Servicing TELEVISION Receivers

No. 140 - THORN 980 CHASSIS

by L. Lawry-Johns

RECEIVERS using this chassis are the Ferguson "Junior 12", H.M.V. "Imp", Ultra "Cub" and Marconiphone Model 4618. These receivers are intended as "second" sets being very light (15 lb.) and easily carried from room to room. There is no provision for u.h.f. reception and therefore the circuitry is simplified for 405 line (Band I—III) standard only. Another limitation is that there is no mains adjustment and the sets should only be used on normal a.c. mains supplies, 220—240V. The tube is a 12in. Mazda CME1201 "Rimband" with no implosion screen.

Unboxing

To obtain access to the chassis, the rear section or shell of the cabinet is removed. This is secured by four screws at the front. First remove the two top front screws and then lay the receiver face down on a soft surface. Remove the two screws from the front underside. Ensure the telescopic aerial is removed from the coaxial socket. Lift off the shell, feeding the mains lead in as far as required. Care is required when the shell is replaced as the two hold controls can easily be bent and damaged if their slender knobs do not accurately pass through their respective holes. Also the mains lead should be withdrawn as the shell is replaced to avoid excess cable inside pushing valves, etc., out of position.

All the circuitry is on a single printed panel. The tube, loudspeaker and tuner unit are separately mounted on the front panel. To separate the front panel and tube from the tuner and printed board, first remove the knobs of the tuner, unsolder the two inner leads from the tag board of the sound output transformer and the earth lead of the tube strap from the copper of the printed board (this is underneath). Then remove the screws marked A on the general rear view diagram (Fig. 2). Remove the e.h.t. cap from the side of the tube and unplug the c.r.t. base connector. Slacken the screw of the deflection coils assembly clamp. Remove the printed panel from the clips on the front and withdraw the tuner unit and the printed panel together with the deflection coils assembly. Alternative fixing bosses are provided in case the original fixings are damaged. There are three for the c.r.t. mounting brackets, also for the front-to-back stay and tuner front-bracket.

Circuit features

It has already been mentioned that there is no provision for mains adjustment. A BY101 silicon diode (W9) is used to supply the heater line. For a full explanation of this system readers are referred to page 27 of the October 1967 issue (Bush TV135

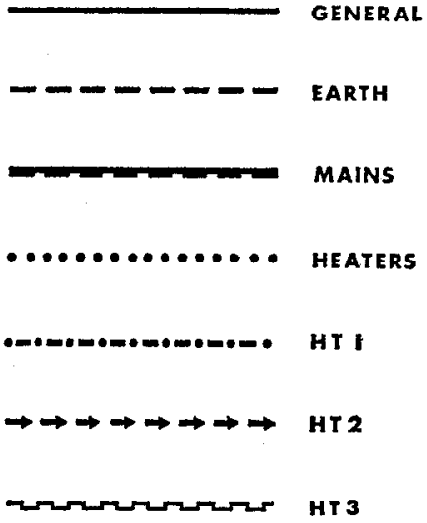


Fig. 1: Coding used on the printed circuit board.

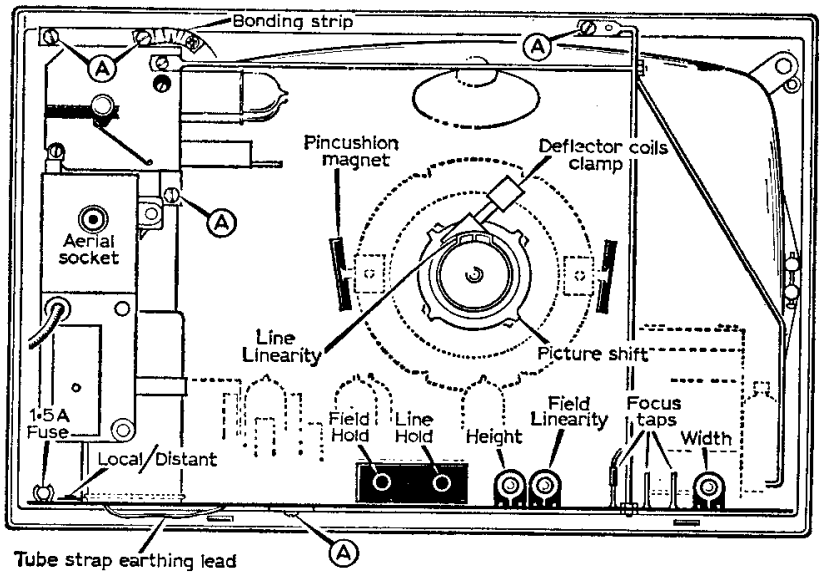


Fig. 2: Rear view to show presets and dismantling points.

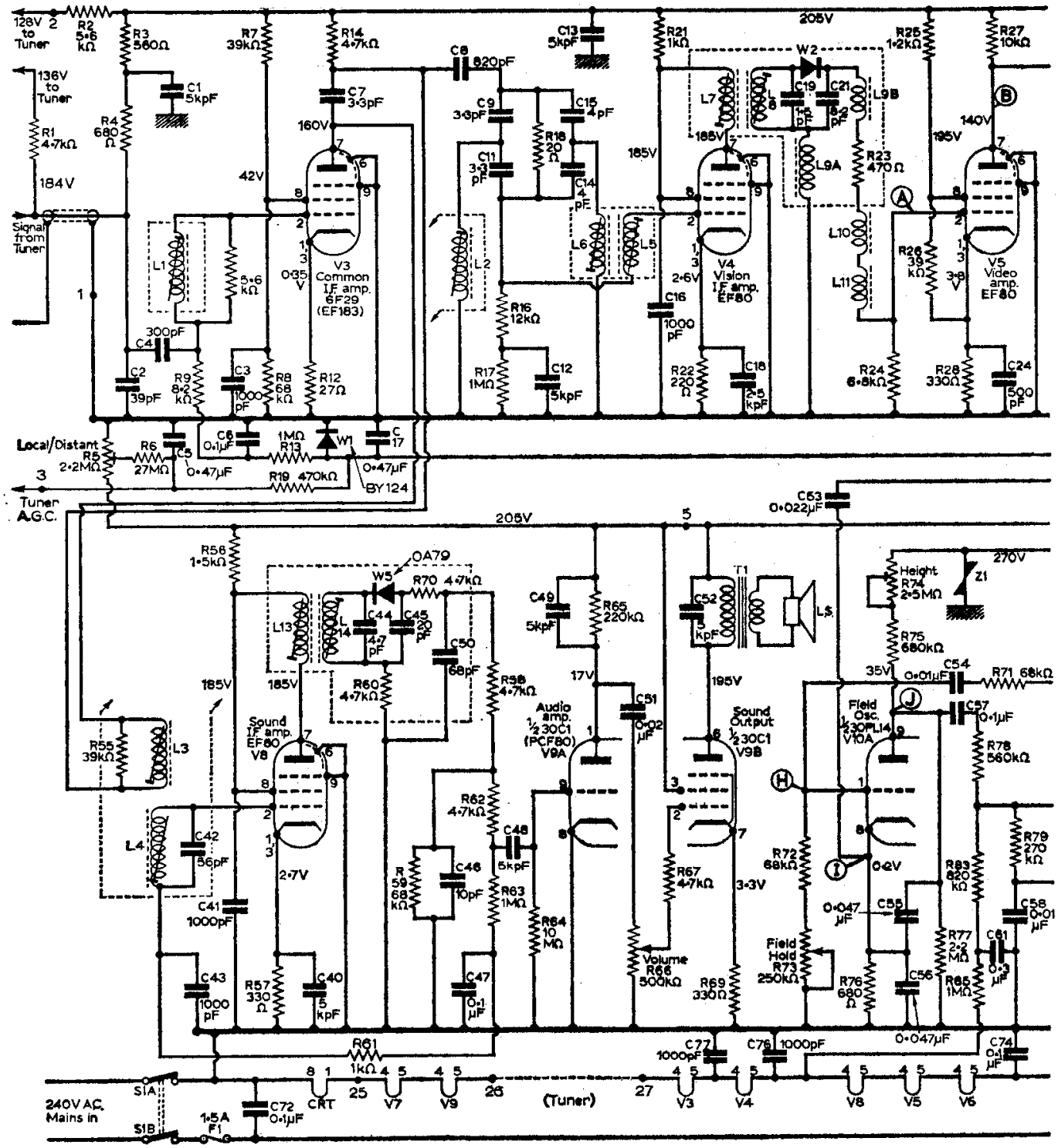


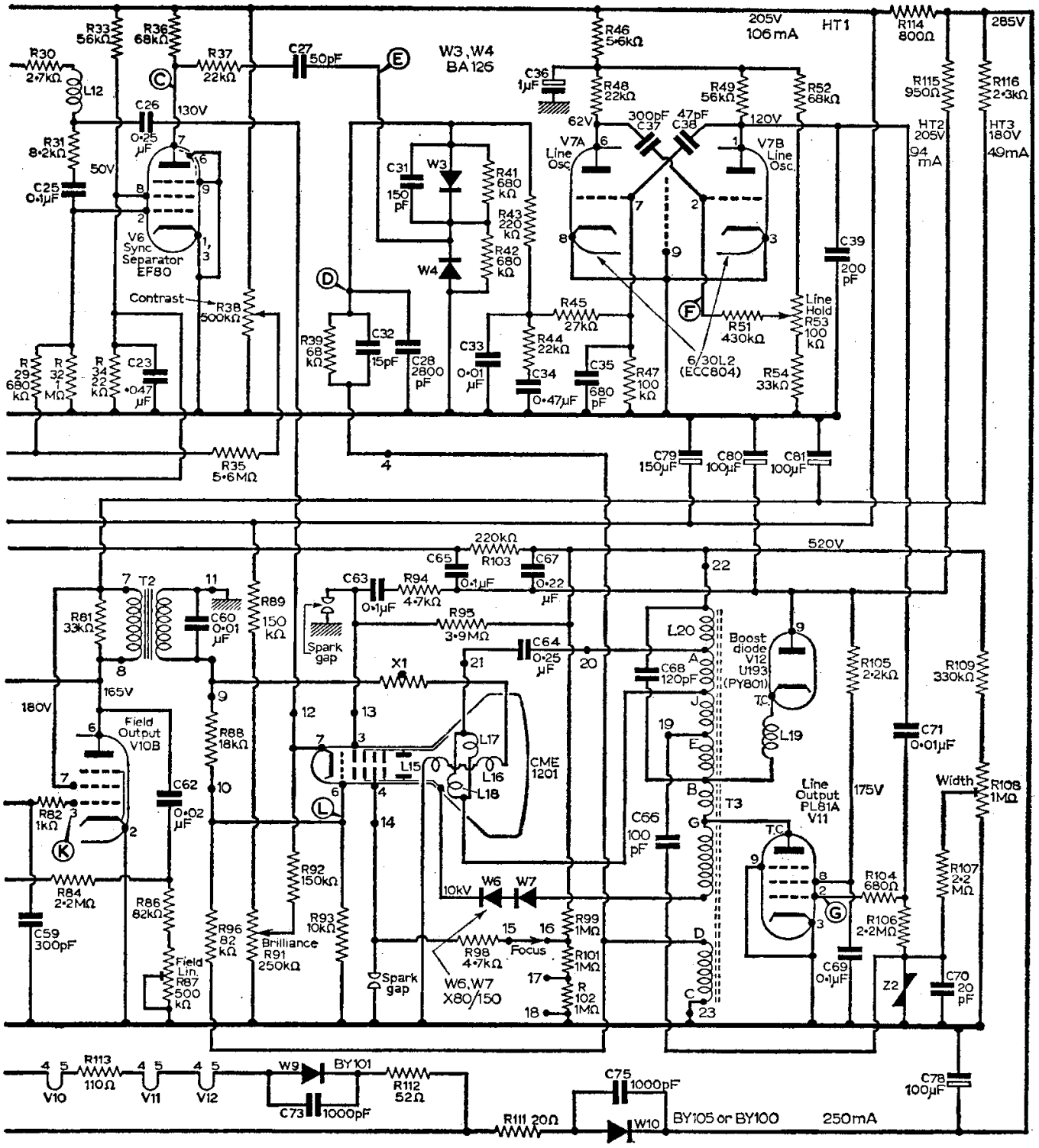
Fig. 3: Circuit diagram of the

series). In this case the warning indication of trouble in the heater line is in the bias to the field output stage (R85 connection to V8 heater), not to the sync separator as in the Bush receivers. There are two resistors in the heater circuit, R112 (52Ω) and R113 (110Ω). These should be checked when the heater chain is dead.

The h.t. rectifier (W10) is a BY105 or BY100 in series with a 20Ω surge resistor R111. All the main smoothing electrolytics are in a single can (C78, 79, 80 and 81). Apart from C36 over on the front centre (1μF) there are no other electrolytics. The field output does not use cathode bias and the audio output is unbypassed for current feedback.

E.H.T. rectifier

The rectifier used (W6, W7) is a scaled down version of the multi-pencil type box used in the larger Thorn chassis, as only 10kV is required. For those not acquainted with this method of e.h.t. supply it follows the voltage doubling and tripling system used in some earlier receivers mainly of the projection type. This basic idea is to avoid



main chassis, Thorn 980 series.

a very high voltage overwind on the line output transformer. Projection receivers used three EY51 in a tripler circuit to provide some 25kV. The Thorn system is to use a small plastic box, which is easily removable, containing whatever number of pencil rectifiers is necessary. This is a very nice system but the smell produced when they break down would turn any chemistry class schoolboy green with envy! So when the customer says his set contains stink bombs as well as producing no picture, go straight for the e.h.t. box. The rectifiers used are of the X80/150 type.

Voltage and current measurements

The readings given on the circuit diagram (Fig. 3) were measured with 240V a.c. mains input, no signal, and all controls set for normal operation using, except for e.h.t., an Avo Model 8 (20,000 ohms/volt). Due to the silicon rectifier in the heater supply line a moving-iron or hot-wire meter should be used to obtain accurate voltage and current measurements in the heater chain: an Avo meter will read approximately 0·2A d.c. and 4V d.c. across a 6·3V heater.

To be continued

Servicing TELEVISION Receivers

No. 141 - THORN 980 CHASSIS
—continued

by L. Lawry-Johns

The tuner unit

Two troubles are likely to be met with the tuner. One is poor contact between the biscuit studs and the springs, which will not always respond to cleaning. Some of the coil biscuit studs do not have sufficient rise to make reliable contact when the springs flatten slightly.

The other trouble is associated with the fine tuner when this does not have the desired effect, or indeed any effect at all. The trouble here is that either the plastic core has fractured or the metal sleeve is loose and is not following the movement of the plastic core. In the former case the core will have to be replaced, in the latter, a light touch of glue is all that is required.

Valve functions

When servicing is carried out without the use of a service sheet the following points should be kept in mind. The audio-output valve is a 30C1 (PCF80). In the event of "no sound", check this first. The video amplifier is an EF80. We mention this because the PCF80 may be thought to be the video amplifier instead of the sound amplifier. The field oscillator-output stage is a 30PL14 whilst the ECC804 is purely the line oscillator (anode-to-grid cross-coupled multivibrator). The latter is controlled by a two-diode (W3, W4) flywheel sync circuit.

Tube

The tube bias is obtained from the cathode circuit and the grid is returned to chassis via a 10kΩ resistor across which the line and field blanking pulses are developed. Thus the brilliance control operates on the cathode which from a d.c. point of view is divorced from the video anode by C26 (0·25μF).

Receiver dead, no valves alight

Check mains input to the fuse holder. If present check at R112. If R112 is in order remember that after the rectifier (W9) the heater chain is at d.c. potential. V12 U193 (PY801) is the first heater in the chain followed by the PL81A line output pentode. Then comes R113 (110Ω) and then the 30PL14. Proceeding along the heater chain at pins 4 and 5 of each base, the fault should rapidly be located.

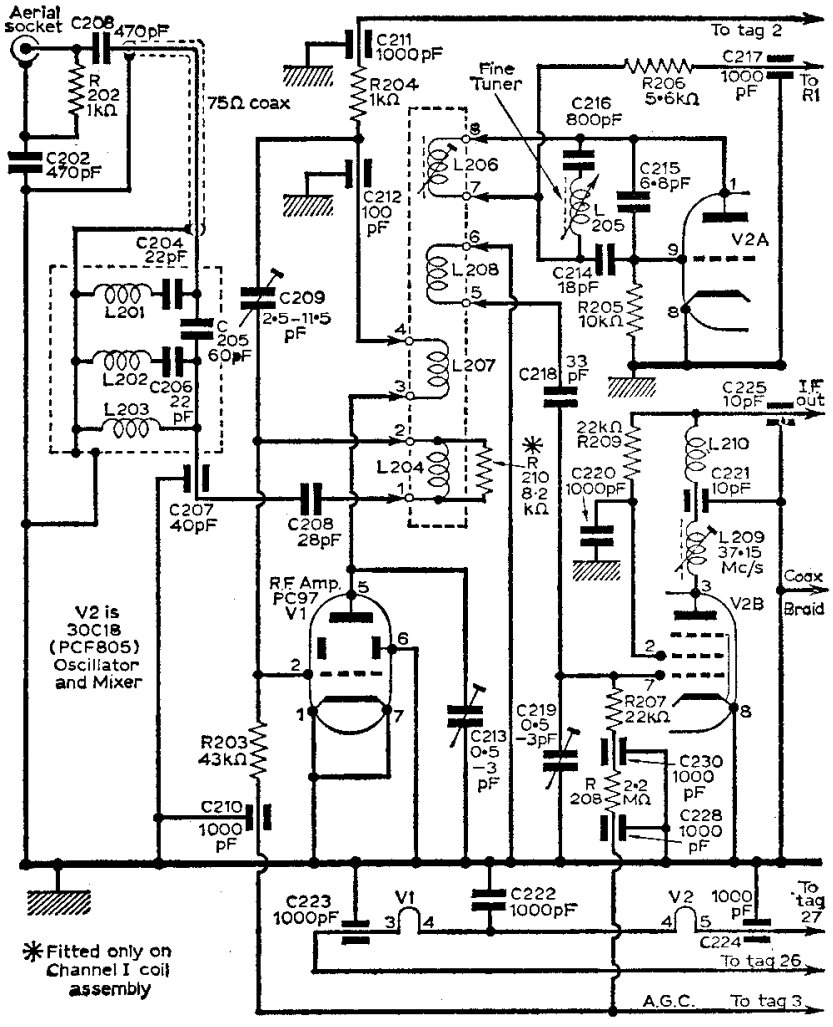


Fig. 4: Tuner unit circuit diagram.

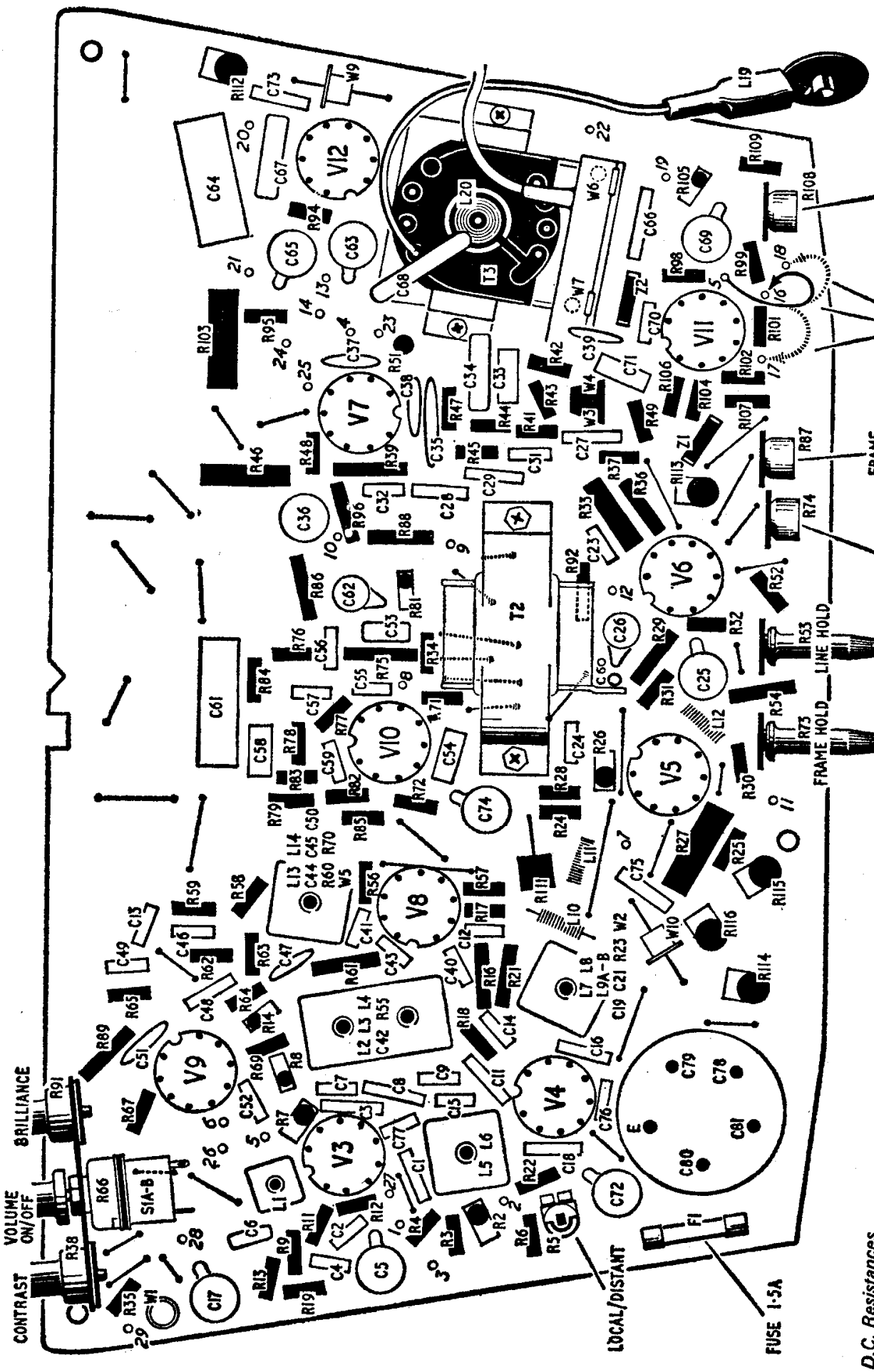


Fig. 5: Layout of the printed circuit board.

D.C. Resistances

L12	19Ω	T2(pri.)	260Ω	T3 E–B	10·5Ω
L20	1·9Ω	(sec.)	8·2Ω	B–G	10Ω
T1(pri.)	600Ω	T3 A–J	0·96Ω	G–W7	61Ω
		J–E	4·6Ω	D–C	0·57Ω

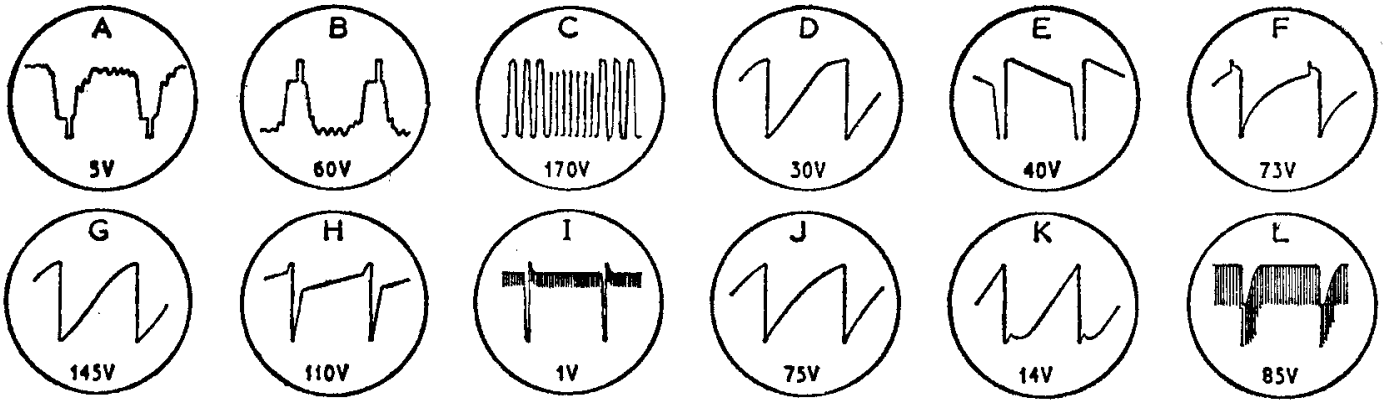


Fig. 6: Typical waveforms. For conditions see text.

Valves alight, no other sign of life

This indicates a "no h.t." condition. The fact that the valves are receiving power indicates that the circuit is in order up to R111. Check this (20Ω) and the rectifier (W10). As the output of the rectifier is split up (there are three main h.t. lines) some sign of life should be obvious in some part of the receiver if the supply is in order and the rectifier is passing current, even if it is only that the PL81A is overheating! It therefore remains to check the three main smoothing resistors, R114, R115 and R116. Their values are marked on the circuit.

No picture, sound in order

Check the PL81A. If this is overheating check the ECC804 (V7) line oscillator and associated components. Check the discriminator diodes (W3, W4) if necessary as an unbalance can put the line oscillator out of action. If the PL81A is not overheating check the h.t. at C80—R115 (HT2) and if this is in order check V11 and V12 and also C67 (0·22μF). If necessary check the line drive to V11. If this is excessive check R106 and the width circuit. In stubborn cases check C68 (120pF) which can short.

White line across screen

This indicates a failure in the field timebase. Check V10 (30PL14) and voltages to pins 6 and 9. The voltage at pin 9 (35V normal) is derived from the boost line via R75, R74 and R103 decoupled by C65 to h.t. If the boost line is right and 270V is at the height control R74, check this control and R75. If these are in order but there is no voltage at pin 9, check C54 0·01μF for shorts. This capacitor (C54) will cause loss of field hold when it becomes slightly leaky.

Poor contrast and sync

This symptom usually denotes a fault in th video circuit and the associated resistors should be checked as R26 and R27 can change value. Check L10 and L11, and L12 if necessary. If all is in order here check W2 (OA70) vision detector in the final i.f. coil can, also L9A and L9B. If the sound is also affected check V3 EF183 common sound and vision i.f. amplifier. This valve is not quite as reliable as the EF80 due to its frame grid construction which imposes more stringent limits. Check the tuner unit PCF805 and PC97 if necessary.

Oscillograms

A, B, D, E, F and G taken at line frequency, C, H, I, J, K and L at field frequency at the points indicated on the circuit diagram (Fig. 3). Voltage figures represent peak-to-peak amplitudes measured via a probe having an input capacitance or 8pF in parellel with 10MΩ. I taken with V10B control grid shorted to chassis.

Supplementary circuit data

In later models R85 is 470kΩ, a 470kΩ resistor is added in series with R85 and the junction of these resistors is taken to chassis via an 0·1μF capacitor. A 100kΩ resistor is added between the junction of C54/R71 and chassis. In some early sets R114, R115 and R116 are mounted on a tagstrip instead of on the printed board. In some models R23 is lkΩ; R30 may not be fitted. W2 is type OA70 or GD13. VDRs Z1 type E298CD/A258, Z2 type E298ZZ/05.

981 series

The 16in. portable Models 2643 (H.M.V.) and 3649 (Ferguson) incorporate the same basic chassis as the 980 series but have a different cabinet assembly. They are fitted with type CME1602/A40—12W/S Rimguard c.r.t.s.