

McMICHAEL 362

TABLE AND CONSOLE MODELS

THE McMichael 362 receiver is a 4-valve (plus rectifier) A.C. superhet of the 3-band type with a short-wave range of 19-51 metres, and employs a signal frequency stage followed by a triode-hexode frequency changer. Provision is made for both a gramophone pick-up and an extension speaker.

An identical chassis is fitted in the 362 console receiver, but this *Service Sheet* was prepared on a table model.

CIRCUIT DESCRIPTION

Aerial input via series condenser **C1** and coupling coils **L1** (S.W.), **L3** (M.W.), **L5** (L.W.) to single tuned circuits **L2**, **C36** (S.W.), **L4**, **C36** (M.W.), **L6**, **C36** (L.W.) which precede variable-mu pentode signal frequency amplifier (**V1**, Mazda metallised AC/VP1).

Tuned-secondary transformer couplings **L7**, **L8**, **C40** (S.W.), **L9**, **L10**, **C40** (M.W.), **L11**, **L12**, **C40** (L.W.) between **V1** and triode-hexode frequency changer valve (**V2**, Mazda metallised AC/TH1) which operates with internal coupling. Oscillator anode coils **L15** (S.W.), **L17** (M.W.), **L19** (L.W.) are tuned by **C44**; parallel trimming by **C41** (S.W.), **C42** (M.W.), **C18**, **C43** (L.W.); series tracking by fixed condensers **C16** (S.W.), **C17** (M.W.), **C19** (L.W.); oscillator grid reaction coils **L14** (S.W.), **L16** (M.W.), **L18** (L.W.).

Single variable-mu pentode intermediate frequency amplifier (**V3**, Mazda metallised AC/VP1) operating with tuned primary tuned-secondary transformer couplings **C45**, **L20**, **L21**, **C46** and **C47**, **L22**, **L23**, **C48**.

C.G. of pentode section. Provision for connection of gramophone pick-up in C.G. circuit. Fixed tone correction in anode circuit by **C29**; variable tone control by R.C. filter **R25**, **C30**. Provision for connection of low-impedance external speaker across secondary of output transformer **T1**. Plug-operated switch **S26** enables internal speaker speech coil circuit to be broken.

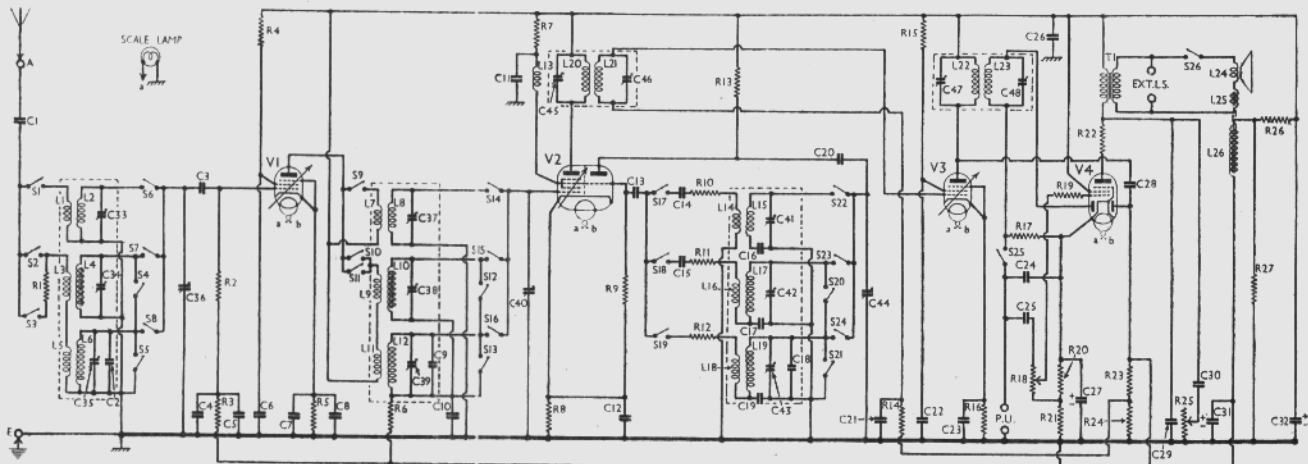
H.T. current is supplied by I.H.C. full-wave rectifying valve (**V5**, Mazda **UU3**). Smoothing by speaker field coil **L26**, resistance **R26** and dry electrolytic condensers **C31**, **C32**.

COMPONENTS AND VALUES

RESISTANCES		Values (ohms)
R1	Aerial series resistance (L.W.)	3,000
R2	V1 C.G. resistance	1,000,000
R3	V1 C.G. decoupling	1,000,000
R4	V1 S.G. H.T. feed	10,000
R5	V1 fixed G.B. resistance	100
R6	V2 hexode C.G. decoupling	1,000,000
R7	V2 hexode S.G. H.T. feed	50,000
R8	V2 fixed G.B. resistance	200
R9	Osc. C.G. resistance	50,000
R10	Osc. C.G. series resistance (S.W.)	100
R11	Osc. C.G. series resistance (M.W.)	2,500
R12	Osc. C.G. series resistance (L.W.)	4,500
R13	Osc. anode resistance	40,000
R14	V3 C.G. decoupling	500,000
R15	V3 S.G. H.T. feed	10,000
R16	V3 fixed G.B. resistance	100
R17	V4 signal diode load	500,000
R18	Manual volume control	500,000
R19	V4 C.G. I.F. stopper	100,000
R20	V4 G.B. and A.V.C. delay vol. tage resistances	150
R21	V4 anode circuit stabiliser	350
R22	V4 anode circuit stabiliser	50
R23	V4 A.V.C. diode load	500,000
R24	V4 A.V.C. diode load	500,000
R25	Variable tone control	100,000
R26	H.T. smoothing	500
R27	H.T. circuit ballast	40,000

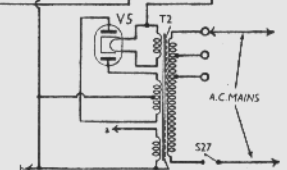
CONDENSERS		Values (μF)
C1	Aerial series condenser	0.0002
C2	Aerial circuit L.W. trimmer	0.00005
C3	V1 C.G. condenser	0.001
C4	V1 C.G. decoupling	0.1
C5	V1 C.G. decoupling	0.005
C6	V1 S.G. by-pass	0.1
C7	V1 cathode by-pass	0.1
C8	condensers	0.01
C9	H.F. trans. sec. L.W. trimmer	0.00005
C10	V2 hexode C.G. decoupling	0.1
C11	V2 hexode S.G. by-pass	0.1
C12	V2 cathode by-pass	0.1
C13	Osc. C.G. condenser	0.001
C14	Osc. C.G. series condenser (S.W.)	0.0001
C15	Osc. C.G. series condenser (M.W.)	0.0001
C16	Osc. S.W. tracker	0.00354
C17	Osc. M.W. tracker	0.000618
C18	Osc. L.W. trimmer	0.000075
C19	Osc. L.W. tracker	0.000216
C20	Osc. anode condenser	0.0001
C21	V3 C.G. decoupling	0.1
C22	V3 S.G. by-pass	0.1
C23	V3 cathode by-pass	0.1
C24	I.F. by-pass	0.0001
C25	L.F. coupling to V4 pentode	0.005
C26	H.T. supply H.F. by-pass	0.1
C27*	V4 cathode by-pass	25.0
C28	V4 A.V.C. diode feed	0.0001
C29	Fixed tone corrector	0.002
C30	Part of T.C. filter	0.03
C31*	H.T. smoothing	8.0
C32*	H.T. smoothing	8.0
C33†	Aerial circuit S.W. trimmer	—
C34†	Aerial circuit M.W. trimmer	—
C35†	Aerial circuit L.W. trimmer	—
C36†	Aerial circuit tuning	—
C37†	H.F. trans. sec. S.W. trimmer	—
C38†	H.F. trans. sec. M.W. trimmer	—
C39†	H.F. trans. sec. L.W. trimmer	—
C40†	H.F. trans. sec. tuning	—
C41†	Osc. circuit S.W. trimmer	—
C42†	Osc. circuit M.W. trimmer	—
C43†	Osc. circuit L.W. trimmer	—
C44†	Osc. circuit tuning	—
C45†	1st I.F. trans. pri. tuning	—
C46†	1st I.F. trans. sec. tuning	—
C47†	2nd I.F. trans. pri. tuning	—
C48†	2nd I.F. trans. sec. tuning	—

* Electrolytic. † Variable. ‡ Pre-set.



Intermediate frequency 465 KC/S. Diode second detector is part of double diode output pentode valve (**V4**, Mazda AC2/PenDD). Audio-frequency component in rectified output is developed across load resistance **R17** and passed via coupling condenser **C25**, manual volume control **R18** and I.F. stopper **R19** to

Circuit diagram of the McMichael 362 3-band A.C. superhet. **S25** and **S26** are jack switches. Alignment is accomplished by fixed tracking condensers and variable trimmers on all bands.



Manuals Info

Under-chassis view. The switch units are indicated by numbers in circles and arrows, and detailed diagrams are given overleaf. Note the jack switches S25 and S26 at the back of the chassis. L13 is a small H.F. choke.



OTHER COMPONENTS		Approx. Values (ohms)
L1	Aerial S.W. coupling coil	0.25
L2	Aerial S.W. tuning coil	Very low
L3	Aerial M.W. coupling coil	2.0
L4	Aerial M.W. tuning coil	3.5
L5	Aerial L.W. coupling coil	23.0
L6	Aerial L.W. tuning coil	28.0
L7	H.F. trans. S.W. pri.	0.25
L8	H.F. trans. S.W. sec.	Very low
L9	H.F. trans. M.W. pri.	2.0
L10	H.F. trans. M.W. sec.	3.5
L11	H.F. trans. L.W. pri.	7.5
L12	H.F. trans. L.W. sec.	28.0
L13	V2 hexode S.G. S.W. choke	Very low
L14	Osc. S.W. grid coil	7.5
L15	Osc. S.W. tuning coil	Very low
L16	Osc. M.W. grid coil	1.5
L17	Osc. M.W. tuning coil	2.2
L18	Osc. L.W. grid coil	2.0
L19	Osc. L.W. tuning coil	5.0
L20	1st I.F. trans.	Pri. 4.5
L21		Sec. 4.5
L22	2nd I.F. trans.	Pri. 4.5
L23		Sec. 4.5
L24	Speaker speech coil	2.0
L25	Hum neutralising coil	0.2
L26	Speaker field coil	1,500.0
T1	Output trans.	Pri. 450.0
		Sec. 0.5
	Pri. total	23.0
T2	Mains trans.	Heater sec. 0.05
		Rect. heat. sec. 0.1
		H.T. sec. total 420.0
S1-24	Waveband switches	—
S25	Gram. pick-up switch	—
S26	Int. speaker switch	—
S27	Mains switch, ganged R18	—

DISMANTLING THE SET

A detachable bottom is fitted to the cabinet and upon removal (ten counter-sunk-head wood screws) gives access to the wave change switch and a number of the under-chassis components.

Removing Chassis.—If it is necessary to remove the chassis from the cabinet, first remove the four control knobs (pull off), taking care not to lose the springs. Then remove the detachable bottom and the four bolts (with washers) holding the chassis to the bottom of the cabinet.

The chassis can now be withdrawn to the extent of the speaker leads, which is sufficient for normal purposes.

To free the chassis entirely, unsolder the speaker leads from the terminal panel on the mains transformer and when replacing, connect the leads as follows, numbering the tags from left to right: 1, brown; 2, red; 3, green; 4, white; 5 and 6 no connections. The blue lead goes to the tag on the frame of the transformer.

Removing Speaker.—To remove the speaker from the cabinet, disconnect the leads and slacken the four clamps (round-head wood screws) holding it to the sub-baffle. When replacing, see that the terminal panel is on the right and connect the leads as follows, numbering the tags from bottom to top: 1, no external connection; 2, one end of the 2 W resistance and one end of the 3 W resistance; 3, green lead; 4, brown; 5, white.

The blue lead and free end of the 2 W resistance go to the tag on the frame of the speaker, while the red lead goes to the tag on the sub-baffle to which the other end of the 3 W resistance is also connected.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on mains of 220 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 1,200 V scale of an Avometer, with chassis as negative.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 AC/VP1	240	12.0	200	3.1
V2 AC/TH1*	240	1.1	55	3.2
V3 AC/VP1	240	11.0	200	2.9
V4 AC/2Pen/DD	225	29.0	240	6.1
V5 UU3	350†	—	—	—

* Oscillator anode, 70 V, 4.9 mA.
† Each anode, A.C.

GENERAL NOTES

Switches.—S1-S24 are the wavechange switches, in three ganged rotary units beneath the chassis, indicated in our under-chassis view by numbers in circles and arrows. The latter show the directions in which the units are viewed in the diagrams on page VIII.

The table (p. VIII) gives the switch positions for the three control settings, starting from the fully anti-clockwise position. O indicates open, and C, closed.

Continued overleaf

McMICHAEL 362—Continued

Switch	S.W.	M.W.	L.W.
S1	C	O	O
S2	O	C	O
S3	O	O	C
S4	C	O	O
S5	O	C	O
S6	O	O	C
S7	O	C	O
S8	O	O	C
S9	C	O	O
S10	O	C	O
S11	O	O	C
S12	C	O	O
S13	O	C	O
S14	C	O	O
S15	O	C	O
S16	O	O	C
S17	C	O	O
S18	O	C	O
S19	O	O	C
S20	C	O	O
S21	O	C	O
S22	C	O	O
S23	O	C	O
S24	O	O	C

S25 and S26 are two jack switches, at the rear of the chassis, for pick-up and internal speaker switching respectively. The switches are normally closed but when the pick-up or external speaker twin plug is fully inserted, the appropriate switch opens.

S27 is the Q.M.B. mains switch, ganged with the volume control, R18.

Coils.—L1-L6, L7-L12, L14-L19 and the I.F. transformers L20, L21 and L22, L23 are in five screened units on the chassis deck. Each of the first three units contains three trimmers, reached through holes in the side of the screen, and numbered from top to bottom in our plan chassis view. Each of these units also contains one or more fixed condensers. The I.F. transformers have their trimmers at the tops of the screens, the second

transformer unit also containing C28. L13 is a small single layer choke, beneath the chassis.

Condensers C17, C18, C19.—These are all inside the third (oscillator) coil unit. C17 is the larger of the two flat ceramic cased types, C19 the smaller, and C18 the small cup-type ceramic at the top of the unit.

Scale Lamp.—This is an Osram 6.2 V, 0.3 A M.E.S. type.

External Speaker.—Two sockets are provided at the rear of the chassis for the connection of a low resistance

from the right is the positive of C32. Resistances R26, R27.—These are mounted on the speaker unit. R26 is the larger of the two (green body).

CIRCUIT ALIGNMENT

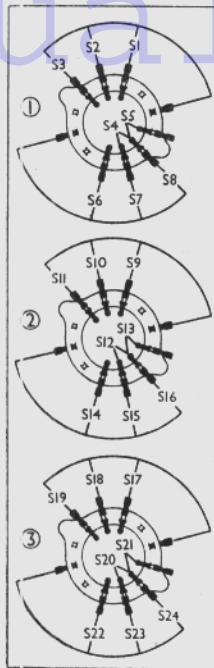
I.F. Stages.—Connect a 0.1 μF or larger swamp condenser across the oscillator section of the gang (C44). Switch set to M.W., lift off thimble cap of V2 and connect in its place one lead from the signal generator, the other going to chassis. Feed in a 465 KC/S signal, and adjust C48, C47, C46 and C45, in that order, for maximum output, keeping the input low to avoid A.V.C. action. Finally check by moving the generator over a range of about 5 KC/S each side of the 465 KC/S setting, watching the output meter to see whether a symmetrical tuning curve has been obtained. Remove swamp condenser, and replace V2 cap.

H.F. and Oscillator Stages.—Switch set to L.W., tune to 1,000 m. on scale, and inject a 300 KC/S (1,000 m.) signal into the A and E sockets. Adjust C43, then C39 and C35 for maximum output.

Switch set to M.W., and tune until upper end of pointer just coincides with lower edge of "RAD. LYONS" (214 m.) Inject a 1,400 KC/S (214 m.) signal, and adjust C42, C38 and C34 for maximum output.

Switch set to S.W., and tune to 19 m. on the scale. Inject a 15.79 MC/S (19 m.) signal and adjust C41 for maximum output. The correct peak is that obtained with C41 nearer minimum (slacker screw position). Then adjust C37 and C33 for maximum output.

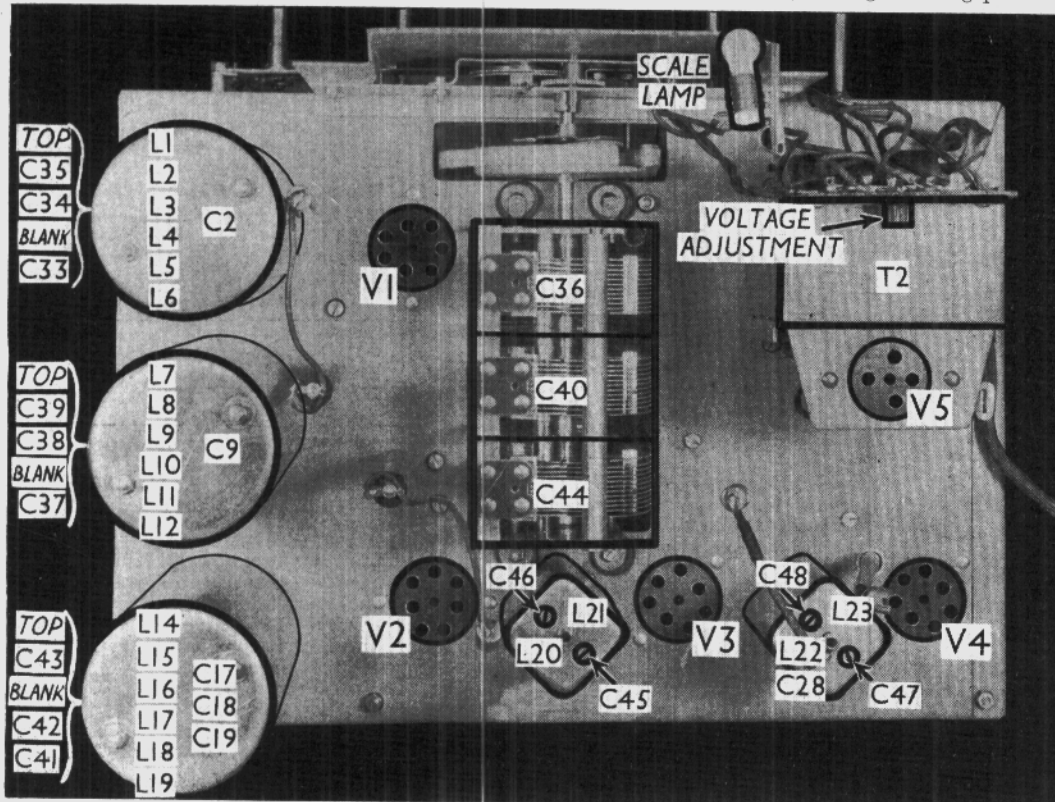
As there may be interaction between the various circuits on the S.W. band, repeat the adjustments until the maximum output reading is obtained at the correct tuning point on the scale.



Switch diagrams, looking at the underside of the chassis in the directions indicated by the arrows in the under-chassis view.

external speaker (20). By pushing the plug of this speaker fully in, S26 opens, and the internal speaker is disconnected.

Condensers C31, C32.—These are two 8 μF dry electrolytics in a single carton beneath the chassis, with a common negative (black) lead. The red lead going to the right hand tag on T1 is the positive of C31, and the red lead to the second tag



Plan view of the chassis. Most of the coil and I.F. units contain certain fixed condensers. The oscillator unit includes three, C17-C19 (see General Notes). The trimmers of the three units on the left are numbered from top to bottom.