

## "TRADER" SERVICE SHEET

1571

## GENERAL DESCRIPTION

**D**ESIGNED for operation in cars with a 12V positive earth electrical system, Ekco CR917 is a two-waveband car radio employing three low-voltage valves and three transistors. The receiver is constructed in two sections, one containing the valves and r.f. circuits, the other containing the transistors and output stages. The loudspeaker forms a separate unit. Unit interconnecting cables are provided complete with plugs, in different lengths covering a range of installations.

Operating power is derived directly from the car battery and consumption is 0.8 to 1.4A with a battery voltage of 14V.

Waveband ranges are 185-575m (m.w.) and 1,000-2,000m (l.w.). In addition to manual tuning on both wavebands, five press-buttons provide for the selection of four pre-set stations in the Medium waveband and one in the Long waveband.

## EKCO CAR RADIO

Covering Medium and Long V

Release date and original price: August 1961, £22 15s 3d. Purchase tax extra.

## VALVE AND TRANSISTOR ANALYSIS

Voltages given in the table below were taken from information supplied by the manufacturer. They were measured on 20,000 $\Omega$ /V meter with no signal input and the volume control set at minimum. Transistor voltages were measured

Voltage Table

Valve	Anode (V)	Screen (V)
V1 ECH83 {a	11.3	—
V1 ECH83 {b	13.3	13.3
V2 ECH83 {a	13.3	—
V2 ECH83 {b	13.3	13.3
V3 EBF83	13.3	13.3

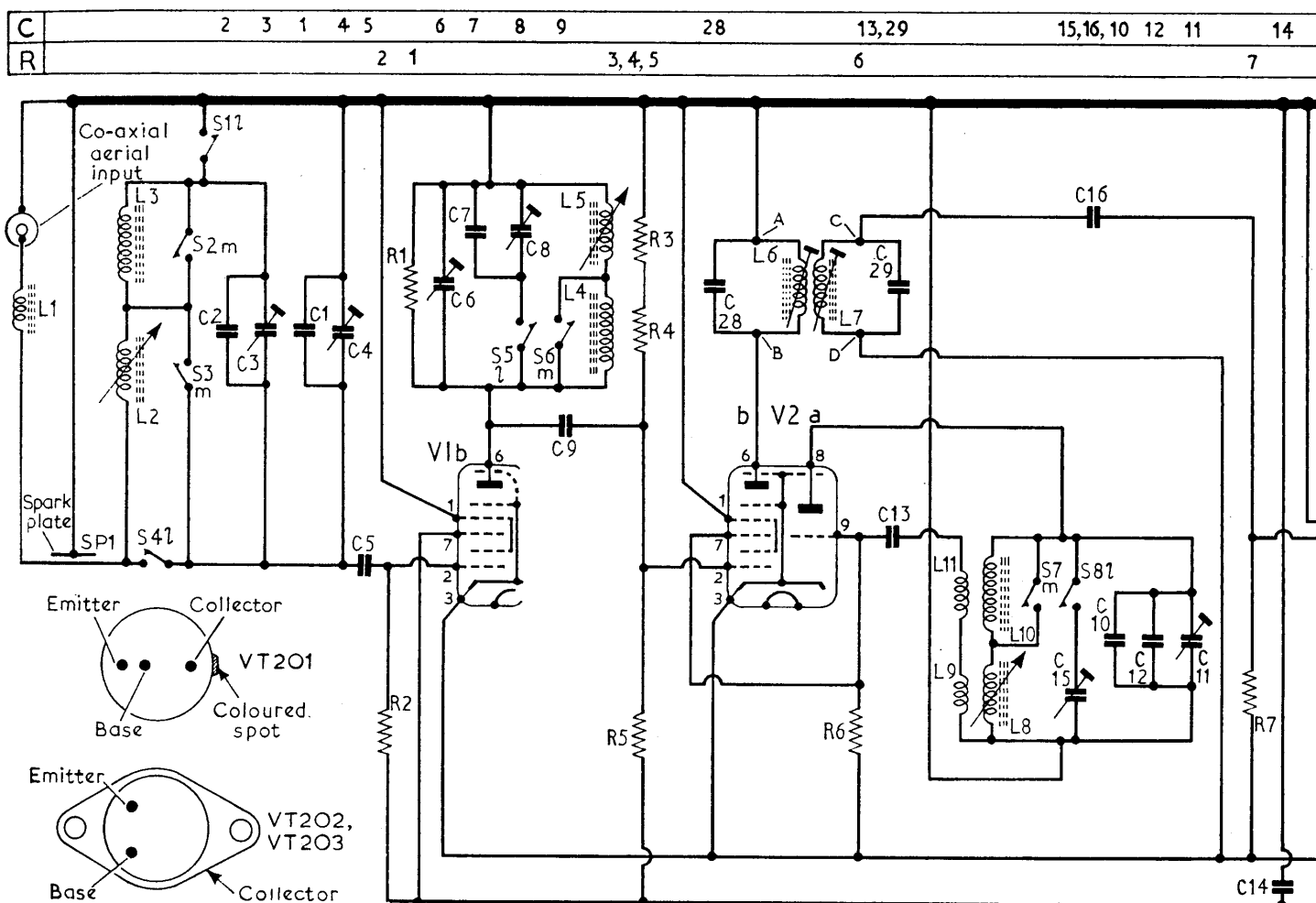
Transistor	Emitter (V)	Base (V)	Collector (V)
VT201 OC82D	10.2	10.0	1.6
VT202 OC26	13.3	13.2	—
VT203 OC26	13.3	13.2	—

with respect to the negative terminal of C203, valve voltages were measured with respect to cathode.

## CIRCUIT DESCRIPTION

Signals from the aerial are fed to the control grid of the r.f. amplifier V1b which is tuned at signal frequency by L2 (m.w.) with the loading coil L3 added in series (l.w.). It is then coupled via C9 and the tuned anode circuit comprising L4, L5 with associated trimming capacitors C6 (m.w.) and C6, C7 and C8 (l.w.) to the r.f. control grid of the frequency changer V2b.

V2a operates as a series fed tuned-anode oscillator supplying the local heterodyne signal which is coupled via the injector grid to V2a, mixer section. Permeability tuning is used for all three r.f. coils L2, L5 and L8 which are ganged. The resultant intermediate frequency selected by L6 in V2b anode circuit is at 470kc/s and is coupled via the secondary winding L7 to the grid of the i.f. amplifier V3.



Circuit diagram of Ekco CR917 car radio which is designed to operate from 12V positive ear

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EKCO  
CR917 1571

# DIO CR917

## Wavebands

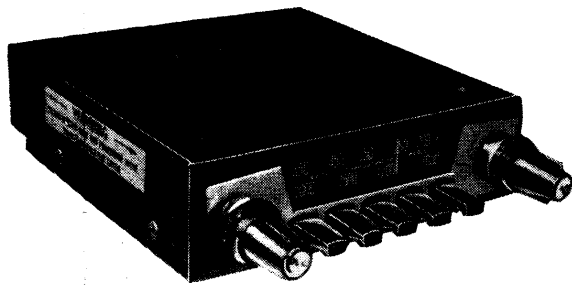
Amplified i.f. signals are rectified by the detector diode in V3 and after filtering by R11 and C21 the audio is developed across the volume control R12. I.f. signals for the a.g.c. diode are taken from the primary winding L12 of the 2nd i.f. transformer via C18, and after rectification the negative d.c. potential is developed across load resistor R9. This potential is then fed back via R8

to the control grids of V1b and V2b as a.g.c. bias. By the inclusion of R3 and R4 a potential dividing network is formed comprising R3, R4, R5, R8 and R9. V1b grid via R2 is connected at a more negative potential point than V2b grid to

obtain optimum control of both stages. No a.g.c. voltage is applied to V3.

From the slider of the volume control which is shunted by the tone control network R10, C23, C27, the audio signal is

(Continued overleaf, col. 1)



Appearance of the tuning unit and valve section.

## COMPONENT VALUES AND LOCATIONS

### Resistors

R1	100kΩ	C4
R2	1MΩ	C5
R3	10MΩ	C5
R4	10MΩ	C5
R5	1MΩ	C5
R6	47kΩ	C5
R7	1MΩ	D5
R8	2.2MΩ	D5
R9	1MΩ	D5
R10	1MΩ	A3
R11	100kΩ	D5
R12	1MΩ	A3
R13	100Ω	A2
R14	10MΩ	C5
R15	10kΩ	C5
R16	1.2kΩ	A2
R17	22Ω	A2
R201	15kΩ	B1
R202	18kΩ	B1
R203	6.8kΩ	B1
R204	470Ω	B1
R205	150Ω	B1
R206	330Ω	A1
R207	330Ω	A1
R208	0.4Ω	A1

### Capacitors

C1	30pF	C4
C2	250pF	C4
C3	140pF	B2
C4	80pF	B2
C5	68pF	L5

C6	80pF	B2
C7	450pF	C4
C8	140pF	B2
C9	30pF	L5
C10	47pF	D4
C11	80pF	A2
C12	68pF	D4
C13	47pF	C5
C14	0.03μF	D5
C15	140pF	A2
C16	1,000pF	D5
C17	1,000pF	A2
C18	68pF	D5
C19	1,000pF	A3
C20	68pF	D5
C21	68pF	D5
C22	0.01μF	A3
C23	1,000pF	A3
C24	0.1μF	C5
C25	500μF	A2
C26	1,000pF	A1
C27	1,000pF	A3
C28†	—	A2
C29†	—	A2
C30†	—	A2
C31†	—	A2
C201	100μF	B1
C202	100μF	B1
C203	500μF	A1

### Coils\*

L1	—	B2
L2	4.1	B2

L3	—	B2
L4	—	A2
L5	3.7	B2
L6	8.2	A2
L7	8.2	A2
L8	2.5	A2
L9	—	A2
L10	2.5	A2
L11	1.2	A2
L12	8.2	A2
L13	8.2	A2
L101	—	A3
L102	—	A3
L103	—	A2

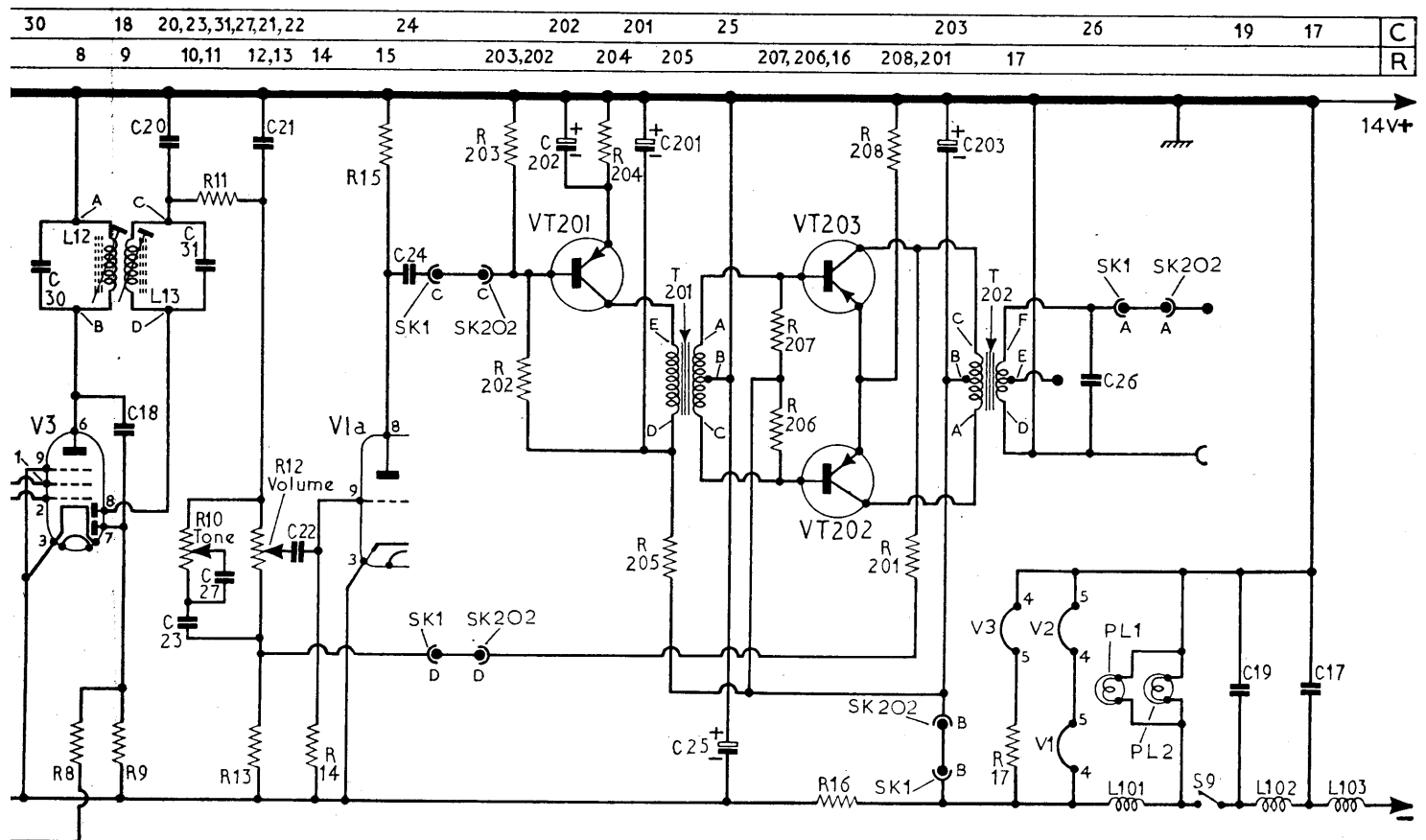
### Transformers\*

T201	{ Pri. 80-0 }	B1
T202	{ Sec. 9-7 }	A1

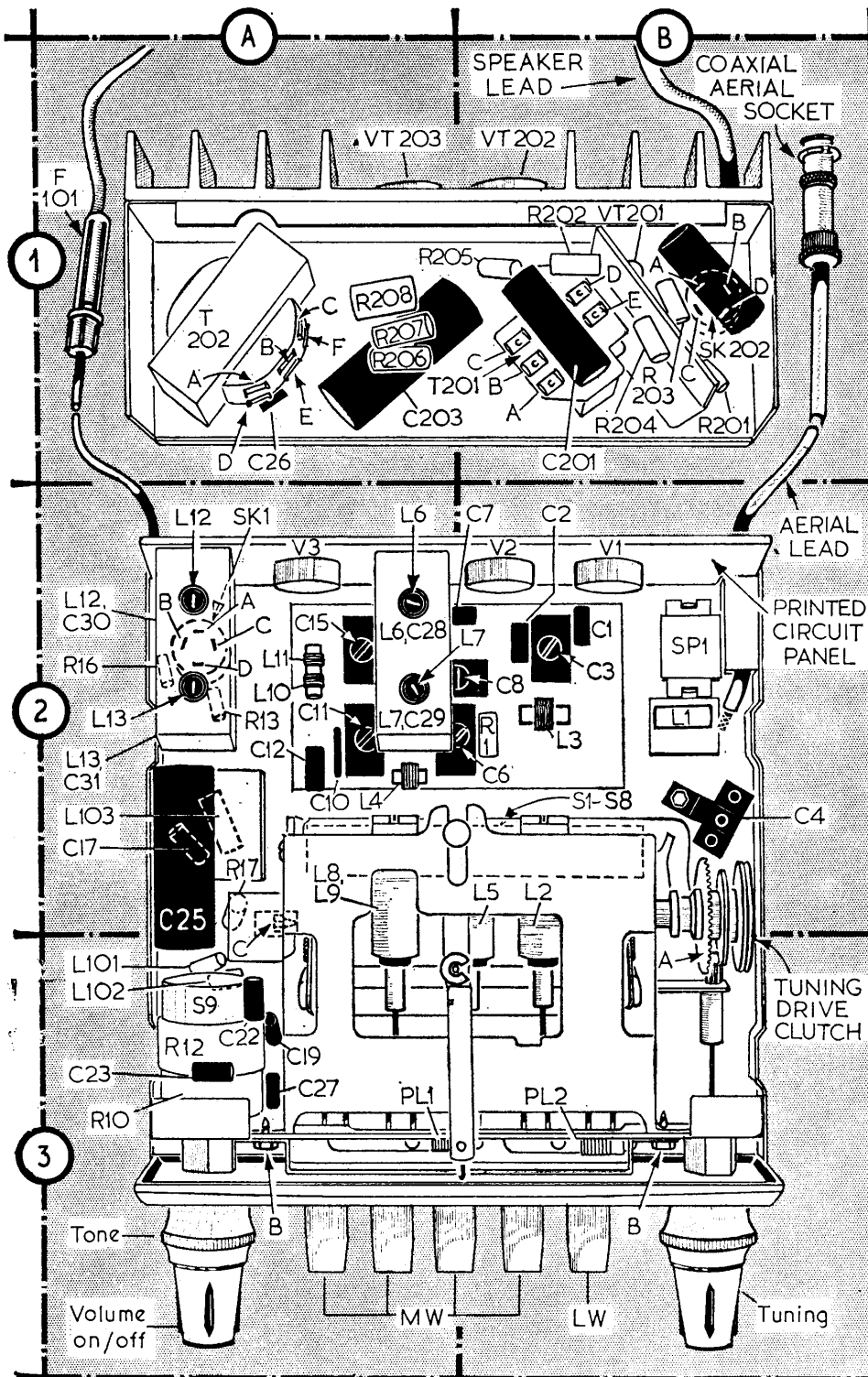
### Miscellaneous

S1-S8	—	B2
S9	—	A3
PL1, PL2§	—	B3
SP1	—	B2
F101	5A	A1

\*Approximate D.C. resistance in ohms.  
†No values given.  
§14V, 0.75W L.E.S. (Lilliput screw).



with systems only. Tappings on the output transformer secondary provide for a range of loudspeaker installations.

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CR917Supplement to Wireless &  
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Plan view of the two units (transistorized audio unit at the top) with screening covers removed. In some assemblies C26 may be fitted in the r.f. unit beneath L12, L13 screening can, adjacent to socket SK1 and not in the location in the audio unit shown here. In these cases the speaker cable makes exit from the r.f. unit and not from the audio unit.

#### Circuit Description—continued

applied to the grid of the audio amplifier V1a. The output from V1a is developed across its anode load R15 and fed via C24 to the base of the driver transistor VT201. Base bias for VT201 is derived from the network R202, R203. T201 with the primary connected in the collector circuit couples the output from VT201 in anti-phase to the bases of the output transistors VT202 and VT203

which operate as a Class B push-pull output stage. The loudspeaker is driven via the centre-tapped output transformer T202.

#### CIRCUIT ALIGNMENT

**Equipment Required.**—An a.m. signal generator; an audio output meter; a fully charged 12V battery; a 0.1μF capacitor and a narrow-bladed trimming tool for the i.f. coil cores.

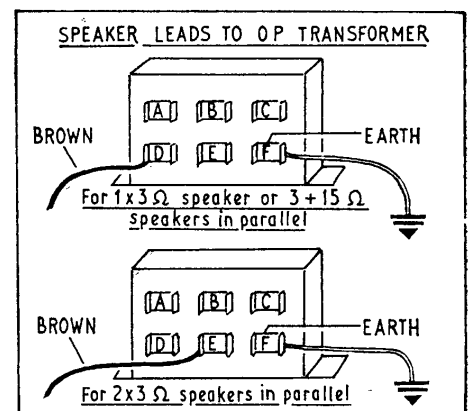
- 1.—Connect the receiver to the battery and after switching on, allow a suitable warming up period. Connect the output meter to the speaker plugs. Connect the signal generator via the 0.1μF capacitor to V2 pin 2.
- 2.—Feed in a 470 kc/s modulated signal and adjust the cores of L12, L13 (location reference A2), L6 and L7 (A2) in that order for maximum output. Repeat until there is no further improvement.
- 3.—Switch receiver to m.w. by depressing any one of the four left-hand buttons. Disengage the tuning drive clutch by sliding the toothed wheel, marked "A" in the diagram, to the left, then rotate the outer clutch plate to bring the ganged tuning cores fully out. Do not zero the cores by using the manual tuning knob as a false position may be obtained. Connect the signal generator via a dummy aerial to the aerial socket.
- 4.—Feed in 1,620 kc/s signal and adjust C11 (A2), C6 (B2) and C4 (B2) in that order for maximum output.
- 5.—Switch receiver to l.w. by depressing the right-hand button and tune to 1,000m.
- 6.—Feed in a 300 kc/s signal and adjust C15 (A2), C8 (B2) and C3 (B2) for maximum output.
- 7.—Tune receiver to 1,500m, feed in 200 kc/s signal and adjust C8 and C3 for maximum output.

The coils in the tuning unit are pre-aligned at the factory and should require no further adjustment.

#### LOUDSPEAKER ASSEMBLIES

Several loudspeaker assemblies are available to suit different installation requirements. The output transformer T202 is wound with a tapped secondary providing output impedances of 3 ohms and 1.5 ohms.

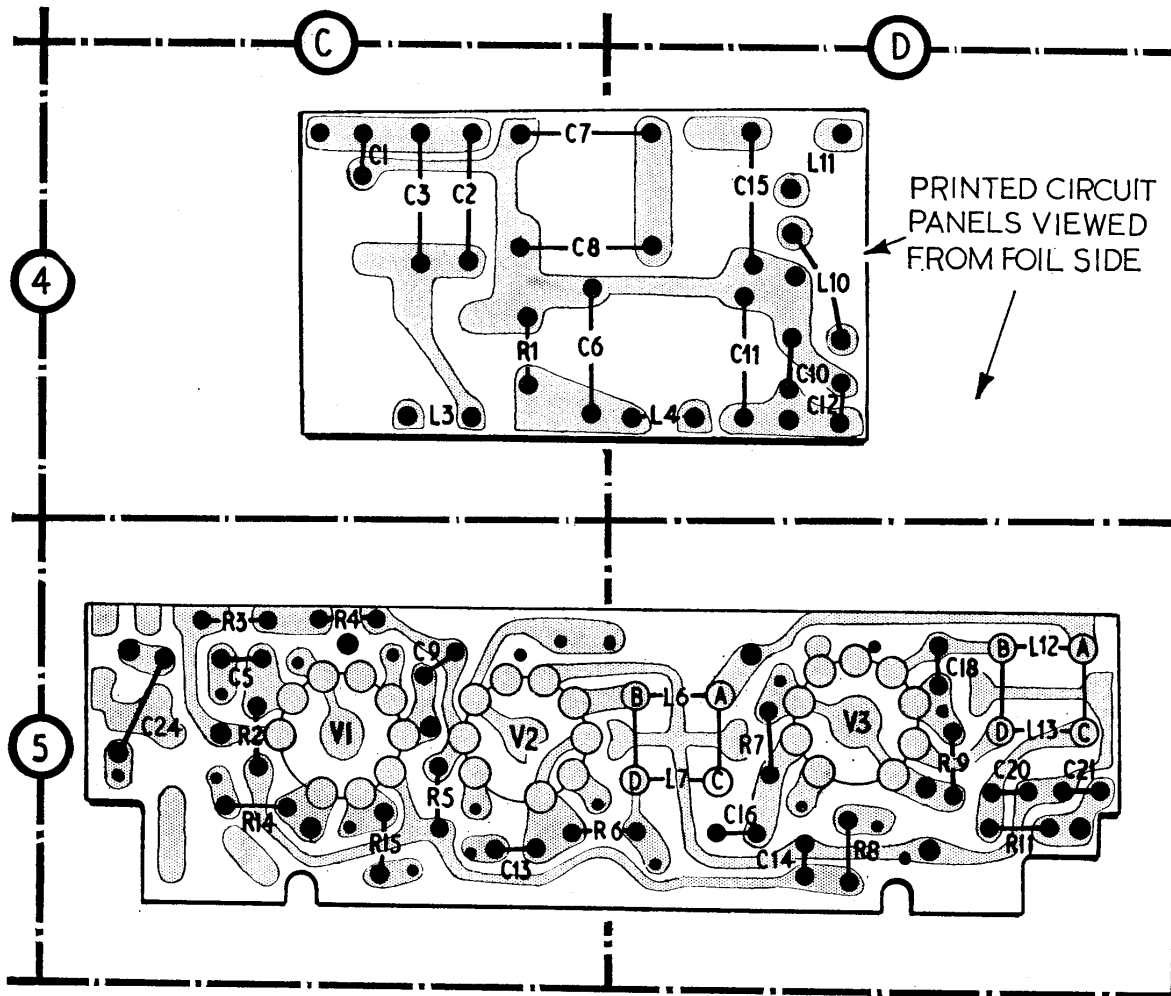
Note: If the loudspeaker is disconnected with the receiver switched on, the output transistors may be damaged if the volume control is at maximum. It is essential therefore that the loudspeaker contacts and connecting leads are kept intact.



Alternative connections provided to match a number of speaker combinations are shown in the above drawing of T202.

#### PRE-SETTING PRESS-BUTTONS

The extreme right-hand button will only select a l.w. station and the remain-



Foil side of the printed panel sub-assemblies with schematic drawing of components mounted on the reverse side.

ing four will select only m.w. stations.

Depress one of the m.w. buttons and tune to the required station manually. Pull out the selected button, then press it in as far as it will go (a click can be heard at the moment it locks). Repeat this procedure for the three remaining m.w. buttons and the l.w. button. The buttons will then select these stations each time they are depressed.

## DISMANTLING

**Receiver Unit Chassis.**—Disconnect the inter-unit cable. Remove seven self-tapping screws and the mounting brackets from the case.

By sliding the chassis forwards it can now be removed from the case.

**Replacement of Pilot Lamps.**—Take off the control knobs after undoing their grub screws.

Remove the large nuts securing the front escutcheon to the control spindles and remove the escutcheon and scale.

Take out the two screws securing the scale backing plate and remove the plate making the pilot lamps accessible.

**Removal of Press-button Unit.**—Unsolder the leads from the tuning coils and switch tags.

Take out two self-tapping screws ("C" on the chassis diagram) securing the fixing brackets on each side of the unit.

Remove the lock nut on the volume control spindle.

Take out four screws securing the press-button unit and withdraw the unit.

Press-button units should be returned to the maker's service department complete for the correction of mechanical or electrical faults.

**Output Unit.**—Most of the output unit components are accessible on removal of the metal cover which is secured by nine self-tapping screws. Output transistors VT202 and VT203 are mounted in rubber bushes on the heat sink and are secured

by 4 B.A. nuts and screws. Their external cases are at collector potential and to prevent accidental short-circuiting of collector to chassis they are protected by a metal shield. If it becomes necessary to replace the output transistors ensure that the mica washers clamped between transistors and heat sink are replaced after smearing the washer on both sides with silicone grease.

To remove VT201, first release two screws securing the tag panel adjacent to the four-pin socket, enabling the panel to be raised sufficiently to unsolder VT201.

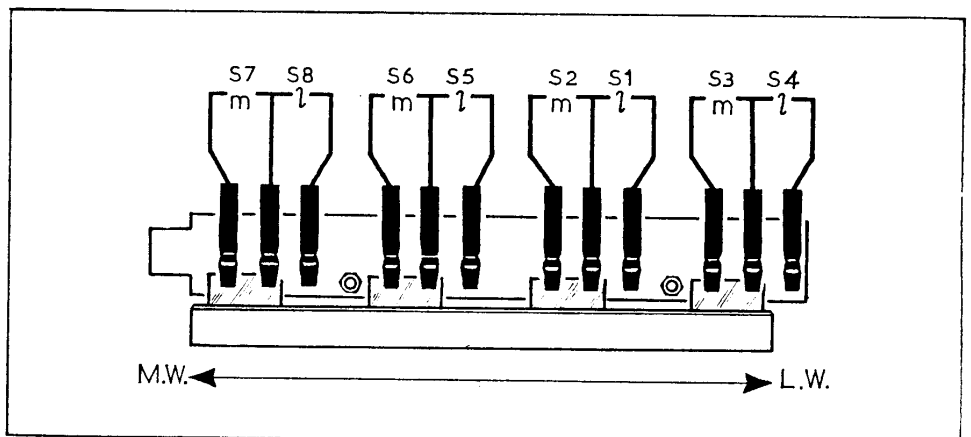


Illustration showing the waveband slide switch unit as it appears from above with the receiver controls pointing towards the operator.