

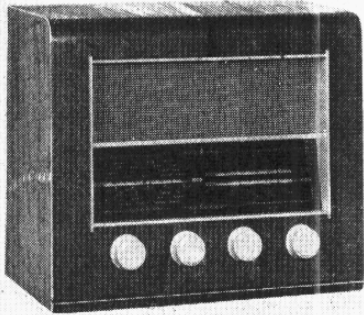
"TRADER" SERVICE SHEET

1188

# BUSH DAC41

3-band A.C./D.C. Superhet

L9 (M.W.) and L10 (L.W.) are tuned by C34. Parallel trimming by C35 (S.W.), C36 (M.W.) and C13, C16 (L.W.); series tracking by C14 (M.W.) and C15 (L.W.). Reaction coupling from oscillator anode via L11 (S.W.), L12 (Continued col. 1 overleaf)



EMPLOYING the triode section of the frequency changer as a pick-up pre-amplifier when switched to Gram, the Bush DAC41 is a 3-valve (plus rectifier) 3-band table superhet receiver designed to operate from A.C. or D.C. mains of 200-250 V, 50 c/s in the case of A.C. The waveband ranges are, 14.3-85.5 m, 176-575 m, 1,000-2,000 m.

Release date and original price: May 1954, £16 12s 3d. Purchase tax extra.

## CIRCUIT DESCRIPTION

Aerial input via coupling coils L1 (S.W.) and L2 (L.W.) to single tuned circuits L3, C33 (S.W.) and L5, C33 (L.W.). For M.W. operation the aerial is coupled to the M.W. tuning circuit L4, C33 via a tapping on L4. Aerial and earth sockets are isolated from chassis by C1, C2.

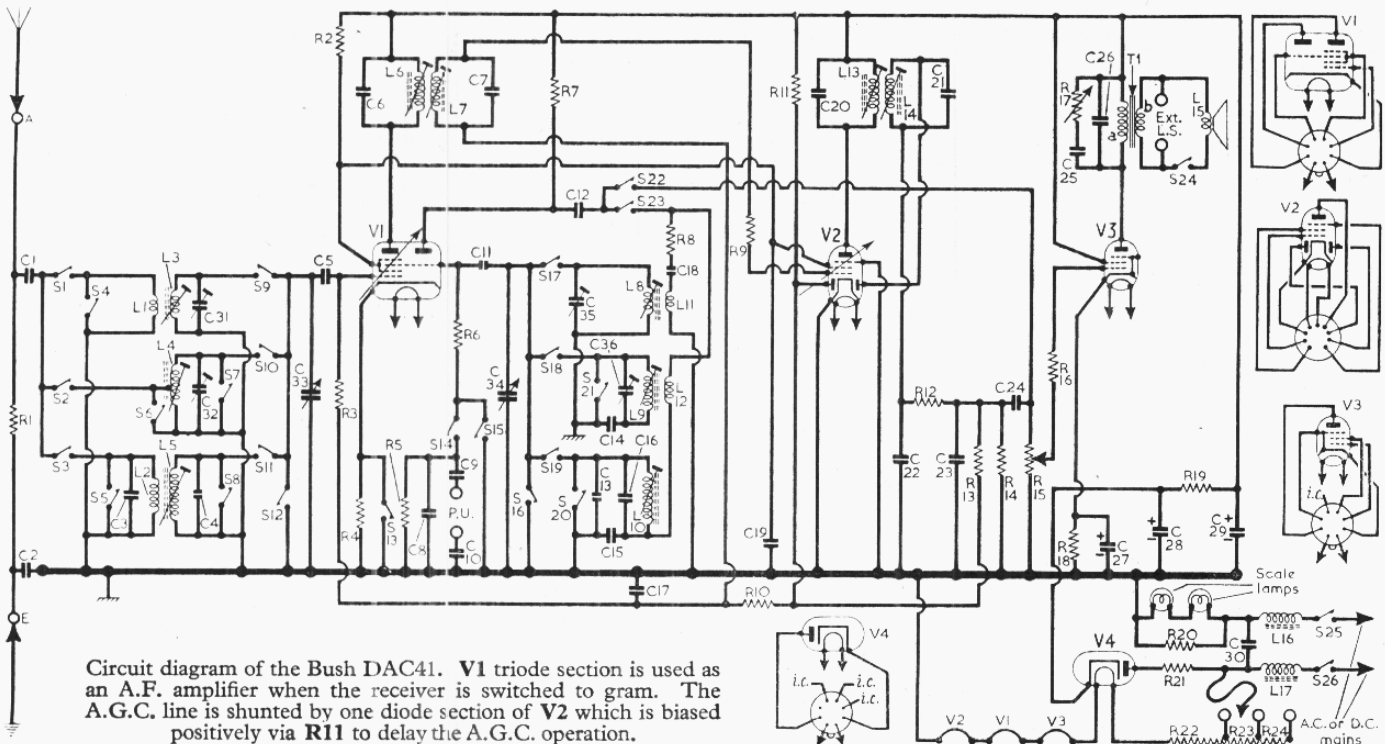
First valve (V1, Mullard UCH42) is a triode hexode operating as frequency changer with internal coupling. Oscillator grid coils L8 (S.W.),

CAPACITORS		Values	Locations
C1	Aerial and earth isolators	0.001µF	G3
C2	L.W. aerial shunt	0.01µF	G3
C3	L.W. aerial trim	600pF	G3
C4	L.W. aerial trim	85pF	G3
C5	V1 C.G.	100pF	G3
C6	1st I.F. trans. tuning	110pF	A1
C7	tuning	110pF	A1
C8	P.U. tone correction	0.002µF	G3
C9	P.U. isolators	0.005µF	F3
C10		0.01µF	G3
C11	Osc. C.G.	50pF	G2
C12	Osc. anode coup.	0.001µF	F2
C13	L.W. osc. trim	33pF	G2
C14	M.W. osc. tracker	515pF	G2
C15	L.W. osc. tracker	365pF	G2
C16	L.W. osc. trim	240pF	G2
C17	A.G.C. decoupling	0.05µF	F2
C18	S.W. reaction coup.	50pF	G2
C19	S.G. decoupling	0.05µF	F2
C20	2nd I.F. trans. tuning	110pF	B1
C21	tuning	110pF	B1
C22	I.F. by-passes	100pF	F3
C23		100pF	E3
C24	A.F. coupling	0.002µF	E3
C25	Part tone control	0.05µF	D2
C26	Tone correction	0.005µF	E2
C27*	V3 cath. by-pass	50µF	E2
C28*	H.T. smoothing	50µF	B1
C29*		50µF	B1
C30	Mains R.F. by-pass	0.01µF	C1
C31†	S.W. aerial trim	—	G3
C32†	M.W. aerial trim	—	G3
C33†	Aerial tuning	—	A1
C34†	Oscillator tuning	—	A1
C35†	S.W. osc. trim	—	G2
C36†	M.W. osc. trim	—	G2

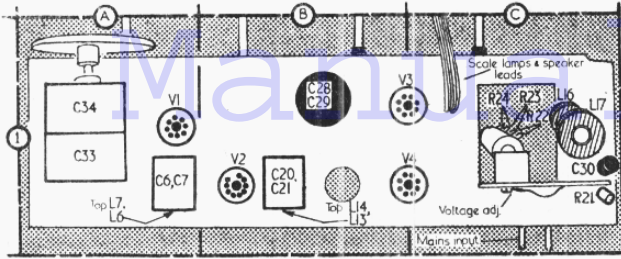
RESISTORS		Values	Locations
R1	Anti-static shunt	1MΩ	G3
R2	S.G. H.T. feed	27kΩ	F2
R3	V1 C.G.	680kΩ	G3
R4	V1 G.B.	330kΩ	G3
R5	P.U. shunt	680kΩ	G3
R6	V1 osc. C.G.	47kΩ	G2
R7	Osc. anode feed	10kΩ	F2
R8	Osc. stabilizer	100Ω	G2
R9	V2 C.G. stopper	2.2kΩ	F3
R10	A.G.C. decoupling	1.5MΩ	F2
R11	Delay diode bias	20MΩ	E2
R12	I.F. stopper	47kΩ	E3
R13	A.G.C. decoupling	680kΩ	E2
R14	Signal diode load	330kΩ	E2
R15	Volume control	500kΩ	E2
R16	V3 C.G. stopper	47kΩ	E2
R17	Tone control	50kΩ	E2
R18	V3 G.B.	180Ω	E2
R19	H.T. smoothing	1kΩ	E3
R20	Scale lamp shunt	75Ω	D2
R21	V4 surge limiter	250Ω	C1
R22		1,030Ω	C1
R23	Heater ballast	200Ω	C1
R24		200Ω	C1

OTHER COMPONENTS		Approx. Values (ohms)	Locations
L1	Aerial coupling coils	50-0	G3
L2			G3
L3			G3
L4	Aerial tuning coils	7-0	G3
L5			G3
L6	1st I.F. trans. { Pri. Sec. }	12.5	A1
L7			A1
L8	Oscillator tuning coils	1.0	G2
L9			G2
L10	Oscillator reaction coils	5.0	G2
L11			G2
L12	2nd I.F. trans. { Pri. Sec. }	12.5	B1
L13			B1
L14	Speech coil	2.5	C1
L15			C1
L16	Mains R.F. chokes	3.0	C1
L17			C1
T1	O.P. trans. { a b }	410-0	E2
S1-S23	Waveband sw.	—	G2
S24	Speaker switch	—	E2
S25, S26	Mains sw., g'd R15	—	E2

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



Circuit diagram of the Bush DAC41. V1 triode section is used as an A.F. amplifier when the receiver is switched to gram. The A.G.C. line is shunted by one diode section of V2 which is biased positively via R11 to delay the A.G.C. operation.



Plan view of the chassis indicating the positions of the I.F. core adjustments in locations A1 and B1.

**Circuit Description—continued**

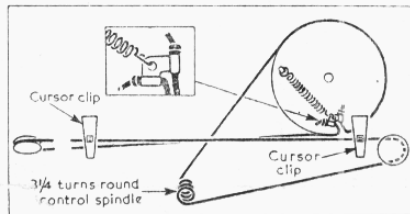
(M.W.) and the common impedance of tracker C15 (L.W.).

Second valve (V2, Mullard UBF80) is a double diode R.F. pentode, its pentode section operating as intermediate frequency amplifier with tuned transformer couplings C6, L6, L7, C7 and C20, L13, L14, C21.

**Intermediate frequency 470 kc/s.**

One diode section of V2 operates as signal detector, the audio frequency component in its rectified output being developed across load resistor R14 and passed via C24 and volume control R15 to control grid of pentode output valve (V3, Mullard UL41).

Sockets are provided for the connection of a gramophone pick-up, whose output is fed via S14 to triode section of V1, which operates as pick-up pre-amplifier. The amplified A.F. output is developed across R7, and is coupled via C12, S22 to the top of R15. S13 opens in the gram position of the waveband control, applying bias to V1 triode.



Sketch of the tuning drive cord system.

**VALVE ANALYSIS**

Valve voltages and currents given in the table below are derived from the manufacturers' information, and were measured on a receiver operating from 230 V A.C. mains. The receiver was tuned to the high wavelength end of the M.W. band, but 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 each case.

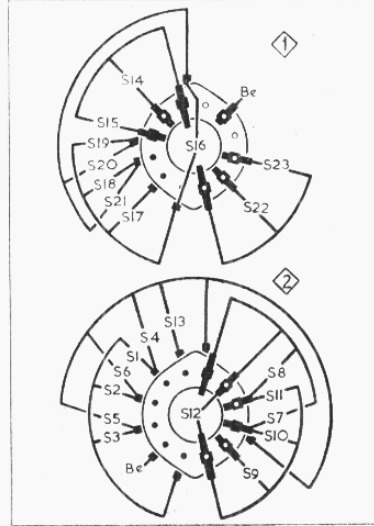
Valve	Anode		Screen		Cath.
	V	mA	V	mA	
V1 UCH42	140	1.5	50	2.1	—
	Oscillator	3.8			
V2 UBF80	140	†	50	†	—
	36.0	7.0			
V3 UL41	130	36.0	140	7.0	7.7
V4 UY41	210*	—	—	—	195.0†

\* A.C. reading. † Cathode current 55 mA.  
‡ No reading quoted; cathode current 4.6 mA.

**CIRCUIT ALIGNMENT**

**I.F. Stages.**—Switch receiver to M.W. and set gang to about two thirds maximum capacitance. Connect output of signal generator, via an 0.1 μF capacitor in the "live" lead, to control grid (pin 2) of V2 and chassis. Feed in a 470 kc/s (638.3 m) signal and adjust the cores of L14 (location reference B1) and L13 (B1) for maximum output. Transfer signal generator "live" lead, together with the 0.1 μF capacitor, to control grid (pin 6) of V1 and chassis. Feeding in a 470 kc/s signal, adjust the cores of L7 (A1) and L6 (A1) for maximum output.

**Waveband Switch Diagram and Table**



Switches	S.W.	M.W.	L.W.	Gram.
S1	○	—	—	—
S2	—	○	—	—
S3	—	—	○	—
S4	—	○	○	—
S5	—	—	—	○
S6	—	—	○	○
S7	—	—	—	—
S8	○	○	—	—
S9	○	—	—	—
S10	—	○	—	—
S11	—	—	○	—
S12	—	—	—	○
S13	○	○	○	○
S14	—	○	—	○
S15	○	○	—	—
S16	—	—	—	○
S17	○	—	—	—
S18	—	○	—	—
S19	—	—	○	—
S20	—	○	—	—
S21	—	○	—	—
S22	—	—	—	○
S23	○	—	—	—

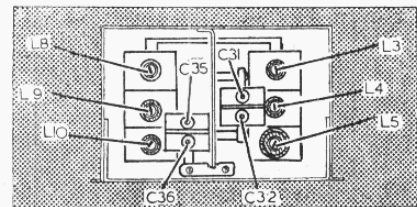
**R.F. and Oscillator Stages.**—As the tuning scale remains fixed to the cabinet when the chassis is withdrawn, reference is made in the following alignment to the substitute tuning scale fixed to the back of the tuning drive drum. This scale has the trimming and tracking points marked on it in wavelengths, and is read off against the top sloping edge of the fixed metal pointer. Check that with the gang at maximum capacitance, the pointer coincides with the datum line on the substitute scale.

When the chassis is finally replaced in its cabinet, check that with the gang at maximum capacitance, the cursors coincide with the short vertical lines at the high wavelength ends of the tuning scales. The positions of all the R.F. and oscillator adjustments are shown in the sketch below where they are drawn as seen from the aerial input end of an upright chassis. Connect output of signal generator, via a dummy aerial, to A and E sockets.

**L.W.**—Switch receiver to L.W., tune to 1,400 m on substitute scale, feed in a 1,400 m (214 kc/s) signal and adjust the cores of L10 and L5 for maximum output. Check calibration over band.

**M.W.**—Switch the receiver to M.W., tune to 500 m, feed in a 500 m (600 kc/s) signal and adjust the cores of L9 and L4 for maximum output. Tune receiver to 200 m, feed in a 200 m (1,500 kc/s) signal and adjust C36 and C32 for maximum output.

**S.W.**—Switch receiver to S.W., tune to 30 m, feed in a 30 m (10 Mc/s) signal and adjust the cores of L8 and L3 for maximum output. Tune receiver to 15 m, feed in a 15 m (20 Mc/s) signal and adjust C35 and C31 for maximum output.



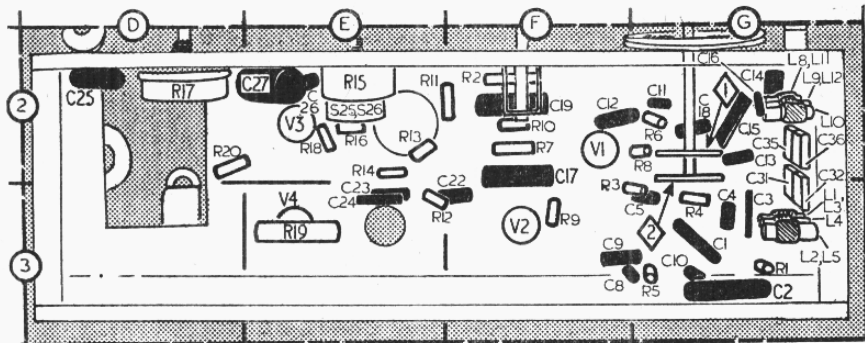
Sketch showing the positions of all the R.F. and oscillator adjustments.

**GENERAL NOTES**

**Switches.**—S1-S23 are the waveband and radio/gram change-over switches, ganged in two rotary units beneath the chassis. These units are indicated in our underside view of the chassis, and shown in detail in the diagrams in col. 2, where they are viewed in the directions indicated by arrows in the under-chassis illustration. The associated switch table gives the switch operations for the four control settings, starting from the fully anti-clockwise position of the control knob. A dash indicates open, and C, closed.

**Scale Lamps.**—These are 3.5V, 0.15A lamps, with large clear spherical bulbs and M.E.S. bases.

**Drive Cord Replacement.**—About 50 inches of nylon-braided glass yarn is required for a new drive. The cord should be run as shown in the sketch of the tuning drive system, where it is drawn as seen from the front of the chassis with the gang at maximum capacitance.



Underside view of the chassis. 1 and 2 in diamonds indicate the waveband switch units.