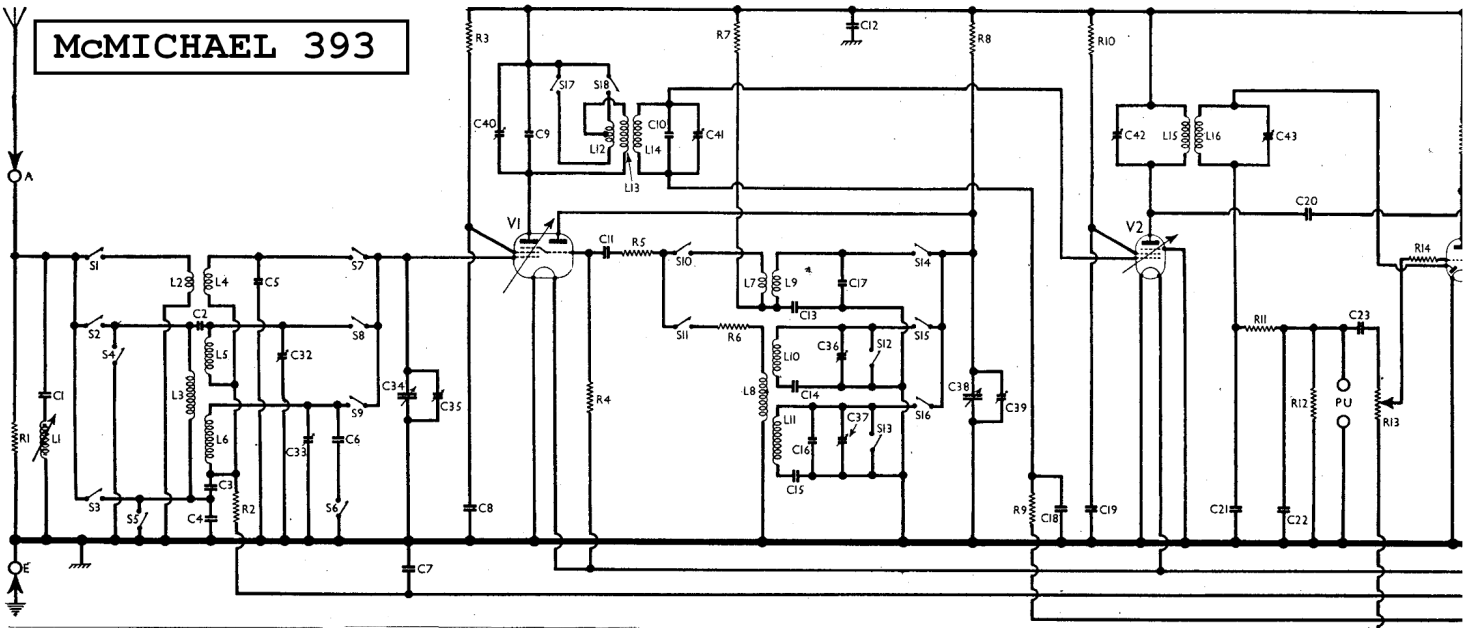
McMICHAEL 393



RESISTANCES		Values (ohms)
R1	Aerial circuit shunt ...	2,000
R2	V1 pentode CG decoupling	500,000
R3	V1 SG HT feed	100,000
R4	V1 osc. CG resistance	50,000
R5	Oscillator reaction circuit stabilisers	100
R6		1,500
R7	V1 oscillator anode HT feed resistances ...	20,000
R8		40,000
R9	V2 CG decoupling ...	1,000,000
R10	V2 SG HT feed resistance	200,000
R11	IF stopper	50,000
R12	V3 signal diode load ...	500,000
R13	Manual volume control ...	1,000,000
R14	V3 triode grid stopper ...	100,000
R15	V3 triode anode load ...	50,000
R16	AVC line decoupling ...	500,000
R17	V3 AVC diode load resistances ...	500,000
R18		500,000
R19	V4 CG's decoupling ...	100,000
R20	V1, V2 fixed GB; V3 triode and V4 GB;	120
R21	AVC delay	800

CONDENSERS		Values (μF)
C1	Aerial IF filter condenser	0·0004
C2	Aerial MW top coupling ...	0·000006
C3	Aerial LW coupling con-	0·1
C4	densers	0·004
C5	Aerial circuit SW trimmer	0·000005
C6	L6 muting on MW ...	0·001
C7	AVC line decoupling ...	0·01
C8	V1 SG decoupling ...	0·1
C9	1st IF transformer fixed	0·00005
C10	trimmers	0·00005
C11	V1 osc. CG condenser ...	0·0001
C12	HT circuit RF by-pass ...	0·1
C13	Osc. circuit SW tracker ...	0·0035
C14	Osc. circuit MW tracker...	0·0005075
C15	Osc. circuit LW tracker...	0·000168
C16	Osc. circ. LW fixed trimmer... ...	0·00005
C17	Osc. circuit SW trimmer	0·000005
C18	V2 CG decoupling ...	0·1
C19	V2 SG decoupling ...	0·1
C20	Coupling to V3 AVC diode	0·0001
C21	IF by-pass condensers ...	0·0001
C22		0·0001
C23	AF coupling to V3 triode	0·005
C24	IF by-pass	0·0003
C25	AF coupling to T1 ...	0·1
C26	Tone control condensers...	0·02
C27		0·01
C28	Fixed tone correctors ...	0·001
C29		0·001
C30*	HT reservoir condenser ...	8·0
C31*	Auto GB circuit by-pass...	50·0
C32‡	Aerial circuit MW trimmer	—
C33‡	Aerial circuit LW trimmer	—
C34†	Aerial circuit tuning ...	—
C35‡	Aerial circuit SW trimmer	—
C36‡	Osc. circuit MW trimmer	—
C37‡	Osc. circuit LW trimmer	—
C38†	Oscillator circuit tuning...	—
C39‡	Osc. circuit SW trimmer	—
C40‡	1st IF trans. pri. tuning...	—
C41‡	1st IF trans. sec. tuning...	—
C42‡	2nd IF trans. pri. tuning	—
C43‡	2nd IF trans. sec. tuning	—

* Electrolytic. † Variable. ‡ Pre-set.

OTHER COMPONENTS		Approx. Values (ohms)
L1	Aerial IF filter coil ...	1·7
L2	Aerial SW coupling coil	0·3
L3	Aerial MW and LW coupling coil...	18·0
L4	Aerial SW tuning coil...	Very low
L5	Aerial MW tuning coil...	2·0
L6	Aerial LW tuning coil...	21·0
L7	Oscillator SW reaction	0·4
L8	Osc. MW and LW reaction	3·9
L9	Osc. circ. SW tuning coil	Very low
L10	Osc. circ. MW tuning coil	2·2
L11	Osc. circ. LW tuning coil	8·5
L12	Variable selectivity coil, total	1·3
L13	1st IF trans. Pri. ...	12·0
L14	Sec. ...	12·0
L15	2nd IF trans. Pri. ...	12·0
L16	Sec. ...	12·0
L17	Speaker speech coil ...	2·2
T1	Intervalve trans. Pri. ... Sec., total	500·0 5,000·0
T2	Speaker input trans. Pri., total Sec. ...	600·0 0·15
S1-S16	Waveband switches ...	—
S17, S18	Variable selectivity switches	—
S19, S20	Tone control switches...	—
S21	Auto muting switch ...	—
S22	LT circ. switch ganged	—
S23	HT circ. switch R13	—

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating with a new HT battery reading 115 V on load. The receiver was tuned to the lowest wavelength on the MW 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.

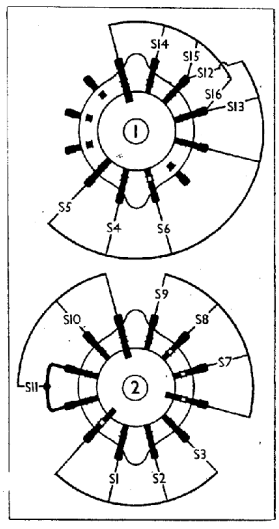
Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 TP25	105	0·5	43	0·6
	Oscillator 48	1·8		
V2 VP23	105	1·0	41	0·3
V3 HL23DD	70	0·6	—	—
V4 QP25	104†	2·25†	105	1·2

† Each anode.

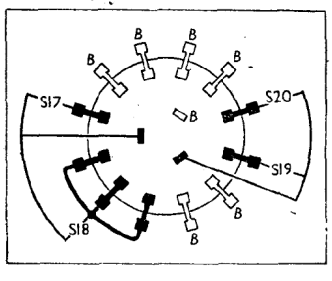
Switch Tables

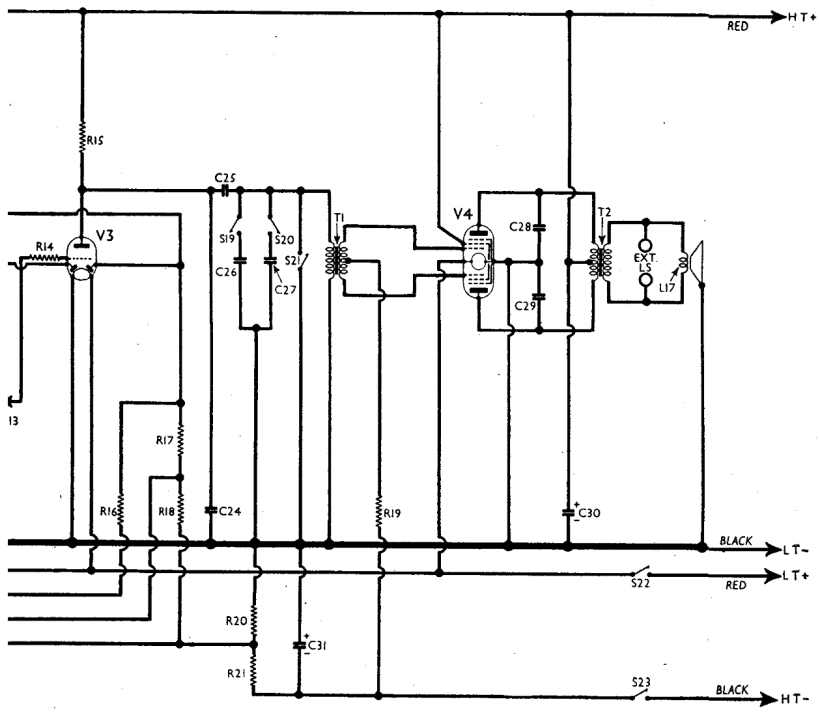
Switch	SW	MW	LW
S1	C	—	—
S2	—	C	—
S3	—	—	C
S4	C	—	C
S5	—	C	—
S6	—	—	—
S7	C	—	—
S8	—	C	—
S9	—	—	C
S10	C	—	C
S11	—	C	—
S12	C	—	—
S13	—	C	—
S14	C	—	—
S15	—	C	—
S16	—	—	C

Switch	Fld.	Norm.	Bass	Foreign
S17	C	—	—	—
S18	—	C	C	—
S19	—	—	—	C
S20	—	—	—	C



Diagrams of the two sides of the wave-change switch unit. *Above :* as seen from front ; *below :* as seen from rear.





CIRCUIT ALIGNMENT

IF Stages.—Connect signal generator between control grid (top cap) of **V1** and chassis, and feed in a 465 KC/S signal. Adjust **C40, C41** and **C42, C43** in turn for maximum output. Re-check these settings.

Transfer signal generator leads to **A** and **E** clips, feed in a strong 465 KC/S signal, and adjust **L1** core for *minimum* output.

RF and Oscillator Stages.—With gang at maximum, pointer should be horizontal. Connect the signal generator to the **A** and **E** clips, via a suitable dummy aerial.

SW.—Switch set to SW, turn gang to minimum, feed in an 18.5 m (16.2 MC/S) signal and adjust **C39** for maximum output. Feed in a 19.6 m (15.3 MC/S) signal, tune to 19.6 m on scale, and adjust **C35** for maximum output.

MW.—Switch set to MW, turn gang to minimum, feed in a 190 m (1,580 KC/S) signal, and adjust **C36** for maximum output. Tune to 214 m on scale, feed in a 214 m (1,400 KC/S) signal, and adjust **C32** for maximum output.

LW.—Switch set to LW, tune to 1,100 m, feed in a 1,100 m (273 KC/S) signal, and adjust **C37,** then **C33** for maximum output.

There are no tracking adjustments, as tracking is fixed on all bands.

Diagram of the tone control switch unit, as seen when viewed from rear of chassis.

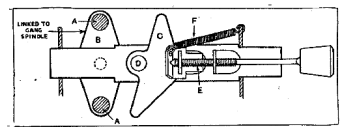
PRESS-BUTTON UNIT

A mechanical press-button unit is employed for automatic tuning. The diagram below shows a sectional view of one of the press-button movements.

The gang condenser spindle is connected up by means of a bell-crank and a system of connecting links to a framework consisting of two rigid parallel rods, A, A, held in end plates B, and the whole frame is arranged to pivot on two bearings.

Rotation of the frame is transmitted to the gang spindle via the crank and connecting links.

Each press-button (of which there are six) actuates a plunger carrying a metal contact plate C, and when the plunger is depressed this plate moves forward until it encounters one or other of the rods in the frame. Further movement of the plunger causes the plate C to push the rod and so rotates the frame (and the gang) until the plate also comes into contact with the other rod.



When this is the case, pressure on the plunger will cause no further rotation of the frame, and the gang is accurately positioned. When the plunger pressure is released, a return spring F carries it back to its normal position, but the frame does not move until another plunger, adjusted for a different station, is pressed.

The final position of the frame, and hence the selection of stations, is achieved by making the metal contact plate rotatable, which adjusts the angle of its contact edge relative to the axis of the plunger.