"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/cs.

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.

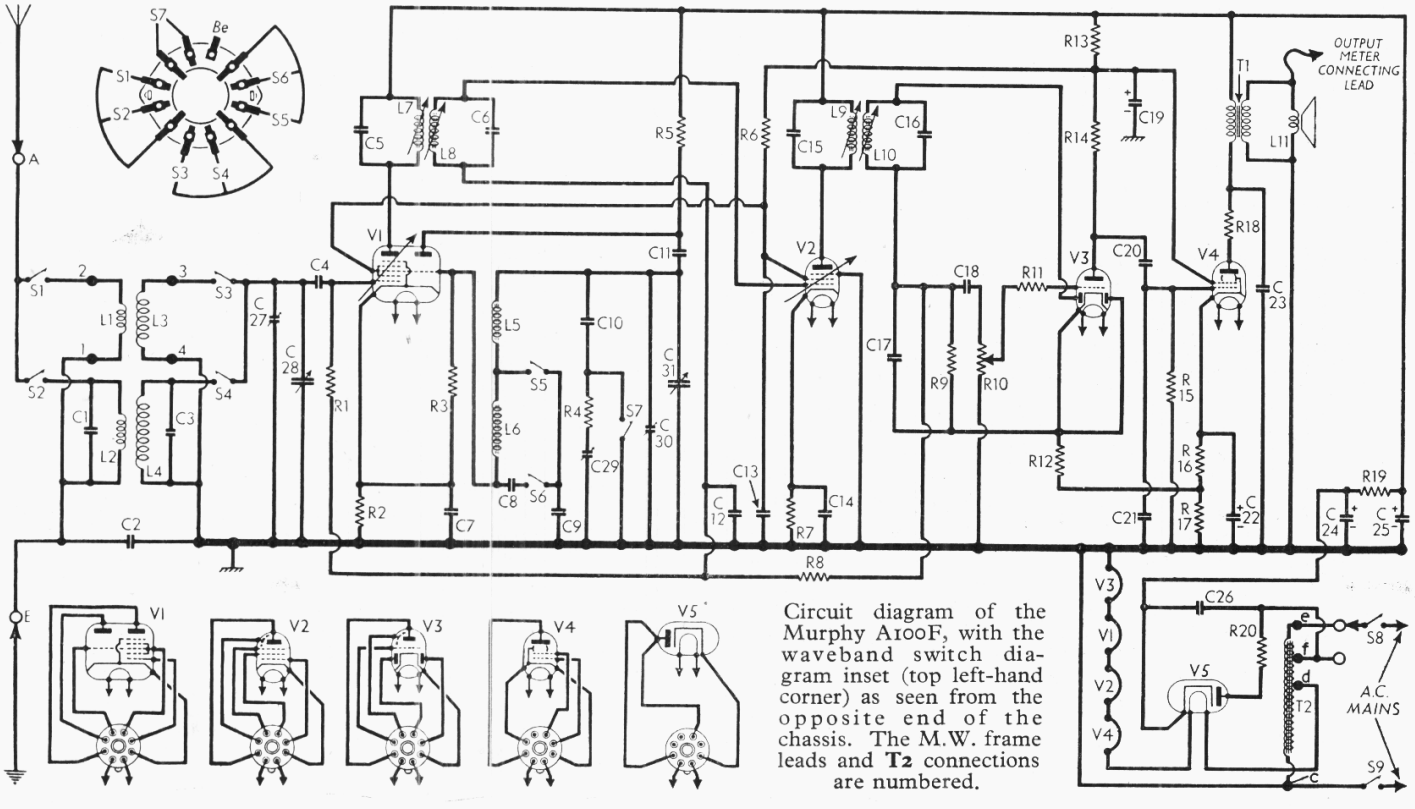
H.T. current is supplied by I.H.C. half-wave rectifying valve **(V5, Mazda U404)** which is fed from the mains via a tapping **(f)** on the auto-transformer **T2.** Smoothing by **R19** and electrolytic capacitors **C24, C25.** H.T. circuit R.F. filtering by **C26.** The heaters of all valves are series-connected and supplied from a section of **T2** between tappings **c** 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 delay resistors ...	270	H6
R17		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. transformer tuning ...	0·0001	B3
C6		0·0001	B3
C7	V1 cath. by-pass .	0·01	L6
C8	Oscillator tracking capacitors ...	0·001	K5
C9		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. transformer tuning ...	0·0001	C3
C16		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	E6
C22*	V4 cath. by-pass ...	10·0	H5
C23	Tone corrector ...	0·02	D2
C24*	H.T. smoothing capacitors	16·0	H4
C25*		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.



Circuit diagram of the Murphy A100F, with the waveband switch diagram inset (top left-hand corner) as seen from the opposite end of the chassis. The M.W. frame leads and **T2** connections are numbered.

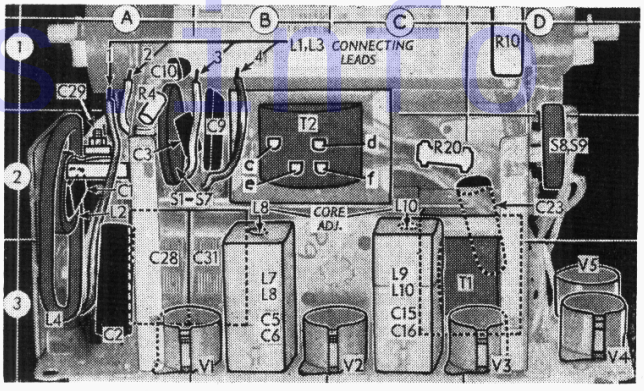
VALVE ANALYSIS

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

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)	Cathode Voltage (V)
V1 10C1	212	1·3	83	3·3	3·1§
	Oscillator				
	30	1·5			
V2 10F9	212	4·5	83	1·4	3·1§
V3 10LD11	46	2·1	—	—	0·6§
V4 10P13	202	21·0	157	6.2	1·7§
V5 U404	222†	—	—	—	253

† A.C. § 10V meter range.

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.



Components and Values—*continued*

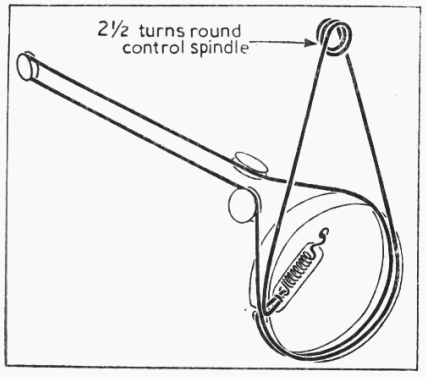
	OTHER COMPONENTS		Approx. Values (ohms)	Locations
L1	Aerial coup. coils...		4·8	—
L2			32·0	A2
L3	Frame aerial windings		1·5	—
L4			16·5	A3
L5	Oscillator tuning coils		1·7	K4
L6			2·0	K4
L7	1st I.F. trans.	Pri. ...	18·0	B3
L8		Sec. ...	18·0	B3
L9	2nd I.F. trans.	Pri. ...	18·0	C3
L10		Sec. ...	18·0	C3
L11	Speech coil ...		2·4	—
T1	Output trans.	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, 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.

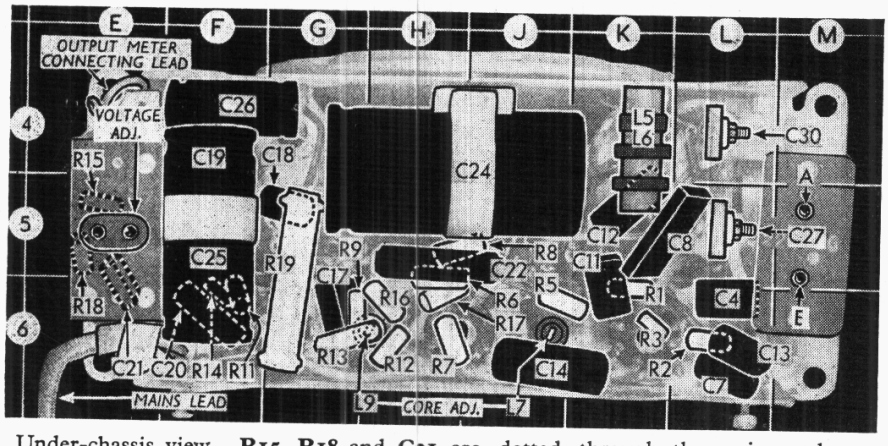
Chassis Divergencies.—Several changes have been made in the A100F since production first started. Originally an I.F. filter of 100,000 Ω and 0.0001 μF was fitted between **C17** and **R9**, when **C17** was 0.0001 μF also. R.F. filter chokes (D.C. resistance 5.7 Ω) were included in the mains input circuit. **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 earthy 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 2½ 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.



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.

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.

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