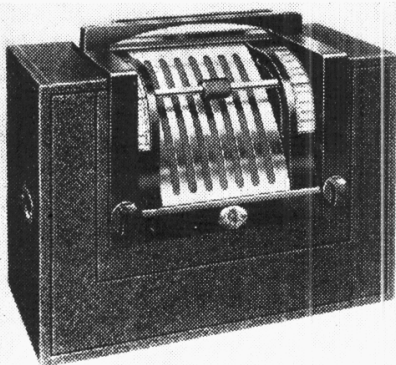


"TRADER" SERVICE SHEET  
498

# McMICHAEL 387

## BIJOU PORTABLE



The McMichael 387 Bijou portable.

**T**HE McMichael model 387 is a two-band, four-valve TRF portable battery receiver.

The chassis is divided into two main units: one for the RF section and one for the AF section; the connections between the two are described under "General Notes."

There are two AF amplifying stages, one resistance-capacity coupled and one parallel-fed transformer coupled. Grid bias is automatic.

Sockets are provided for an external aerial and an earth connection, and for an external speaker.

Release date: May, 1938.

### CIRCUIT DESCRIPTION

Tuned frame aerial input **L1** (MW), plus **L2** (LW) and **C18** to control grid of first valve (**V1**, Mazda metallised **VP23** or **VP22**) which operates with second and third grids strapped together as a variable-mu tetrode RF amplifier.

Provision is made, via the small series condenser **C1**, for connection of an external aerial, and an earth socket is also fitted.

**V1** gain control **R2** provides the volume control for the receiver; it consists of an HT potential divider, whose positive excursion is limited by the resistance **R1**.

Tuned-anode coupling by iron-dust cored coils **L4** (MW) and **L5** (LW), tuned by **C22**, between **V1** and triode detector valve (**V2**, Mazda metallised **HL22**), which operates on the grid leak system with **C7** and **R4**. Reaction is applied from anode by coil **L3**, and controlled by variable condenser **C20**, which is ganged with **R2**.

The cores of **V1** anode coils **L4**, **L5** are shown in the circuit diagram as adjustable, as indicated by the broken arrows. They are, however, adjusted with the aid of special apparatus at the works, and should not be touched during alignment.

Resistance-capacity coupling by **R5**, **C10** and **R7**, via RF filter circuit **C9**, **R6**, between **V2** and triode audio frequency amplifying valve (**V3**, Mazda metallised **HL22**).

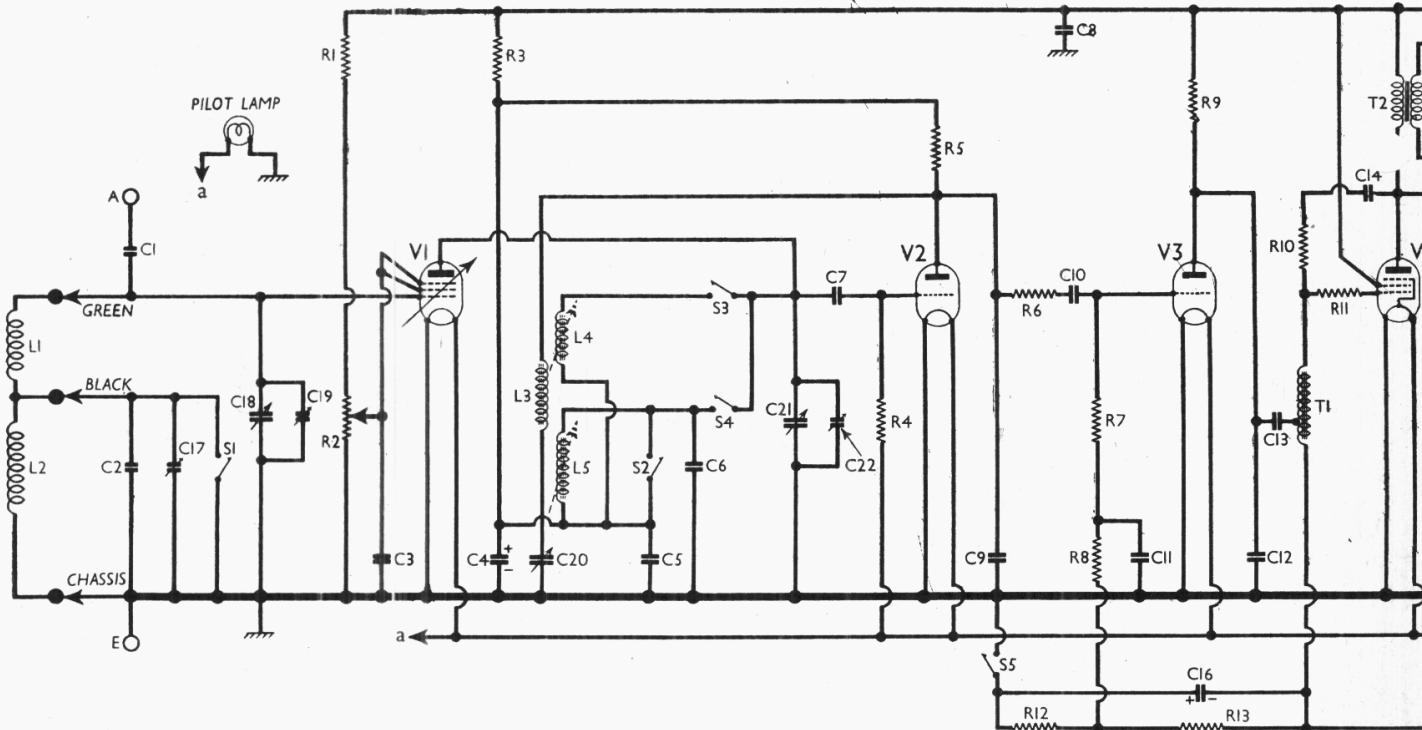
Resistance-capacity coupled auto-trans-

former coupling by **R9**, **C13** and **T1**, via grid stopper **R11**, between **V3** and pentode output valve (**V4**, Mazda Pen 25 or Pen 24). Tone correction by feed-back circuit **C14**, **R10** between anode and control grid circuits, and **C15** between anode and chassis. Provision for connection of low impedance external speaker across secondary of internal speaker input transformer **T2**.

Grid bias potentials for **V3** and **V4** are obtained from drop developed automatically across resistances **R12**, **R13**, which form a potential divider in the negative HT lead to chassis. The grid bias circuit is by-passed by the dry electrolytic condenser **C16** which, it should be noted, is connected at its positive end to the junction of **S5** and **R12**, and not to chassis. **C8** provides an RF by-pass across the HT circuit.

### COMPONENTS AND VALUES

RESISTANCES		Values (ohms)
R1	V1 SG voltage limiter ...	150,000
R2	V1 gain control ...	500,000
R3	V1, V2 anodes HT feed...	5,000
R4	V2 grid leak ...	6,000,000
R5	V2 anode load resistance	80,000
R6	Part of RF filter ...	50,000
R7	V3 CG resistance ...	1,000,000
R8	V3 CG decoupling ...	1,000,000
R9	V3 anode load resistance	50,000
R10	Part of feed-back filter...	5,000,000
R11	V4 grid stopper ...	200,000
R12	} V3, V4 auto GB potential { divider ...	100
R13		250



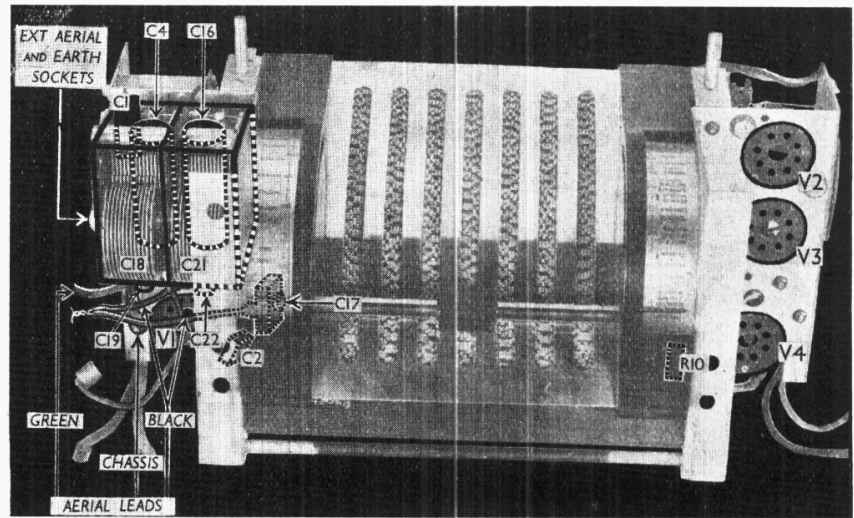
CONDENSERS		Values (μF)
C1	External aerial series ...	0-00001
C2	LW frame aerial fixed trimmer... ..	0-000075
C3	V1 SG decoupling ...	0-1
C4*	V1, V2 anodes decoupling	8-0
C5	V1, V2 anodes RF by-pass	0-1
C6	V1 anode LW trimmer ...	0-0001
C7	V2 CG condenser... ..	0-0001
C8	HT circuit RF by-pass ...	0-1
C9	Part of RF filter ... ..	0-0001
C10	V3 CG condenser... ..	0-0003
C11	V3 CG decoupling ... ..	0-1
C12	RF by-pass ... ..	0-0003
C13	AF coupling to T1 ... ..	0-1
C14	Part of feed-back filter ...	0-01
C15	Fixed tone corrector ... ..	0-01
C16*	Auto GB circuit by-pass... ..	50-0
C17†	LW frame aerial trimmer	0-00005
C18†	Frame aerial tuning ... ..	—
C19†	MW frame aerial trimmer	—
C20†	Reaction control ... ..	0-00035
C21†	V1 anode circuit tuning ...	—
C22†	V1 anode MW trimmer ... ..	—

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

OTHER COMPONENTS		Approx. Values (ohms)
L1	} Frame aerial windings ... {	1-2
L2		19-0
L3		2-5
L4	V1 anode MW tuning coil	1-4
L5	V1 anode LW tuning coil	17-0
L6	Speaker speech coil	2-5
T1	Intervalve auto-trans- former, total ... ..	2,700-0
T2	} Speaker input { Pri. ... ..	900-0
		Sec. ... ..
S1-S4	Waveband switches ... ..	—
S5	HT circuit switch ... ..	—
S6	LT circuit switch... ..	—

**VALVE ANALYSIS**

Valve voltages and currents given in the table (col. 5) are those measured in our receiver when it was operating with a new HT battery reading 89 V on load. The receiver was tuned to the lowest



Plan view of the chassis. Several components are shown dotted. C1, C4 and C16 are mounted beneath the gang. C2 and C17 are mounted vertically on the edge of the RF chassis deck, while R10 is mounted on a vertical panel, which is fixed to the edge of the AF chassis deck.

wavelength on the medium wave band, and the volume control was adjusted to a point just short of where oscillation commenced. The frame aerial was disconnected and the frame aerial leads on the chassis were joined together, so that there was no signal input.

Voltages were measured on the 400 V scale of a model 7 Universal Avometer, the negative lead of which was connected to chassis.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 VP23	80	0-9	30	0-3
V2 HL22	41	0-45	—	—
V3 HL22	51	0-7	—	—
V4 Pen 25	84	4-3	86	1-0

**DISMANTLING THE SET**

**Removing Chassis.**—Remove the two control knobs from the front of the 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 terminal-type nut holding the pilot lamp to the small metal plate on the front (inside) of the case;

lift the rear ends of the three metal runners, on which the batteries stand, until the claws at their ends are clear of the holes in the bottom of the frame

aerial support, and insert wedges under them.

The complete receiver assembly can now be withdrawn from the casing.

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

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

**Separating Frame and Chassis.**—A large number of components are still inaccessible, until the frame aerial support and a screening plate beneath the chassis have been separated from it, and the chassis is exposed as shown in our chassis illustrations.

To do this, unsolder the three braided leads, and the bare earthing wire, from the three tags on the frame aerial connecting panel;

remove the six countersunk-head set-screws (three each side) holding the chassis to the side members of the frame aerial support;

remove the two cheese-head set-screws holding the screening plate to the end chassis members.

When replacing, the inclined side of the frame assembly goes towards the front of the chassis.

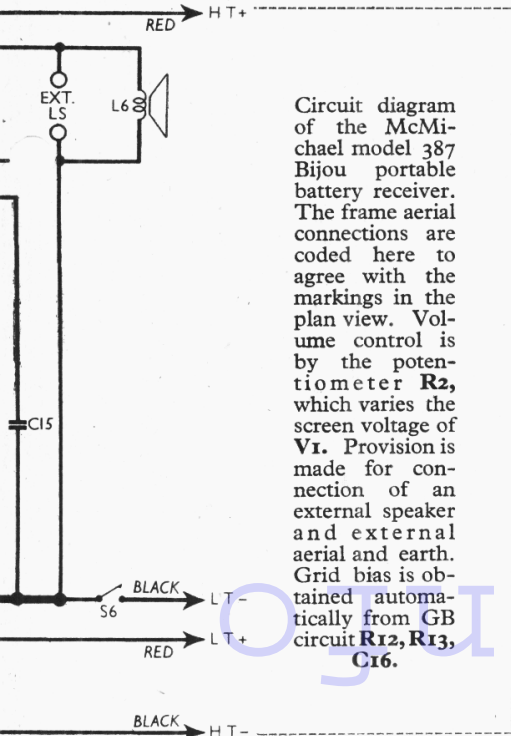
Connect the leads to the frame aerial connecting panel as follows, numbering the tags from top to bottom:—

- 1, green from condenser gang;
- 2, black from pre-set trimmer condenser and black lead emerging through hole in chassis deck;
- 3, bare tinned copper wire from tag on chassis deck.

When replacing the screening plate, the two strips of yellow Empire tape should be at the front, and the flanges of the plate should be directed downwards; the cheese-head screws are then fixed in the two front fixing holes.

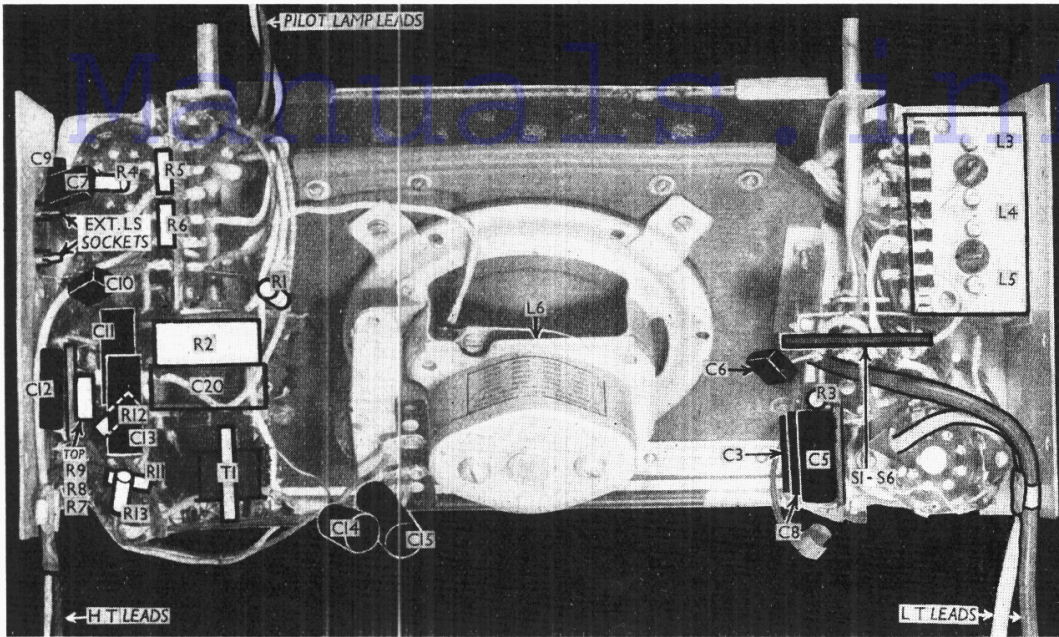
**Removing Speaker.**—Lay the chassis upon its front side;

unsolder the black speech coil lead from its tag under the top fixing screw;



Circuit diagram of the McMichael model 387 Bijou portable battery receiver. The frame aerial connections are coded here to agree with the markings in the plan view. Volume control is by the potentiometer R2, which varies the screen voltage of V1. Provision is made for connection of an external speaker and external aerial and earth. Grid bias is obtained automatically from GB circuit R12, R13, C16.





Under-chassis view. The RF chassis section is on the right, and the AF section is on the left. The connections between the two are described in "General Notes." A diagram of the S1-S6 switch unit appears at the foot of column 1. R9, R8, R7 are mounted on a panel above one another in the order indicated, reading from top to bottom.

unsolder the white (lower) speech coil lead from the speech coil tag on the speaker; unsolder the four leads from the tags on the speaker transformer; remove the three countersunk-head wood screws holding the fixing clamps to the speaker.

When replacing, the transformer should be on the right; the two speech coil leads should be connected as indicated in "Removing Speaker"; the red lead from V4 holder should be connected to the lower tag on the speaker transformer; the yellow lead from V4 holder and the free ends of the two condensers C14 and C15 go to the upper tag on the transformer.

**GENERAL NOTES**

**Switches.**—S1-S4 are the waveband switches, and S5, S6 the HT and LT circuit switches respectively, in a single rotary unit beneath the chassis. The unit is indicated in our under-chassis view, and shown in detail in the diagram below, where it is viewed as seen looking in the direction of the arrow in the under-chassis view.

The table (col. 3) gives the switch posi-

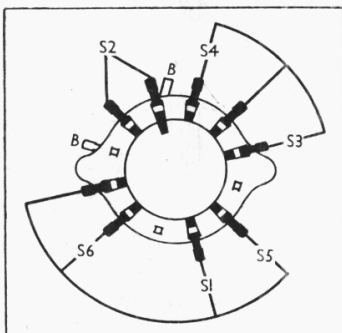


Diagram of the switch unit, drawn as seen when looking in the direction of the arrow in the under-chassis view.

tions for the three control settings, starting from fully anti-clockwise. A dash indicates open, and C closed.

**Coils.**—L1, L2 are the frame aerial windings, supported on a wooden framework upon which the chassis is also supported. It was removed in the process of our dismantling (see "Dismantling the Set") and is not shown in our chassis illustrations.

V1 anode circuit tuning coils L4, L5, and the reaction coil L3, are contained in an enclosed metal unit, beneath the tuning condenser gang. They are seen in our under-chassis view. The coils are iron-dust cored, and the adjustments are easily accessible, but they are pre-set at the works, and should not be interfered with, since inductance-measuring apparatus is required for their adjustment.

**Chassis.**—The chassis consists virtually of two units: an RF unit and an AF unit, with the speaker and tuning scales between them. Viewed from the rear, and as in our plan view, the RF unit is on the left, and the AF unit on the right. The connections between the two units are effected by ten leads which pass from one unit to the other in a bunch.

If it is necessary to separate the two units, when re-assembling, the connections to RF unit are as follows, numbering the tags on the RF coil unit from front to rear:

- 1, yellow sleeved lead from V2 anode;
- 2, white and close-spaced red lead from live side of C20;
- 3, no external connection;
- 4, brown;
- 5 and 6, no inter-chassis lead.

The second yellow sleeved lead, with a black earthing lead emerging with it from the large sleeving, goes to one of the live tags of C21. The earthing lead goes to the gang frame.

The red lead goes to the live side of C8. The red/yellow lead goes to pins 4 and 5 on V1 holder.

The white and wide-spaced red lead goes to pin 2 of V1 holder.

The white lead goes to pin 1 on V1 holder.

The black (chassis) lead goes to pin 6 on V1 holder.

The blue lead goes to the S5 tag on the switch unit.

At the LF end, the leads are connected as follows, numbering the tags on the connecting strip by the volume control spindle from front to rear:

- 1, two black leads;
- 2, brown;
- 3, yellow sleeved lead from C21;
- 4, yellow sleeved lead (with a black earthing lead emerging with it);
- 5, white;
- 6, no inter-chassis lead;
- 7, red;

The red/yellow lead goes to the middle tag of R2.

The white and close-spaced red lead goes to the fixed plates of C20.

The white and wide-spaced red lead goes to the middle right-hand tag of T1, when viewed from the rear.

The blue lead goes to pin 7 on V4.

**Pilot Lamp.**—This is Ever Ready MES type with a round bulb. It is rated at 2 V, 0.1 A, and is mounted behind a McMichael medallion with a red background fitted to the front of the moulded escutcheon. The lamp is connected to the chassis by a pair of flexible leads.

**External Speaker.**—Two sockets are provided on a panel at one end of the chassis for a low impedance (2-4 O) external speaker. When the chassis is in position, this panel registers with a hole in the side of the carrying case.

**External Aerial and Earth.—These are**  
**Switch Table**

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