

McMICHAEL MODEL 135 (Cont.)

thumb-screws at the ends, lift out and pull apart.

Quick Tests.—Between the tags on the terminal strip on the right-hand side and chassis:—

VALVE READINGS				
Valve.	Type.	Electrode.	Volts.	M.A.
1	ACTP met. (9)	anode	180	*
		aux. grid	190	*
		osc. anode	110	*
2	MVS Pen. met.	anode	250	7.5
		aux. grid	120	
3	DD4 (5)	double diode only.		
4	AC/2 Pen.	anode	230	29
		aux. grid	250	4.8

* Owing to small space, it is not possible to get an adaptor into position.

CONDENSERS		
C.	Purpose.	Mfd.
1	Series aerial	.0002
2	Series aerial	.00001
3	V1 grid	.001
4	Decoupling V1 grid	.1 (375)
5	V1 anode decoupling	.1 (450)
6	V1 aux. grid decoupling	.5 (450)
7	V1 osc. grid reservoir	.0002
8	V1 bias resistor by-pass	.1 (375)
9	Osc. M.W. track	.001258
10	Osc. L.W. track	.0023
11	Decoupling V2 grid	.1 (375)
12	V2 aux. grid by-pass	.1 (450)
13	V2 cathode by-pass	.1 (375)
14	V2 anode decoupling	.1 (450)
15	L.F. feed to AVC diode	.0001
16	L.F. coupling from diode	.005 (375)
17	H.F. by-pass	.0001
18	V4 cathode by-pass (el.)	25 (25)
19	Tone compensating	.002(100.0)
20	Part of tone control circuit	.03(100.0)
21	H.T. smoothing (el.)	8 (450)
22	H.T. smoothing (el.)	8 (450)

Bracketed figures denote working voltage rating.

RESISTANCES		
R.	Purpose.	Ohms.
1	V1 grid leak	1 meg. (4)
2	Voltage dropping to V1 aux. grid	25,000 (1)
3	V1 anode decoupling	10,000 (1)
4	V1 grid decoupling	1 meg. (4)
5	V1 osc. grid harmonic suppressor	1,000 (4)
6	V1 osc. grid leak	50,000 (4)
7	V1 cathode bias	1,000 (4)
8	V1 osc. anode decoupling	60,000 (1)
9	Voltage dropping to V2 aux. grid	60,000 (1)
10	V2 cathode bias	175 (4)
*11	V2 grid decoupling	.5 meg (4)
12	Part of A.V.C. ptr.	.5 meg. (4)
13	Part of A.V.C. ptr.	.5 meg. (4)
*14	Diode load	.5 meg. (4)
15	V4 grid stabiliser	.1 meg. (4)
16	V4 bias ptr.	150 (1)
17	V4 bias ptr.	500 (1)
18	V4 anode stabiliser	50 (4)
19	Voltage dropping to L.S. field No. 2	3,000 (1 1/2)

Bracketed figures denote wattage rating.
* These are not colour coded.

Top (F) (pink lead), H.T. unsmoothed, 380 volts, 1 and 2, L.T. to pilot lamp; 3 and 4, speech coils; F. (cream lead), H.T. smoothed, 250 volts.

Removing Chassis.—If performed methodically, this task is easy. Tune to minimum. Pull off the knobs that have the long shanks. Remove the metal panel in front of the dial by undoing the coin-slot screws. Remove the glass and, taking care that the tuning is not shifted, pull off the indicator pointer—this also has a long shank.

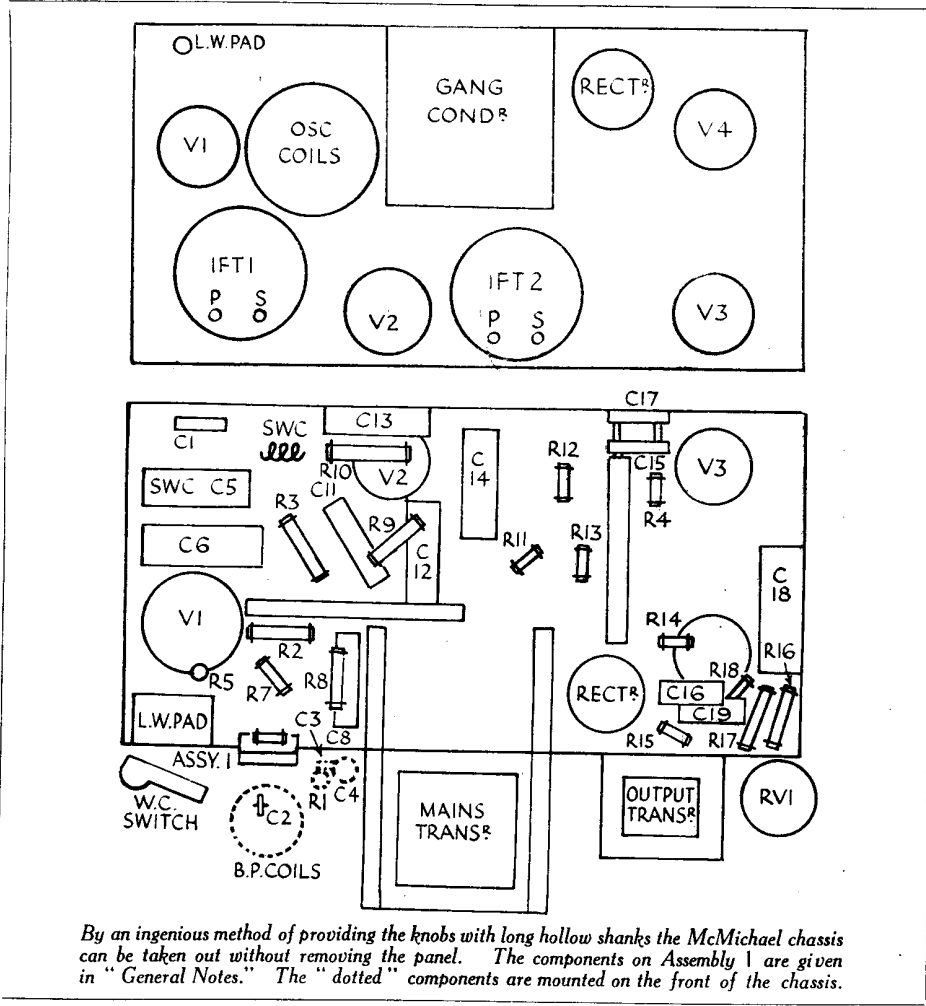
Remove four screws from underneath and, while easing the chassis upwards at the rear to let the pointer spindle clear the aperture, lift the chassis out, left-hand side first. The leads are sufficiently long to allow the set to be tested while still connected to the speakers.

General Notes.—If the chassis must be removed entirely the speaker leads should be unsoldered. The connections of the leads are given in "Quick Tests."

The volume control RV1 and the tone control RV2 are mounted on the same bracket. Assembly 1 consists of the fixed oscillator tracking condensers C9 and C10 with oscillator circuit resistances R6 (green) and R7 (brown).

The rubber-covered wire wound round C5 forms a short-wave choke in the anode circuit of V1.

Replacing Chassis.—Lay chassis inside cabinet and replace the knobs. Replace the holding screws and press home the pointer in the zero position. Check the tuning before replacing the glass and front plate, remembering the distance pieces under the plate.



By an ingenious method of providing the knobs with long hollow shanks the McMichael chassis can be taken out without removing the panel. The components on Assembly 1 are given in "General Notes." The "dotted" components are mounted on the front of the chassis.

MULLARD MU35 SUPERHET

Circuit.—The first detector oscillator valve, F.C.13 met. (V1), has a band-pass aerial coupling with a special I.F. filter in the aerial lead. Bias is by cathode resistance and A.V.C. and coupling to the next valve is by band-pass I.F. transformer (frequency 115 kc.).

The I.F. valve, VP13A met. (V2), is also biased by cathode resistance and A.V.C., but the grid circuit is connected to a potentiometer (R3 and R4) across the H.T. This provides a form of muting and amplified A.V.C. by having the potentials across R4 and R10 in opposition.

Coupling to the next valve is by a second band-pass I.F. transformer. The second

detector is a double diode, 2D13A met. (V3), of which one anode is used for L.F. purposes, and is biased by the voltage drop across the R10 and R11 potentiometer. The other anode is used for A.V.C. with the load resistance R21.

The following coupling is a resistance-capacity filter of which the grid leak is the volume control potentiometer.

The L.F. valve, HL13 met. (V4), is also coupled by resistance-capacity filter to the output valve, a Pen 26. This is stabilised by a grid resistance and tone compensation is provided by a condenser in series with a variable resistance across the primary of the output transformer.

The speaker is a permanent-magnet model.

Mains equipment consists of:—H.F. chokes (mounted in the top of the cabinet), barretter lamp C1, half-wave UR1 rectifier, a smoothing choke in the positive H.T. lead and two 32 mfd. electrolytic condensers.

Special Notes.—The pilot lamps are No. 8066. To remove them, unscrew the milled screws on the supports.

The noise suppressor control potentiometer R11 is mounted in the top of the cabinet at the back. The condenser connected across it is C48.

The extension speaker leads are connected to the transformer primary through two .2 mfd. condensers.

Quick Tests.—Between the soldering tag

(Continued on page 72.)

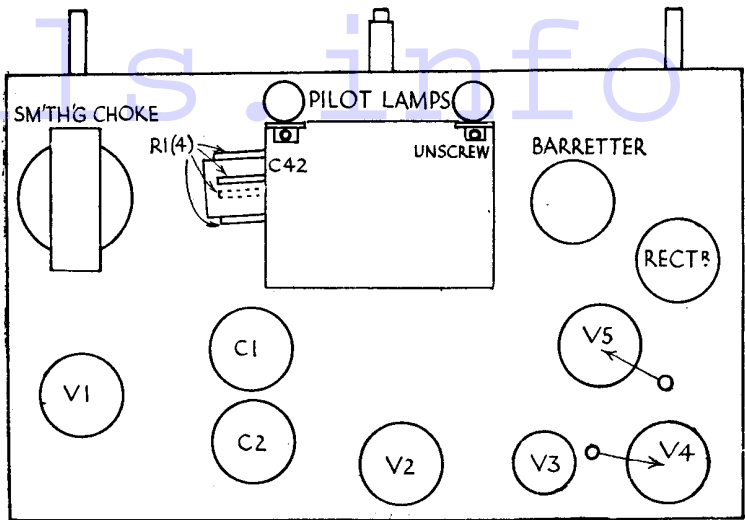
MULLARD MU35 DIAGRAMS

RESISTANCES

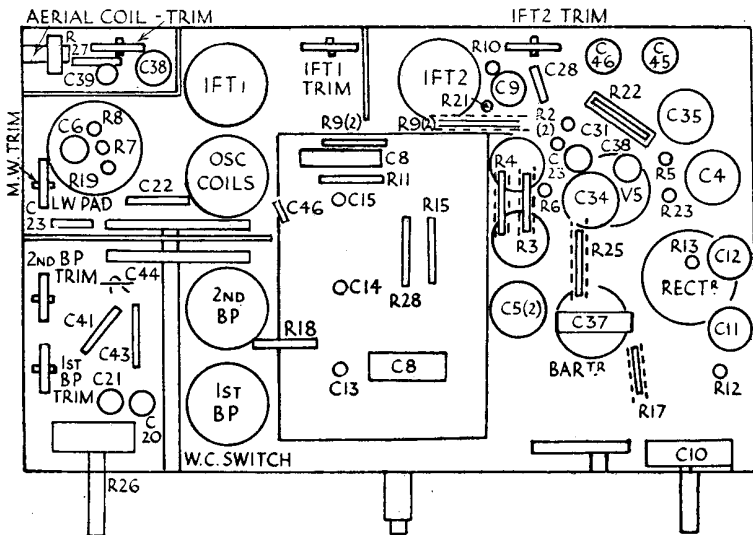
R.	Purpose.	Ohms.
1	H.T. stabiliser	200
2	Voltage dropping to aux. grids	2X 40,000
3	V2 bias ptr.	.4 meg.
4	V2 bias ptr.	80,000
5	V4 anode decoupling	20,000
6	Voltage dropping to V5 aux. grid	16,000
7	V1 cathode bias ptr. across H.T.	250
8	V1 cathode bias ptr. across H.T.	160
9	Decoupling V2 grid	2X .5 meg.
10	V2 cathode bias	5,000
11	Muting control ptr.	50,000
12	V4 cathode bias	5,000
13	V5 cathode bias	320
14	V.C. grid leak of V4	var.
15	Diode load	.8 meg.
16	H.F. stopper	.2 meg.
17	H.F. stopper	1 meg.
18	Decoupling V1 grid	.5 meg.
19	V1 osc. grid leak	50,000
20	A.V.C. feed to V2	2.5 meg.
21	A.V.C. diode load	.32 meg.
22	V4 anode, L.F. coupling	.2 meg.
23	V5 grid leak	.64 meg.
24	V5 grid stabiliser	1,000
25	Tone control circuit	100
26	Tone control circuit	50,000
27	Across aerial input	.2 meg.
28	Decoupling A.V.C. to V1	.5 meg.

CONDENSERS

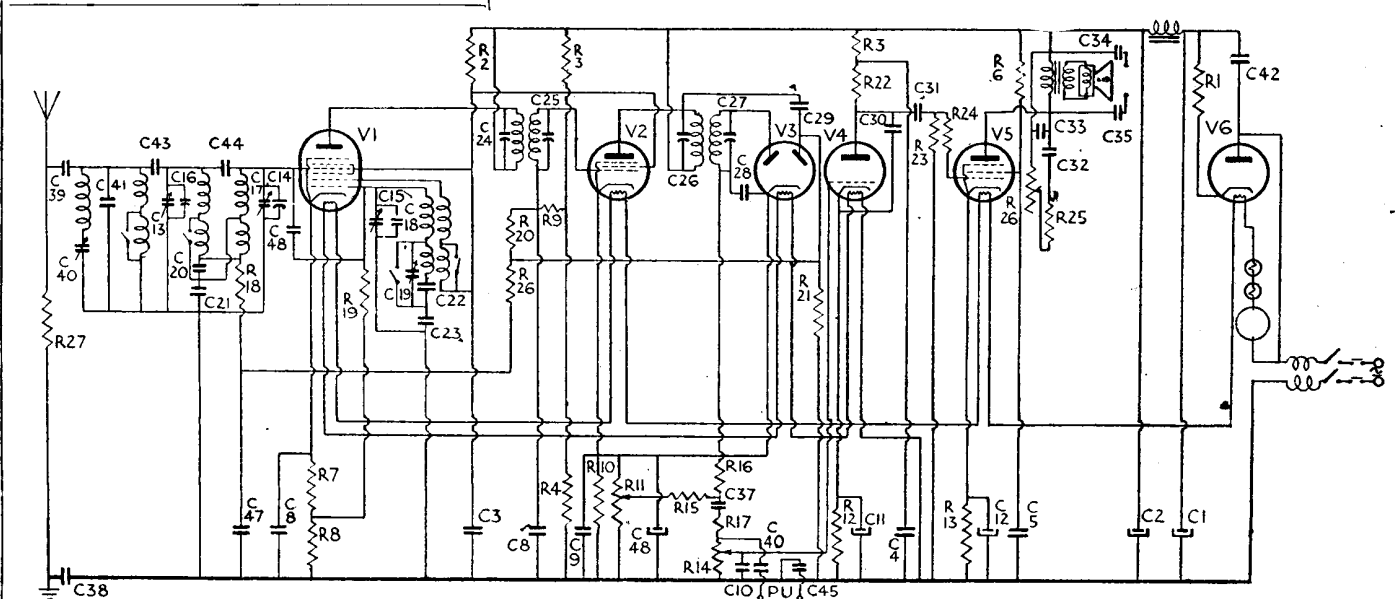
C.	Purpose.	Mfd.
1	H.T. smoothing	el. 32
2	H.T. smoothing	el. 32
3	Aux. grids by-pass	.5
4	V4 anode decoupling	.5
5	V5 aux. grid by-pass	2X .5
6	V1 cathode by-pass	.05
8	Decoupling V2 grid	.1
9	V2 cathode by-pass	.1
10	H.F. by-pass from V4 grid	.000064
11	V4 cathode by-pass	el. 25
12	V5 cathode by-pass	el. 25
20	Band pass coupling	.025
21	Band pass coupling	.025
22	L.W. osc. tracking	.00093
23	M.W. osc. tracking	.00181
28	H.F. by-pass from diode	.0001
29	I.F. feed to A.V.C. anode	.000064
30	H.F. by-pass, V4 anode	.00025
31	L.F. coupling V4 to V5	.05
32	Tone control circuit	.05
33	Tone compensating V5 anode	.002
34	Feed to ex. L.S.	.2
35	Feed to ex. L.S.	.2
37	L.F. coupling from diode	.05
38	Series with earth lead	.1
39	Series with aerial lead	.001
42	By-pass across rectifier	.1
45	Series with P.U.	.05
47	Decoupling A.V.C.	.1
48	V2, V3 cathode by-pass	el. 25
49	Series with P.U.	.05



The components on top of the Mullard MU35 chassis. The receiver uses the side-contact universal type Mullard valves.



Bare connecting wires are employed and care must be taken to avoid causing "shorts." See "General Notes" regarding the I.F. trimmers.



An ingenious and stable method of "muting" is a feature of the Mullard MU35 circuit.

MULLARD MU35 (Contd.)

on the speaker transformer and chassis (the two underneath the winding) :-

Front (red), V5 anode, 154 volts.

Back (black), H.T. and smoothed, 182 volts.

Removing Chassis.—Undo the knobs grub screw, two in large switch knob. Remove the cleats from the cables and, after removing the insulating covers on the holding screws, remove the latter and lift the chassis clear.

General Notes.—In handling this chassis take care that the bare connecting wires are not displaced.

The band-pass coupling condenser C44 consists of a piece of sistoflex covered wire bent round another bare wire; this must not be disturbed.

The trimmers of the band-pass I.F. transformers are in two sections, those on the outside are the primary trimmers, while the

secondary trimmers are on the inside. The adjustments of these are extremely critical.

Replacing Chassis.—Lay the chassis inside the cabinet, replace holding screws (fitting the earthing piece under the left hand rear screw) so that it makes contact with the metallic screen.

Cover the screw heads and clip the leads. Replace the knobs (two grub screws in the large one).



The Mullard MU 35.

VALVE READINGS

Valve.	Type.	Electrode.	Volts.	M.A.
1	FC13 met. (8) ..	anode ..	177	.5
		aux.grid ..	68	
		osc.anode ..	68	
2	VP13A (8) ..	anode ..	177	1.4
		aux.grid ..	68	
3	2D13A (5) ..	diode ..		
4	H.L. 13 ..	anode ..	80	.46
5	Pen. 26..	anode ..	154	42
		aux.grid ..	86	5.7

Voltagcs will be dependent on the mains. The above are comparative readings.

LISSEN MODELS 8111, 8116 AND 8117

Circuit.—The combined first detector-oscillator valve, A/80/A met. (V1), is preceded by a band-pass aerial coupling. Bias for the H.F. pentode section is by cathode resistance (variable) and A.V.C. and coupling to the next valve is by band-pass I.F. transformer (frequency 127 kc.). The oscillator tuning is in the grid circuit.

The I.F. valve, A/50/N met. (V2) is also biased by A.V.C. and cathode resistance, and is followed by a second band-pass I.F. transformer.

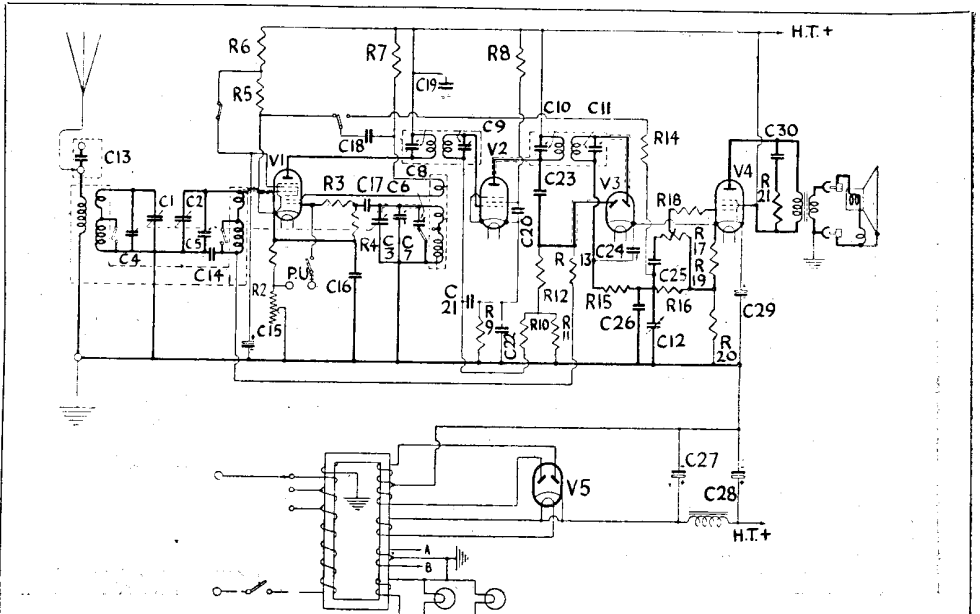
The second detector valve, A/20/B met. (V3), is a double diode. The A.V.C. diode anode is fed from the primary of I.F.T.I. and the load resistance is in two sections, R12 and R11.

Delay is applied by connecting the cathode

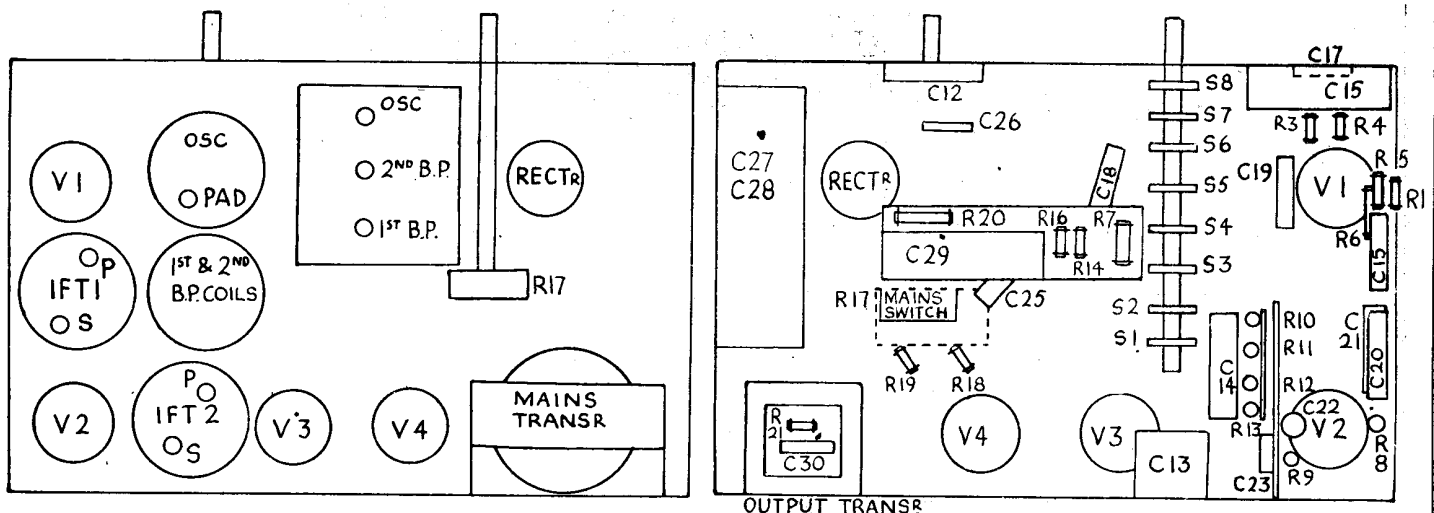
VALVE READINGS

Ever Ready valves. No signal.

Valve.	Type.	Electrode.	Volts.	Ma.
1	A/80/A met.(7)	anode ..	275	1.2
		aux.grid ..	72	
		osc.anode ..	77	
2	A/50/N met. ..	anode ..	275	6
		aux.grid ..	105	
3	A/20/B met.(5)	diode ..	258	27
4	A/70/C ..	anode ..	275	3.1
		aux.grid ..	275	



The circuit of the Lissen 8111, 8116 and 8117 receivers includes a very interesting way of using V1 for pick-up amplification.



The long-wave oscillator padding trimmer is on top of the oscillator coil. All components below the chassis (right) are easily accessible.