

"TRADER" SERVICE SHEET  
**1127**

# BUSH BAC31

All-dry Battery Portable

**R11**, which acts as diode load, and is passed via **C17** to control grid of pentode section. I.F. filtering by **C15**, **R9**, **C16** and **C21**.

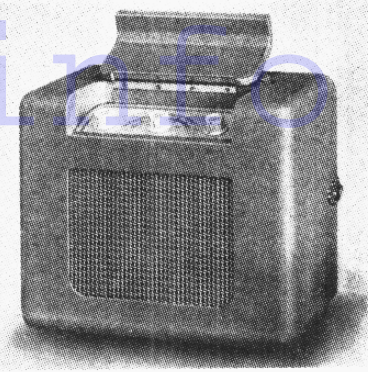
Resistance-capacitance coupling via **R14**, **C22** and **R17** between **V3** and pentode output valve (**V4**, Mullard **DL94**). Tone correction in anode circuit by **C23**. Grid bias voltage for **V4** is developed across **R17** in the H.T. negative lead.

The receiver, which is designed primarily for operation from all-dry batteries, may be powered from an A.C. mains supply by means of a separate add-on mains unit. When in use this mains unit is bolted into the cabinet beneath the main receiver chassis, H.T. and L.T. connections between the two being made by means of the 4-pin plugs and sockets **A**, **B**, **C** and **D**. Details of the plug and socket connections are given under

(Continued col. 1 overleaf)

### COMPONENTS AND VALUES

RESISTORS		Values	Locations
R1	V1 C.G. ...	2.2MΩ	G3
R2	V1 S.G. feed ...	180kΩ	F3
R3	V1 osc. C.G. ...	47kΩ	G4
R4	Fil. H.T. by-pass ...	150Ω	G4
R5	Osc. H.T. feed ...	33kΩ	F3
R6	V2 C.G. ...	4.7MΩ	F3
R7	V2 S.G. feed ...	56kΩ	F3
R8	Fil. H.T. by-pass ...	220Ω	F4
R9	I.F. stopper ...	47kΩ	E4
R10	A.G.C. decoupling ...	2.2MΩ	E3
R11	Volume control ...	500kΩ	E3
R12	V3 C.G. ...	4.7MΩ	E3
R13	Fil. H.T. by-pass ...	180Ω	E3
R14	V3 anode load ...	470kΩ	E4
R15	V3 S.G. feed ...	2.2MΩ	D4
R16	V4 C.G. ...	1MΩ	D3
R17	V4 G.B. ...	150Ω	D3
R18	Fil. H.T. by-pass ...	470Ω	D3
R19	H.T. smoothing ...	2.7kΩ	F4
R20	} Fil. smoothing	1.5kΩ	D4
R21		700Ω	D4



Appearance of the Bush BAC31

**T**HE Bush BAC31 is a 4-valve all-dry battery portable superhet covering 187-560 m and 1,071-1,898 m.

A separate mains unit is designed for use with the BAC31 which enables it to operate from 200-250 V A.C. mains of 40-100 c/s.

Release date, August 1953. Original prices: BAC31, £13 4s 4d, plus purchase tax and batteries; Mains Unit, £3.

### CIRCUIT DESCRIPTION

Tuned frame aerial input by **L1**, **C30** (M.W.) and **L1**, **L2**, **C30** (L.W.) to heptode valve (**V1**, Mullard **DK92**), which operates as frequency changer with electron coupling. When the receiver is operated in conjunction with the specially designed mains unit (see end of "Circuit Description") the extra chassis surface involved acts as a short-circuit turn on the frame aerials, reducing their inductance. This effect is particularly marked on L.W., and to offset it a L.W. loading coil **L3** is inserted in series with the frame aerials. This coil is only brought into operation where a mains unit is fitted, and is otherwise short-circuited as indicated in the circuit diagram.

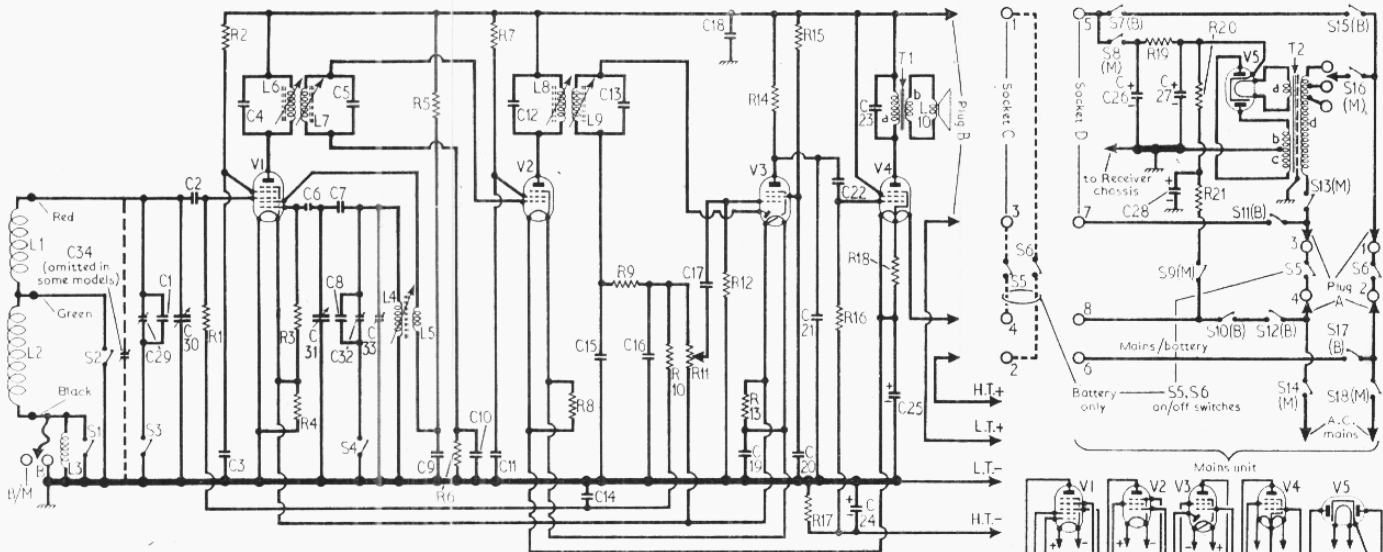
Second valve (**V2**, Mullard **DF91**) is a variable- $\mu$  R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings **C4**, **L6**, **L7**, **C5** and **C12**, **L8**, **L9**, **C13**.

Intermediate frequency 470 kc/s.

Diode signal detector is part of diode pentode valve (**V3**, Mullard **DAF91**). Audio frequency component in rectified output is developed across volume control

CAPACITORS	Values	Locations	
C1	L.W. aerial trim. ...	140pF	G3
C2	V1 C.G. ...	100pF	G3
C3	V1 S.G. decoup. ...	0.05μF	F4
C4	} 1st I.F. trans. tun. {	110pF	A1
C5		110pF	A1
C6	V1 osc. C.G. ...	80pF	G3
C7	Osc. tracker ...	605pF	F3
C8	L.W. osc. trim. ...	515pF	F3
C9	Osc. anode decoup. ...	0.05μF	F3
C10	V2 C.G. ...	0.01μF	F3
C11	V2 S.G. decoup. ...	0.05μF	F3
C12	} 2nd I.F. trans. tun. {	110pF	B1
C13		110pF	B1
C14	A.G.C. decoupling ...	0.05μF	E3
C15	} I.F. by-passes ... {	500pF	E3
C16		100pF	E4
C17	A.F. coupling ...	500pF	E3
C18	H.T. by-pass ...	0.5μF	B1
C19	Filament by-pass ...	0.05μF	E3
C20	V3 S.G. decoup. ...	0.05μF	D4
C21	L.F. by-pass ...	100pF	E4
C22	A.F. coupling ...	0.005μF	E3
C23	Tone corrector ...	0.001μF	—
C24*	V4 G.B. by-pass ...	50μF	F1
C25*	Filament by-pass ...	200μF	D3
C26*	} H.T. smoothing ... {	32μF	A2
C27*		32μF	A2
C28*	Filament smoothing ...	25μF	D4
C29†	L.W. aerial trim. ...	40pF	F3
C30†	Aerial tuning ...	528pF	G3
C31†	Oscillator tuning ...	528pF	F3
C32†	L.W. osc. trim. ...	40pF	G3
C33†	M.W. osc. trim. ...	40pF	G3
C34‡	M.W. aerial trimmer ...	40pF	G3

\* Electrolytic. † Variable. ‡ Pre-set.



Circuit diagram of the Bush BAC31. On/off switches **S5**, **S6** are either connected directly to the receiver, as shown by the socket C connections 1, 2, 3, 4 in broken line, or directly to the mains unit, shown on the extreme right.

OTHER COMPONENTS		Approx. Values (ohms)	Locations
L1	M.W. frame aerial	2-0	—
L2	L.W. frame aerial...	7-5	—
L3	L.W. loading coil...	3-8	F3
L4	Osc. tuning coil	1-5	F3
L5	Osc. reaction coil...	2-0	F3
L6	1st I.F. trans.	{ Pri. 11-0	A1
L7		{ Sec. 11-0	A1
L8	2nd I.F. trans.	{ Pri. 11-0	B1
L9		{ Sec. 11-0	B1
L10	Speech coil	2-5	—
T1	O.P. trans.	540-0	—
T2	Mains trans.	a	—
		b	300-0
		c	300-0
		d, total	280-0
S1-S4	Waveband switches	—	F3
S5, S6	Power sw., g'd R11	—	F3
S7(B)-S18(M)	Mains/battery switches	—	E4

**Circuit Description—continued**

“Mains Unit” in “General Notes.” Mains/battery change-over switches **S7(B)**, **S10(B)**, **S11(B)**, **S12(B)** and **S17(B)** close for battery operation as indicated by the suffix **(B)**. Switches **S8(M)**, **S9(M)**, **S13(M)**, **S14(M)**, **S16(M)** and **S18(M)** close for mains operation.

For mains operation H.T. current is supplied by full-wave H.T. rectifying valve **(V5, Mullard EZ41)**. Smoothing by **R19** and capacitors **C26, C27**.

**VALVE ANALYSIS**

Valve voltages and currents given in the table below are those derived from the manufacturers' information. Readings for **V1-V4** were measured on a receiver operating from new batteries. Those obtained when it was operating from the mains unit were about 10 per cent lower. Readings for **V5** were measured on a mains unit that was operating from A.C. mains of 230 V, the voltage adjustment being set to the 220-230 V tapping.

Voltages were measured on the 10 V and 400 V ranges of a Model 7 Avometer, chassis being the negative connection. The negative bias measured across **R17** was 1.3 V, when the receiver was operating from batteries.

Valve	Anode		Screen	
	V	mA	V	mA
V1 DK92	{ 90 42	{ 1-3 1-9	62	0-2
V2 DF91	90	1-2	62	0-4
V3 DAF91	42	0-12	22	0-02
V4 DL94	85	4-2	90	0-8
V5 EZ41	125*	—	—	—

\* A.C., each anode. Cathode voltage, 106V.

**GENERAL NOTES**

**Switches.**—**S1-S4** are the waveband switches, ganged in a single rotary unit beneath the chassis. The unit is shown in detail in our front view of the chassis, switches **S1** and **S2** closing for M.W. operation, and **S3, S4** for L.W. operation.

**S5, S6** are the Q.M.B. on/off switches ganged with the volume control **R11**. The switch connections terminate in a 4-pin socket (labelled “C” in the chassis picture and circuit diagram) which allows it to be used as a battery on/off switch when the receiver is operated from batteries only, or as a power on/off switch when the receiver is operated in conjunction with the mains unit.

**S7(B)-S18(M)** are the mains/battery change-over switches, ganged in a single rotary unit under the chassis. The unit is

Rear view of the BAC31 chassis (top) with the mains unit chassis attached (below). Trimmer **C34** in location A1, is omitted in some receivers.

