Supplement to The Wireless & Electrical Trader, November 6, 1943

"TRADER" SERVICE SHEET

645

EKCO AC74, DC74,

C74 AND RADIOGRAMS RG84, RG84DC

The black and chromium table model.

THE Ekco AC74 is a 4-valve (plus rectifier) 2-band superhet, using an RF pentode frequency changer, designed for mains of 200-250 V.

The moulded cabinet of the table model has either a walnut or black and chromium finish. The same chassis is used in the C74 console model and in the RG84 radiogram.

Differences in the Standard chassis of the DC74, which is used in a similar range of table and console models, and in the RG84DC, are fully described overleaf, following the AC model. In addition, differences between the standard model and a special model for mercury arc rectified mains are also described. This *Service Sheet* covers all models, but it was prepared from an AC table model.

Release dates and original prices : Table and console models, 1933; *radiograms,* 1934. *Table models : walnut,* £13 13s.; *black and chromium,* £14 14s. (*AC models reduced September,* 1934, *to* £12 12s. *and* £12 1s. 6d. *respectively*); 25 *c/s models,* £14 10s. 6d. *and* £15 11s. 6d. *respectively; console models,* £18 18s.; *RG84AC,* £22 1s.; *RG84DC* £23 2s. (*Radiograms reduced September,* 1934, *to* £19 19s. *and* £21, *AC and DC respectively*).

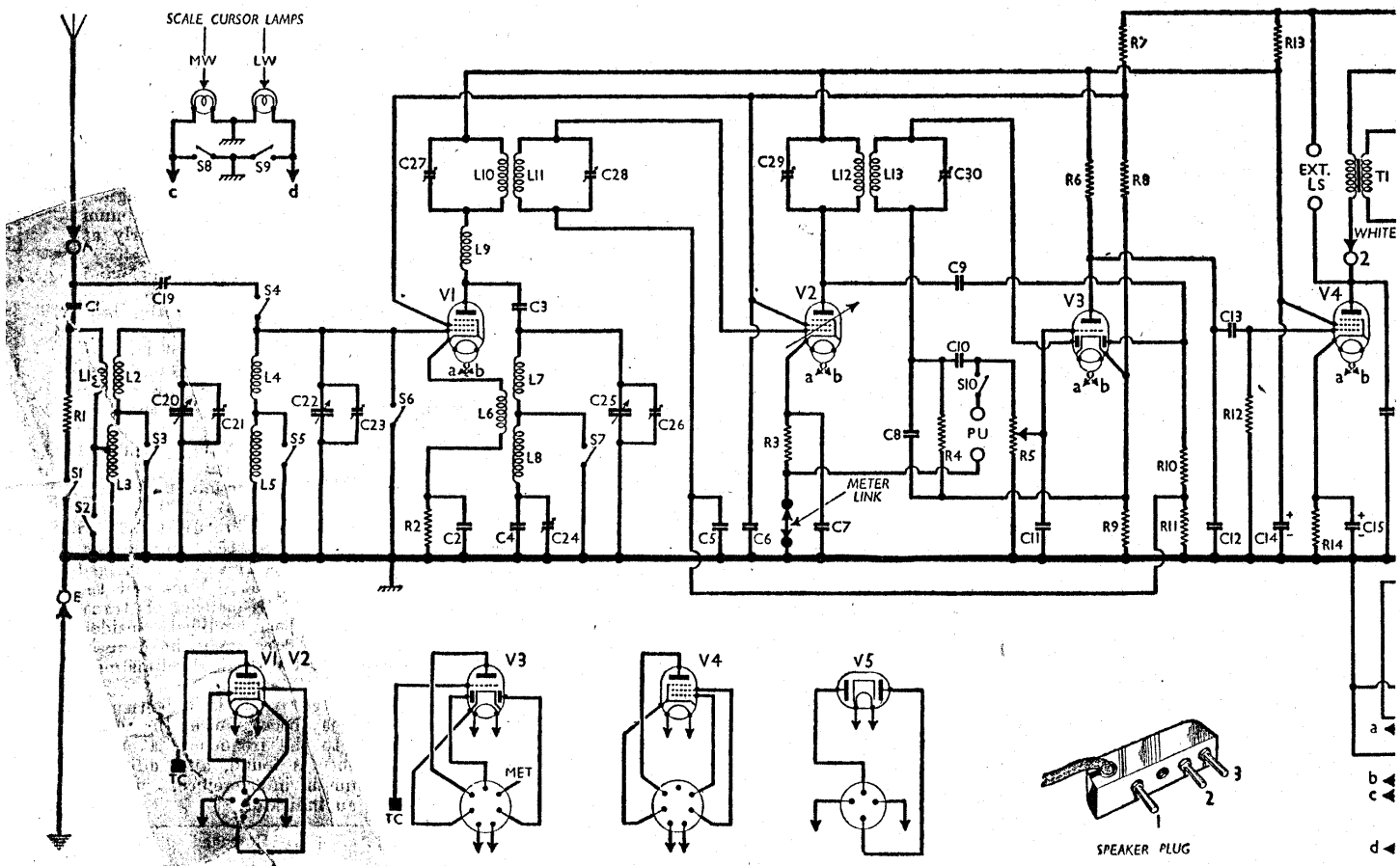
CIRCUIT DESCRIPTION

Aerial input via series condenser **C1** and coupling coil **L1** to inductively coupled band-pass filter, input being tapped in to **L3** on LW. Primary coils **L2, L3** are tuned by **C20;** secondary coils **L4, L5** are tuned by **C22.** Coupling by mutual inductance between primary and secondary windings.

Local-distant control by **R1, S1** across aerial circuit, **R1** damping the aerial circuit heavily when **S1** is closed. Image suppression by **C19,** which is brought into circuit only on MW, when **S4** closes.

First valve **(V1, Mullard SP4** or **Cossor MSPen)** is an RF pentode operating as frequency changer with cathode injection coupling. Oscillator circuit **L7** (MW) and **L8** (LW), tuned by **C25,** is coupled by **C3** and **L9** to **V1** anode, and reaction coupling is via cathode coil **L6.** Parallel trimming by **C26** (MW); tracking by specially shaped vanes of **C25** (MW) and series condensers **C4, C24** (LW).

Second valve **(V2, Mullard metallised VP4** or **Cossor MVSPen)** is a variable-mu RF pentode operating as intermediate



frequency amplifier with tuned-primary, tuned-secondary transformer couplings **C27, L10, L11, C28** and **C29, L12, L13, C30.** A soldered wire link is inserted in the cathode circuit between the bias resistor **R3** and chassis to provide a convenient connection for a tuning meter during alignment operations.

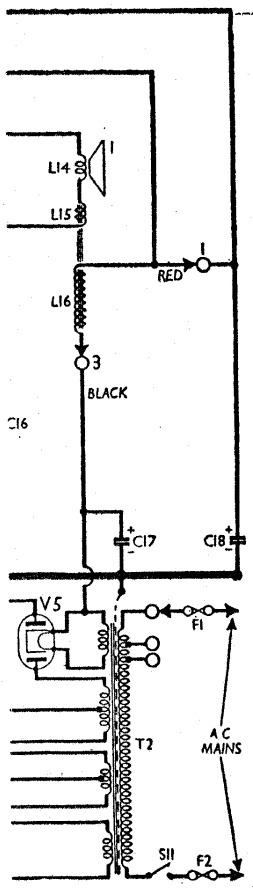
Intermediate frequency 110 kc/s.

Diode second detector is part of double diode triode valve **(V3, Mullard metallised TDD4** or **Cossor DDT).** Audio frequency component in rectified output is developed across load resistor **R4** and passed via AF coupling condenser **C10** and manual volume control **R5** to CG of triode section, which operates as AF amplifier. IF filtering by **C8** in diode circuit, **C11** in triode grid circuit and **C12** in triode anode circuit. Provision for connection of gramophone pick-up, via switch **S10,** across **R5.**

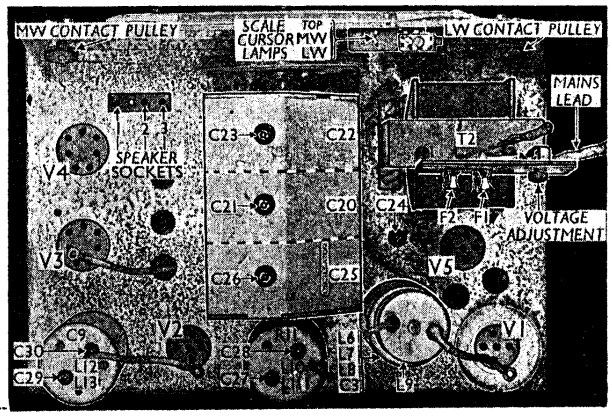
Second diode of **V3,** fed from **V2** anode via **C9,** provides DC potential which is developed across **R10, R11,** that across **R11** being fed back as GB to IF valve, giving automatic volume control. Decoupling is effected by **R10, C5.** Delay voltage, together with GB for triode section and screen grid voltage for **V1** and **V2,** is obtained from an HT potential divider comprising resistors **R7, R8, R9.**

Resistance-capacity coupling by **R6, C13** and **R12** between **V3** triode and pentode output valve **(V4, Mullard Pen4V).** Fixed tone correction in anode circuit. Provision for connection of high impedance external speaker, also in anode circuit.

HT current is supplied by IHC full-wave rectifying valve **(V5, Mullard IW3).** Smoothing by speaker field **L16** and dry electrolytic condensers **C17, C18.** Scale cursor lamps are energised from a separate secondary winding on the mains transformer **T2,** one of them being short circuited by switch **S8** or **S9** while the other band is in use. On gram, both lamps light dimly.



Circuit diagram of the Ekco AC74 superhet. It is the same for table, console and (with the exception of the motor and pick-up) radiogram models. The three speaker connections are numbered and colour coded in the diagram, and a sketch of the plug appears beneath the diagram. If the DC diagram overleaf is laid over the right-hand end of this diagram, the whole is then the complete circuit of the DC74 (Standard model), which also applies equally to the table, console and radiogram models.



Plan view of the chassis. The scale lamps receive their current via the contact pulleys, at the ends of the scale assembly, and the metallic drive cords.

COMPONENTS AND VALUES

	RESISTORS	Values (ohms)
R1	"Local-distant" shunt	20
R2	V1 GB resistor	4,000
R3	V2 fixed GB resistor ...	300
R4	V3 signal diode load ...	250,000
R5	Manual volume control	250,000
R6	V3 triode anode load ...	80,000
R7	V1, V2 SG's HT feed, V3 triode GB and AVC	50,000
R8		50,000
R9	delay potential divider	300
R10	AVC diode load resistor	250,000
R11		1,000,000
R12	V4 CG resistor	250,000
R13	HT smoothing resistor...	4,000
R14	V4 GB resistor	450

	CONDENSERS	Values (μF)
C1	Aerial series condenser	0·001
C2	V1 cathode by-pass ...	0·002
C3	V1 anode osc. coupling	0·0001
C4	Osc. LW fixed tracker ...	0·00055
C5	V2 CG decoupling ...	0·1
C6	V1, V2 SG decoupling ...	0·1
C7	V2 cathode by-pass ...	0·1
C8	IF by-pass	0·001
C9	Coupling to V3 AVC diode	0·0001
C10	AF coupling to V3 triode	0·01
C11	IF by-pass condensers ...	0·0005
C12		0·002
C13	V3 triode to V4 coupling	0·1
C14*	HT smoothing condenser	4·0
C15*	V4 cathode by-pass ...	25·0
C16	Fixed tone corrector ...	0·0025
C17*	HT smoothing condensers	4·0
C18*		4·0
C19‡	Image suppressor ...	—
C20†	Band-pass pri. tuning ...	0·0005
C21‡	B-P pri. MW trimmer ...	—
C22†	Band-pass sec. tuning ...	0·0005
C23‡	B-P sec. MW trimmer ...	—
C24‡	Osc. circ. LW tracker ...	—
C25†	Oscillator circuit tuning	0·0004
C26‡	Osc. circ. MW trimmer	—
C27‡	1st IF trans. pri. tuning	—
C28‡	1st IF trans. sec. tuning	—
C29‡	2nd IF trans. pri. tuning	—
C30‡	2nd IF trans. sec. tuning	—

* Electrolytic. † Variable. ‡ Pre-set.

	OTHER COMPONENTS	Approx. Values (ohms)
L1	Aerial coupling coil ...	2·7
L2	Band-pass primary coils	4·0
L3		14·0
L4	Band-pass secondary coils	4·0
L5		14·0
L6	Cathode reaction coupling coil	4·5
L7	Osc. MW tuning coil ...	7·5
L8	Osc. LW tuning coil ...	11·5
L9	V1 anode RF choke ...	300·0
L10	1st IF trans. Pri. ...	100·0
L11	Sec. ...	100·0
L12	2nd IF trans. Pri. ...	100·0
L13	Sec. ...	100·0
L14	Speaker speech coil ...	4·0
L15	Hum neutralising coil ...	0·1
L16	Speaker field coil ...	2,000·0
T1	Speaker input trans. Pri.	750·0
	Sec.	0·3
T2	Mains trans. Pri., total ...	37·0
	Heater sec. ...	0·1
	Rect. heat. sec.	0·15
	Scale lamp sec.	6·5
	HT sec., total	900·0
S1	'Local-distant' switch ...	—
S2-S5 & S7	Waveband switches ...	—
S6	Radio muting switch ...	—
S8, S9	Scale lamp switches ...	—
S10	PU switch	—
S11	Mains switch, ganged R5	—
F1, F2	Mains fuses, 1A	—

VALVE ANALYSIS

Valve voltages and currents given in the table below are those quoted by the makers as average values when the receiver is operating with the voltage adjustment properly set, and with no signal input.

Voltages were measured on a high resistance meter (1,000 ohms-per-volt) whose negative lead was connected to chassis.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 SP4	225	1·3	109	0·22
V2 VP4	225	5·3	109	1·4
V3 TDD4	63	2·3	—	—
V4 Pen 4V	250	27·5	225	4·5
V5 IW3	380*	—	—	—

* Cathode to chassis, DC.

DISMANTLING THE SET

Removing Chassis.—Remove the three control knobs (recessed grub screws); withdraw the non-reversible speaker plug from its socket on the chassis deck; lay the receiver on its back, remove the four hexagon bolts (with flat metal washers) from the four rounded corners

at the bottom of the cabinet, and lift off the cabinet.

To gain access to the under-chassis compartment, remove the two cheese-head screws holding the base-plate to the bottom of the chassis.

When replacing, the two screws are fitted into the two holes at diagonal corners on the longer sides of the base-plate.

Removing Speaker.—Withdraw the plug from its socket on the chassis deck, and remove the four nuts (with lock washers) holding the speaker to the sub-baffle.

When replacing, the transformer should be on the right.

GENERAL NOTES

Switches.—**S1** is the QMB local-distant switch, mounted on the front chassis member.

S2-S5 and **S7** are the waveband switches, **S8, S9** the scale cursor lamp switches, and **S6, S10** the radio muting and gramophone pick-up switches, ganged in a spring-leaf unit beneath the chassis.

Switch	Gram	MW	LW
S2	—	C	—
S3	—	C	—
S4	—	C	—
S5	—	C	—
S6	C	—	—
S7	—	C	—
S8	—	—	C
S9	—	C	—
S10	C	—	—

The unit is indicated in our under-chassis view, where the switch tags are identified. The table above gives the switch positions for the three control settings, starting from the gram. position of the control, which is continuously rotatable, and turning clockwise. A dash indicates open, and **C** closed.

S11 is the QMB mains switch, ganged with the volume control **R5.**

Coils.—**L1-L5** are the aerial coupling and band-pass coils, wound on a common unscreened tubular former beneath the chassis.

The oscillator coils **L6-L8** are in a screened unit on the chassis deck. The associated RF choke **L9** is in a separate screened unit mounted on top of the oscillator unit.

The IF transformers **L10, L11** and **L12, L13** are in two further screened units on the chassis deck with their associated trimmers. The first unit also contains **R11,** and the second one **C9.**

Scale Cursor Lamps.—These are two MES-type lamps with large spherical bulbs, rated at 6.2 V, 0.3 A. They are mounted on the cursor carrier, which slides along a rail behind the scale, a cursor line on the carrier throwing a shadow on the screen.

The two lamps are connected in series across a special four-volt secondary winding on the mains transformer **T2** (or in some models across the heater winding), and connections to the lamps are made via the two drive cords, which are conductors. They pick up the energising current from the two contact pulleys at the ends of the assembly as shown in our plan view, the pulleys being insulated from chassis but connected to the ends of the secondary winding.

The centre tap between the two lamps is taken to chassis via the carrier rail. The two controlling switches **S8, S9** also are connected in series across the lamps, their centre going to chassis, so that when **S9** closes, the LW lamp is short-circuited and the MW lamp lights, and vice versa.

External Speaker.—Two sockets are provided at the rear of the chassis for the connection of a high-impedance (6,000 to 8,000 Ω) external speaker.

Condensers C14, C17, C18.—These are four dry electrolytics, in a single rectangular unit beneath the chassis, rated at 4 μF, 500 V peak, each. The three red leads are the positive connections, and there is a black common negative connection.

Speaker Connections.—A three-pin plug and socket provides the connections between the speaker unit and the chassis, the socket being mounted on the underside of the chassis deck. The three interconnecting points are indicated in our circuit diagram by numbered circles and arrows, and a sketch of the plug appears beneath the diagram.

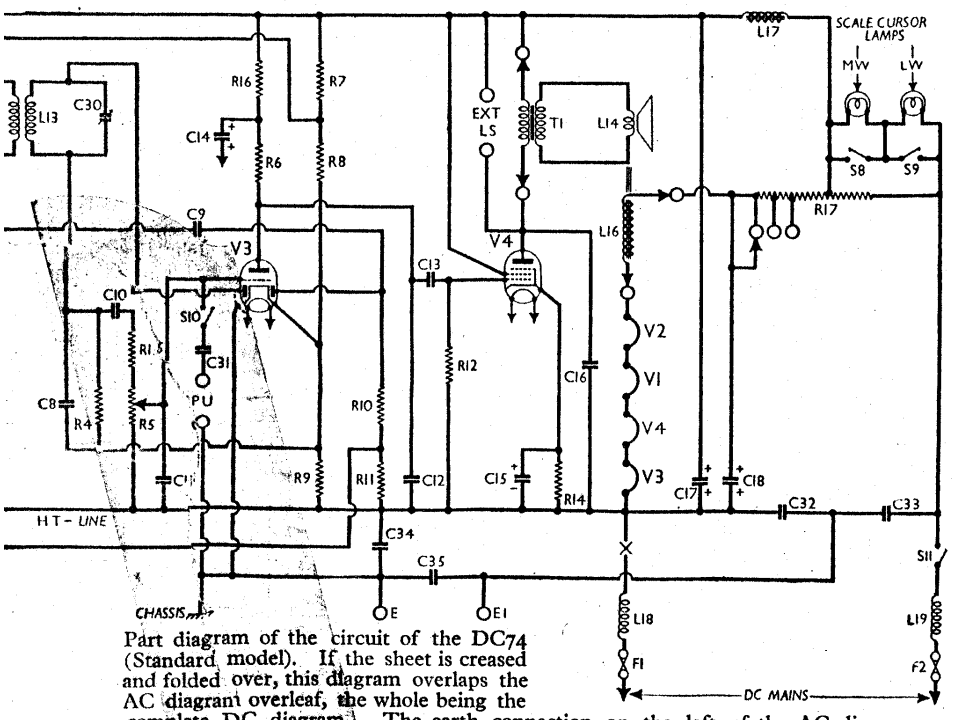
Fuses F1, F2.—These are two standard 1¼-inch fuses, rated at 1 A each, mounted on the voltage adjustment panel.

Meter Link.—This consists of a piece of flexible wire soldered between the earthy pick-up socket and a chassis tag. If one end of the wire is unsoldered and a milliammeter with an 0-5 mA scale is inserted, **V2** cathode current is indicated, and the meter acts as a tuning meter for alignment purposes.

Speaker Grill.—The moulded speaker aperture escutcheon, with its chromium bars, is made as a separate piece from the cabinet, and can be removed by turning its rim a few degrees anti-clockwise and lifting out, as it is held in position by a bayonet fixing.

This provides a convenient means of access to the inside of the speaker cone and gap without removing the speaker. It is also useful if it is desired to fit a new piece of fabric behind the bars, the material being held in place by an expanding ring inside the rear of the escutcheon moulding.

Chassis Divergence.—In early chassis, **T2** had a special 4 V secondary winding for the scale cursor lamps, but in later models this was discarded and the lamps were run from the valve heater secondary.



Part diagram of the circuit of the DC74 (Standard model). If the sheet is creased and folded over, this diagram overlaps the AC diagram overleaf, the whole being the complete DC diagram. The earth connection on the left of the AC diagram must then be ignored, and the chassis line must be regarded as HT negative line only. The chassis pressing is isolated from it. The point marked "X" between **L18** and HT negative shows where **L16** is inserted in the mercury arc model.

DC MODELS

The following is based entirely on information supplied by the makers.

Standard Model.—Considerable differences occur between the AC and DC versions, although these are confined mainly to the power supply circuits, and a section of the diagram, from the second detector stage onwards as applied to the standard DC74 chassis, appears in cols. 1 and 2. Its position is so arranged that the sheet may be folded so that this diagram overlaps the portion of the AC diagram overleaf that it replaces, the whole then being the complete DC74 circuit.

The valves used are now :

V1, Cossor DS Pen
V2, Cossor metallised DVS Pen
V3, Cossor metallised DDT 16
V4, Cossor DP Pen

and their base connections are the same as those in the AC model, but the electrode voltages generally are lower and are measured from HT negative (not chassis). They all have 16 V, 0.25 A heaters, which are connected in series, together with the speaker field **L16** (now 200 Ω) and the ballast resistor **R17** across the mains input circuit. **L16** now smoothes the heater current. The scale cursor lamps, which are rated at 4 V, 0.11 A, are connected across a portion of **R17,** and an HT smoothing choke **L17** takes the HT feed to the HT positive line. An RF filter circuit **L18, L19, C32, C33** is fitted in the mains lead, and in association with it are two alternative earth connection sockets **E** and **E1** and condensers **C34, C35.** The chassis, it should be observed, is isolated from HT negative. The original plug is used for the speaker connection, but a fourth pin, which is omitted in the AC model, is added between pins 1 and 2.

HT feed is now direct to **V4** screen and **V1-V3** anodes, **R13** being omitted. Several changes of value occur in components that occupy the same positions as they did in the AC74. **C14, C17** and **C18** change their values and their positions, but they still comprise an electrolytic block. They are now, however, reversible electrolytics, rated at 350 V.

The gramophone pick-up sockets are connected between chassis (not HT negative) and, via isolating condenser **C31,** the slider of **R5.** The metallising of **V3** also goes to chassis. **R15** is added in series with **R5,** and a decoupling resistor **R16** is inserted in **V3** triode anode circuit.

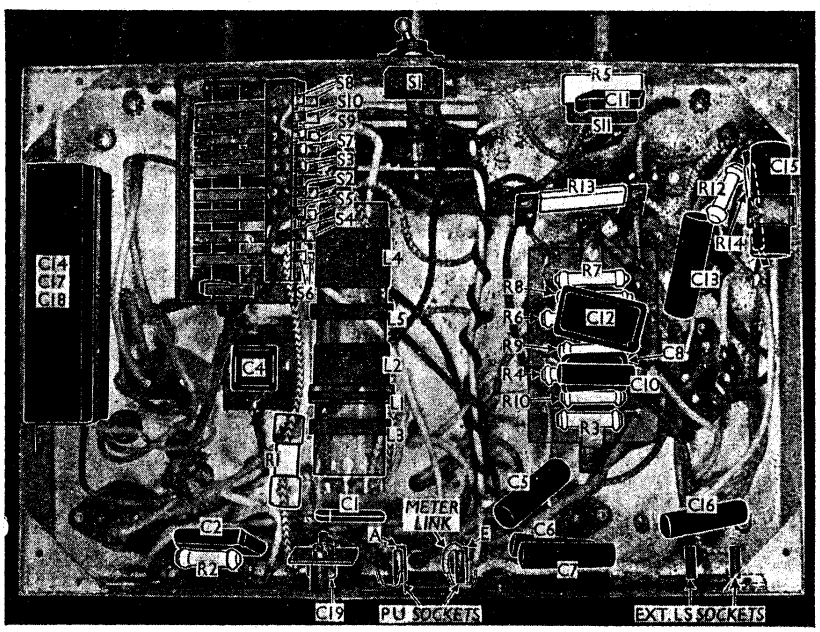
The table below gives the values of the added resistors and condensers, and new values of those that are different as compared with the AC model. Those that are omitted from the tables either have the same values and positions as before or are omitted in the DC chassis. The RF oscillator and IF stages are the same in both models. The DC resistance of the filter coils **L18** and **L19,** which are not included in the table, is 1Ω each.

	STANDARD DC74 COMPONENTS	Values
	RESISTORS	
R7	Part HT pot. divider	30,000Ω
R10	Part AVC diode load	1,000,000Ω
R14	V4 GB resistor ...	350Ω
R15	Volume control limiter	9,000Ω
R16	V3 triode anode decoupling	4,000Ω
R17	Heater circuit ballast	§720Ω
	CONDENSERS	
C14**	V3 triode anode decoupling	2·0μF
C17**	HT smoothing ...	8·0μF
C18**	Heater circ. smoothing	1·0μF
C31	PU isolator	0·1μF
C32	Mains RF filter condensers	0·1μF
C33		0·1μF
C34	Earth isolating condensers	0·1μF
C35		0·004μF

§ Tapped at 115Ω + 111Ω + 468Ω + 20Ω from L16 end. ** Reversible electrolytics.

MERCURY ARC MODEL

There is a special version of the DC74 designed especially for mercury arc rectified mains supplies, incorporating more stringent smoothing and RF filtering arrangements than those in the Standard DC model.



Under-chassis view. The switches are all identified. **R1, R13** and **R14** are wire-wound resistors. The meter link is a piece of wire connected between the earthy pick-up socket and a chassis tag near it. **C4** is mounted directly upon the back of **C24.**

The differences, as compared with the Standard model, involve additions, omissions, and alterations in value, of some components. An additional heater smoothing choke (DC resistance 28 Ω) replaces the speaker field coil **L16,** and **L16,** shunted by a 1 μF condenser, is inserted in the negative mains lead at the point marked "X" in the Standard DC diagram. The choke is wound on the same core as **L17. C34** becomes 1μF, and another 1 μF condenser is added between socket E1 and HT negative. The valve heater sequence is altered, reading from the new choke down to HT negative, to **V4, V3, V2, V1.** HT voltages are generally lower than in the Standard model.

R17 becomes 590Ω, tapped at 80Ω+80Ω+410Ω+20Ω from the choke end, and **L16** becomes 100Ω. **R16** is omitted, and so is **C14. C17** becomes 2 μF, and **C18** becomes 8 μF.

CIRCUIT ALIGNMENT

Instead of the usual output meter, a milliammeter reading about 0·5 mA is inserted in **V2** cathode lead as a tuning indicator, the meter link shown in the diagram being replaced by the meter. Its position is shown in our under-chassis view. An output meter can be used in the normal manner, of course, but the following instructions assume that a milliammeter is used as suggested.

IF Stages.—Connect signal generator to **A** and **E** sockets, switch set to LW, and turn the gang to maximum. Feed in a 110 kc/s (2,727 m) signal, and adjust **C29, C28** and **C27** for *minimum* reading on the meter. Then adjust **C30** for maximum reading.

RF and Oscillator Stages.—Insert a suitable dummy aerial in the lead to the **A** socket. With the gang at minimum, the cursor should coincide with the 200 m calibration mark on the scale. Set **S1** at "Distant" (toggle to left).

MW.—Switch set to MW, tune to 200 m on scale, feed in a 200 m (1,500 kc/s) signal, and adjust **C26** for minimum reading on the meter. Tune to 250 m on scale, feed in a 250 m (1,200 kc/s) signal, and adjust **C23** and **C21** for minimum reading. **C23** will usually be nearly at its minimum position.

Feed in a 500 m (600 kc/s) signal, and tune it in. If the calibration now reads too high, slacken off **C26** slightly, feed in a 250 m (1,200 kc/s) signal, tune it in, and adjust the cursor carrier for correct calibration, readjusting **C23** and **C21.** If the calibration at 500 m is low, screw up **C26** slightly, and then proceed as before.

LW.—Switch set to LW, tune to 1,800 m on scale, feed in a 1,800 m (166.5 kc/s) signal, and adjust **C24** for minimum reading. Check calibration at 1,200 m (250 kc/s), and if incorrect, readjust **C24** to divide the error between the two settings.

Image Suppressor.—This was arranged to operate originally at 479 m, but the relative powers and frequencies of transmitters have since been modified considerably, and their sites may have been changed, so that the original adjustment may not be effective.

If image interference is experienced, therefore, it may be minimised by tuning the receiver to the frequency at which the interference is found, and adjusting **C19** for minimum interference, using the speaker as an indicator.

Printed in Great Britain by The Cornwall Press Ltd., Paris Garden, London, S.E.1. [B.2311—H.&S.]