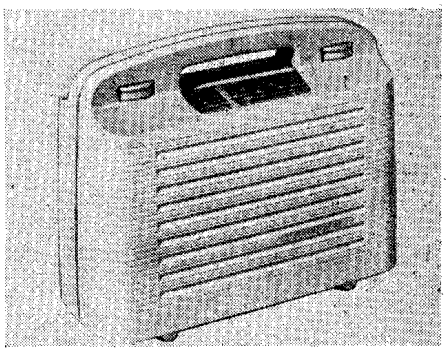
"TRADER" SERVICE SHEET

1265

MURPHY U144M & U144

A.C. Transportable Receivers



EMPLOYING an internal frame aerial for M.W. and L.W. reception, the U144M is a 4-valve (plus rect.) transportable for operation from A.C. or D.C. mains of 200-250 V, 25-100 c/s. The total mains consumption is 40 watts. The bands covered are 187-560 m and 1,000-2,050 m.

Model U144 is an earlier version of the U144M. Differences between the two models are described in "General Notes."

Release dates and original prices: U144, August* 1949, £11 10*s*; *U144M, January* 1953, £12 5*s* 8*d*. *Purchase tax extra.

CIRCUIT DESCRIPTION

Tuned frame aerial input on M.W. by **L3, C6.** On L.W. the M.W. frame aerial is coupled to a tapping on the L.W. aerial tuning coil **L4.** Provision is made for the connection of an external aerial via **C1** and **L1, L2.**

First valve **(V1, Mazda 10C1)** is a triode heptode valve operating as frequency changer with internal coupling. Oscillator grid coils **L5** (M.W.) and **L6** (L.W.) are tuned by **C11.**

Second valve **(V2, Mazda 10F9)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings **L8, L9** and **L10, L11.**

Intermediate frequency 470 kc/s.

Signal detector is formed by one diode section of **V3 (Mazda 10LD11).** Audio frequency component in its rectified output is developed across load resistance **R9** and is passed via **C26** and volume control **R10** to grid of triode section.

Resistance-capacitance coupling by **R13, C28** and **R14** between **V3** and pentode output valve **(V4, Mazda 10P13).** Bass boost is obtained by means of positive feed-back between the junction of **R16, R17** and **V3** cathode circuit. As **V3** grid circuit is effectively shunted across **R17** via **R9, C26, R10,** thus introducing an opposing degree of negative feed-back, the bass boost correction approaches a maximum when the volume control is tuned towards minimum. Further tone correction in **V4** anode circuit by **C30.**

CIRCUIT ALIGNMENT

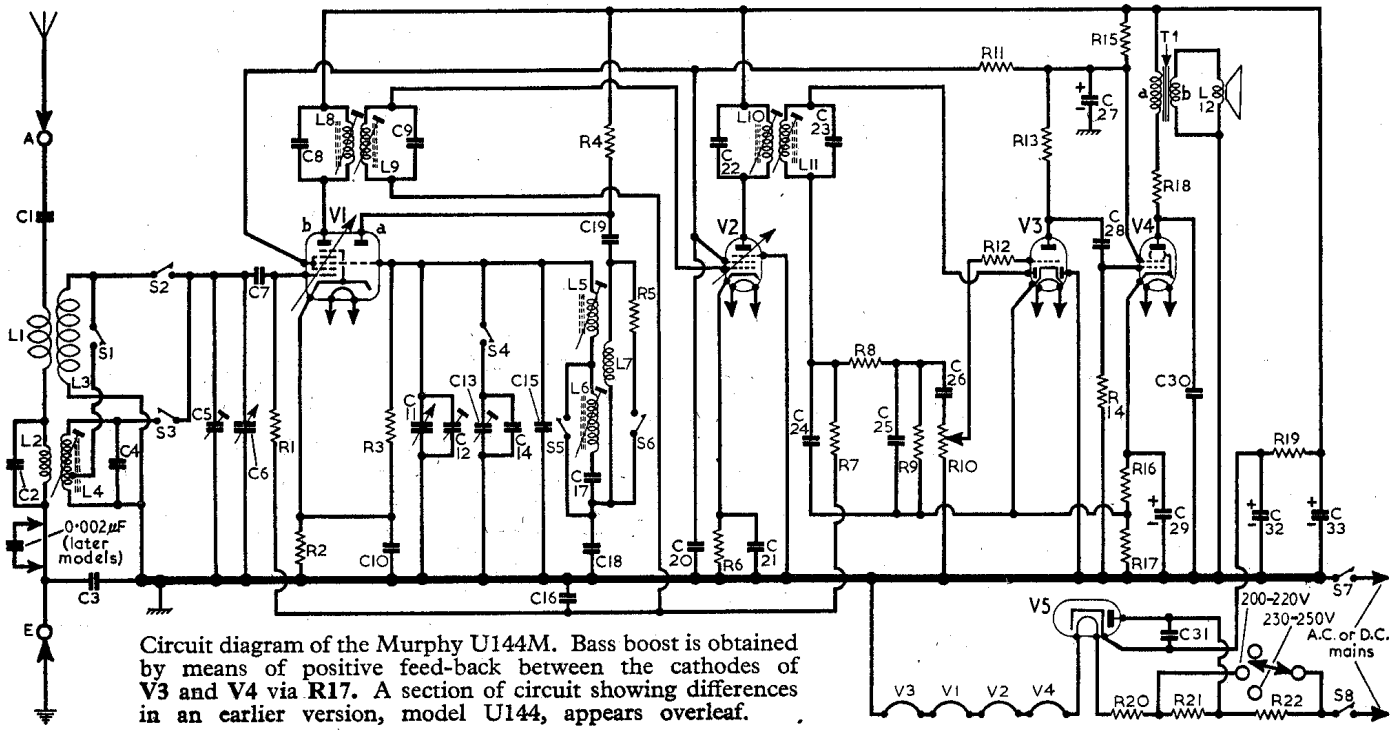
1.—Connect output meter across speech coil winding **b** on **T1.** Adjust output of signal generator during alignment so that output meter reading does not exceed 0.7 V (150 mW).

2.—Switch receiver to M.W. and turn gang to maximum. Connect output of

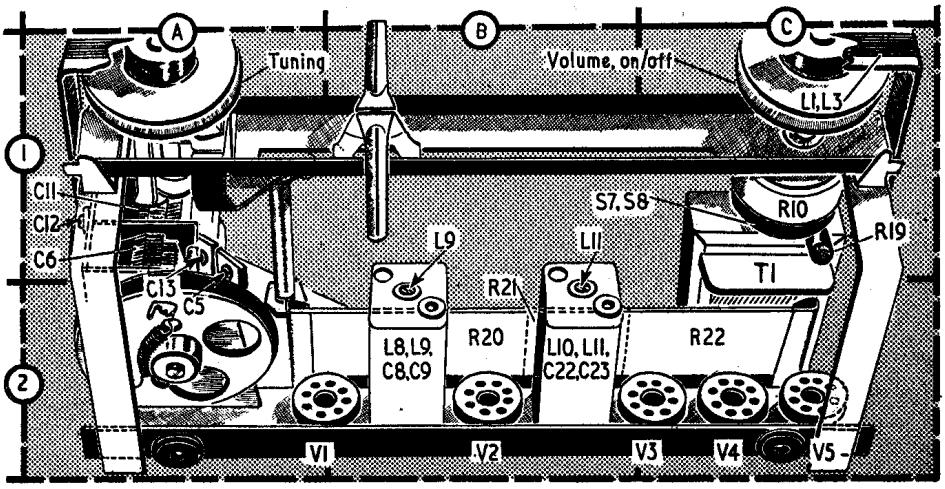
(*Continued col.* 1 *overleaf*)

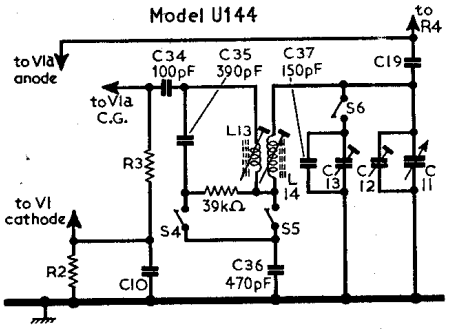
Capacitors			C26	0·005μF	F3	R16	120Ω	F3
C1[1]	470pF	D3	C27	16μF	G4	R17	68Ω	F3
C2	500pF	D4	C28	0·002μF	G3	R18	47Ω	G3
C3	0·01μF	D4	C29	100μF	F4	R19[7]	1·5kΩ	C1
C4	91pF	E4	C30	0·02μF	G3	R20	712Ω	B2
C5	35pF	A1	C31	0·02μF	G3	R21	118Ω	B2
C6	536pF	A1	C32	16μF	G4	R22	118Ω	C2
C7[2]	500pF	E4	C33	16μF	G4			
C8	100pF	B2				***Miscellaneous***[8]		
C9	100pF	B2	***Resistors***			L1	—	C1
C10	0·01μF	E3	R1	1MΩ	E3	L2	35·0	D4
C11	536pF	A1	R2	470Ω	E3	L3	1·5	C1
C12	35pF	A1	R3	47kΩ	D3	L4	27·3 total	D4
C13	35pF	A1	R4	82kΩ	E3	L5	5·0	D3
C14[3]	100pF	D4	R5	390Ω	E3	L6	11·0	D3
C15	27pF	D3	R6	2·2kΩ	E4	L7	—	D3
C16[4]	0·04μF	E3	R7	2·2MΩ	F3	L8	16·5	B2
C17	330pF	D3	R8	100kΩ	F3	L9	16·5	B2
C18	620pF	D3	R9	470kΩ	F3	L10	16·5	B2
C19	100pF	E3	R10	1MΩ	C1	L11	16·5	B2
C20	0·01μF	E3	R11	2·2kΩ	F3	L12	2·5	—
C21[5]	0·04μF	F3	R12	100kΩ	F3	T1[9]	a 300·0	C1
C22	100pF	B2	R13[6]	47kΩ	G3		b —	
C23	100pF	B2	R14	470kΩ	G3	S1-S6	—	D4
C24	100pF	F3	R15	4·7kΩ	G4	S7, S8	—	C1
C25	100pF	F3						

[1]270pF in U144. [2]May be 470pF. [3]150pF in U144. [4]0·01μF in U144. [5]0·05μF in U144. [6]100kΩ in U144. [7]Two resistors, 680Ω + 680Ω, in U144. [8]Approximate D.C. resistance in ohms.



Circuit diagram of the Murphy U144M. Bass boost is obtained by means of positive feed-back between the cathodes of **V3** and **V4** via **R17.** A section of circuit showing differences in an earlier version, model U144, appears overleaf.





Above: Circuit differences in U144. *Left:* Rear view of upright chassis.

Circuit Alignment—*Continued*

signal generator, via 0.01 μF capacitor in live lead, to control grid (pin 6) of **V2** and chassis. Unscrew the core of **L11** (location reference B1).

3.—Feed in a 470 kc/s signal and adjust the cores of **L10** (F3) and **L11** (B1) in that order. Do not re-adjust **L10.**

4.—Transfer signal generator "live" lead with 0.01 μF capacitor, to control grid (pin 6) of **V1.** Unscrew the core of **L9** (B1).

5.—Feeding in a 470 kc/s signal, adjust the cores of **L8** (E3) and **L9** (B1) in that order. Do not re-adjust **L8.**

6.—The following adjustments must be made with the chassis lying in the front half of the cabinet so that the influence of the speaker on the frame aerial can be taken into account. Check that with the gang at maximum capacitance (i.e., with plates fully meshed, which occurs just short of the maximum clockwise setting) the cursor coincides with the calibration spot on the scale below the word "Medium."

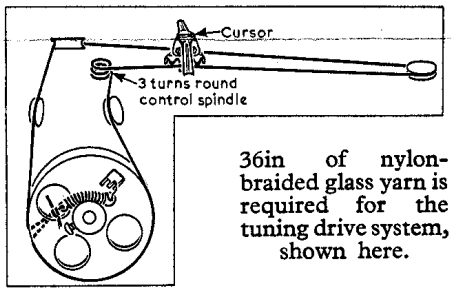
7.—Connect output of signal generator, via a 10 pF capacitor in the live lead, to **A** and **E** sockets. Tune receiver to 500 m, feed in a 600 kc/s signal and adjust the core of **L5** (D3) for maximum output, choosing peak with core farthest out.

8.—Tune receiver to 200 m, feed in a 1,500 kc/s signal and adjust **C12** (A1) and **C5** (A2) for maximum output. Repeat these adjustments, and those in operation 7, until no further improvement results.

9.—Switch receiver to L.W. and tune it to 1,900 m. Feed in a 158 kc/s signal and adjust the cores of **L6** (D3) and **L4** (D4) for maximum output, choosing peak with core farthest out.

10.—Tune receiver to 1,000 m, feed in a 300 kc/s signal and adjust **C13** (A1) for maximum output. Repeat this adjustment, and the adjustments in operation 9, until no further improvement results.

11.—Finally, check the calibration on M.W. at 500 m and on L.W. at 1,900 m, and re-adjust **L5** and **L6** if necessary.



36in of nylon-braided glass yarn is required for the tuning drive system, shown here.

GENERAL NOTES

Switches.—**S1-S6** are the band switches ganged in a single rotary unit beneath the chassis. This unit is indicated in the underside illustration of the chassis and shown in detail in the diagram beside it. With the control knob turned fully clockwise for M.W. operation, switches **S2** and **S5** close. For L.W. operation, switches **S1, S3, S4** and **S6** close.

V5 Alternative.—Some receivers may be fitted with a **UY41** rectifier instead of a **U404.** In these models **R22** is connected to the 230-250 V voltage adjustment socket instead of to **S8** and the common socket of the adjustment. A 90Ω 4 watt resistor is also connected in series between **V5** heater and **R20.** It should be noted that these two valves are not inter-changeable.

Model U144.—This is an earlier version of the U144M. The main difference between the two receivers is the type of oscillator circuit employed. Other small differences are indicated in the component tables. A section of circuit showing the oscillator arrangement for the U144 appears at the head of this column. For M.W. operation **S5** closes and the tuned circuit is formed by **L14, C11.** Reaction coupling is via **L13** and **C36** is the tracker. For L.W. operation **S4** closes and **L13, L14** form a Colpitts circuit between anode and grid of **V1a** with tuning capacitors **C35, C36** and **C11.**

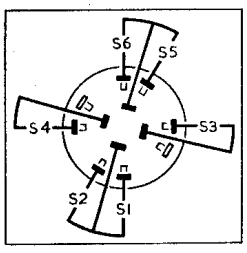
VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured on our sample receiver when it was operating from A.C. mains of 230 V. The receiver was switched to M.W. and tuned to the high wavelength end of the band, but there was no signal input.

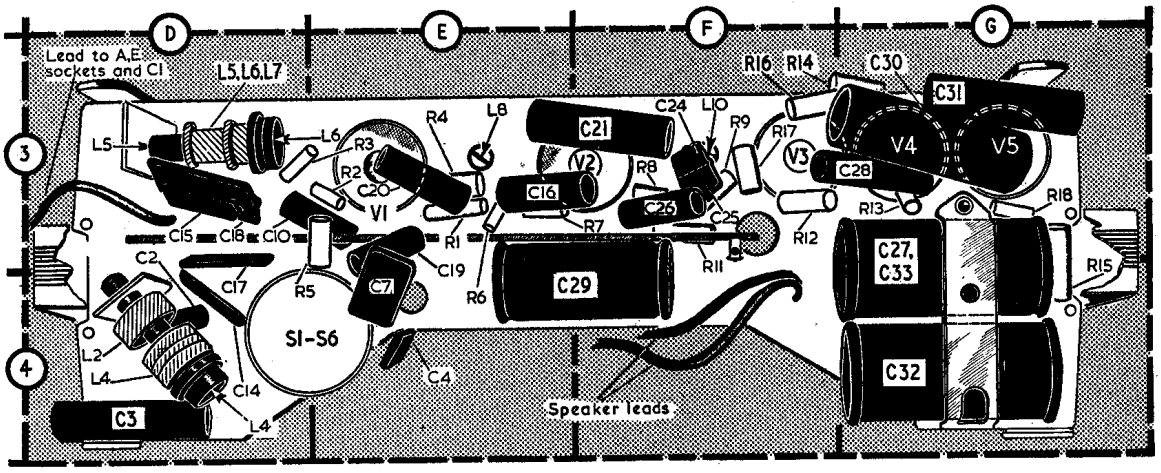
Voltages were measured on an Avo Electronic TestMeter. As this instrument has a high internal resistance, allowance should be made for the current drawn when using other types of meter. Chassis was the negative connection.

Valve	Anode		Screen		Cath.
	V	mA	V	mA	V
V1 10C1	188 / Oscillator / 45	2·9 / 1·8	115	5·8	5·5
V2 10F9	188	3·4	115	0·7	7·0
V3 10LD11	69	1·3	—	—	2·1
V4 10P13	178	23·0	128	4·7	5·2
V5 U404	210[1]	—	—	—	250·0[2]

[1] *A.C. reading.* [2] *Cathode current 44mA.*



Above: Switch unit. *Right:* Underside view of chassis. Early version U144 can be identified by its oscillator coil (location D3), which has only three connections.



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