

"TRADER" SERVICE SHEET  
**1706**

# ROBERTS R404

Portable Transistor Radio Receiver

**E**MPLYING a transformerless complementary push-pull output stage, Roberts R404 is a seven transistor portable radio receiver covering medium and long wavebands. Two external sockets are provided, one for the connection of a car-type aerial and the other to give earphone listening facilities.

Waveband ranges are 183-570m (m.w.) and 1,120-2,000m (l.w.) with press-button waveband control and full length tuning scale. An internal ferrite rod aerial is

fitted. The chassis and two 9V dry batteries are housed in a fabric-covered case with polished wooden ends.

Release date and original price: March 1965 £15 7s 7d complete with batteries. Carrying cover £1 10s. Purchase tax extra in both cases.

### CIRCUIT VOLTAGES

Circuit voltage readings given below were taken from information supplied by the manufacturers, and indicate correct

operating conditions for the associated stages. They were measured on a model 8 Avometer with the receiver switched to m.w., volume control at minimum and no signal input.

Across R3, 1.05V. Across R7, 2.3V. Across R8, 0.68V. Across R11, 1V. Across C18, 7.1V. Across R19, 0.45V. Across R22, 0.32V. From the junction of R24 and R25 to chassis, 8.9V.

The total quiescent current should read 13mA.

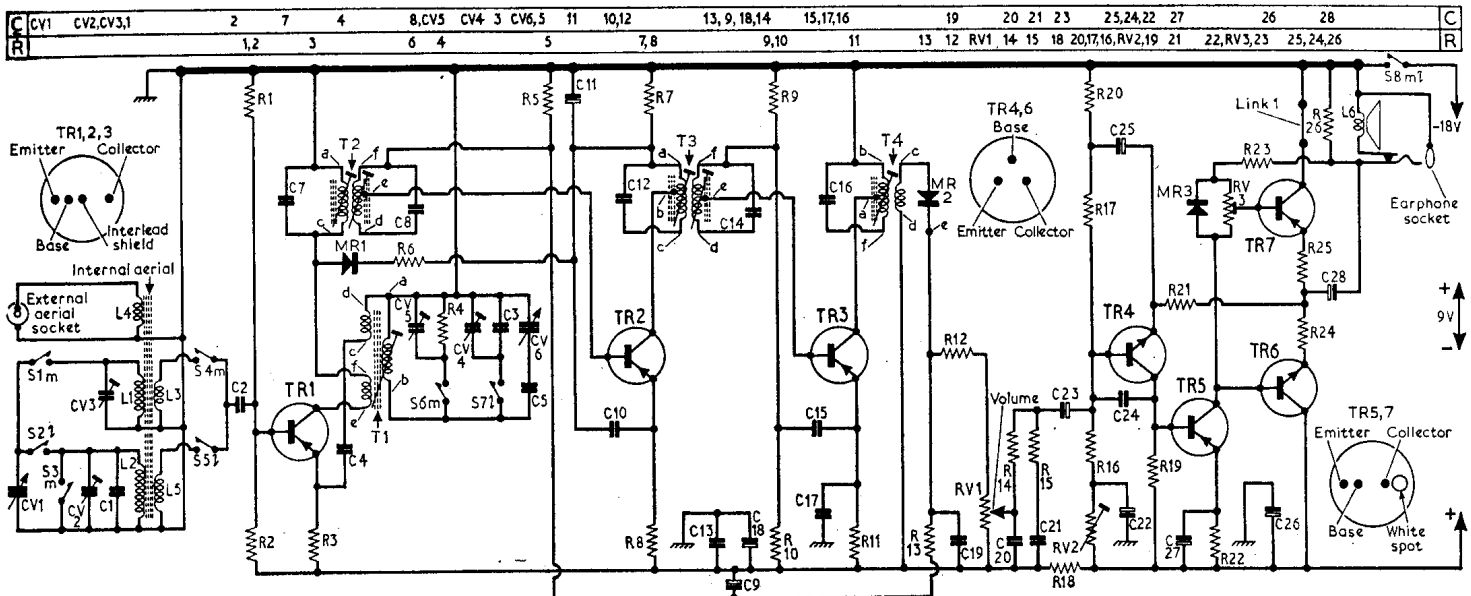
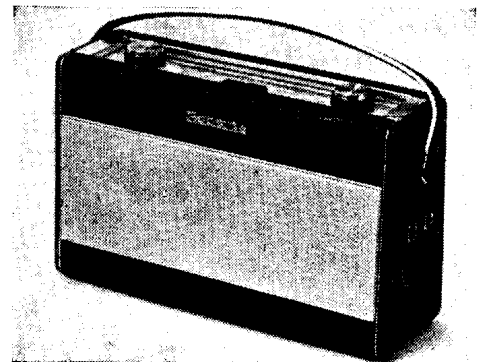
### COMPONENT VALUES AND LOCATIONS

Capacitors			Resistors			Coils & Transformers			Transistors			Miscellaneous		
C1	50pF	A1	CV2	80pF	B1	R24	2-2Ω	D2	TR1	AF117	B2	MR1	OA79	C2
C2	0.01μF	B1	CV3	40pF	B1	R25	2-2Ω	D2	TR2	AF117	C2	MR2	OA90	C1
C3	300pF	C2	CV4	80pF	B2	R26	330Ω	D2	TR3	AF117	C1	MR3	BA114	D2
C4	0.022μF	B2	CV5	40pF	B2	RV1	5kΩ	D1	TR4	AC127	D2	S1-S8	—	B1
C5	380pF	B1	CV6	—	A1	RV2	10kΩ	D1	TR5	OC81D	D2			
C6	560pF	C2				RV3	200Ω	D2	TR6	AC127	D2			
C7	560pF	C2							TR7	OC81	D2			
C8	560pF	C2												
C9	10μF	C2												
C10	0.047μF	C2												
C11	2μF	C1												
C12	270pF	D1												
C13	0.022μF	C2												
C14	270pF	D1												
C15	0.022μF	C1												
C16	250pF	C1												
C17	0.022μF	C1												
C18	100μF	C1												
C19	0.01μF	C1												
C20	0.022μF	D1												
C21	0.22μF	D1												
C22	100μF	D1												
C23	2μF	D1												
C24	1,000pF	D1												
C25	200μF	D2												
C26	100μF	D2												
C27	100μF	D1												
C28	350μF	D2												
CV1	—	A1												

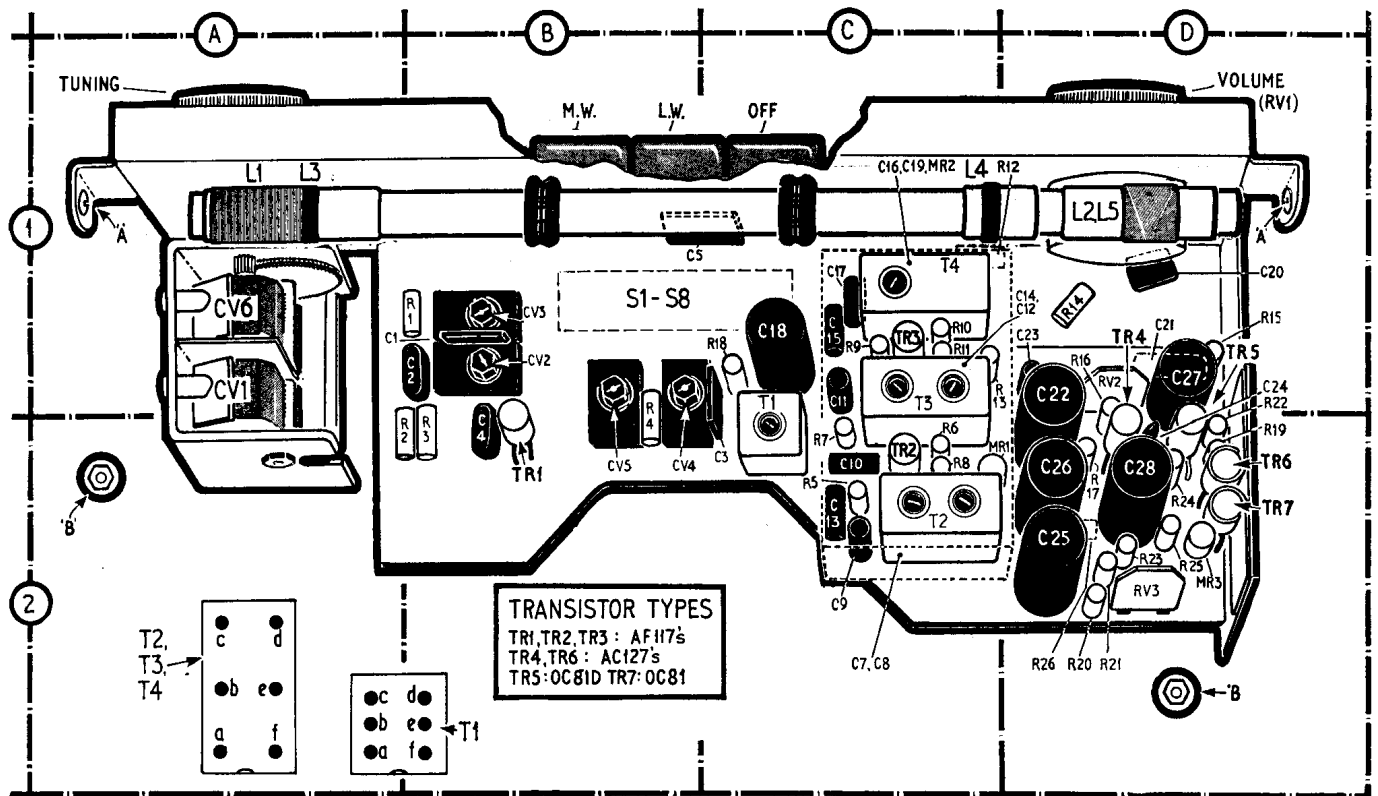
### CIRCUIT ALIGNMENT

**Equipment Required.**—An a.m. signal generator; an audio output meter with an impedance of 25Ω, or alternatively an a.c. voltmeter; an r.f. coupling coil and a narrow-bladed trimming tool. During alignment the signal input level should be reduced to keep the receiver output

(Continued overleaf, col. 1)



Circuit diagram of the Roberts R404



Rear view of component side of the vertical chassis. A separate sketch of the switch unit is shown below

**Circuit Alignment—continued**

as low as possible to prevent a.g.c. action.

The i.f. circuits should not normally require re-alignment unless it is known the cores have been disturbed. I.f. response may be checked for symmetry using a wobulator and oscilloscope.

- 1.—Connect the audio output meter in place of the loudspeaker or connect the a.c. voltmeter across the loudspeaker terminals. Connect the signal generator to the r.f. coupling coil and loosely couple the coil to the ferrite rod aerial.
- 2.—Switch receiver to m.w. and tune to a quiet spot at the h.f. end of the band. Feed in a 470 kc/s modulated signal and adjust the cores of T2, T3 and T4 for maximum output.
- 3.—Check that with the tuning gang fully meshed, the cursor coincides with the high wavelength (l.f.) end of the scale apertures.
- 4.—Tune receiver to 200m (calibration notch under the first nought of "200"). Feed in a 1,500 kc/s signal and adjust CV5 and CV3 for maximum output.
- 5.—Tune receiver to 536m (calibration notch above the first n in "Vienna"). Feed in a 560 kc/s signal and adjust T1 and L1 for maximum output.
- 6.—Repeat operations 4 and 5 for optimum results.
- 7.—Switch receiver to l.w. and set the cursor to the 200m calibration mark on the m.w. scale. Feed in a 263 kc/s signal and adjust CV4 and CV2 for maximum output.
- 8.—Set the cursor to the 536m calibration mark on the m.w. scale, feed in a

157 kc/s signal and adjust L2 for maximum output.

- 9.—Repeat operations 7 and 8 for optimum results.

**GENERAL NOTES**

**Dismantling.**—To remove the chassis from the case, first open the back cover and lay the receiver face downwards.

Remove two screws "A" and slacken

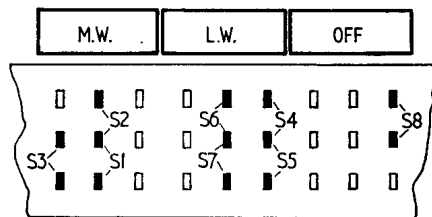


Diagram of the press-button switch unit

two 4BA nuts "B," and slide the slotted wood members away from the chassis.

Disconnect the external aerial socket and withdraw the chassis by easing backwards and upwards out of the case.

**Output Stage Bias.**—The output stage bias is controlled by the setting of RV3. For adjustment insert a low impedance millimeter in TR7 collector by disconnecting the flex link (Link 1) provided for this purpose on the foil side of the panel. With no signal input, adjust RV3 for a reading of 4mA.

**Output Stage Balance.**—To adjust for correct output stage balance, observe a sine wave output on an oscilloscope and

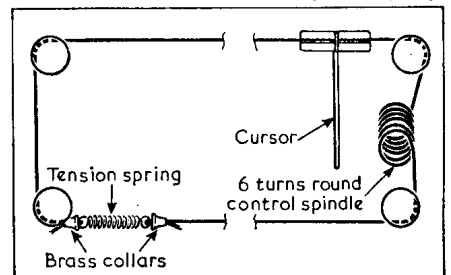
adjust RV2 for symmetry at the onset of clipping.

Alternatively, connect a high-resistance voltmeter between the junction R25, R24, C28 and chassis, and adjust RV2 to obtain a reading equal to half the total supply voltage.

**Switches.**—S1-S7 (waveband) and S8 (battery on/off) switches are housed in a press-button unit which is soldered directly into place on the printed circuit panel. Connections for each switch are shown separately in col. 2. Suffix letters following the switch numbers on the circuit diagram show the closed position for each switch where m means medium and l means long.

**Drive Cord Replacement.**—To fit a replacement drive cord, route the cord as shown in the sketch below, where the drive assembly has been drawn with the tuning gang in the maximum capacitance position. Fit the cursor to conform with the requirements in operation 3 of "Circuit Alignment."

**Batteries.**—9V Ever Ready PP9 (two).



Sketch showing the tuning drive system