



Circuit diagram of the McMichael 363 battery transportable receiver. **S7** and **S8** form a single pole double throw sensitivity switch.

### COMPONENTS AND VALUES

RESISTANCE		Values (ohms)
R1	V2 pent. C.G. decoupling	500,000
R2	V2 pent. S.G. H.T. feed	100,000
R3	V2 pent. supp. grid resistance	2,000,000
R4	V2 osc. harmonic suppressor	1,000
R5	V2 osc. C.G. resistance	100,000
R6	V2 osc. anode resistance	70,000
R7	V1, V3 S.G. H.T. feed	100,000
R8	V1, V2, V3 H.T. feed resistance	5,000
R9	I.F. stopper	100,000
R10	V4 signal diode load	500,000
R11	A.V.C. line decoupling	1,000,000
R12	Manual volume control	1,000,000
R13	V4 triode C.G. I.F. stopper	100,000
R14	V4 triode anode load	50,000
R15	V4 A.V.C. diode load	1,000,000
R16	V5 C.G. circuit stabiliser	100,000
R17	Variable tone control	100,000
R18	Automatic G.B., A.V.C., delay voltage and sensitivity control resistances	400
R19		450
R20		20
R21		100

### OTHER COMPONENTS (Continued)

			(ohms)
T <sub>1</sub>	Intervalve trans.	{ Pri. . . . .	650·0
T <sub>2</sub>	Speaker input	{ Sec. total . . . . .	6,000·0
	trans.	{ Pri. total . . . . .	700·0
		Sec. . . . .	0·25
S <sub>1</sub> -S <sub>4</sub>	Waveband switches	.. .. .	—
S <sub>5</sub>	Radio muting switch (gram.)	.. .. .	—
S <sub>6</sub>	Internal speaker switch	.. .. .	—
S <sub>7</sub> ,S <sub>8</sub>	Sensitivity switches	.. .. .	—
S <sub>9</sub>	H.T. circuit switch	.. .. .	—
S <sub>10</sub>	L.T. circuit switch	.. .. .	—
S <sub>11</sub>	Scale lamp switch	.. .. .	—

### VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating with a new H.T. battery reading 125 V on load. The receiver was tuned to the lowest wavelength on the medium band and both the volume and sensitivity controls were at maximum (the latter down). There was no signal input, as the frame aerial connections were shorted.

Voltages were measured on the 1,200 V scale of an Avometer, chassis being negative.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 VP210	93	0·8	40	0·2
V2 TP22*	93	0·6	43	0·4
V3 VP210	93	1·1	40	0·3
V4 HL21/DD	80	0·5	—	—
V5 QP230	112†	2·1†	114	1·0

\* Oscillator anode 42 V, 0·6 mA.  
† Each anode.

### GENERAL NOTES

**Switches.**—**S1-S4** are the waveband switches, ganged in two rotary units beneath the chassis. They are indicated in our under-chassis view, and shown in detail in the diagrams below. All these switches are *closed* on the M.W. band (anti-clockwise) and *open* on the L.W. band (clockwise).

**S5** is the radio muting jack switch

*Continued overleaf*

at the rear of the chassis, which opens when the pick-up plug is fully inserted. **S6** is a similar jack switch, also at the rear of the chassis, which opens when the external speaker plug is fully inserted, thus disconnecting the internal speaker.

**S7, S8** are the Q.M.B. sensitivity switches in a single unit at the rear of the chassis. In the "L" position (up), **S8** is open and **S7** closed; in the "H" position (down), **S7** is open and **S8** closed.

**S9** and **S10** are the H.T. and L.T. circuit switches, of the Q.M.B. type, ganged with the volume control, **R12**. The blue leads go to **S9** and the white ones to **S10**.

**S11** is the scale lamp switch, which closes when the tuning knob is pushed in.

**Coils.**—**L1** and **L2** form the frame aerial windings. **L3-L6** and **L7-L10** are in two screened units on the chassis deck. The I.F. transformers, **L11, L12** and **L13, L14** are in two further screened units on the chassis deck, with their associated trimmers. The second unit also contains **R9, R11, C10** and **C15**.

**Scale Lamp.**—This is a Bulgin M.E.S. type, rated at 2·0 V, 0·6 A. It is only illuminated as long as the tuning knob is pushed in, closing **S11**.

### CIRCUIT ALIGNMENT

**I.F. Stages.**—Switch set to M.W., set sensitivity switch to maximum (knob down) and connect across **C27** a 0·1  $\mu$ F swamp condenser. Remove top cap from **V2** and connect the signal generator output lead in its place, the other lead going to chassis.

Feed in a 128·5 KC/S signal, and adjust **C32, C31, C30** and **C29** for maximum output, in that order. Keep the input low to avoid A.V.C. action. Remove swamp condenser, and replace top cap of **V2**.

**R.F. and Oscillator Stages.**—With gang at maximum, pointer should rest over the black mark on the double line of the outer scale, about  $\frac{1}{2}$  in. to the left of the pointer bearing support. If it does not, rotate it round the spindle to the correct position.

Tune to 214 m. on the scale (pointer resting so that "Radio Lyons" can be read along its upper edge). Inject a 214 m. (1,400 KC/S) signal into external A and E sockets, and adjust **C28** for maximum output. If there are two peaks, that produced with the least capacity of **C28** is correct. Now adjust **C25** for maximum output. Return to **C28**, which may need slight re-adjustment. Always leave **C23** at minimum (no adjusting nut is fitted here).

Switch set to L.W., tune to 1,000 m. on scale, and inject a 1,000 m. (300 KC/S) signal. Adjust **C26** (through hole in chassis deck) for maximum output, rocking the gang slightly for optimum results.

### CONDENSERS

CONDENSERS		Values ( $\mu$ F)
C1	Ext. aerial series condenser ..	0·00001
C2	V2 pentode C.G. decoupling ..	0·1
C3	V2 pentode S.G. decoupling ..	0·1
C4	V2 osc. anode to supp. grid coupling ..	0·0005
C5	V2 osc. C.G. condenser ..	0·0005
C6	V2 osc. anode condenser ..	0·0001
C7	V2 osc. L.W. tracker ..	0·00108†
C8	V1, V3 S.G. decoupling ..	0·1
C9	A.V.C. line decoupling ..	0·1
C10	I.F. by-passes .. ..	0·0001
C11		0·0001
C12*	H.T. supply reservoir	8·0
C13*		8·0
C14	A.F. coupling to V4 triode ..	0·0005
C15	Coupling to V4 A.V.C. diode ..	0·0001
C16	V4 triode anode I.F. by-pass ..	0·0003
C17	A.F. coupling to T1 ..	0·1
C18	Fixed tone correctors	0·001
C19		0·001
C20	Part of T.C. filter ..	0·01
C21*	Auto. G.B. circuit by-pass ..	50·0
C22†	Frame aerial tuning ..	—
C23†	Frame aerial trimmer ..	—
C24†	R.F. trans. sec. tuning ..	—
C25†	R.F. trans. sec. trimmer ..	—
C26†	Oscillator L.W. trimmer ..	—
C27†	Oscillator tuning ..	—
C28†	Oscillator M.W. trimmer ..	—
C29†	1st I.F. trans. pri. tuning ..	—
C30†	1st I.F. trans. sec. tuning ..	—
C31†	2nd I.F. trans. pri. tuning ..	—
C32†	2nd I.F. trans. sec. tuning ..	—

\* Electrolytic. † Variable. ‡ Pre-set.

### OTHER COMPONENTS

OTHER COMPONENTS			Approx. Values (ohms)
L1	{	Frame aerial windings	2·5
L2			17·5
L3	{	R.F. trans. pri. coils . .	3·5
L4			2·5
L5	{	R.F. trans. sec. coils . .	4·5
L6			12·0
L7	{	Oscillator grid coils, total . .	2·0
L8			
L9	{	Oscillator anode tuning coils	4·0
L10			7·5
L11	{	1st I.F. trans. Pri. . . . .	43·0
L12		Sec. . . . .	43·0
L13	{	2nd I.F. trans. Pri. . . . .	43·0
L14		Sec. . . . .	43·0
L15	{	Speaker speech coil	2·0

Switch diagrams, as seen from the rear of the underside of the chassis.

