BUSH - TR102

TRANSISTOR ANALYSIS

Transistor voltages given in the table below are derived from information supplied

Transistor		Emitter (V)	Base (V)	Collector (V)
VT1	AF117	1·1	1·1	7·0
VT2	AF117	0·8	1·0	4·4
VT3	AF117	1·0	1·25	6·8
VT4	OC71	0·85	0·95	2·7
VT5	OC81D	0·9	1·0	8·7
VT6	OC81	—	0·18	*
VT7	OC81	—	0·18	*

**No readings quoted.*

Capacitors

C1	150pF	B1
C2	0·01μF	A1
C3	0·02μF	F3
C4	300pF	A2
C5	300pF	A2
C6	556pF	F3
C7	4μF	F4
C8	490pF	B1
C9	300pF	A2
C10	0·1μF	F4
C11	0·1μF	E4
C12	300pF	A2
C13	250pF	B2
C14	0·02μF	F4
C15	0·02μF	E4
C16	0·02μF	E4
C17	0·01μF	B2
C18	8μF	E3
C19	0·01μF	C1
C20	8μF	C1
C21	0·04μF	C1
C22	100μF	C1
C23	8μF	C1
C24	0·04μF	C1
C25	100μF	E4
C26	100μF	B1
C27	0·1μF	B2
C28	0·02μF	B2
C29	100μF	B2
C30	0·1μF	B2
C31	0·04μF	B2
CV1	523pF	A2
CV2	523pF	A2
CT1	40pF	B1
CT2	80pF	B1
CT3	40pF	B1
CT4	80pF	B1

Coils*

L1	1·0	C1
L2	—	B1
L3	—	B1
L4	14·5	C1
L5	2·5	C1
L6	—	A1
L7	—	A1
L8	2·5	A1
L9	6·5†	A2
L10	6·5†	A2
L11	6·5†	A2
L12	6·5†	A2
L13	6·5†	B2
L14	1·0§	B2
L15	3·0	—

Resistors

R1	33kΩ	F3
R2	6·8kΩ	F3
R3	1kΩ	F3
R4	150kΩ	A1
R5	680Ω	E4
R6	2·2kΩ	F4
R7	680Ω	F4
R8	22kΩ	E4
R9	4·7kΩ	F4
R10	390Ω	E4
R11	1kΩ	B2
R12	560Ω	E4
R13	56kΩ	E4
R14	8·2kΩ	E4
R15	82kΩ	C1
R16	22kΩ	C1
R17	15kΩ	C1
R18	5·6kΩ	C1
R19	68Ω	C1
R20	1kΩ	C1
R21	39kΩ	B1
R22	8·2kΩ	B1
R23	56Ω	B2
R24	270Ω	B1
R25	470Ω	B2
R26	6·8kΩ	B2
R27	150Ω	B1
R28	10kΩ	B2
R29	4·7Ω	E4
R30	150Ω	B2
R31	56Ω	E4
R32	68Ω	B2
RV1	5kΩ	C1

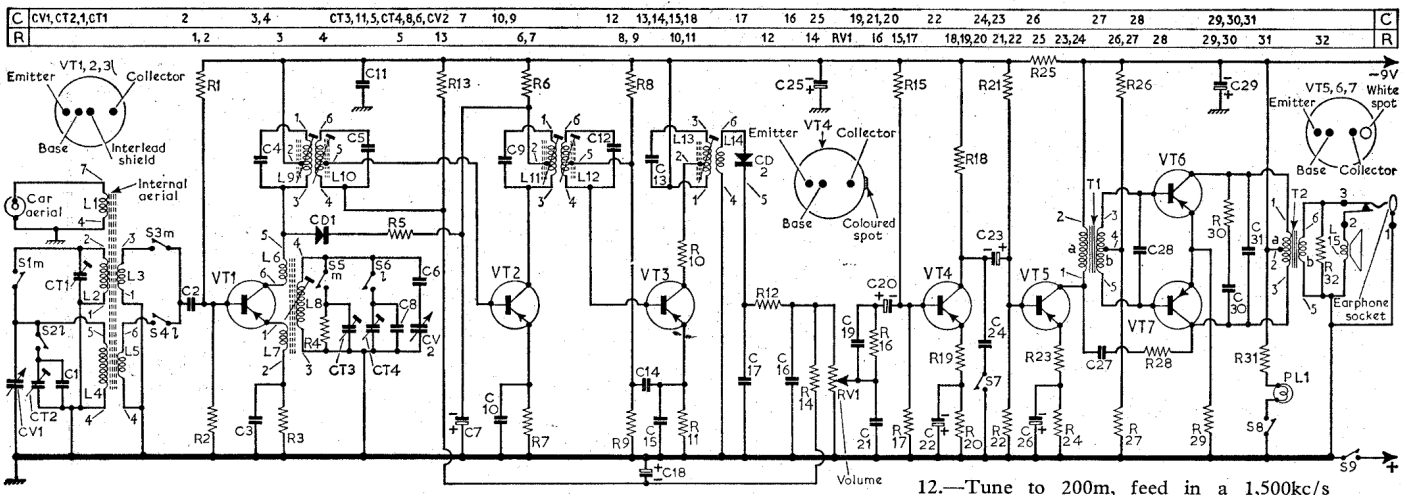
Transformers*

T1 a	138·0	B2
T1 b	120·0	B2
T2 a	5·2	B2
T2 b	—	B2

Miscellaneous

CD1	OA79	F3
CD2	OA90	B2
PL1‡	—	E3
S1-S7	—	D4
S8	—	A1
S9	—	A1

**Approximate D.C. resistance in ohms.*
†4Ω in early production receivers.
§0·5Ω in early production receivers.
‡6V, 60mA miniature.



CIRCUIT ALIGNMENT

Equipment Required.—An A.M. signal generator modulated 30% at 400c/s; a 0-200mW output meter to match 3ohms impedance; a length of insulated wire formed into an R.F. coupling loop; a 2.2pF capacitor and a 0.1μF capacitor; a de-sensitizing resistor of 8,200 ohms fitted with crocodile clips and a non-metallic bladed type trimming tool for adjustment of the I.F. and oscillator coil cores.

1.—Switch on the signal generator and allow a 15-minute warm-up period. Remove the chassis from its case.

Disconnect the loudspeaker and connect the output meter in its place. The output meter may be connected via the earphone socket using the correct type of plug.

Note: If the output meter is connected across the output transformer secondary with the speaker remaining in circuit, ensure that the output does not exceed 70mW otherwise output transistors may be damaged.

2.—Removal of the chassis from the case renders the on/off switch **S9** inoperative and the switch should be by-passed during alignment. Do this by connecting the battery positive terminal to chassis. Set the volume control to the maximum output position and the tone control to maximum treble. During alignment the input signal should be adjusted to maintain the output at 50mW (20mW if the internal loudspeaker is left connected). If two peaks occur, the correct one is that which occurs at the outer end of the former.

3.—Switch receiver to M.W. and tune to a point at about 300m. Connect the signal generator via the 0.1μF capacitor to the junction of **C2** and **S4**.

4.—Feed in a 470kc/s modulated signal and adjust the cores of **L13** (location reference B2), **L12, L11** (A2) and **L10, L9** (A2) in that order for maximum output. Adjust each coil once only.

5.—For R.F. alignment refit the chassis to its case. If difficulty is being experienced through interference, temporarily desensitize the receiver by connecting the 8,200Ω resistor between the junction of **R13** and **R14** (E4) and chassis. Fully mesh the tuning gang and check that the cursor coincides with the datum mark at the L.F. end of the scale.

6.—Connect the signal generator via the 2.2pF capicitor to the junction of **CV1** and **S1** (A2). Switch to M.W. and tune receiver to 500m. Feed in a 600kc/s signal and adjust **L8** (A1) for maximum output.

7.—Tune receiver to 200m, feed in 1,500kc/s signal and adjust **CT3** (B1) for maximum output.

8.—Repeat operations 6 and 7 for correct calibration at both points.

9.—Switch to L.W. and tune to 1,400m. Feed in 214kc/s signal and adjust **CT4** (B1) for maximum output.

10.—Disconnect the signal generator from the junction **CV1, S1** and connect its output across the coupling loop. Place the loop about 3 feet from the chassis with its plane at right angles to the ferrite rod.

11.—Switch to M.W. and tune to 500m. Feed in a 600kc/s signal and adjust **L2** (B1) for maximum output.

12.—Tune to 200m, feed in a 1,500kc/s signal and adjust **CT1** (B1) for maximum output.

13.—Repeat operations 11 and 12 until no further improvement can be obtained.

14.—Switch to L.W. and tune to 1,400m. Feed in a 214kc/s signal and adjust **CT2** (B1) for maximum output.

The ferrite rod aerial coils are unlikely to require adjustment and operation 11 should only be carried out if obviously necessary. L.W. coil **L4** should not be moved.

Switches.—S1-S6 are the waveband switches; **S7** is the tone switch. They are combined in a three press-button unit which is wired to the chassis in location reference A1. Individual switch contacts are identified in a separate drawing of the press-button unit inset in location D4. **S7** can be operated independently and is depressed for treble cut.

S8 is the pilot lamp switch which closes when the operator applies pressure to the tuning knob. When pressure is released it returns to the open position automatically. **S9** in location reference A1 is the receiver on/off switch and is operated by opening the tuning scale cover.