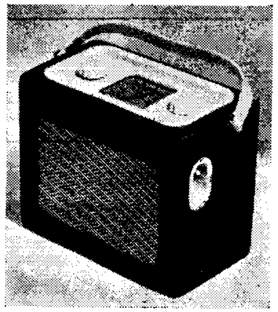
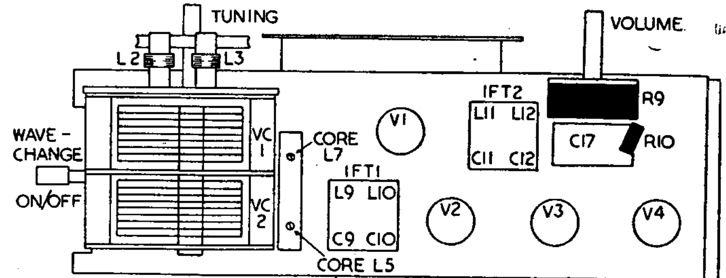
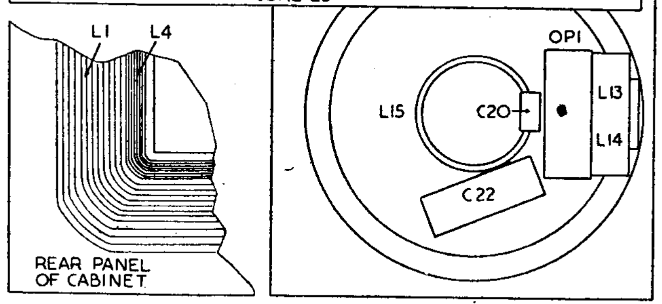
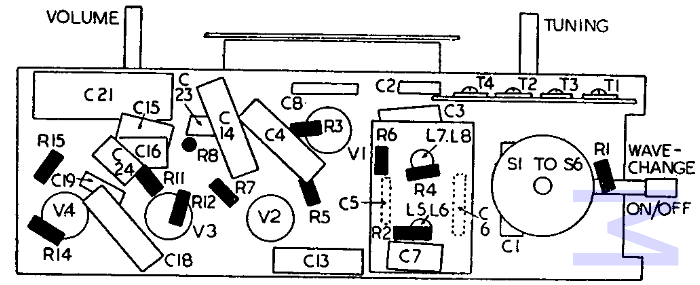
McMICHAEL 493



Four-valve two-waveband all-dry battery-operated miniature portable superhet receiver with internal frame aerial. Leatherette covered case fitted with plastic carrying handle. Manufactured by McMichael Radio, Ltd., Slough, Bucks.



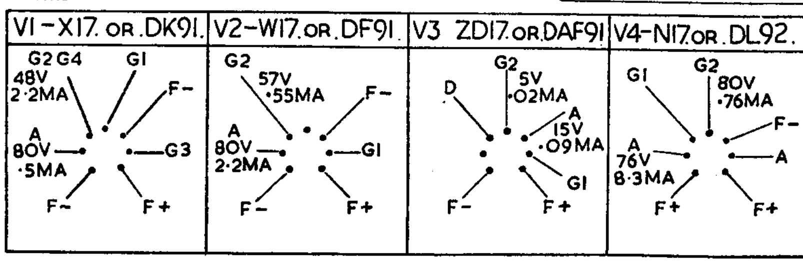




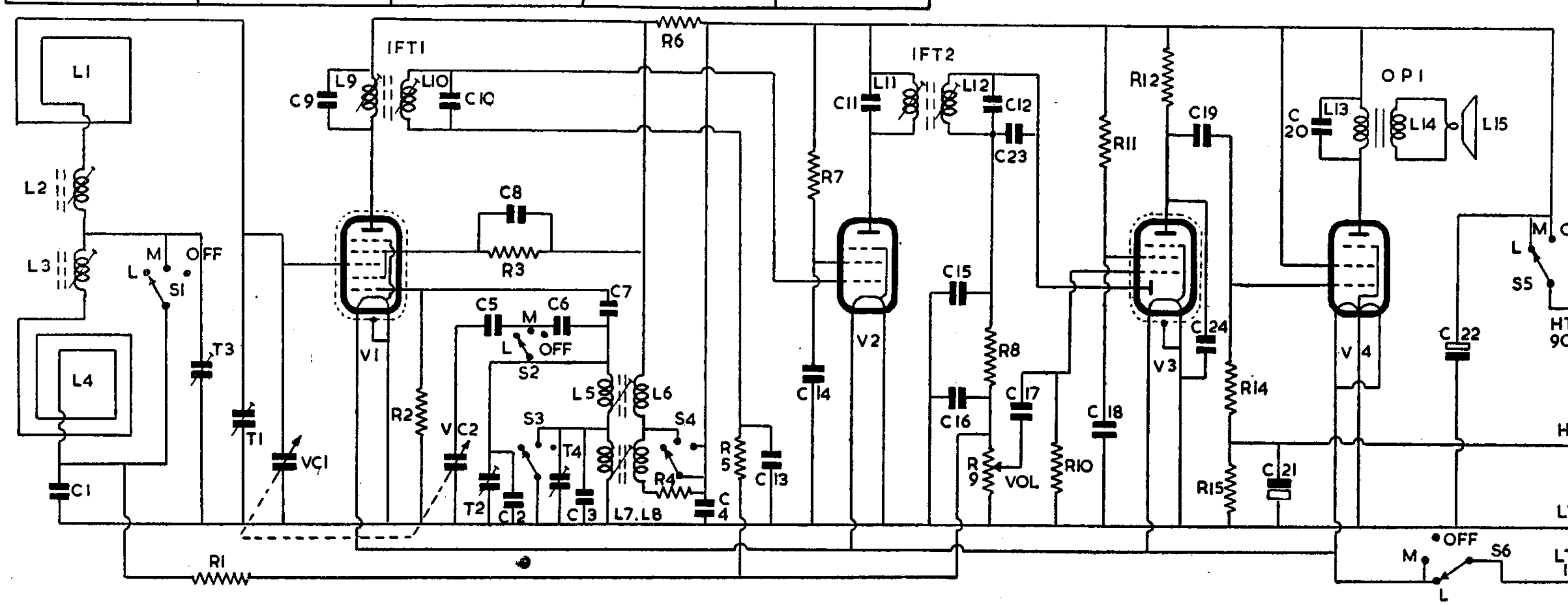
TRIMMING INSTRUCTIONS

Apply signal as stated below	Tune receiver to	Trim in order stated for max. output
(1) 465 kc/s to g3 of V1 via .01 mF	—	Core L12, L11, L10, L9
(2) With gang at maximum capacity check to see that dial pointer coincides with 550 metres calibration.		
(3) 1.5 mc/s to frame aerial via loop	200 metres	T2, T1
(4) 300 kc/s as above	1000 metres	T4, T3

NOTE.—No instructions are given for realignment of cores of L2, L3, L5, L7, as these are factory adjusted and sealed.



TOTAL HT. CURRENT. = 14·5MA.
LT. CURRENT. = 250MA
BIAS ACROSS R15 = 9·7V.



CAPACITORS

C	Capacity	Type
1	.05	Tubular 350V
2	20pF	Silver Mica
3	270pF	Silver Mica
4	.1	Tubular 350V
5	690pF	Silver Mica
6	690pF	Silver Mica
7	100pF	Silver Mica
8	250pF	Silver Mica
9	100pF	Silver Mica
10	100pF	Silver Mica
11	100pF	Silver Mica
12	100pF	Silver Mica
13	.05	Tubular 350V
14	.1	Tubular 350V
15	33pF	Silver Mica
16	33pF	Silver Mica
17	500pF	Mica
18	.1	Tubular 350V
19	.001	Tubular 350V
20	.01	Tubular 500V
21	25	Electrolytic 25V
22	4	Electrolytic 200V
23	5pF	Silver Mica
24	100pF	Silver Mica

NOTE—C24 fitted when Osram valves used.

RESISTORS

R	Ohms	Watts
1	2.2M	1/4
2	100K	1/4
3	150K	1/4
4	470	1/4
5	2.2M	1/4
6	18K	1/4
7	39K	1/4
8	270K	1/4
9	1M	Potr.
10	8.2M	1/4
11	3M	1/4
12	470K	1/4
14	4.7M	1/4
15	680	1/4

INDUCTORS

L	Ohms
1	.4
2	1.25
3	3
4	9.5
5	2.25
6	1.4
7	3.5
8	1.4
9	11
10	11
11	11
12	11
13	500
14	Very Low
15	2.5

Continued on page 24

VIEW MASTER

Continued from page 22

pulses are fed through grid stopper R43 to grid of line scan oscillator V9.

Frame trigger pulses are developed by the intergrating circuit R53, C46, the time constant of which is comparatively long so that only the longer duration frame pulses build up the charge on C46. Resultant pulses are fed by C47 through grid stopper R55 to grid of frame scan oscillator V11.

Line time-base is generated by thyratron V9 together with network R46, C38, R47, R44, R45. The time-base capacitor C38 charges up through R46 and is discharged rapidly by V9, when it strikes, due to positive sync. pulse on its grid. R45 by varying the effective cathode bias of V9 gives a fine control of time-base frequency. R47 provides wave-form correction.

Line amplifier.—The saw-tooth waveform developed on C38 is fed by C39 through R49 to grid of beam tetrode amplifier V10 in the anode of which is the primary of line output transformer T2. Secondary of T2 feeds scanning wave-form through width control L14 to line deflector coils on CRT. R52 with C43, which are connected across L14, give control of linearity at commencement of line.

L14 is a small coil with an inductance variable between .5 and 2.5 mH by movement of its iron core. Adjustment of inductance will alter its series impedance and hence the scanning current, giving control of width of line waveform.

Frame time-base.—Frame scan is generated by thyratron V11 together with network R56, R57 C48, R58, R59 and operates in a similar manner to the line time-base circuit. R59 gives control of frequency and R57 is to limit V10 discharge current.

Frame amplifier.—The saw-tooth waveform developed on C48 is direct coupled by R60, R63 to grid of beam tetrode amplifier V12.

R60, R61, C49, C50 constitute a waveform correction circuit to compensate for the deficiencies of the frame output transformer T3 in the anode circuit. R65 by varying the cathode bias gives control of linearity whilst R64 by varying the amount of negative feedback gives frame amplitude or height control. Secondary of T3 feeds output to frame deflector coils on the CRT. R67 is fitted to prevent coupling with the line deflector coils.

Efficiency diode.—When line amplifier V10 is cut off at commencement of flyback period large shock oscillations are set up in primary of line transformer T2. These are rectified by MR2 and a charge of approximately 40 volts is built up on C42 which being in series with HT line feed to anode V10 provides an additional 40 volts HT giving increased deflection power during the scanning stroke.

EHT of 6.3 KV is obtained by rectifying by MR3 the surge voltages set up across the overwound primary of line transformer T2 when V10 is cut off. An auxiliary secondary winding is provided on T2 to supply the filament current for an EY51 type rectifier which is sometimes fitted in place of MR3. C45 gives EHT smoothing.

HT is provided by a half-wave metal rectifier MR4 fed direct from the mains input. Choke capacity smoothing is employed. R70 decoupled by C55, in the negative HT lead to chassis, provide a 2.5V negative bias for grid of video output valve V5. Positive bias for CRT grid is taken from R69 the lower arm of a potential divider across the HT supply.

Heaters of V1 to V12 are connected in parallel and obtain their current from a 6.3V, 7A secondary on the heater transformer T1.

Heater of CRT is fed from a separate 6.3V, 2A winding on T1. R71 is fitted between cathode and one side of CRT heater to prevent any high voltage developing between cathode and heater.

Primary of T1 is tapped for inputs of 200, 220, 240V 50c/s.

Neon indicator is fitted to show when receiver chassis mains lead is connected to live side of supply. This safety device will only function when an earth lead is connected to the earth socket.

CRT is a 9-in. Mullard MW22-14C tetrode or a 9-in. Mazda CRM91, or GEC 6504 triode type. Focussing is by an adjustable permanent magnet ring. Brightness is controlled by CRT bias.

Alignment Instructions

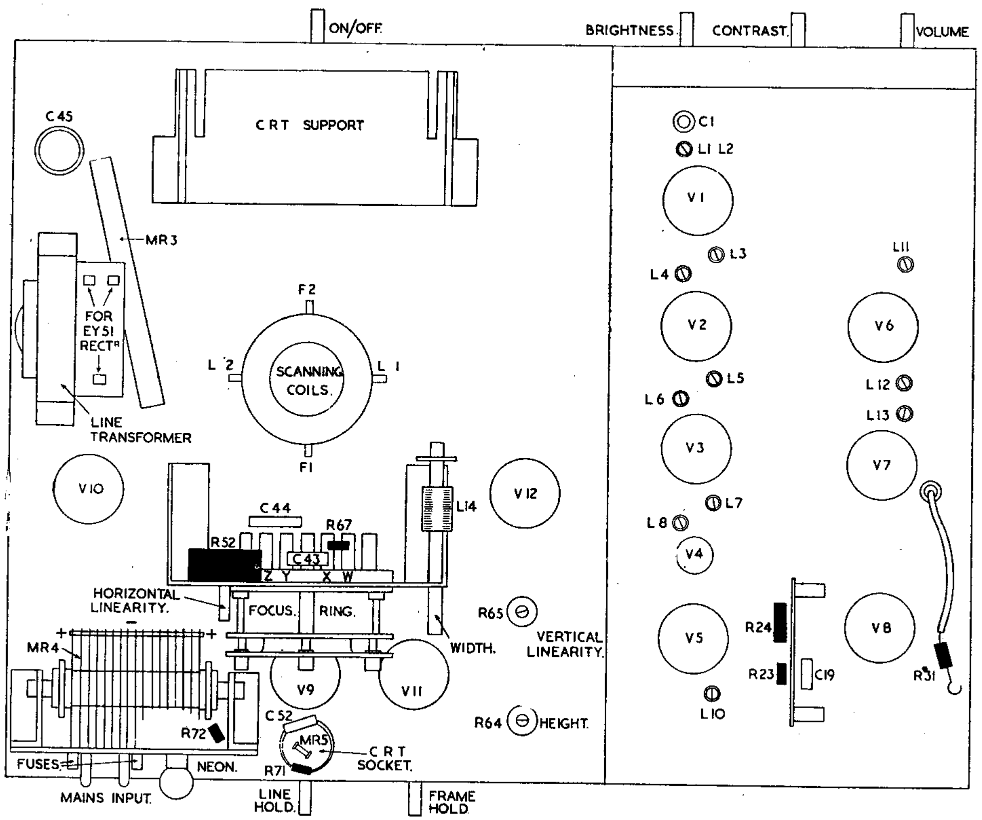
Adjust all iron cores so that they are level with top of bakelite formers. Connect output meter or oscilloscope to output of vision receiver and couple LS to sound receiver.

1. Inject 41.5 mc/s to gl of V6 and tune L12, L13, for maximum.
2. Inject 41.5 mc/s to aerial input and tune L11 for maximum.
3. Inject 45 mc/s to gl of V3 and tune L8 for maximum.
4. Inject 48 mc/s to gl of V3 and tune L7 for maximum.
5. Inject 45 mc/s to gl of V2 and tune L6 for maximum.
6. Inject 48 mc/s to gl of V2 and tune L5 for maximum.
7. Inject 45 mc/s to aerial input and tune L4 for maximum.
8. Inject 48 mc/s to aerial and tune L3 for maximum.
9. Inject 44.5 mc/s to aerial input and tune L2 for maximum.
10. Inject 41.5 mc/s to aerial and re-tune L11 for maximum.

Repeat all the above operations but with the signal generator connected to aerial input only.

To increase sensitivity. In fringe areas gain may be increased by the following changes :—

Omit R18, R2. Change R14 to 33K, R13 to 47K, R9 to 33K, and R4 to 180.



McMICHAEL 493—*from page 21*

CIRCUIT consists of a heptode frequency-changer V1, coupled by a permeability tuned transformer to an RF pentode IF amplifier V2. A second permeability-tuned transformer couples V2 to a diode pentode signal rectifier, AVC and AF amplifier V3. Signal from V3 is resistance-capacity coupled to an output pentode V4 and fed to a 5-in. PM speaker. HT is obtained from a 90V Vidor battery type L5515 and LT from a 1.5V Vidor heavy-duty battery.

Aerial circuit consists of frame aerials L1 (MW), L4 (LW), together with loading coils L2 (MW) and L3 (LW). On LW operation, L1, L2, L3, L4 are in series and tuned by VC1. T3 is LW trimmer across L3, L4. On MW operation S1 shorts out L3, L4 leaving L1, L2 tuned by VC1 and trimmed by T1. Aerial tuned circuit is coupled direct to control grid (g3) of heptode frequency-changer V1. AVC decoupled by R1, C1, is fed through the tuned circuits to g3.

Oscillator is connected in a tuned-grid series-fed HT circuit. On LW operation L5, L7 are in series and tuned by VC2. T4, with shunt capacitor C3, is LW trimmer and C5, C6 are padders. On MW operation S3 short circuits L7, T4, C3, and S2 shorts out padder C6. This leaves L5 in circuit tuned by VC2, with T2, C2 as trimmer and C5 as padder. Oscillator tuned circuits are coupled by C7 to oscillator grid (gl) of V1.

R2, C7 provide self bias for oscillator grid. Anode reaction voltages are developed inductively across L6 (MW) and L6, L8 (LW). R6 is a damping resistor across the feedback coils, and R4 a LW series limiter resistor. S4 shorts L8, R4 on MW band.

The reaction voltages are derived from oscillator anode (g2, g4) and also through L9, the primary of IFT1, in the anode of V1. R3 functions as a voltage dropper for oscillator anode (g2, g4) and C8 as bypass capacitor for feedback.

IF amplifier operates at 465 kc/s. L10, C10, which form the secondary of IFT1, feeds signal to gl of V2. AVC, decoupled by R5, C13, is fed through L10 to gl. Screen voltage is obtained from R7 and decoupled by C14. Primary L11, C11, of IFT2, is in the anode circuit.

Signal rectifier and AVC. Secondary L12, C12 of IFT2 feeds signal to diode of V3. R9, the volume control, is the diode load and R8, C15, C16 form an IF filter. The DC component of the rectified signal is utilised for AVC purposes and is fed through decoupling networks R1, C1 and R5, C13 to control grids of V1, V2.

AF amplifier.—C17 feeds signal from volume control R9 to grid of pentode section of V3. Negative bias for grid gl is developed on C17 with R10 as leak resistor. Screen voltage is obtained from R11 decoupled by C18. When V3 is a ZD17, then anode load is R12 and an anode RF bypass capacitor C24 is fitted. When V3 is a DAF91, a tapped anode load R12, R13 is employed and C24 is omitted.

Output stage.—C19 feeds signal at anode V3 to grid pentode output valve V4. Negative bias is developed across R15, decoupled by C21, in the HT negative lead to chassis and is fed through grid resistor R14. C20 is a tone correction capacitor. Secondary L14 of OP1 feeds signal to a 5-in. PM speaker L15.

High tension of 90V is obtained from a Vidor type L5515 battery. C22 provides decoupling for HT battery and S5, which is ganged to the wave-change switch, breaks positive lead to receiver, R15, decoupled by C21, in the negative lead to chassis, provide automatic bias for gl of output valve V4. Total HT consumption of receiver is approximately 14.5mA.