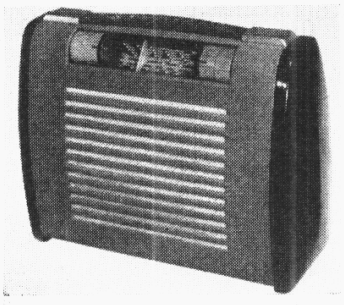
"TRADER" SERVICE SHEET 1072

MURPHY B143

All-dry Battery Portable



HOUSED in a pressed-metal and plastic carrying case, the Murphy B143 is a 5-valve 2-band all-dry superhet portable covering 188-560 m and 970-2,050 m. An unusual feature is the inclusion of an R.F. amplifier in front of the frequency changer.

Release date and original price: December 1949; £14 10s 6d plus purchase tax.

CIRCUIT DESCRIPTION

For M.W. operation, the aerial tuning circuit is formed by frame aerial **L1** in series with M.W. loading coil **L2,** and **C30.** For L.W. operation, **C30** tunes L.W. aerial coil **L4,** and the frame aerial is coupled to it via a tapping on the coil. Provision is made for the connection of an external aerial which is coupled to the tuning circuits via **C29** (M.W.) and **L3** (L.W.). **C29** is primarily the M.W. trimmer, via **C1.**

First valve **(V1, Mazda 1F3)** is a variable-mu R.F. pentode operating as signal frequency amplifier. Its anode coils **L5** (M.W.) and **L6** (L.W.) are tuned by **C32,** and it is capacitatively coupled via **C8** to the second valve **(V2, Mazda 1C1)** a heptode operating as frequency changer with electron coupling.

Oscillator grid coils **L7** (M.W.) and **L8** (L.W.) are tuned by **C33.** Parallel trimming by **C14, C34** (M.W.) and **C14, C15, C34, C35** (L.W.); series tracking by **C13** (M.W.) and **C12, C13** (L.W.). Inductive reaction coupling by **L9** (M.W.) and **L10** (L.W.).

Third valve **(V3, Mazda 1F3)** is an R.F. pentode operating as intermediate frequency

(Continued col. 1 overleaf)

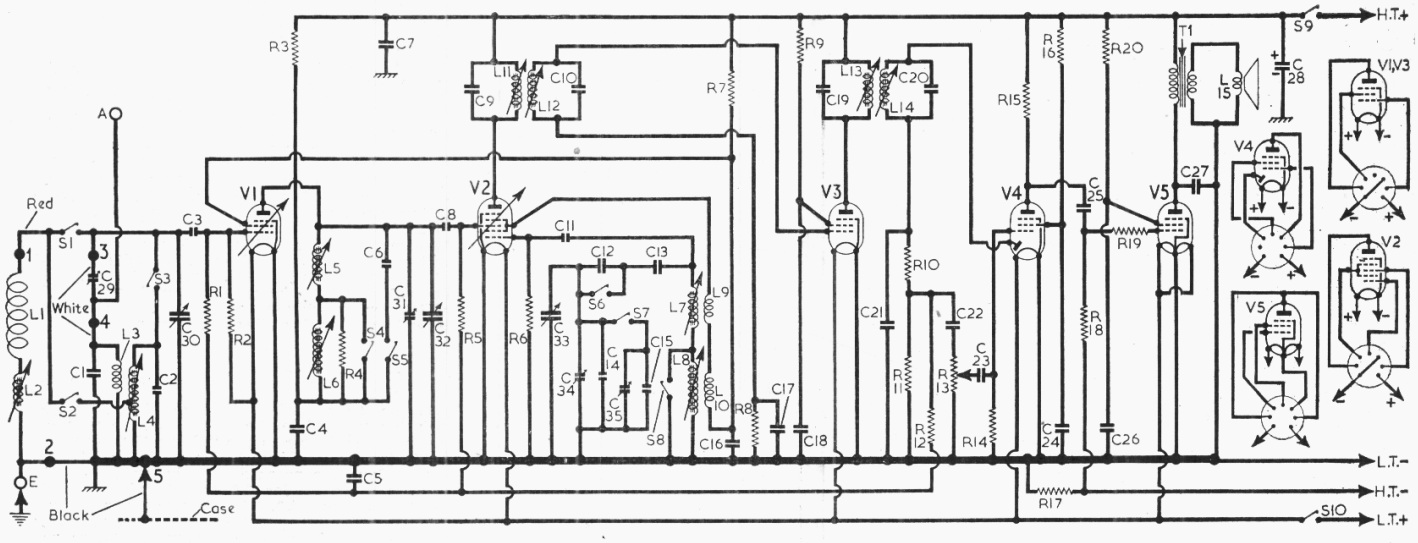
COMPONENTS AND VALUES

	CAPACITORS	Values	Locations
C1	L.W. aerial shunt	220pF	C2
C2	L.W. aerial trim.	77pF	C1
C3	V1 C.G.	47pF	D4
C4	V1 R.F. by-pass ...	0·05μF	D4
C5	A.G.C. decoupling	0·01μF	D4
C6	L.W. R.F. trim.	82pF	D3
C7	H.T. R.F. by-pass	0·05μF	F4
C8	V2 C.G.	33pF	E4
C9	1st I.F. trans. ...	100pF	B1
C10	tuning	100pF	B1
C11	V2 osc. C.G. ...	68pF	E4
C12	L.W. osc. tracker	425pF	E4
C13	M.W. osc. tracker	620pF	C2
C14	M.W. osc. trimmer	15pF	E4
C15	L.W. osc. trimmer	92pF	E3
C16	S.G. decoupling ...	0·01μF	D4
C17	V3 C.G.	0·01μF	E3
C18	V3 S.G. decoupling	0·01μF	F4
C19	2nd I.F. trans. ...	100pF	B1
C20	tuning	100pF	B1
C21	I.F. by-pass ...	200pF	F4
C22	A.F. coupling ...	0·001μF	F3
C23		0·005μF	F3
C24	V4 S.G. decoupling	0·01μF	F4
C25	A.F. coupling ...	0·005μF	F4
C26	V5 S.G. decoupling	1·0μF	F4
C27	Tone corrector ...	0·001μF	G3
C28*	H.T. reservoir ...	8μF	B2
C29‡	M.W. aerial trim.	35pF	—
C30†	Aerial tuning ...	546pF	C2
C31‡	M.W. R.F. trim. ...	35pF	D4
C32†	R.F. tuning ...	546pF	C2
C33†	Oscillator tuning	546pF	C2
C34‡	M.W. osc. trim. ...	35pF	E4
C35‡	L.W. osc. trim. ...	35pF	E3

* Electrolytic. † Variable. ‡ Pre-set.

	RESISTORS	Values	Locations
R1	V1 C.G.	4·7MΩ	D3
R2		4·7MΩ	D3
R3	V1 anode feed ...	22kΩ	E4
R4	L.W. R.F. shunt	150kΩ	D3
R5	V2 C.G.	2·2MΩ	F4
R6	V2 osc. C.G. ...	100kΩ	E4
R7	S.G. H.T. feed ...	47kΩ	E4
R8	V3 C.G.	5·6MΩ	E4
R9	V3 S.G. feed ...	100kΩ	F4
R10	I.F. filter ...	220kΩ	F4
R11	Signal diode load ...	820kΩ	F4
R12	A.G.C. decoupling	3·3MΩ	F4
R13	Volume control ...	1MΩ	A1
R14	V4 C.G. ...	10MΩ	F3
R15	V4 anode load ...	220kΩ	F4
R16	V4 S.G. feed ...	2·2MΩ	F4
R17	V5 G.B.	680Ω	G4
R18	V5 C.G. ...	1MΩ	G4
R19	V5 C.G. stopper ...	220kΩ	G3
R20	V5 S.G. feed ...	22kΩ	F4

	OTHER COMPONENTS	Approx. Values (ohms)	Locations
L1	Frame aerial ...	1·8	—
L2	M.W. loading coil	3·7	—
L3	L.W. coupling coil	85·0	C2
L4	L.W. tuning, total	30·7	C2
L5	V1 anode tuning	3·0	E4
L6	coils	24·0	E4
L7	Oscillator tuning	4·5	E4
L8	coils	7·8	E4
L9	Oscillator reaction	1·8	E4
L10	coils ...	2·8	E4
L11	1st I.F. trans. Pri.	15·5	B1
L12	Sec.	15·5	B1
L13	2nd I.F. trans Pri.	15·5	B1
L14	Sec.	15·5	B1
L15	Speech coil ...	2·5	—
T1	O.P. trans. Pri....	1,000·0	G3
	Sec.	—	
S1-S8	Waveband switches	—	C1
S9, S10	Battery sw., g'd R13	—	A1



Circuit diagram of the Murphy B143. **V1** is a signal frequency amplifier, the frame aerial input being tuned by **C30,** which is a section of the gang. The dotted line connected to the chassis line by the arrowhead numbered 5 represents the metal portions of the carrying case. Its tag is clamped under one of the chassis bolts.

Circuit Description—*continued*

amplifier with tuned-primary, tuned-secondary transformer couplings **C9, L11, L12, C10** and **C19, L13, L14, C20.**

Intermediate frequency 465 kc/s.

Diode signal detector is part of diode-pentode valve **(V4, Mazda 1FD9.)** Audio frequency component in the rectified output is developed across load resistor **R11** and passed via **C22,** manual volume control **R13** and **C23** to control grid of pentode section, which operates as A.F. amplifier. I.F. filtering by **C21** and **R10.** D.C. potential developed across **R11** is fed back as bias to **V1** and **V2** grid circuits giving automatic gain control.

Resistance-capacitance coupling by **R15, C25** and **R18** between **V4** pentode and pentode output valve **(V5, Mazda 1P10).** Tone correction in anode circuit by **C27.** G.B. for **V5** is developed across **R17,** in series with the H.T. negative lead to chassis. The two sections of **V5** filament are parallel-connected for 1.4 V operation. **C28** by-passes the H.T. battery.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating from a new set of batteries. The receiver was tuned to the highest wavelength end of M.W. and the volume control turned to maximum, but there was no signal input.

Voltage readings were measured with an Avo Electronic TestMeter, and as this instrument has a high internal resistance, allowance should be made for the current drawn by other types of meter. Chassis was the negative connection in every case. The voltage measured across **R17** was 6.5 V.

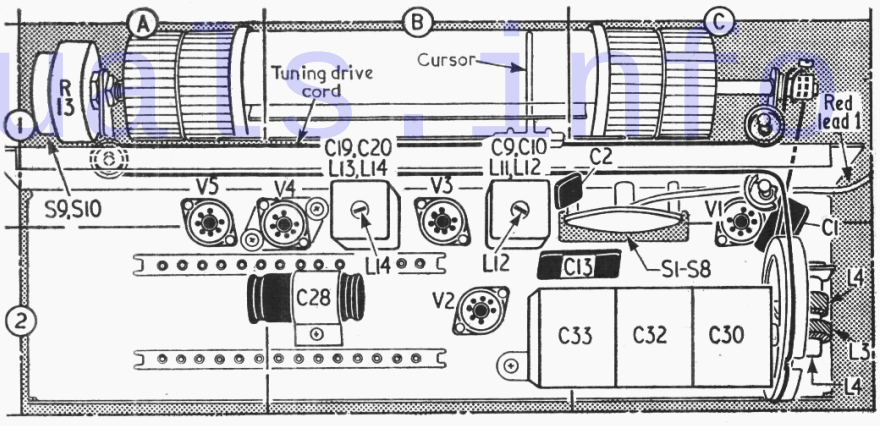
Valve	Anode		Screen	
	V	mA	V	mA
V1 1F3	66	0·7	27	0·35
V2 1C1	83	0·15	27	0·85
V3 1F3	83	1·2	38	0·4
V4 1FD9	45	0·15	20	0·03
V5 1P10	77	4·9	56	1·0

GENERAL NOTES

Switches.—**S1-S8** are the waveband switches, ganged in a single 2-position rotary unit mounted in a slot in the chassis deck. Its position is indicated in both of our chassis illustrations, but in the diagram in col. 2, where it is shown in detail, it is viewed in the direction indicated by the arrow in our plan view. **S1** closes on M.W., and **S2** on L.W. For the remainder, all even-numbered switches close on M.W., and odd ones on L.W.

S9, S10 are the Q.M.B. battery switches, ganged with the volume control **R13.**

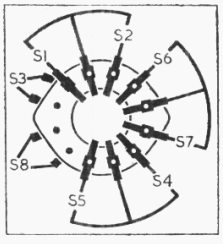
Batteries.—The receiver is provided with a 2-pin plug for the L.T. battery, and with female (positive) and male (negative) snap studs for the H.T. battery. The respective voltages are 1.5 V and 90 V, and types suggested by the makers are: L.T., Ever Ready "Alldry 1" or "Alldry 32," Drydex H1155 or H1178, or Siemens 1517 or 1432; H.T., Ever Ready "Batrymax" B117, Drydex "Drymax" 517 or Siemens S117. In an earlier version than ours an Ever Ready "Flag" cell or Drydex BT11 were used as the L.T. unit.



Plan view of the chassis. The course of the tuning drive is shown, and the turns round the spindle indicated.

Drive Cord Replacement.—About 40 inches of cord (the makers quote a 38in length of 3962/1 cord) is required for a new drive cord, which should be run as shown in our plan view illustration, where the gang as shown is just short of maximum capacitance. The cursor should be adjusted as described under "Circuit Alignment."

Diagram of the waveband switch unit, drawn as seen from the rear of an upright chassis.



DISMANTLING

Removing Chassis.—Open back cover of carrying case (two catches at lower edge), and unplug batteries;

unsolder leads from speech coil tags on speaker;

unsolder white lead connecting **C29** in base of carrying case to junction of **C3, C30** (location reference D4);

unsolder red, white and black leads from their tags above the **A** and **E** sockets in base of carrying case;

remove four 4BA cheese-head bolts with shake-proof washers from corners of chassis, and slide chassis rearwards out of carrying case.

When replacing, insert the chassis with the scale uppermost and the valves pointing forwards, its flanges running in the grooves.

The earthing tag 5 on the lead from the metal runner in top of carrying case goes under the right-hand top chassis fixing bolt. The black lead No. 2 (location reference D4) is connected to the **E** socket tag, and the white lead lead No. 4 (D4) to the **A** socket tag in the base of the carrying case.

The red lead No. 1 (C1) should be connected to the tag on **L2** nearest to the front of the carrying case, **L2** being mounted above the **A** and **E** sockets. The remaining white lead No. 3 (D4) from **C29,** also above the **A** and **E** sockets, should be connected to the junction of **C3** and **C30** indicated in the under-chassis illustration (D4).

CIRCUIT ALIGNMENT

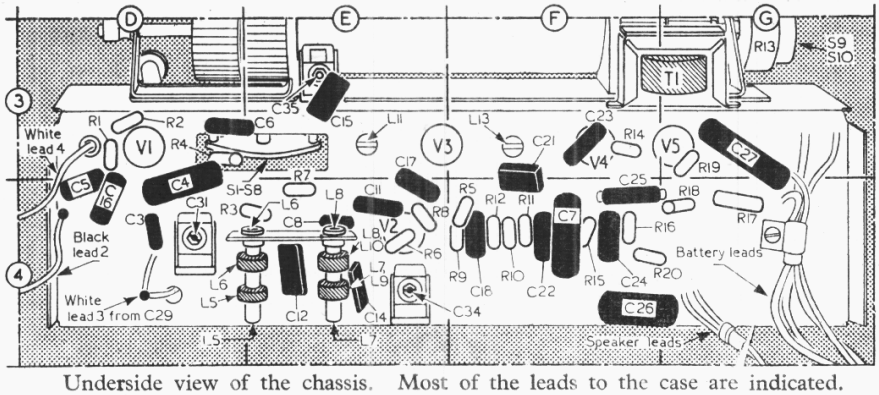
The R.F. and I.F. adjustments can be made accessible by hinging open the back cover and the front cover (the latter being secured by two Philips wood screws at its lower edge) removing two further wood screws from the ends of the speaker baffle now accessible, and hinging the baffle forward to reveal the I.F. transformers.

I.F. Stages.—Switch receiver to M.W. and tune to 540 m. Connect output of signal generator, via an 0.1 μF capacitor on the "live" lead, to the control grid (pin 6) of **V3** and chassis and unscrew the core of **L14** (location reference B1) to its full extent. Feed in a 465 kc/s (645.16 m) signal and adjust the cores of **L14** (B1) and **L13** (F3) for maximum output. Transfer signal generator leads to control grid (pin 6) of **V2** and chassis. Adjust the cores of **L12** (B1) and **L11** (E3) for maximum output. Do not re-adjust **L13** and **L14.**

R.F. and Oscillator Stages.—Check that with the gang at maximum capacitance the cursor coincides with the high wavelength ends of the tuning scale lines. When making adjustments to **C29** and the core of **L2,** the back and front covers of the carrying case should be closed and the adjustments carried out through two holes in the base of the carrying case next to the **A** and **E** sockets.

M.W.—Switch receiver to M.W., transfer the signal generator leads via a dummy aerial, to **A** and **E** sockets. Tune to 500 m, feed in a 500 m (600 kc/s) signal and adjust the cores of **L7** (E4), **L5** (E4) and **L2** (in base of carrying case) for maximum output. Tune to 200 m, feed in a 200 m (1,500 kc/s) signal and adjust **C34** (E4), **C31** (D4) and **C29** (in base of carrying case) for maximum output. Repeat these adjustments until calibration is correct.

L.W.—Switch receiver to L.W., tune to 1,900 m, feed in a 1,900 m (158 kc/s) signal and adjust the cores of **L8** (E4), **L6** (E4) and **L4** (C2) for maximum output. Tune to 1,000 m, feed in a 1,000 m (300 kc/s) signal and adjust **C35** (E3) for maximum output. Repeat these adjustments until calibration is correct.



Underside view of the chassis. Most of the leads to the case are indicated.

Service Sheet Correction

Owing to a defect that developed in the printing type while the machines were running, some of the figures in the "Other Components" table in *Service Sheet* 1068 were unreadable.

The figures concerned are the values of the D.C. resistances for **L6** to **L9,** which should read as follows: **L6,** 1.0; **L7,** 1.3; **L8,** very low; **L9,** 2.6. The values, of course, are in ohms. It will be appreciated as a favour if dealers will mark in the appropriate values on their copies if they are not clear.

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