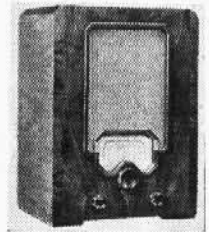


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"TRADER" SERVICE SHEET 542

COSSOR 375 AND 385 AC SUPERHETS



The Cossor 375.

THE Cossor 375 is a 4-valve (plus rectifier) 2-band table receiver, designed to operate from AC mains of 200-250 V, 40-100 C/S. Provision is made for the connection of an external speaker, and pick-up input is arranged via a tapped volume control which acts as a fader.

The model 385 is fitted in a different cabinet, but electrically it is identical with the 375, from which this *Service Sheet* was prepared.

Release dates: 375, September, 1936; 385, May, 1937.

CIRCUIT DESCRIPTION

Aerial input via coupling coil **L1** to inductively coupled band-pass filter. Primary coils **L2, L3** are tuned by **C21**; secondaries **L5, L6** by **C23**. Coupling by mutual inductance and **L4**.

First valve (**V1, Cossor metallised 41MPG**) is a heptode operating as frequency changer with electron coupling. Oscillator grid coils **L7 (MW)**, plus **L8 (LW)**, are tuned by **C25**. Parallel trimming by **C26 (MW)** and **C27 (LW)**; series tracking by **C29 (MW)** and **C28 (LW)**. Reaction coupling by **L9 (MW)** and **L10 (LW)**.

Second valve (**V2, Cossor metallised MVS/Pen**) is a variable- μ RF pentode operating as IF amplifier with tuned-primary, tuned-secondary transformer couplings.

Intermediate frequency, 465 KC/S.

Diode second detector is part of double diode triode valve (**V3, Cossor metallised DDT**). Audio frequency component in

rectified output is developed across **R7** and part of the manual volume control **R8**, which together form the load resistance, and passed via **C11** to CG of triode section. IF filtering by **C10** and **C13**. Variable tone control by **R11, C14** in triode anode circuit.

Pick-up sockets are provided between the lower section of **R8** and chassis, and when a pick-up is connected, **R8** operates as a fader, although radio is muted by turning the waveband control to gram, when **S6** closes and short-circuits **L12**.

Second diode of **V3**, fed from **V2** anode via **C12**, provides DC potential which is developed across load resistance **R13** and fed back through decoupling circuits as GB to FC and IF valves, giving AVC.

Resistance-capacity coupling by **R10, C15, R14** between **V3** triode and DH pentode output valve (**V4, Cossor PT41**). Fixed tone correction by **R15, C16** and **C17**, and provision for high impedance external speaker, in anode circuit.

HT current is supplied by full-wave rectifier (**V5, Cossor 442BU**). Smoothing by speaker field **L18** and electrolytic condensers **C18, C19**. GB for **V3** triode, **V4** and AVC delay are obtained from drop along **R16, R17** in the cathode circuit of **V4**, while fixed GB for **V1** and **V2** is obtained from drop along **R18** in negative HT lead to chassis. The drop along **R18** also increases the AVC delay and the GB applied to **V4**.

DISMANTLING THE SET

The cabinet is fitted with a detachable bottom, upon removal of which (two set screws with metal washers) most of the components beneath the chassis become accessible.

Removing Chassis.—Remove the three control knobs (recessed screws); remove the two round-head wood screws holding top of scale assembly to the sub-baffle;

disconnect the three speaker leads from their terminals on the speaker transformer, and free them from the cleat on the side of the cabinet;

remove the four set screws (with large metal washers and lock-washers) holding the chassis to the bottom of the cabinet.

When replacing, connect the speaker leads as follows, numbering the terminals on the transformer from top to bottom:

1. no external connection;
2. red;
3. no external connection;
4. blue;
5. yellow.

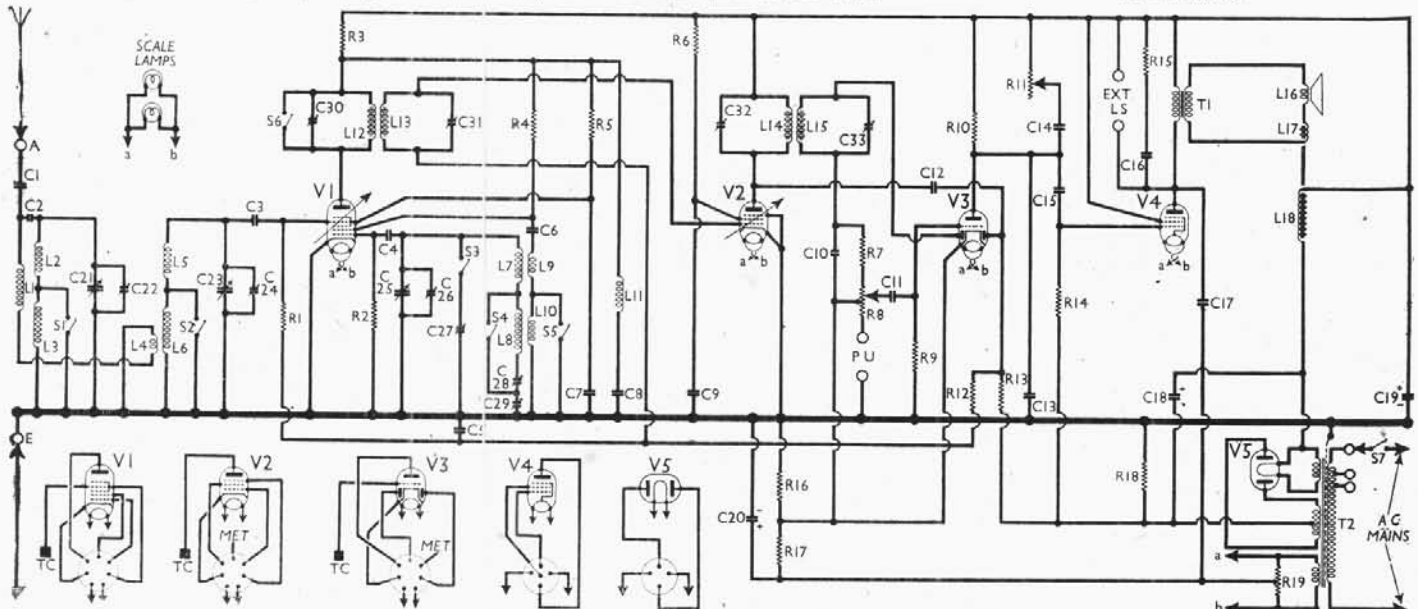
Removing Speaker.—Disconnect the leads from the speaker transformer; slacken the nuts (with lock-washers) holding the four clamps to the speaker rim, and swivel the clamps.

When replacing, the transformer should be on the right, and the leads should be connected as previously indicated.

COMPONENTS AND VALUES

| RESISTANCES | | Values (ohms) |
|-------------|----------------------------|---------------|
| R1 | V1 tetrode CG resistance | 1,000,000 |
| R2 | V1 osc. CG resistance ... | 50,000 |
| R3 | V1 HT feed ... | 4,000 |
| R4 | V1 osc. anode HT feed... | 50,000 |
| R5 | V1 SG HT feed ... | 50,000 |
| R6 | V2 SG HT feed ... | 100,000 |
| R7 | V3 signal diode load and | 500,000 |
| R8 | manual volume control | 1,000,000* |
| R9 | V3 triode CG resistance... | 2,000,000 |
| R10 | V3 triode anode load ... | 25,000 |
| R11 | Variable tone control ... | 20,000 |
| R12 | AVC line decoupling ... | 2,000,000 |
| R13 | V3 AVC diode load ... | 2,000,000 |
| R14 | V4 CG resistance ... | 500,000 |
| R15 | Part fixed tone corrector | 12,000 |
| R16 | V1, V2 fixed GB, V3 | 75 |
| R17 | triode GB, V4 GB and | 250 |
| R18 | AVC delay resistances | 25 |
| R19 | Heater circuit pot. ... | 25* |

* Centre-tapped.



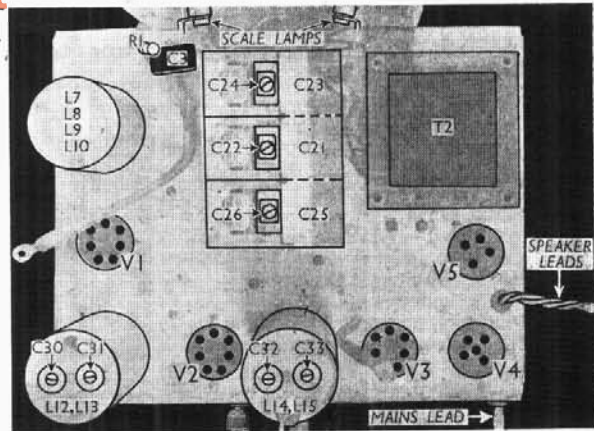
Circuit diagram of the Cossor 375 AC superhet. An identical chassis is employed in the model 385. **R8** is the fader type volume control.

| CONDENSERS | | Values (μ F) |
|------------|--------------------------------|----------------------|
| C1 | Aerial series condenser ... | 0.0003 |
| C2 | Aerial coupling condenser ... | 0.00025 |
| C3 | V1 tetrode CG condenser ... | 0.001 |
| C4 | V1 osc. CG condenser ... | 0.0002 |
| C5 | AVC line decoupling ... | 0.05 |
| C6 | V1 osc. anode coupling ... | 0.002 |
| C7 | V1 SG decoupling ... | 0.1 |
| C8 | V1 tet. anode decoupling ... | 0.1 |
| C9 | V2 SG decoupling ... | 0.1 |
| C10 | IF by-pass ... | 0.00005 |
| C11 | AF coupling to V3 triode ... | 0.01 |
| C12 | Coupling to V3 AVC diode ... | 0.0001 |
| C13 | IF by-pass ... | 0.001 |
| C14 | Part variable tone control ... | 0.02 |
| C15 | V3 triode to V4 coupling ... | 0.01 |
| C16 | Parts fixed tone corrector ... | 0.01 |
| C17 | Parts fixed tone corrector ... | 0.002 |
| C18* | HT smoothing condensers ... | 8.0 |
| C19* | HT smoothing condensers ... | 8.0 |
| C20* | GB by-pass ... | 50.0 |
| C21† | Band-pass pri. tuning ... | — |
| C22† | B-P pri. MW trimmer ... | — |
| C23† | Band-pass sec. tuning ... | — |
| C24† | B-P sec. MW trimmer ... | — |
| C25† | Oscillator circuit tuning ... | — |
| C26† | Osc. circ. MW trimmer ... | — |
| C27† | Osc. circ. LW trimmer ... | 0.00003 |
| C28† | Osc. circ. LW tracker ... | 0.0004 |
| C29† | Osc. circ. MW tracker ... | 0.00075 |
| C30† | 1st IF trans. pri. tuning ... | 0.0003 |
| C31† | 1st IF trans. sec. tuning ... | 0.0003 |
| C32† | 2nd IF trans. pri. tuning ... | 0.0003 |
| C33† | 2nd IF trans. sec. tuning ... | 0.0003 |

* Electrolytic. † Variable. ‡ Pre-set.

| OTHER COMPONENTS | | Approx. Values (ohms) |
|------------------|-------------------------------|-----------------------------|
| L1 | Aerial coupling coil ... | 9.0 |
| L2 | Band-pass primary coils ... | 3.4 |
| L3 | Band-pass primary coils ... | 12.5 |
| L4 | Band-pass coupling coil ... | Very low |
| L5 | Band-pass secondary coils ... | 3.4 |
| L6 | Band-pass secondary coils ... | 12.5 |
| L7 | Osc. circ. MW tuning ... | 3.0 |
| L8 | Osc. circ. LW tuning ... | 5.0 |
| L9 | Osc. MW reaction coil ... | 1.3 |
| L10 | Osc. LW reaction coil ... | 3.0 |
| L11 | RF choke ... | Very low |
| L12 | 1st IF trans. { Pri. ... | 2.5 |
| L13 | 1st IF trans. { Sec. ... | 2.5 |
| L14 | 2nd IF trans. { Pri. ... | 2.5 |
| L15 | 2nd IF trans. { Sec. ... | 2.5 |
| L16 | Speaker speech coil ... | 1.8 |
| L17 | Hum neutralising coil ... | 0.1 |
| L18 | Speaker field coil ... | 2,000.0 |
| T1 | Speaker input { Pri. ... | 700.0 |
| | trans. { Sec. ... | 0.2 |
| | trans. { Pri., total ... | 20.0 |
| | trans. { Heater sec. ... | 0.06 |
| | trans. { Rect. heat. sec. ... | 0.11 |
| | trans. { HT sec., total ... | 406.0 |
| S1-S5 | Waveband switches ... | — |
| S6 | Radio muting switch ... | — |
| S7 | Mains switch ... | — |

Plan view of the chassis. The mains voltage adjustment panel is not indicated, but it is on the side of T₂ facing the rear of the chassis.



VALVE ANALYSIS

Valve voltages and currents given in the table below are average values as quoted by the makers in their service manual. They were measured on the 600 V scale of a 1,000 ohms-per-volt meter, whose negative lead was connected to chassis. The receiver was switched to MW and tuned to 825 m, but there was no signal input.

| Valve | Anode Voltage (V) | Anode Current (mA) | Screen Voltage (V) | Screen Current (mA) |
|------------|----------------------------|--------------------|--------------------|---------------------|
| V1 41MPG | { 212 Oscillator 105 | { 2.4 2.1 | 100 | 2.3 |
| V2 MVS/Pen | 243 | 4.6 | 85 | 1.6 |
| V3 DDT | 185 | 2.4 | — | — |
| V4 PT41 | 215 | 33.0 | 245 | 7.2 |
| V5 442BU | 335† | — | — | — |

† Each anode, AC.

GENERAL NOTES

Switches.—S1-S5 are the waveband switches, S6 the radio muting switch, and S7 the mains switch. They are all comprised in a four-position barrel-type rotary unit beneath the chassis, and are indicated in our under-chassis view. The switch positions, as the control is turned clockwise from the "off" position, are: MW, LW, Gram. On MW, all switches except S3 and S6 are closed; on LW, S3 and S7 only are closed; and on gram, only S6 and S7 are closed.

Coils.—All the aerial and band-pass coils L1-L6 are in a single unscreened tubular unit beneath the chassis. The oscillator coils L7-L10 are in a screened unit on the chassis deck. The IF transformers L12, L13; L14, L15 are in two further screened units on the chassis deck with their associated trimmers. The small stabilising

choke L11 is mounted beneath the chassis, beside S7.

Scale Lamps.—These are two MES types, with small spherical bulbs, rated at 6.5 V, 0.3 A. Cossor type 365.

External Speaker.—Two sockets are provided at the rear of the chassis for a high impedance (8,000-10,000 Ω) external speaker. The sockets are "live" to the HT circuit, and the makers suggest the use of a 4 μ F condenser, near the receiver, in series with each lead. A single 2 μ F condenser could be used in series with one lead only, connected to the socket from V4 anode, the other speaker lead going to chassis, or a low impedance (about 4 Ω) speaker could be connected across T1 secondary connections on the speaker unit.

R15, C16.—These two components are fitted directly to the appropriate tags on the speaker assembly, and do not appear in our chassis illustrations.

Condensers C18, C19.—These are two 8 μ F dry electrolytics in a single cardboard container beneath the chassis. They are independently connected by four separate leads: red and black are the positive and negative leads respectively of C18; and yellow and brown are those of C19. Both condensers are rated at 450 V peak working, 500 V surge.

Resistance R8.—This is the manual volume control, which is centre-tapped to operate as a radio/gram fader. The tapping is brought out to a tag mounted on a projection situated diametrically opposite to the slider tag.

Resistance R19.—This is a small fixed wire-wound unit with a centre-tap brought out to a tag. The resistance element is protected by a tape covering.

CIRCUIT ALIGNMENT

IF Stages.—As the IF circuits are slightly staggered to produce a band-pass characteristic, the Cossor ganging oscillator and oscilloscope should be used when lining them up, to procure the correct wave-shape. Where the equipment is available, the usual procedure should be followed, using a mean intermediate frequency of 465 KC/S (645.16 m).

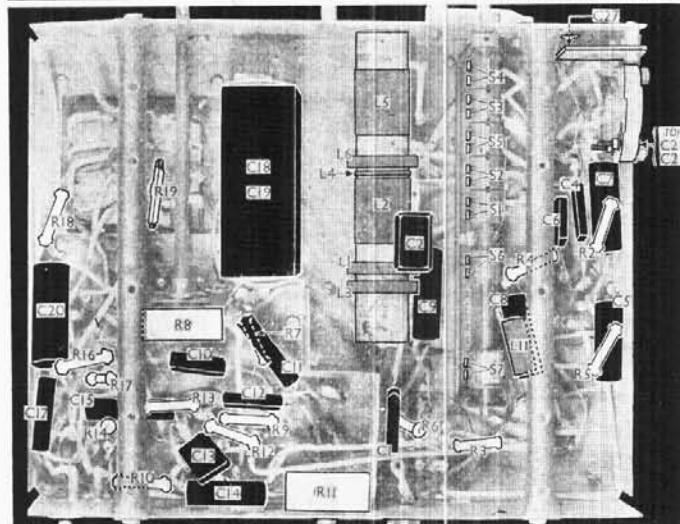
If it is not available, the following procedure should be adopted:

Connect signal generator via a 0.01 μ F condenser to control grid (top-cap) of V1, turn the volume control to maximum, feed in a 465 KC/S (645.16 m) signal, and adjust C33, C32, C31 and C30 in that order for maximum output. Then adjust the trimmers in turn, while swinging the signal generator frequency either side of 465 KC/S, until by trial and error equal peaks are obtained either side of resonance, about 9 KC/S apart (460.5 KC/S and 469.5 KC/S) with a slight dip at 465 KC/S.

RF and Oscillator Stages.—With the gang at minimum, the pointer should be just below the horizontal line at 200 m on the scale. Transfer signal generator leads to A and E terminals via a suitable dummy aerial.

MW.—Switch set to MW, tune to 214 m on scale, feed in a 214 m (1,400 KC/S) signal, and adjust C26, then C24 and C22 for maximum output. Feed in 500 m (600 KC/S) signal, and adjust C29 for maximum output, while rocking the gang for optimum results.

LW.—Switch set to LW, tune to 1,000 m on scale, feed in a 1,000 m (300 KC/S) signal, and adjust C27 for maximum output. Feed in a 1,875 m (160 KC/S) signal, and adjust C28 for maximum output, while rocking the gang for optimum results.



Under-chassis view. All the switches are in a single unit to the right of the illustration, and are individually identified. C27 adjustment is reached through a hole in the front chassis member.