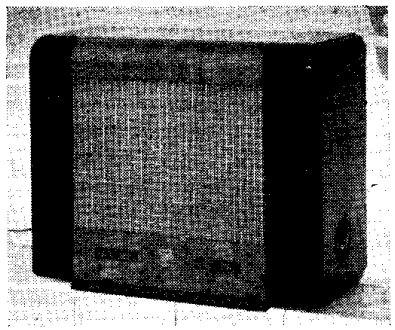
EKCO CONNOISSEUR A110



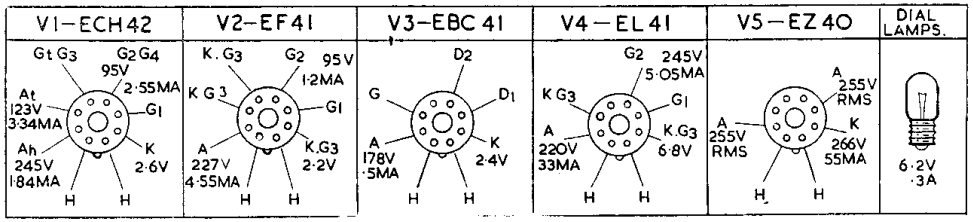
Five-valve superhet giving four preset switch-selected stations. Fitted with internal frame aerial, sockets for external aerial and earth, a low-impedance extension speaker and a high-impedance magnetic or crystal pickup. Housed in walnut veneered table type cabinet. Suitable for use on 200–250V, 50–100c/s mains. Made by E. K. Cole Ltd., Southend-on-Sea, Essex.

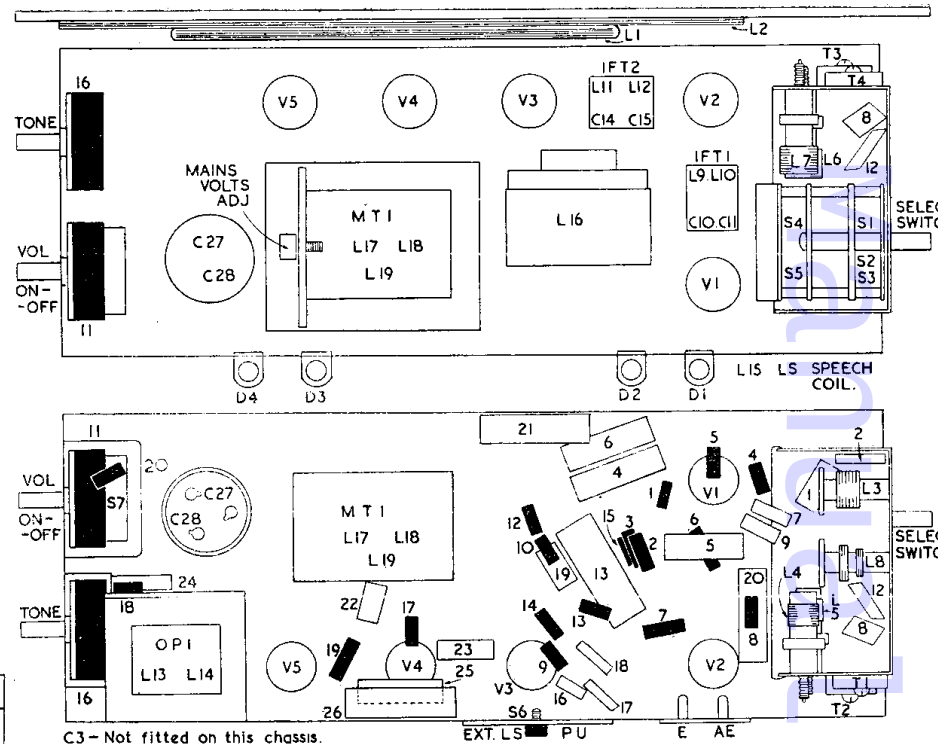
THE receiver consists of a five-valve superhet with internal aerials and provides a choice of three MW and one LW pre-tuned programmes. Ranges covered are 194-290, 245-390, 340-550 and 1200-1800 metres. Sockets are provided for external aerial and earth when receiver is used in areas of low signal strength.

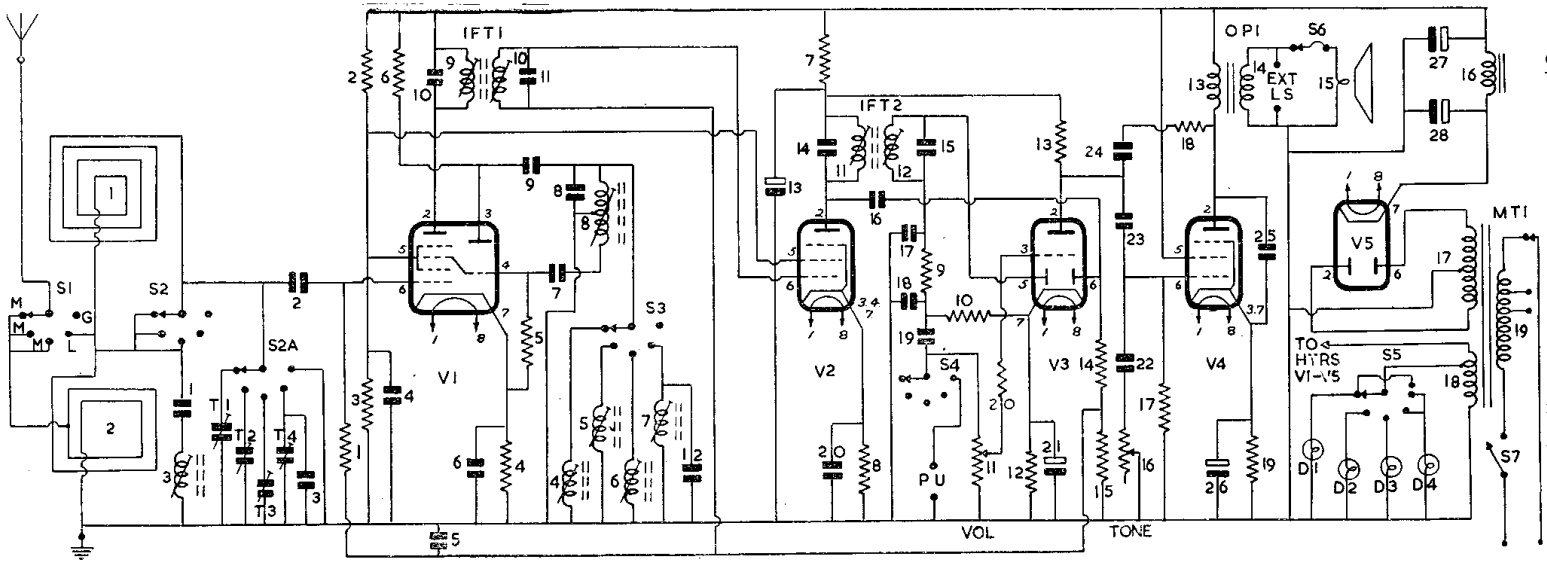
Aerial. Frame aerials L1 (LW), L2 (MW) are connected in series and coupled by C2 to triode-hexode frequency changer V1. L3, C1 are shunted across MW frame L2 and form an IF filter. When receiver is switched to LW programme S2 is open

INDUCTORS

L	*Ohms*	*L*	*Ohms*
1	6.2	9	30
2	1.2	10	34
3	16.5	11	13.5
4	3.5	12	13.5
5	4.5	13	700
6	2.5	14	.34
7	5.5	15	2.5
8	15.5	16	350
		17	680
		18	very low
		19	50 total







CAPACITORS

C	*Capacity*	*Type*
1	82pF	Silver Mica
2	100pF	Silver Mica
3	140pF	Silver Mica
4	.1	Tubular 350V
5	.02	Tubular 350V
6	.1	Tubular 350V
7	200pF	Mica
8	270pF	Silver Mica
9	500pF	Mica
10	56pF	Silver Mica
11	56pF	Silver Mica
12	250pF	Silver Mica
13	4	Electrolytic 350V
14	100pF	Silver Mica
15	100pF	Silver Mica
16	15pF	Tub. Ceramic
17	100pF	Silver Mica
18	100pF	Silver Mica
19	.01	Tubular 350V
20	.1	Tubular 350V
21	50	Electrolytic 12V
22	.01	Tubular 350V
23	.01	Tubular 500V
24	.001	Tubular 500V
25	.005	Tubular 400VAC
26	50	Electrolytic 12V
27	32	Electrolytic 350V
28	32	Electrolytic 350V

RESISTORS

R	*Ohms*	*Watts*
1	1M	½
2	22K	½
3	33K	½
4	330	½
5	47K	½
6	33K	½
7	3.3K	½
8	330	½
9	100K	½
10	560K	½
11	1M Potr. with Sp Switch.	½
12	4.7K	1
13	100K	½
14	1M	½
15	2.2M	½
16	500K Potr.	
17	680K	½
18	1.8M	½
19	180	½
20	47K	½

C3 fitted on earlier models only.

EKCO A110—*Continued*

and L1, L2 are tuned by T4, C3 which are switched in circuit by S2A.

On the three MW programmes S2 short circuits LW frame L1 and either T1, T2 or T3 is switched in across L2 by S2A.

External aerial signal is switched by S1 to tap on L2 for MW ranges and to bottom of L1 on LW.

AVC decoupled by C5 is fed through R1 to V1. Cathode bias is provided by R4 decoupled by C6. Screen voltage is obtained from potential divider R2, R3, decoupled by C4. Primary L9, C10 of IFT1 is in the hexode-anode circuit.

Oscillator is fundamently a tuned-anode shunt-fed circuit in which a permeability-tuned master oscillator coil L8, trimmed by C8, is shunted by preset permeability tuned coils L4 to L7 to produce the required frequency.

Upper section of L8, tuned by C8, and forming the tuned-anode coil, is coupled by C9 to oscillator anode of V1, R6 being the load resistor. Reaction voltages are developed across lower section of L8 and coupled by C7 to oscillator grid of V1.

Automatic bias for oscillator grid is developed on C7 with R5 as leak.

The preset tuned coils L4, L5, L6 (MW) and L7, C12 (LW) are switched by S3 across upper (anode) section of L8.

IF amplifier operates at either 455 or 460kc/s according to the area for which the set is intended. The former frequency is for southern and the latter for northern areas. Receiver chassis are stamped on the rear with N or S to indicate the appropriate frequency.

Secondary L10, C11 of IFT1 feeds signal and AVC voltages, decoupled by C5, to IF amplifier V2. Cathode bias is by R8 decoupled by C20. Screen voltage is obtained from potential divider R2, R3 decoupled by C4. Suppressor is internally strapped to cathode.

Primary L11, C14 of IFT2 is in the anode circuit, the HT for which is decoupled by R7, C13.

Signal rectifier. Secondary L12, C15 of IFT2 feeds signal to one diode of V3. R10 is the load and R9, C17, C18 an IF filter.

AVC. IF signal is coupled by C16 to second diode of V3 of which R14, R15 form a tapped diode load. Approximately two-thirds of the rectified control voltage is applied to V2 and through R1 to V1. AVC line decoupling is given by C5 and delay bias by cathode voltage across R12, C21.

AF amplifier. Rectified audio signal is fed by C19 to volume control R11 and thence to grid of triode section of V3. Cathode bias is by R12 decoupled by C21. R13 is anode load—the HT for anode being obtained from R7 decoupled by C13 which also decouples the HT to V2.

Pickup. Sockets are fitted at rear of chassis for connection of a high-impedance magnetic or crystal pickup. In Gram position of S4 the pickup signal is switched to volume control R11 and at the same time external aerial is disconnected from input circuit by S1 and of V1 is earthed to chassis through C2 by S2A.

Output stage. C23 feeds signal at anode V3 to pentode output valve V4. R17 is its grid resistor and C22, R16 form a variable top-cut tone control. Cathode bias is by R19 decoupled by C26.

Primary L13 of output matching transformer OP1 is in the anode circuit. Secondary L14 feeds signal to an 8 in. PM speaker L15. Sockets are fitted on L14 for connection of a low-impedance extension speaker. S6 enables internal LS to be disconnected.

Negative feedback from anode to g1 of V4 is given by R18, C24.

HT is provided by an indirectly-heated full-wave rectifier V5. Its anode voltages are obtained from HT secondary L17 of mains input transformer MT1.

Choke-capacity smoothing is given by L16, C27, C28. Reservoir smoothing capacitor C28 should be rated to handle 100mA ripple current.

Heaters are connected in parallel and obtain their current from secondary L18 of MT1.

Station indicator lamps, D1 to D4, are switched by S5—which is ganged to selector switches S1 to S4—to a tapping on secondary L18. In Gram position of selector switch both D1 and D4 are illuminated. Primary L19 of MT1 is tapped for inputs of 200-210, 220-230, 240-250 V, 50-100c/s, S7 ganged to volume control spindle, is ON/OFF switch.

Chassis removal. Remove rear panel of cabinet and from inside cabinet undo the two grub screws in each control knob and remove knobs. Remove the four chassis fixing bolts on underside of cabinet. Loosen the nuts on LS clamps—rotate clamps sideways to allow LS to be removed from baffle.

Chassis and LS can be withdrawn.

Alignment. To adjust IF circuits inject 455kc/s to Southern area models with S on chassis, or 460kc/s to Northern area models with N on chassis, to g1 of V1 via 0.1mF capacitor and trim cores of L12, 11, 10 and 9 for maximum output.

The master oscillator coil should not need adjustment but if it does switch to gram, inject 135kc/s to V1 and adjust L8.

Range of adjustment for each preset tuning position is indicated on rear panel of cabinet. Select appropriate oscillator coil core for required station, tune in station, then adjust aerial trimmer for maximum.

ULTRA U626

AN Ultra U626 was stated by the customer to work satisfactory and then to suddenly "burst forth" at terrific volume, but only when the volume control was turned low. The most obvious thing faulty was the volume control but this proved OK.

Eventually it was found that on tapping the paxolin tube protruding from the top of the first IF can, the signal increased suddenly.

The IF was removed from the chassis and inspection showed that pF condensers are stamped into the paxolin base of the IF. By carefully dissecting, it was possible to trace a crack in the sprayed mica. As the wire ends of the IF actually solder on to the eyelets of the condensers between the paxolin, it was necessary to cut away part of the paxolin to remove all traces of the condenser.

A new 120pF condenser was fitted inside of the can and the set returned to normal working.—H. L. MITCHELL, Portsmouth.

SIMPLE TOOLS

ASK your wife for some old knitting needles; select the "odd" bone or plastic ones.

File a nick near the point of one pin and you have a useful tool for testing suspicious joints in those difficult-to-reach places by hooking and pulling the wires. It can also be used for "fishing" tuning cords past difficult points.

Fit a rubber washer to the end of another pin and you have a neat hammer for tapping valves.

Other needles can be shaped to form trimming tools.—A.C.T.

SERVICE CASEBOOK

ULTRA V116

THE frame generator could be stopped or started by subjecting the chassis to a sharp knock. Since so many new receivers seem to be blessed with similar symptoms, due to dry joints, intermittent valves, etc., it first appeared as though this fault was one of the many. Thus, the valves were tapped and the time base circuit examined for dry joints and some joints re-soldered.

The fault persisted but eventually it was noticed that a resistor connected to the height control pot. was overheating; a more detailed analysis revealed a short circuit from the height control pot. to earth.

Removing the metal cover from the control exposed the cause; a small piece of metal swarf.—G. J. KING, Oxford.

GEC BT2147

FAULTS were: (a) Insufficient adjustment available on "horizontal hold," causing picture to tear during bursts of interference, and (b) intermittent frame scan.

Components associated with the line oscillator were first checked and after these were proved to be normal, the line oscillator valve V8B, a B36, was substituted. This effected a cure for fault (a): the emission of the original valve appeared to be normal, but its characteristics had somehow varied. Although a slight modification of the circuit constants might have rendered the circuit normal, it was decided to change the valve.

Since the frame oscillator uses the other triode section of the B36, it was thought that perhaps replacing the valve would also clear up fault (b). This was not the case. Due to the extremely intermittent nature of this fault, diagnosis was very difficult. Finally an intermittent 0.1 mF capacitor (C53 in the service sheet), connected from the cold end of the primary of the frame blocking feedback transformer to chassis, was found to be the culprit.—G. J. KING, Oxford.

MULLARD MTS684

A MULLARD MTS 684 T/V receiver had been giving intermittent trouble for several nights, working OK for probably an hour or more, then the line hold suddenly failing; this could be re-synchronised on adjusting the line-hold control, but then the oscillator would suddenly fail completely and the raster disappear.

The set uses a single valve power oscillator for line scanning. This valve and the UY41 "damping" diode were substituted without a cure. The chassis was removed to the workshop, and by now the line oscillator would only function for a minute or so on switching on.

A systematic check was then carried out, using an R/C bridge, of all capacitors and resistors in the line oscillator circuit, including C54, a 15pF condenser coupling the line sync pulses into the oscillator grid. Still the fault persisted, appearing to leave only the line O/P transformer or scan coils faulty.

A new O/P transformer was fitted, the oscillator started up OK and continued for about three minutes (I was just shaking hands with myself) and the oscillator failed again.

I decided to check each component by *substitution*. On coming to C54 again (line sync input) a new 15 pF condenser was fitted; oscillations commenced and continued. A check on picture proved OK now.

The faulty condenser was checked on the bridge again, and read exactly 15 pF but on fitting it in the set again the fault came on. A new condenser was permanently fitted and the set is now OK.

Another identical set also caused me a bit of head scratching. The picture would slip rapidly in and out of line sync, at the same time the brilliance would vary, and the line osc. whistle could be heard varying in pitch.

This at first led me to suspect the line osc. stage faulty, but on checking the voltage between tube grid and cathode, this was found very low. The cathode connects directly back to the video amplifier anode, and it was now found that no voltage existed between here and chassis.

The 3,300 ohm ½th watt load resistor had gone O/C; this was replaced with a similar resistor of more tolerant wattage rating, and the set has been OK ever since.

This fault was misleading in that one would have expected no picture modulation on the tube with the VF anode load O/C.—C. G. HINE, MORETON-IN-MARSH.

PHILIPS 209U

A PHILIPS 209U receiver reported to be producing a lot of noise, had the symptoms of a dry joint. The source proved to be the dial lamp which is of the 25V type.

The filament was intact but slight movement at the centre suspension caused the noise.—A.C.T.

FERGUSON 968T, 978T

Continued from page 11.

for an input of not more than 130 microvolts (40 microvolts for 968TS) to the Direct aerial socket.

968T only. On either side of this frequency (45mc/s) peaks will be found in the response curve. The lower of these should occur at a frequency not higher than 43mc/s and the higher at a frequency not lower than 47.25mc/s. These peaks should be approximately 6dB (i.e. 2: 1) up on the response at 45mc/s.

968TS only. The peak response will occur at approximately 45mc/s and the frequencies at which the response is 6dB (i.e. 2: 1) down on that at 45mc/s must not be less than 1.5mc/s either side of 45mc/s.

Sound channel rejection should be at least 32dB relative to vision carrier (i.e. 40: 1) on both models.

Sound sensitivity (taken with a 30 per cent. 1000c/s modulated signal at 41.5mc/s) should be better than 70 microvolts (40 microvolts on 968TS) for a 50mW output into a 3 ohm load across OP1 secondary.

MODEL 978T

Upon feeding in an unmodulated signal at 61.75mc/s (vision carrier frequency) the vision output meter reading should fall 10V for an input of not more than 300 microvolts to the Direct aerial socket.

If the input frequency is gradually reduced, the response should increase to approximately 6dB (i.e. 2: 1) up on that at 61.75mc/s and then fall again as the frequency is reduced further. The frequency at which the response is level with that at 61.75mc/s should be not greater than 59.75mc/s.

Sound channel rejection should be at least 27dB relative to vision carrier (23: 1).

Sound sensitivity (taken with a 30 per cent. 1000c/s modulated signal at 58.25mc/s) should be better than 100 microvolts for a 50mW output in to a 3 ohm load across OP1 secondary.