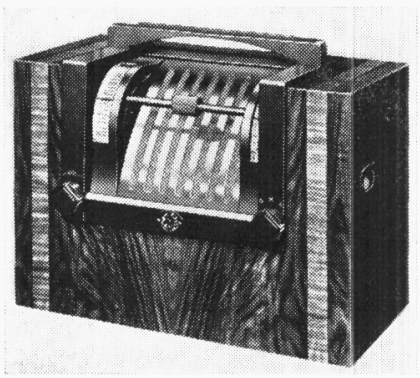
Supplement to The Wireless & Electrical Trader, July 27, 1940

"TRADER" SERVICE SHEET

477

McMICHAEL 808

TRANSPORTABLE AC SUPERHET



The wooden cabinet model of the McMichael 808.

THE McMichael 808 is a transportable AC 2-band superhet, with self-contained frame aerials, fitted in a small cabinet with a carrying handle, and the type of tuning drive and scales which were used in the Bijou battery portable.

The latest model is in a walnut cabinet with variable tone control at the side; early models may have a blue leatherette-covered cabinet, with 2-point tone control at the rear.

The receiver is suitable for use on 200-260V, 50-100 C/S AC mains.

Release date: Original, Sept. 1938; *Later model, Oct.* 1939.

CIRCUIT DESCRIPTION

Tuned frame aerial input **L1, C28** (MW) or **L1, L2, C28** (LW) precedes a triode-heptode valve **(V1, Mazda metallised TH41 or AC/TH1A)** which operates as frequency changer with internal coupling.

Provision for connection of external aerial to frame aerial windings via the small series condenser **C1,** and an earth.

Triode oscillator anode of **V1** is coupled via condenser **C7** to the coils **L5** (MW) and **L6** (LW), which are tuned by **C32.** Parallel trimming by **C30** (MW) and **C31** (LW); series tracking by **C5** (MW) and **C6** (LW).

Reaction coupling by grid coils **L3** (MW) and **L4** (LW) via series damping resistances **R3** (MW) and **R4** (LW).

Second valve **(V2, Mazda metallised VP 41)** is a variable-mu RF pentode operating as intermediate frequency amplifier with tuned-primary, tuned-secondary transformer couplings **C33, L7, L8, C34** and **C35, L9, L10, C36.**

Intermediate frequency 460 KC/S.

V2 anode circuit is fed via **R8** and by-pass condenser **C11.**

Diode second detector is part of double diode triode valve **(V3, Mazda metallised HL 41DD).** Audio frequency component in rectified output is developed across load resistance **R11** and passed via AF coupling condenser **C15,** manual volume control **R10** and grid stopper **R12** to control grid of triode section, which operates as audio frequency amplifier. Its anode circuit is decoupled by **R14** and electrolytic condenser **C18.**

IF filtering by **C12, R9, C13** and **C16** in the diode circuit, and by **C20** in the triode anode circuit.

Second diode of **V3,** fed from **V2** anode via **C17,** provides DC potential which is developed across load resistance **R17** and fed back through decoupling circuits to FC and IF valves, giving automatic volume control.

Resistance-capacity coupling by **R15, C21** and **R18,** via grid stopper **R19,** between **V3** triode and beam tetrode output valve **(V4, Mazda AC5 Pen).** Fixed tone correction by **C22** connected between anode (via stabilising resistance **R21)** and cathode. Variable tone control by **C24** and **R22** connected between anode and chassis.

Provision for connection of low impedance external speaker across secondary winding of internal speaker input transformer **T1.**

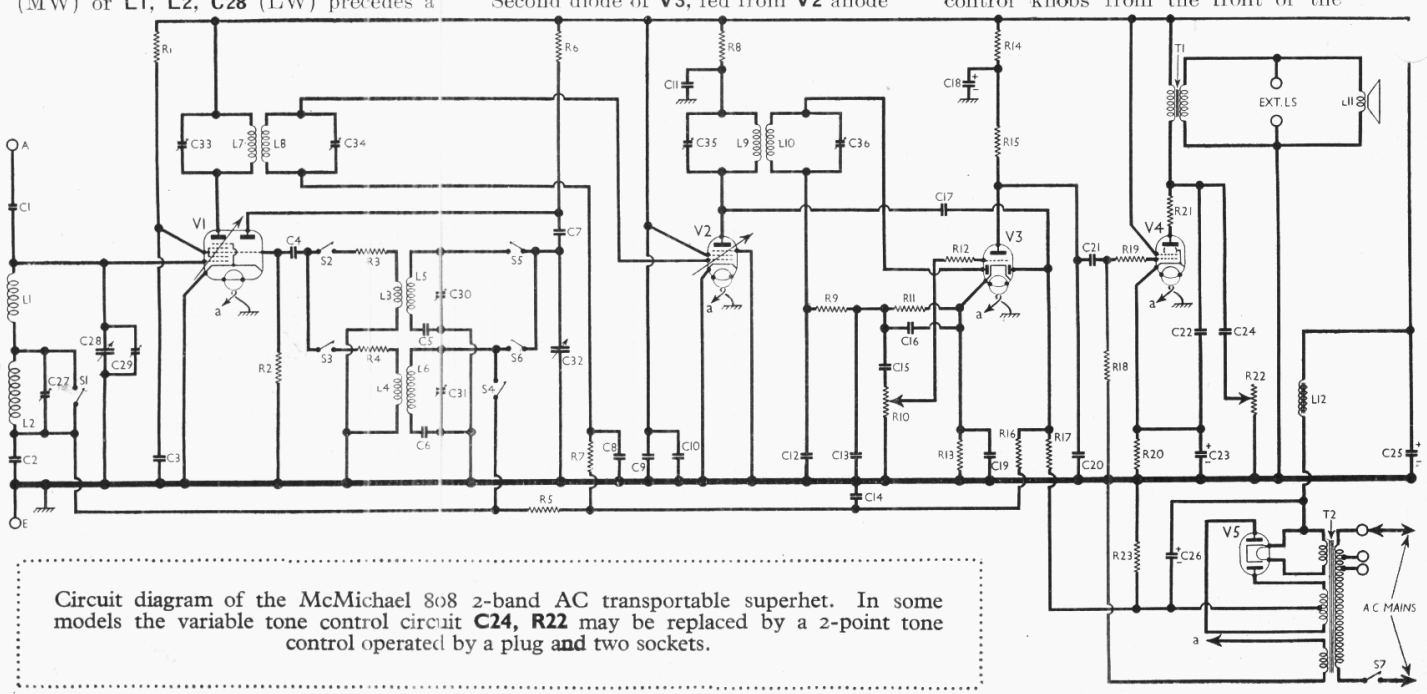
HT current is supplied by 1HC full-wave rectifying valve **(V5, Mazda metallised UU6).** Smoothing by iron-cored choke **L12** in conjunction with dry electrolytic condensers **C25** and **C26.** HT circuit RF filtering by **C9** and **C10** which are connected in parallel with each other across the HT circuit.

Fixed minimum grid bias potential for **V1** and **V2,** together with AVC delay voltage, is obtained automatically from drop along resistance **R23** in the negative HT lead to chassis. The GB for **V1** and **V2** is fed via **R17, R16** and the AVC line.

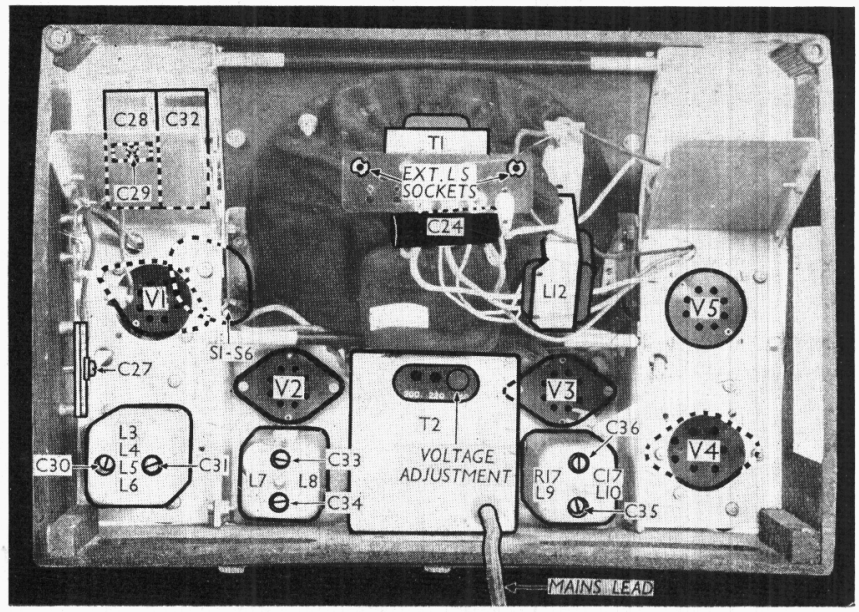
To the AVC delay voltage mentioned above must be added that obtained from the drop along **R13** in **V3** cathode lead to chassis.

DISMANTLING THE SET

Removing Chassis.—Remove the two control knobs from the front of the



Circuit diagram of the McMichael 808 2-band AC transportable superhet. In some models the variable tone control circuit **C24, R22** may be replaced by a 2-point tone control operated by a plug and two sockets.



Rear view of the complete assembly. The position of the S1-S6 unit is indicated, and a diagram of it is overleaf. C29 is a trimmer on one section of the gang.

carrying case, and a third one from the side of the case (all recessed grub screw fixings);

remove the two nuts inside the top of the case holding the carrying handle in position. This is a difficult operation, and involves the use of a chisel or screwdriver and a hammer, since the nuts are not accessible to a spanner. The edge of the tool must be located in the rough grooves in the flats of the nuts and tapped to move the nut round.

The carrying handle, and the moulded escutcheon surrounding the exposed part of the receiver, can now be removed.

Remove the four countersunk-head set screws now exposed on top of the carrying case, and remove the two clamp plates into which they are screwed (inside top of case);

remove the fixing nut (with lock-washer) from the tone control on the side of the case;

ease the complete receiver assembly with aerial frames out towards the rear of the case until the tone control can be pushed inwards into the case, then withdraw the receiver assembly entirely.

To obtain access to the underside of **V2** valve holder, a small metal screen and its insulating shield must be removed (two countersunk-head screws).

When replacing, the vertical members of the clamp plates must face the rear of the receiver.

The loose valve screening cap should be fitted on **V3**.

A black fibre washer should be fitted to each of the front control spindles, between the control knob and the cabinet.

Removing Speaker.—First remove the chassis as outlined above;

slide out the speaker grille (with silk-covered backing plate);

unsolder from the connecting strip on the speaker transformer the three leads connecting it to chassis, and the two leads from **L12**;

unsolder the black earthing lead from the right-hand external speaker socket on the connecting strip and the tag under the top right-hand fixing nut (viewed from the rear);

remove the two right-hand fixing nuts (with spacing collars) from the bolts holding the speaker to the sub-baffle, at the same time freeing **L12** and its mounting bracket, and withdraw the bolts (with several washers);

remove the two left-hand fixing nuts and withdraw the bolts (with washers).

Withdraw speaker, with tone control and **C24** attached.

When replacing, the transformer should be at the top;

fit the two left-hand fixing bolts first, to hold the speaker in position.

Each bolt should have:

one plain washer, then a spring washer, under its head;

one spacing sleeve through sub-baffle;

one plain washer between speaker rim and sub-baffle;

one plain washer between speaker rim and fixing nut.

Now fit the two right-hand fixing bolts, together with **L12** and its mounting bracket, which is held in position by them. The leads should point towards the transformer.

Each bolt should have the same complement of washers as the left-hand bolts, except that instead of a plain washer, a spacing collar is fitted under each nut. The **L12** bracket lugs go between the collars and the speaker rim. The earthing tag is fitted on the top bolt, between the fixing nut and the spacing collar.

The leads should be connected as follows, numbering the tags from left to right, still viewed from the rear:

COMPONENTS AND VALUES

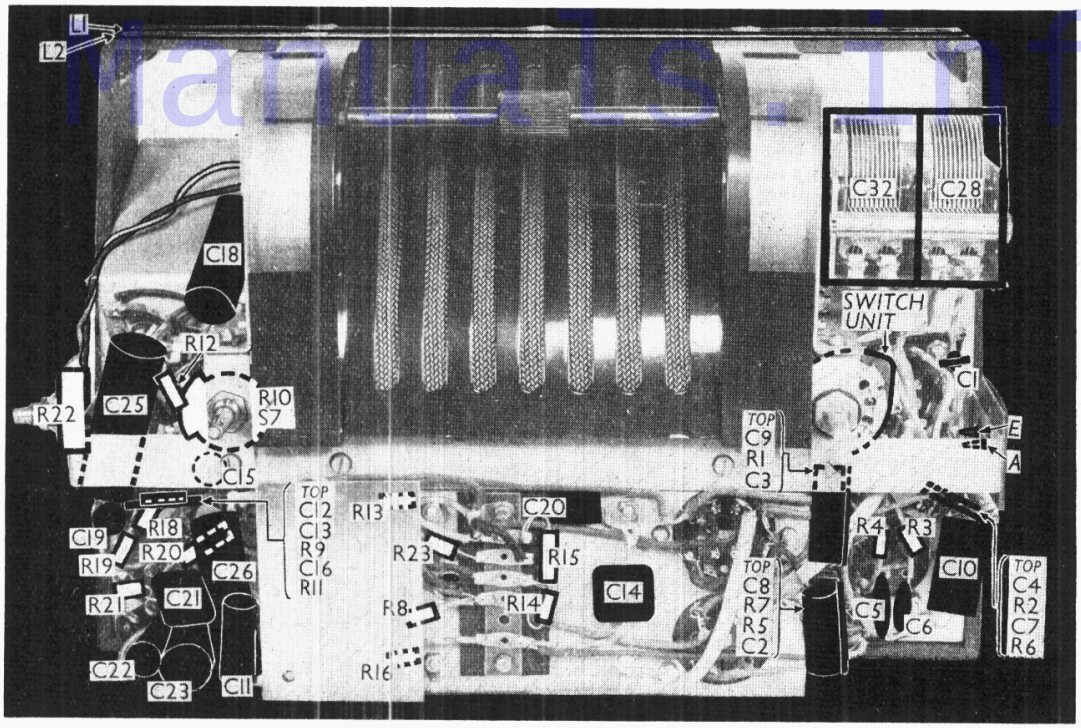
	RESISTANCES	Values (ohms)
R1	V1 SG HT feed	20,000
R2	V1 osc. CG resistance	50,000
R3	Osc. MW reaction damping	2,500
R4	Osc. LW reaction damping	5,000
R5	V1 heptode CG decoupling	500,000
R6	V1 osc. anode HT feed	20,000
R7	V2 CG decoupling	500,000
R8	V2 anode HT feed	1,000
R9	IF stopper	50,000
R10	Manual volume control	500,000
R11	V3 signal diode load	250,000
R12	V3 triode grid stopper	100,000
R13	V3 triode GB resistance	1,000
R14	V3 triode anode decoupling	10,000
R15	V3 triode anode load	50,000
R16	AVC line decoupling	500,000
R17	V3 AVC diode load	1,000,000
R18	V4 CG resistance	500,000
R19	V4 grid stopper	100,000
R20	V4 GB resistance	250
R21	V4 anode stopper	50
R22	Variable tone control	50,000
R23	V1, V2 fixed GB; AVC delay	40

	CONDENSERS	Values (μF)
C1	External aerial series	0·00001
C2	V1 heptode CG decoupling	0·1
C3	V1 SG decoupling	0·1
C4	V1 osc. CG condenser	0·0001
C5	Osc. circuit MW tracker	0·000482
C6	Osc. circuit LW tracker	0·000174
C7	V1 osc. anode coupling	0·0001
C8	V2 CG decoupling	0·1
C9	HT line RF by-pass condensers	0·1
C10		0·25
C11	V2 anode decoupling	0·1
C12	IF by-pass condensers	0·0001
C13		0·0001
C14	AVC line decoupling	0·01
C15	AF coupling to V3 triode	0·01
C16	IF by-pass	0·0001
C17	Coupling to V3 AVC diode	0·0001
C18*	V3 triode anode decoupling	8·0
C19	V3 cathode by-pass	0·1
C20	IF by-pass	0·0003
C21	V3 triode to V4 AF coupling	0·01
C22	Fixed tone corrector	0·01
C23*	V4 cathode by-pass	50·0
C24	Part of variable tone control	0·03
C25*	HT smoothing condensers	8·0
C26*		8·0
C27‡	LW frame aerial trimmer	—
C28†	Frame aerial tuning	—
C29‡	MW frame aerial trimmer	—
C30‡	Osc. circuit MW trimmer	—
C31‡	Osc. circuit LW trimmer	—
C32†	Oscillator circuit tuning	—
C33‡	1st IF trans. pri. tuning	—
C34‡	1st IF trans. sec. tuning	—
C35‡	2nd IF trans. pri. tuning	—
C36‡	2nd IF trans. sec. tuning	—

* Electrolytic. † Variable. ‡ Pre-set.

	OTHER COMPONENTS	Approx. Values (ohms)
L1	Frame aerial windings	1·4
L2		2·3
L3	Oscillator MW reaction	2.25
L4	Oscillator LW reaction	3·0
L5	Osc. circuit MW tuning coil	4·4
L6	Osc. circuit LW tuning coil	9·0
L7	1st IF trans. Pri.	18·0
L8	1st IF trans. Sec.	12·0
L9	2nd IF trans. Pri.	12·0
L10	2nd IF trans. Sec.	12·0
L11	Speaker speech coil	2·0
L12	HT smoothing choke	700·0
T1	Speaker input trans. Pri.	480·0
	Speaker input trans. Sec.	0·2
T2	Mains trans. Pri., total	35·0
	Mains trans. Heater sec.	Very low
	Mains trans. Rect. heat. sec.	0·05
	Mains trans. HT sec., total	190·0
S1-S6	Waveband switches	—
S7	Mains switch, ganged R10	—

Supplement to The Wireless & Electrical Trader, July 27, 1940



Front view of the unit. Many of the components in small groups are not visible, but are numbered from top to bottom in each group.

1, yellow lead from chassis, together with one end of **C24**;
2, red lead from chassis, together with white lead from **L12**;
3, brown lead from chassis, together with second white lead from **L12**;
4, yellow lead from tone control (still attached) together with other end of **C24**;

The black earthing lead goes to the right-hand external speaker socket and the earthing tag, to which is also attached the black lead from the tone control.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on mains of 236V, using the 240V tapping on the mains transformer.

The receiver was tuned to the lowest wavelength on the medium wave band and the volume control was at maximum, but in order to suppress any signal that might be picked up a 0.1 μF condenser was connected between the top cap of **V1** and chassis.

Voltages were measured on the 400V scale of a model 7 Universal Avometer, chassis being negative.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 TH41	190	2·7	52	6·9
	Oscillator			
	86	5·0		
V2 VP41	73	15·0	190	3·5
V3 HL41DD.	74	1·8	—	—
V4 AC5Pen ...	175	21·0	190	3·8
V5 UU6	228†	—	—	—

† Each anode, AC.

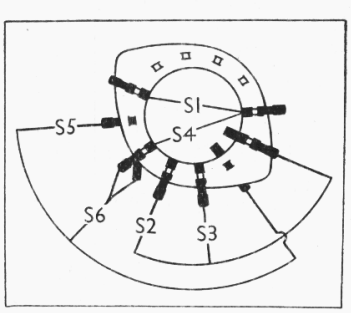
GENERAL NOTES

Switches.—S1-S6 are the waveband switches, in a single rotary unit mounted at the front of the set, and indicated in our front view of the assembly. The switches can be seen from the rear of the set, particularly if **V1** valve-holder is demounted and moved to the left. A diagram of the switch unit, as seen from the rear of the set is below, and the table (col. 3) gives the switch positions for the two control settings, starting from the anti-clockwise position of the control knob. A dash indicates open, and **C** closed.

S7 is the QMB mains switch, ganged with the volume control **R10.**

Coils.—L1, L2 are the frame aerial windings, **L1** being nearest the back of the receiver. **L3-L6** and the IF transformers **L7, L8** and **L9, L10** are in three screened units, indicated in our rear view of the assembly. Each unit contains two trimmers, and, in addition, the second IF transformer also contains **R17** and **C17.** **L12** is the smoothing choke mounted on a bracket behind the loudspeaker.

External Speaker.—Two sockets are provided on the internal speaker connection strip for a low impedance (about 2Ω) external speaker.



The wavechange switch unit, viewed from the rear of the assembly, as described above.

Chassis Divergencies.—In early models a plug on a flying lead and two sockets may be used for tone control instead of the continuously variable arrangement of **C24, R22.** In this case **R22** will not be present, and the bottom of **C24** will be connected to one of the sockets. The other socket is blank, and the flying lead goes to chassis. By plugging into the blank socket, **C24** is not connected, and the tone is "high," but by plugging into the other socket, **C24** is connected to chassis, and the tone is "low."

C18 is shown as 4μF by the makers; it was 8μF in our chassis. **C22** is shown by the makers as being returned to chassis, and having a value of 0.03μF. In our chassis it is returned to cathode of **V4**, and is 0.01μF.

CIRCUIT ALIGNMENT

IF Stages.—Connect signal generator, via a 0.1μF condenser to control grid (top cap) of **V1** and chassis. Switch set to MW, turn gang to minimum and volume control to maximum, and feed in a 460 KC/S signal. Adjust **C36, C35, C34** and **C33** in turn for maximum output. Repeat these adjustments.

RF and Oscillator Stage.—Signal generator must be coupled to the frame aerials by a loop of wire about 12 inches from the set. With gang condenser at maximum the two pointers should cover the thick lines at the higher wavelength ends of the scales.

MW.—Switch set to MW, tune to 214 m on scale, feed in a 214 m (1,400 KC/S) signal, and adjust **C30,** then **C29** (on gang), for maximum output.

LW.—Switch set to LW, tune to 1,000 m on scale, feed in a 1,000 m (300 KC/S) signal, and adjust **C31,** then **C27,** for maximum output.

SWITCH TABLE

Switch	MW	LW
S1	C	—
S2	C	—
S3	—	C
S4	C	—
S5	C	—
S6	—	C