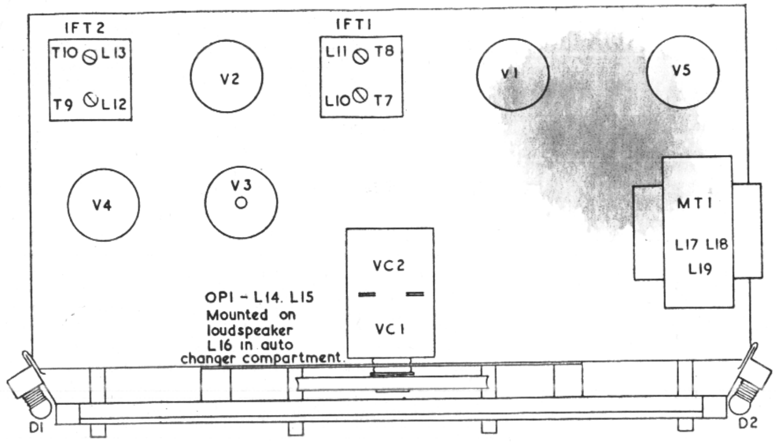
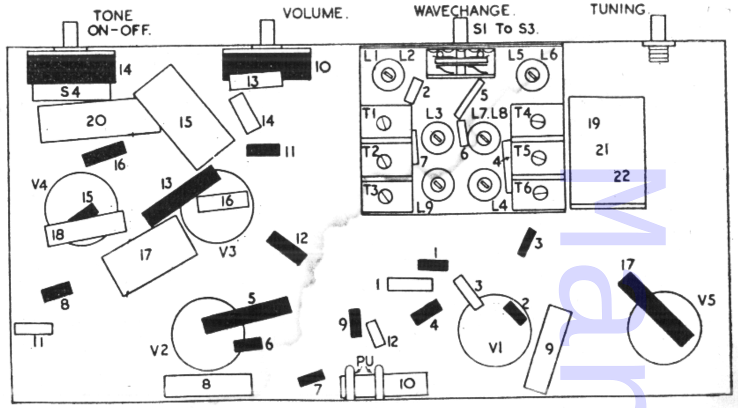
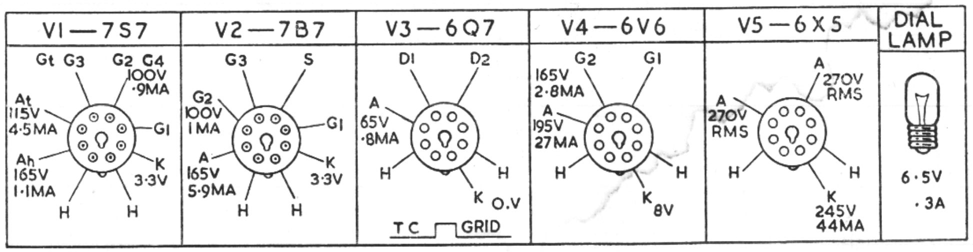
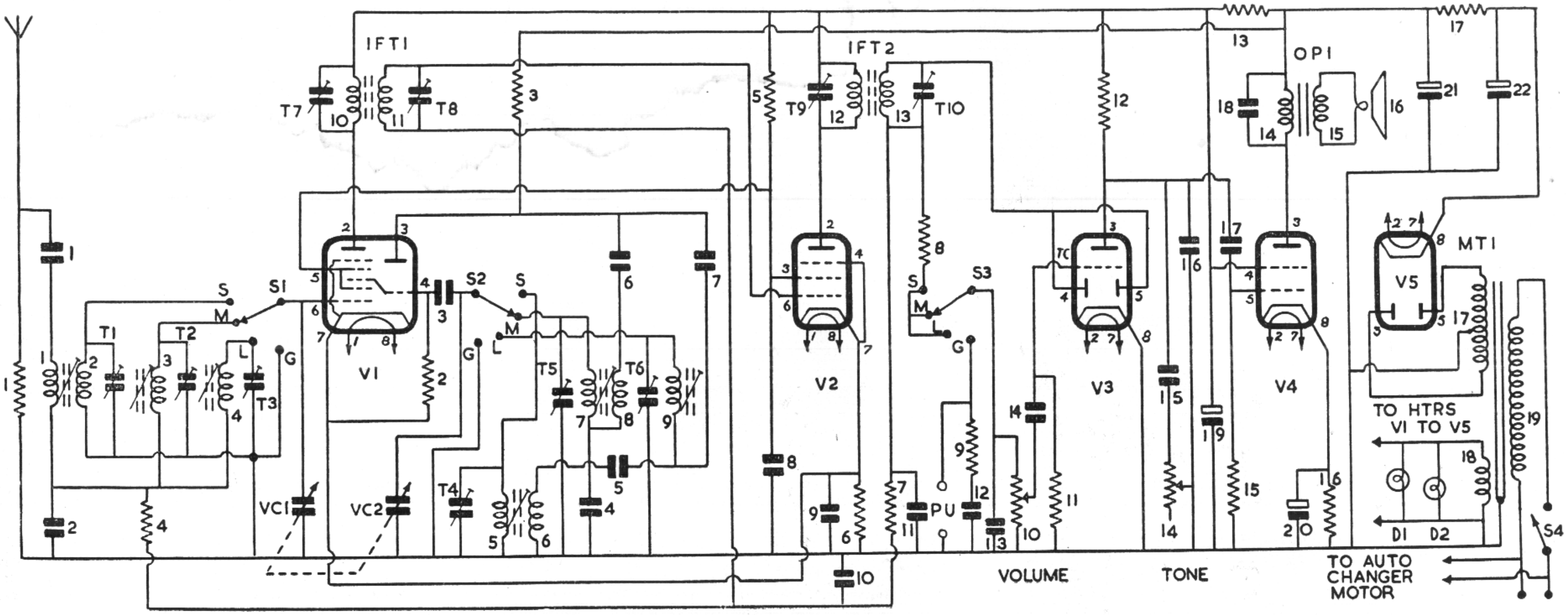
ETRONIC EGA5317 'WINDSOR' RADIOGRAM





Console radiogram consisting of a five-valve three-waveband superhet with a Collaro RC500 automatic changer fitted with lightweight moving-iron pickup. Housed in light walnut console cabinet. Suitable for 200 to 250V 50c/s mains. Manufactured by Hale Electric Co., Ltd., Talbot Road, West Ealing, W13.





RESISTORS

R	Ohms	Watts
1	4.7K	¼
2	47K	¼
3	22K	¼
4	150K	¼
5	22K	1W
6	220	¼
7	2.2M	¼
8	56K	¼
9	4.7K	¼
10	500K	Potr.
11	10M	¼
12	220K	¼
13	3.3K	1
14	500K Potr. with SP switch	
15	470K	¼
16	330	½
17	1K	WW 5W

CAPACITORS

C	Capacity	Type
1	.001	Tubular 500V
2	.005	Tubular 350V
3	100pF	Tub. Ceramic
4	500pF	Silver Mica
5	175pF	Silver Mica
6	100pF	Tub. Ceramic
7	100pF	Tub. Ceramic
8	.1	Tubular 350V
9	.1	Tubular 350V
10	.05	Tubular 350V
11	100pF	Tub. Ceramic
12	.01	Tub. Ceramic
13	400pF	Tub. Ceramic
14	.005	Tubular 500V
15	.01	Mica
16	400pF	Tub. Ceramic
17	.01	Mica
18	.02	Tubular 1000V
19	17	Electrolytic 350V
20	25	Electrolytic 12V
21	16	Electrolytic 350V
22	16	Electrolytic 350V

INDUCTORS

L	Ohms
1	very low
2	very low
3	4
4	31
5	very low
6	.25
7	2.5
8	1
9	12.5
10	4.75
11	4.75
12	4.75
13	4.75
14	450
15	.5
16	2.5
17	600
18	very low
19	60

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CASEBOOK—*Continued*

After checking that the resistance between the EK2 anode and HT line was not excessive, we isolated each decoupling condenser in turn and switched on. The result in each case was the same: whether or not the condensers were in circuit, the EK2 voltages remained very low.

There is at the back of the chassis a small gram/radio switch which, when turned to Gram, removes HT from the EK2 to prevent radio break-through. As it was dirty we wondered if it had developed a partial leak to earth, so cleaned it thoroughly with a proprietory cleaner. Results on re-testing were as before.

Some of the wiring attracted our attention. The conventional Philips rubber-covered type, it had perished here and there. But in other places, in particular near the gram/radio switch, some closely running wires had coalesced together as if oil had deteriorated the rubber. We separated these wires and after switching on found that the EK2 was getting its full voltages and working normally.

The trouble was due to the rubber insulation acting as a semi-conductor when a fairly high voltage was applied to it. We replaced a number of the various connecting wires that presented a poor appearance and no further trouble was experienced.

COSSOR 395

THE owner of a Cossor 395 AC superhet complained that it gave distorted output although in other respects it was normal. We found the reproduction was below par although, to be more accurate, it was distorting only on really strong signals and then a little de-tuning either side of optimum would remove the trouble.

As the distortion sounded as if it were caused by an over- or under-biased AF valve we first checked that the cathode biasing of the 4XP output triode and the DDT duo-diode-triode was in order. Both cathode circuits were perfect with the correct voltage across each cathode resistor.

As more than one of the trimmer seals had been broken sometime previously we decided to re-align the receiver. When this had been completed the distortion was even more noticeable.

We then fed a pickup to the set's gram sockets and found that even at maximum volume no distortion was present in the output comparable to that caused by a strong radio signal. The distortion was, therefore, definitely caused by the high-frequency section of the receiver and, most likely things first, we turned our attention to the AVC circuit.

After some brief testing, we found the cause of the trouble—the AVC feed resistor to the IF valve had developed an open circuit and was thus robbing the valve of bias. We replaced it with another and no further distortion was experienced.—G.R.W.

USE OF ELECTRONIC VOLTMETER

THE electronic voltmeter is a revealing instrument, and will indicate voltage in parts of a receiver where measurements couldn't be made with the old type multimeter. The first obvious use of the VTVM is the measurement of grid bias directly at the grid. A typical example is a self-biased output valve in a mains set. A reading taken across the cathode bias resistor shows that the cathode is, say, 15 volts positive to chassis.

The polarity switch on the meter is now turned to negative, and a reading at the grid of the valve should show it to be 15 volts negative to cathode. The negative prod of the meter should be on the cathode.

If the reading obtained at the grid of the valve is less than 15V, steps should be taken to find out why. It is usually because of a leaky audio coupling condenser, whose goodness or otherwise can be checked on the high ohms range of the VTVM.

Another use for the electronic voltmeter is the checking of AVC voltages at the grids of the IF and FC valves. The rise and fall of the negative bias voltage may be noted as the set is tuned through a strong station. Failure to obtain a reading here may mean an open circuited AVC feed condenser. Excessive AVC voltage could be due to the AVC diode load resistor being open or gone high.

Many DC voltages exist only while the circuits are carrying high frequency AC. A common example of this is the local oscillator in a superhet. An attempt to measure the osc. grid voltage of a frequency-changer with an ordinary direct probe meter will result in serious detuning with a considerable error in the voltage indicated, if any. The reason for this is that the high input capacitance of the meter places an excessive load on the RF circuit. On the other hand, the usual 1 meg resistor in the probe of the electronic meter places a high isolating resistance between the source voltage and the stray capacity of the test leads. Thus the low input capacity and high input resistance enable accurate readings to be taken at critical points in the receiver.

Using the electronic voltmeter, it is but the work of moments to determine whether the local oscillator is functioning, as indicated by the absence or presence of the normal negative potential at the oscillator grid. Dead spots on the short waveband can readily be located if they are due to failure of oscillator to function at certain points. The electronic voltmeter may also be used for making impedance measurements of speech coils and such in conjunction with the 400c/s output from the test oscillator.

In spite of its sensitivity, the VTVM is a rugged instrument and it is impossible to burn out the meter movement by overload on the voltage ranges. On accidentally applying a high voltage to a low voltage range, the valves in the instrument saturate and limit the current to a value within the capacity of the meter.

A word of caution is, however, advisable. The movement of a VTVM can be damaged due to overload on the current ranges, and for this reason the service engineer should make a practice of carrying out current measurements with a spare milliameter.—P.J.S., Kilcar, Co. Donegal.

BEST TIP ON SERVICE FILES

TAILPIECE tip—save yourself much bother and time in years to come by buying, today, sufficient copies of the bound volumes of SERVICE CHARTS.

Of the postwar series, Volume I is sold out, but some copies of Volumes II and III remain. These contain Charts published between September, 1949—February, 1950 and March—August, 1950, respectively, and are available from The Publisher, ELECTRICAL AND RADIO TRADING, 6, Catherine Street, London, WC2, at 3s. each, post free—to ELECTRICAL AND RADIO TRADING subscribers exclusively.

ETRONIC EGA5317

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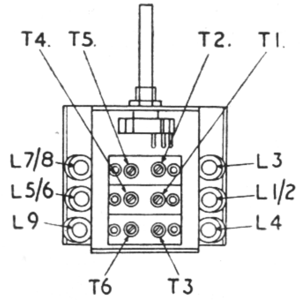
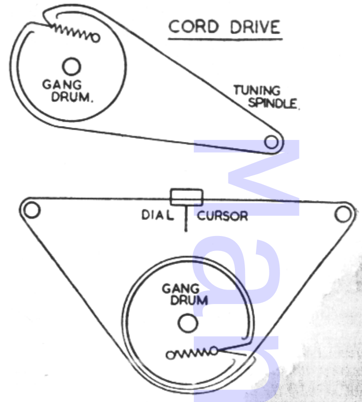


ALTERNATIVE COIL PACK



AERIAL is fed through isolating capacitor C1 to SW aerial coupling coil L1 and thence to bottom ends of grid tuned coils L3 (MW), L4 (LW). R1 is static drain. The grid coils L2 (SW), L3 (MW), L4 (LW) which are trimmed by T1, T2, T3 respectively, are switched by S1 to aerial tuning capacitor VC1 and to grid of triode-heptode frequency changer V1. AVC voltages decoupled by R4, C2 are fed through the tuned coils to V1 on all except Gram position of S1 when the grid is earthed to chassis.

Cathode bias is provided by R6 decoupled by C9 in the cathode circuit of IF amplifier V2. Screen voltage is obtained from R5 decoupled by C8. Primary L10, T7 of IFT1 is in the heptode anode.

Oscillator is connected in a tuned-grid shunt-fed circuit. The grid coils L5 (SW), L7 (MW), L9 (LW), trimmed by T4, T5, T6 respectively and padded by C4 (MW), C5 (LW), are switched by S2 to oscillator tuning capacitor VC2 and through C3 to oscillator grid (gt) of V1. Automatic bias for grid is developed on C3 with R2 as leak.

Anode reaction voltages are obtained inductively from L6 (SW), L8 (MW) and capacitively from padder C5 on LW band and fed by C6 (MW), C7 (SW, LW) to oscillator anode (at) of V1 of which R3 is the anode load. Oscillator grid is earthed through C3 when S2 is switched to Gram to prevent radio break through.

IF amplifier operates at 470kc/s. Secondary L11, T8 of IFT1 feeds signal and AVC voltages decoupled by R7, C10 to IF amplifier V2. Cathode bias is provided by R6 and decoupled by C9. Screen voltage is obtained from R5 decoupled by C8. Primary L12, T9 of IFT2 is in the anode circuit.

Signal rectifier. Secondary L13, T10 of IFT2 feeds signal to strapped diodes of V3. R10 the volume control is the diode load and R8, C11, C13 give IF filtering.

AVC. The DC component of the rectified signal decoupled by R7, C10, is applied to V1, V2 for AVC.

Pickup. Sockets are fitted at rear of chassis for connection of the pickup of the auto-changer unit. Pickup signal is fed to tone correcting network R9, C12 and thence switched by S3 through to volume control R10. To prevent radio breakthrough when pickup is being used, grid of V1 is earthed by S1, oscillator grid is earthed through C3 by S2, and signal rectifier circuits are disconnected by S3.

AF amplifier. Rectified signal across R10 is fed by C14 to triode section of V3. Bias for grid is developed on C14 with R11 as leak. R14, C15 between anode and chassis give variable top cut tone control and C16 is anode RF by-pass.

Output stage. C17 feeds signal from anode V3 to beam-tetrode output amplifier V4, HT for which is obtained from junction of R13, R17. Secondary L15 feeds output to a 10-in. PM speaker L16.

HT is provided by rectifier V5. Resistance-capacity smoothing is given by R17, C21, C22. Voltage dropping and further smoothing of HT feed to V1-V3 (except oscillator anode V1) and to screen V5 is provided by R13, C19. Reservoir smoothing capacitor C22 should be rated to handle 75 mA ripple.

Auto-changer is Collaro model RC500 fitted with a lightweight plug-in moving-iron pickup using miniature needles such as Columbia 99 or HMV Silent Stylus or miniature permanent sapphire needles.

Motor fitted to auto-changer is provided with dual field coils which can be coupled in parallel for 100-125V or in series for 200-250V supplies.

Chassis removal. Remove rear panel and detach aerial-earth socket strip from side runner. Remove PU plugs from sockets. Unsolder LS and earth leads from speaker. Slacken the two lower lefthand terminals on auto-changer panel and remove leads.

Pull off four control knobs and remove four chassis fixing bolts.

Removal of auto-changer. Unplug PU leads from receiver chassis and remove mains leads from motor.

Undo and remove the three fixing bolts situated at front, rear and righthand sides of unit plate. With drawer fully open withdraw auto-changer.

TRIMMING INSTRUCTIONS

Apply signals as stated below	Tune Receiver to	Trim in Order stated for Max. Output
(1) 470 kc/s to g1 of V1, via .1 mF	MW with gang fully meshed	T10, T9, T8, T7
(2) 150 kc/s to AE E Sockets via dummy aerial	2000 metres	Cores L9, L4
(3) 300 kc/s as above	1000 metres	T6, T3. Repeat (2) and (3)
(4) 600 kc/s as above	500 metres	Cores L7, L3
(5) 1.5 mc/s as above	200 metres	T5, T2. Repeat (4) and (5)
(6) 6 mc/s via 400 Ω resistor to AE socket	50 metres	Cores L5, L2
(7) 15 mc/s as above	20 metres	T4, T1. Repeat (6) and (7)

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