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"TRADER" SERVICE SHEET

1598

MURPHY-VOXSON MR750

12 Volt Transistorized Car Radio

GENERAL DESCRIPTION

THE Murphy Voxon MR750 car radio is composed of two units, a loudspeaker unit and receiver tuning head. The tuning head front face contains, in addition to the receiver operating controls, an integral driving mirror which is designed to replace the normal interior driving mirror when the unit is attached in position on the car windscreen. Fixing is by means of a rubber suction disc

The loudspeaker unit, which also contains the output transistor, may be mounted in any convenient position and is connected to the tuning head by a 9ft multi-way cable.

Operation is from a 12V car battery using the positive earth system (see "General Notes" for negative earth system operation) and reception is by means of a built-in ferrite rod aerial in the tuning head (later receivers are provided with an external aerial co-axial socket). Waveband ranges are 187-575m (m.w). and 1,100-1,930m (l.w.). Consumption is 470 mA.

Release date and original price: September, 1960, £16 6s. Purchase tax extra.

TRANSISTOR ANALYSIS

Transistor voltages given in the table below were derived from information supplied by the manufacturer. They were measured on a 20,000Ω/V meter with no signal input and the volume control at minimum. The room temperature was approx. 68 deg F.

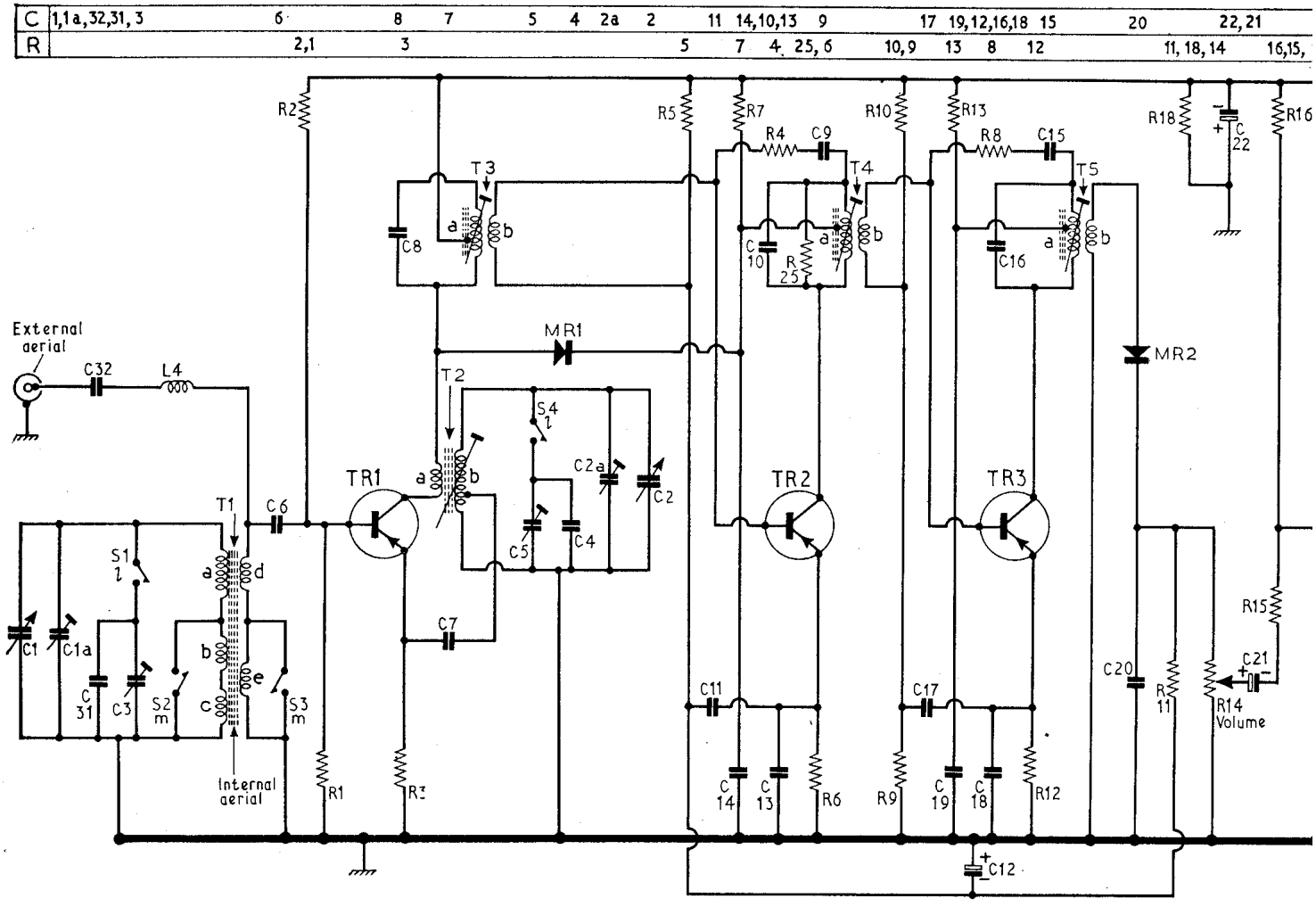
Transistor Table

Transistor	Emitter (v)	Base (v)	Collector (v)
TR1 PXA102	1·31	1.23	8·9
TR2 PXA101	0·22	0·32	8·7
TR3 PXA101	0·50	0·49	8·5
TR4 XB113	0·84	0·92	8·5
TR5 XC141	0·63	0·93	10·8

CIRCUIT ALIGNMENT

Equipment Required.—An a.m. signal generator; an audio output meter; an aerial coupling coil comprising about 20 turns of wire wound on a 6-inch diameter former; a 0.1μF isolating capacitor and a narrow-bladed trimming tool.

Alignment Notes.—If external interference is troublesome during alignment, operate the receiver from a 12V battery in preference to a mains-driven power unit. Before connecting the signal generator to the receiver ensure that its case or output leads are properly earthed or that the receiver chassis is not earthed, to prevent the possibility of damaging the transistors. The "earthy" signal generator lead should be connected to the rear frame of the tuning gang. Make all adjustments for maximum output with the volume control at maximum and during alignment maintain the output at not greater than 50mW by adjusting the input signal. The correct peak when adjusting the i.f. coil cores is the first which occurs when screwing the



Circuit diagram of the Murphy MR750 12V car radio. In early versions the external aerial socket and coupling components **C32, L4** *are not fitted. receivers not so fitted the i.f. is 470kc/s*

core in from the top of the former.

Receivers which are not fitted with an external aerial socket on the rear of the tuning head are aligned to 470kc/s i.f.; those with an external socket are aligned to 460kc/s i.f. It may not be possible on some receivers to obtain correct calibration in the centre of the tuning scale due to the fitment of tuning gang assemblies and tuning scales with dissimilar laws. On some receivers the calibration marks on the cursor guide rail may occupy slightly different positions (see illustration at top of page 3).

1.—Switch receiver to m.w. and short-circuit **C2**. Rotate the tuning gang to maximum capacitance and check that the edge of the cursor is $\frac{1}{2}$in from the adjacent pulley rivet. Leave the gang at maximum. Connect the signal generator via the 0.1μF capacitor to **C1**.

2.—Feed in a 470kc/s signal (460kc/s in the case of receivers with an external aerial

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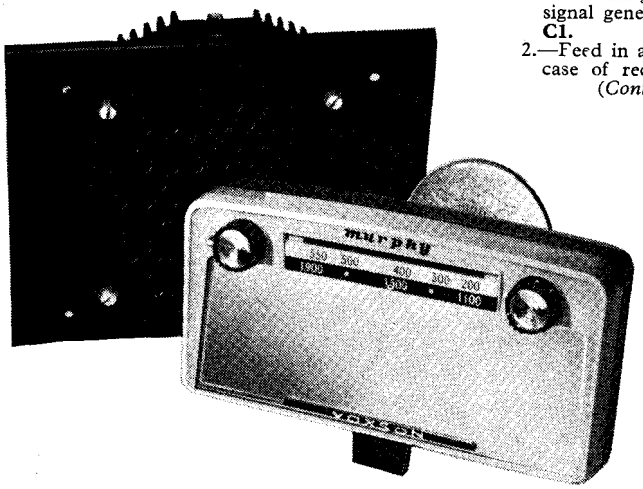
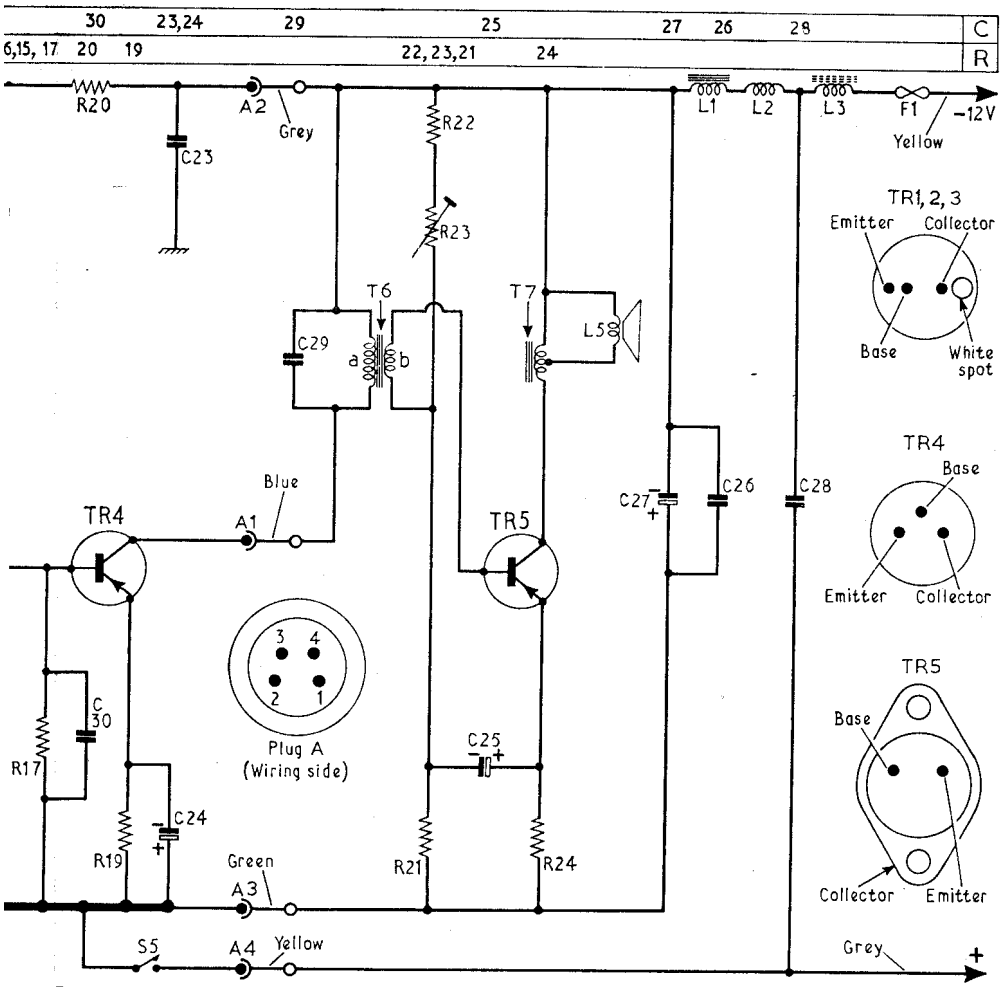


The tuning head (complete with driving mirror) and loudspeaker assembly which, when installed in a car, are joined by a 9 ft multi-way cable



ed. **C30** *is also a later addition. Receivers fitted with an aerial socket have an i.f of 460 kc/s and in those* /s

Resistors

R1	4·7kΩ	D4
R2	27kΩ	D4
R3	3·9kΩ	D4
R4	680Ω	D3
R5	180kΩ	D3
R6	1kΩ	D3
R7	1kΩ	D3
R8	1kΩ	C3
R9	1·5kΩ	C3
R10	22kΩ	C3
R11	6·8kΩ	D3
R12	820Ω	C3
R13	1kΩ	C4
R14	5kΩ	C3
R15	560Ω	C3
R16	33kΩ	C4
R17	4·7kΩ	C3
R18	1·8kΩ	C4
R19	470Ω	D3
R20	390Ω	D4
R21	15Ω	F5
R22	120Ω§	F5
R23	100Ω	F5
R24	1Ω	F5
R25	180kΩ†	D3

Capacitors

C1	118pF	A2
C1a	10pF	A1
C2	71pF	A2
C2a	10pF	A1
C3	30pF	E4
C4	120pF	C4
C5	30pF	C4
C6	0·01μF	D4
C7	0·01μF	D3
C8	250pF	A1
C9	22pF§	D3
C10	250pF	B1
C11	0·05μF	D3
C12	10μF	D3
C13	0·05μF	D3
C14	0·1μF	D3
C15	33pF§	C3
C16	250pF	B2
C17	0·05μF	D3
C18	0·05μF	C3
C19	0·05μF	C4
C20	0·04μF	C3
C21	10μF	C3
C22	50μF	D4
C23	0·1μF	C4
C24	32μF	D4
C25	500μF	F5
C26	0·1μF	F5
C27	1,200μF	F5
C28	0·1μF	F5
C29	5,000pF	F5
C30	0·05μF§	C3
C31	22pF	E4
C32	0·01μF§	—

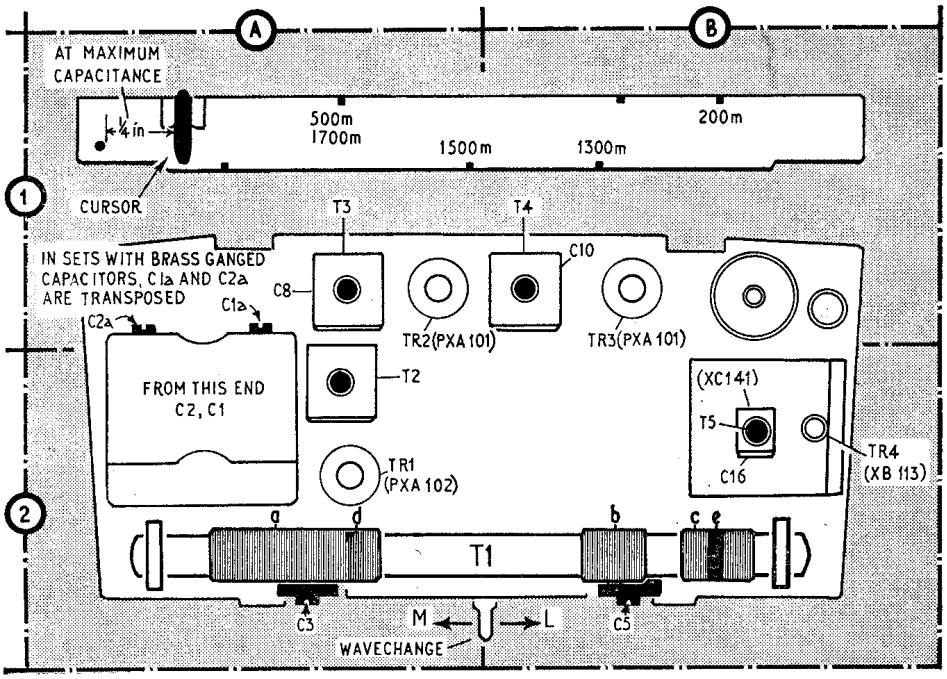
*Coils and Transformers**

L1	—	F5
L2	—	F5
L3	—	F5
L4§	—	—
L5	3·0	—
T1 a	5·5	D4
T1 b	9·5	D4
T1 c	9·5	D4
T1 d	—	D4
T1 e	—	D4
T2 a	—	A2
T2 b	3·5	A2
T3 a	4·2	A1
T3 b	—	A1
T4 a	4·2	B1
T4 b	—	B1
T5 a	3·7	B2
T5 b	—	B2
T6 a	1700·0	F5
T6 b	6·0	F5
T7	—	F5

Miscellaneous

MR1	XD201	D3
MR2	XD202	C4
F1	2A	F5
S1-S4	—	D4
S5	—	C3

**Approximate d.c. resistance in ohms.*
†*Or* 100kΩ *or omitted.*
§*See "Modifications".*



Circuit alignment locations and calibration scale

Circuit Alignment—*continued*

socket) and adjust **T5, T4** and **T3** for maximum output. Repeat until there is no further improvement.

3.—Remove the short-circuit from **C2**. Disconnect the signal generator from **C1** and connect its output leads across the aerial coupling coil. Place the coil about a foot from the receiver coaxially in line with the ferrite rod aerial coils.

4.—Tune receiver to the 500m mark on the cursor guide rail. Feed in a 600kc/s signal and adjust **T2** for maximum output.

5.—Tune receiver to 200m mark on the cursor guide rail. Feed in a 1,500kc/s signal and adjust **C2a** and **C1a** for maximum output.

6.—Repeat operations 4 and 5.

7.—Switch receiver to l.w. and tune to the 1,300m mark on the cursor guide rail. Feed in a 231kc/s signal and adjust **C5** and **C3** for maximum output.

MODIFICATIONS

Neutralizing Components.—In early receivers various values of components were used in the neutralizing circuits: **C9** was 4.7pF, 6.8pF or 12pF; **C15** was 3.3pF or 12pF; **R4** was 1.5kΩ and **R8** was 2.2kΩ. If any of these components are changed they should be replaced with the values shown in the component tables.

On/off Switch Connections.—In some receivers the on/off switch is incorrectly wired and the supply voltage is still connected to the tuning head when the switch is in the off position. To correct this condition it is necessary to transpose the yellow and green leads at the socket of the multi-core cable.

R22.—In some early receivers **R22** was 180Ω and was transposed with **R23.**

C30.—C30 is an additional component which is fitted on the foil side of the printed circuit panel in later receivers to prevent instability on l.w.

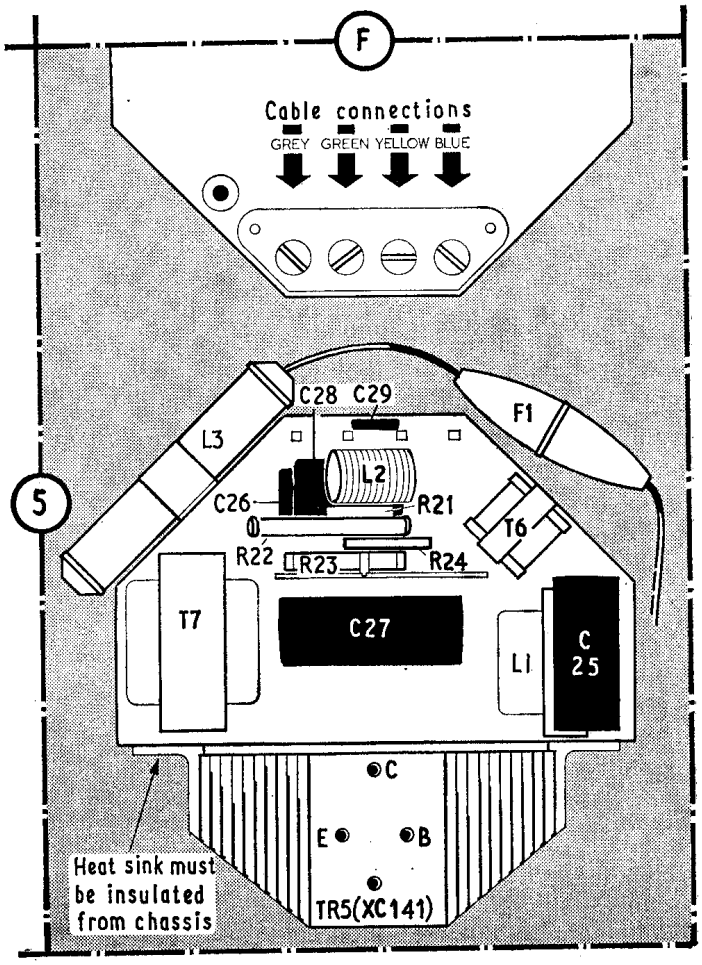
External Aerial Socket.—Later receivers are fitted with a coaxial socket for the connection of an external car aerial. It is connected to **TR1** base via **C32** and **L4** which are additional components in these receivers. The intermediate frequency of receivers fitted with the external aerial socket is 460kc/s. A rear tuning head moulding with a hole for fitting a coaxial socket is available from the manufacturers and this together with **C32** and **L4** can be ordered to modify early receivers. It is also permissible to change the i.f. from 470kc/s to 460kc/s if necessary to avoid heterodyne interference. The oscillator and aerial circuits should be re-aligned accordingly.

DISMANTLING

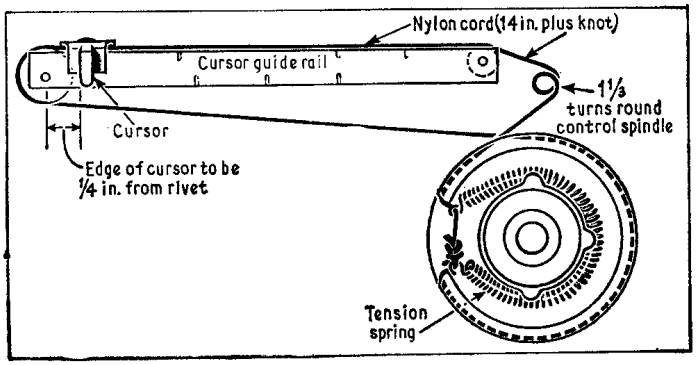
Printed Circuit Panel.—To remove the printed circuit panel from the tuning head case: Pull off the two knobs and remove the spring clip on the connecting plug at the rear of the case. Then with the mounting spindle in the facing position, grip the ends of the case in the palms of the hands with the ball of the thumbs resting on the top edge of the grey front cover above the ends of the tuning scale. Press the thumbs downwards and then forwards to release the lugs beneath the top edge of the front cover, taking care not to break the lugs. Then lift the front to release the lower pair of lugs before completely removing the cover.

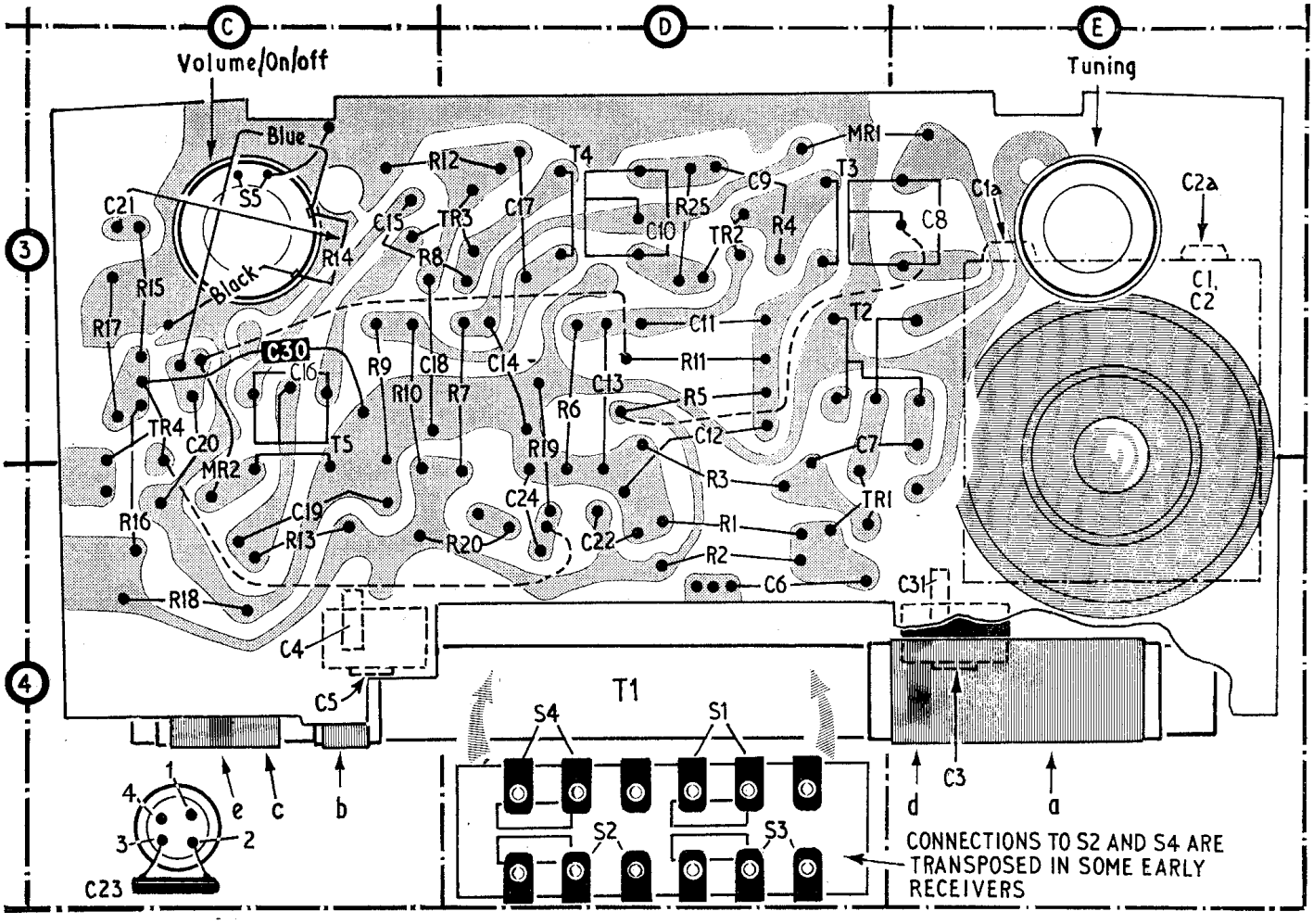
Remove the two screws at the top corners of the printed panel and the two screws at the

Right: The output assembly with the loudspeaker unit removed showing the internal components. **F1** *is inside the spring-loaded plastics container*



Below: Replacement scale drive cord should be fitted as shown in the diagram of the complete assembly as seen from the front





View of the foil side of the printed circuit panel contained in the tuning head, with the waveband switches shown out of position for clarity. The wiring side of inter-connecting plug A is shown in location reference C4

lower edge, near the waveband switch, and ease out the panel by its top edge. Finally, unsolder the lead which connects the braiding to the tag on the mounting socket, and the lead which connects the printed panel to the external aerial socket in sets with this modification.

Ball and Socket Tension.—If difficulty is experienced in adjusting the position of the mirror, it will be necesary to remove the tuning head from the suction disc by using ¼ in. B.S.F. and 4 B.A. spanners. The printed panel should then be removed from the case as described above. The locking screw in the socket will then be accessible and should be turned anti-clockwise to reduce pressure on the ball.

Replacing the Tuning Gang Assembly.—There are two types of ganged capacitor and, to maintain calibration in the centre of the tuning scale, it is important to identify and order the correct replacement. The frame of one capacitor is made of aluminium and has the word "Voxson" engraved upon it, while the frame of the other capacitor is made of brass and is without markings.

It is necessary to remove the drum to gain access to the three fixing screws. Push a thin screwdriver between the drum and the panel until it is in contact with the spindle and then give the screwdriver a gentle twist (not lift). Apply similar pressure to the opposite side of the drum and repeat the procedure until the drum is loosened.

When replacing the drum, support the rear of the ganged capicitor and apply pressure to the centre of the drum. The position of the drum relative to the spindle can be seen in the scale drive assembly illustration.

The Output Unit.—To gain access to the components in the output unit, remove the three screws in the middle of the label and lift the complete assembly off the loudspeaker. Unsolder the loudspeaker leads, release the spring securing **C27** and move it to the position shown in the illustration.

When refitting the heat sink, care must be taken to ensure that it is insulated from the chassis.

GENERAL NOTES

Output Stage Current.—To obtain the correct collector current in the output stage, the bias on the base of **TR5** is made adjustable. If **TR5** or any of the associated components are changed, the current must be checked and if necessary adjusted as follows:

Switch off the receiver. Connect an ammeter (1A f.s.d.) in series with **TR5** collector (positive lead to collector), switch on the receiver, and adjust **R23** slider to give a reading of 400mA. Should the minimum collector current, after adjustment of **R23**, be greater than 400mA, a reading of up to 450mA is permissible for normal operation. When connecting the meter, do not unscrew the transistor mounting unless it is tightened again before switching on the receiver.

Negative Earth System.—The Output Unit may be altered to enable the receiver to operate in those cars equipped with a battery with negative terminal earthed.

Remove the three screws in the middle of the label, lift the complete assembly off the loudspeaker and position **C27** (1,200μF) as shown in the illustration. Disconnect the black lead at the end of the tag strip adjacent to **T7**, which comes from the underside of **L1** (not from the tag panel on **L1**). Transpose this lead with the grey battery lead which is connected to the tag on the rear of the screw terminal marked yellow (on the top label).

Heat Sink and Chassis.—The heat sink on the output transistor **TR5** is at collector potential and its mounting is insulated from the chassis. The chassis is also isolated from the wiring and from the "earth" line in the tuning head, but may become connected to the metal work of the car when installed.

Interference Suppression.—The receiver manufacturers state it is essential to ensure that the plugs, distributor, coil and generator are fully suppressed. It may also be necessary to suppress auxiliary electrical equipment (petrol pump, windscreen wiper motor, voltage regulator, clock, etc.) depending on the nature of the interference. In some cases it may be necessary to bond flexibly mounted components to the engine.

Suppression requirements may vary for cars even of the same type and worn or defective electrical components can cause severe interference.

A number of special items associated with interference suppression are obtainable from the manufacturer's service department and detailed suppression instructions are available from the same source.

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