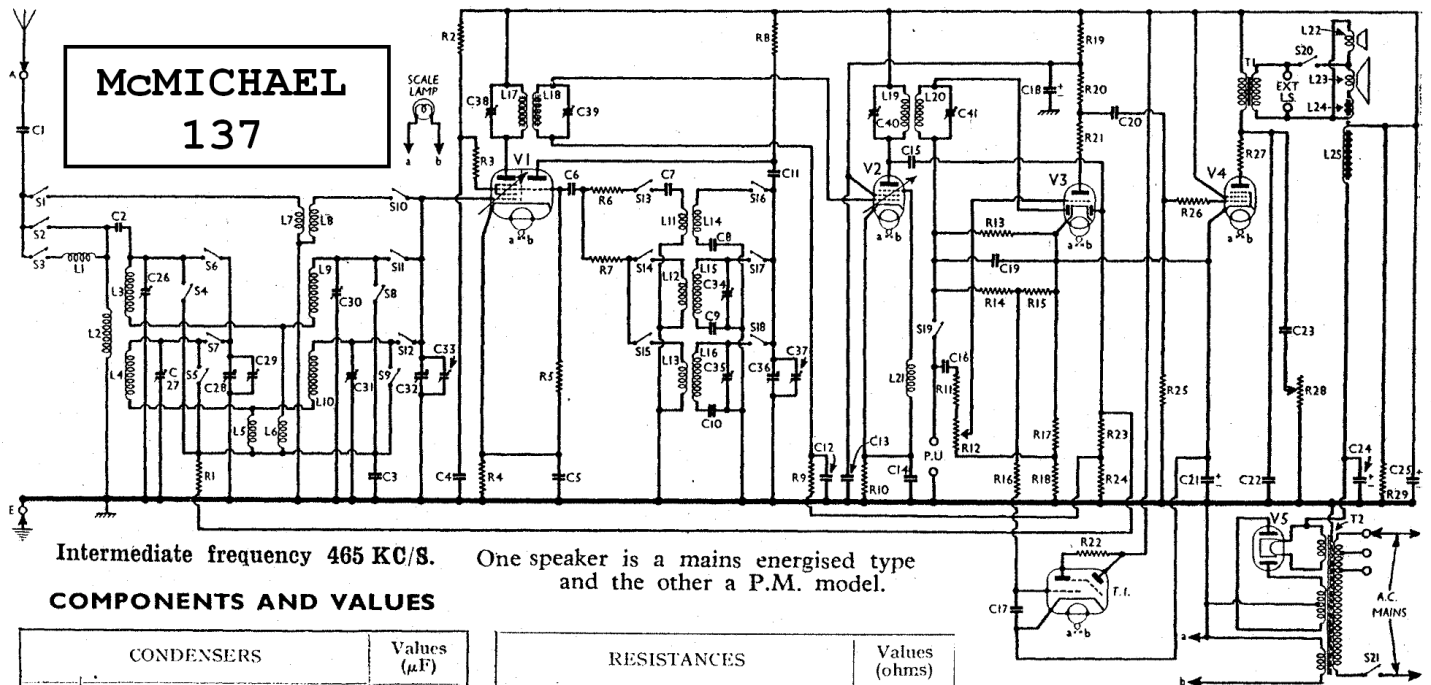


McMICHAEL

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Intermediate frequency 465 KC/S.

One speaker is a mains energised type and the other a P.M. model.

## COMPONENTS AND VALUES

CONDENSERS	Values (μF)
C1 Aerial series condenser	0.0002
C2 Aerial M.W. coupling condenser	0.000007
C3 Part band-pass bottom coupling	0.1
C4 V1 S.G. decoupling	0.1
C5 V1 cathode by-pass	0.1
C6 V1 osc. C.G. condenser	0.0001
C7 V1 osc. C.G. S.W. series condenser	0.0001
C8 Osc. circuit S.W. tracker	0.0035
C9 Osc. circuit M.W. tracker	0.000547
C10 Osc. circuit L.W. tracker	0.000174
C11 V1 osc. anode coupling	0.0001
C12 V2 C.G. decoupling	0.1
C13 V2 S.G. decoupling	0.1
C14 V2 cathode by-pass	0.1
C15 Coupling to V3 A.V.C. diode	0.0001
C16 A.F. coupling to V3 triode	0.005
C17 T.I. feed decoupling	0.1
C18 V2 S.G. and V3 triode anode decoupling	4.0
C19 I.F. by-pass	0.0001
C20 V3 triode to V4 A.F. coupling	0.01
C21 V3, V4 cathode by-pass	50.0
C22 Fixed tone corrector	0.002
C23 Part variable T.C. circuit	0.03
C24 H.T. smoothing	8.0
C25 H.T. smoothing	8.0
C26 Band-pass pri. M.W. trimmer	—
C27 Band-pass pri. L.W. trimmer	—
C28 Band-pass pri. tuning	—
C29 Band-pass pri. trimmer	—
C30 Band-pass sec. M.W. trimmer	—
C31 Band-pass sec. L.W. trimmer	—
C32 Band-pass sec. and S.W. aerial tuning	—
C33 Aerial S.W. trimmer	—
C34 Osc. circuit M.W. trimmer	—
C35 Osc. circuit L.W. trimmer	—
C36 Osc. circuit anode tuning	—
C37 Osc. circuit S.W. trimmer	—
C38 1st I.F. trans. pri. tuning	—
C39 1st I.F. trans. sec. tuning	—
C40 2nd I.F. trans. pri. tuning	—
C41 2nd I.F. trans. sec. tuning	—

\* Electrolytic. † Variable. ‡ Pre-set.  
§ Sometimes omitted.

## VALVE ANALYSIS

Valve voltages and currents given in the table (p. VIII) are those measured in our receiver when it was operating on mains of 228 V, using the 220 V tapping on the mains transformer. The receiver was tuned to the lowest wavelength on the medium band and the volume control was at maximum, but there was no signal input.

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

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 AC/THr	220	1.5	70	3.6
V2 AC/VP2	57	3.8	180	2.0
V3 AC/BI/	220	7.6	—	—
DD	133	1.2	—	—
V4 AC/2Pen	203	33.0	220	7.2
V5 UU4	332†	—	—	—
T.I. TV4	18	0.1	Target anode	0.5

† Each anode, A.C.

RESISTANCES	Values (ohms)
R1 V1 hexode C.G. decoupling	1,000,000
R2 V1 S.G. H.T. feed	40,000
R3 V1 S.G. stopper resistance	50
R4 V1 fixed G.B. resistance	250
R5 V1 osc. C.G. resistance	50,000
R6 V1 osc. C.G. S.W. stabiliser	50
R7 V1 osc. C.G. M.W. and L.W. stabiliser	2,000
R8 V1 osc. anode H.T. feed	40,000
R9 V2 C.G. decoupling	500,000
R10 V2 fixed G.B. resistance	200
R11 A.F. feed series resistance	100,000
R12 Manual volume control	500,000
R13 V3 Signal diode load	250,000
R14 T.I. feed potential divider	3,000,000
R15 T.I. feed decoupling resistance	1,000,000
R16 V3 triode and V4 G.B. and A.V.C. delay voltage resistances	250,000
R17 V2 S.G. and V3 triode anode decoupling	10,000
R18 V3 triode anode load	4,000
R19 V3 triode anode I.F. stopper	30,000
R20 T.I. anode H.T. feed	2,000,000
R21 V3 A.V.C. diode load resistances	500,000
R22 V4 C.G. resistance	500,000
R23 V4 grid stopper	100,000
R24 V4 anode stopper	50
R25 Variable tone control	100,000
R26 Voltage surge load	40,000

OTHER COMPONENTS	Approx. Values (ohms)
L1 Aerial L.W. series coil	41.0
L2 Band-pass pri. coupling coil	15.0
L3 Band-pass primary tuning coils	2.5
L4 Band-pass L.W. common coupling	21.0
L5 Band-pass M.W. common coupling	3.0
L6 Aerial S.W. coupling coil	0.1
L7 Aerial S.W. tuning coil	0.2
L8 Band-pass secondary tuning coils	Very low
L9 Osc. circuit S.W. grid reaction	2.5
L10 Osc. circuit M.W. grid reaction	6.0
L11 Osc. circuit L.W. grid reaction	2.5
L12 Osc. circuit S.W. tuning coil	3.25
L13 Osc. circuit M.W. tuning coil	0.1
L14 Osc. circuit L.W. tuning coil	2.5
L15 Osc. circuit L.W. tuning coil	9.5
L16 1st I.F. trans. Pri.	5.5
L17 1st I.F. trans. Sec.	5.5
L18 2nd I.F. trans. Pri.	13.0
L19 2nd I.F. trans. Sec.	13.0
L20 V2 supp. grid choke	Very low
L21 P.M. speaker speech coil	3.25
L22 Energised speaker speech coil	3.25
L23 Hum neutralising coil	0.15
L24 Speaker field coil	1,750.0
T1 Speakers input Pri.	460.0
T2 Speakers input Sec.	0.5
T3 Pri. total	24.0
T4 Heater sec.	0.1
T5 Rect. heat. sec.	0.1
T6 H.T. sec. total	410.0
S1-S18 Waveband switches	—
S19 Radio muting switch (Grant.)	—
S20 Internal speakers switch	—
S21 Mains switch, ganged R12	—

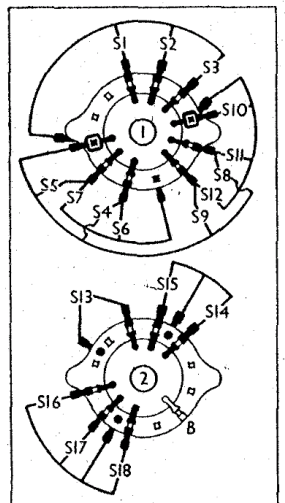
## GENERAL NOTES

**Switches.**—S1-S18 are the waveband switches, ganged in two rotary units on either side of a sub-assembly above the main chassis deck. The units are marked 1 and 2 in our front chassis view, and diagrams showing them in detail, as seen looking in the directions of the arrows, are given below.

The table below gives the switch positions for the three control settings, starting from fully anti-clockwise. A dash indicates open, and C, closed.

Switch	S.W.	M.W.	L.W.
S1	C	—	—
S2	—	C	—
S3	—	—	C
S4	—	—	C
S5	—	C	C
S6	—	C	C
S7	—	—	C
S8	—	—	C
S9	—	C	—
S10	C	—	—
S11	—	C	—
S12	—	—	C
S13	C	—	—
S14	—	C	—
S15	—	—	C
S16	C	—	—
S17	—	C	—
S18	—	—	C

Switch diagrams, looking in the directions of the arrows in the front chassis view.



S19 is the radio muting jack switch, at the rear of the chassis, which opens when the pick-up plug is fully inserted, and mutes radio.

S20 is the internal speakers switch, also at the rear of the chassis, which opens when the external speaker plug is fully inserted, and mutes the internal speakers.

S21 is the Q.M.B. mains switch, ganged with the volume control R12.

**Coils.**—L1; L5, L6; L7, L8; and L11, L14 are on tubular formers, and are

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unscreened. They are indicated in our front chassis view. **L2-L4; L9, L10; L12, L13, L15, L16** and the I.F. transformers **L17, L18** and **L19, L20** are in five screened units, seen in our three-quarter plan chassis view. **L21** is a small choke, situated beneath the chassis, under the **V2** valve-holder. **L22** is the P.M. speaker speech coil and **L23** the energised speaker speech coil.

**Scale Lamp.**—This is mounted in a tubular metal casing, with removable end-plugs, fitted in clips inside the lid of the cabinet. The lamp is an Ever-Ready M.E.S. type, rated at 6.2 V, 0.3 A.

**External Speaker.**—Two sockets are provided at the rear of the chassis for a low impedance (20) external speaker. On inserting the special plug to its full extent, **S20** opens and mutes the internal speakers.

**Condensers C18, C24, C25.**—These are three dry electrolytics in a single carton beneath the chassis, with a common negative (black lead). The red lead is the positive of **C24** (8 $\mu$ F), the yellow the positive of **C25** (8 $\mu$ F) and the green the positive of **C18** (4  $\mu$ F).

**T.I. Connections.**—The TV<sub>4</sub> C.R. tuning indicator is fitted with an eight side-contact base. The holder has contact numbers moulded on its underside. The connections are as follows: 1, blank; 2, black lead (heater); 3, yellow lead (heater); 4, blue lead (cathode); 5, blank; 6, green lead (control grid); 7, red lead and one side of **R22** (target); 8, other side of **R22** (anode).

**Condenser C7.**—This may be omitted in some chassis.

**Speaker Assembly.**—A wooden framework carries the two speakers and their wiring, and also **R29** and **T1**. The connections from this assembly to the

terminal strip on the receiver chassis are given under "Dismantling the Set."

**Trimmer C29.**—This is not used for alignment, and must be kept fully screwed up.

**Chassis Divergency.**—In some models the mains transformer and rectifier stand separately to the right of the chassis.

## CIRCUIT ALIGNMENT

Circuit alignment can be performed without removing the chassis from the cabinet.

**I.F. Stages.**—Connect a 0.1  $\mu$ F or larger condenser across **C38** to swamp the oscillator circuit. Remove top cap connection of **V1** and connect in its place the high potential output lead from the signal generator, the earth lead going to chassis. Feed in a 465 KC/S signal and adjust **C41, C40, C39** and **C38** for maximum output in that order. Keep the input low to avoid A.V.C. action. Finally, swing the signal generator control a few KC/S each side of 465 KC/S, and watch the output meter for a symmetrical response. Remove the swamp condenser, and replace **V1** top cap.

**R.F. and Oscillator Stages.**—If the pointer has been displaced, it may be necessary to undo the three nuts below one edge of the dial, and after sliding out the glass, adjust the pointer. To ascertain if this is necessary, turn the tuning control as far as it will go towards the top of the scales. The pointer should now lie over the point of the angle made by the medium wave line joining the right-hand sector line, on the other side of which are the RANGE slots.

If the pointer does not lie right through the point of the angle, then the centre screw should be loosened with a pair of sharp pointed pliers and the pointer reset.

**S.W.**—Switch set to S.W. and turn tuning knob to bring pointer over the printed mark which will be seen just above the shaded portion of the S.W. scale, between 16 and 17 m. Connect signal generator to **A** and **E** sockets, and feed in an 18 MC/S (16.67 m.) signal. Adjust **C37** for maximum output, using the peak obtained with the trimmer screw in the slacker position. Then adjust **C33** for maximum output. **C29** is not used, and should be left at maximum. Repeat the **C37** and **C33** adjustments, and make sure that the maximum output is obtained at the correct tuning point.

**L.W.**—This band should be adjusted next, as it affects the M.W. adjustment slightly. Switch set to L.W., and tune to 1,000 m. on scale. Feed in a 1,000 m. (300 KC/S) signal, and adjust **C35**, then **C31** and **C27**, for maximum output.

**M.W.**—Switch set to M.W. and tune to bring pointer over the mark below the M.W. scale adjacent to the name "Rad Lyons." Feed in a 1,400 KC/S (214 m.) signal and adjust **C34**, then **C30** and **C26**, for maximum output.