

BUSHwww.radio-workshop.co.uk**Model PB.83**

General Description : Five-valve, including rectifier, three-waveband superheterodyne receiver with seven push buttons, three as waveband switches for manual tuning and four as pre-tuned station selectors. Permeability tuning employed for pre-tuned stations and I.F. transformers. Released January 1946. Price £22 19s. 3d. (including purchase tax).

Power Supply : A.C. mains only, 200–250 volts, 40–100 c/s. Three tapplings 210, 230, 250. Consumption 40 watts.

Wavebands : L.W. 850–2000 m. (352.9–150 kc/s.); M.W. 200–560 m. (1500–535.7 kc/s.); S.W. 16.5–51 m. (18.18–5.88 Mc/s.).

Button No. 1, 1100–2000 m.; Button No. 2, 350–550 m.; Button No. 3, 350–550 m.; Button No. 4, 200–350 m.

Intermediate Frequency : 465 kc/s.

Valves : Mullard (V₁) ECH35, frequency changer; (V₂) EF39, I.F. amplifier; (V₃) EBC33, detector, AVC diode, L.F. amplifier; (V₄) EL33, output; (V₅) IW4/350, mains rectifier.

Scale Lamps : One for each waveband, two for escutcheon illumination, one for Bush "Teleflic" short-wave logging device. All 6.2 volts, 0.3 amp.

Modifications : Some models can be used on 100–120, 200–250 volts A.C., in which case a mains transformer having a 110-volt tapping in the primary is fitted. Later models were fitted with a tapped primary output transformer. The unsmoothed H.T. from the rectifier is fed to the tap, and the ends of the winding are taken to the anode of V₄ and R17 respectively.

Alignment Procedure : A dummy aerial consisting of a 400-ohm non-inductive resistor for short waves, or a 200-pF. capacitor for medium and long waves, should be used where indicated.

A sensitive output meter is required as a visual indicator.

I.F. : Set the receiver to Medium waveband and tune to about 300 m. From the signal generator feed in a signal of 465 kc/s. to V₂ control grid (top cap). Adjust L₂₀ and L₁₉. Transfer the signal generator to V₁ hexode control grid (top cap). Adjust L₁₈ and L₁₇. A final adjustment should then be made to L₁₉ and L₂₀.

Manual Tuning—S.W. : Connect signal generator to the sensitive aerial socket (via dummy aerial) and chassis, set to 18 m. (16.67 Mc/s.).

Press S.W. Button (No. 6) and set pointer to 18 m. Adjust oscillator TC₉ and aerial TC₂ for maximum output.

Check calibration on 50 m. (6.00 Mc/s.).

M.W. : Press M.W. Button (No. 7), set pointer to 300 m. Set signal generator to 300 m. (1000 kc/s.). Adjust oscillator TC₈ and aerial TC₁ for maximum output.

Check calibration on 500 m. (600 kc/s.).

L.W. : Press L.W. Button (No. 5), set pointer to 1500 m. Set signal generator to 1500 m. (200 kc/s.). Adjust oscillator TC₁₀ and aerial TC₃ for maximum output.

Check calibration on 1900 m. (157.6 kc/s.).

Important. Adjustment of the L.W. oscillator TC₁₀ will affect the tuning of the pre-selected stations. After L.W. manual circuit adjustment, recheck L₁₃, L₁₄, L₁₅ and L₁₆.

Adjustment of the M.W. manual aerial TC₁ will necessitate re-adjustment of the M.W. pre-selected trimmers TC₄, TC₅ and TC₆.

Pre-selected Station Adjustment, Buttons 1-4: Connect the aerial and earth to the sockets. Tune to the station required on the Manual Tuner to ascertain the nature of the programme.

Press the button allocated to that particular station. Turn the core adjustment (clockwise for increase in wavelength) above the button so that the index mark coincides approximately with the wavelength required. Then carefully rotate the core for the loudest output from the station.

Adjust the aerial-tuning trimmer below the button (clockwise for increase in wavelength) for loudest output. Unless the aerial trimmer is tuned fairly near to the wavelength of the desired station, it may not be possible to make the necessary adjustment to the oscillator circuit, so as far as possible the aerial and oscillator adjustments should be aligned together. Finally, make a careful re-adjustment of each tuned circuit. The remainder of the circuits associated with each button should be adjusted in the same manner as outlined above.

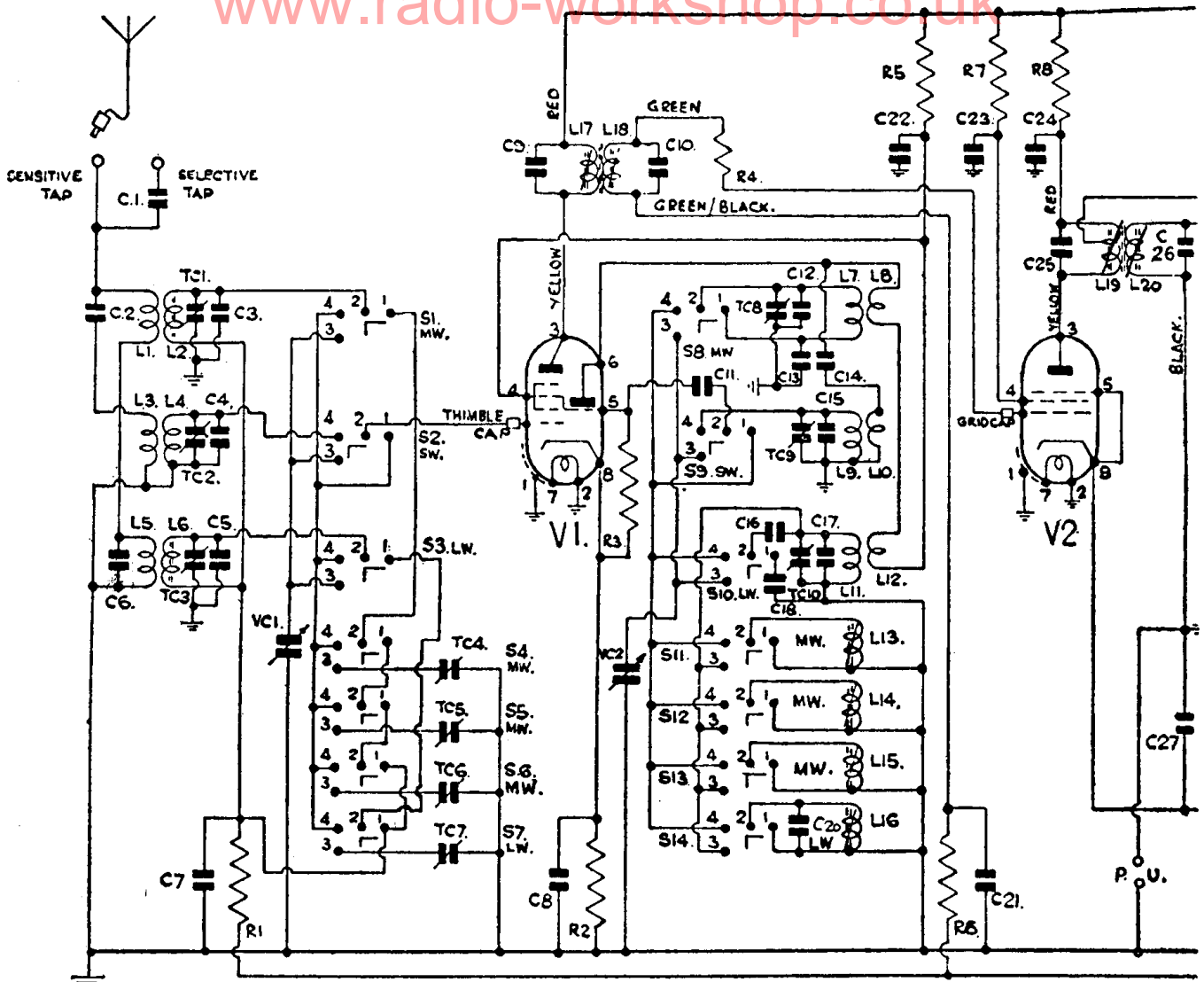
D.C. Resistances :

L ₁	0.5 ohm	L ₂	1.0 ohm	L ₃ , L ₄	Under $\frac{1}{2}$ ohm	L ₅	30 ohms
L ₆	14 ohms	L ₇	1.5 ohms	L ₈	1.0 ohms	L ₉	Under $\frac{1}{2}$ ohm
L ₁₀	1.0 ohm	L ₁₁	2.7 ohms	L ₁₂	2.3 ohms	L ₁₃	2.0 ohms
L ₁₄	2.3 ohms	L ₁₅	2.3 ohms	L ₁₆	4.0 ohms	L ₁₇ , 18, 19, 20	5 ohms each
Mains transformer :			Special mains transformer :				
Primary 210-volt tap			40 ohms	110-volt tap		19 ohms	
230-volt tap			45 ohms	100-120, 200-250 volts.		Other details as above	
250-volt tap			49 ohms	Output transformer :			
Secondary H.T. winding			425 ohms total	Primary		480 ohms	
Heater winding			0.22 ohm total	Secondary		0.37 ohm	
				Ratio		86 : 1	

Voltage Checks : When operating on 230 volts, A.C.

ECH35	Hex. anode	.	.	140	EBC33	Anode	.	.	60
	Screen	.	.	60		Cathode	.	.	1.4
	Osc. Anode	.	.	60	EL33	Anode	.	.	290
	Cathode	.	.	6		Screen	.	.	140
EF39	Anode	.	.	95	IW4/350	Cathode	.	.	3.3
	Screen	.	.	75		Anodes 1 and 2	.	.	245 A.C.
	Cathode	.	.	1.4		Cathode	.	.	300

Pick-up Sockets : Pick-up sockets are provided, but no changeover switch is used, since the sockets are wired directly into the circuit. The tuning control or push buttons must be set away from a station to avoid break through. A pick-up having a D.C. resistance of approximately 700-2000 ohms is required, but a crystal type needs a correction circuit.

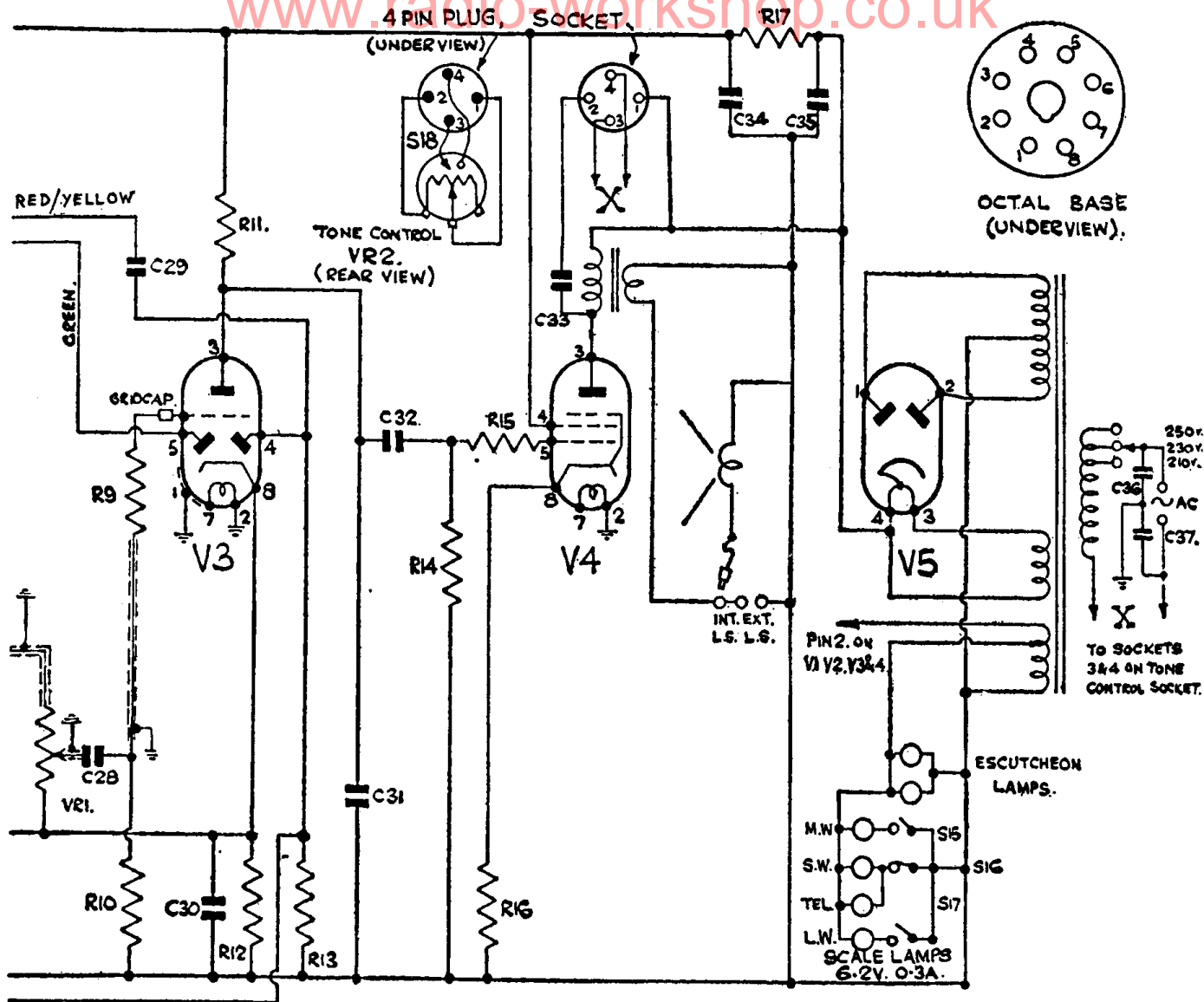


CIRCUIT DIAGRAM—

Capacitors.									
C1	50 pF.	C7	0.05	C13	556 pF.	C19	—	C25	110 pF.
C2	50 pF.	C8	0.05	C14	50 pF.	C20	316 pF.	C26	110 pF.
C3	5 pF.	C9	110 pF.	C15	15 pF.	C21	0.05	C27	100 pF.
C4	5 pF.	C10	110 pF.	C16	316 pF.	C22	0.05	C28	0.01
C5	30 pF.	C11	30 pF.	C17	130 pF.	C23	0.05	C29	50 pF.
C6	800 pF.	C12	15 pF.	C18	310 pF.	C24	0.05	C30	0.05

Fitting Cord Drive : Remove the glass scale by releasing its fixing clamps. Turn the tuning control fully clockwise, *i.e.*, until the pointer is at the bottom of the scale. Make the cord drive into a loop approximately 48 in. between the knots. Fix the anchor to the tensioning spring on the drive drum. Pass the cord around the drive drum for approximately three-quarters of a turn, in an anti-clockwise direction from the anchoring spring, and fix it temporarily to the chassis. Take the other end of the loop and pass it in a clockwise direction round the drum (in front of the turn already made), and over the right-hand side of the pulley nearest the drum; then pass it in front of the scale reflector to the right of the upper pulley, and into the first (left-hand) of the two slots in the "Telefic" drum, these slots being uppermost on the drum. Next, bring the cord out of the second (right-hand) slot, and wind it two and a half turns in a clockwise direction round the

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Resistors.			Variable Capacitors.				
C31	0.001	R1	1M	R8	10k	TC1-3	10 pF.
C32	0.01	R2	100	R9	100k	TC4	15-150 pF.
C33	0.03	R3	33k	R10	2.2M	TC5-7	100-450 pF.
C34	16	R4	4.7k	R11	68k	TC8-10	10 pF.
C35	16	R5	22k	R12	220	VC1	} Ganged
C36	0.01	R6	1M	R13	1M	VC2	
C37	0.01	R7	47k				

drum. The cord should now pass from the right-hand side, over the right-hand pulley, and meet the other side of the cord loop attached temporarily to the chassis. Ease it gently into the grooves of the pulley and the drive drum, and clip the pointer to the cord. Finally, adjust the pointer to give the correct position in relation to the tuning capacitor and the scale.