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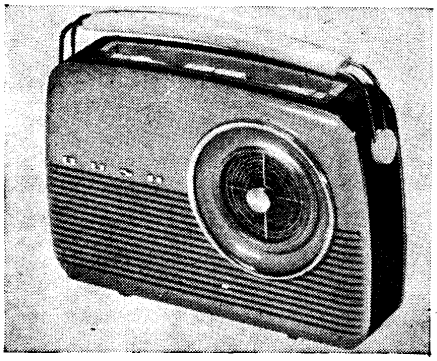
BUSH TR82B

2-band 7-transistor Portable Receiver



Appearance of the Bush TR82B.

THE Bush TR82B is a 2-band transistor portable receiver housed in a plastics case. It is fitted with seven Mullard transistors, a Mullard germanium diode, a press-button waveband switch, and an internal aerial. A co-axial socket is provided for the connection of a car aerial. The waveband ranges are 187-570m (M.W.) and 1,070-1,900m (L.W.).

The TR82C employs a similar chassis to the TR82B. The finish of the cases differs: C, chrome and blue; B, brown and brass.

Release date and original price: both models, May 1959, £17 8*s* 11*d. Purchase tax extra.*

TRANSISTOR ANALYSIS

Transistor voltages given in the table (col. 2) are those derived from the manufacturers' information. They were measured on a model 8 Avometer, chassis being the positive connection in each case. There was no signal input and the volume control was at minimum.

Battery consumption is between 20mA and 30mA on an average programme and varies according to the volume control setting.

Transistor*	Emitter (V)	Base (V)	Collector (V)
TR1 OC44	1·1	1·0	6·4
TR2 OC45	0·25	0·35	7·2
TR3 OC45	0·45	0·6	7·0
TR4 OC71	1·0	1·1	1·5
TR5 OC78d	1·3	1·5	8·3
TR6 OC78†	—	0·2	9·0
TR7 OC78†	—	0·2	9·0

**See "Early Versions" overleaf. †Matched pair.*

CIRCUIT DESCRIPTION

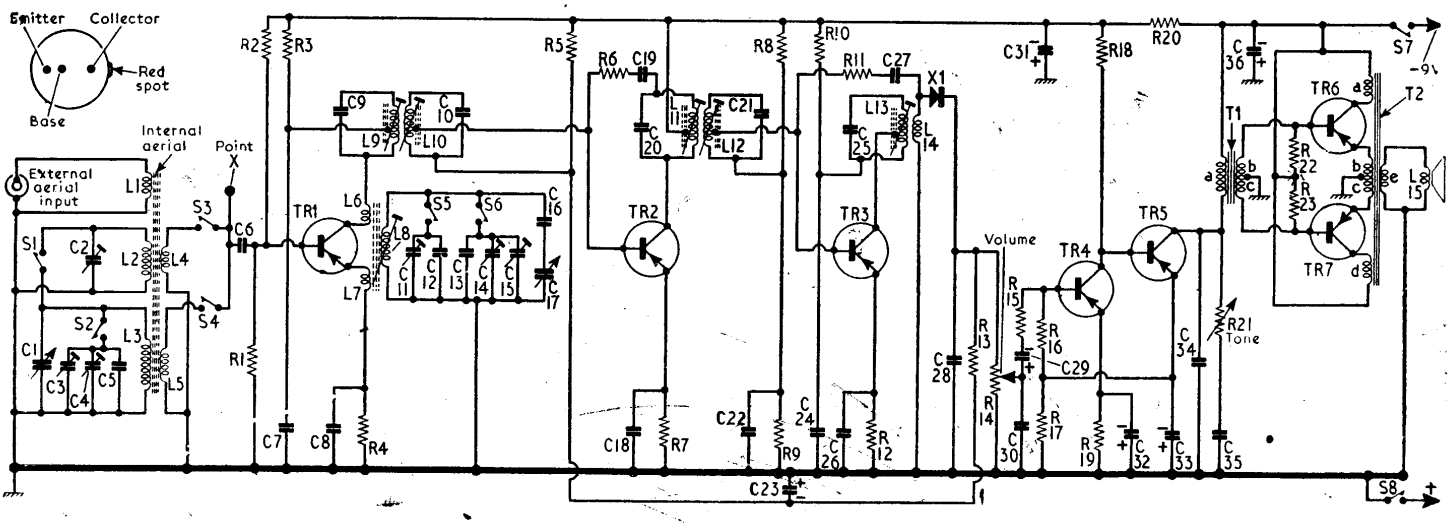
L1-L5 are mounted on a ferrite rod. For L.W. reception, aerial coil **L3** is tuned by **C1, C3-C5;** for M.W. reception, **L2** and **L3** are connected in parallel and tuned by **C1, C2.** A socket is provided for the connection of an external aerial, which is coupled to the aerial coils via **L1. L4** (M.W.) and **L5** (L.W.) are placed adjacent to the aerial coils and provide low impedance coupling to the base of the self-oscillating mixer **TR1.**

Local oscillations are produced by feedback from the collector to the emitter

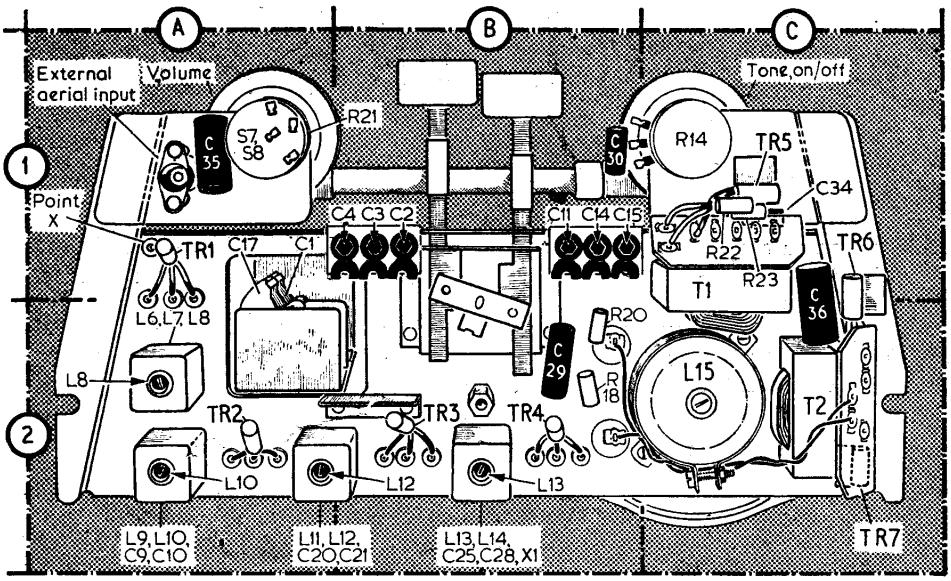
Resistors			
R1	22kΩ	F4	
R2	100kΩ	F4	
R3	1kΩ	F4	
R4	1·8kΩ	F4	
R5	180kΩ	E4	
R6	10kΩ	F4	
R7	220Ω	F4	
R8	47kΩ	E4	
R9	2kΩ	F4	
R10	270Ω	E4	
R11	2·2kΩ	E4	
R12	470Ω	E4	
R13	15kΩ	E4	
R14	5kΩ	C1	
R15	1·8kΩ	E4	
R16	7·5kΩ	E4	
R17	330Ω	D3	
R18	5·6kΩ	B2	
R19	1·2kΩ	F4	
R20	470Ω	B2	
R21	10kΩ	A1	
R22	9·1kΩ	C1	
R23	9·1kΩ	C1	
Capacitors			
C1	523pF	A1	
C2	30pF	B1	
C3	30pF	B1	
C4	30pF	B1	
C5	150pF	E3	
C6	0·04μF	F3	
C7	0·04μF	F4	
C8	0·02μF	F4	
C9	400pF	A2	
C10	200pF	A2	
C11	30pF	B1	
C12	10pF	E4	
C13	490pF	E4	
C14	30pF	B1	
C15	30pF	B1	
C16	556pF	F4	
C17	523pF	A1	
C18	0·04μF	F4	
C19	6·8pF	F4	
C20	400pF	A2	
C21	200pF	A2	
C22	0·04μF	E4	
C23	8μF	F4	
C24	0·04μF	E4	
C25	200pF	B2	
C26	0·04μF	E4	
C27	27pF	E4	
C28	0·01μF	B2	
C29	8μF	B2	
C30	0·04μF	B1	
C31	100μF	E4	
C32	100μF	E4	
C33	500μF	D3	
C34	0·01μF	C1	
C35	0·25μF	A1	
C36	100μF	C2	
Coils*			
L1	0·8	F3	
L2	0·5	D3	
L3	12·0	F3	
L4	—	D3	
L5	1·3	F3	
L6	—	A2	
L7	—	A2	
L8	2·0	A2	
L9	5·5	A2	
L10	8·0	A2	
L11	5·5	A2	
L12	8·0	A2	
L13	9·0	B2	
L14	0·8	B2	
L15	3·0	C2	
Transformers*			
T1 a	170·0	C1	
T1 b	200·0	C1	
T1 c	200·0	C1	
T2 a	2·6	C2	
T2 b	10·0	C2	
T2 c	10·0	C2	
T2 d	2·6	C2	
T2 e	0·19	C2	
Miscellaneous			
X1	OA70	B2	
S1-S4	—	E3	
S5, S6	—	E4	
S7, S8	—	A1	

**Approximate D.C. resistance in ohms.*

If component numbers in these tables are used when ordering spares, the fact should be mentioned, as these numbers may differ from those used by the manufacturer.



Circuit diagram of the Bush TR82B together with a diagram of the transistor base connections. Waveband switches **S1**, **S3** *aad* **S5** *close on M.W., connecting* **L2** *and* **L3** *in parallel. Switches* **S2, S4** *and* **S6** *close on L.W*



Rear view of the chassis. Point X in location reference A1 is provided for the connection of a signal generator during I.F. alignment. Output transistors **TR6** *and* **TR7** *are mounted on the right of the chassis;* **TR7** *is hidden by* **T2** *and is shown dotted in this illustration.*

circuits of **TR1**. Oscillator coil **L8** is tuned by **C16, C17, C11** and **C12** (M.W.) and by **C16, C17, C13-C15** (L.W.).

The output of **TR1** is coupled via a two-stage intermediate frequency amplifier comprising earthed-emitter transistors **TR2, TR3,** double-tuned transformers **L9, L10** and **L11, L12,** and single-tuned transformer **L13, L14** to germanium diode detector **X1**. Base bias for **TR1, TR2** and **TR3** is provided by the potential dividers **R2, R1; R5, R13, R14;** and **R8, R9** respectively. Collector currents are stabilized by emitter resistors **R4, R7** and **R12. TR2** and **TR3** are neutralized by **R6, C19** and **R11, C27.**

Intermediate frequency 470kc/s.

The audio frequency component in the rectified output of **X1** is developed across volume control **R14** and passed via **C29, R15** to the A.F. amplifier **TR4.** A.G.C. bias is derived from the D.C. component of the rectified signal developed across **R14,** which is fed back to the base circuit of **TR2** via decoupling components **R13, C23.**

The output of **TR4** is D.C. coupled to the base of driver stage **TR5,** and thence via **T1** to the bases of the Class B push-pull output transistors **TR6, TR7.**

CIRCUIT ALIGNMENT

Equipment Required.—A signal generator covering the frequency range 214kc/s to 1,500kc/s, modulated 30 per cent at 400c/s; an A.C. voltmeter for use as an output meter; a length of insulated wire to form a coupling loop; a 0.1μF capacitor; and a non-metallic trimming tool having a small screwdriver blade for adjusting the cores of the I.F. transformers.

Allow the signal generator to warm up for at least 15 minutes before commencing the alignment operations. If two peaks are found when adjusting the cores of the I.F. transformers, the correct one is that nearer the adjusting end of the coil can. Maintain the signal generator output as low as practicable at all times during the alignment procedure in order to avoid A.G.C. action.

1.—Remove the chassis from the cabinet as described under "Dismantling" in col. 3.

2.—Switch the receiver to M.W. and tune it to approximately 300m. Set the volume control to maximum and the tone control for maximum top response. Connect the output meter across the speaker and the signal generator to point **X** (location reference A1), via the 0.1μF capacitor.

3.—Feed in a modulated 470kc/s signal and adjust the cores of **L13** (B2), **L12** (B2), **L11** (E4), **L10** (A2) and **L9** (F4) in that order for maximum output.

4.—Replace the chassis in the case and check that with the tuning gang set at maximum capacitance the pointers coincide with the horizontal datum line on the tuning scale.

5.—Connect the generator output leads to the length of insulated wire, formed into a loop about 7in across. Place the loop 3 feet from the chassis and with its plane at right angles to the ferrite rod aerial.

6.—Switch the receiver to M.W. and tune it to 500m. Feed in a 600kc/s signal and adjust **L8** (A2) for maximum output. The M.W. aerial coil **L2** (D3) is unlikely to re-require adjustment. However, should this be found necessary, feed in a 600kc/s signal and slide the former of **L2** along the ferrite rod for maximum output.

7.—Tune the receiver to 200m. Feed in a 1,500kc/s signal and adjust **C11** and **C2** (location reference B1) for maximum output.

8.—Repeat operations 6 and 7.

9.—Switch the receiver to L.W. and tune it to 1,400m. Feed in a 214kc/s signal and adjust **C14, C15** and **C3, C4** (location reference B1) for maximum output. The L.W. aerial coil **L3** (F3) should not be disturbed.

DISMANTLING

Removing Chassis.—Loosen the large screw in the centre of the back cover and remove the cover; disconnect and remove the battery;

remove the tuning control knob and pointer. As the tuning knob is difficult to grip with the hand, the manufacturers' recommend that it be pulled off with the aid of a rubber suction pad sink cleaner. Do not use a screwdriver or other tool as a lever;

move four Phillips head chassis retaining screws;

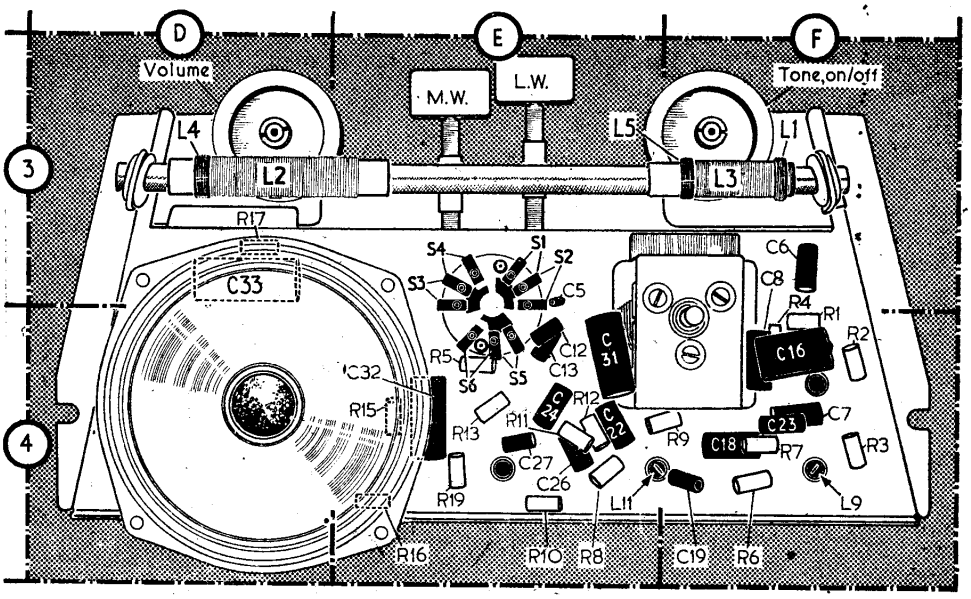
pull the lower edge of the chassis outwards and then downwards to allow the tuning gang spindle and control knobs to clear the holes in the case.

GENERAL NOTES

Switches.—The waveband switches **S1-S6** are ganged in a single rotary unit and are operated by means of two press-buttons. The unit is shown in our front view illustration of the chassis in location references **E3, E4,** where the contacts are identified. **S1, S3** and **S5** close on M.W. and **S2, S4** and **S6,** on L.W.

Batteries.—The batteries recommended by the manufacturers are an Ever Ready PP9, a Vidor T6009, or a Drydex DT9, rated at 9V each.

Early Versions.—In early versions of this receiver TR4-TR7 are Mullard OC72's. **C12** is 22pF; **C13,** 470pF; **C23,** 4μF; **R16,** 8.2kΩ; **R18,** 6.8kΩ; and **R22, R23** are 10kΩ.



Front view of the chassis. Components which are hidden by the speaker are shown dotted. The waveband switch unit **S1—S6** *is shown in E3, E4, where the contacts are identified.*

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