn from the cabinet as a single unit.

When replacing, do not omit to replace the spring washer between the switch control lever and the metal backing plate on the front of the cabinet.

Removing Speakers.—First code the connecting leads and sketch their positions, then unsolder them and remove the four bolts in each case holding the speakers to the vertical sub-baffle. A box spanner may be required to reach the bottom bolts.

When replacing, the connecting tags should be at the top.

Note that the left-hand speaker (viewed from the rear) carries the transformer.



Plan view of the chassis. The rectifier **MR1** is beneath the left-hand speaker.

GENERAL NOTES

Switches.—**S1-S6** are the waveband and tone control switches, ganged in a five-position assembly distributed along the length of the underside of the chassis, as indicated in our under-chassis view. The table (col. 3) gives the switch positions for the five control settings, starting from the fully anti-clockwise position of the control. A dash indicates open, and **C**, closed. **S7** is the QMB mains switch, ganged with the gain control **R16.**

Gramophone Pick-up.—Provision is made for connection of a gramophone pick-up, but an external volume control will be required with it.

External Speaker.—Provision is also made for the connection of a high impedance (about 8,000 Ω) external speaker. The connecting leads should be well insulated, as they are both at HT positive potential.

Scale Lamp.—This is an MES type with a round bulb. A suitable replacement lamp would be one rated at 6.2 V, 0.3 A.

Condenser C1.—This is made up by twisting together two insulated wires from sockets **A1** and **A2** respectively.

Switch Table

Switch	MW Controlled	MW Normal	Gram	LW Normal	LW Controlled
S1	C	C	—	—	—
S2	C	C	—	—	—
S3	C	C	—	—	—
S4	C	C	—	C	C
S5	—	—	C	—	—
S6	C	—	—	—	C

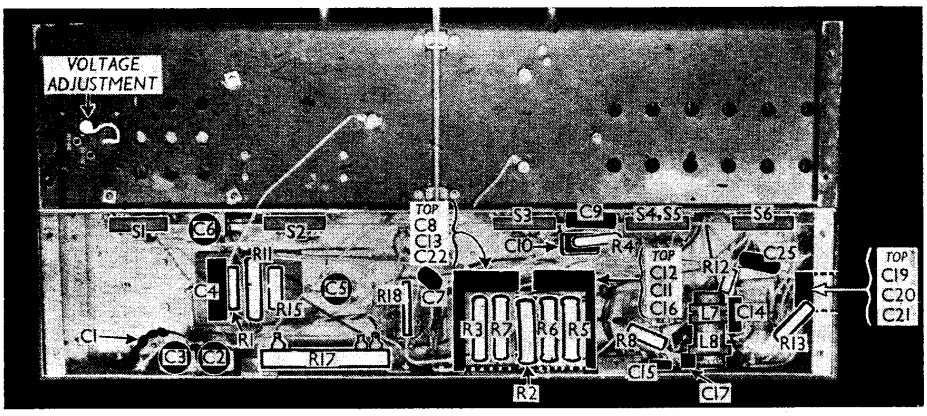
Condensers C23, C24.—These were originally wet electrolytics. Dry or wet types could be used as replacements, a suitable rating being 500-550 V peak working.

Instability.—If motor-boating occurs in certain positions of the gain control, it is probably due to a fault in **V4** or the use of unsuitable substitutes for **V1** or **V2.**

Gain Control R16.—If this appears in action to be badly graded or "jerky," the fault may not lie in the control : it is more probably due to an unsuitable valve in **V1** socket.

CIRCUIT ALIGNMENT

Connect signal generator via a suitable dummy aerial to **A1** and **E** sockets, switch set to MW, and turn the gain control to maximum. Feed in a weak signal of about 230 m (1,300 KC/S) and adjust the three trimmers **C30, C32, C34** on the gang for maximum output. There are no further adjustments, but the calibration should be checked at several points on each waveband. Unless there is a fault in one of the coils, the ganging should hold fairly well, but it may be necessary to adjust the pointer for the best compromise at the extremes of travel, after which the calibration should be re-checked, and the trimmers readjusted if necessary.



Under-chassis view. **R17** is the tapped GB resistance.

Printed in Great Britain by The Cornwall Press Ltd., Paris Garden, London, S.E.1