KRIESLER
AUSTRALASIA PTY. LIMITED

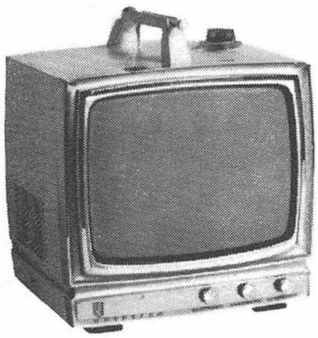
TECHNICAL ADVISORY SERVICE
SERVICE SHEET NO. 35
ISSUE 2

BOX 107 P.O. CARINGBAH N.S.W. 524-0444

PLEASE CIRCULATE TO YOUR SERVICE DEPARTMENT

# TELEVISION SERVICE MANUAL No. 35 DECEMBER, 1969.

MODEL PT1
CHASSIS 49-1



"MINISCOPE 11"

MODEL PT2
CHASSIS 49-2

"MINISCOPE 9"

**SPECIFICATIONS.**

| | |
|---|---|
| Transistors | – 33 |
| Diodes | – 14 |
| Deflection | – $90^{o}$ Magnetic |
| Focus | – Electrostatic, Adjustable |
| Picture Tube | – PT1 : 11" Type A28-14W<br>P.T2 : 9" Type 9WP4 |
| Audio Output | – 500 mW |
| Loudspeaker | – 5" x 3" (see Parts List) Auxiliary output jack at rear. |
| Aerial | – Inbuilt 1 metre Telescopic Aerial plus external aerial terminals and socket (300 Ohm).<br>See Note 1. |
| Power Supplies | – Mains Supply 225 to 265 Volts, 50 Hz.<br>External Battery 12 to 16 Volts d.c., 1.25 Amps. See Note 2. |
| Fuse | – Secondary 2 Amp. Type 3AG/2A. On rear panel of cabinet. |
| Dimensions | – PT1 : 11¼" Wide x 12¾" High x 10½" Deep.<br>PT2 : 10½" Wide x 10¾" High x 10¼" Deep. |
| Weight | – PT1 : 22 lb. packed. 18 lb. nett.<br>PT2: 19 lb. packed 16 lb. nett. |

**NOTE 1**

Aerial terminals, paralleled with a 2-pin socket are fitted on the rear panel. The socket is principally for convenience in connecting the inbuilt telescopic aerial but, in difficult reception areas when using an external aerial, experiment may show that if the inbuilt aerial is also connected, reception is improved on a particular channel. Check that it does not impair reception on other channels.

## NOTE 2

A slide switch at the rear of the receiver covers the 2-pin 'Battery' socket when the switch is moved to reveal the 3-pin 'Mains' socket, and vice versa.

If the wrong polarity d.c. connection is made, the receiver will not operate. If the wrong polarity d.c. connection is made, and the receiver chassis is shorted to a car chassis wired with a negative earth system, the fuse will blow. If the correct polarity d.c. connection is made, and the receiver is shorted to a car chassis wired with a positive earth system, the fuse will blow.

## GENERAL DESCRIPTION

### Production Changes

Both models incorporate the same basic printed wiring board (10-8378) which has been released under four different Issue Numbers – 2, 3, 8 & 9.

Issue 2 and 3 boards were used in Model PT1 only.

Both boards are identical except for a minor conductor pattern change to accommodate R41A (15K) which was wired on conductor side of Issue 2 board.

Issue 2 boards were wired to Issue 1 circuit for a short run in early production. The remainder of Issue 2 boards were wired to Issue 2 circuit with R41A on underside.

Issue 3 boards were wired to Issue 2 circuit and contain the pattern modification to place R41A on the component side.

Issue 8 boards were introduced as a common board for Models PT1 and PT2. They are wired in accordance with Issue 3 circuit diagram.

Model PT1 may use either Philips or M.S.P. deflection components. Model PT2 used mainly M.S.P. deflection components. The M.S.P. yoke must be used on 9" picture tubes.

The conductor pattern was changed in the H.O.T. area (layout change only), the frame oscillator area (C70A added for improved interlace) and near the Focus preset (picture tube grid 2 preset R84 added).

The 10-9635 printed wiring board socket for the picture tube was employed to mount the three spark gaps SG1, SG2, SG3 and the 1.5K resistor R89 for improved protection from picture tube flashovers.

Issue 9 boards were introduced as a common board for Models PT1, PT2 and PT3.

It also contains modifications for the additional components required for Anodeon semiconductor kits (refer Service Notes No. 43). These components were previously connected on the conductor side of Issue 8 boards.

**ERRATA:** On the conductor pattern of Issue 2 and early production Issue 9 boards, the collector 'c' and emitter 'e' designations of TR28 were shown reversed. The emitter is connected to the 'L' shaped conductor pattern.

## CHASSIS ACCESS

(a) Completely remove the screw (2 screws on PT2) from the carrying handle.

(b) Pull off the channel change and fine tuning knobs. Also remove control knobs on PT2.

(c) Lay the receiver on the tube face, suitably protecting this and the escutcheon from abrasions. Remove four screws from the back. Remove aerial plug.

(d) Lift off the back and the centre wrap-around.

(e) Lay the receiver on the side housing the loudspeaker. Remove two screws below the bakelite panel at the rear.

(f) The chassis may now be swung out for servicing; if necessary, easing the two pivot screws slightly.

**CAUTION:** When re-assembling, ensure that the two chassis pivot screws are tight and do **NOT** forget to replace the screw(s) in the carrying handle otherwise, when the receiver is lifted, the handle may be damaged.

**PICTURE TUBE REPLACEMENT.**

Follow procedure for chassis access then, having disconnected appropriate leads:-

(a) Pull off control knobs (PT1 only).
(b) Remove four screws securing front escutcheon (accessible from the rear).
(c) Remove four screws from picture tube mounting flange and take out tube.
(d) Centre new tube in position, checking that the escutcheon locates squarely on its guide pins.

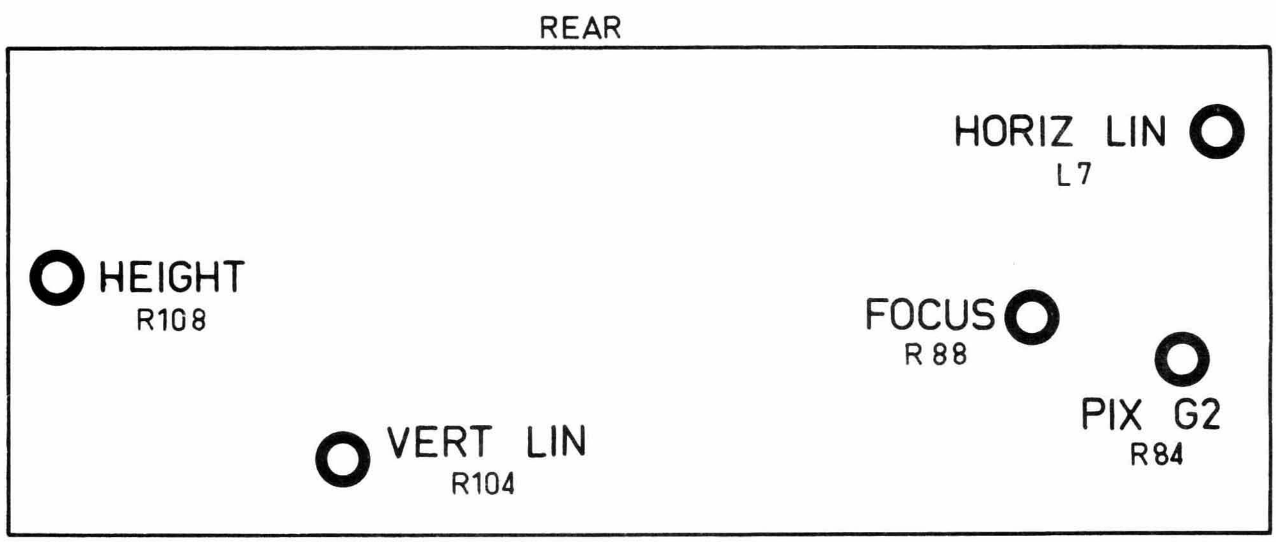
**CAUTION:** Discharge the picture tube before handling.

**DY51 REPLACEMENT.**

Model PT1, from July 1969 production, and all PT2 receivers are fitted with a selenium E.H.T. rectifier type TV11-S or TV11-K in lieu of the valve rectifier type DY51 used in early production. It is recommended that the selenium rectifier be used for replacement purposes. The rectifier, together with mounting parts and installation instructions are available in kit form, Part No. 90-9658.

**CONTROLS.**

| | | |
|---|---|---|
| Main Controls | : | Off/Volume, Contrast, Brilliance, Channel Change, Fine Tuning, Horizontal Hold, Vertical Hold (at rear). |
| Externally Accessible Presets | : | Horizontal Linearity/Width, Vertical Linearity, Height, Focus, Pix G2. |
| Internally Accessible Presets | : | Video Amplifier Bias, Horizontal Sync, Main A.G.C. (I.F.), Tuner A.G.C. (R.F.), H. T. Voltage. |




EXTERNALLY ACCESSIBLE PRESET CONTROLS

VIEW ON BASE OF CABINET

**NOTE:** When adjusting externally accessible preset controls through the holes provided in the base of the cabinet, it is advisable to use a screwdriver made from insulating material to avoid the possibility of short-circuiting adjacent areas, or affecting the tuning in the case of horizontal linearity coil adjustment. A screwdriver with a 1/8" wide blade is ideal for all preset adjustments.

## CONTROL ADJUSTMENTS

**IMPORTANT.**
Carry out the following adjustments in the order given below. Always check the H.T. Voltage before servicing.

1. H. T. Voltage : Set contrast and brilliance to maximum. Set tuner to blank channel (dot).
   PT1 : Adjust preset R4 for 11.0 volts d.c. on main rail.
   PT2 : Adjust preset R4 for 11.5 volts d.c. on main rail.
   **Note:** PT2 requires higher voltage since picture tube has 12V heater.

2. Horizontal Linearity/Width : The horizontal linearity adjustment should be carried out on a test pattern. Adjust L7 until satisfactory linearity is achieved. This adjustment also has an appreciable effect on scan width and, consequently, may be used to vary the width as required, whilst observing that the linearity remains satisfactory. If width adjustment only is required, adjust the value of C95. Provision is made on the board for adding an additional capacitor to reduce width.

3. Video Amplifier Bias : Set contrast to maximum, set tuner to blank channel (dot) and connect d.c. voltmeter (20 K /V or greater) between TP9 and chassis. Adjust bias preset R57 for meter reading of 30 volts for PT1 or 40 volts for PT2.

4. Main A.G.C. (I.F.) : Set contrast to maximum and set tuner to an operating channel receiving a moderate to strong signal. Connect a C.R.O., switched to d.c. input, to the 10.4 volt supply rail temporarily. Set the C.R.O. to the one volt per centimetre range and adjust the trace to the top line of the graticule. Re-connect the C.R.O. to TR16 collector (board reference L7) and adjust preset R62 so that the sync pulse tips are one volt below the top line of the graticule.

   Where no C.R.O. is available, an approximate adjustment using a 20 KΩ/V d.c. voltmeter may be made. This may degrade the noise-immunity characteristic of the receiver but in a given location, if this is not operationally needed, proceed as follows:-

   Set contrast to maximum and select a channel receiving a strong signal (to develop A.G.C. voltage). Connect the voltmeter between TR16 collector and chassis and adjust preset R62 for meter to read 7 volts d.c. Slight fluctuations will occur as the video content of the picture changes.

5. Tuner A.G.C. (R.F.) : With contrast and brilliance normal, select an operating channel receiving a medium strength signal. Slowly adjust preset R33 until noise grain appears on the picture. Back off the control approximately $10^{o}$ from this point.

6. Pix G2 : Preset R84 (on Issue 3 & 4 circuit diagrams) controls the grid 2 voltage of the picture tube so that its cut-off voltage, and hence the brilliance range, can be standardised for all tubes. Set contrast to maximum and brilliance to minimum. Select blank channel (dot). Adjust R84 until raster is almost extinguished. Check brilliance range on normal picture. If maximum brilliance is excessive, as characterised by de-focussing in the white areas, back-off R84 slightly. If maximum brilliance is insufficient, advance R84 slightly.

7. Focus: Select blank channel (dot) and, with contrast at maximum and brilliance normal, adjust R88 preset for best overall focus of the raster.

8. Vertical Linearity and Height: Adjust on a test pattern with presets R104 (Board reference G3) and R108 respectively, accessible through the base of the cabinet.

9. Fine Tuning : Tuner Type NT3017. Fine tuning is accomplished by a variable piston-type capacitor shunted across the local oscillator tuning coil. The capacitance is controlled by the movement of a piston which, in turn, is controlled by a lever system. The lever is actuated by cams on the end of the coil turret. These cams are set by the fine tuning knob as follows:-

   Press in the fine tuning knob to engage the cam mechanism; turn knob to adjust fine tuning; release knob. Fine tuning is then preset for that channel and will reset itself each time that channel is selected. Note that there is no 'stop' on the fine tuning adjustment.

   An overall fine tuning adjustment screw for all channels is provided. If this screw is adjusted, re-seal with 'Grip-Lac' or similar material.

   With the exception of the fine tuning adjustment described above, no adjustment should be made to the tuner WITHOUT ADEQUATE ALIGNMENT EQUIPMENT AND EXPERIENCE IN ITS APPLICATION.

10. Horizontal Sync : The receiver should hold sync, when on channel, over the full range of the horizontal hold control, but may lose sync when changing channels if the hold control is at either extremity. In adjusting the horizontal sync preset to obtain these conditions, proceed as follows:-

(a) Gain access to chassis as previously described.
(b) Centre the horizontal hold control.
(c) Short-circuit the collector of TR22 to chassis (to remove sync).
(d) Adjust the core of L5 until the picture 'floats' steadily on the screen.
(e) Remove the short-circuit on TR22 and check that the picture jumps firmly into sync.

11. Vertical Sync : Over a small part of the range of the vertical hold control, the picture should roll slowly downward. Adjust the control just past the point at which the picture locks in. It is immaterial whether or not the picture loses sync at the opposite end (low frequency) of the control range.

**POSITION OF TEST POINTS.**

| Number | Position | Board Reference |
|---|---|---|
| 1 | TR3-C/TR4-B | M15 |
| 2 | R16/C19 | G19 |
| 3 | T2, pin 9/C21 | J17 |
| 4 | IFT lb, pin F/C35 | D21 |
| 5 | R39/C38 | C20 |
| 6 | TR13-C/IFT 2b | B17 |
| 7 | TR15-B/C44 | B12 |
| 8 | TR16-B/L2 | L9 |
| 9 | TR17-C/R79 | R9 |
| 10 | TR28-B/C80 | L23 |

**ALIGNMENT PROCEDURES:**

**INTERCARRIER I.F. AMPLIFIER AND RATIO DETECTOR**

Sweep Method

Equipment required.

(a) Sweep Generator $\pm$250 $KH_Z$ deviation at 50 $H_Z$ rate, centre frequency 5.5 KHz.
(b) Marker Generator which will accurately indicate 5.5 KHz.
(c) CRO.

Procedure

1a. Disconnect the stabilizing capacitor (C21) across the RD diodes (lift jumper at Board Reference F17).
1b. Disconnect the de-emphasis capacitor, C18 (lift jumper at Board Reference L17).
2. Connect the CRO across the diode load resister (TP3 to earth).
3. Connect Sweet Generator to TP1.
4. Unscrew secondary core of Ratio Detector transformer until flush with the end of the former (access through middle hole in top of T2 can).
5. Peak primary core for the curve of Fig. 1, using the Marker Generator to set the limits shown.
6. Connect Sweep Generator to TP8 (BR L8).
7. Tune ICIF 1 to 5.5 MHz as shown in Fig. 1.
8 Re-connect the stabilizing capacitor C21.
9. Re-connect CRO to TP2 (BR G18). Tune secondary core of Ratio Detector to display a typical 'S' curve centred on 5.5 KHz as shown in Fig. 2.
9a. Re-connect C18.
10. Remove Sweep Generator and CRO.

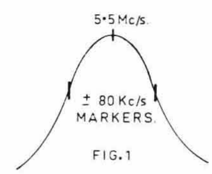


FIG. 1

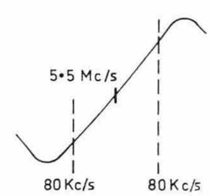


FIG. 2

DC Method

Where a 5.5 Mc/s sweep generator is not available, the transmitted signal, attentuated as required, provides an accurate and convenient method of alignment.

Equipment Required.

(a) A centre-zero VTVM or voltmeter, completely isolated from earth with zero reading adjusted to centre scale by the 'Set Zero' control. In lieu of the centre-zero VTVM or voltmeter, an ordinary voltmeter may be used as explained below. The voltmeter used must be at least 10,000 ohms per volt and preferably higher.

(b) Two resistors approximately 100K each, matched to within 1% and connected in series.

Procedure

1. Connect the two series 100K resistors across the electrolytic stabilising capacitor bridging the ratio detector diodes, TP3.
2. Connect the voltmeter, positive to the centre of the 100K resistors, negative to ground. Unscrew secondary core of ratio detector transformer flush with the can (middle hole in T2 can). With an incoming transmitted signal, peak RD primary and ICIF for maximum reading, attentuating the signal as required to a level below limiting.
3. Re-connect the negative voltmeter lead to the audio output line of the ratio detector at the output end of the de-emphasis network, TP2.
4. Tune secondary for maximum output. This means that the secondary, at this juncture, is tuned to one of the two maxima of the ratio detector voltage curve.
5. Further adjustment of the secondary core, in the correct direction, will cause the ratio detector voltage curve to pass through zero to the other maximum: Therefore, readjust the secondary core, taking note of the maximum positive and maximum negative readings obtainable on the centre-zero voltmeter, until the meter reading is exactly the mean of these maximum positive and maximum negative values. Ideally, these maxima should be equal, depending on the matching of the diodes and 100K resistors. In the field there may be cases where equality cannot be obtained, and in these cases, ignoring polarity, their numerical values should be within 10% of their average.
6. If the inequality of the maxima readings is too great, check the diodes and/or the 1K resistors in series with them.

Where no centre-zero voltmeter is available an ordinary voltmeter may be used and, by reversing the test leads as required, the maximum positive and negative readings taken as before, setting the core for the average reading.
When no transmitted signal is available, or in deep fringe areas where the noise level is high and the signal strength fluctuates, an accurate 5.5 Mc/s signal derived from an FM signal or marker generator may be used.
Feed the signal in at TP8, taking care the input is at low level but sufficient to produce 3 volts across the electrolytic stabilising capacitor when the ICIF's are correctly aligned. This ensures that the limiter is functioning correctly.

## 5.5 MHz TRAP

Equipment

Signal Generator to provide accurate 5.5 MHz signal, 30% AM by 400 or 1000 Hz.
CRO.
High impedance detector probe (see Fig. 7).

Procedure

Connect CRO, via high impedance probe, to TP9 (TR17 collector).
Set Contrast to maximum (clockwise) and Brilliance to minimum (anti-clockwise).
Connect Signal Generator to TP8 (TR16 base).
Feed in strong signal at 5.5 MHz and adjust L3 for minimum amplitude on CRO.

ALTERNATIVE METHOD (USING TRANSMITTED SIGNAL):

Set Contrast to maximum (clockwise).
By-pass the junction of ICIF 1 and C10 (Board Reference M10) to earth with .0047 uF (approximately) capacitor.
Couple TP9 to TP1 with 100 pF (approximately) capacitor.
Connect DC Voltmeter (20K /V or greater), positive to TP3, negative to earth, on low voltage range (to read less than 1 volt).
Adjust L3 for minimum reading on meter.

## VIDEO I.F.

Equipment

(a) Sweep generator capable of providing a deviation of 12 MHz or more at 50 Hz sweep rate, centre frequency 34.75 MHz.
(b) An accurate marker generator for use with the sweep.
(c) CRO with low impedance detector probe. See circuit of probe, (Fig. 7).

Procedure.

1. Set the tuner to the blank channel between channels ) and 11.
2. Connect CRO directly to TP9 (BR R9).
3. Connect sweep to TP7 (BR B12).
4. Set Contrast to maximum, Brilliance to minimum and video amp bias to mid-position.
5. Unscrew cores of IFT 1B, L1, IFT 2 & IFT 3 flush with top of cans.
6. Tune primary and secondary of IFT 4 for the response as in Fig. 3. If necessary, touch up on IFT4 coupling coil (underside). Amplitude of Fig. 3 should be approx. 40 V. p.p.
7. Disable Horizontal Oscillator (earth base of TR 30) (BR R17).
8. Connect Sweep to tuner test point.
9. Connect CRO, via a low impedance detector (Fig. 7) to TP4 and adjust CRO for high sensitivity (50 mV/cm or better).
10. Adjust both tuner coils for maximum response at 34.75 MHz, as in Fig. 4, (NOTE: Do NOT subsequently alter the coil near the AGC post, if 'touching up' the alignment).
11. Re-connect CRO, with detector, to TP6 (BR B17).
12. Tune L1 (31.25 MHz Trap) and IFT 1B for the response shown in Fig. 5. (Very slight re-adjustment of IFT 1A, on tuner near IF output lead, may be necessary to obtain the required response.)
13. In the event of any initial difficulty in displaying a response curve for this stage, turn the AGC pre-set fully clockwise (viewed from the conductor side). Re-set the AGC correctly when alignment is completed.
14. Remove detector probe and re-connect CRO to TP9 (BR R9).
15. Remove earth on base of TR30.
16. Adjust IFT 2 and IFT 3 for the response shown in Fig. 6.

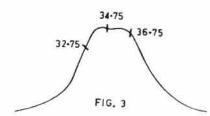


FIG. 3

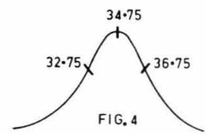


FIG. 4

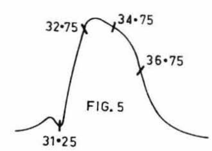


FIG. 5

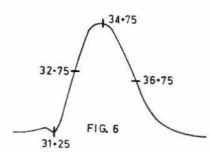


FIG. 6

## ADJACENT CHANNEL TRAPS

These traps are not normally supplied with the receiver but may be supplied on request.

The trap assembly and associated additional components may be inserted where shown on the component layout diagram (position E24 approx.).

The additional components are:-

| | |
|---|---|
| Coil assembly | CZ320-388 |
| Ca and Cb | 27 pF 5% NPO Ceramic |
| Ra | 5.6 K ½W 10% carbon. |

C32 (12pF) changes to a 15pF
5% NPO Ceramic when traps are fitted.

Alignment instructions are available on request.

## CIRCUIT DESCRIPTION

Circuit Reference: 49-1, 49-2 Issue 4 1.10.69

### Regulated Power Supply

The DC output (approx. 18V) from the power rectifier diodes D1 and D2 is fed to the main H.T. rail via the series regulator transistor TR1, the conduction of which is controlled by the error amplifier TR2 so that the H.T. rail is stabilised at 11V (11.5V on PT2).

The purpose of the regulated supply is to prevent changes in H.T. voltage due to load current and/or mains voltage variations. If, for example, the output voltage tends to rise due to one of the above causes, the emitter of the error amplifier TR2 rises by the same amount since it is connected to the H.T. rail via the 6.2V zener diode D3. The base voltage of TR2 also rises, but to a lesser extent due to the voltage divider R3, 4 and 5. This means that the base-to-emitter voltage of TR1 decreases, producing a lower conduction in TR2. This decreases the collector current of TR2 thus allowing the base-to-emitter voltage of TR1 to decrease which in turn lowers the conduction of TR1 and restores the H.T. to its previous level.

The operating point of TR2, and thus the H.T. level, is controlled by the preset R4 in the TR2 base bias divider.

If the H.T. rail is short-circuited, both base and emitter of TR2 become equal at OV and therefore TR2 is cut-off. With zero base current in TR1, the base is at emitter potential and therefore TR1 is also cut-off. Upon removal of the short-circuit, the H.T. rail returns to normal.

The normal H.T. current is approximately 1.25 amps depending on brightness and volume settings. Under slight overload conditions, the H.T. voltage is maintained at 11V by the regulator, but should the overload become excessive (but not actually a short-circuit), the H.T. current could exceed 2 amps and the fuse F1 would blow to protect the regulator transistors and power rectifier diodes.

Since the regulator is driven from the output side only, the 68 ohm resister R1 is included to enable the regulator to start upon initial switch-on.

Without this resistor, the power supply electrolytic capacitors would simulate a short-circuit condition upon initial switch-on, and no output voltage would be developed. Bleed current through the resistor charges the electrolytics and produces sufficient drive to operate the regulator.

Capacitor C4 filters out any ripples on the base of TR2 and increases the gain of the error amp at ripple frequencies. Resistor R8 (220 ohms) limits dissipation in TR2.

### Intercarrier I.F.

The I.C.I.F. comprises two direct coupled common emitter stages driving a conventional unbalanced ratio detector circuit. D.C. feedback from the emitter of the limiter TR4 to the base of amplifier TR3 maintains bias stability of both stages.

De-emphasis is provided by R16 and C18.

### Audio Output

Audio output is provided by a conventional four transistor complementary symmetry amplifier comprising transistors TR5, 6, 7 and 8. Output is approximately 500 mW into 15 ohm speaker.

The audio signal from the volume control R17 is amplified by TR5 and then direct-coupled to the driver stage TR6 which drives the output pair TR7 and TR8. Both d.c. and a.c. feedback is provided by the network R25, R25 and C25. The driver collector load resistor R32 is bootstrapped by connecting it back to the negative side of the speaker coupling capacitor C26.

### Vision I.F.

The vision I.F. amplifier comprises three common emitter tuned stages TR13, TR14 and TR15. The first stage employs a special transistor in which a gain reduction is achieved by increasing the collector current which is controlled by the forward A.G.C. voltage applied to the base. Transistor TR33 senses the voltage drop across TR13 collector load resistor R42 and applies a proportional positive-going A.G.C. to the tuner. Preset R33 sets the emitter voltage of TR33 so that the correct tuner A.G.C. delay can be obtained. The input bandpass circuit is a bottom capacitance coupled network comprising IFT1A (in tuner), IFT1B, the I.F. cable capacitance and C34. The 31.25 Mc/s sound step is provided by L1, C32 and C33.

Adjacent channel traps are not normally fitted; however provision is made on the printed circuit board for their addition if required. See instructions under heading "Adjacent Channel Traps". The interstage coupling circuits IFT2 and IFT3 are single tuned.

The video detector assembly comprising IFT4, D7 and the filter network is contained in a two-compartment can. Additional filtering is provided externally by L2. The detector diode is connected so that the composite video output signal is negative-going.

**Video Amplifier**

A two stage d.c. coupled video amplifier is used, comprising TR16 and TR17. The first stage is a phase splitter wherein the output stage is driven from the low impedance emitter circuit via the contrast control R71 and the 5.5 Mc/s trap L3. The output from the collector circuit of TR15 (sync positive) is used to drive the sync separator TR22 and A.G.C. keying stage TR20. The bias control R57 is provided to compensate for spreads in component tolerances so that the correct white level can be obtained. The function of diode D9 is described under the heading "Sync Separator and Noise Gate". The 5.5 MHz intercarrier sound signal is extracted from the emitter of TR16 by I.C.I.F. 1. The choke L2a provides additional filtering of unwanted vision I.F. harmonics.

The video amplifier output stage TR17 is connected to the cathode of the picture tube via the R-C network R78, R79, R80 and C63. The 1.5 K resistor R89 (not included in early models) provides protection from picture tube flashovers emanating from the cathode.

The overall voltage gain of the video amplifier (at max. contrast) is approximately 33 times (30dB) as illustrated by the circuit waveforms (C) and (F).

**A.G.C. Keying and Amplifier**

Composite video signal from the collector of TR16 is applied to the base of the keying stage TR20 which conducts when the level of the sync tips exceeds the emitter voltage set by the A.G.C. preset R62. The positive-going keying pulse, derived from a separate winding on the horizontal output transformer, is applied to the collector of TR20. The other end of the keying pulse winding is a.c. bypassed to earth by C53. It follows, therefore, that TR20 can only conduct when both the keying pulse and sync tips are coincident. When TR20 conducts, it becomes, in effect, a switch which partially a.c. grounds the positive-going end of the keying pulse winding thus developing a negative d.c. voltage across C53 proportional to the degree of conduction of TR20.

The negative voltage across C53 is applied to the base of the amplifier TR19 which amplifies the voltage and inverts it to provide the positive forward A.G.C. applied to the gain-controlled 1st vision I.F. amplifier TR13. Diode D8 prevents the collector-base-diode of TR20 becoming forward biased during the time interval between keying pulses. The A.G.C. time constant is mainly established by C53 and R55.

The R.F. A.G.C. system is described under the heading "Vision I.F."

**Waveform "B"**

The waveform, as shown, is that of the maximum excursion of the flyback keying pulse. This will be seen when a T.V. carrier wave is being received, without picture modulation. Under other operating conditions, the waveform may be widely different. On a blank channel, for example, the waveform may appear to be of an integrated shape, sloping from the top end of one keying pulse to the bottom of the next pulse but this shape partly depends upon the input impedance of the CRO in use. On a strong signal channel, video information will be present on the waveform below the pulse cut-off level, but the accuracy of its presentation may also depend upon the CRO input impedance.

**Sync Separator and Noise Gate**

Composite video signal derived from the collector of TR16 is applied to the base of the sync separator TR22 via C57. The noise gate TR21 is connected as a switch between the emitter of TR22 and earth. Under noise-free operating conditions, TR21 is held into saturation by bias current via R56 and from the A.G.C. line via R53 and therefore it has no effect on the operation of TR22. TR22 is biased so that it conducts only for the duration of the sync pulse tips. The resulting sync output is fed to the horizontal sync phase splitter TR28 via C78, and to the vertical sync amplifier TR23 via the integration network R113, R114, R115, C76 and C77.

The noise diode D9 is biased by R63 and R64 so that it conducts only on noise pulses which exceed the sync pulse tip level of the composite video signal at the base of TR16. In this event, the noise pulses are coupled via C59 to the base of the noise gate TR21. Since the noise pulses are negative-going, they will cut off TR21 whilst they are present. This in turn cuts off the sync separator TR21 and A.G.C. Keyer TR20 so that sync and A.G.C. are gated out for the duration of the noise pulses. The high stability of the vertical and horizontal time bases ensures that synchronisation is minimally affected during interference noise. Under weak signal conditions, the A.G.C. level is lower and therefore the bias current of TR21 through R53 is also lower which increases the sensitivity of the noise gate.

**Vertical Deflection**

Vertical sync pulses from the integrator are inverted by TR23 and then coupled to the base of TR25 via C71. TR25 and TR24 form an emitter-coupled multivibrator in which the fundamental frequency (with no sync input) is determined mainly by the time-constant of C71, R102 and the resistors in the vertical hold network.

The sawtooth output at the collector of TR25 is direct-coupled to the base of the driver transistor TR26 which is connected as an emitter follower stage. Two feedback loops are employed to provide linearity correction. Variable positive feedback is applied from the emitter of TR20 via R104, R105 and C74 and fixed negative feedback from the collector of TR27 via R111 to provide the required amount of symmetrical 'S' correction. In some early models a preset control was connected in series with R111.

The output from the emitter of TR26 is d.c. coupled via the height preset R108 to the base of the class 'A' vertical output amplifier TR27. The series connected vertical deflection coils in the yoke are choke-capacitance coupled to TR27 collector via L4 and C75.

**Horizontal A.F.C.**

Sync pulses are coupled to the base of the phase splitter TR28 producing two symmetrical outputs of opposite phase which are connected to the discriminator diodes D10 and D11. The reference sawtooth waveform is derived from the horizontal output transformer and fed via the integrating network R123, C83 to the junction of the discriminator diodes. Horizontal phasing correction is effected by R84. The d.c. voltage developed by the discriminator is filtered by the network R127, R131, C85 and C86 and coupled to the base of the reactance transistor TR29. The capacitive reactance of TR29 (which is effectively connected in parallel with C89) is therefore dependent on the amplitude of the discriminator d.c. output which, in turn, is determined by the phase-relationship of the reference pulse to the incoming sync pulse. The discriminator output is superimposed on a d.c. bias provided by the horizontal hold control R124.

For example, should the horizontal oscillator frequency tend to drift low, the reference pulse would lag behind the incoming sync pulse. The discriminator d.c. output would decrease thereby lowering the conductance of the reactance transistor. This would reduce the effective capacitance of the stage and raise the operating frequency of the oscillator, bringing it back into sync.

**Horizontal Oscillator and Driver**

The horizontal oscillator TR30 is a sine-wave L.C. oscillator in which the free-running frequency is preset by adjustment of the oscillator coil slug.

The pulse output developed across the IK ohm collector resistor (R137) of the oscillator is coupled to the driver stage via the pulse-shaping network R136, R138 and C91 for switching the driver transistor TR31.

The driver transistor operates in a non-simultaneous mode with respect to the output transistor (TR32) i.e. when TR31 is bottomed, a positive pulse is fed to the base of the output transistor, cutting off this transistor. The energy stored in the inductance of the driver transformer T3, during the time the driver transistor conducts, provides the base current of the output transistor during the scan period. The supply rail for the phase-splitter, reactance stage, oscillator and driver is de-coupled from the main 11V supply rail by R140 and C93.

**Horizontal Output and E.H.T. Generation**

The output transistor TR32 is driven into conduction by the driver stage producing a sawtooth current in the deflection coils to form the second half of the horizontal scanning line. At the end of the scan period TR32 is cut off by the driving waveform and the parallel resonant circuit comprising yoke and flyback tuning capacitor C98 produces one half cycle of oscillation to provide the line flyback. At this stage the flyback voltage reaches the supply voltage and the efficiency diode D12 conducts, producing a sawtooth current in the deflection coils to form the first half of the scanning line.

Coupling capacitor C95, as well as preventing d.c. from flowing through the deflection coils, provides the 'S' correction of the deflection current. Protection of the output transistor against damage caused by arcing of the picture tube and the E.H.T. rectifier is provided by the resistors R142 and R143.

The 10 KV E.H.T., 100V video amplifier supply and 390V picture tube voltage supply are generated by rectification of pulse waveforms derived from secondary windings on the horizontal output transformer T4.

**Picture Tube Circuits**

The d.c. voltage supply for the picture tube grids is obtained from the 390V auxiliary supply generated by the horizontal output stage as described in the previous section.

Horizontal retrace blanking is provided by C65 from the horizontal output transformer.

Frame flyback suppression is achieved by clamping the Pix tube grid to ground during the flyback period via the blanking transistor TR18 which is driven into saturation by the positive pulse obtained from the frame multivibrator.

Preset R84 provides control over the grid 2 voltage of the picture tube so that the cut-off point (and hence the brilliance range) of all tubes can be held constant. See also "Control Adjustments".

Focus adjustment is by preset R88.

Spark gaps SG1, SG2 and SG3 are fitted to the grids of the picture tube to absorb the bulk of any picture tube flash-over voltages appearing on these grids.

## COMPONENT LAYOUT CHART – 49-1 & 49-2 CHASSIS

| | |
|---|---|
| R1 | Speaker Panel |
| R2 | Speaker Panel |
| R3 | Speaker Panel |
| R4 | Speaker Panel |
| R5 | Speaker Panel |
| R6 | C8 |
| R7 | Speaker Panel |
| R8 | Speaker Panel |
| R10 | N13 |
| R11 | M13 |
| R12 | L13 |
| R13 | Part of T2 |
| R14 | L51 |
| R15 | J14 |
| R16 | G18 |
| R17 | Control Panel |
| R18 | Part of T2 |
| R19 | Part of T2 |
| R20 | Part of T2 |
| R22 | J21 |
| R23 | G20 |
| R24 | G22 |
| R25 | H22 |
| R26 | J21 |
| R27 | K21 |
| R28 | H23 |
| R29 | H24 |
| R30 | K24 |
| R31 | H24 |
| R32 | G24 |
| R33 | Tuner Panel |
| R33A | Tuner Panel (PT2 only) |
| R34 | Tuner |
| R35 | Tuner Panel |
| R36 | Tuner Panel |
| R37 | Tuner Panel |
| R38 | E21 |
| R39 | C20 |
| R40 | C19 |
| R41 | B17 |
| R41A | D17 |
| R42 | C16 |
| R43 | A16 |
| R44 | B15 |
| R45 | C14 |
| R46 | D15 |
| R47 | A13 |
| R48 | D12 |
| R49 | D11 |
| R50 | Part of I.F.T.4 |
| R51 | E12 |
| R52 | E17 |
| R53 | P6 |
| R54 | F18 |
| R55 | F20 |
| R56 | M6 |
| R57 | G13 |
| R58 | K11 |
| R59 | K12 |
| R60 | L10 |
| R61 | K7 |
| R62 | L4 |
| R63 | N8 |
| R64 | P8 |
| R65 | R2 |
| R67 | Q4 |
| R68 | P2 |
| R69 | K7 |
| R70 | L11 |
| R71 | Control Panel |
| R72 | H8 |
| R74 | R12 |
| R75 | J7 |
| R77 | Q9 |
| R78 | R4 |
| R79 | T9 |
| R80 | S4 |
| R81 | V1 |
| R82 | Control Panel |
| R83 | W2 |
| R84 | W4 |
| R85 | Z2 |
| R86 | Y2 |
| R87 | W2 |
| R88 | U5 |
| R89 | Pix Tube Socket |
| R92 | G7 |
| R93 | G7 |
| R94 | J2 |
| R95 | H2 |
| R96 | E7 |
| R97 | M25 |
| R98 | N25 |
| R99 | J4 |
| R100 | K3 |
| R101 | L2 |
| R102 | F6 |
| R103 | E5 |
| R104 | G2 |
| R105 | F3 |
| R108 | C6 |
| R109 | C7 |
| R110 | A8 |
| R111 | B2 |
| R112 | B4 |
| R113 | G5 |
| R114 | M2 |
| R115 | N2 |
| R120 | K22 |
| R121 | L23 |
| R122 | M23 |
| R123 | R22 |
| R124 | R25 |
| R125 | R25 |
| R126 | R24 |
| R127 | P22 |
| R128 | P23 |
| R129 | P22 |
| R130 | R21 |
| R131 | M21 |
| R132 | N21 |
| R133 | P20 |
| R134 | M18 |
| R135 | R17 |
| R136 | S15 |
| R137 | Q15 |
| R138 | S14 |
| R139 | T12 |
| R140 | S20 |
| R141 | Y13 |
| R142 | X24 |
| R143 | X25 |
| R145 | Base of Aerial |

| | |
|---|---|
| C1) | Speaker Panel PT1 |
| C2) | Control Panel PT2 |
| C3 | Speaker Panel |
| C4 | Speaker Panel |
| C5 | Speaker Panel |
| C6 | Speaker Panel |
| C7 | C10 |
| C10 | M11 |
| C11 | M13 |
| C12 | M11 |
| C13 | L14 |
| C14 | K14 |
| C15 | Part of T2 |
| C16 | G16 |
| C17 | Part of T2 |
| C18 | J18 |
| C19 | H19 |
| C20 | Part of T2 |
| C21 | Part of T2 |
| C24 | H21 |
| C25 | F23 |
| C25A | K25 |
| C25B | G23 |
| C26 | F24 |
| C28 | Tuner Panel |
| C29 | Tuner Panel |
| C30 | Tuner |
| C31 | Tuner |
| C31A | Tuner Panel |
| C32 | B25 |
| C33 | A23 |
| C34 | C25 |
| C35 | D21 |
| C36 | B21 |
| C37 | A20 |
| C38 | D19 |
| C39 | C19 |
| C40 | D12 |
| C41 | C16 |
| C42 | A16 |
| C43 | C15 |
| C44 | B13 |
| C45 | D14 |
| C46 | D11 |
| C47 | Part of I.F.T. 4 |
| C48 | F11 |
| C49 | E20 |
| C50 | Part of I.F.T. 4 |
| C51 | Part of I.F.T. 4 |
| C52 | Part of I.F.T. 4 |
| C53 | F21 |
| C55 | Part of I.F.T. 4 |
| C56 | L8 |
| C57 | N8 |
| C59 | N7 |

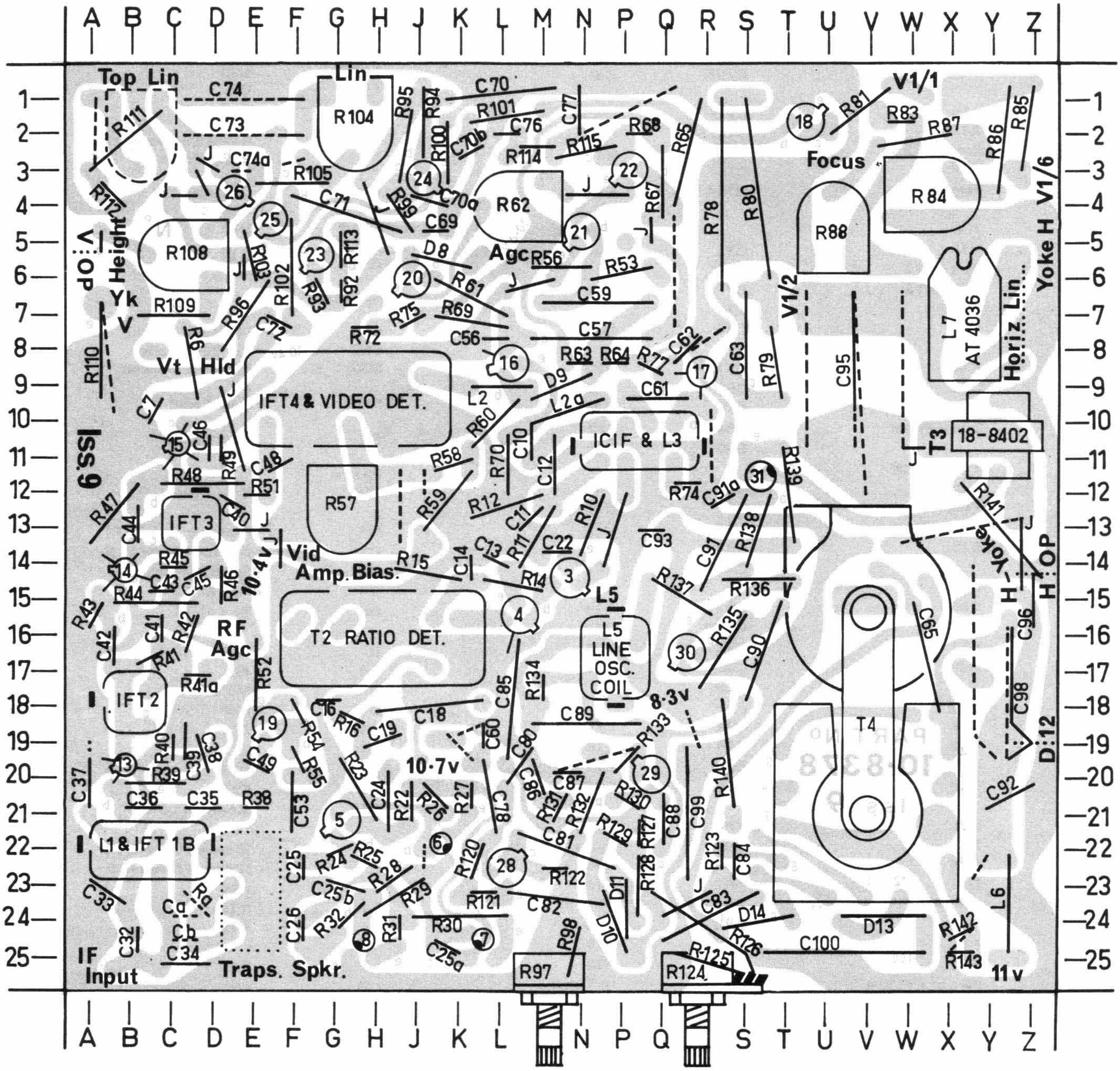
| | |
|---|---|
| C60 | L19 |
| C61 | Q9 |
| C62 | R8 |
| C63 | S8 |
| C65 | W17 |
| C66 | Part of I.F.T. 4 |
| C69 | J5 |
| C70 | L1 |
| C70A | J4 |
| C70B | K3 |
| C71 | G4 |
| C72 | F7 |
| C73 | E2 |
| C74 | E1 |
| C74A | E3 |
| | (Board Surround PT1 |
| C75 | (Control Panel PT2 |
| C76 | L2 |
| C77 | N1 |
| C78 | L21 |
| C80 | L20 |
| C81 | N22 |
| C82 | M23 |
| C83 | R24 |
| C84 | S22 |
| C85 | L18 |
| C86 | M20 |
| C87 | N20 |
| C88 | Q21 |
| C89 | L18 |
| C90 | S17 |
| C91 | R14 |
| C91A | R12 |
| C92 | Y21 |
| C93 | Q13 |
| C95 | V9 |
| C96 | Z15 |
| C98 | Z18 |
| C99 | R21 |
| C100 | U25 |
| TR1 | Speaker Panel |
| TR2 | Speaker Panel |
| TR3 | N14 |
| TR4 | L16 |
| TR5 | G21 |
| TR6 | K22 |
| TR7 | L25 |
| TR8 | H25 |
| TR9 | In Tuner |
| TR10 | In Tuner |
| TR11 | In Tuner |
| TR12 | In Tuner |
| TR13 | B20 |
| TR14 | B14 |
| TR15 | C11 |
| TR16 | L8 |
| TR17 | R9 |

| | |
|---|---|
| TR18 | T2 |
| TR19 | E19 |
| TR20 | J6 |
| TR21 | N5 |
| TR22 | P3 |
| TR23 | F5 |
| TR24 | J3 |
| TR25 | E5 |
| TR26 | D4 |
| TR27 | (Board Surround A5 - PT1 |
| | (Control Panel - PT2 |
| TR28 | L23 |
| TR29 | Q20 |
| TR30 | R17 |
| TR31 | S12 |
| TR32 | Board Surround Z14 |
| TR33 | Tuner Panel |
| IFT 1a | In Tuner |
| IFT 1b | C22 |
| IFT 2 | B18 |
| IFT 3 | C13 |
| IFT 4 | G9 |
| ICIF 1 | P11 |
| SG1 | Pix Tube Socket |
| SG2 | Pix Tube Socket |
| SG3 | Pix Tube Socket |
| SW2 | Rear Panel |
| F1 | Rear Panel |
| Phone Jack: | Rear Panel |
| D1 | (Speaker Panel PT1 |
| D2 | (Control Panel PT2 |
| D3 | Speaker Panel |
| D4 | Part of T2 |
| D5 | Part of T2 |
| D7 | Part of I.F.T. 4 |
| D8 | K6 |
| D9 | M9 |
| D10 | P24 |
| D11 | P24 |
| D12 | Z19 |
| D13 | V24 |
| D14 | S24 |
| D15 | Mounted on T4 |
| T1 | (Speaker Panel PT1 |
| | (Control Panel PT2 |
| T2 | H16 |
| T3 | Y10 |
| T4 | V19 |
| L1 | B22 |
| L2 | L9 |
| L2a | N10 |
| L3 | Q11 |
| | (Board Surround A5 - PT1 |
| | (Control Panel - PT2 |
| L5 | P17 |
| L6 | Y24 |
| L7 | X7 |

# CHASSIS 49-1 & 49-2

Issue 9

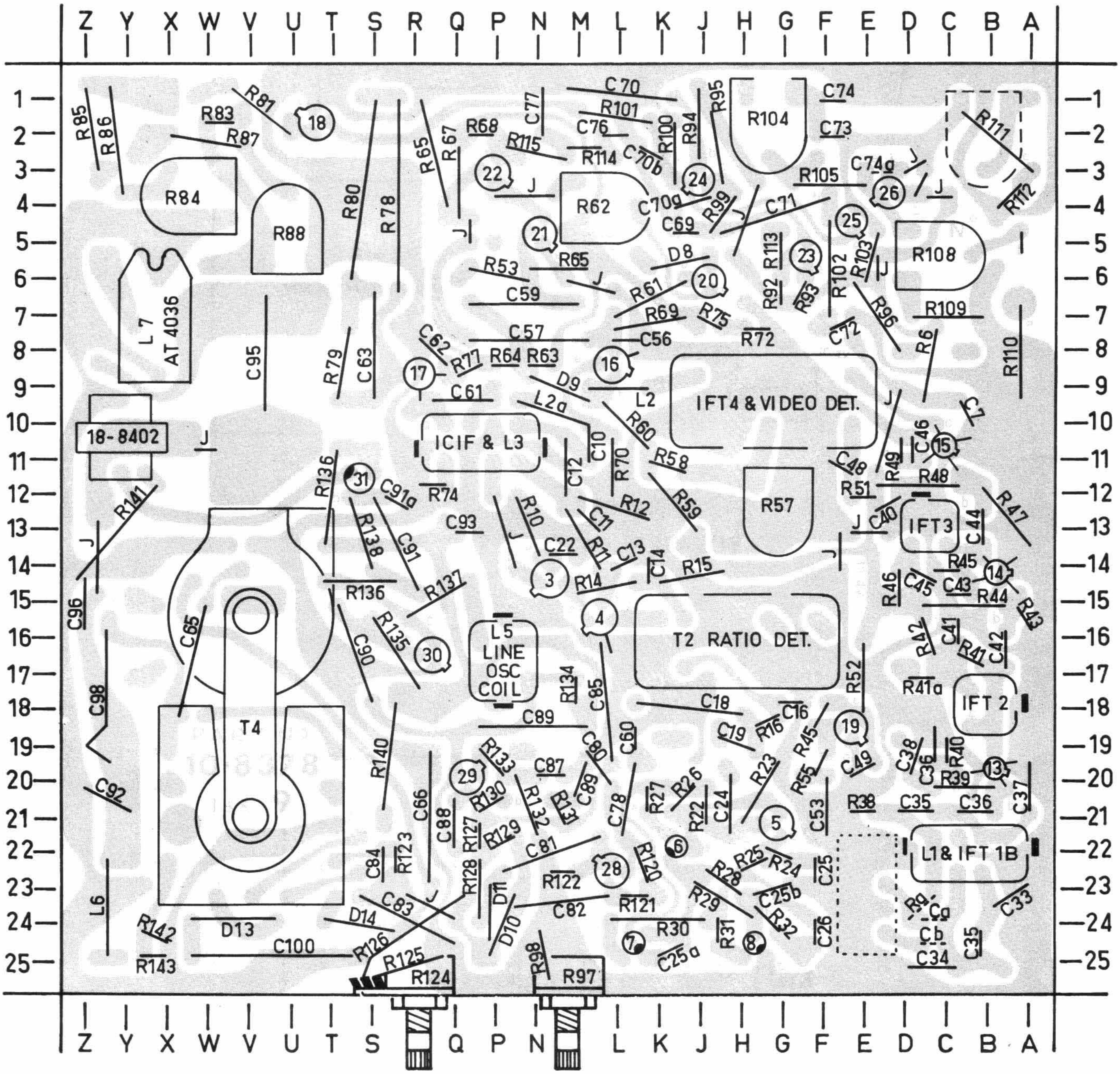
## PRINTED BOARD VIEWED FROM ABOVE (COMPONENT SIDE)

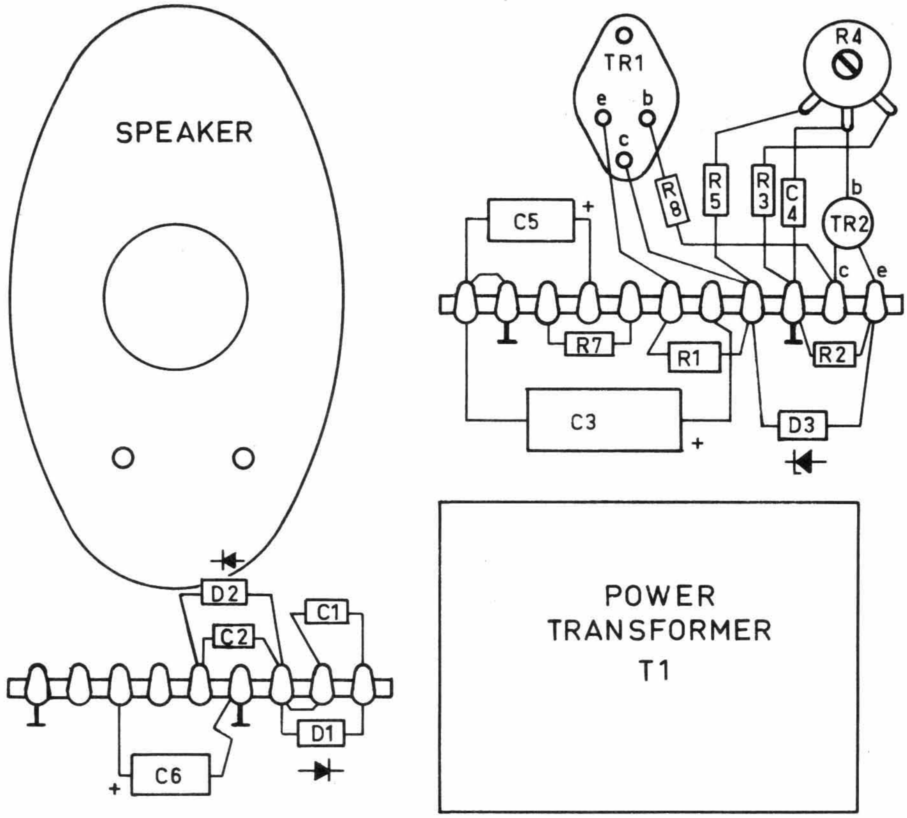


# CHASSIS 49-1 & 49-2

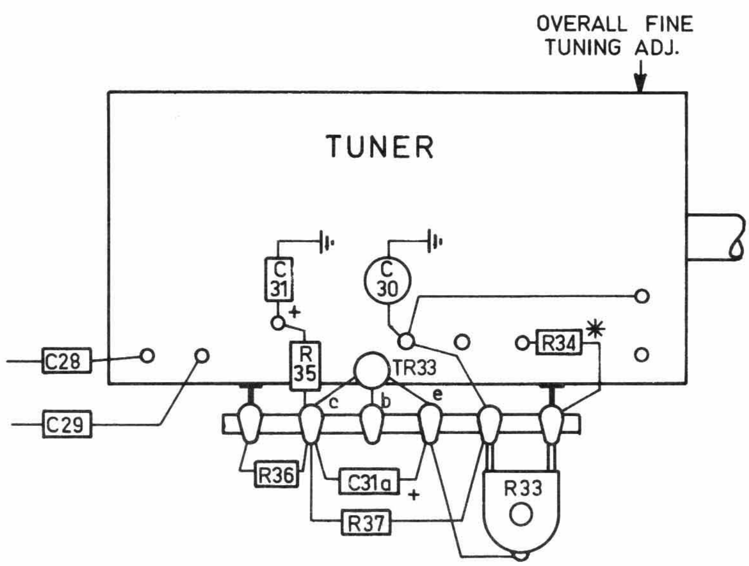
Issue 9

## PRINTED BOARD VIEWED FROM BELOW (CONDUCTOR SIDE)



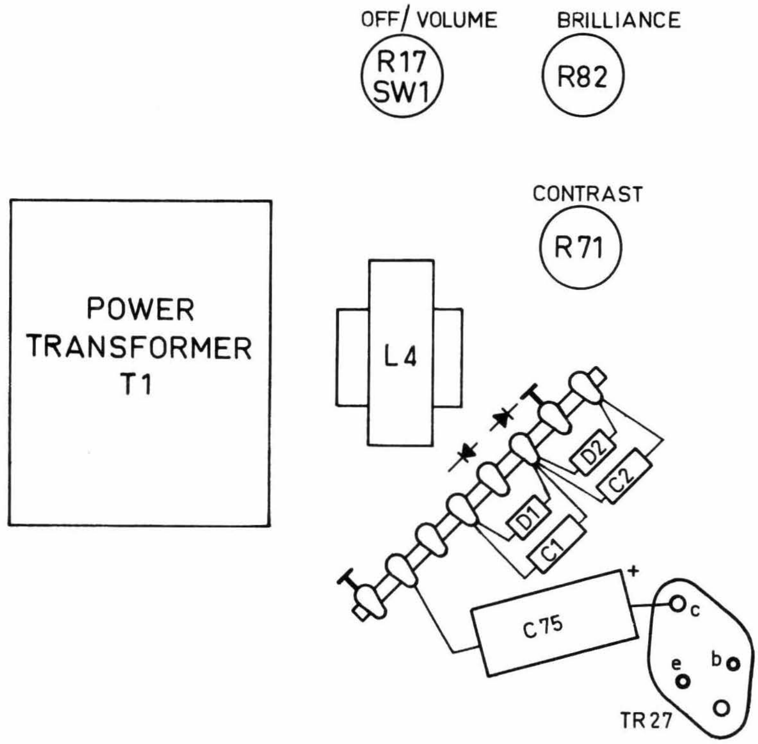



SPEAKER PANEL PT1
VIEW ON INSIDE

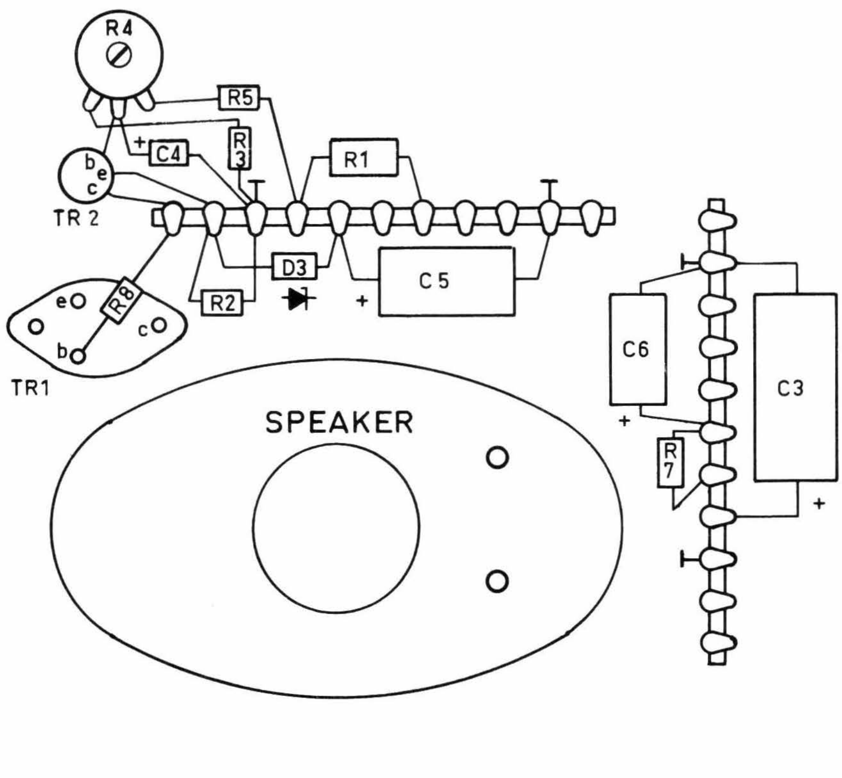



* R34 may be wired to 10·4v rail or to chassis

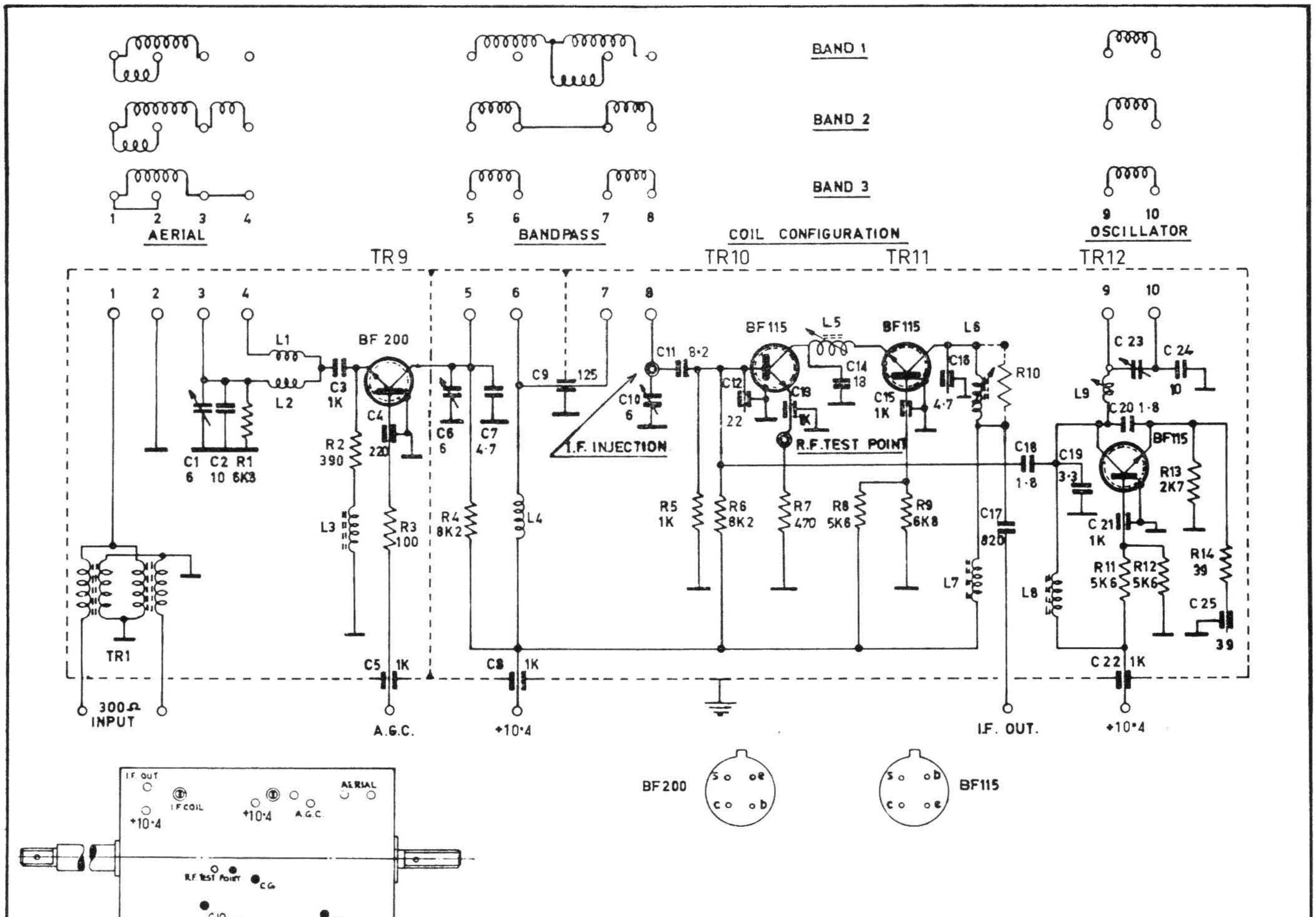
TUNER PANEL PT1




CONTROL PANEL PT2
VIEW ON INSIDE




SPEAKER PANEL PT 2
VIEW ON INSIDE




TRANSISTOR TUNER – NT3017

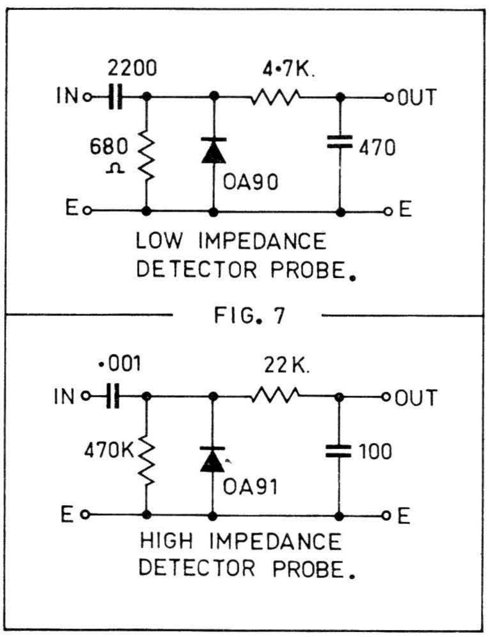
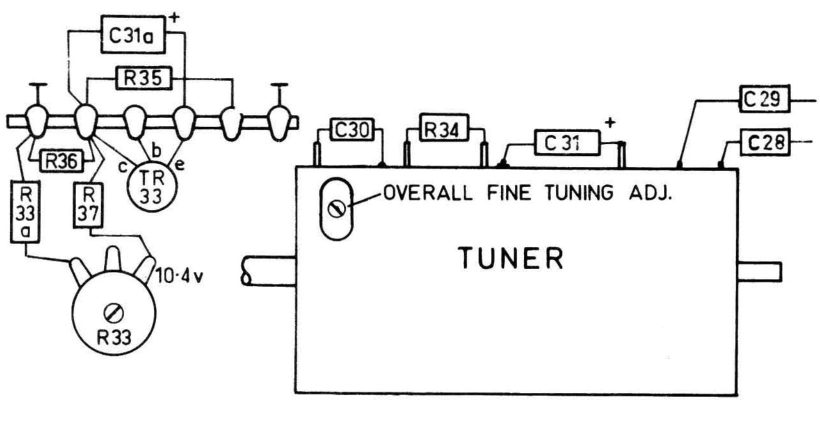



FIG. 7




TUNER PANEL PT2

VIEW ON UNDERSIDE

## ORDERING REPLACEMENT PARTS:

When ordering replacement and/or spare parts, quote the following information in correspondence and attach a label bearing this information to every component returned to the Company. Printed labels for this purpose will be supplied by the Service Division upon request.

1. Model No. of receiver – printed on rear of cabinet.
2. Chassis No. of receiver – e.g. 49-1, Issue 1.
3. Serial No. of chassis – printed on card attached to chassis.
4. Detailed specification of component – include circuit code No. where applicable.
5. Detailed description of the fault.

All the above information is necessary to ensure that the correct replacement part is despatched with minimum delay. The Kriesler Laboratory is interested in examining defective components so that the established quality of the product and reliability of components is under constant surveillance.

## PARTS LIST – MECHANICAL

| Description | Part No. PT1 | Part No. PT2 |
|---|---|---|
| Numeral Disc, Bone | 16-8367 A | N/A |
| Numeral Disc, Charcoal | 16-8367 B | N/A |
| Knob, Fine Tuning | 20-8366 | See Note |
| Knob, Channel Change | 20-8368 | See Note |
| Knob, Volume | 20-8449 | See note |
| Knob, Contrast or Brilliance | 20-8450 | See Note |
| 3-pin Contact Insulator Ass'y | 46-8443 | 46-8443 |
| 2-pin Contact Insulator Assy | 46-8442 | 46-8442 |
| Socket Body, 3-pin (240V) | 20-8384 | 20-8384 |
| Socket Body, 2-pin (12V.) | 20-8383 | 20-8383 |
| Contact, Slide (phosphor bronze) | 16-8377 | 16-8377 |
| Switch Cap | 20-8369 | 20-8369 |
| Sliding Cover, socket | 20-8380 | 20-8380 |
| Contact Retaining Block, 2-pin | 20-6142 | 20-6142 |
| Contact Retaining Block, 3-pin | 20-8386 | 20-8386 |
| Spacer, Power Socket | 20-8390 | 20-8390 |
| Spring, Earthing | 16-8388 | 16-8388 |
| Spring, Cathode Lead | 16-9623 | 16-9623 |
| Fuse Cover | 20-5156 | 20-5156 |
| Aerial Terminal Ass'y | 46-8445 | 46-9634 |
| Handle, Ivory | 20-8389 A | See Note |
| Handle, Charcoal | 20-8389 B | See Note |
| Foot | 20-8365 | 40-9638 |
| Escutcheon, Gold and Bone | 36-8360 A | See Note |
| Escutcheon, Chrome and Charcoal | 36-8360 B | See Note |
| Picture Tube Socket | McMurdo B7-HM-50 | |

Note: When ordering decorative parts, specify receiver Model No. and colour.

## PARTS LIST – ELECTRICAL

Circuit Ref. 49-1 or 49-2 Issue 4.

### Resistors

All values in ohms. All resistors ½W ±10% carbon unless otherwise specified

| Code | Value | |
|---|---|---|
| R1 | 68 | PW5 5W wire-wound |
| R2 | 120 | |
| R3 | 680 | |
| R4 | 1K | H.T. Preset 20% |
| R5 | 820 | |
| R6 | 10 | |
| R7 | 10 | |
| R8 | 220 | |
| R9 | | |
| R10 | 100 | |
| R11 | 1K | |
| R12 | 220 | |
| R13 | 470 | |
| R14 | 2.2K | |
| R15 | 47 | |
| R16 | 1K | |
| R17 | 10K | VOLUME/OFF 32-8392 |
| R18 | 1K | 5% |
| R19 | 1K | 5% |
| R20 | 22K | |
| R21 | | |
| R22 | 56K | (47K with Anodeon xistors) |
| R23 | 82K | (100K with Anodeon xistors) |
| R24 | 47 | |
| R25 | 1.5K | |
| R26 | 1K | |
| R27 | 33 | (10 with Anodeon xistors) |
| R28 | 50 | N.T.C. Phillips' B8-320-01P/50E 20% (not used when Anodeon xistors fitted) |
| R29 | 100 | |
| R30 | 2.2 | BW½ wire-wound |
| R31 | 2.2 | BW½ wire-wound |
| R32 | 470 | |
| R33 | 1K | (PT1) 470 (PT2) R.F. A.G.C. Delay Preset |
| R33A | 470 | |
| R34 | 3.9K | |
| R35 | 220 | |
| R36 | 5.6K | |
| R37 | 22K | |
| R38 | 2.2K | |
| R39 | 1K | |
| R40 | 220 | |
| R41 | 1.5K | |
| R41a | 15K | |
| R42 | 330 | |
| R43 | 820 | |
| R44 | 4.7K | |
| R45 | 150 | |
| R46 | 100 | |
| B47 | 820 | |
| R48 | 4.7K | |

| Code | Value | |
|---|---|---|
| R49 | 150 | |
| R50 | 10K | |
| R51 | 33 | |
| R52 | 1K | |
| R53 | 56K | |
| R54 | 18K | (15K with Anodeon xistors) |
| R55 | 10K | |
| R56 | 100K | (56K with Anodeon xistors) |
| R57 | 1K | Bias Preset 20% |
| R58 | 47 | |
| R59 | 1.5K | |
| R60 | 2.7K | |
| R61 | 10K | |
| R62 | 1K | A.G.C. Preset 20% |
| R63 | 220K | |
| R64 | 22K | |
| R65 | 47K | |
| R66 | | |
| R67 | 1M | |
| R68 | 3.3K | |
| R69 | 820 | |
| R70 | 470 | |
| R71 | 1K | CONTRAST 32-8394 |
| R72 | 220 | |
| R73 | | |
| R74 | 3.9K | |
| R75 | 1K | |
| R76 | | |
| R77 | 120 | (150 in PT2) |
| R78 | 5.6K | BTB 2W |
| R79 | 100K | |
| R80 | 220K | |
| R81 | 470K | |
| R82 | 250K | BRILLIANCE 32-8393 |
| R83 | 1.5M | |
| R84 | 2.2M | |
| R85 | 22K | |
| R86 | 100K | |
| R87 | 47K | |
| R88 | 2.2M | Focus Preset 20% |
| R89 | 2.5K | |
| R90 | | |
| R91 | | |
| R92 | 22K | |
| R93 | 2.7K | |
| R94 | 220K | |
| R95 | 10K | |
| R96 | 8.2K | |
| R97 | 10K | VERT. HOLD 32-8391 |
| R98 | 8.2K | |

| Code | Value | |
|---|---|---|
| R99 | 5.6K | |
| R100 | 100 | |
| R101 | 22K | |
| R102 | 470K | (330K with Anodeon xistors) |
| R103 | 5.6K | |
| R104 | 470 | Overall Lin. Preset 20% |
| R105 | 47 | |
| R106 | | |
| R107 | | |
| R108 | 220 | Height Preset 20% |
| R109 | 100 | |
| R110 | 4.7 | BW½ wire-wound 5% |
| R111 | 56K | |
| R112 | 2.2K | |
| R113 | 82K | |
| R114 | 47K | |
| R115 | 47K | |
| R116 | | |
| R117 | | |
| R118 | | |
| R119 | | |
| R120 | 47K | |
| R121 | 330 | 5% |
| R122 | 330 | 5% |
| R123 | 4.7K | |
| R124 | 10K | HORIZ. HOLD 32-8391 |
| R125 | 47K | |
| R126 | 22K | |
| R127 | 22K | |
| R128 | 27K | 5% |
| R129 | 27K | 5% |
| R130 | 1K | |
| R131 | 220 | |
| R132 | 2.7K | |
| R133 | 15 | |
| R134 | 1.5K | |
| R135 | 100K | |
| R136 | 33 | (220 with Anodeon xistors) |
| R137 | 1K | |
| R138 | 1.5K | |
| R139 | 3.3 | BW½ wire-wound |
| R140 | 33 | |
| R141 | 1 | (.33 when TR32 is 2SB468) BW½ wire-wound |
| R142 | 1 | BW½ wire-wound |
| R143 | 1 | BW½ wire-wound |
| R144 | | |
| R145 | 150 | 1W (not shown on circuit) (This resistor is between telescopic aerial and chassis) |

## CAPACITORS

All values in microfarads unless otherwise specified.

| CODE | VALUE | TOL. % | V.D.C. Wkg. | TYPE |
|---|---|---|---|---|
| C1 | 2200pF | 20 | 500 | Ceramic |
| C2 | 2200pF | 20 | 500 | Ceramic |
| C3 | 2000 | -10 + 50 | 25 | Electro. |
| C4 | 10 | -10 + 50 | 12 | Electro. |
| C5 | 500 | -10 + 50 | 12 | Electro. |
| C6 | 1000 | -10 + 50 | 12 | Electro. |
| C7 | 250 | -10 + 50 | 12 | Electro. |
| C8 | | | | |
| C9 | | | | |
| C10 | 22pF | 5 | 500 | Ceramic NPO |
| C11 | 0.01 | 20 | 25 | Ceramic |
| C12 | 220pF | 10 | 100 | Styroseal |
| C13 | 0.01 | 20 | 25 | Ceramic |
| C14 | 0.01 | 20 | 25 | Ceramic |
| C15 | 330pF | 20 | 500 | Ceramic |
| C16 | 680pF | 20 | 500 | Ceramic |
| C17 | 330pF | 20 | 500 | Ceramic |
| C18 | 0.047 | 10 | 160 | Polyester |
| C19 | 10 | -10 + 50 | 12 | Electro. |
| C20 | 680pF | Part of T2 | | |
| C21 | 10 | -10 + 50 | 12 | Electro. |
| C22 | | | | |
| C23 | | | | |
| C24 | 10 | -10 + 50 | 12 | Electro. |
| C25 | 50 | -10 + 50 | 10 | Electro. |
| C25A | 4700pF | 20 | 25 | Ceramic |
| C25B | 4700pF | 20 | 25 | Ceramic |
| C26 | 200 | -10 + 50 | 10 | Electro. |
| C27 | | | | |
| C28 | 680pF | 20 | 500 | Ceramic |
| C29 | 680pF | 20 | 500 | Ceramic |
| C30 | 4700pF | 20 | 25 | Ceramic |
| C31 | 10 | -10 + 50 | 12 | Electro. |
| C31A | 60 | -10 + 50 | 10 | Electro. |
| C32 | 12pF | 5 | 500 | Ceramic NPO |
| C33 | 10pF | ± ½pF | 500 | Ceramic NPO |
| C34 | 68pF | 5 | 500 | Ceramic NPO |
| C35 | 22pF | 5 | 500 | Ceramic NPO |
| C36 | 22pF | 5 | 500 | Ceramic NPO |
| C37 | 82pF | 5 | 500 | Ceramic NPO |
| C38 | 4700pF | 20 | 25 | Ceramic |
| C39 | 4700pF | 20 | 25 | Ceramic |
| C40 | 4700pF | 20 | 25 | Ceramic |
| C41 | 4700pF | 20 | 25 | Ceramic |
| C42 | 10pF | ± ½pF | 500 | Ceramic NPO |
| C43 | 4700pF | 20 | 25 | Ceramic |
| C44 | 10pF | ± ½pf | 500 | Ceramic NPO |
| C45 | 4700pF | 20 | 25 | Ceramic |
| C46 | 4700pF | 20 | 25 | Ceramic |
| C47 | 4.7 pF | Part of IFT 4 | | |
| C48 | 4700pF | 20 | 25 | Ceramic |
| C49 | 10 | -10 + 50 | 12 | Electro. |
| C50 | 5.6 pF | Part of IFT 4 | | |

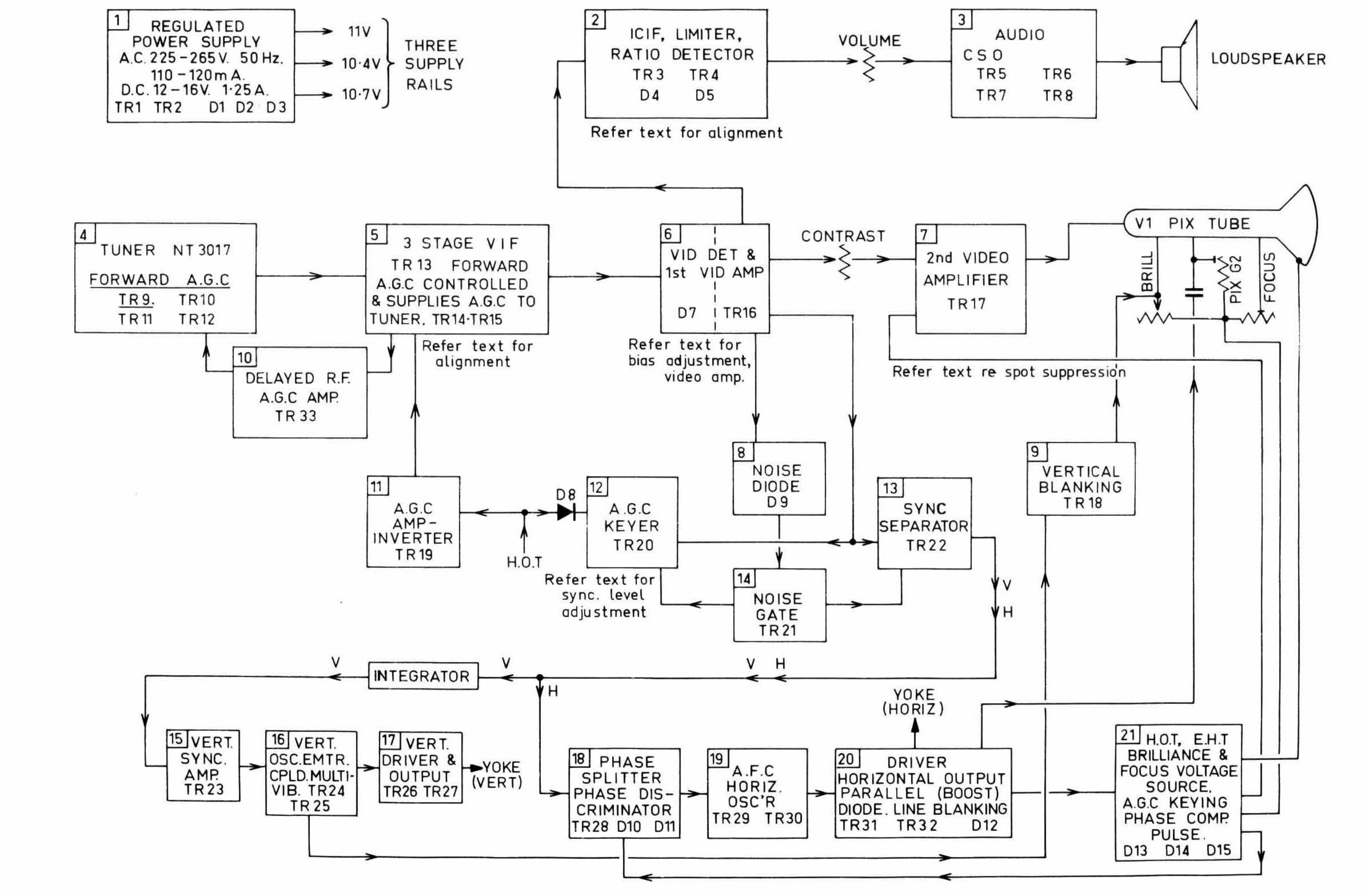
| CODE | VALUE | TOL. % | V.D.C. Wkg. | TYPE |
|---|---|---|---|---|
| C51 | 4700pF | Part of IFT 4 | | |
| C52 | 4700pF | Part of IFT 4 | | |
| C53 | 10 | -10 + 50 | 12 | Electro. |
| C54 | | | | |
| C55 | 3.9 pF | Part of IFT 4 | | |
| C56 | 680pF | 20 | 500 | Ceramic |
| C57 | 1 | -10 + 50 | 40 | Electro. |
| C58 | | | | |
| C59 | 0.1 | 10 | 160 | Polyester |
| C60 | 1000pF | 20 | 500 | Ceramic |
| C61 | 150pF | 10 | 100 | Styroseal |
| C62 | 330pF | 20 | 500 | Ceramic |
| C63 | 0.15 | 10 | 160 | Polyester |
| C64 | | | | |
| C65 | 1000pF | 10 | 400 | Polyester |
| C66 | 3.3 pF | Part of IFT 4 | | |
| C67 | | | | |
| C68 | | | | |
| C69 | 1000pF | 20 | 500 | Ceramic |
| C70 | 0.033 | 10 | 160 | Polyester |
| C70A | 0.01 | 20 | 25 | Ceramic |
| C70B | 330pF | 20 | 500 | Ceramic |
| C71 | 0.047 * | 10 | 160 | Polyester |
| C72 | 0.047 | 20 | 25 | Ceramic |
| C73 | 15 | 20 | 10 ) | Siemens Tantalum Electro |
| C74 | 15 | 20 | 10 ) | Type B45134-A3156-M002. |
| C74A | 330pF | 20 | 500 | Ceramic |
| C75 | 1000 | -10 + 50 | 12 | Electro. |
| C76 | 1000pF | 20 | 500 | Ceramic |
| C77 | 1000pF | 20 | 500 | Ceramic |
| C78 | 150pF | 10 | 100 | Styroseal |
| C79 | | | | |
| C80 | 330pF | 20 | 500 | Ceramic |
| C81 | 0.01 | 10 | 160 | Polyester |
| C82 | 0.01 | 10 | 160 | Polyester |
| C82 | 0.022 | 10 | 160 | Polyester |
| C84 | 220pF | 20 | 500 | Ceramic |
| C85 | 0.1 | 10 | 160 | Polyester |
| C86 | 10 | -10 + 50 | 12 | Electro. |
| C87 | 50 | -10 + 50 | 10 | Electro. |
| C88 | 470pF | 10 | 100 | Styroseal |
| C89 | 0.022 | 10 | 63 | Polystyrene[1] |
| C90 | 5600pF | 10 | 400 | Polyester |
| C91 | 0.047 | 10 | 160 | Polyester |
| C91A | 68pF | 20 | 500 | Ceramic N750 |
| C92 | 400 | -10 + 50 | 16 | Electro. |
| C93 | 250 | -10 + 50 | 12 | Electro. |
| C94 | | | | |
| C95 | 6 | 10 | 50 | Lacquer Film [2] |
| C96 | 2200pF | 20 | 500 | Ceramic |
| C97 | | | | |
| C98 | 0.068 | 10 | 160 | Polyester [3] |
| C99 | 0.015 | 20 | 600 | Paper |
| C100 | 12.5 | -10 + 50 | 150 | Electro. |

NOTES:

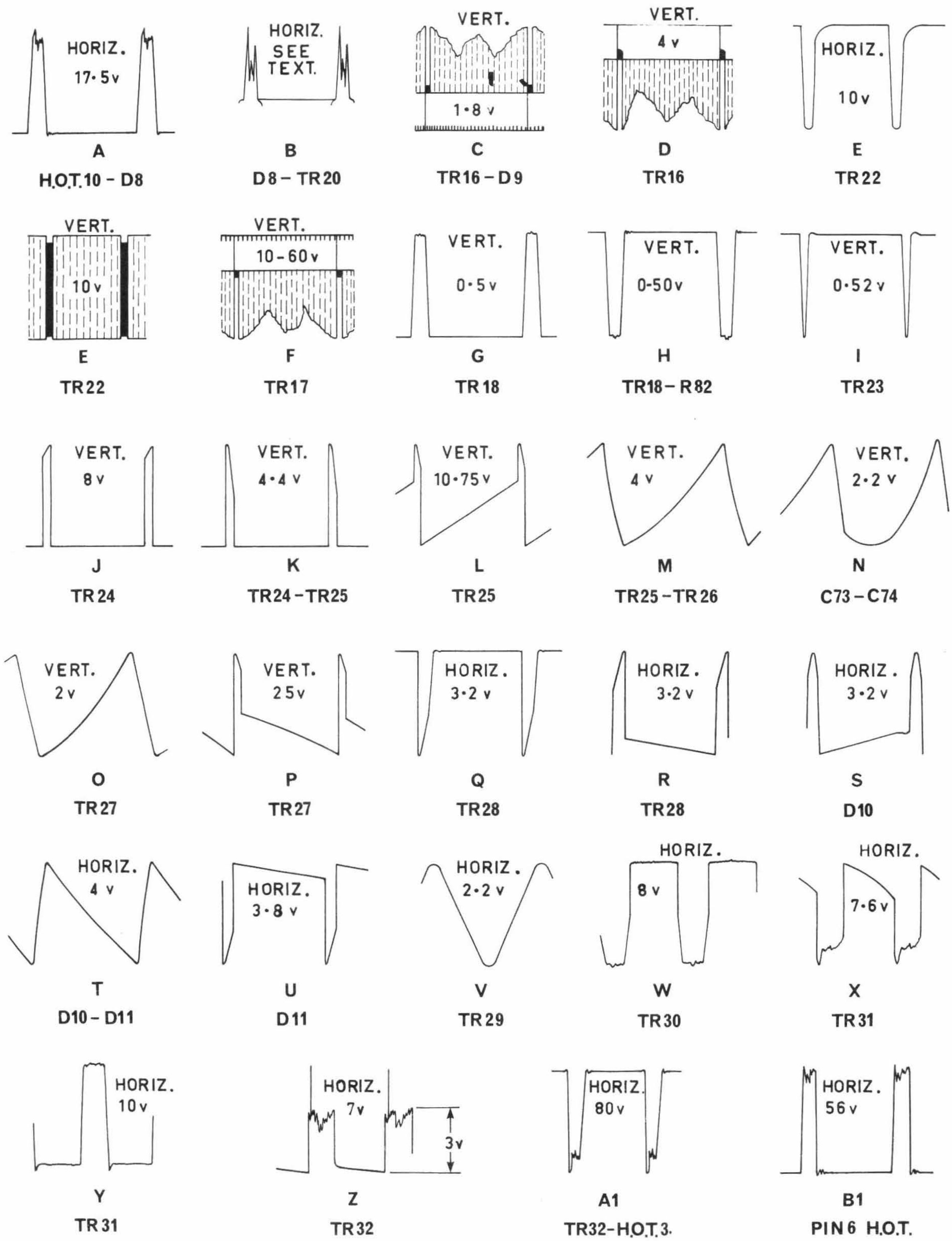
1. Allied Capacitor Type TCS/E Extended Foil.
2. Allied Capacitor Type PML.
   A 5 uF capacitor has been used in this position, sometimes shunted with a 0.47 uF. Use the 6 uF type listed for replacement purposes.
3. The 0.068 uF value is used with Philips yokes only. Value 0.082 uF is used with M.S.P. yokes.

* Different value when Anodeon transistors are used. For actual value, see circuit diagram.

# TV MODELS PT1 & PT2 BLOCK DIAGRAM 49-1 & 49-2 CHASSIS ISS. 4 CIRCUIT



## 49-1 & 49-2 CHASSIS PEAK·TO·PEAK WAVE FORMS



Production Changes shown in this Issue:

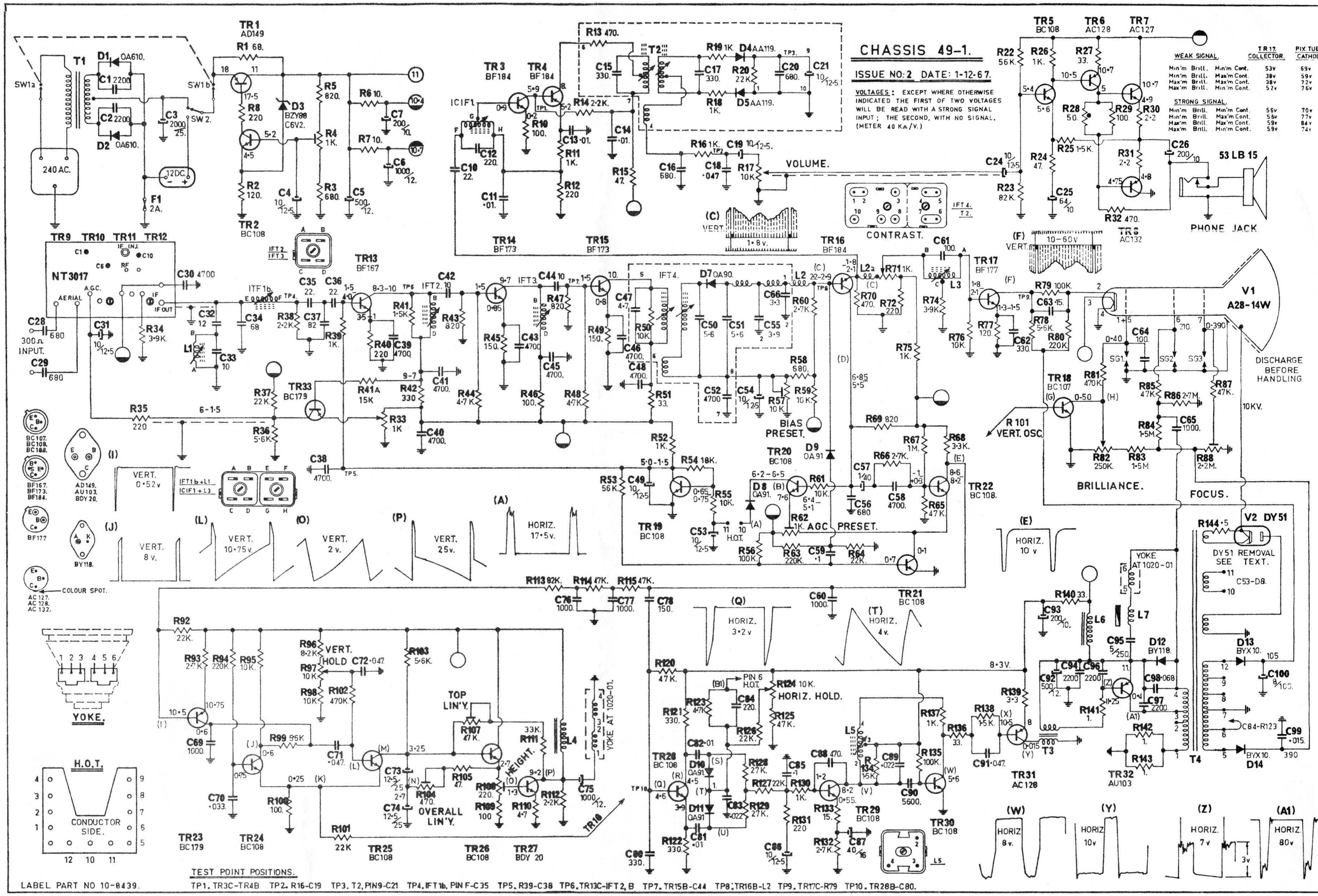
| FROM | TO |
|---|---|
| D6 (OA91) | TR33 (BC179) |
| R36 8.2K | 5.6K |
| R39 1K | 2.2K |
| R39 2.2K | 1K |
| R40 390Ω | 68Ω |
| R40 68Ω | 220Ω |
| R42 180Ω | 330Ω |
| R52 1K | 1.2K |
| R52 1.2K | 1K |
| R54 33K | 18K |
| R55 22K | 10K |
| R101 100K | 22K |
| C18 .1μF | .047μF |
| C32 15pF | 12pF |
| C87 10μF | 40μF |
| TR23 BC188 | BC179 |

L2 changed from Philips CZ322-068 to Kriesler 34-8447.

Additions:
R8, 220Ω ± 10% ½W carbon.
R33, 1KΩ Pre-set, Philips E097AD/1K.
R41a, 15KΩ ± 10% ½W carbon.

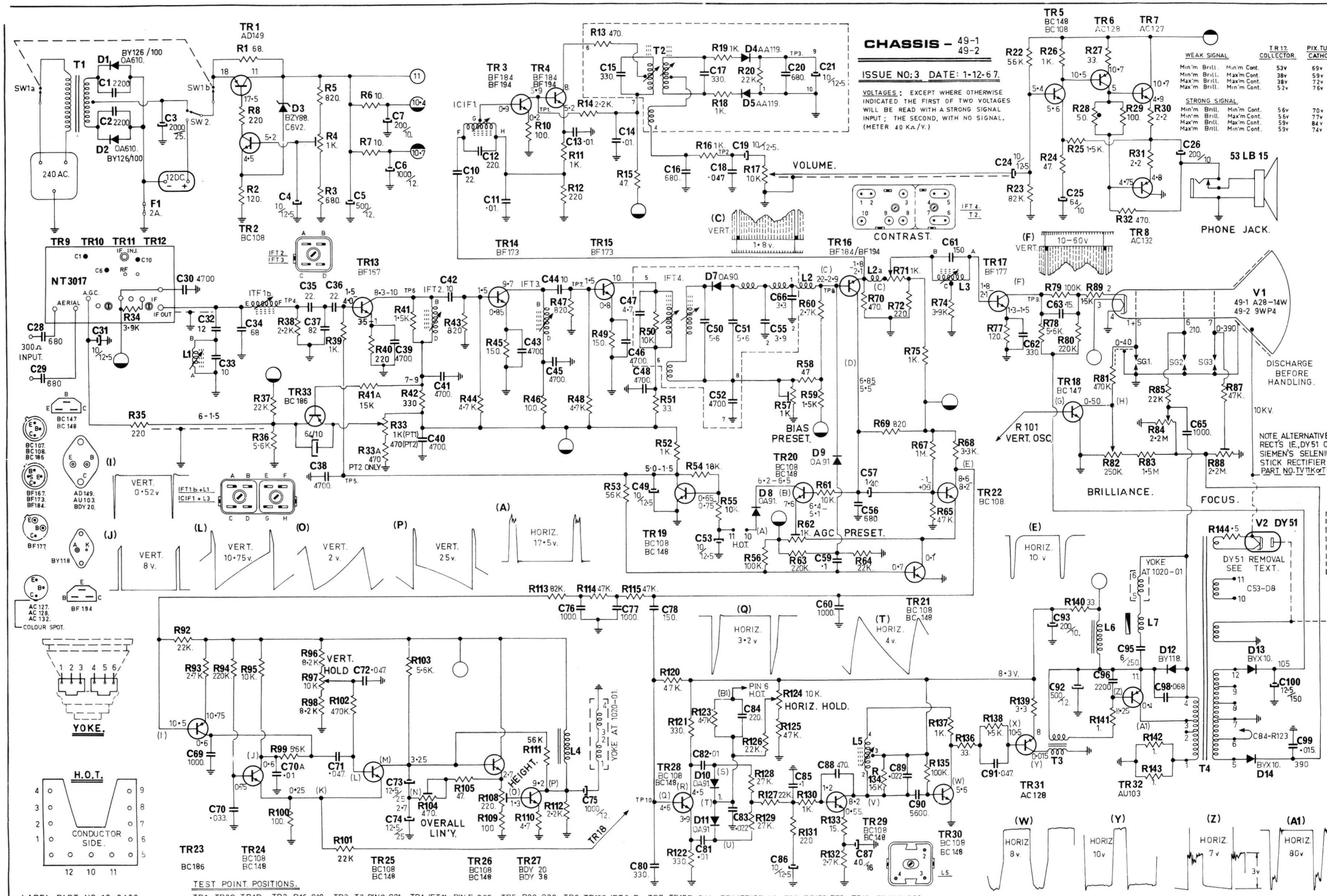
Wiring Deletion:
D6 anode to TR13 emitter;
D6 cathode to junction of R36/R37.

Service Manual Addition:
Adjustment of Pre-set R4:— With receiver operating normally, adjust R4 to provide 11 volts on the 11 volt supply rail.



**Production Changes shown in this Issue:**

| FROM | TO |
|---|---|
| R33, 1K | 470 (PT2 only) |
| R57, 10K | 1K |
| R58, 680 | 47 |
| R59, 10K | 1.5K |
| R84, 1.5M | 2.2M Preset |
| R85, 47K | 22K |
| R111, 33K | 56K |
| C95, 5 $\mu$F, 250V | 6 $\mu$F, 50V |
| D1, 2, OA610 | BY126/100 |
| DY51 | TV11-K or TV11-S |
| TR3, 4, 16 (BF184) | BF194 |
| TR5, 19, 20, 21, 24, 25, 26, 28, 29, 30, (BC108) | BC148 |
| TR23, 33, (BC179) | BC186 |
| TR27 (BDY20) | BDY38 |




## ADDITIONS:

R33A, 470 10% ½W Carbon (PT2 only)
R89, 1.5K 10% ½W Carbon
C31A, 64 $\mu$F 10V Electro (not designated)
C70A, .01 $\mu$F 25V Ceramic

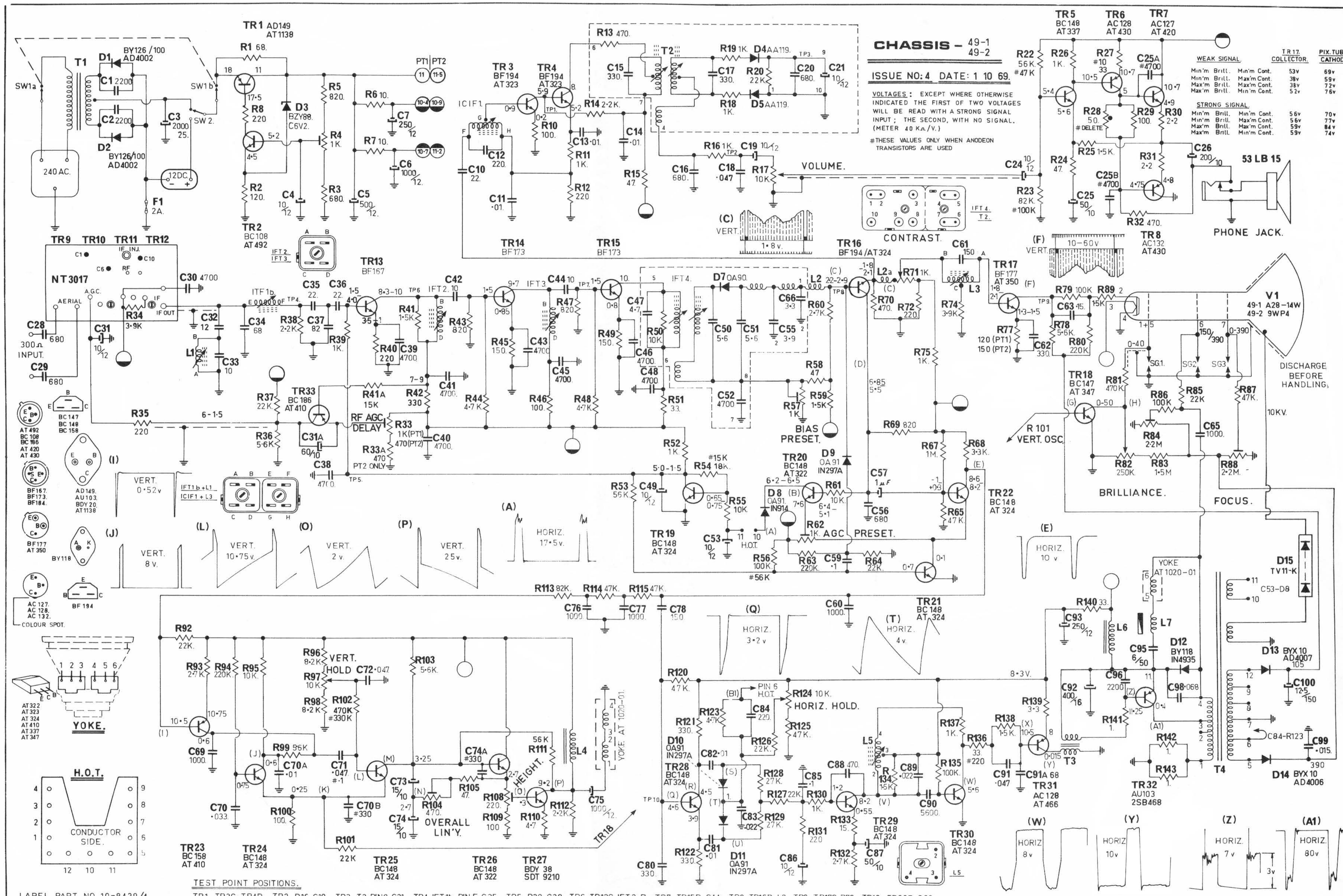
## DELETIONS:

R86, 2.7M
R107, 47K Top Lin Control
C54, 10 $\mu$F 12.5V Electro

C64, 100 pF
C94, 2200 pF
C97, 2200 pF

**Production Changes shown in this Issue:**

| FROM | TO |
| --- | --- |
| R77, 120 | 150 (PT2 only) |




## ADDITIONS:

**R86, 100K 10% ½W Carbon**

**Anodeon Transistor Conversion. See Service Notes No. 43 and the Issue 4 circuit diagram.**