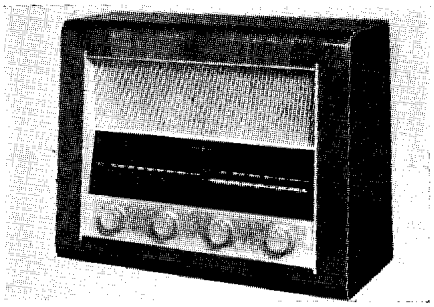
"TRADER" SERVICE SHEET

1147

BUSH AC34

A.C. Transportable Superhet



EMPLOYING series-fed heaters and an A.C./D.C. range of valves, the Bush **AC34** is a 3-band 4-valve (plus rectifier) A.C. transportable table receiver, designed to operate from A.C. mains of 100-120 V and 200-250 V, 40-100 c/s. The waveband ranges are 16-50 m, 182-560 m and 833-2,068 m.

Release date and original price: August, 1953, £19 12s 9d. Purchase tax extra.

CIRCUIT DESCRIPTION

Aerial input via coupling coils **L2, L3, L4** to single-tuned circuits **L5, C34** (S.W.), **L6, C34** (M.W.) and **L7, C34** (L.W.), which precede triode hexode valve **(V1, Mullard UCH42)** operating as frequency changer. Reception from an internal frame aerial **L1** is provided on M.W. and L.W., the winding being connected in series with the chassis end of the two tuning coils. Oscillator grid coils **L8, L9** and **L10** are tuned by **C35.** Parallel trimming by **C36** (S.W.), **C37** (M.W.) and **C13, C38** (L.W.); series tracking

(*Continued col. 1 overleaf*)

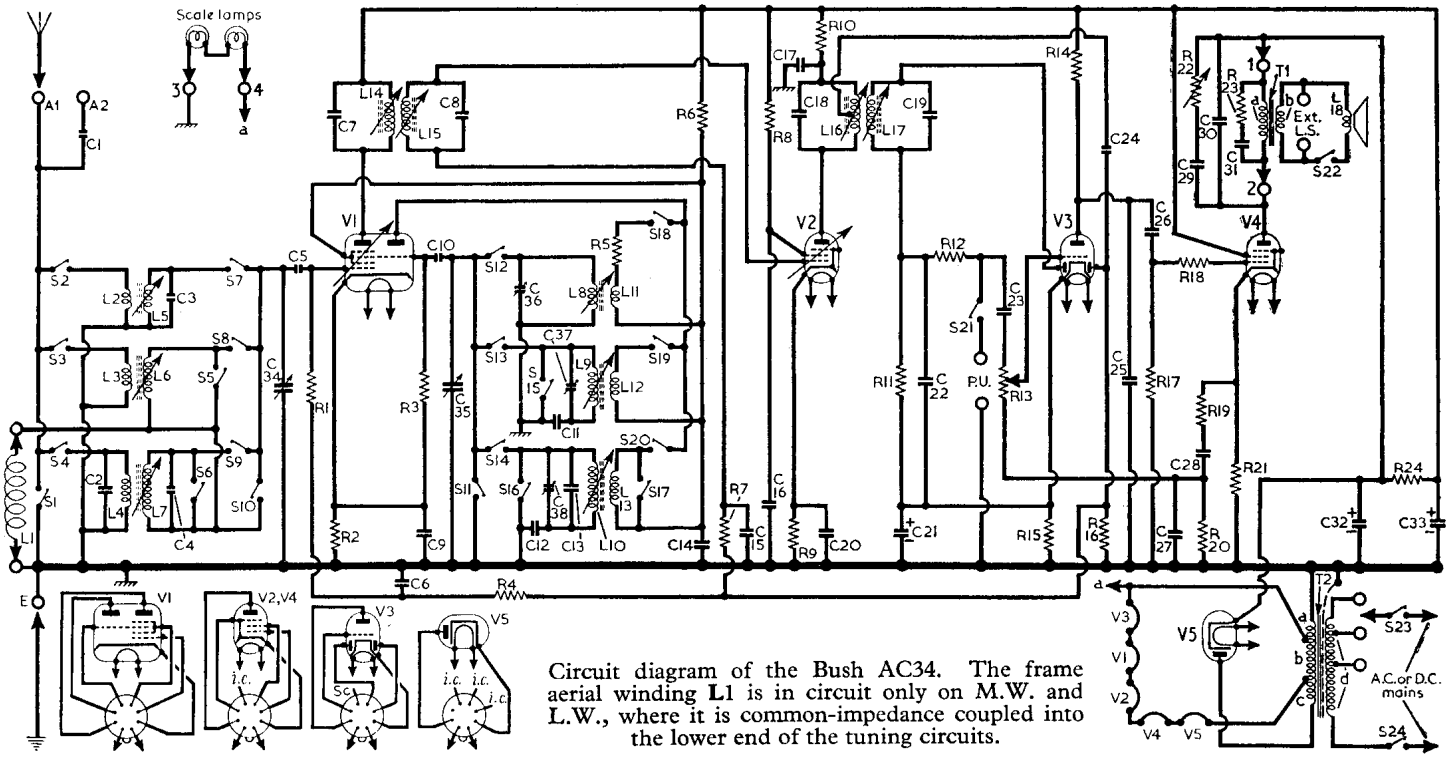
COMPONENTS AND VALUES

	CAPACITORS	Values	Locations
C1	Aerial series ...	50pF	H4
C2	L.W. aerial shunt...	800pF	G4
C3	S.W. aerial trim. ...	20pF	H4
C4	L.W. aerial trim. ...	60pF	G4
C5	V1 C.G.	50pF	G4
C6	A.G.C. decoupling	0·1μF	G4
C7, C8	1st I.F. trans. tuning	110pF	C2
C9	V1 cath. by-pass ...	0·05μF	G3
C10	V1 osc. C.G. ...	45pF	G4
C11	M.W. osc. tracker...	556pF	G3
C12	L.W. osc. tracker...	390pF	G3
C13	L.W. osc. trimmer	180pF	G3
C14	H.T. decoupling ...	0·05μF	G4
C15	A.G.C. decoupling	0·05μF	G4
C16	V2 S.G. decoupling	0·05μF	G4
C17	V2 anode decoup.	0·05μF	F4
C18, C19	2nd I.F. trans. tuning	110pF	B2
C20	V2 cath. by-pass ...	0·05μF	F4
C21*	V3 cath. by-pass ...	50μF	F3
C22	I.F. by-pass ...	100pF	F4
C23	A.F. coupling ...	0·01μF	F3
C24	A.G.C. coupling ...	50pF	F4
C25	Tone corrector ...	0·002μF	F4
C26	A.F. coupling ...	0·01μF	F4
C27, C28	Neg. feed-back ...	0·1μF	F3
C29	Part tone control...	0·05μF	E4
C30, C31	Tone correctors ...	0·001μF	E3
C32*, C33*	H.T. smoothing ...	0·01μF	E4
C34†	Aerial tuning ...	32μF, 16μF	C2
C35†	Oscillator tuning ...	528pF	C2
C36‡	S.W. osc. trimmer...	528pF	A1
C37‡	M.W. osc. trimmer	40pF	H3
C38‡	L.W. osc. trimmer	40pF	H3
		40pF	G3

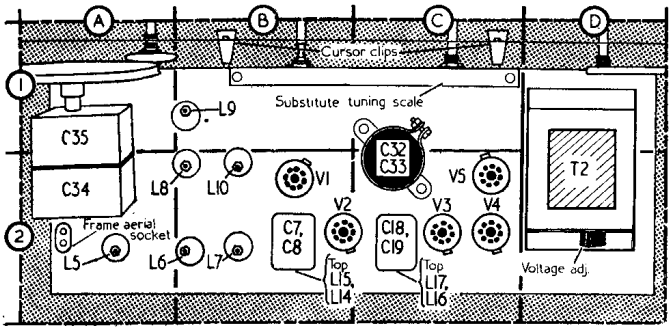
* Electrolytic. † Variable. ‡ Pre-set.

	RESISTORS	Values	Locations
R1	V1 C.G.	470kΩ	G4
R2	V1 G.B.	220Ω	G4
R3	V1 osc. C.G. ...	47kΩ	G4
R4	A.G.C. decoupling	1MΩ	F4
R5	S.W. stabilizer ...	47Ω	H4
R6	H.T. feed ...	15kΩ	G4
R7	A.G.C. decoupling	2·2MΩ	G4
R8	V2 S.G. decoupling	47kΩ	F4
R9	V2 G.B.	330Ω	F4
R10	V2 anode decoup....	10kΩ	F4
R11	Signal diode load ...	330kΩ	F4
R12	I.F. stopper ...	100kΩ	F3
R13	Volume control ...	2·2MΩ	F3
R14	V3 triode load ...	150kΩ	F4
R15	V3 G.B.	5·6kΩ	F4
R16	A.G.C. diode load...	1MΩ	F4
R17	V4 C.G.	470kΩ	F4
R18	V4 C.G. stopper ...	47kΩ	F4
R19, R20	Neg. feed-back ...	1kΩ, 10kΩ	E4, F3
R21	V4 G.B.	220Ω	E4
R22	Tone control ...	50kΩ	E3
R23	Tone corrector ...	10kΩ	—
R24	H.T. smoothing ...	10kΩ	E4

	OTHER COMPONENTS	Approx. Values (ohms)	Locations
L1	Frame aerial ...	0·5	—
L2	Aerial coupling coils	—	H4
L3		0·6	H4
L4		32·0	G4
L5	Aerial tuning coils	—	H4
L6		4·0	H4
L7		16·0	G4
L8	Oscillator tuning coils	—	H3
L9		3·2	H3
L10		4·0	G3
L11	Oscillator reaction coils	—	H3
L12		0·6	H3
L13		1·5	G3
L14	1st I.F. trans. Pri.	12·5	C2
L15	1st I.F. trans. Sec.	12·5	C2
L16	2nd I.F. trans. Pri.	12·5	B2
L17	2nd I.F. trans. Sec.	12·5	B2
L18	Speech coil ...	2·5	—
T1	O.P. trans a ...	500·0	—
	O.P. trans b ...	0·5	
T2	Mains trans. a...	3·2	D2
	Mains trans. b	45·2	
	Mains trans. c	237·0	
	Mains trans. d, total	48·0	
S1-S21	Waveband/gram sw.	—	H4
S22	Speaker switch ...	—	—
S23, S24	Mains sw., g'd R13	—	F3



Circuit diagram of the Bush AC34. The frame aerial winding **L1** is in circuit only on M.W. and L.W., where it is common-impedance coupled into the lower end of the tuning circuits.



Plan view of chassis showing the position of the substitute tuning scale referred to in "Circuit Alignment."

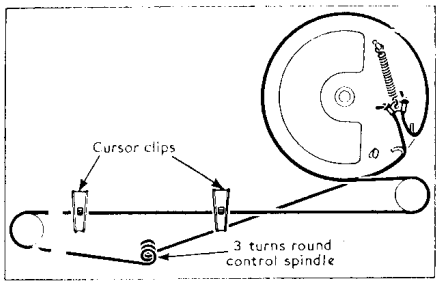
Circuit Description—*continued*

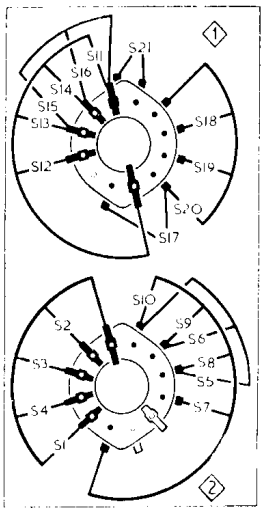
by **C11** (M.W.) and **C12** (L.W.). Reaction coupling from anode by **L11, L12** and **L13.**

Second valve **(V2, Mullard UF41)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings **C7, L14, L15, C8** and **C18, L16, L17, C19.**

Intermediate frequency 470 kc/s

Diode signal detector is part of double diode triode valve **(V3, Mullard UBC41).** Audio frequency component in its rectified output is developed across diode load resistor **R1,** and passed via **C23** and volume control **R13** to grid





Above: Sketch of the tuning drive cord system as seen from the front of an upright chassis.

Left: Diagram of the waveband switch units, which are drawn as seen in the directions indicated by the arrows in the underchassis illustration.

of triode section. I.F. filtering by **C22, R12** and the capacitance of the screened leads.

Second diode of **V3** is fed from **V2** anode via **C24,** and the resulting D.C. potential developed across load resistor **R16** is fed back as bias to **V1** and **V2,** giving A.G.C.

Resistance-capacitance coupling by **R14, C26** and **R17** between **V3** triode anode and pentode output valve **(V4, Mullard UL41).** Tone correction in anode circuit by **C30, C31** and **R23.** Variable tone control by **R22, C29.** Negative feed-back tone correction between **V4** cathode circuit and **V3** grid circuit via **R19, C28, R20, C27.**

H.T. current is supplied by I.H.C. half-wave rectifying valve **(V5, Mullard UY41).** H.T. smoothing by **R24** and electrolytic capacitors **C32, C33.** Valve heaters are connected in series across section **b** of the mains transformer secondary winding, which is isolated from the mains.

CIRCUIT ALIGNMENT

I.F. Stages.—Switch receiver to medium waves and tune it to 300 m. Connect output of signal generator, via an 0.1 μF capacitor in one lead, to control grid (pin 6) of **V2** and chassis, feed in a 470 kc/s (638.3 m) signal and adjust the cores of **L17** (location reference C2) and **L16** (C2) for maximum output. Transfer signal generator leads to control grid (pin 6) of **V1** and chassis, and, feeding in a 470 kc/s signal adjust the cores of **L15** (B2) and **L14** (B2) for maximum output. Repeat these adjustments until no further improvement results.

R.F. and Oscillator Stages.—In order that the receiver may be aligned with the chassis in its cabinet, three holes are provided in the cabinet base to give access to **C36, C37** and **C38.** If, however, the chassis is removed from its cabinet for alignment, the frame aerial should be disconnected and a shorting link placed across the frame aerial sockets. As the tuning scale is fixed to the cabinet, reference should be made in this case to the substitute tuning scale fixed along the front of the chassis deck. A temporary cursor, such as a paper clip, should be fixed to the tuning drive, and, with the gang at maximum, aligned with the datum line on the substitute tuning scale.

L.W.—Switch receiver to L.W. and connect signal generator output leads to **A** and **E** sockets. Tune receiver to 2,000 m, feed in a 2,000 m (150 kc/s) signal and adjust the cores of **L10** (B2) and **L7** (B2) for maximum output. Tune receiver to 1,000 m, feed in a 1,000 m (300 kc/s) signal and adjust **C38** (G3) for maximum output. Repeat these adjustments until no further improvement results.

M.W.—Switch receiver to M.W., tune to 500 m, feed in a 500 m (600 kc/s) signal and adjust the cores of **L9** (B1) and **L6** (B2) for maximum output. Tune receiver to 200 m, feed in a 200 m (1,500 kc/s) signal and adjust **C37** (H3) for maximum output. Repeat these adjustments until no further improvement results.

S.W.—Switch receiver to S.W., tune to 50 m, feed in a 50 m (6 Mc/s) signal and adjust the cores of **L8** (B2) and **L5** (A2) for maximum output. Tune receiver to 25 m, feed in a 25 m (12 Mc/s) signal and adjust **C36** (H3) for maximum output. Repeat these adjustments until no further improvement results.

L.W. Check.—If alignment has been carried out with the chassis out of its cabinet, the cores of **L7** and **L10** should be re-adjusted for maximum output at 2,000 m (150 kc/s) after the chassis has been replaced in its cabinet and the frame aerial re-connected.

GENERAL NOTES

Switches.—S1-S21 are the waveband and radio/gram changeover switches, ganged in two rotary units beneath the chassis. These units are indicated in our underside illustration of the chassis and shown in detail in the switch diagram in column 1, where they are drawn as seen in the direction of the indicating arrows in the chassis view. In the associated switch table, a dash indicates open, and **c,** closed.

S22 is the internal speaker muting switch and is mounted, together with the external speaker sockets, in the top rear corner of the cabinet.

Switches	S.W.	M.W.	L.W.	Gram
S1	—	—	—	c
S2	c	—	—	—
S3	—	c	—	—
S4	—	—	c	—
S5	c	—	—	—
S6	c	c	—	—
S7	c	—	—	—
S8	—	c	—	—
S9	—	—	c	—
S10	—	—	—	c
S11	—	—	—	c
S12	c	—	—	—
S13	—	c	—	—
S14	—	—	c	—
S15	c	—	—	—
S16	c	c	—	—
S17	—	c	—	—
S18	c	—	—	—
S19	—	c	—	—
S20	—	—	c	—
S21	—	—	—	c

Scale Lamps.—These are 6.2 V, 0.3 A, lamps with large clear spherical bulbs and M.E.S. bases.

Drive Cord Replacement.—About 4ft 6in of nylon braided glass yarn is required for a new drive cord which should be run as shown in the sketch of the drive cord system, starting with the gang at maximum capacitance and running the cord off clockwise round the drum.

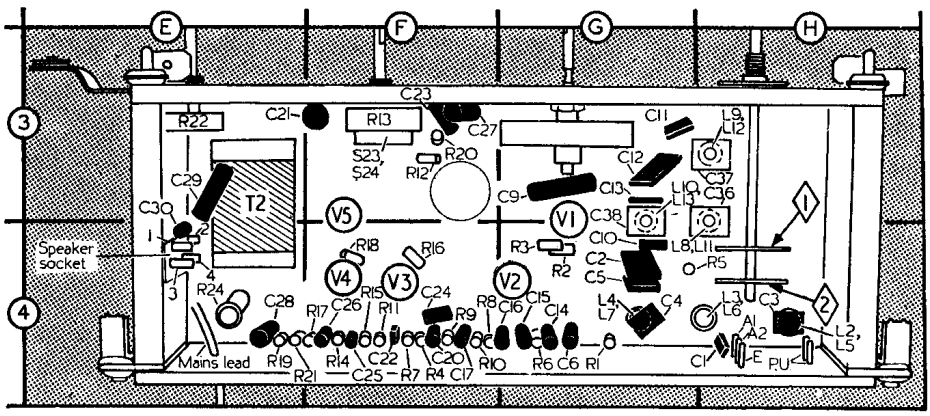
VALVE ANALYSIS

Valve voltages and currents given in the table below are those derived from the manufacturer's information. They were measured on a receiver which was operated from A.C. mains of 230 V and tuned to the highest wavelength end of M.W. There was no signal input.

Voltages were measured on the 10 V and 1,000 V ranges of a Model 7 Avometer, chassis being the negative connection in every case.

Valve	Anode		Screen		Cath.
	V	mA	V	mA	V
V1 UCH42	120 Osci'tor 60	3·0 1·5	60	1·5	1·2
V2 UF41	84	3·5	62	1·5	1·5
V3 UBC41	60	0·2	—	—	0·8
V4 UL41	264	31·0	120	4·0	8·0
V5 UY41	263*	—	—	—	282·0†

* A.C. reading. † Cathode current 46 mA.



Underside view of chassis. The speaker socket in E4 also connects up with the scale lamps.

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