MULLARD MAS 305

Four-valve, three-band, AC table superhet in horizontal moulded table cabinet 17 by 11½ by 8¼ in., with large, rectangular speaker opening. Made by Mullard Wireless Service Co., Ltd., Century House, Shaftesbury Avenue, London, WC2.

CIRCUIT consists of a triode-heptode FC V1 followed by another triode-heptode V2, the heptode portion of which is used as an IF amplifier and the triode section as an AF amplifier. Output valve V3 is a double-diode pentode, the diodes being used for signal rectification and AVC.

Aerial is connected to S1 which switches it to primary windings L1 (SW), L3 (MW) and part of L3 and L5 (LW). A capacity aerial, consisting of a metallised layer on the inside of the removable back of the cabinet, is also connected to the aerial input circuit.

L18, T10 form an IF filter across the aerial primaries. S2 switches the secondary windings L2, T1 (SW), L4, T2 (MW), and L6, T3 to the heptode grid of V1, through C3. VC1 is grid tuning capacitor.

AVC is applied through R2. Cathode is returned direct to chassis. Screen voltage is obtained from R1, decoupled by C2. L14, C17, the primary of IFT1, is in the anode circuit.

Oscillator is a parallel-fed, tuned anode circuit. Tuned primaries L9, T4 (SW), L11, T5, T8, C6 (MW), and L13, T6, T9 (LW), are switched to the anode by S3.

VC2 is oscillator tuning capacitor and C5 is anode coupling capacitor. R3 is oscillator anode load. S4 switches the reaction coils L7, T7, L8 (SW), L10 (MW), and L12 (LW), to oscillator grid, through C4. Leak-condenser bias for the oscillator grid is provided by R4, C4.

IF Amplifier operates at 470 kcs. L15, C18, secondary of IFT1, feeds the signal to the heptode grid of V2. AVC is applied to grid circuit from R17, decoupled by C15. Screen voltage is obtained from R5, decoupled by C7. L16, C19, primary of IFT2, is in the heptode anode circuit of V2.

Detection and AVC.—L17, C20, secondary of IFT2, applies the signal to one of the diodes of V3. The diode load consists of R10, R11, R12 (volume control) and R13. C13 is a filter capacitor. PU is connected by a switch-plug S6, to top of R12.

Note. — On some models R11 is short-circuited by an auxiliary contact on S6 during radio operation.

When PU is used the radio circuit is earthed by S6 at junction R10, R11, and R11 is therefore shunted across R12, R13.

Negative feedback from speech coil is introduced at this point and is applied through L22 to R13, L29, and thence to triode grid of V2 through R12, C9. C25 applies the IF signal to AVC diode of V3. R18 is AVC diode load and returned to earth via R20, which provides AVC delay.

AF Amplification is by triode section of V2, C9 applying either radio or gram. signals to grid. R8 is grid resistor ; bias is obtained from R20 and is fed through R9, R8. R6 is anode load and R7, C11 provide anode decoupling.

Output.—C8 feeds the signal to grid V3, the pentode output valve. Cathode is connected direct to chassis.

Bias is obtained from R19, R20 and is applied to grid resistor R16. R16, R15, C12 provide tone control. Screen voltage comes from HT line to V1—V2. L19, C14, primary of output matching transformer OP1, is in the anode circuit of V3. HT for V3 anode is drawn from reservoir capacitor C22. HT is fed in at a tap on L19 to cancel hum.

C14 provides correction of pentode characteristic of V3 at higher frequencies.

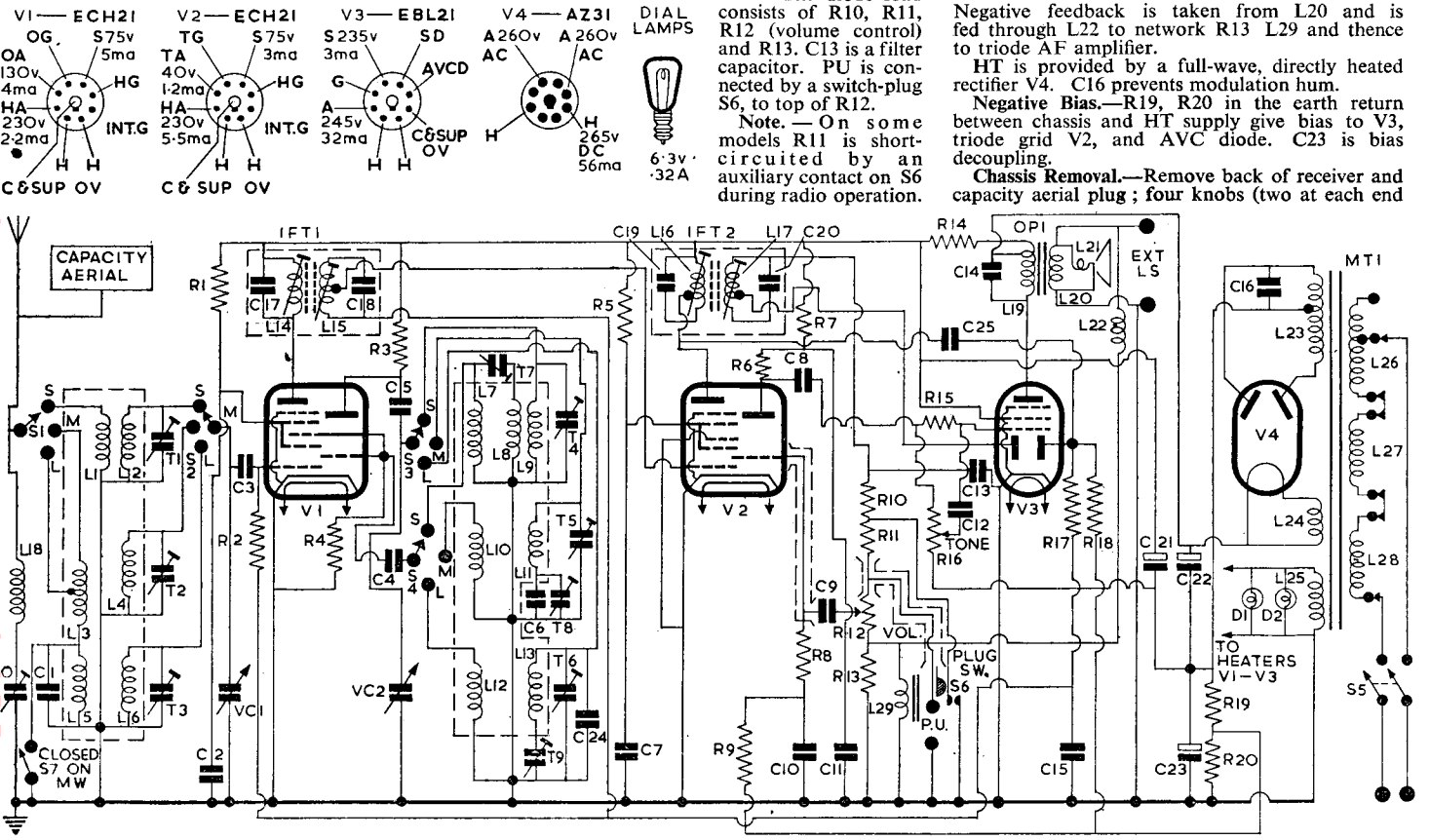
Extension LS sockets are fitted across L20. Negative feedback is taken from L20 and is fed through L22 to network R13 L29 and thence to triode AF amplifier.

HT is provided by a full-wave, directly heated rectifier V4. C16 prevents modulation hum.

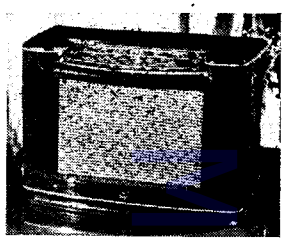
Negative Bias.—R19, R20 in the earth return between chassis and HT supply give bias to V3, triode grid V2, and AVC diode. C23 is bias decoupling.

Chassis Removal.—Remove back of receiver and capacity aerial plug ; four knobs (two at each end of set) ; milled screw holding scale pointer. Unfasten earth wire to metallised base-plate and remove pilot lamps by half a turn clockwise. Unfasten four chassis bolts underneath cabinet.

Slide chassis partly out of cabinet. Loosen three clamps holding LS.



INDUCTORS



L		Ohms
1	...	2
2	...	very low
3	...	100
4	...	5
5	...	175
6	...	50
7	...	1.5
8	...	.5
9	...	very low
10	...	2
11	...	5.5
12	...	4
13	...	18
14	...	9
15	...	6.5
16	...	9
17	...	5
18	...	45
19	...	820
20	...	.5
21	...	3.5
22	...	150
23	...	400
24	...	very low
25	...	very low
26	...	8.5
27	...	23.0
28	...	21.5
29	...	2.5

RESISTORS

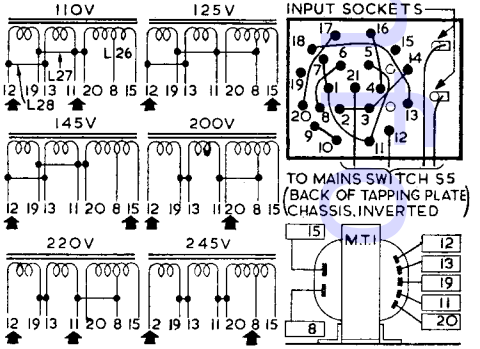
R		Ohms	
1	...	23.5K	... 2W (2X47K. 1W)
2	...	820K	... ½W
3	...	22K	... 1W
4	...	47K	... ½W
5	...	39K	... 1W
6	...	100K	... ½W
7	...	100K	... ½W
8	...	2.2M	... ½W
9	...	470K	... ½W
10	...	1M	... ½W
11	...	100K	... ½W
12	...	700K Potr.	(with switch)
13	...	22	... ½W
14	...	1.2K	Wirewound
15	...	120K	... ½W
16	...	500K Potr.	
17	...	1.5M	... ½W
18	...	820K	... ½W
19	...	68	... ½W
20	...	33	... ½W

CAPACITORS

C		Mfds	
1	...	39pF	Ceramic
2	...	.047	Tubular 400V
3	...	220pF	Silver Mica
4	...	82pF	Ceramic
5	...	470pF	Silver Mica
6	...	390pF	,, ,,
7	...	.047	Tubular 400V
8	...	.022	,, 400V
9	...	.01	,, 100V
10	...	.047	,, 100V
11	...	.047	,, 400V
12	...	.0039	,, 400V
13	...	82pF	Ceramic
14	...	.001	Tubular 400V
15	...	.047	,, 400V
16	...	.022	,, 1400V
17	}	Capacitors contained in sealed cans together with coils	
18	}		
19	}		
20	}		
21	...	47	Electrolytic 330V
22	...	47	,, 330V
23	...	250	,, 8—12V
24	...	27pF	Ceramic
25	...	5.6pF	,,

TRIMMING NOTES OVERLEAF

Below are Mains Tapping details



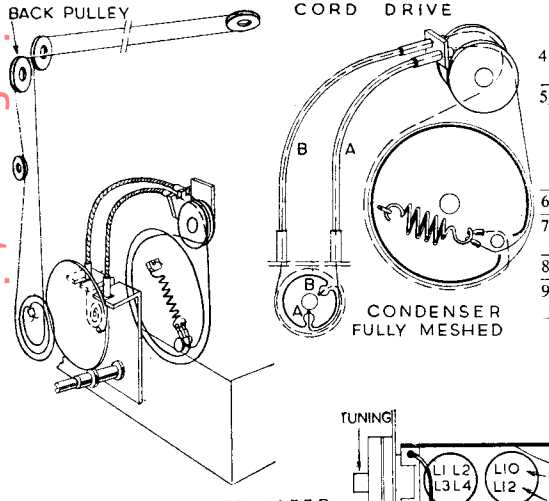
MULLARD MAS 305—*Contd.*

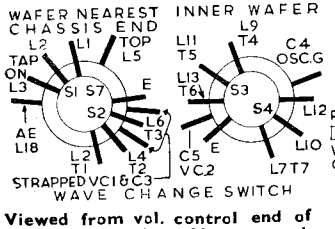
TRIMMING INSTRUCTIONS

Apply signal as below	Tune to	Trim for max. output
1) 470 Kc to hexode grid of V1 *via* .047 capacitor	550 metres	Damp L16 and adjust core of L17*
		Damp L15 and adjust cores of L14, L16
		Damp L14 and adjust core of L15
2) 470 Kc to AE socket *via* dummy aerial ..		T10 for MINIMUM
3) Turn gang condenser to min. and adjust pointer so that it lines up with right-hand leg of letter "M" at the left-hand end of SW scale. At max. the pointer should line up with left-hand leg of letter "W" of W450 at bottom right-hand corner of scale		
4) 17.8 Mc to AE socket *via* dummy aerial ..	16.9 metres (approx.)	T4, T1
5) 6.1 Mc as above ..	49 metres (approx.)	T7 in small steps—the tail of winding being cut short. Re-trim T4, T1, T7, as a check.
6) 1.5 Mc as above ..	200 metres	T5, T2
7) 550 Kc as above ..	545 metres	T8 and check T5 and T2
8) 400 Kc as above ..	750 metres	T6, T3
9) 160 Kc as above ..	1875 metres	T9 and check T6 and T3

* Damp by connecting 80pF capacitor across the coil.

NOTE: T7, T8 and T9 are wire formed trimmers and capacity is reduced by removing turns of wire.





Viewed from vol. control end of inverted chassis. Note: each wafer has a following shorting blade.