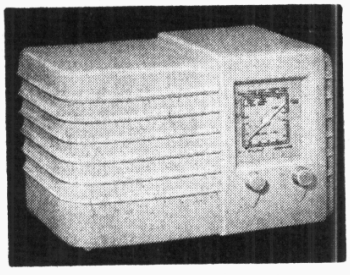
"TRADER" SERVICE SHEET

893

McMICHAEL 488U

A.C./D.C. Reflex Superhet Midget



ALTHOUGH the McMichael 488U is not equipped with a frame aerial, it has a "whip" aerial rod that serves equally well to render the receiver transportable. The rod is self-supporting when plugged into the aerial sockets, and breaks down to three plug-in sections when not in use.

The receiver is a 3-valve (plus rectifier), 2-band superhet designed for A.C. or D.C. mains of 200-250 V, 40-100 c/s in the case of A.C. The valves employed have B.V.A. B8A bases, and special attention is drawn to the modification note overleaf concerning **V2.**

A very small number of early models were issued with a non-reflexed I.F. stage. These are not covered by this Service Sheet, but the differences are so small that it can still be used when servicing them.

Release date and original price: August 1948; £13 13*s. plus purchase tax.*

CIRCUIT DESCRIPTION

Aerial input is via isolating capacitor **C1,** I.F. rejector **L1, C2,** and coupling coils **L2** (M.W.) and **L3** (L.W.) to single-tuned circuits **L4, C33** (M.W.) and **L5, C33** (L.W.), which precede a triode-hexode valve **(V1, Mullard UCH42)** operating as frequency changer with internal coupling.

Triode oscillator anode coils **L8** (M.W.) and **L9** (L.W.) are tuned by **C36,** with parallel trimming by **C34** (M.W.) and **C15, C35** (L.W.) and series tracking by **C13** (M.W.) and **C14** (L.W.). Reaction coupling by grid coils **L6** (M.W.) and **L7** (L.W.).

Second valve **(V2, Mullard UAF42)** is a single diode variable-mu R.F. pentode, the pentode section of which operates in a reflex circuit, first as an intermediate frequency amplifier with tuned-transformer couplings, and then as an A.F. amplifier.

Intermediate frequency 465 kc/s.

The diode section of **V2** provides A.F. output, which is developed across load resistors **R11, R12** in series and passed via **C23,** manual volume control **R13** and I.F. stopper **R6** to C.G. of pentode section. I.F. filtering by **C21, R9, C22** in diode circuit and **C24** in pentode anode circuit.

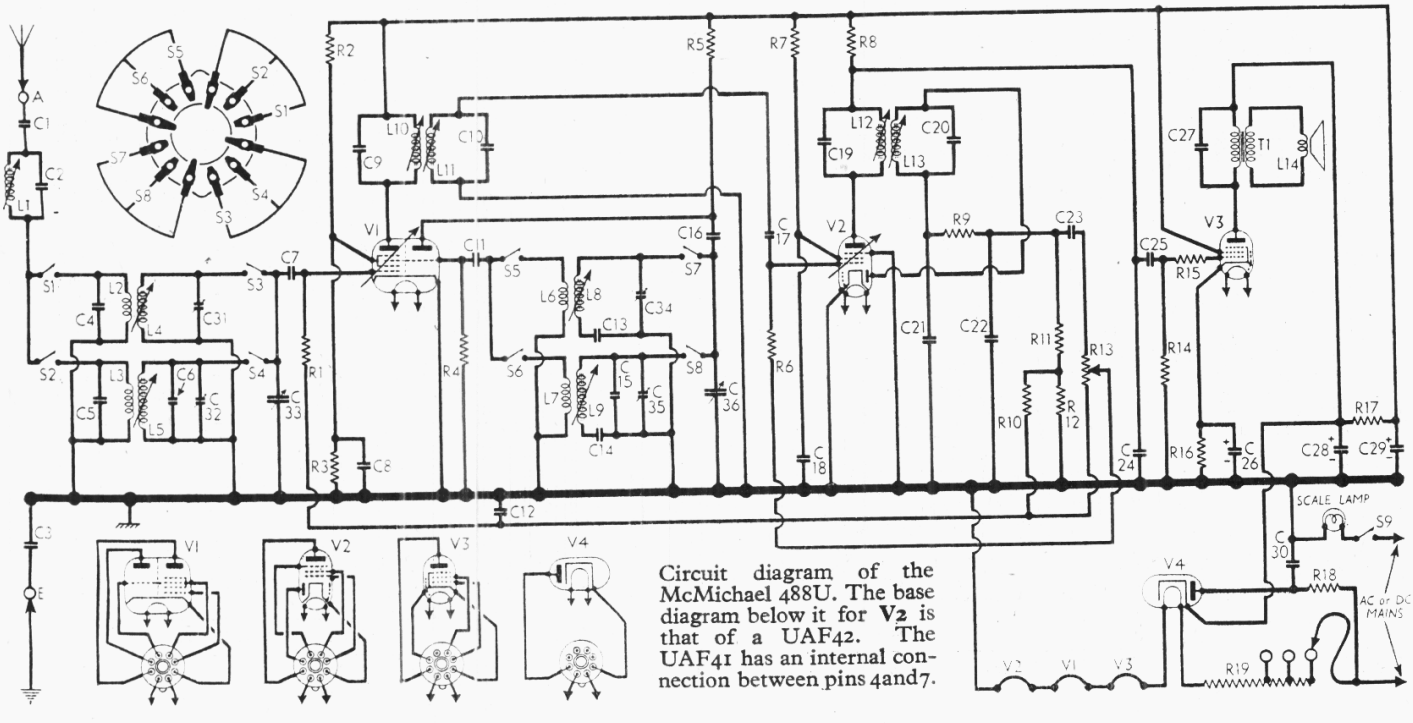
The D.C. potential developed across diode load resistor **R12** is tapped off and fed back through a decoupling circuit **R10, C12** as G.B. to **V1** and **V2,** giving automatic gain control.

A.F. voltage developed across **R8** in **V2** anode circuit is passed, via coupling capacitor **C25,** C.G. resistor **R14** and grid stopper **R15** to control grid of pentode output valve **(V3, Mullard UL41).** Fixed tone correction by **C27** in anode circuit.

COMPONENTS AND VALUES

	CAPACITORS	Values (μF)	Locations
C1	Aerial isolator ...	0·005	K6
C2	I.F. rejector tune...	0·0005	B2
C3	Earth isolator ...	0·02	J6
C4	Aerial M.W. shunt	0·00025	J3
C5	Aerial L.W. shunt	0·001	J4
C6	Aerial L.W. trim ...	0·00002	J4
C7	V1 hex C.G. ...	0·0001	H5
C8	V1 S.G. decoup. ...	0·05	H5
C9	1st I.F. transformer tuning ...	0·0001	C1
C10		0·0001	C1
C11	V1 osc. C.G. ...	0·0001	H6
C12	A.V.C. decoupling	0·02	G5
C13	Osc. M.W. tracker	0·000538	J5
C14	Osc. L.W. tracker...	0·00016	K5
C15	Osc. L.W. trimmer	0·00005	J6
C16	Osc. anode coup. ...	0·0001	G6
C17	V2 I.F. coupling ...	0·00005	G5
C18	V2 S.G. decoup. ...	0·05	G5
C19	2nd I.F. transformer tuning ...	0·0001	B1
C20		0·0001	B1
C21	I.F. by-passes ...	0·0001	G4
C22		0·0005	F4
C23	A.F. coupling ...	0·02	G3
C24	I.F. by-pass ...	0·002	G4
C25	A.F. coupling ...	0·01	F4
C26*	V3 cath. by-pass ...	50·0	F6
C27	Tone corrector ...	0·01	C1
C28*	H.T. smoothing capacitors ...	32·0	D1
C29*		32·0	D1
C30	Mains R.F. by-pass	0·01	E4
C31‡	Aerial M.W. trim....	0·00004	L4
C32‡	Aerial L.W. trim....	0·00004	L4
C33†	Aerial tuning ...	—	A1
C34‡	Osc. M.W. trim ...	0·00004	L5
C35‡	Osc. L.W. trim. ...	0·00004	L5
C36†	Oscillator tuning ...	—	A1

* Electrolytic. † Variable. ‡ Pre-set.



Circuit diagram of the McMichael 488U. The base diagram below it for **V2** is that of a UAF42. The UAF41 has an internal connection between pins 4 and 7.

	RESISTORS	Values (ohms)	Locations
R1	V1 hex. C.G. ...	470,000	G5
R2	V1 S.G's H.T. feed potential divider	22,000	G5
R3		47,000	H5
R4	V1 osc. C.G. ...	22,000	G6
R5	Osc. anode load ...	12,000	G6
R6	V2 C.G. resistor ...	470,000	H4
R7	V2 S.G. feed ...	56,000	G5
R8	V2 anode load ...	10,000	F4
R9	I.F. stopper ...	22,000	G3
R10	A.G.C. decoupling	1,000,000	F5
R11	Diode load resistors	220,000	G4
R12		220,000	G4
R13	Volume control ...	1,000,000	J4
R14	V3 C.G. resistor ...	470,000	F5
R15	V3 grid stopper ...	22,000	F5
R16	V3 G.B. resistor ...	150	F5
R17	H.T. smoothing ...	3,000	F5
R18	V4 surge limiter ...	250	E4
R19	Heater ballast ...	1,425*	D2

Tapped at 1,025 Ω + 200 Ω + 200 Ω from V4 heater.

	OTHER COMPONENTS	Approx. Values (ohms)	Locations
L1	I.F. rejector coil ...	4·0	B2
L2	Aerial coupling coils	8·0	K3
L3		22·5	K4
L4	Aerial tuning coils	4·0	K3
L5		17·0	K4
L6	Oscillator reaction coils	1·7	K5
L7		2·3	K6
L8	Oscillator tuning coils	2·6	K5
L9		6·2	K6
L10	1st I.F. trans. Pri.	9·0	C1
L11	1st I.F. trans. Sec.	9·0	C1
L12	2nd I.F. trans. Pri.	9·0	B1
L13	2nd I.F. trans. Sec.	9·0	B1
L14	Speech coil ...	2·5	—
T1	Speaker Pri. ...	270·0	C1
	trans. Sec. ...	0·1	C1
S1-S8	W/band switches ...	—	H5
S9	Mains sw., g'd R13	—	J4

GENERAL NOTES

Switches.—**S1-S8** are the waveband switches, ganged in a single rotary unit mounted on the rear member beneath the chassis. This is indicated in our under-chassis view, where the side shown is that which is seen in the diagram inset in the top left-hand corner of the circuit diagram overleaf. **S1, S3, S5, S7** close on M.W., and **S2, S4, S6, S8** close on L.W.

Scale Lamp.—This is an Osram M.E.S. type, rated at 6.5 V, 0.3 A, with a small clear spherical bulb.

Capacitors C28, C29.—These are two dry electrolytics in a single tubular metal container mounted on the chassis deck. Both sections of our sample, which was a Hunts type K49, were rated at 32 μF, 350 V D.C. working, but the red tag was the positive connection for the reservoir section. The black tag was the common negative.

V2 Modification.—Since production started on this receiver, **V2** has been modified. Originally it was a Mullard UAF41, but this valve has recently been superseded by the UAF42.

The difference between the two is that whereas in the former the suppressor grid and the cathode were connected together internally (although also connected to pins 4 and 7 on the base), in the latter they are not internally connected. Late UAF41's are like the UAF42.

The result is that in early chassis pin 7 was connected to chassis, but pin 4 was not. If a UAF42 is subsequently fitted in one of these models, it will be necessary to solder a connection from pin 4 to chassis.

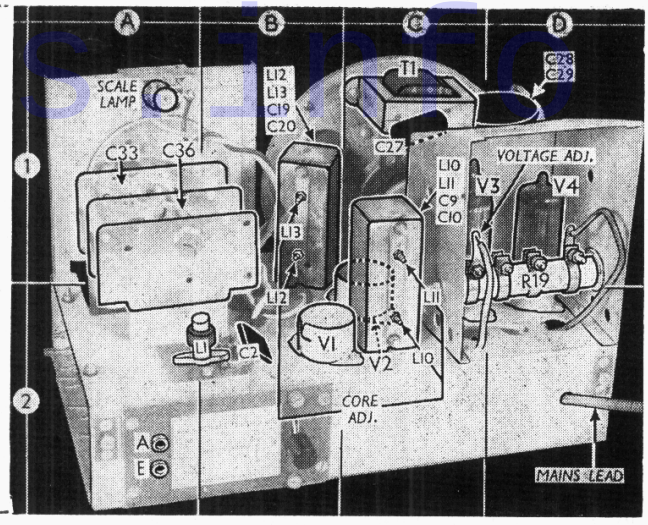
Drive Cord Replacement.—This is quite simple and requires no special instructions. The cord makes about 1½ turns round the drive pulley on the control spindle.

DISMANTLING THE SET

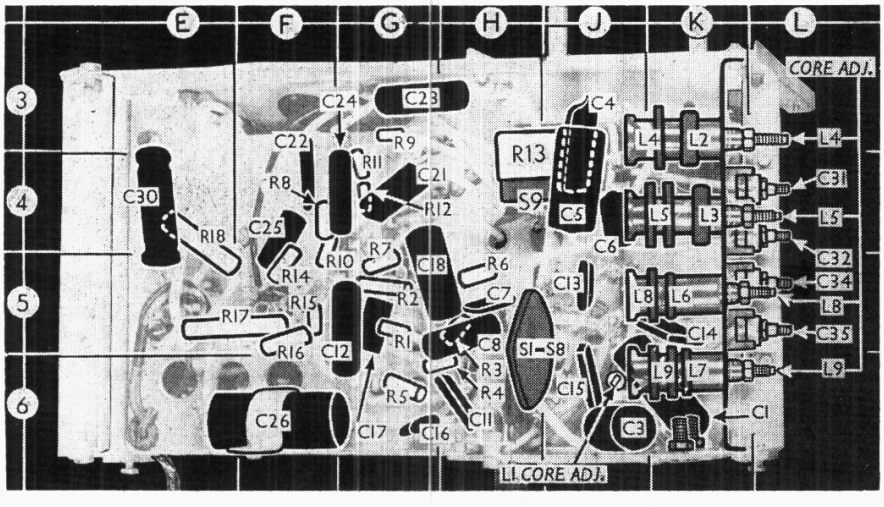
Remove the two control knobs (recessed grub screws), and the four short round-head screws securing the back cover;

from the underside of the cabinet remove the two 2BA cheese-head screws securing the chassis, and slide out the chassis and speaker as a single unit.

When replacing, do not omit to cover the control knob grub screws and chassis retaining screws with a suitable insulating compound.



Three - quarter rear view of the chassis, showing the components on the deck. When removing **V3** or **V4**, which are seen here in their sockets, care should be taken to prevent them from hitting the top of the heat deflector and breaking the glass.



Under-chassis view. All the RF. and oscillator adjustments are indicated.

CIRCUIT ALIGNMENT

I.F. Stages.—Connect signal generator, via an 0.1 μF capacitor in the "live" lead, to control grid (pin 6) of **V1** and the **E** socket, switch set to M.W., turn gang and volume control to maximum, and slacken the core adjustment lock nuts. Feed in a 465 kc/s (645.16 m) signal, and adjust the cores of **L10, L11, L12** and **L13** (location references C1, B1) for maximum output, progressively attenuating the signal generator output as the circuits are aligned, to avoid A.G.C. action. Finally, tighten the core adjustment lock nuts.

R.F. and Oscillator Stages.—Transfer "live" signal generator lead to **A** socket, via a suitable dummy aerial. With the gang at maximum capacitance the pointer should be horizontal and coincident with the spot beneath the right-hand end of the M.W. scale. It may be adjusted in position by removing the transparent scale cover (four round-head set-screws) and slackening the hexagon-head pointer fixing screw.

M.W.—Switch set to M.W., tune to 526.3 m (spot on scale), feed in a 526.3 m (570 kc/s) signal, and adjust the cores of **L8** (L5) and **L4** (L3) for maximum output. Tune to 200 m on scale, feed in a 200 m (1,500 kc/s) signal, and adjust **C34** (L5) and **C31** (L4) for maximum output. Repeat these operations until no improvement results.

L.W.—Switch set to L.W., tune to 2,000 m on scale, feed in a 2,000 m (150 kc/s) signal, and adjust the cores of **L9** (L6) and **L5** (L4) for maximum output. Tune to 750 m on scale, feed in a 750 m (400 kc/s) signal, and adjust **C35** (L5) and **C32** (L4) for maximum output. Repeat these operations until no improvement results.

I.F. Rejector.—Switch set to M.W., tune to 550 m on scale, feed in a 465 kc/s signal, and adjust the core of **L1** (J6) for minimum output.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on 230 V A.C. mains, using the 220 V tapping on the heater ballast resistor. The receiver was tuned to the lowest wavelength on the M.W. 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 Avometer, chassis being the negative connection.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 UCH42	143	0·45	63	3·7
	Oscillator			
	94	3·6		
V2 UAF42	103	3·1	75	1·1
V3 UL41	177	40·0	143	6·6
V4 UY41	†	—	—	—

† Cathode to chassis 187 V, D.C.

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