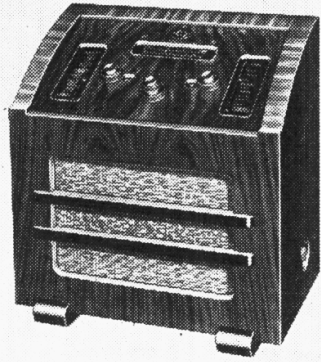


McMICHAEL 380

3-BAND AC SUPERHET



SUITABLE for mains of 200-250 V, 50-100 C/S, the McMichael 380 (AC) is a 4-valve (plus rectifier) AC 3-band superhet covering a short-wave range of 16-52 m.

CIRCUIT DESCRIPTION

Aerial input via series condenser **C1**, IF rejector circuit **L1**, **C24** and coupling coils **L3** (SW) and **L4** (MW and LW); via LW aerial loading coil **L2** on LW only to single-tuned circuits **L5**, **C27** (SW), **L6**, **C27** (MW) and **L7**, **C27** (LW), coupling being assisted by **C2** on MW only.

First valve (**V1**, Mazda metallised AC/TH1) is a triode hexode operating as frequency changer with internal coupling.

Triode oscillator anode coils **L11** (SW), **L12** (MW) and **L13** (LW) are tuned by **C31**; parallel trimming by **C29** (MW) and **C30** (LW); series tracking by **C6** (SW), **C7** (MW) and **C8** (LW). Reaction by grid coils **L8** (SW), **L9** (MW) and **L10** (LW).

Second valve (**V2**, Mazda metallised AC/VP2) is a variable-mu RF pentode operating as intermediate frequency amplifier with tuned-primary tuned-secondary first transformer and tuned-primary untuned secondary transformer couplings **C32**, **L14**, **L15**, **C33** and **C34**, **L16**, **L17**.

Intermediate frequency 460 KC/S.

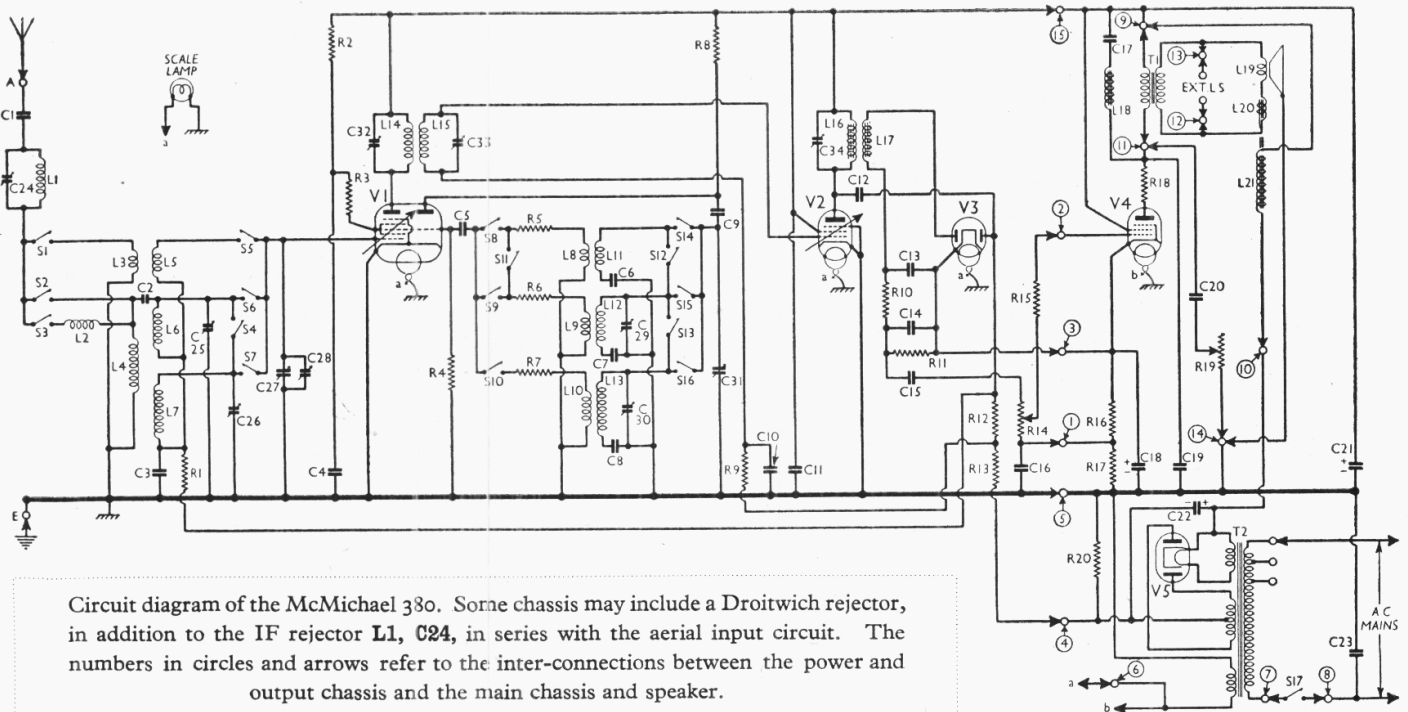
Diode second detector is part of separate double diode valve (**V3**, Mazda V914). Audio-frequency component in rectified output is developed across load resistance **R11** and passed via AF coupling condenser **C15**, manual volume control **R14** and grid stopper **R15** to CG of pentode output valve (**V4**, Mazda AC/2Pen). Fixed tone correction in anode circuit by **C17**, **L18** and **C19**; variable tone control by **C20**, **R19** in anode circuit. Provision for connection of low impedance external speaker across secondary of **T1**.

HT current is supplied by IHC full-wave rectifying valve (**V5**, Mazda UU4). Smoothing by speaker field **L21** and dry electrolytic condensers **C21**, **C22**. HT circuit RF filtering by **C11**.

COMPONENTS AND VALUES

| CONDENSERS | | Values (μF) |
|------------|-------------------------------|-------------|
| C1 | Aerial series condenser | 0.0003 |
| C2 | Aerial MW coupling | 0.000007 |
| C3 | V1 hexode CG decoupling | 0.25 |
| C4 | V1 SG decoupling | 0.1 |
| C5 | V1 osc. CG condenser | 0.0001 |
| C6 | Osc. circuit SW tracker | 0.0035 |
| C7 | Osc. circuit MW tracker | 0.0004823 |
| C8 | Osc. circuit LW tracker | 0.000174 |
| C9 | V1 osc. anode coupling | 0.0001 |
| C10 | V2 CG decoupling | 0.1 |
| C11 | HT circuit RF by-pass | 0.01 |
| C12 | Coupling to V3 AVC diode | 0.0001 |
| C13 | IF by-pass condensers | 0.0001 |
| C14 | AF coupling to V4 | 0.005 |
| C15 | V4 CG RF decoupling | 0.0003 |
| C16 | V4 CG RF decoupling | 0.0003 |
| C17 | Part of fixed tone corrector | 0.005 |
| C18* | V4 cathode by-pass | 25.0 |
| C19 | Part of fixed tone corrector | 0.002 |
| C20 | Part of variable tone control | 0.03 |
| C21* | HT smoothing | 8.0 |
| C22* | HT smoothing | 8.0 |
| C23 | Mains RF by-pass | 0.001 |
| C24† | Aerial IF rejector tuning | — |
| C25† | Aerial circuit MW trimmer | — |
| C26† | Aerial circuit LW trimmer | — |
| C27† | Aerial circuit tuning | — |
| C28† | Aerial circuit SW trimmer | — |
| C29† | Osc. circuit MW trimmer | — |
| C30† | Osc. circuit LW trimmer | — |
| C31† | Oscillator circuit tuning | — |
| C32† | 1st IF trans. pri. tuning | — |
| C33† | 1st IF trans. sec. tuning | — |
| C34† | 2nd IF trans. pri. tuning | — |

* Electrolytic. † Variable. ‡ Pre-set.



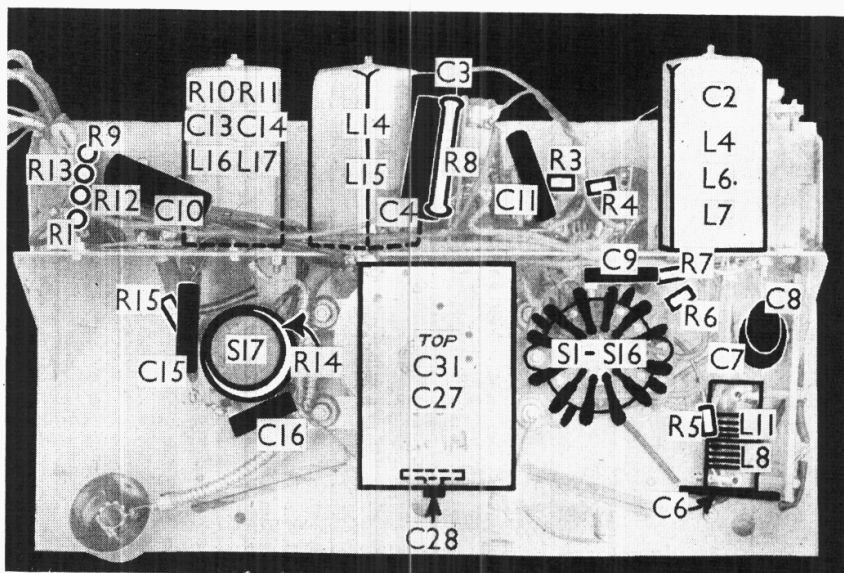
Circuit diagram of the McMichael 380. Some chassis may include a Droitwich rejector, in addition to the IF rejector **L1**, **C24**, in series with the aerial input circuit. The numbers in circles and arrows refer to the inter-connections between the power and output chassis and the main chassis and speaker.

| RESISTANCES | | Values (ohms) |
|-------------|-------------------------------|---------------|
| R1 | V1 hexode CG decoupling | 500,000 |
| R2 | V1 SG HT feed | 40,000 |
| R3 | V1 SG RF stopper | 40 |
| R4 | V1 osc. CG resistance | 50,000 |
| R5 | Osc. SW reaction stabiliser | 50 |
| R6 | Osc. MW reaction stabiliser | 2,500 |
| R7 | Osc. LW reaction stabiliser | 5,000 |
| R8 | V1 osc. anode HT feed | 40,000 |
| R9 | V2 CG decoupling | 500,000 |
| R10 | IF stopper | 50,000 |
| R11 | V3 signal diode load | 250,000 |
| R12 | V3 AVC diode load resistances | 500,000 |
| R13 | | 500,000 |
| R14 | | 500,000 |
| R15 | Manual volume control | 500,000 |
| R16 | V4 grid stopper | 100,000 |
| R17 | V4 GB potential divider | 150 |
| R18 | AVC delay | 350 |
| R19 | V4 anode stabiliser | 50 |
| R20 | Variable tone control | 50,000 |
| | V1, V2 fixed GB resistance | 40 |

| OTHER COMPONENTS | | Approx. Values (ohms) |
|------------------|-----------------------------|-----------------------|
| L1 | Aerial IF filter coil | 6.75 |
| L2 | Aerial LW loading coil | 40.0 |
| L3 | Aerial SW coupling coil | 0.2 |
| L4 | Aerial MW and LW coupling | 15.0 |
| L5 | Aerial SW tuning coil | Very low |
| L6 | Aerial MW tuning coil | 2.0 |
| L7 | Aerial LW tuning coil | 20.0 |
| L8 | Oscillator SW reaction | 5.5 |
| L9 | Oscillator MW reaction | 3.6 |
| L10 | Oscillator LW reaction | 4.5 |
| L11 | Osc. circuit SW tuning coil | 0.1 |
| L12 | Osc. circuit MW tuning coil | 2.5 |
| L13 | Osc. circuit LW tuning coil | 9.0 |
| L14 | 1st IF trans. | Pri. 12.5 |
| L15 | | Sec. 12.5 |
| L16 | 2nd IF trans. | Pri. 3.5 |
| L17 | | Sec. 7.5 |
| L18 | Whistle filter coil | 95.0 |
| L19 | Speaker speech coil | 3.0 |
| L20 | Hum neutralising coil | 0.15 |
| L21 | Speaker field coil | 1,200.0 |
| T1 | Speaker input trans. | Pri. 650.0 |
| | | Sec. 0.3 |
| T2 | Mains trans. | Pri., total 32.0 |
| | | Heater sec. 0.1 |
| | | HT sec., total 0.1 |
| S1-S16 | Waveband switches | 380.0 |
| S17 | Mains switch, ganged R14 | — |

DISMANTLING THE SET

It should be noted that the control panel is pivoted at each side, and that access can be gained to the components on the top deck of the chassis by removing the two large coin-slot screws at the front edge of the panel and swivelling it up. Components on the other face of the chassis can be reached from the back



View looking at the rear of the control panel. The switch unit is shown in detail overleaf.

of the cabinet, after the back has been removed (six round-head wood screws).

Removing Chassis.—If it should be necessary to remove the chassis from the cabinet, remove the aerial and earth socket panel (two round-head wood screws) and the IF rejector (two round-head wood screws) from the side of the cabinet and free the leads to the power and output unit from the three cleats on the side of the cabinet and from the cleat on the power and output unit itself.

Now remove the four screws (with cup washers and nuts) and the two wood screws with instrument heads holding the control panel to the chassis. Then remove the two round-head wood screws holding the chassis brackets to the side of the cabinet, when the chassis can be withdrawn to the extent of the leads, which is sufficient for normal purposes.

To free the chassis entirely, disconnect the leads from the terminal strips on the power and output unit. When replacing, it will be found that the leads more or less fall into their correct positions on the strips. Those on the strip on the

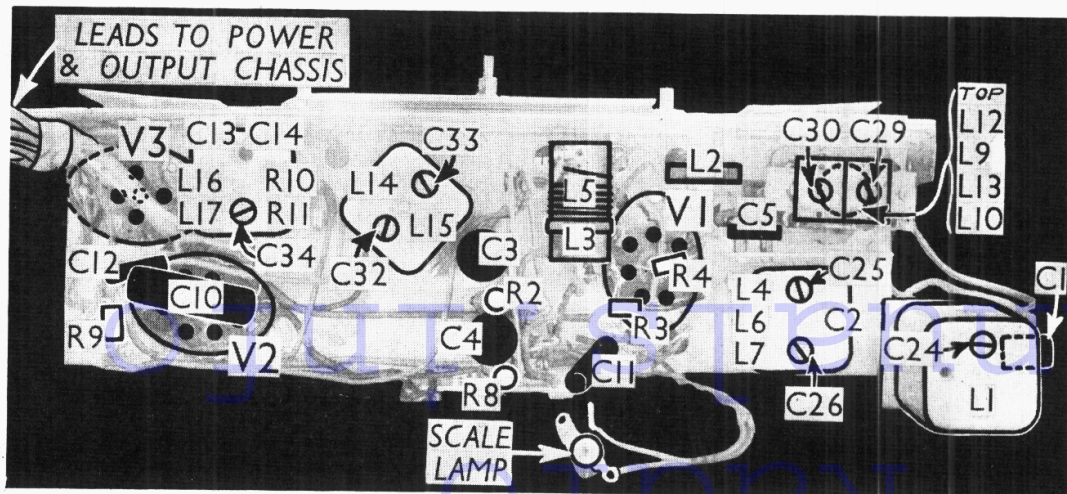
rear member of the power and output chassis are connected as follows, numbering the terminals from left to right:—1, white; 2, thick black braided lead; 3, blue; 4, black braided lead; 5, black rubber-covered lead; 6, red rubber-covered lead; 7, black braided lead; 8, red braided lead. The remaining red braided lead goes to the nearest terminal (15 in our illustration) on the other strip.

Removing Power and Output Unit.—

To remove the power and output unit from the cabinet, disconnect the leads and remove the nuts and washers from the four bolts holding it to the bottom of the cabinet, when by lifting it up so that the bolts clear the holes in the cabinet, it can be withdrawn.

When replacing, connect the leads from the main receiver chassis as above, and the other leads to the left-hand terminal strip as follows, starting with the terminal furthest away from you, which is numbered 9 in our illustration and circuit:—9, two red leads; 10, brown; 11, yellow braided lead and free end of

Continued overleaf



View looking at the underside of the valve holders. The L1, C24 unit, and C1, are fitted on the inside of the cabinet. The tone control components R19, C20 are also inside the cabinet, and are not shown in the chassis pictures.

McMICHAEL 380—Continued

C20; 12, two green leads; 13, two blue leads; 14 (nut), two black leads; 15, red lead to main chassis.

Removing Speaker.—If it is desired to remove the speaker from the cabinet, disconnect the leads from the terminal strip, slacken the two bottom clamps, remove the two top ones (round-head wood screws), swivel the control panel up and withdraw the speaker. When replacing, see that the transformer is on the left and connect the leads as above.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on mains of 225 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) | IScreen Voltage (V) | Screen Current (mA) |
|------------|-------------------|--------------------|---------------------|---------------------|
| V1 AC/TH1 | 262 | 1.5 | 72 | 4.4 |
| V2 AC/VP2 | 62 | 4.6 | — | — |
| V3 Vg14 | 262 | 13.0 | 262 | 3.5 |
| V4 AC/2Pen | 242 | 29.0 | 262 | 6.4 |
| V5 UU4 | 305† | — | — | — |

† Each anode, AC.

GENERAL NOTES

Switches.—S1-S16 are the wavechange switches, in a single rotary unit behind the control panel. The unit is indicated in our view showing the rear of the panel, and the switches are shown in detail in the diagram (col. 3) which is drawn looking at the rear of the panel.

The table (col. 2) gives the switch positions for the three control settings, starting from fully anti-clockwise. A dash indicates open, and C, closed.

In addition to the switches shown, there are two extra "accidental" ones, which on MW cross-connect S7, S14, and S8, S16. These are not shown, as they serve no useful purpose, and would add complications to the diagram.

S17 is the QMB mains switch, ganged with the volume control R14.

Coils.—L1 is in a separate screened unit (with C24) attached by a bracket

TABLE AND DIAGRAM OF THE SWITCH UNIT

| Switches | SW | MW | LW |
|----------|----|----|----|
| S1 | C | — | — |
| S2 | — | C | — |
| S3 | — | — | C |
| S4 | C | — | — |
| S5 | C | — | — |
| S6 | — | C | — |
| S7 | — | — | C |
| S8 | C | — | — |
| S9 | — | C | — |
| S10 | — | — | C |
| S11 | — | — | C |
| S12 | — | — | C |
| S13 | C | — | — |
| S14 | C | — | — |
| S15 | — | C | — |
| S16 | — | — | C |

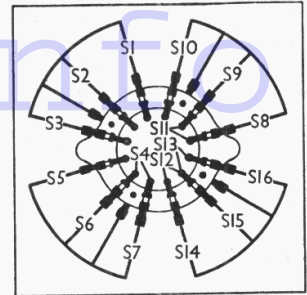


Diagram of the switch unit, as seen looking at the rear of the control panel.

to the inside of the cabinet, on the right. It is shown to the right of our view looking at the underside of the valveholders. L2 is on a wooden former, seen in the same view, as are also L3 and L5 (on a tubular former), L5 being the thick wire winding.

L4, L6, L7 are in a screened unit with two associated trimmers and a fixed condenser, while L9, L10, L12, L13 are in an unscreened unit, with two trimmers mounted above it. L8, L11 are in another unscreened tubular unit, seen in the rear panel view, L11 being the thick wire winding.

The IF transformers L14, L15 and L16, L17 are located in two screened units, with their associated trimmers. Note that the second only has one trimmer (for the primary winding), but it also contains two resistors and two fixed condensers.

L18, the whistle filter coil, is beneath the power and output chassis, and is iron-cored.

Components not on Chassis.—Apart from L1 and C24, already mentioned, the components C1, C20 and R19 are external to the two chassis.

Scale Lamp.—This is an Ever Ready MES type, rated at 6.2 V, 0.3 A.

External Speaker.—Two sockets are provided on a panel at the rear of the cabinet for a low impedance (2.4 O) external speaker.

Droitwich Filter.—In certain models a 200 KC/S (1,500 m) rejector for reducing interference from Droitwich is incorporated, in addition to the 460 KC/S IF rejector (L1, C24) shown in our diagram. This extra filter is inserted between C1 and C24, L1, and consists of an extra coil and pre-set condenser in parallel.

Power and Output Unit.—This is connected to the main receiver chassis,

and to the speaker, tone control, and Ext. LS sockets by twenty leads and tags, held under fifteen terminals on strips on the power and output chassis, certain terminals carrying two leads and tags. The inter-connections are fully explained under "Dismantling the Set," while the terminals are numbered in our view of the power and output chassis, and also on the circuit diagram, where the connections are shown by arrows and numbers in circles.

Condensers C21, C22.—These are two 8μF dry electrolytics in a single carton beneath the power and output chassis. The black lead is the common negative, the red lead to terminal 9 is the positive of C21, and the red lead to terminal 10 the positive of C22.

CIRCUIT ALIGNMENT

IF Stages.—Switch set to MW, and turn gang condenser to minimum. Connect signal generator to control grid (top cap) of V1 and chassis, feed in a 460 KC/S signal, and adjust C32, C33 and C34 for maximum output.

IF Filter.—Connect signal generator to A and E sockets, turn gang to maximum, and feed in the 460 KC/S signal. Adjust C24 (in L1 unit inside cabinet) for minimum output.

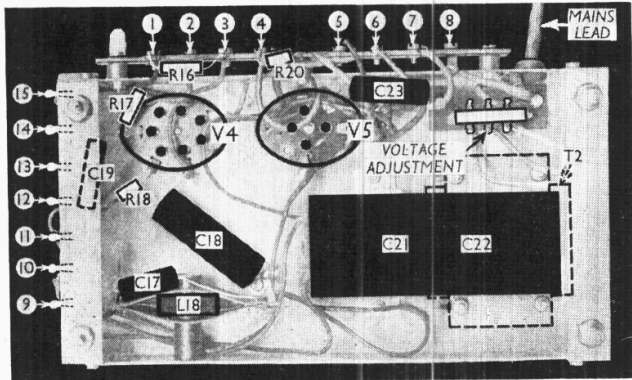
RF and Oscillator Stages.—With gang at maximum, the left-hand edge of the pointer of the wavelength scale should be in line with the white adjustment mark at the extreme right-hand end of the scale. The top edge of the LW station pointer should then be in line with the adjustment mark at the bottom of the LW station scale. The MW station pointer should indicate London Regional when the wavelength pointer has its left-hand edge in line with the 340 m calibration mark.

Connect signal generator to A and E sockets.

SW.—Switch set to SW, feed in an 18.5 m (16.22 MC/S) signal, tune it in on the set, and adjust C28 for maximum output, rocking the gang very slightly, if necessary, for optimum results.

MW.—Switch set to MW, tune to 214 m on scale, feed in a 214 m (1,400 KC/S) signal, and adjust C29, then C25, for maximum output.

LW.—Switch set to LW, tune to 1,100 m on scale, feed in a 1,100 m (272.7 KC/S) signal, and adjust C30 for maximum output. Feed in a 1,800 m (166.7 KC/S) signal, tune it in, and adjust C26 for maximum output.



Underneath view of the power and output chassis. All the connecting screws are numbered in accordance with the circuit diagram.