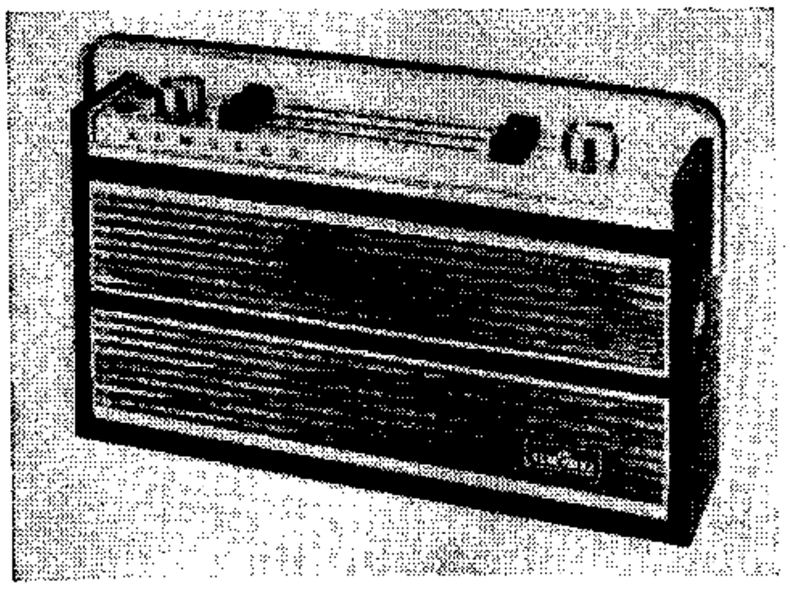
KB KR022 "Commodore" RGD RR222 "Rambler"

Transistored Portable Radio Receivers



Appearance of RGD RR222

PROVIDING a separate switched input circuit when operating with a car type aerial, KB KR022 and RGD RR222 are electrically identical, incorporating modular construction and press-button waveband switching.

Wavebands covered are l.w. (1,175–1,940m) and m.w. with bandspread over two halves giving m.w.1 (275–555m) and m.w.2 (185–280m).

A tape socket for record and playback is featured, also a switched earphone socket providing a mute to the loudspeaker when a miniature jack plug is inserted.

At maximum volume a 7in by 3¾in 8Ω loudspeaker delivers 850mW of audio power. Power being provided by an Ever Ready PP9 or equivalent type battery.

TRANSISTOR ANALYSIS

Transistor voltages given in the table below, were taken from information supplied by the manufacturers. They were measured on a 20,000Ω/V meter and are negative with respect to battery positive.

CIRCUIT ALIGNMENT

Equipment Required.—An a.m. signal generator (output impedance 10Ω) capable of being modulated 30 per cent at 1kc/s; an audio output meter with an impedance of 8Ω; a screened test coil made up with 85 turns of enamel covered wire, wound on a 2in diameter former; a dummy aerial constructed as illustrated overleaf; 0·1μF and 18pF capacitors; an oscilloscope; an a.f. signal generator and a 100kΩ resistor.

Before starting the alignment procedure it is advisable to check the output balance as described in the following paragraph.

Output Balance Adjustment.—To check the balance of output transistors TXa3/TXa4, first ensure that the battery is in good condition and provides a nominal 9V on load. Connect the output meter via a miniature jack plug to the earphone socket (this disconnects the loudspeaker), and the oscilloscope across the input terminals of the output meter. Feed in a 1kc/s sine wave via the 100kΩ resistor to the top of the volume control R1 (the tape socket is a convenient point), turn volume control to maximum and adjust the signal generator attenuator for a measured 700mW as indicated on the output meter. Adjust Ra4 in conjunction with the signal generator attenuator for equal clipping of the displayed waveform.

Alternatively an Avo model 8 set to the 10V d.c. range may be connected between the junction of Ra13/Ra14 and chassis (positive to chassis). Adjust

(*Continued overleaf col.* 1)

Transistor Table

Transistor		Emitter (V)	Base (V)	Collector (V)
TXm1	AF117	0·95	—	7·5
TXk1	AF117	1·6	1·9	—
TXk2	OC70	—	—	4·0
TXa1	AC157	4·3	—	0·35
TXa2	AC113	0·25	0·35	—
TXa3	AC154	5·0†	—	9·0
TXa4	AC157	5·0†	—	0

† *Measured at the junction of* Ra13 *and* Ra14 *Quiescent current* 19mA.

Resistors

Rm1	39kΩ	F3
Rm2	6·8kΩ	F3
Rm3	1kΩ	F3
Rk1	680Ω	
Rk2	12kΩ	
Rk3	15kΩ	
Rk4	15kΩ	
Rk5	100Ω	
Rk6	330Ω	
Rk7	4·7kΩ	**
Rk8	820Ω	
Rk9	47kΩ	
Rk10	100Ω	
Rk11	100Ω	
Rk12	270Ω	
Rk13	18kΩ	
Ra1	6·8kΩ	C2
Ra2	180Ω	C2
Ra3	12kΩ	C2
Ra4	10kΩ	D2
Ra5	10kΩ	C2
Ra6	10Ω	C2
Ra7	1kΩ	C2
Ra8	820Ω	D2
Ra9	27Ω	D2
Ra10	VA1034	D2
Ra11	500Ω	D2
Ra12	430Ω	D2
Ra13	1Ω	D2
Ra14	1Ω	D2
Ra15	390Ω	C2
R1	20kΩ	H4

Capacitors

Cm1	125pF	F3
Cm2	118pF	F3
Cm3	69pF	F3
Cm5	0·047μF	F3
Cm6	0·02μF	F3
Cm7	466pF	F3
Cm8	520pF	F3
Cm9	69pF	E3
Cm10	118pF	E3
Tm1	30pF	E3
Tm2	30pF	E3
Tm3	50pF	E3
Ck1	0·047μF	
Ck2	0·047μF	
Ck3	250pF	
Ck4	2·7pF	
Ck5	250pF	
Ck6	25μF	**
Ck7	0·47μF	
Ck8	250pF	
Ck9	2,200pF	
Ck10	4,700pF	
Ck11	0·22μF	
Ca1	160μF	C2
Ca2	0·22μF	C2
Ca3	50μF	C2
Ca4	320μF	C2
Ca5	160μF	C2
Ca6	1,800pF	D2
Ca7	200μF	D2
Ca8	320μF	D2
C1	0·022μF	D2
VC1, VC2	—	G4
TC1	140pF	G4

*Coils**

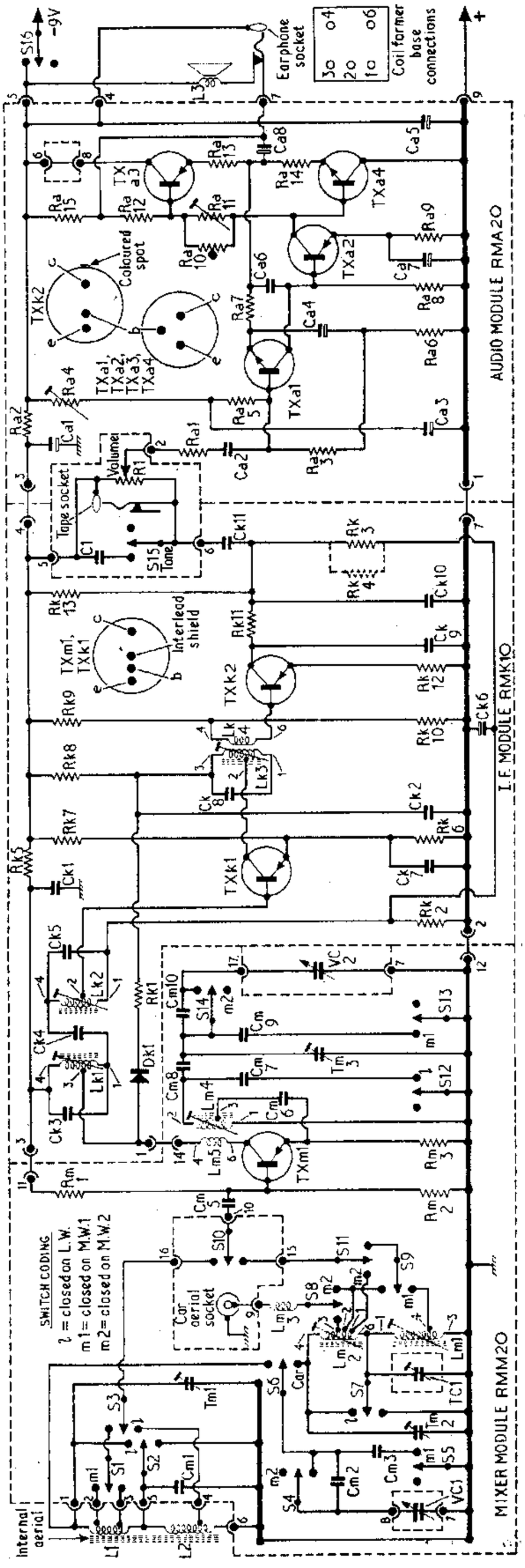
Lm1	11·6Ω	F3
Lm2	2·8Ω	F3
Lm3	—	F3
Lm4	1·8Ω	F3
Lm5	—	F3
Lk1	5·5Ω	
Lk2	5·5Ω	**
Lk3	3·7Ω	
Lk4	—	
L1	1·8Ω	G4
L2	7·8Ω	H4
L3	8Ω	H4

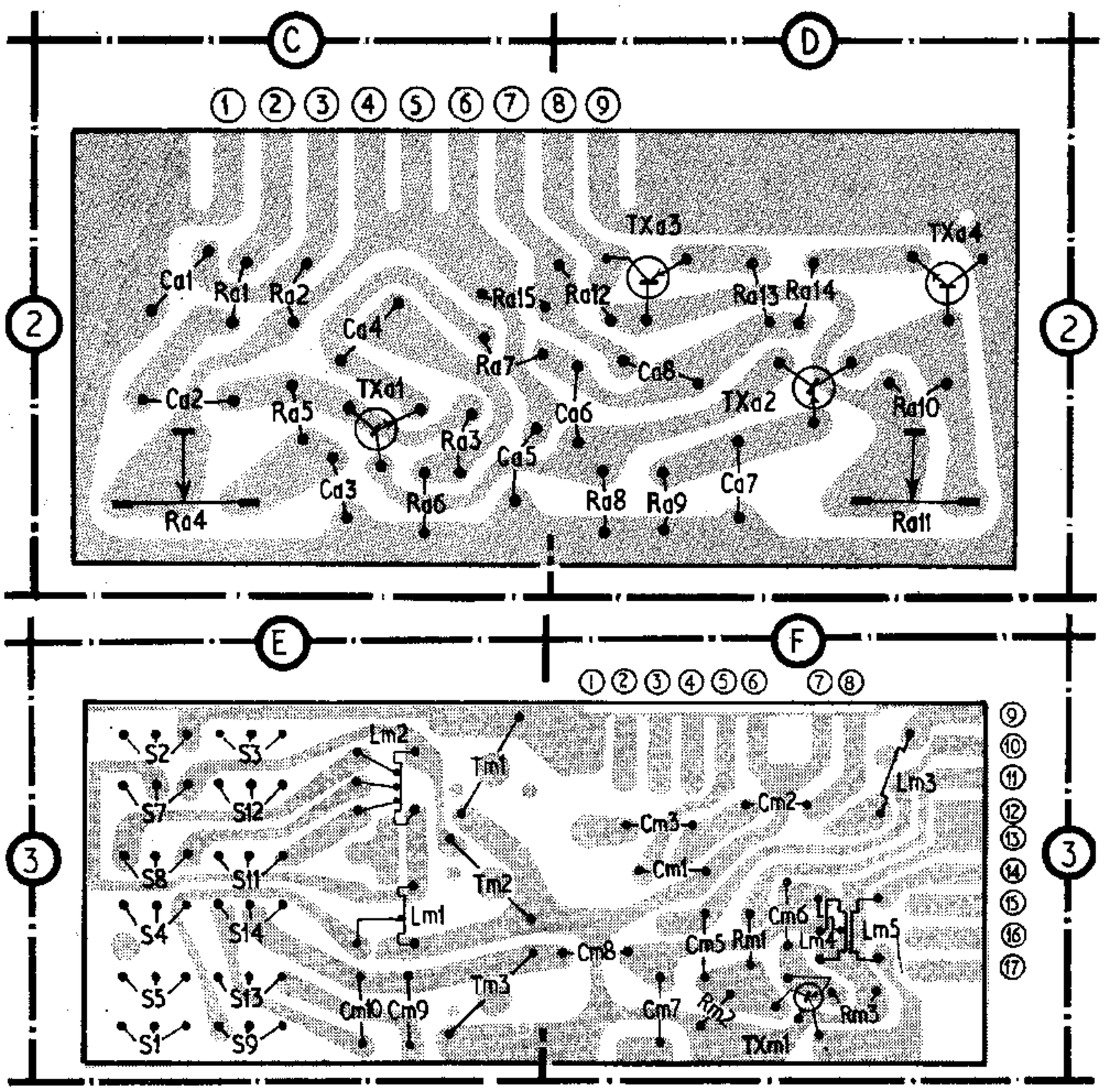
Miscellaneous

S1–S5, S7–S9, S11–S14	—	E3
S6, S10, S15, S16	—	H4
Dk1	CG64H	**

* *Approximate d.c. resistance in ohms.*

** *Wired on type RMK10 panel* (*see Service Sheet* 1841).





R.f. (upper) and a.f. (lower) modules with component locations.

Circuit Alignment—*Continued*

Ra4 for a meter reading of 5V.

Remove test equipment, turn volume control to minimum and set **Ra11** fully anti-clockwise. Connect a milliameter in series with the negative power supply lead, in order to measure the quiescent current. Adjust **Ra11** to increase the initial quiescent current by 4mA. The final quiescent current should be between 16mA and 19mA.

Alignment Procedure.—All r.f. and i.f. tuning adjustments are to be made with an a.m. signal modulated to a depth of 30 per cent at 1kc/s. The signal input should be progressively attenuated with increasing receiver sensitivity in order to maintain an output power of approximately 50mW as indicated on the output meter, with the volume control at maximum.

1.—Switch receiver to m.w.2 and rotate tuning gang to maximum capacitance. Connect output meter via a miniature jack plug to the earphone socket and connect the signal generator output via the 0·1μF capacitor to the base of the mixer/oscillator **TXm1** (common pole of S3 is a convenient point).
2.—Feed in a 470kc/s a.m. signal and adjust **Lk3, Lk2** and **Lk1** for maximum output, repeating the adjustments until no further improvement is obtained. Disconnect signal generator.
3.—Ensure car press-button is released, connect the signal generator to the test coil and position the coil co-axially with the ferrite rod 6½in from **L1**.
4.—Switch receiver to m.w.1, turn tuning gang to maximum capacitance and check that the cursor is in line with the end of the scale window. Feed in a 540kc/s a.m. signal and adjust **Lm4** for maximum output.
5.—Switch receiver to m.w.2, turn tuning gang to minimum capacitance. Feed in a 1,620kc/s a.m. signal and adjust **Tm3** for maximum output.
6.—Repeat operations 4 and 5 for optimum results.
7.—Switch receiver to m.w.1 and tune to 500m calibration mark. Feed in a 600kc/s a.m. signal and adjust **L1** on the ferrite rod for maximum output.
8.—Switch receiver to m.w.2 and tune to 200m calibration mark. Feed in a 1,500kc/s a.m. signal and adjust **Tm1** for maximum output.
9.—Repeat operations 7 and 8 for optimum results.
10.—Switch receiver to l.w., feed in a 225kc/s a.m. signal and tune receiver to this signal. Adjust **L2** on ferrite rod for maximum output.
11.—Depress car press-button, set **Tc1** to maximum capacitance (screw up tight but not excessively), and switch receiver to l.w. Feed in a 225kc/s a.m. signal via the 18pF capacitor and car aerial socket. Adjust **Lm1** for maximum output.
12.—Remove 18pF capacitor and connect the signal to the car aerial socket via the dummy aerial.
13.—Switch receiver to m.w.1, feed in a 600kc/s a.m. signal, and tune receiver to this signal. Adjust **Lm2** for maximum output.
14.—Switch receiver to m.w.2, feed in a 1,500kc/s a.m. signal and tune receiver to this signal. Adjust **Tm2** for maximum output.
15.—Repeat operations 13 and 14 for optimum results.

Car Aerial Matching.—To match the input circuits to a car aerial, depress the car and l.w. press-buttons and tune to Radio 2 (B.B.C. 2 on scale) 1,500m.

Telescope the car aerial in order to reduce the input signal strength to a minimum. Adjust **Tc1** for maximum output. The m.w. does not need re-aligning.

If an exceptionally long aerial lead is used, say 10 feet or more, m.w.2 can be re-aligned by tuning to a weak signal at about 200m and adjusting **Tm2** for maximum output.

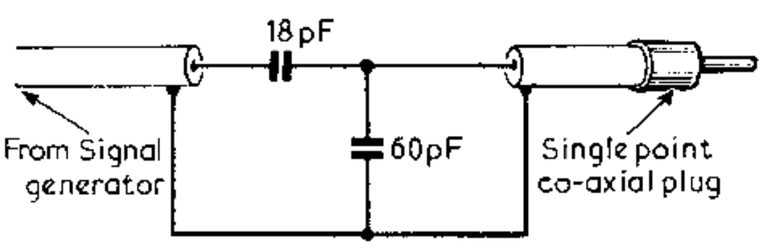
GENERAL NOTES

The i.f. panel RMK10 used in these receivers is identical to that used in the KB KR021 and RGD RR221 receivers. Trader *Service Sheet* 1841 covers these receivers and the printed panel component locations are illustrated. A brief circuit note is also given.

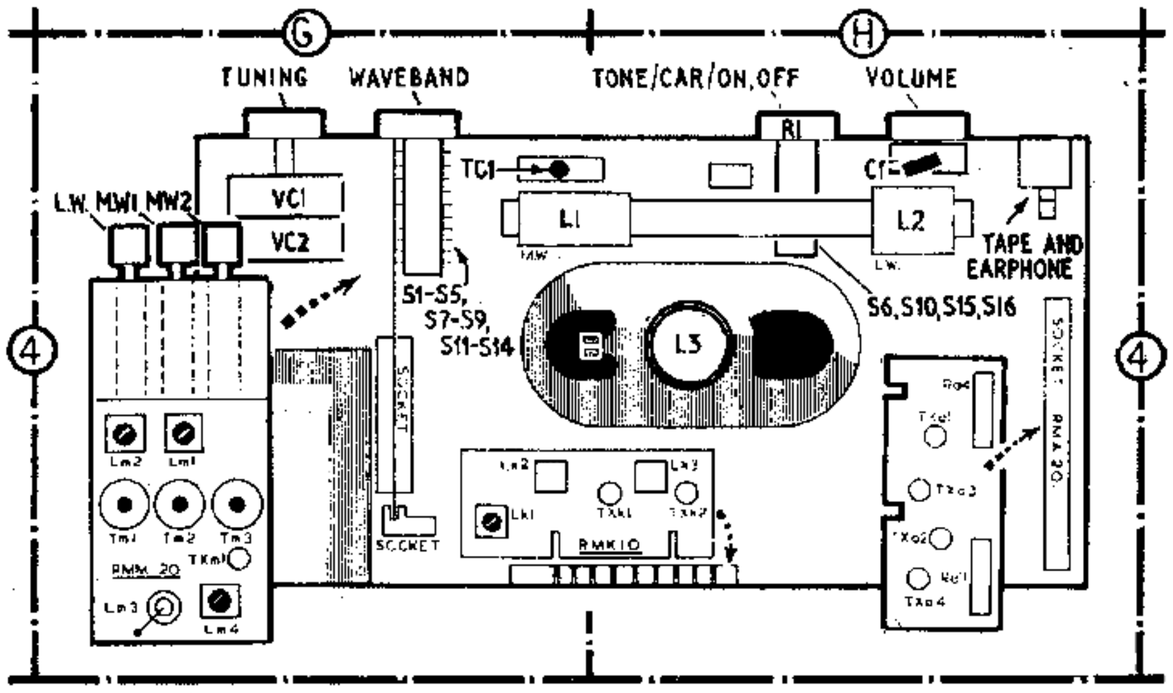
Drive Cord Replacement.—To replace drive cord(s), unscrew coin slotted screw and remove back cover, disconnect and remove battery and card container. Close tuning gang, and pull off leads at tape and earphone sockets (note colour coding of wires). Pull off knobs, then unscrew and remove two Phillips head screws holding the top moulding and scale window in position, one screw to the left of tuning gang, the other just to the right of the car/portable switch, taking care not to damage L2 on ferrite rod.

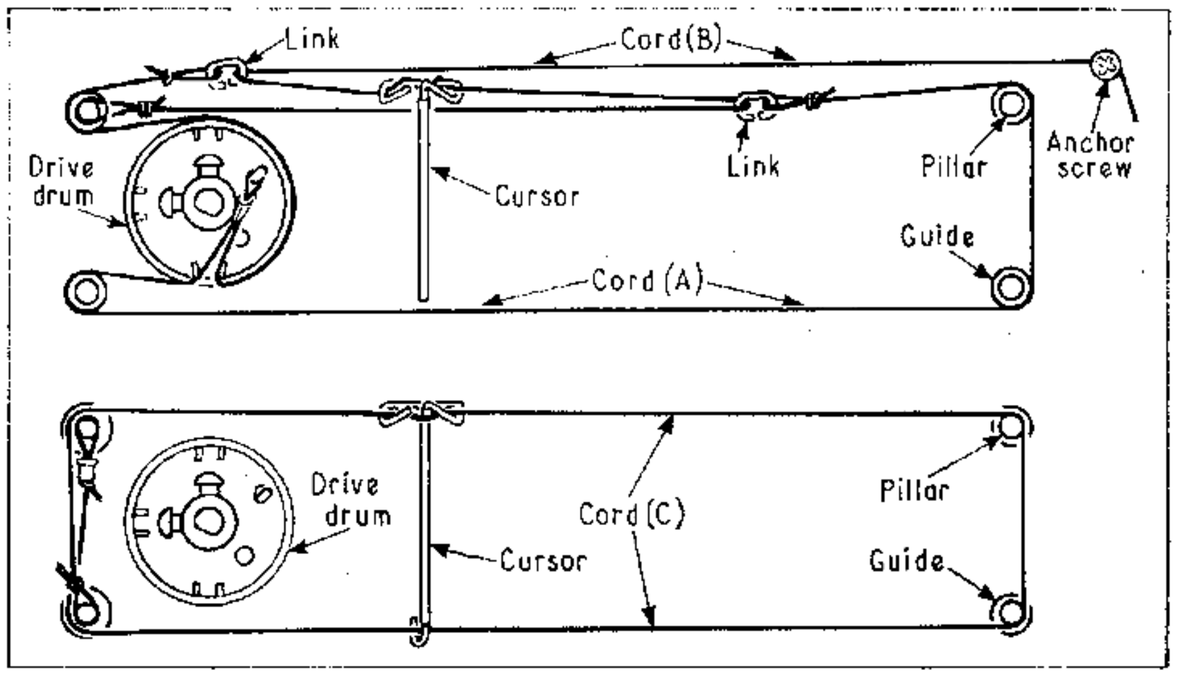
Prepare cord(s) as follows: cord (A), tie a loop at one end then form and tie a ¼in loop at 5in from that end. Measure off sufficient cord so that with a loop tied at the other end, the overall length of cord is 20¾in; cord (B) has a loop tied at one end only, and should be 20in overall; cord (C), tie a loop at each end and produce an overall length of 22¼in.

With the tuning gang at maximum capacitance, route cord (A) and cord (B) as shown in the upper illustration of drive cord, ensure that cord (A) is routed over the guides. Fit the cursor on cord (B) and with the scale temporarily in position align the cursor with the low frequency end of the scale window. Fit cord (C) (lower illustration) ensuring that the cord only passes over the pillars.



Dummy aerial as referred to in circuit alignment.





Left: General view of receiver with back corner removed. Right: Drive cord assembly.

Printed in Great Britain by George Rose Printers, Nursery Road/Zion Road, Thornton Heath, Surrey, and Published by Iliffe Technical Publications Ltd., Dorset House, Stamford Street, London, S.E.1.