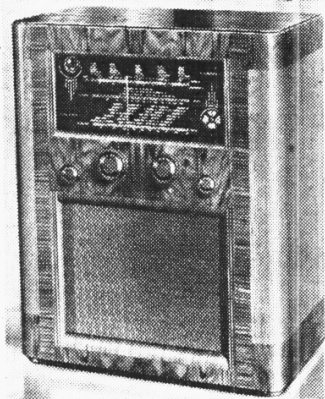


"TRADER" SERVICE SHEET

506

COSSOR 74

AC SUPERHET



THE Cossonor 74 receiver is a 5-valve (plus valve rectifier) 3-band AC superhet, for operation from mains of 200-250 V, 40-100 C/S. The SW range is 16-49 m.

An RF amplifying stage is included, and there is provision for the connection of a gramophone pick-up and an external speaker.

There are three versions of chassis in successive issues of the receiver, and the differences between them are explained under "Chassis Divergencies."

Release date: February, 1940.

CIRCUIT DESCRIPTION

Aerial input via series condenser **C1** and coupling coils **L1** (SW), **L2** (MW) and **L3** (LW) to single tuned circuits **L4**, **C34** (SW), **L5**, **C34** (MW) and **L6**, **C34** (LW) which precede variable-mu pentode RF amplifying valve (**V1**, **Cossonor metalised MVS/Pen**).

Tuned-secondary RF transformer coupling by **L7**, **L10**, **C38** (SW), **L8**, **L11**, **C38** (MW) and **L9**, **L12**, **C38** (LW) between **V1** and triode hexode valve (**V2**, **Cossonor metalised 4THA**), which operates as frequency changer with internal coupling. Triode oscillator grid coils **L13** (SW), **L14** (MW) and **L15** (LW) are tuned by **C39**; parallel trimming by **C40** (SW), **C41** (MW) and **C11**, **C42** (LW); series tracking by **C12** (MW) and **C13**, **C43** (LW). Reaction by coils **L16** (SW), **L17** (MW) and **L18** (LW).

Third valve (**V3**, **Cossonor metalised MVS/Pen/B**) is a variable-mu RF pentode operating as intermediate frequency amplifier with tuned-primary, tuned-secondary iron-cored transformer couplings **C7**, **L20**, **L21**, **C8** and **C19**, **L22**, **L23**, **C20**.

The band-width to which the first IF transformer will respond is modified by the effect of the coil **L19**, to whose centre is connected the low-potential end of **L21**. Thus variable selectivity is attained by

reversing the sense in which **L19** is connected, according to whether **S30** or **S31** is closed.

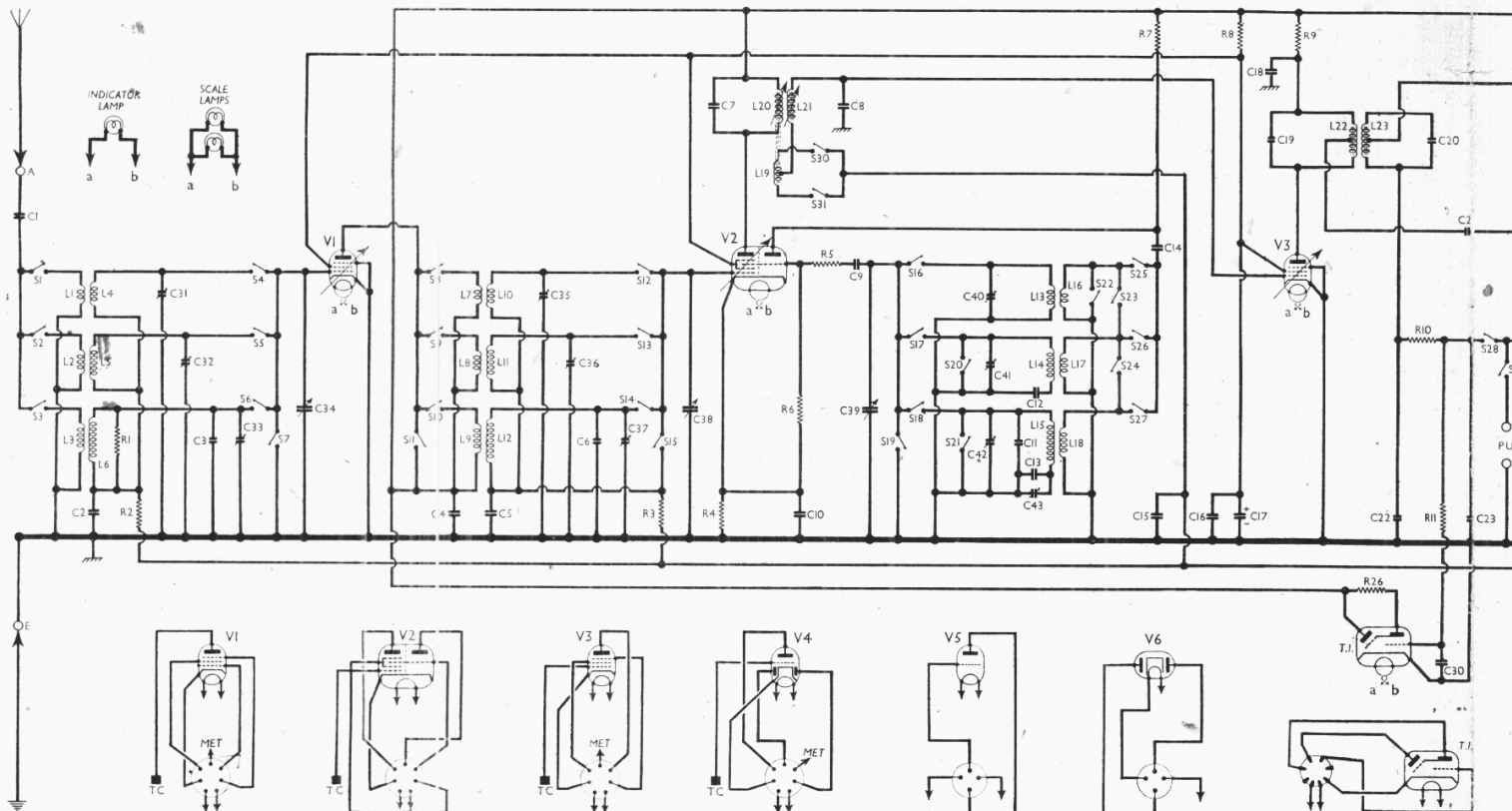
Intermediate Frequency 465 KC/S.

Diode second detector is part of double diode triode valve (**V4**, **Cossonor metalised DDT**). Audio frequency component in rectified output is developed across manual volume control **R12**, which also operates as load resistance, and passed via AF coupling condenser **C24** and grid stopper **R14** to CG of triode section, which operates as AF amplifier. IF filtering by **C22**, **R10** and **C23**. Provision for connection of gramophone pick-up via **S29** across **R12**. Radio muting by **S28**. Variable tone control by **C25**, **R18** in triode anode circuit.

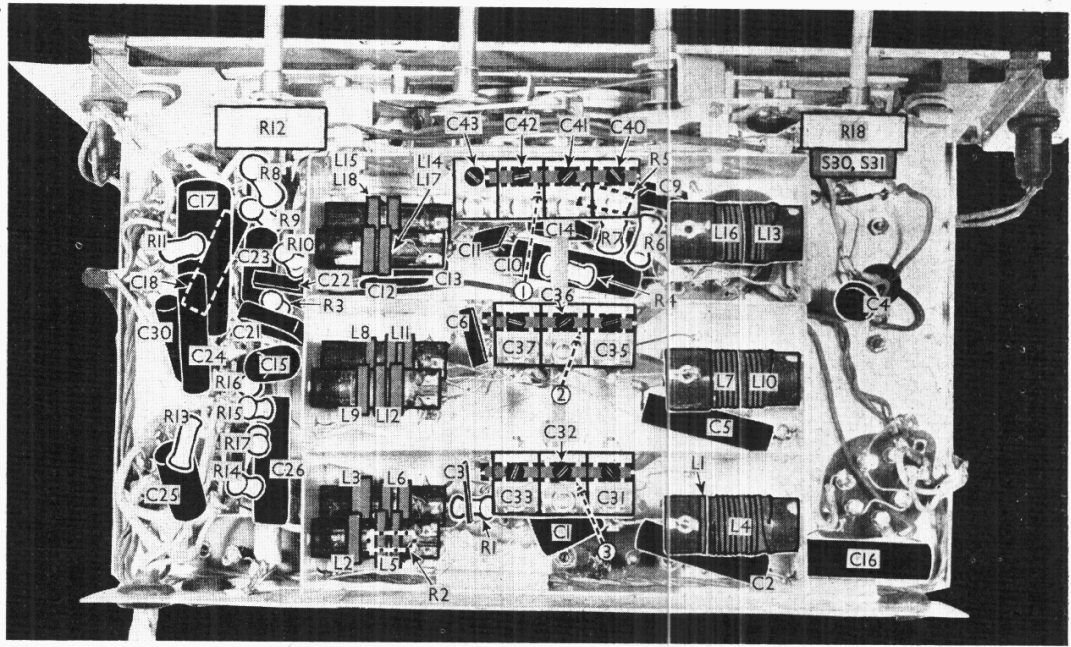
Control potential for cathode ray tuning indicator (**T.I.**, **Cossonor 41ME**) is obtained from junction of **R10** and **S28** and fed via decoupling circuit **R11**, **C30** to T.I. CG.

Second diode of **V4**, fed from tapping on **L22** via **C21**, provides DC potential which is developed across load resistance **R17** and fed back through decoupling circuits as GB to RF, FC and IF valves, giving automatic volume control.

Resistance-capacity coupling by **R15**, **C26** and **R19** between **V4** triode and directly heated triode output valve (**V5**,



Underside of the main chassis. All the pre-set trimmer and tracker adjustments are shown in this view. The three waveband switch units are indicated, and are shown again in detail in the diagrams in column 3 overleaf. S30 and S31 are the variable selectivity switches, ganged with the tone control R18.



Cossor 2P). Provision for connection of high impedance external speaker between V5 anode and HT positive line. Switch S32 between internal speaker input transformer T1 primary and V5 anode permits internal speaker to be muted.

It should be noted that, when S32 is open, HT current to V5 must flow via the external speaker circuit.

HT current is supplied by IHC full-wave rectifying valve (V6, Cossor 43 IU). Smoothing by speaker field L26 in HT

negative lead to chassis, and electrolytic condensers C28, C29.

Fixed GB potential for V1, V2 and V3, GB potentials for V4 triode and V5, and AVC delay potential are obtained automatically from potential divider comprising resistances R21, R22, R23 connected across L26.

VALVE ANALYSIS

Valve voltages and currents given in the table (col. 6) are those measured in our receiver when it was operating on mains

of 235 V, using the 240 V tapping on the mains transformer. The receiver was tuned to the lowest wavelength on the MW band and the volume control was at maximum, but there was no signal input.

Voltages were measured on the 400 V scale of a model 7-Universal Avometer, chassis being negative.

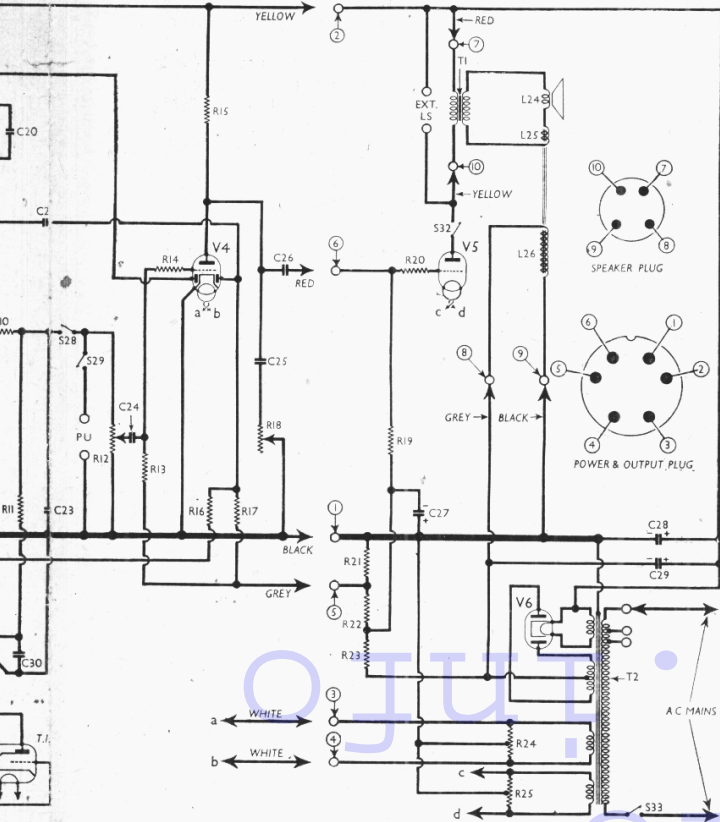
| Valve | Anode Voltage (V) | Anode Current (mA) | Screen Voltage (V) | Screen Current (mA) |
|--------------|-------------------|--------------------|--------------------|---------------------|
| V1 MVS Pen | 243 | 7.5 | 145 | 1.6 |
| V2 4THA | 243 | 3.6 | 145 | 3.4 |
| | Oscillator | 35 | | |
| V3 MVS Pen/B | 200 | 6.4 | 145 | 1.8 |
| | 200 | 6.4 | | |
| V4 DDT | 135 | 1.7 | — | — |
| V5 2P | 234 | 42.0 | — | — |
| V6 43IU | 290† | — | — | — |
| | 20 | 0.1 | — | — |
| | 243 | 0.13 | — | — |

† Each anode, AC.

COMPONENTS AND VALUES

| RESISTANCES | | Values (ohms) |
|-------------|--|---------------|
| R1 | Aerial circ. LW damping | 30,000 |
| R2 | V1 CG decoupling | 500,000 |
| R3 | V2 hexode CG decoupling | 500,000 |
| R4 | V2 fixed GB resistance | 300 |
| R5 | V2 osc. CG stabiliser | 15 |
| R6 | V2 osc. CG resistance | 25,000 |
| R7 | V2 osc. anode HT feed | 80,000 |
| R8 | V1, V2, V3 SG's HT feed | 15,000 |
| R9 | V3 anode HT feed | 5,000 |
| R10 | IF stopper | 50,000 |
| R11 | T.L. CG decoupling | 2,000,000 |
| R12 | Manual volume control; V4 signal diode load | 500,000 |
| R13 | V4 triode CG resistance | 2,000,000 |
| R14 | V4 triode grid stopper | 100,000 |
| R15 | V4 triode anode stopper | 50,000 |
| R16 | AVC line decoupling | 2,000,000 |
| R17 | V4 AVC diode load | 1,000,000 |
| R18 | Variable tone control | 100,000 |
| R19 | V5 CG resistance | 500,000 |
| R20 | V5 grid stopper | 100,000 |
| R21 | V1, V2, V3 fixed GB; V4 V5 GB; and AVC delay potential divider | 6,000 |
| R22 | V5 GB; and AVC delay potential divider | 60,000 |
| R23 | V1-V4 heater pot., total | 25* |
| R24 | V5 heater pot., total | 25* |
| R25 | T.L. anode HT feed | 2,000,000 |
| R26 | T.L. anode HT feed | 2,000,000 |

* Centre-tapped.



Circuit diagram of the Cossor 74 AC superhet. An RF amplifying stage, variable selectivity and a tuning indicator are provided. Some versions of the chassis differ in several ways from ours, and the differences are described under "Chassis Divergencies." The two connecting plug diagrams, which are viewed from the free ends of the pins, are those of the power and output plug (below) and the speaker plug (above). Valve base diagrams are shown beneath the circuit diagram.

| CONDENSERS | | Values (μF) |
|------------|---|-------------|
| C1 | Aerial series condenser ... | 0-0005 |
| C2 | V1 CG decoupling ... | 0-05 |
| C3 | Aerial LW fixed trimmer ... | 0-000015 |
| C4 | HT circuit RF by-pass ... | 0-1 |
| C5 | V2 hexode CG decoupling ... | 0-05 |
| C6 | RF trans. LW fixed trimmer ... | 0-000015 |
| C7 | 1st IF transformer tuning condensers ... | 0-000225 |
| C8 | | 0-000225 |
| C9 | V2 osc. CG condenser ... | 0-0001 |
| C10 | V2 cathode by-pass ... | 0-1 |
| C11 | Osc. circ. LW fixed trimmer ... | 0-00004 |
| C12 | Osc. circuit MW tracker ... | 0-00057 |
| C13 | Osc. circ. LW fixed tracker ... | 0-00012 |
| C14 | V1 osc. anode coupling ... | 0-0002 |
| C15 | V3 CG decoupling ... | 0-05 |
| C16 | V1, V2, V3 SG's decoupling condensers ... | 0-1 |
| C17* | | 2-0 |
| C18 | V3 anode decoupling ... | 0-1 |
| C19 | 2nd IF transformer tuning condensers ... | 0-00006 |
| C20 | | 0-000075 |
| C21 | Coupling to V4 AVC diode ... | 0-00005 |
| C22 | IF by-pass condensers ... | 0-00005 |
| C23 | | 0-00005 |
| C24 | AF coupling to V4 triode ... | 0-01 |
| C25 | Part variable tone control ... | 0-03 |
| C26 | V4 triode to V5 coupling ... | 0-01 |
| C27* | V5 CG decoupling ... | 10-0 |
| C28* | HT smoothing condensers ... | 16-0 |
| C29* | | 16-0 |
| C30 | | 0-01 |
| C31† | Aerial circuit SW trimmer ... | — |
| C32† | Aerial circuit MW trimmer ... | — |
| C33† | Aerial circuit LW trimmer ... | — |
| C34† | Aerial circuit tuning ... | — |
| C35† | RF trans. sec. SW trimmer ... | — |
| C36† | RF trans. sec. MW trimmer ... | — |
| C37† | RF trans. sec. LW trimmer ... | — |
| C38† | RF trans. sec. tuning ... | — |
| C39† | Oscillator circuit tuning ... | — |
| C40† | Osc. circuit SW trimmer ... | — |
| C41† | Osc. circuit MW trimmer ... | — |
| C42† | Osc. circuit LW trimmer ... | — |
| C43† | Osc. circuit LW tracker ... | — |

*Electrolytic. †Variable. ‡Pre-set.

| OTHER COMPONENTS | | Approx. Values (ohms) |
|------------------|---|-----------------------|
| L1 | Aerial SW coupling coil ... | 0-6 |
| L2 | Aerial MW coupling coil ... | 19-0 |
| L3 | Aerial LW coupling coil ... | 100-0 |
| L4 | Aerial SW tuning coil ... | Very low |
| L5 | Aerial MW tuning coil ... | 2-7 |
| L6 | Aerial LW tuning coil ... | 36-0 |
| L7 | RF trans. SW pri. ... | 0-5 |
| L8 | RF trans. MW pri. ... | 5-0 |
| L9 | RF trans. LW pri. ... | 15-0 |
| L10 | RF trans. SW sec. ... | Very low |
| L11 | RF trans. MW sec. ... | 2-7 |
| L12 | RF trans. LW sec. ... | 31-0 |
| L13 | Osc. circuit SW tuning ... | Very low |
| L14 | Osc. circuit MW tuning ... | 3-6 |
| L15 | Osc. circuit LW tuning ... | 8-6 |
| L16 | Oscillator SW reaction ... | 0-3 |
| L17 | Oscillator MW reaction ... | 1-4 |
| L18 | Oscillator LW reaction ... | 2-8 |
| L19 | Variable selectivity coil, total ... | 0-2 |
| L20 | 1st IF trans. { Pri. ... | 3-8 |
| L21 | | Sec. ... |
| L22 | 2nd IF trans. { Pri., total ... | 18-0 |
| L23 | | Sec., total ... |
| L24 | Speaker speech coil ... | 2-4 |
| L25 | Hum neutralising coil ... | 0-1 |
| L26 | Speaker field coil ... | 1,250-0 |
| T1 | Speaker input trans. { Pri., total ... | 240-0 |
| | | Sec. ... |
| | V1-V4 heat sec. trans. ... | 0-35 |
| | V5 heater sec. ... | 0-35 |
| | Rect. heat. sec. (HT sec., total) ... | 0-1 |
| S1-S27 | Waveband switches ... | — |
| S28, S29 | Radio/gram change switches ... | — |
| S30, S31 | Variable selectivity switches, ganged R18 ... | — |
| S32 | Internal speaker switch ... | — |
| S33 | Mains switch ... | — |

DISMANTLING THE SET

Removing Chassis.—The receiver comprises two chassis units: the main

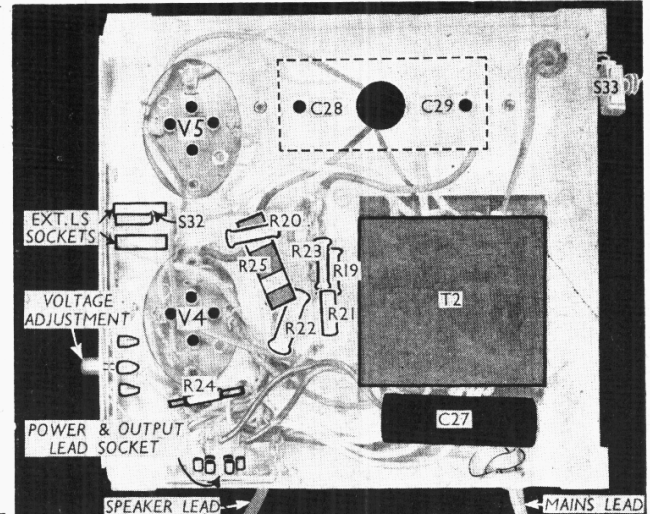
| Switch Table | | | | | |
|--------------|----|----|----|------|---|
| Switch | SW | MW | LW | Gram | |
| S1 | C | — | — | — | — |
| S2 | — | C | — | — | — |
| S3 | — | — | C | — | — |
| S4 | C | — | — | — | — |
| S5 | — | C | — | — | — |
| S6 | — | — | C | — | — |
| S7 | — | — | — | C | — |
| S8 | C | — | — | — | — |
| S9 | — | C | — | — | — |
| S10 | — | — | C | — | — |
| S11 | — | — | — | C | — |
| S12 | C | — | — | — | — |
| S13 | — | C | — | — | — |
| S14 | — | — | C | — | — |
| S15 | — | — | — | C | — |
| S16 | C | — | — | — | — |
| S17 | — | C | — | — | — |
| S18 | — | — | C | — | — |
| S19 | — | — | — | C | — |
| S20 | C | — | — | — | — |
| S21 | — | C | — | — | — |
| S22 | — | — | C | — | — |
| S23 | — | — | — | C | — |
| S24 | — | — | — | — | C |
| S25 | C | — | — | — | — |
| S26 | — | C | — | — | — |
| S27 | — | — | C | — | — |
| S28 | C | — | — | — | — |
| S29 | — | — | — | C | — |

chassis and the power and output unit. To remove the main chassis, remove the four control knobs (recessed grub screws) from the front of the cabinet; loosen the two round-head wood screws holding the metal clamps to the top of the scale assembly inside the cabinet; withdraw from the side of the power and output unit the plug connecting it to chassis; remove the wooden batten supporting the rear of the chassis (one cheese-head screw and washer at each end), taking the weight of the chassis with one hand while removing the screws with the other.

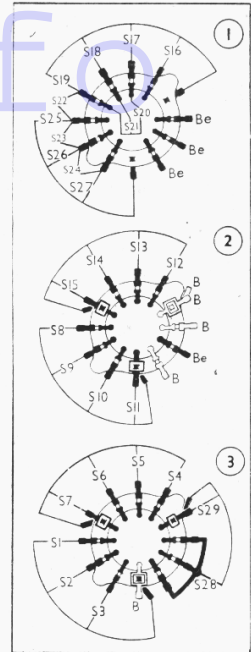
When replacing, see that the chassis supporting pegs inside the front of the cabinet, and those on the batten at the rear, are located in the grommets provided for them on the chassis.

Removing Power and Output Unit.—Withdraw the connecting plug from the side of the unit, and another plug from the panel on the speaker transformer; remove the fixing nut holding the toggle-switch to the cupped escutcheon on the

Underside view of the power and output unit. The electrolytic condenser block C28, C29 (shown dotted) and the mains transformer T2 are mounted on the deck of the unit. S33 is not mounted on the unit, but is attached to it by its connecting leads.



Diagrams of the three switch units, drawn as seen when viewed from the rear of the underside of the chassis, as indicated by the arrows in the underside view of the main chassis.



side of the cabinet (this is best done by first loosening the stop nut inside the cabinet); remove the four cheese-head fixing screws (with large metal and rubber washers) holding the unit to the bottom of the cabinet.

When replacing, note that two large rubber washers are fitted to each fixing bolt, one going either side of the bottom of the cabinet.

Removing Speaker.—Withdraw the connecting plug from the speaker transformer; loosen the four cheese-head screws (with lock-washers) holding the clamps to the rim of the speaker, swivel two of the clamps, and lift out the speaker.

When replacing, the transformer should be on the left.

GENERAL NOTES

Switches.—S1-S27 and S28, S29 are the waveband and radio/gram switches respectively, in three rotary units beneath

the chassis. They are indicated in our under-chassis view, and shown in detail in the diagrams in col. 3, where they are drawn as seen looking from the rear of the underside of the chassis. The table (col. 2) gives the switch positions for the four control settings, starting from fully anti-clockwise. A dash indicates open, and C, closed.

S30, S31 are the variable selectivity switches, ganged with the tone control **R18**. They are of the QMB type, and have a common tag (which is connected to **C15**). The other two tags are the other connections of the two switches, and have leads running into the first IF unit. One of the switches closes when the tone control knob is turned fully clockwise (minimum selectivity) while the other closes when the knob is turned anti-clockwise.

S32 is the internal speaker switch, associated with one of the external speaker sockets in the power and output unit. When an external speaker is fully plugged in, **S32** opens and mutes the internal speaker.

S33 is the QMB mains switch, mounted at the side of the cabinet, and shown in our underneath view of the power and output unit.

Coils.—L1-L18 are in pairs in nine unscreened tubular units beneath the chassis. They are all indicated in our under-chassis view. The IF transformers **L19-L21** and **L22, L23** are in two screened units on the chassis deck. These units also contain their associated fixed trimmers. The positions of the core adjustments are indicated in our plan chassis view.

External Speaker.—Two sockets are provided on the side of the power and output unit for a high impedance (3,000 Ω) external speaker. If the plug is pushed fully home, **S32** opens and mutes the internal speaker.

Scale and Indicator Lamps.—These are three Osram MES types, rated at 6.5V, 0.3A, and having large clear bulbs.

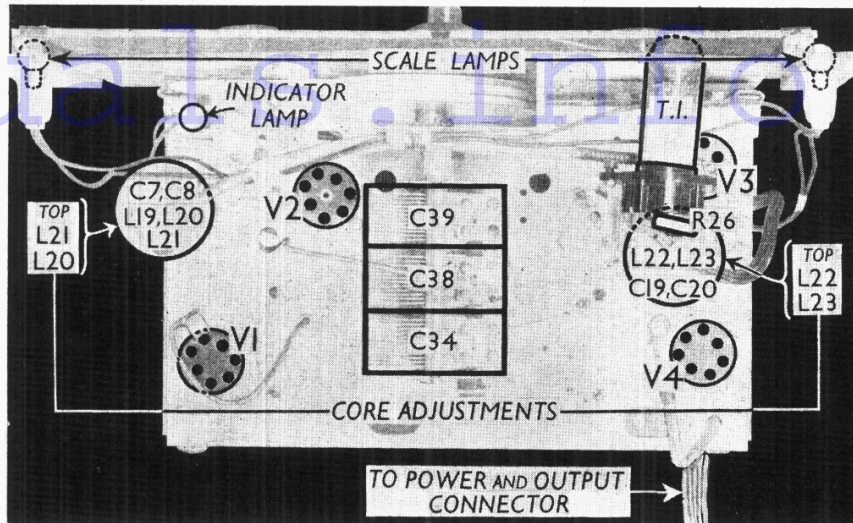
Condensers C28, C29.—These are two 16 μ F dry electrolytics in a single carton on the deck of the power and output unit, having a common positive (red) lead. The black lead is the negative of **C28**, and the blue lead is the negative of **C29**.

Chassis Interconnections.—The main chassis is connected to the power and output unit by a 6-pin plug and socket. A diagram of the plug, looking at the free ends of the pins, is right of the circuit diagram. The pins are numbered to agree with the corresponding arrows and circles in the circuit diagram. The coding of the leads to the plug is: 1, black; 2, yellow; 3 and 4, yellow systoflex; 5, grey; 6, red.

Speaker Plug.—A second plug, whose diagram is shown above that of the power and output connector, is used to connect the power and output unit to the speaker. Its pins are numbered to follow those of the first plug. The coding of the leads is: 7, red; 8, grey; 9, black; 10, yellow.

Resistances R24, R25.—These are two centre-tapped wire-wound resistors located in the power and output unit.

Valve V5.—Note that the 2P triode output valve is directly-heated, and is run from a separate winding on **T2**.



Plan view of the main chassis. **R26** is mounted directly on the tuning indicator holder. The positions of the IF transformer core adjustments are approximately indicated.

Condenser C27.—The positive side of this electrolytic is connected to chassis.

Chassis Divergencies.—There are three versions of the model 74 chassis, all of which follow generally similar lines, with modifications. If we refer to our chassis as (a), the other two versions can conveniently be (b) and (c).

In the (b) version, switches **S7, S11, S15, S19** and **S23** are omitted, while **S24** is directly across **L17**. The radio/gram switching is omitted, and the circuit is as it would be if **S28** and **S29** were permanently closed.

R1 is omitted, and **R7** is 30,000 Ω , while the top of **R6** may be connected to the opposite end of **R5**.

In the (c) version, the circuit is the same as that given in this *Service Sheet*, except that the variable selectivity device is omitted. Therefore, the coil **L19** and the switches **S30, S31**, which are ganged with the tone control **R18** in our chassis, are omitted, and a standard type of IF transformer replaces our **L20, L21**.

Mechanically, the (c) version is similar to our chassis, but in the (b) version the wavechange control and tuning spindle are concentric and appear in the centre of a line beneath the tuning scale, with the remaining pair of controls disposed on either side.

The chassis bear no distinguishing marks, but the (a) can be easily identified by the presence of variable selectivity and radio/gram switching; the (b) by the absence of radio/gram switching; and the (c) by the absence of variable selectivity.

CIRCUIT ALIGNMENT

IF Stages.—A Cossor ganging oscillator and double-beam oscilloscope are recommended. Switch set to MW, turn tone control anti-clockwise until selectivity switch operates and set volume control to minimum (maximum if alignment is carried out with an ordinary signal generator and output meter). To connect up the oscilloscope, connect amplifier terminal for one Y plate to the junction of **R16, R17** and the terminal for the other Y plate to the junction of **R10, R11, S28. A**

2M Ω resistance can be connected in series with either lead to act as an RF stopper. Feed in a 465 KC/S (645.2 m) signal via a 0.01 μ F condenser to control grid (top cap) of **V3**, and chassis leaving existing connection in place. Detune **L22**, and align **L23** for maximum output. Then adjust **L22** until the middle points of the two curves coincide and the peaks of the primary are symmetrical.

Transfer ganging oscillator to control grid (top cap) of **V2**, and adjust **L20** and **L21** so that the curves coincide with the position on the screen of the **L22, L23** curves.

When the tone control is turned fully clockwise so that the selectivity switches operate, the secondary curve should have a reasonably flat top, and the primary a wide peaked curve whose trough should coincide with the middle of the secondary curve, and should have symmetrical peaks.

If no oscilloscope is available, the usual method of alignment should be followed, attempting to secure a flat-topped response curve.

RF and Oscillator Stages.—An ordinary signal generator can be used for this, connecting it to the **A** and **E** sockets, via a suitable dummy aerial. With gang at maximum, pointer should cover sloping lines at right hand ends of scales. Tone control should be turned anti-clockwise.

MW.—Switch set to MW, and tune to 214 m on scale. Feed in a 214 m (1,400 KC/S) signal, and adjust **C41, C36** and **C32** for maximum output.

LW.—Switch set to LW, tune to 1,200 m on scale, feed in a 1,200 m (250 KC/S) signal and adjust **C42, C37** and **C33** for maximum output. Feed in a 1,875 m (160 KC/S) signal, tune it in, and adjust **C43** for maximum output, while rocking the gang for optimum results.

SW.—Switch set to SW, tune to 18 MC/S on scale, feed in an 18 MC/S (16.67 m) signal and adjust **C40** for maximum output, using the peak involving the lesser trimmer capacity. Then adjust **C35** and **C31** for maximum output. Re-check all these settings.