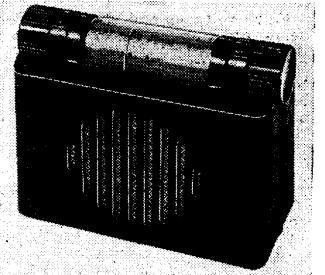


"TRADER" SERVICE SHEET
908

MURPHY A100F



THE Murphy A100F is distinguished from the A100 by the inclusion of frame aerial windings in place of the "mains" aerial lead. Provision is made for the connection of an external aerial and earth. Like the A100, the A100F is double-sided.

The A100F is a 4-valve (plus half-wave rectifier) 2-band superhet designed to operate from A.C. mains of 200-250 V, 50-100 c/s. The heaters are series-connected, and the chassis is "live" to the mains, but power is obtained from an auto-transformer.

This Service Sheet covers only model A100F, NOT Model A100. Model A100 is covered separately in Service Sheet 907.

Release date and original price: July 1948, £12 plus purchase tax.

CIRCUIT DESCRIPTION

Tuned frame aerial input by L3, C28 (M.W.) or L4, C28 (L.W.) precedes a triode heptode valve (V1, Mazda 10C1) operating as frequency changer with internal coupling. Provision is made for the connection of an external aerial via coupling coils L1 (M.W.) and L2 (L.W.).

Triode oscillator coils L5 (M.W.) and L5, L6 (L.W.) are tuned by C31, with parallel trimming by C29 (M.W.), C10, C30 (L.W.), and series tracking by C9 (M.W.), C8, C9 (L.W.). Reaction coupling to grid by L6, C9 on M.W., but for L.W. operation L5, L6 in series are connected in a Colpitts circuit.

Second valve (V2, Mazda 10F9) is a variable-mu R.F. pentode operating as I.F. amplifier with tuned transformer couplings C5, L7, L8, C6 and C15, L9, L10, C16.

Intermediate frequency 465 k/c.s.

Diode second detector is part of double diode triode valve (V3, Mazda 10LD11), the second

diode of which is unused and wired to cathode. Audio frequency component in rectified output is developed across load resistor R9 and passed via A.F. coupling capacitor C18 and volume control R10, to C.G. of triode section.

The D.C. component developed across R9 is tapped off and fed back through a decoupling circuit R8, C12 as G.B. to F.C. and I.F. valves, giving automatic gain control.

Resistance-capacitance coupling by R14, C20, R15 between V3 triode and beam tetrode output valve (V4, Mazda 10P13), with fixed tone correction by C23 in anode circuit.

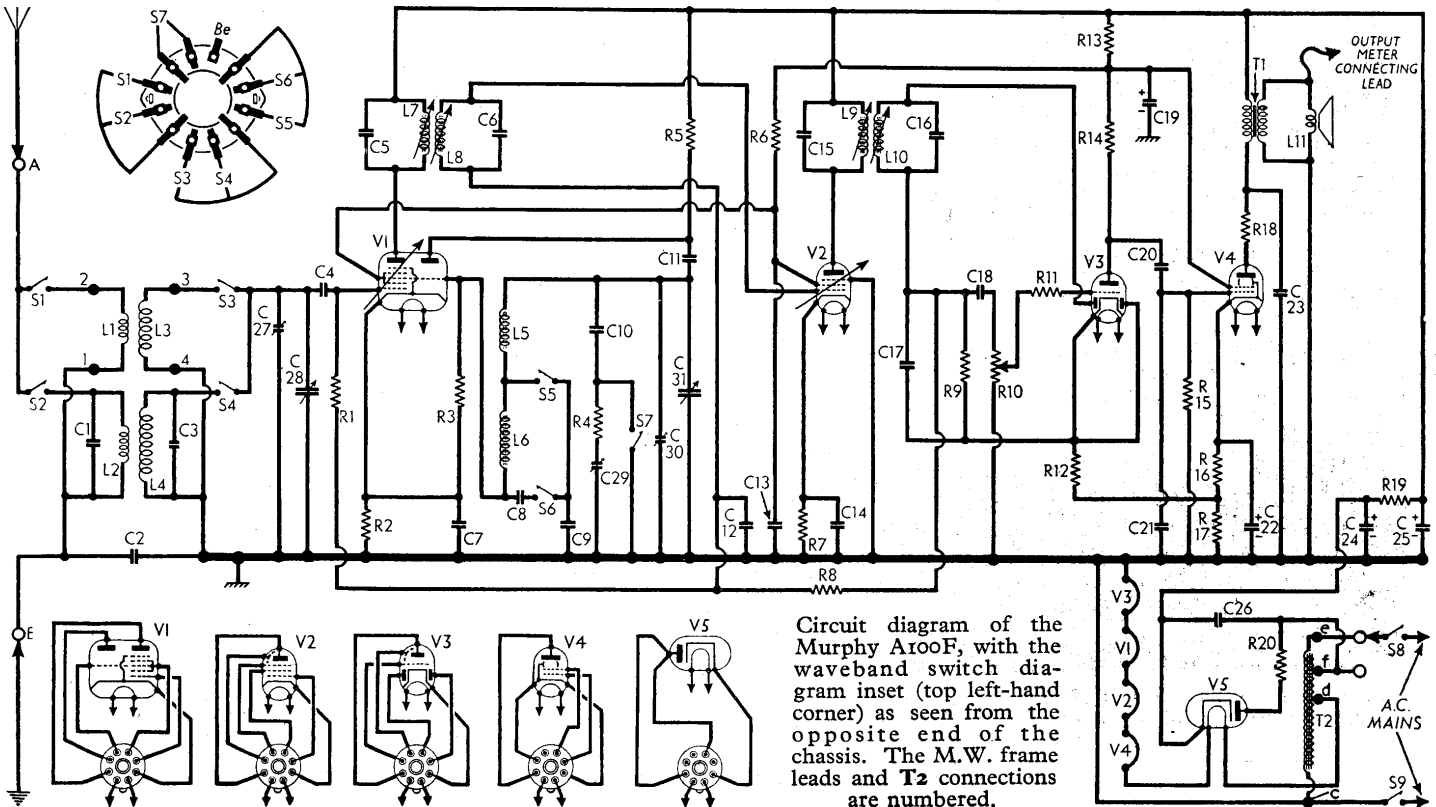
H.T. current is supplied by I.H.C. half-wave rectifying valve (V5, Mazda U404) which is fed from the mains via a tapping (f) on the auto-transformer T2. Smoothing by R19 and electrolytic capacitors C24, C25. H.T. circuit R.F. filtering by C26. The heaters of all valves are series-connected and supplied from a section of T2 between tappings e and d.

COMPONENTS AND VALUES

RESISTORS		Values (ohms)	Locations
R1	V1 hept. C.G. ...	1,000,000	K5
R2	V1 fixed G.B. ...	560	L6
R3	V1 osc. C.G. ...	47,000	K6
R4	Osc. stabilizer ...	4,700	A1
R5	Osc. anode load ...	150,000	J6
R6	S.G.'s H.T. feed ...	15,000	H5
R7	V2 fixed G.B. ...	560	H6
R8	A.G.C. decoup. ...	2,200,000	H5
R9	Diode load ...	470,000	G6
R10	Volume control ...	1,000,000	D1
R11	V3 C.G. stopper ...	100,000	F6
R12	Part V3 G.B. ...	100	H6
R13	H.T. feed decoup. ...	4,700	G6
R14	V3 triode load ...	47,000	F6
R15	V4 C.G. resistor ...	220,000	E5
R16	V3, V4 G.B., A.G.C. {	270	H6
R17	delay resistors ...	15	H6
R18	V4 anode stopper ...	47	E5
R19	H.T. smoothing ...	1,000	G5
R20	V5 surge limiter ...	100	C2

CAPACITORS		Values (μF)	Locations
C1	Aerial L.W. shunt	0.0005	A2
C2	Earth isolator ...	0.01	A3
C3	Aerial L.W. trim. ...	0.000053	A2
C4	V1 hept. C.G. ...	0.0005	L6
C5	1st I.F. transform. {	0.0001	B3
C6	mer tuning ...	0.0001	B3
C7	V1 cath. by-pass ...	0.01	L6
C8	Oscillator tracking {	0.0001	K5
C9	capacitors ...	0.00044	B2
C10	Osc. L.W. trim. ...	0.000195	A1
C11	Osc. anode coup. ...	0.0001	K5
C12	A.G.C. decoup. ...	0.01	K5
C13	S.G.'s H.T. decoup. ...	0.01	L6
C14	V2 cath. by-pass ...	0.05	J6
C15	2nd I.F. transform. {	0.0001	C3
C16	mer tuning ...	0.0001	C3
C17	I.F. by-pass ...	0.0002	G6
C18	A.F. coupling ...	0.01	G5
C19*	H.T. feed decoup. ...	16.0	F4
C20	A.F. coupling ...	0.01	F6
C21	I.F. by-pass ...	0.0005	B6
C22*	V4 cath. by-pass ...	10.0	H5
C23	Tone corrector ...	0.02	D2
C24*	H.T. smoothing cap- {	16.0	H4
C25*	acitors ...	16.0	F6
C26	Mains R.F. by-pass ...	0.02	F4
C27†	Aerial M.W. trim. ...	0.00004	L5
C28†	Aerial tuning ...	0.000435	A3
C29†	Osc. M.W. trim. ...	0.00004	A2
C30†	Osc. L.W. trim. ...	0.00004	L4
C31†	Oscillator tuning ...	0.000435	B3

* Electrolytic. † Variable. ‡ Pre-set.



VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating from mains of 227 V, using the 200-220 V mains tapping. 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

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)	Cathode Voltage (V)
V1 10C1	{ 212 Oscillator 30 }	{ 1.3 1.5 }	83	3.3	3.15
V2 10F9	212	4.5	83	1.4	3.15
V3 10LD11	46	2.1	—	—	0.65
V4 10P13	202	21.0	157	6.2	1.75
V5 U404	222†	—	—	—	253

† A.C. 5 10V meter range.

measured on the 400 V scale of a model 7 Avometer, except where otherwise indicated, chassis being the negative connection.

Components and Values—continued

OTHER COMPONENTS		Approx. Values (ohms)	Locations	
L1	Aerial coup. coils...	4.8	—	
L2		32.0	A2	
L3	Frame aerial windings ...	1.5	—	
L4		16.5	A3	
L5	Oscillator tuning coils ...	1.7	K4	
L6		2.0	K4	
L7	1st I.F. { Pri. ...	18.0	B3	
L8		{ Sec. ...	18.0	B3
L9	2nd I.F. { Pri. ...	18.0	C3	
L10		{ Sec. ...	18.0	C3
L11	Speech coil ...	2.4	—	
T1	Output { Pri. ...	310.0	D3	
		{ Sec. ...	1.0	—
T2	Mains auto-trans. { e-f ...	30.0	B2	
		{ f-d ...		70.0
		{ d-c ...		140.0
S1-S7	W/band switches	—	A2	
S8, S9	Mains switches	—	D2	

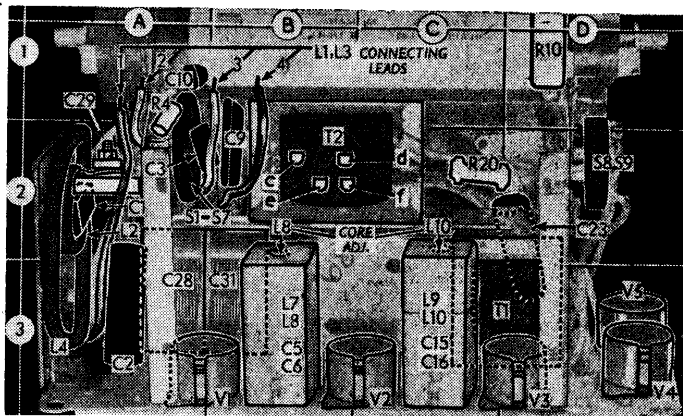
DISMANTLING THE SET

Removing Chassis.—Remove the tuning and volume control knobs (recessed grub screws), the four 2 BA screws securing the plastic bottom cover, and the four insulating pillars which are then revealed at the corners of the chassis, and lift out the chassis.

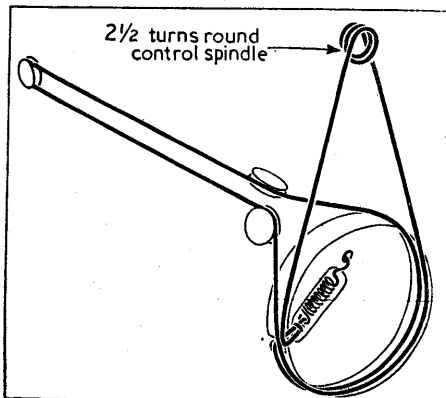
To extract V1, V2, V3 it is necessary to free the M.W. frame aerial L1, L3 (four self-tapping screws and two spacing collars) and press the valve spigots upward with a suitable tool.

When replacing, if the M.W. frame aerial has been disconnected, the leads to it (indicated and numbered in our rear view of the chassis,

Rear view of upper side of chassis with the frame aerial leads (L1, L3) and mains transformer tags identified. V2 has a close-fitting shield, and so has the 2nd I.F. can.



and in the circuit diagram) should be reconnected as follows: blue (1) and white (2) leads to lower and upper eyelets on left-hand side, respectively; white (3) and red (4) leads to left- and right-hand tags on top edge, respectively. A spacing collar must be fitted between the frame aerial and the chassis with each bottom corner fixing screw.



Sketch showing the tuning drive system, as seen from the upper right-hand front corner of the chassis with the gang at maximum.

GENERAL NOTES

Switches.—S1-S7 are the waveband switches, ganged in a single rotary unit mounted on one of the chassis uprights, just below their control knob. The unit is indicated in our rear view of

the chassis, where an arrow indicates the direction in which it is viewed in the diagram inset in the top left-hand corner of the circuit diagram overleaf. S1, S3 and S5 close on M.W. (knob clockwise); S2, S4, S6 and S7 close on L.W.

S8, S9 are the Q.M.B. mains switches, which are mounted on one of the chassis uprights directly beneath their control knob.

Chassis Divergencies.—Several changes have been made in the A100F since production first started. Originally an I.F. filter of 100,000 Ω and 0.0001 μF was fitted between C17 and R9, when C17 was 0.0001 μF also. R.F. filter chokes (D.C. resistance 5.7 Ω) were included in the mains input circuit. R18 was not fitted, and R3 was 22,000 Ω.

In the oscillator circuit, R4 was not fitted originally at all, but was added later in series with C30, then moved to C29 as in our sample. It has since been removed altogether, a 15,000 Ω resistor being connected in parallel with C29 instead. The early end of C30 in such cases goes to the junction of S7 and C10, and C10 may then be changed to 0.00018 μF.

Drive Cord Replacement.—The cord used for the tuning drive is thin plaited and waxed Italian hemp cord, and 4 ft is ample, leaving a comfortable margin for tying off. Access to the cursor portion of the cord is obtained most conveniently by removing the channel-section scale (4 self-tapping screws).

The course followed by the cord is shown in the sketch (Col. 2) in which the receiver is viewed from above its front right-hand corner with the gang at maximum, when the drive drum should be hard against its stop.

It is advisable to commence by making the 2 1/2 turns round the control spindle, and it is helpful to use strips of adhesive tape to hold the cord to the flat rim of the drum until the work is completed.

CIRCUIT ALIGNMENT

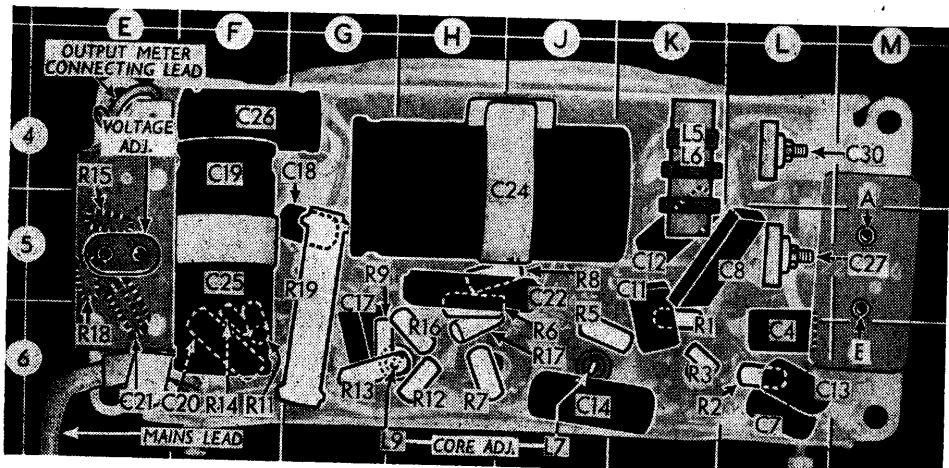
Before commencing these operations the iron-dust cores of the I.F. transformers should be fully unscrewed (anticlockwise). A lead, connected to the "live" side of T1 secondary winding, will be found coiled up beneath the voltage adjustment panel, and an output meter should be connected between this point and chassis.

I.F. Stages.—Switch set to M.W., turn gang and volume control to maximum, connect signal generator, via an 0.1 μF capacitor in the "live" lead, to C.G. (pin 6) of V2 and chassis, feed in a 465 kc/s (645.16 m) signal, and adjust the cores of L10 and L9 (location references C2, H6) for maximum output. Transfer "live" signal generator lead to C.G. (pin 6) of V1, and adjust the cores of L8 (B2) and L7 (J6) for maximum output. Do not repeat these adjustments.

R.F. and Oscillator Stages.—With the gang at maximum capacitance the cursor should coincide with the dots beneath the high wavelength ends of the L.W. scales. It may be adjusted in position by sliding it along the drive cord.

L.W.—Switch set to L.W., tune to 1,300 m on scale, feed in a 1,300 m (230.8 kc/s) signal, and adjust C30 (L4) for maximum output.

M.W.—Switch set to M.W., tune to 200 m on scale, feed in a 200 m (1,500 kc/s) signal, and adjust C29 (A2) for maximum output. Transfer "live" signal generator lead to A socket, via an 0.0001 μF capacitor, feed in a 200 m signal, and adjust C27 (L5) for maximum output.



Under-chassis view. R15, R18 and C21 are dotted through the mains voltage adjustment panel, which obscures them. The output meter lead is seen in the upper left-hand corner.