"TRADER" SERVICE SHEET

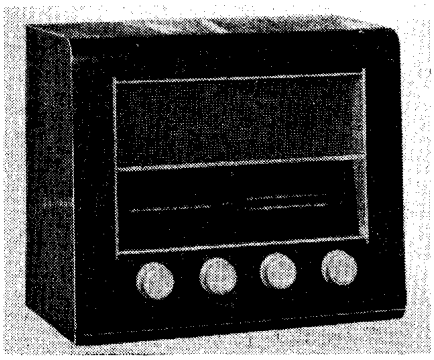
1188

# 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, 14.3-35.5 m, 176-575 m, 1,000-2,000 m.

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

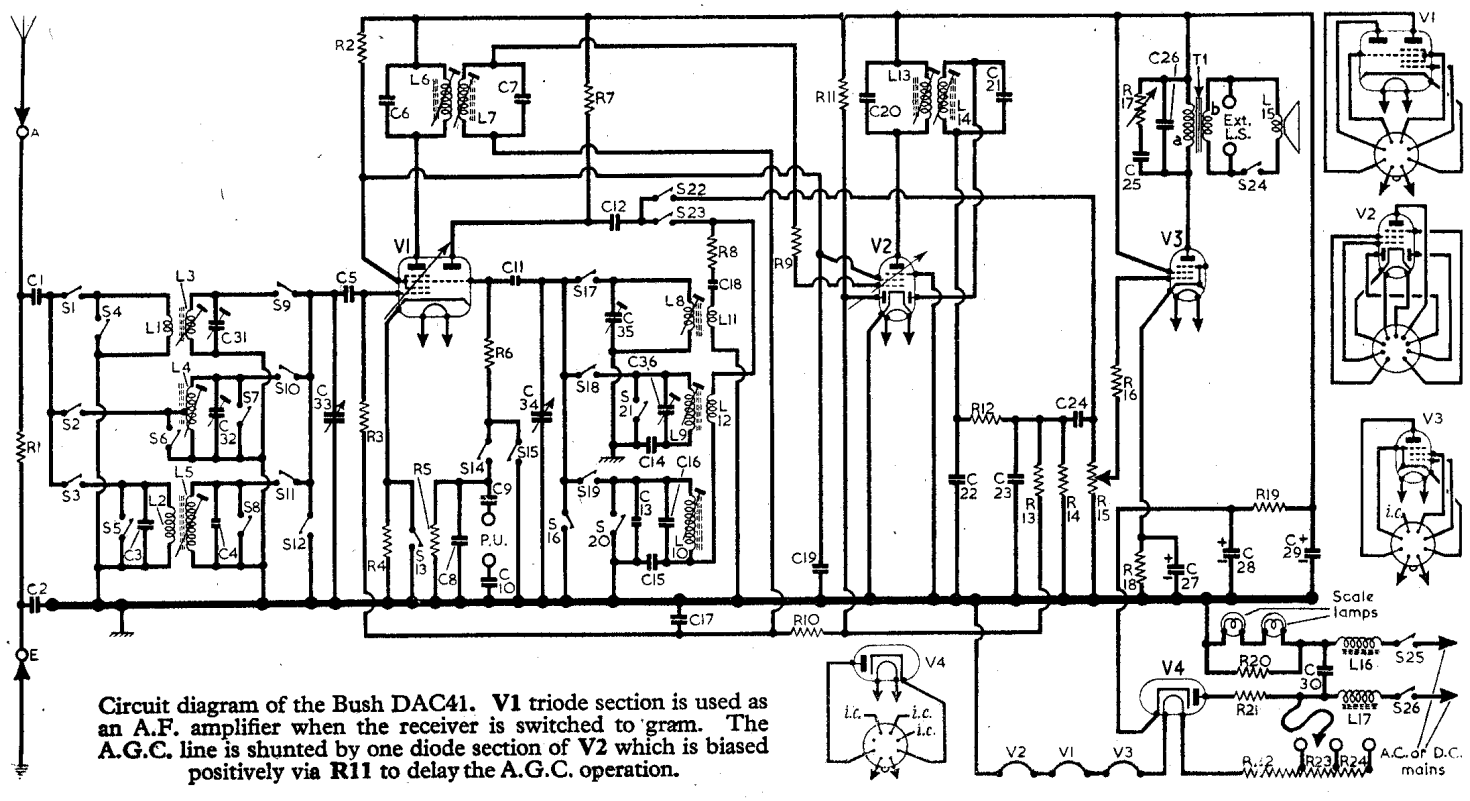
First valve **(V1, Mullard UCH42)** is a triode hexode operating as frequency changer with internal coupling. Oscillator grid coils **L8** (S.W.),

| CAPACITORS | | Values | Locations |
|---|---|---|---|
| C1 | Aerial and earth isolators | 0·001μF | G3 |
| C2 | | 0·01μF | G3 |
| C3 | L.W. aerial shunt | 600pF | G3 |
| C4 | L.W. aerial trim. | 85pF | G3 |
| C5 | V1 C.G. | 100pF | G3 |
| C6 | 1st I.F. trans. tuning | 110pF | A1 |
| C7 | | 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. | 56pF | 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. | 56pF | G2 |
| C19 | S.G. decoupling | 0·05μF | F2 |
| C20 | 2nd I.F. trans. tuning | 110pF | B1 |
| C21 | | 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 |

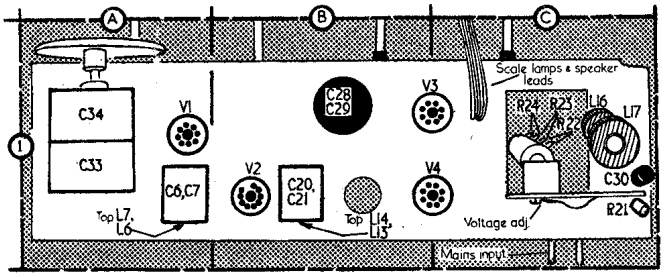
* Electrolytic. † Variable. ‡ Pre-set.

| 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. | 330Ω | 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 | D2 |
| 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 | Heater ballast | 1,030Ω | C1 |
| R23 | | 200Ω | C1 |
| R24 | | 200Ω | C1 |

| OTHER COMPONENTS | | Approx. Values (ohms) | Locations |
|---|---|---|---|
| L1 | Aerial coupling coils | — | G3 |
| L2 | | 50·0 | G3 |
| L3 | Aerial tuning coils | — | G3 |
| L4 | | 7·0 | G3 |
| L5 | | 20·0 | G3 |
| L6 | 1st I.F. trans. Pri. | 12·5 | A1 |
| L7 | 1st I.F. trans. Sec. | 12·5 | A1 |
| L8 | Oscillator tuning coils | — | G2 |
| L9 | | 1·0 | G2 |
| L10 | | 5·0 | G2 |
| L11 | Oscillator reaction coils | — | G2 |
| L12 | | 5·0 | G2 |
| L13 | 2nd I.F. trans. Pri. | 12·5 | B1 |
| L14 | 2nd I.F. trans. Sec. | 12·5 | B1 |
| L15 | Speech coil | 2·5 | — |
| L16 | Mains R.F. chokes | 3·0 | C1 |
| L17 | | 3·0 | C1 |
| T1 | O.P. trans. a | 410·0 | — |
| | O.P. trans. b | — | — |
| S1-S23 | Waveband sw. | — | G2 |
| S24 | Speaker switch | — | — |
| S25, S26 | Mains sw., g'd R15 | — | E2 |




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*

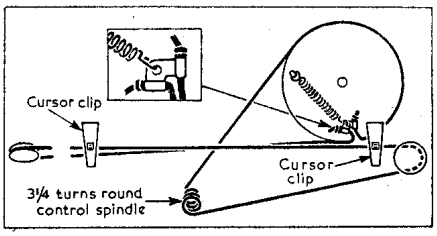
(M.W.) and the common impedance of tracker **C15** (L.W.).

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.

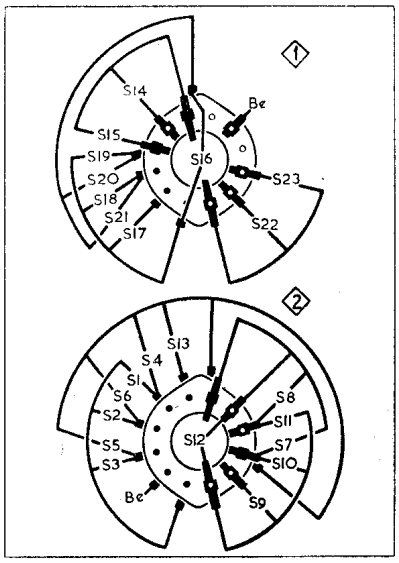
| Valve | Anode | | Screen | | Cath. |
|---|---|---|---|---|---|
| | V | mA | V | mA | V |
| V1 UCH42 | 140 | 1·5 | 50 | 2·1 | — |
| | Oscillator | | | | |
| | 100 | 3·8 | | | |
| V2 UBF80 | 140 | ‡ | 50 | ‡ | — |
| V3 UL41 | 130 | 36·0 | 140 | 7·0 | 7·7 |
| V4 UY41 | 210* | — | — | — | 195·0† |

* 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 | C | — | — | — |
| S2 | — | C | — | — |
| S3 | — | — | C | — |
| S4 | — | C | C | — |
| S5 | — | — | — | C |
| S6 | — | — | C | C |
| S7 | C | — | — | — |
| S8 | C | C | — | — |
| S9 | C | — | — | — |
| S10 | — | C | — | — |
| S11 | — | — | C | — |
| S12 | — | — | — | C |
| S13 | C | C | C | — |
| S14 | — | — | — | C |
| S15 | C | C | C | — |
| S16 | — | — | — | C |
| S17 | C | — | — | — |
| S18 | — | C | — | — |
| S19 | — | — | C | — |
| S20 | C | C | — | — |
| S21 | C | — | — | — |
| S22 | — | — | — | C |
| S23 | C | C | C | — |

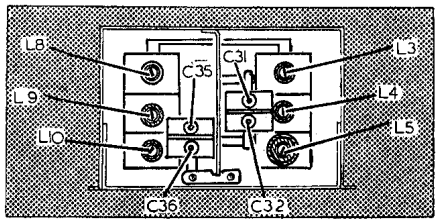
**R.F. and Oscillator Stages.**—As the tuning scale remains fixed to the cabinet when the chassis is withdrawn, reference is made in the following alignment to the substitute tuning scale fixed to the back of the tuning drive drum. This scale has the trimming and tracking points marked on it in wavelengths, 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.



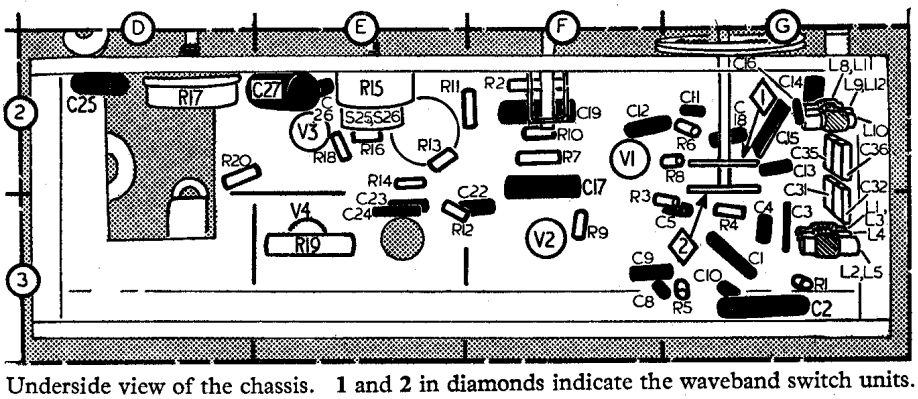

Sketch showing the positions of all the R.F. and oscillator adjustments.

## 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.

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