

# BUSH SAC31

Four-valve, plus rectifier, two waveband superhet for operation from AC mains of 200-240 v. Provision for a high resistance pickup and a low resistance extra loudspeaker with a switch plug device for silencing the internal speaker. Marketed by Bush Radio, Ltd., Power Road, Chiswick, London, W4.

UNTUNED coupling coils L1 (MW) L2 (LW) feed the signals to a bandpass filter unit in which L3, L4 are the primary coils tuned by VC1 section of the triple-ganged condenser and L8, L9 are the secondaries, or grid coils, tuned by VC2. L7 is the image suppression winding and inductive coupling is effected by L5 and L6.

From L8 signals are fed via R1 to the control grid of the frequency changer V1. This valve is cathode biased by R2 decoupled by C3 and its grid circuit is returned to the AVC line.

The oscillator section of the valve employs tuned grid circuits in which L10 (MW) L11 (LW) are tuned by VC3. The anode feedback coils are L12 and L13 and the feed resistance is R5 from which the screening grid of V1 is also fed decoupled by C6.

The IF signals from V1 are transferred by L14, L15 to the grid of the pentode V2. The grid circuit of this valve is also returned to the AVC line.

A second IF transformer L16, L17, passes on the signal to the signal diode of the double diode V3. The load resistance is the volume control

VR1 and the signal is filtered by R10 and C14. Pickup sockets are provided across the volume control.

A three-position tone and selectivity control switch, S2, with positions designated "L" (low), "M" (medium) and "H" (high), brings in C11 across the by-pass condenser C12 in the low position, while in the high position the coupling between L16 and L17 is modified by the introduction of C13 and R13 feeding the second diode of V3 with R14 as the load resistance.

AVC potentials are derived from the DC voltage across VR1, a divider network R11, R12 enables the correct amount of control to be applied to V1 and V2 grid circuits.

From VR1 the LF signals are fed via C15 and the grid stopper R15 to the grid of the pentode output valve V4. R16 is the grid leak and R17 the cathode biaser decoupled by C16. A permanent degree of tone correction is effected by C17, C18 and R18 and the signal is coupled by the output transformer L18, L19 to the energised loudspeaker in which L20 is the hum-bucking coil, L21 the speech coil and L22 the field winding.

HT is supplied by a full-wave rectifier V5 with smoothing effected by L22, C19 and C20.

## GANGING

IF Circuits.—Switch receiver to LW with variable condenser at maximum capacity. Inject a signal of 123 kcs. into the grid of V1 and adjust T1, T2, T3 and T4 for maximum output, keeping the input low to avoid AVC action.

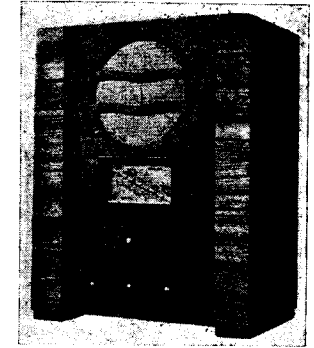
MW Band.—Switch to MW and tune receiver to 200 m. Inject a signal of this wavelength into the aerial and earth sockets and adjust T5, T6 and T7 for maximum output.

LW Band.—Switch receiver to LW and tune it

## VALVE READINGS

V	Type	Electrode	Volts	Mas
1	FC4	Anode	250	1.5
		Osc anode	100	2.5
		Screen	100	7
3	VP4B	Anode	215	5.5
		Screen	95	2
4	V914 or 2D4A	—	—	—
		PEN 4VA	Anode	250
5	1W3	Screen	285	4.5
		Cathode	405 DC	—

Pilot Lamps 6 volts 3 amps.  
Readings taken with a 1,000 o.p.v. meter with no signal input.



The SAC31 is attractively housed in an upright design table cabinet.

to 1,000 m. Inject a signal of this wavelength and adjust T8, T9 and T10 for maximum output.

Tune receiver to about 1,700 m. and with a signal of this wavelength adjust T11 for maximum output.

Chassis layout diagrams, see overleaf.

## RESISTORS

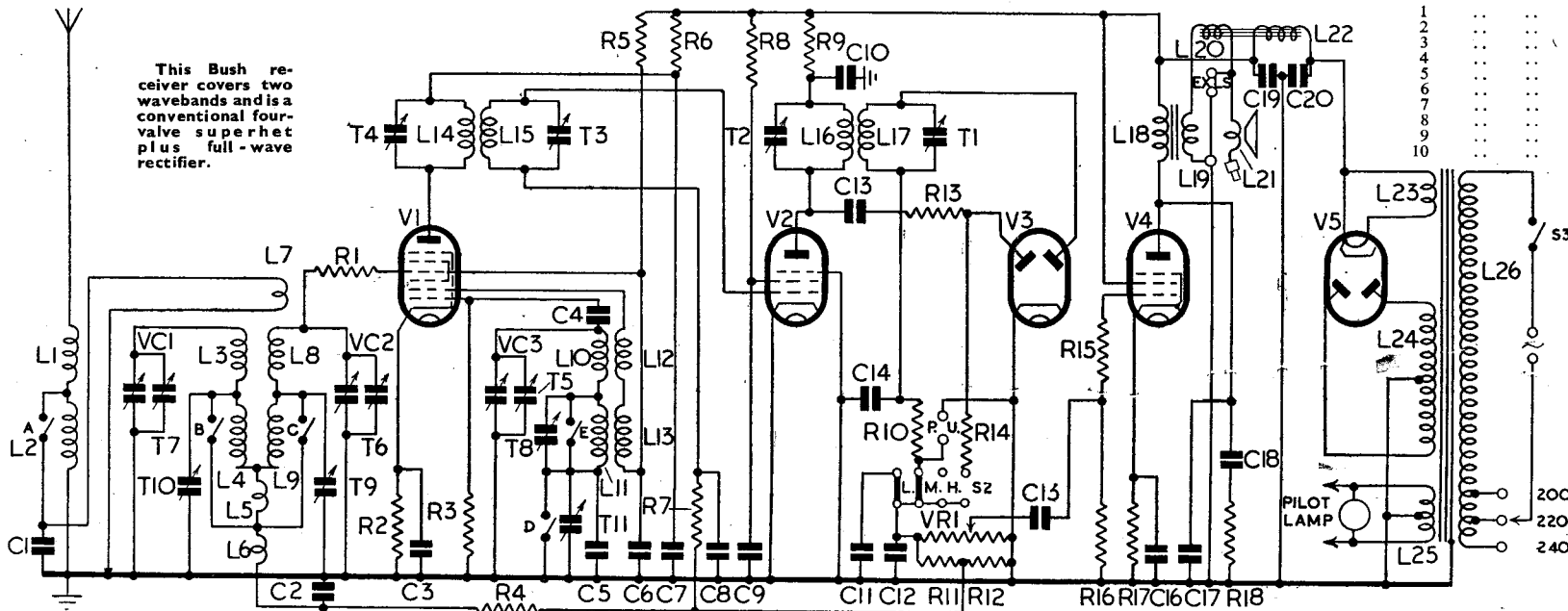
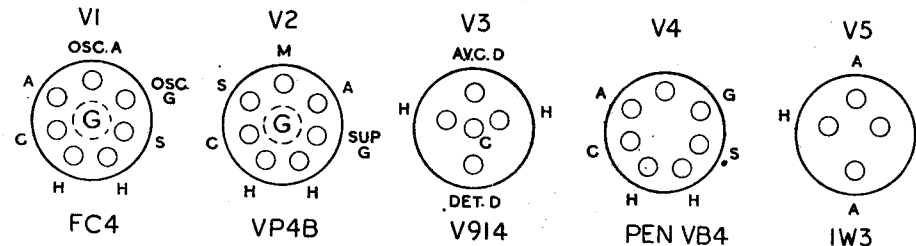
R	Ohms	R	Ohms
1	250	11	500,000
2	250	12	150,000
3	30,000	13	10,000
4	1 meg	14	250,000
5	20,000	15	100,000
6	10,000	16	500,000
7	5 meg	17	150
8	100,000	18	10,000
9	10,000	19	10,000
10	50,000	20	500,000

## CONDENSERS

C	Mfds	C	Mfds
1	.01	11	.001
2	.1	12	.0002
3	.1	13	.0001
4	.0005	14	.0005
5	.0011	15	.005
6	.1	16	25
7	.1	17	.002
8	.1	18	.03
9	.1	19	8
10	.1	20	8

## WINDINGS

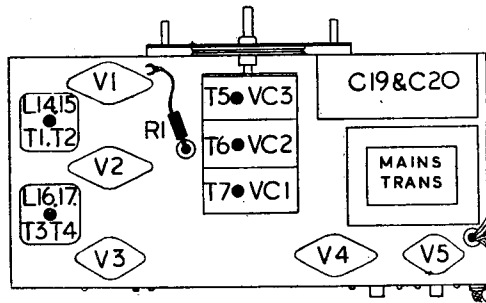
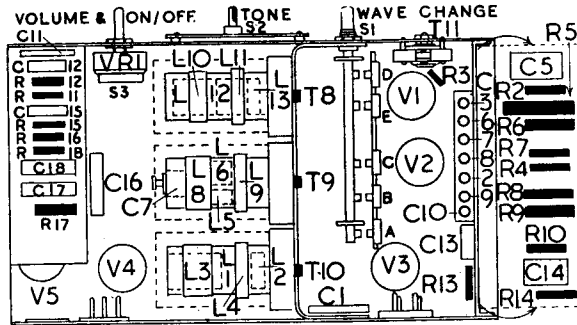
L	Ohms
1	1.5
2	7
3	3
4	12
5	3.5
6	.5
7	low
8	3
9	12
10	3.5
11	8.5
12	3.5
13	3.5
14	110
15	110
16	60
17	60
18	750
19	low
20	low
21	2.5
22	2,000
23	.1
24 (total)	600
25	.05
26 (total)	25



## BUSH SAC31

Continued

(Right) how parts are arranged below the chassis of the Bush SAC31; and (below) the top deck layout. Trimmers are located both on and under the chassis.



**MW Band.**—Switch to MW and tune receiver to 200 m. Inject a 200 m signal and adjust T3 for maximum output. Adjust receiver and service oscillator to 250 m and trim T4 and T5 for maximum output.

**LW Band.**—Switch to LW and tune receiver to 1,300 m. Inject a signal of this wavelength and adjust T6 for maximum output, then adjust T7 and T8. Tune receiver and service oscillator to 1,700 m and adjust the core of L19 for calibration.

**Note.**—The main intermediate frequency is 480 kcs, but receivers within a radius of about 40 miles from the Washford Cross, Droitwich, Westerglen, and Burghhead Stations were aligned at 465 kcs.

### RE-SETTING BUTTONS

(1) In the hole beside the white button is an ivory box-spanner for re-setting the button keys. Pull out the spanner and, holding it lightly between two fingers, fully unscrew the left-hand key of the button to be re-set. (It may require several turns, or only half a turn.) Do not press on the keys or force them past their stops or damage will result.

(2) Press the station button and turn its left-hand key in a clockwise direction for as many turns as are indicated on the name card for that station and that button.

(3) Increase volume by volume control.

(4) Turn right-hand key (of same button) to right or left until the output from the speaker is loudest. Do not fully unscrew right-hand key.

(5) Press white button, tune by knob to the wanted station, and make a mental note of the programme.

(6) Press station button and turn left-hand key to right or left until the same programme is heard. (It will probably be within one complete turn in either direction.)

(7) Carefully adjust left-hand key, then right-hand key, until "mystic Eye" opens widest. The adjustment is now complete. Replace spanner and front panel and slide in the new station name.

### HOTPOINT WASHER—Continued from page ii

comes between two of teeth on worm gear. Tilt mechanism to prevent loss of oil.

**Adjustment of worm and wormwheel engagement.**—The wormwheel is on an eccentric shaft to permit fine adjustment of engagement.

Make the adjustment preferably with motor running and gyrotor stationary.

Loosen clamp bolt,  $\frac{3}{4}$  in. BS Fine hexagon, righthand thread. Insert tommy bar in  $\frac{1}{4}$  in. dia. hole in worm wheel shaft top end. Loosen shaft locknut,  $\frac{3}{4}$  in. BS Fine hexagon, right-hand thread, until it is just possible to turn shaft with tommy bar.

With tommy bar, turn worm wheel shaft in a counter-clockwise direction, looking down from above to bring worm wheel and worm into closer mesh. Turn shaft with caution until you hear an increase in noise level, then back off slightly until gears again become silent.

Whilst holding adjustment with tommy bar, tighten  $\frac{3}{4}$  in. locknut really firmly to ensure test shaft cannot turn. Finally, re-tighten the  $\frac{3}{4}$  in. clamp bolt.

## EKCO PBUI79—Continued from page vi.

fed from the anode of V2 via C25, the load resistances being R15 and R16. Full AVC is applied via R14 and R1 to the grid circuit of V1, while smaller control is applied from the junction of R15, R16 to the grid circuit of V2.

The output transformer L29, L30 passes on the signal from V3 to the permanent-magnet low-resistance moving-coil speaker in which L32 is the speech coil. Extra loudspeaker sockets are connected across L30 with a muting switch S1 to silence the internal speaker.

LT and HT supplies conform to the usual practice in universal receivers, the heaters being in series with a mains dropping resistance R26, with HF filtering in the mains leads effected by L34, L35.

Rectifying valve V4 has its anodes strapped and operates as a half-wave rectifier in series with the positive mains input and feeds HT via the smoothing choke L33 and condensers C39, C40.

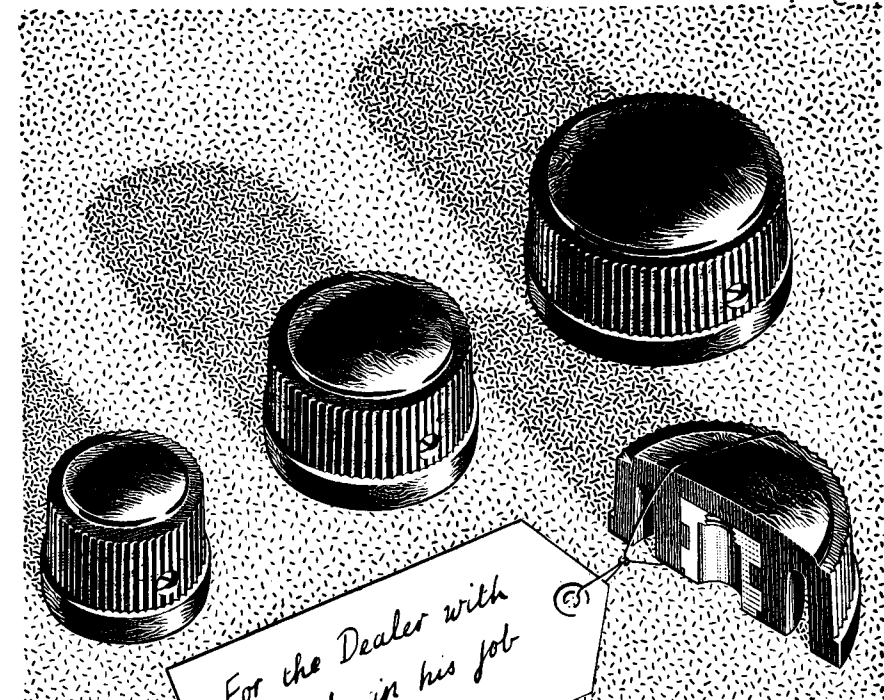
### GANGING

**IF Circuits.**—Check calibration which should be horizontal to the right with gang fully meshed. Tune receiver to 500 m with volume control at maximum and tone control to high. With output meter connected to the extra loudspeaker sockets inject a signal of 480 kc via a .02 mfd condenser to the top cap grid of V1, leaving the existing grid lead in place.

Adjust the cores of L14, L13, L12 and L11 for maximum output.

**IF Filter.**—Remove .02 mfd condenser and connect service oscillator in aerial socket. Unscrew core of L1 and then screw in, tuning for maximum dip on meter, ignoring the small dip in the centre position.

**SW Band.**—Remove scale and fit dummy scale provided by the manufacturers. Adjust pointer as before and switch receiver to SW. Tune receiver to 17 mc and inject a signal of this wavelength into the aerial and earth sockets. Adjust T1 and T2 for maximum output so that maximum signal coincides with true calibration. Check calibration at 6 mc.



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