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Issue 1
August 1984

Main Chassis Information

(including preset adjustments, alignment and circuit description)

PC1150

The TX100 chassis is an advanced technology product catering for a wide range of models and facilities. By varying the component make up, the single board chassis is capable of driving various sizes of 90° and 110° picture tubes.

High levels of safety, reliability and ease of servicing have been attained with the TX100 chassis. Apart from a small area which is protected by safety covers, the chassis is fully isolated from the mains, thus permitting the addition of peripheral facilities without further isolation. Reliability is improved by a lower component count, a large number of which are automatically inserted employing the latest production techniques. Servicing is made easier by a reduction in the number of preset adjustments and simplified test procedures, for example auto black level setting is provided by the luma/chroma IC, thus removing the presets from the video drive stages.

The TX100 chassis will accept additional modules for remote control, teletext, baseband stereo sound and other facilities to be included in certain models. The chassis is extendable for RF stereo sound should a suitable system be launched by the broadcasting authorities. By adding a small printed circuit board the chassis will accept Peri television input/output facilities. Connecting pins for most of the facilities are already provided.

Contents

CONCISE SPECIFICATION

The specifications for remote control, teletext etc., are given in the relevant sections of this manual.

POWER SUPPLIES

Nominal: 240V a.c. 50Hz. The chassis is fully mains isolated and is stabilized across mains voltage range 185V to 265V for less than 0·75% change in picture size. No mains input adjustment is required.

POWER CONSUMPTION

240V a.c. supply

90° Tube: Typically 65W with normal picture; 80W at 1mA beam current; 55W at zero beam current.

110° Tube: (30AX) Typically 80W with normal picture; 90W at 1mA beam current; 68W at zero beam current.

FREQUENCY COVERAGE

UHF channels 21-68
471·25MHz-847·25MHz (vision carriers)

TUNER

Electronic varicap with voltage stabilization and AFC.

SENSITIVITY

30μV p.d. into 75Ω (60μV emf) with a locked colour picture.

MAXIMUM SIGNAL INPUT

Any channel 20mV at aerial input for 1% cross-modulation.

VISION IF

Adjacent channel (vision) 31·5MHz. Sound carrier 33·5MHz. Chroma sub-carrier 35·07MHz. Vision carrier 39·5MHz. Adjacent channel (sound) 41·5MHz.

AUDIO OUTPUT

2·7W rms into 16Ω at less than 5% THD

PICTURE TUBES

90° Type: In-line with integral saddle/toroidal self-convergence deflection yoke.

110° Type: (30AX) In-line with integral saddle/saddle self-convergence deflection yoke.

110° Type: (S4) In-line with integral saddle/toroidal self-convergence deflection yoke.

BEAM CURRENT LIMITING

1mA ±10%

EHT

Zero beam current: 25kV maximum for 90° tube (26·5kV for 110° tube).

1mA beam current: 22·7kV for 90° tube (24kV for 110° tube).

The above figures are subject to ±0·7kV tolerance.

INSTALLATION

Mains Connection

The receiver operates from a.c. mains supplies 185V-265V 50Hz. No input adjustment is required.

The chassis is isolated. As indicated on the top printing, an area of the printed circuit board carries live mains and this is protected above and below by plastic covers which should not be removed unless absolutely necessary.

Fuse

FS1 mains input T1A6 (20mm cartridge type).

Degaussing

The built-in degaussing circuit operates whenever the receiver is switched on from cold, neutralizing all but the most severe cases of magnetization.

On installation, the receiver may be manually degaussed with an external coil should this be considered necessary.

Aerial

A wide bandwidth aerial is required and careful siting and orientation are necessary for the best signal strength with freedom from ghosting on all available channels. This is particularly important when installing a receiver fitted with teletext facilities. Low-loss 75Ω coaxial feeder should be used.

Varicap Tuning

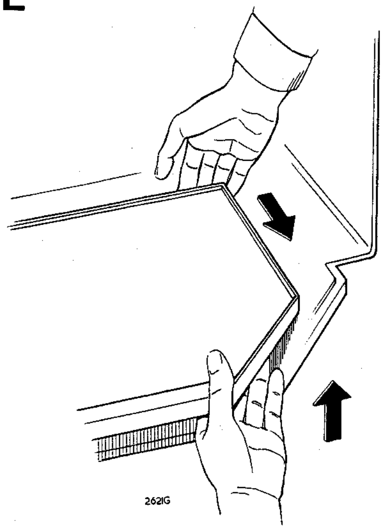
The location of the tuning potentiometers and the method of defeating the AFC depends on the particular model. However, in most cases the AFC is automatically defeated whilst gaining access to the tuning potentiometers.

Switch on and select the desired programme number. Ensure that the AFC has been defeated and operate the tuning potentiometers to obtain the required station. Tune to between loss of colour and patterning. Finally check that no change to tuning occurs with the AFC on or off and readjust if necessary to achieve this.

ACCESS FOR SERVICE

Removing Cabinet Back

The cabinet back moulding hooks into slots in the cabinet base, and is held at the top by either plastic screws or by a simpler fixing using a barb and catch arrangement. The catch is released by inserting a screwdriver into the slot provided, and pushing down on the barb whilst pulling the back away from the cabinet at the top. Swing back the top to free the moulding from the slots in the cabinet base.



Chassis Removal

The chassis frame is positioned in the bottom of the cabinet by lugs on either side of the frame which locate in slots at the bottom of the cabinet. The chassis is latched into the cabinet base by a lip on each of the rear lugs.

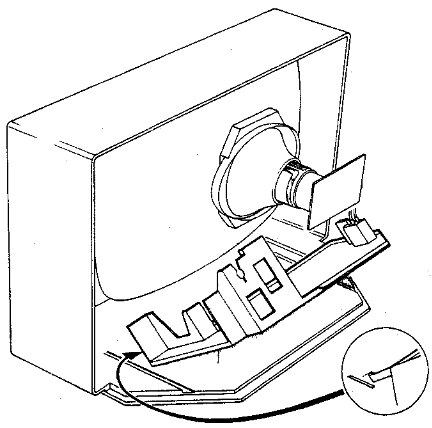
To remove the chassis, lift the right-hand side rear of the chassis frame in order to delatch it. With the other hand, push the right-hand side front of the chassis frame towards the rear of the cabinet; refer to diagram. Repeat this procedure with the left-hand side of the chassis frame after which the chassis may be removed or fitted into the servicing position.

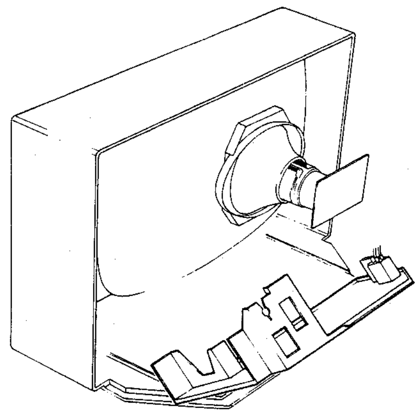
Chassis Servicing Position

The chassis may be fitted into a sloping position to enable the printed circuit board to be easily serviced whilst in an operational mode, both component and copper sides being accessible. The two protruding lugs at the front of the chassis frame slot into the cabinet base. Two positions are available; refer to diagram.

SAFETY COVERS

Moulded plastic covers, one above and one underneath the printed circuit panel, give protection over the live mains area of the chassis. If removed for servicing, adequate precautions must be taken until they are replaced.





SERVICING NOTES

Removal of Components. To avoid damage to the copper track when removing components, it is advisable to use a solder wick and not a solder sucker. In addition, it should be noted that many components have been automatically inserted into the printed boards and this process involves bending of the leads underboard prior to soldering. Therefore to remove these components it is recommended that their leads be cut above the board and the soldered remains removed from below.

Replacing chopper and line output transistors TR6 and TR10. These transistors are mounted on heatsinks. The transistors are secured to the heatsinks by spring clips. To remove the clip, simply press it out from the inside of the heatsink. It is not necessary to remove the heatsink from the PCB.

Before replacing the transistors, inspect the insulating washers and replace if necessary. Secure the transistors to the heatsink by pressing the spring clip firmly in position.

Replacing ICs Mounted on Heatsinks. In the majority of cases, when replacing the ICs that are mounted on heatsinks, it is easier to remove both the heatsink and IC from the PCB, then remove the IC from the heatsink. Before replacing the IC, clean off the old heatsink compound from the heatsink and insulating washer (if fitted), and apply fresh compound to both sides. Always ensure the IC retaining screw is secured tightly.

Integrated Circuits. All ICs are vulnerable to static damage unless properly mounted in printed circuit boards or in approved packing.

They must be handled with care and must not be loosened, removed from or inserted into a live circuit.

Touch an earthed object before handling any IC or PCB and use an earthed soldering iron.

Replacement ICs are specially packed in conductive material, which may be plastic.

Keep ICs in transit packing until used and when returning suspect devices under guarantee, always protect them in the original packing.

Do not use non-conductive plastic such as polystyrene even for temporary storage of ICs.

SERVICING ADJUSTMENTS

The following preset adjustment procedures are not required during installation and should be made, only if necessary, after servicing.

WARNING

EHT Shock Hazard

The EHT must be safely discharged before attempting to disconnect the EHT lead from the tube anode.

Clip one end of a convenient lead, such as a meter lead, to the tube earthing strap on the tube body, fold back the suction cap and discharge the EHT through the lead.

Press in one side of the spring clip which projects into the tube cavity to ease removal of the EHT connector.

IMPORTANT

Do not disturb the tube neck adjustments as these have been set for optimum performance during tube manufacture.

Before attempting the following adjustments the receiver should be tuned if possible to a test card with the brightness, contrast and colour controls adjusted for the best picture, unless stated otherwise.

Receivers fitted with remote facilities should be normalized by switching off and on again before adjusting the preset controls. On certain receivers some of the analogue controls, i.e., brightness, contrast etc., may be presets on the remote control receiver board.

The adjustments should be carried out in the following order for convenience.

Set HT (RV13)

Turn contrast and brightness controls to minimum for zero beam current. Check voltage at pin 5 of LOPT with a 20kΩ/volt meter of 2% accuracy. If necessary, adjust RV13 for 119V (90° tube) or 148V (110° tube). Adjust contrast and brightness for best picture.

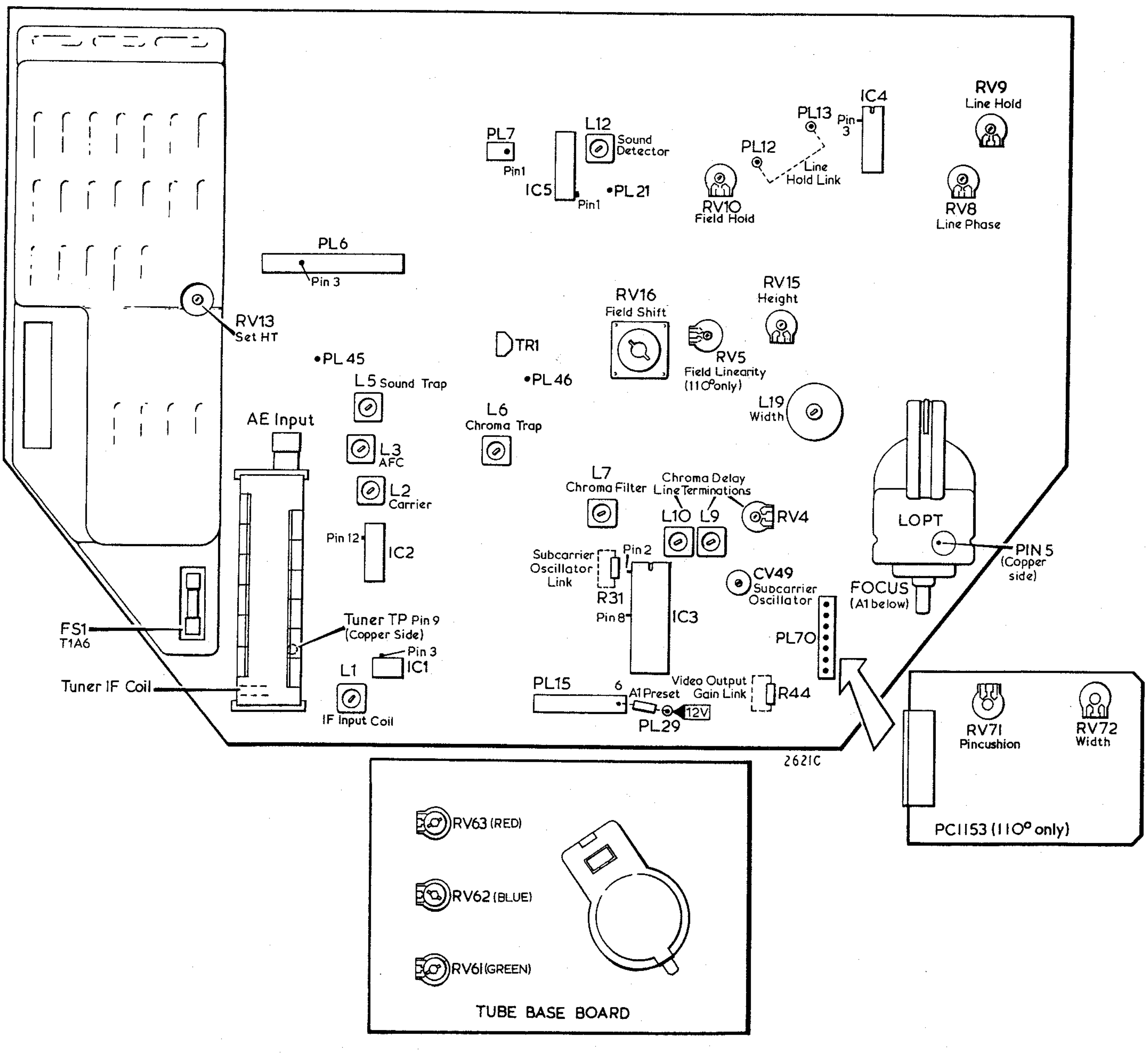
Picture Geometry

Line Hold (RV9)

Link PL12 and PL13 together. Adjust RV9 for the best floating but resolved display attainable. The display will lock when the link is removed.

Field Hold (RV10)

RV10 is a factory preset adjustment which is set for 46Hz free running at pin 3 of IC4 with sync removed by linking PL12 to PL13.



DVM Method

Turn RV10 fully counter-clockwise. Turn RV10 clockwise until field just locks; measure volts on pin 3 of IC4. Continue turning RV10 clockwise until lock is just lost; again measure volts on pin 3 of IC4. The approximate position of RV10 is halfway between the two voltage measurements taken.

Alternatively

If a DVM or oscilloscope is not available, adjust as follows:-
Starting with RV10 fully counter-clockwise, adjust for a steady picture and note the positition. Continue rotation until the picture suddenly increases in height. Then back off until approximately half way between these two positions.

Pincushion (RV71-110° only)

Adjust RV71 for straight verticals at the edges of the display.

Field Linearity (RV5-110° only)

Adjust RV5 for best field linearity at the top and bottom of the display.

Line linearity is fixed.

Picture Shift (RV8 and RV16)

Adjust Line Phase RV8, and Field Shift RV16 to centre the display.

Picture Size (L19, RV72 and RV15)

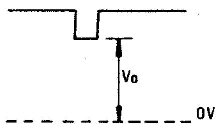
Adjust Height control RV15 in conjunction with Width control L19 for 90° or RV72 for 110°, for full scan consistent with a correctly proportioned display.

Focus

Adjust for optimum overall resolution.

A1 Preset

Ensure that the A1 preset is at mid position.
Blank out the picture by connecting PL15 pin 6 to PL29 (12V) via a 1·5kΩ resistor.
Connect the oscilloscope locked to frame rate, to the tab of one of the video output transistors TR61, TR63 or TR65.
Referring to the diagram, measure Vo for each of the video outputs and note which one has the highest value.
Adjust the A1 preset to make the highest value of Vo noted equal 150V.
Remove the oscilloscope and shorting link.



Alternatively:

With a normal picture displayed, ensure that the A1 preset is at mid position. Rotate the A1 preset clockwise until the picture begins to lose contrast and note the position of the screwdriver slot.

Rotate the A1 preset counter-clockwise until the picture again begins to lose contrast or loses one colour, and note the position of the screwdriver slot. The approximate position of the A1 preset should be midway between the two noted positions of the screwdriver slot.

Grey Scaling Procedure

Video Output Gain (RV61, RV62 and RV63)

The video output gain presets RV61, RV62 and RV63 should be at about mid-position before grey scaling.
Disable the beam limiter by connecting a shorting link across R44.
Turn the contrast control to maximum and the brightness control to a little less than mid position.
Connect the oscilloscope to the tab of one of the video output transistors and adjust the appropriate gain preset for 100V black to white. Repeat for the other two colours and then remove the shorting link across R44.

Alternatively:

Ensure that the three video output gain presets RV61, RV62 and RV63 are set to mid position.

Highlights Final Adjustment

With a suitable picture displayed inspect the highlights for colouration.

If green, turn down RV61.

If red, turn down RV63.

IMPORTANT: Do not readjust the blue output gain preset RV62. If highlights are blue, turn up red and green presets.

CIRCUIT ALIGNMENT

Unless it is known that a panel is misaligned or that tuning components have been replaced, all other causes for a particular fault condition should be checked before realignment is considered. Receivers fitted with remote control facilities should be 'normalized' by switching off and on before proceeding.

Equipment Required

Where appropriate, an alternative method of adjustment is given to cover situations where suitable test equipment is not available.

1 An IF wobbulator with markers.

2 An AM signal generator with an output impedance of approximately 75Ω, and with an accurate frequency calibration covering a range of at least 1MHz to 45MHz.

3 An FM signal generator with an output impedance of approximately 75Ω, and with an accurate frequency calibration covering the range 4MHz to 6MHz.

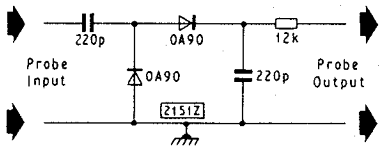
4 An oscilloscope capable of displaying 100mV at 6MHz.

5 A multirange meter (20kΩ/V) such as the AVOmeter Model 8.

6 Non-metallic trimming tools and a suitable tool for adjusting sub-minature potentiometers.

7 A 100kΩ linear potentiometer and a 10nF capacitor.

8 A detector probe such as the one shown below.



Preliminaries

Test connections can be soldered to the copper side of the printed circuit board (with the receiver switched off); lead lengths should be kept to a minimum.

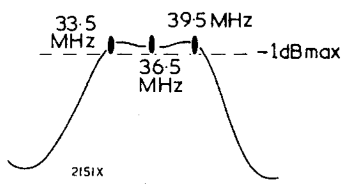
Tuner Output and Vision IF

Tuner IF Output Coil and Input Coil (L1) Bandpass

Wobbulator Method

Connect the output lead from the wobbulator (terminated with 75Ω) between pin 9 of the tuner and earth. Connect the input of the detector probe to pin 4 of IC1 with the earth wire soldered to L1 can. Connect the probe output to the oscilloscope. Link PL45 to earth in order to mute the detector IC (IC2).

Set the wobbulator centre frequency to 36·5MHz and the output to maximum, and switch on the receiver. Adjust the wobbulator 'Y' gain to give a full scale display. Switch on markers at 39·5MHz and 33·5MHz. Adjust the tuner IF output coil and the input coil (L1) bandpass for a symmetrical response centred on



The markers should be no more than 1dB down the slope. No further adjustments are necessary.

Spot Frequency Method

Connect the output of the signal generator between pin 9 of the tuner and earth. Link PL45 to earth and connect the detector probe between pin 3 of IC1 and earth as for the wobbulator method. Feed the detector probe output into the oscilloscope 'Y' amplifier, set to d.c.

Set the signal generator to 38.9MHz. Turn up the generator output and adjust the oscilloscope 'Y' amplifier gain for a satisfactory indication (shift of trace). Remove L1 input coil core and adjust the tuner IF coil for maximum output at 38.9MHz. Insert L1 input coil core. Set the signal generator to 35MHz and tune L1 for maximum output. (Note: L1 has two peaks, the correct tuning position is with the core below the former and can top). Without removing the core repeat the two adjustments as necessary to ensure the output at these two frequencies is the same. Switch off the receiver and disconnect the generator, probe and earth link.

Continued . .

Carrier (L2) and AFC (L3) Coils

To set these coils an accurate signal source is essential. Connect the terminated signal generator between pin 9 of the tuner and earth and set the frequency to 39·5MHz. Connect a 100kΩ linear potentiometer connected as a variable resistance between PL45 and earth. Connect a meter set to d.c. between PL46 and earth.

Switch on the receiver, and with zero output from the generator, adjust the potentiometer until noise just disappears from the TV screen. Then increase the output from the generator until the d.c. level drops down below the nominal zero output 6V level. Adjust L2 for maximum output at the carrier frequency (minimum voltage reading) and adjust the generator to make the reading approximately 4V d.c.

With the same signal input, remove the potentiometer and using a digital voltmeter or AVOmeter (25V range) adjust L3 until the voltage on pin 3 of PL6 is the nominal 6V level.

Switch off the receiver and disconnect the generator and meter.

Sound IF

6MHz Sound Trap (L5)

Spot Frequency Method

Switch off receiver.

Link PL45 to earth.

Connect the generator (terminated with 75Ω and d.c. isolated with 10nF) between IC2 pin 12 and earth. Connect the oscilloscope between the base of TR1 and earth.

Switch on the receiver. Set the signal generator to full output and the frequency to 6MHz CW. Tune L5 for minimum deflection at 6MHz on the oscilloscope screen.

Remove oscilloscope, generator and earth link.

Alternatively:

Operate the receiver with a colour signal applied to the aerial input (standard colour bars if available). Connect the oscilloscope between PL46 and earth.

Set L5 core flush with the top of can and then turn downwards through loss of colour until colour is restored. Then adjust for minimum sound-chroma beat on the TV display (corresponding to minimum 6MHz on the oscilloscope).

Sound Detector (L12)

If it is suspected that the Vision IF alignment has been disturbed, the latter should be checked before adjusting L12.

FM Signal Generator Method

Switch off the receiver and link PL45 to earth.

Connect the FM signal generator (terminated with 75 Ω and d.c. isolated with 10nF.) between IC2 pin 12 and earth.

Connect the oscilloscope set to 0·5V/cm sensitivity between PL21 and earth.

Set the generator frequency to 6MHz 50kHz deviation, level about 10mV. With the receiver switched on, adjust L12 for maximum symmetrical sine wave display on the oscilloscope. Pin 3 of IC5 is independent of the volume control setting. At maximum volume the sound just clips at around the 2·7W level on PL7/1.

The ceramic filter CF1 is non-adjustable. If it is required to check its response, keep the signal generator connected as above, switch to CW, and connect the oscilloscope probe between pin 1 of IC5 and earth.

Adjust the output level of the generator in conjunction with the 'Y' gain of the oscilloscope until a measurable waveform is displayed. Now swing the generator frequency slowly from 5·9MHz to 6·1MHz and check that the amplitude of the waveform does not change by more than about 6dB.

Alternatively:

Plug in an aerial feed and tune to a suitable signal. Coarsely tune L12 so that the programme sound is heard and then adjust L12 for minimum video buzz and maximum recovered sound.

4·43MHz Chroma Trap (L6)

With an off-air colour signal applied to the aerial input (standard colour bars if available), and the oscilloscope probe connected to the junction of C27-R22-R23, adjust L6 for minimum burst.

Alternatively:

Adjust L6 for minimum chroma patterning on the picture with the colour control at minimum.

Chroma Input Filter (L7)

Spot Frequency Method

Switch off receiver.

Link PL45 to earth.

Connect the generator (terminated with 75Ω and d.c. isolated with 10nF) between PL46 and earth. Connect the oscilloscope via a 10pF capacitor, between the junction of C29, C30, R24 and R26 and earth.

Switch on receiver.

Set the signal generator to 4·43MHz. Tune L7 for maximum peak at 4·43MHz on oscilloscope screen.

Remove the generator, oscilloscope and earth link.

Alternatively:

Measure the d.c. volts on pin 2 of IC3. Display a locked colour picture and adjust L7 for maximum d.c.

NOTE: The meter must not load pin 2 appreciably.

Chrominance Adjustments

The following setting up instructions are carried out with the receiver operated from an off-air colour bar signal or UHF colour bar generator connected to the aerial socket.

Set the customer controls as follows: brightness to the centre of its range, contrast and colour to approximately two-thirds of their maximum setting.

Subcarrier Oscillator (CV49)

Short circuit R31 in order to override the colour killer and colour control. Whilst looking at a colour picture, attenuate the aerial signal. Using a non-metallic trimming tool, adjust the trimmer CV49 to achieve colour lock on the weakest signal possible, occasionally interrupting the signal in order to indicate correct colour pull-in.

Reconnect the aerial and disconnect the short circuit.

Alternatively:

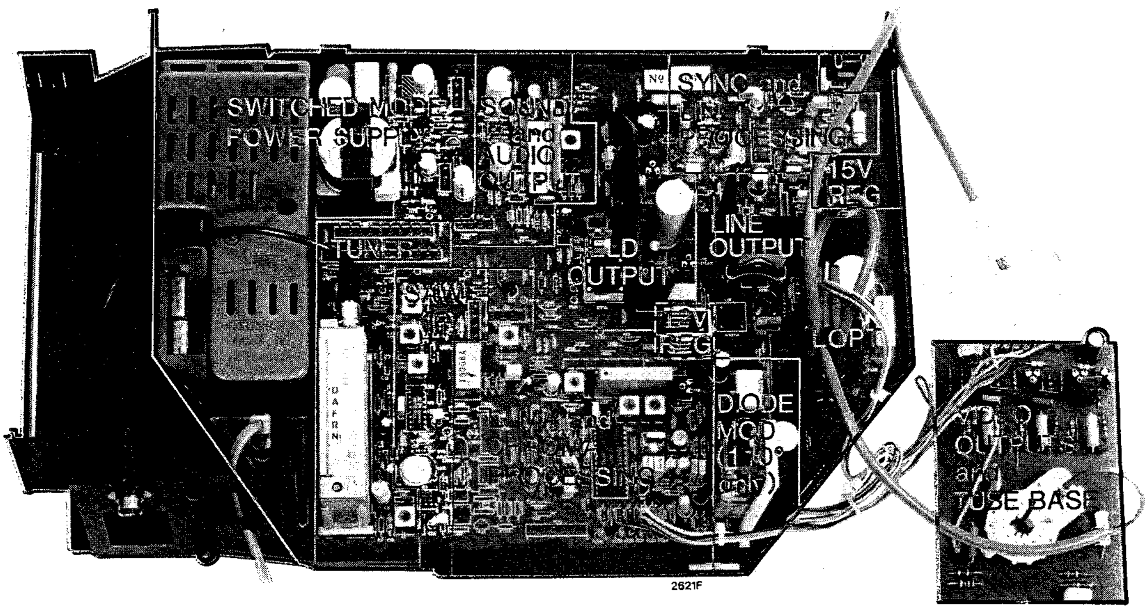
Short circuit R31 and link pins 24 and 25 of IC3 together. Using a non-metallic trimming tool adjust CV49 for zero frequency run through. Remove the links.

Chroma Delay Line Terminations (RV4, L9 and L10)

Set L10 core one and a half turns down from the top of the former and adjust RV4 and L9 for minimum venetian blind effect. In a very few cases balance may be unattainable by adjustment of L9. If so, adjust L9 for the best setting and trim L10 for balance.

Circuit Description

MAIN CHASSIS (PC1150)



General Indication of Circuit Locations

GENERAL

The isolated power supply is a switched mode type using a TDA4600-2 (IC7) as the control IC, with a T9063V (TR6) chopper transistor. To eliminate the need for a separate standby transformer in remote control models, a relay, RL1 is fitted. This is de-energised during standby to break the main HT supply (119V).

The electronic varicap tuner is band-pass coupled to the SL1432 (IC1) preamplifier which drives a SW153 (SF1) SAW filter. The main IF gain detector, AFC and AGC circuits, are contained within the TDA3540 (IC2).

The complete sound stage IF and audio is within a single TDA1701 (IC5).

A TDA3562A (IC3) performs luma/chroma processing as well as providing direct input for digital signals with fast blanking ability, together with auto black level setting.

Wide band class A video output stages are mounted on the tube base PCB, the only adjustments being for the gain controls to set correct white level.

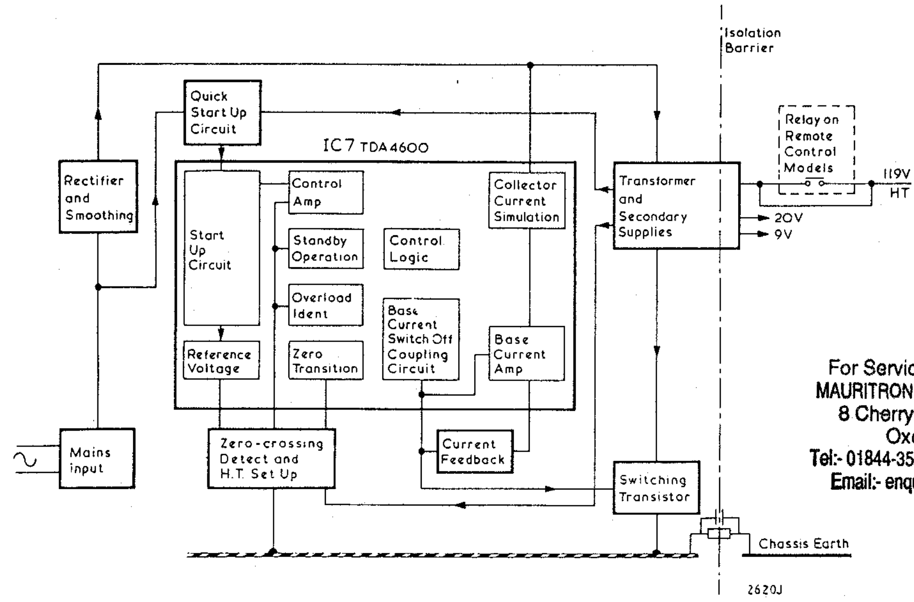
The video signal from the IF is taken through filters to the TDA2578A (IC4). In addition to performing all the synchronization, IC4 also provides 50Hz/60Hz detection and height adjustment, and a video transmitter ident circuit for sound mute when no sync is present.

IC6, which contains the whole field stage, differs between the 90° tube and the 110° tube versions. The heatsink and a number of components change value but the basic circuit is common. The only adjustments are for height and d.c. field shift. An output from IC6 is used by the TDA2578A (IC4) to sense field timebase operation and blank the CRT in the event of the timebase failing.

The line drive from IC4 is used to drive the line timebase via a low voltage transistor and driver transformer circuit, feeding a diode-split line output transformer. The LOPT provides EHT, focus and A1 volts, tube heater supply, and the mains low voltage supply of 12V via an IC regulator. The circuit differs between the 90° tube and the 110° tube versions. The 90° version is designed to drive pincushion distortion free tubes and has no diode modulator. The width control is by a variable inductor. The 110° version boosts the basic 119V power rail and has a plug-in diode modulator PCB to provide E-W raster correction and width control. The LOPT (T3) differs between the 90° tube and the 110° tube versions of the receiver.

The circuit description which follows is for both the 90° tube and 110° tube versions of the basic chassis, and is not specific to any one particular model.

POWER SUPPLY



The isolated power supply is a switched mode configuration; IC7 being the control IC and TR6 the chopper transistor. At zero beam current the main HT rail for 90° tube receivers is 119V, set by RV13. RV13 is adjusted to give 148V as the boost rail on 110° tube receivers. There are two LT supply rails; one for 20V and one for 9V.

The mains input is fed via the bridge rectifier circuit D5-D8 and smoothing capacitor C110, to the chopper transformer T1. Switch-on current limiting resistor R106 also supplies the silicon controlled rectifier (SCR) quick start circuit. SCR1 anode is fed via R116, and the gate is fired from the a.c. supply via R117 and R118.

During the positive half-cycle SCR1 switches on, charges up C119 and supplies start-up current to pin 9 of IC7. The start-up is thus set by the R116/C119 time constant. Once IC7 is activated, a supply of nominally 12V is fed from T1 via D12, to pin 9 of IC7. This voltage is higher than that supplied via SCR1 and is thus higher than the SCR gate voltage which is set by D11. D10 is therefore forward biased and the SCR gate is driven negative with respect to its cathode. On the next a.c. negative half-cycle, SCR1 turns off.

IC7 has its own start-up sequence to ensure correct switching of the chopper transistor TR6 from the first cycle of operation. The sequence is as follows:

The start-up enables the coupling capacitor C117 charging circuit, and an internal reference of 4V is built up. The current drawn from the supply is approximately 3mA.

This internal reference voltage is switched to all sections of the IC when the input voltage from D12 reaches its normal 12V.

The control logic is then enabled and drive to the chopper transistor TR6 commences. Should the voltage at pin 9 of IC7 drop below 7V, the control logic will be blocked and the base current amplifier drive will be disabled.

A facsimile of the collector current flowing in TR6 is provided by R115 and C118 at pin 4 of IC7. C118 is allowed to charge up whilst the transistor is on and is discharged when the transistor is switched off. The sawtooth-shaped rise at pin 4 of the IC is impressed on the base current amplifier within the IC, and is used to drive the switching transistor via pins 7 and 8, providing a base current proportional to the collector current. The sawtooth waveform also provides current limit information. D14 and R134 are incorporated in the circuit to reduce the rate of discharge of C120, thus assisting the transistor operation. This is especially useful during standby.

On receivers fitted with remote control, the chopper supply is left operative in the standby condition so that the remote circuit can be powered from the receiver 20V supply line. A relay is used to disconnect the main HT rail, thus preventing the rest of the circuitry of the main chassis from operating. In this state, the operational frequency of IC7 increases to 60kHz due to the reduction of loading. R122 provides a minimum loading in the standby state so as to ensure that IC7 remains within its operating curve. The 9V rail is mainly used to power teletext circuitry and TR7 disconnects this rail in the standby mode.

TUNER AND IF

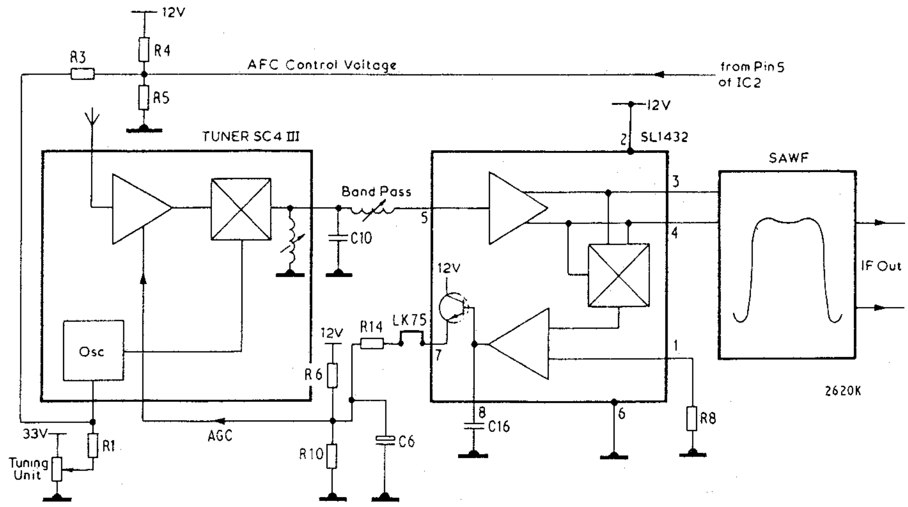
The SC4 Mark III tuner output drives the IF preamplifier IC1, via bandpass coil L1. The preamplifier provides not only the necessary gain block between the tuner and Surface Acoustic Wave Filter (SAWF) SF1, but also supplies a broad band AGC signal to the tuner via R14, the level being preset by R8 and an internal resistor chain, to maintain conditions equal to a 1·5mV signal input at the aerial socket.

The main chassis is multi pierced for a standard 'T08' SAWF and also for a parallel sound SAWF. The output from the SAWF is fed to the IC2.

IC2 consists of an AGC controlled IF amplifier which has an overall gain of 60dB resulting in a sensitivity of only 60μV for the onset of IF AGC. The AGC has a control range of 64dB.

The AGC detector compares the top of synchronisation with an internal 3V reference. Any deviation from 3V changes the charge on the storage capacitor C22, at pin 14. This change, reflected at pin 3, is smoothed by C18 and applied to the internal IF amplifier block.

If a negative going noise spike causes the video output to reduce to below 1·8V, a noise gating circuit generates two outputs. One reduces the current from the AGC detector so as to minimise any spurious AGC action, whilst the other is



applied to the noise inverter where it causes the video to be clamped at 3·8V for the duration of the noise spike.

The synchronous demodulator is a type in which the video modulated IF is multiplied by its own carrier, giving an exact replica of the original video with little, or no, non-linear or quadrature distortion. The output signal is also free of odd harmonics.

The reference amplifier is tuned by L2 and C23. Since the internal collector circuits cause very little clamping, the tuned circuit has a very high loaded Q. Internal diodes are fitted in parallel with the circuit, thus limiting the amplitude of the reference signal and avoiding radiation problems.

Since any mistuning will produce phase errors, the AFC circuit has a double balanced comparator with a portion of the reference signal being a.c. coupled. The required capacitance is very low and is actually formed by inter-track capacitance on the PCB. The other input being fed by L3 and C25. If the two signals are in quadrature, the AFC demodulator does not generate any output. Any frequency deviation of the IF carrier causes a phase difference between the two inputs, thus causing a proportional change of current at pin 5 of the IC. This variation is converted to a delta voltage at pin 5 of the tuner by R3, Z1 and R1 and the tuner unit. The AFC is defeated by taking IC2 pin 6 below 1·6V, which reduces the current at pin 5 of the IC to zero.

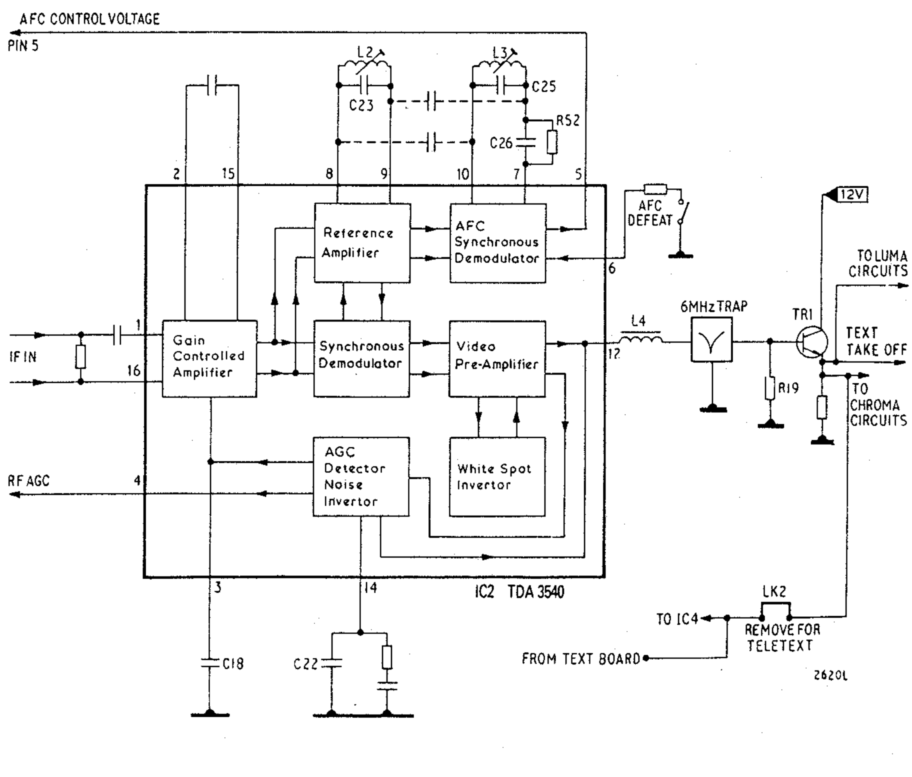
Because of the asymmetric noise spectrum, due to the Nyquist slope, C26 and R52 are added to make the noise symmetrical, as seen by the AFC circuit.

The video output is protected from interference by a white spot inverter and if any noise pulse with an amplitude greater than 6·8V is received, the video output is clamped to 4·7V for the duration of the pulse.

The video feed to emitter follower TR1 base is via choke L4 and 6MHz bridge-T sound trap L5 and associated components. L4 reduces capacitance loading on the output so that any residual harmonics are kept to a minimum. R19 is incorporated to damp the quadratic factor of the trap so that the video response is flat to 5.2MHz.

When teletext is incorporated, take-off is via PL19 pin 5 which incorporates the required insertion for After Hours Synchronisation (AHS). The emitter follower TR1, is included to ensure optimum text performance.

The fact that a parallel sound SAWF can be accommodated has already been mentioned and the PCB is also pierced for parallel sound using a TDA 2525 and a buffer, so that the sound IF may be supplied to standard stereo processing circuits.



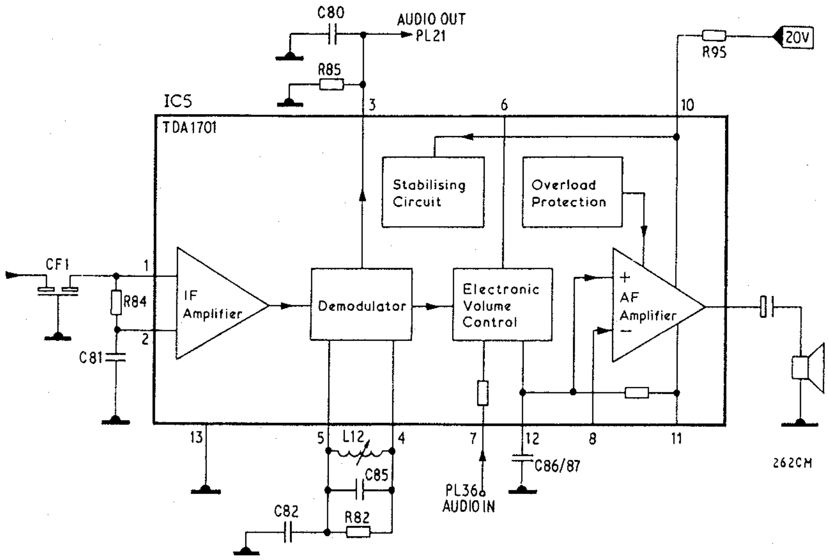
SOUND IF AND AUDIO

The special heatsink for IC5 enables the IC to develop 2·7W RMS audio power into 16 ohm loudspeakers.

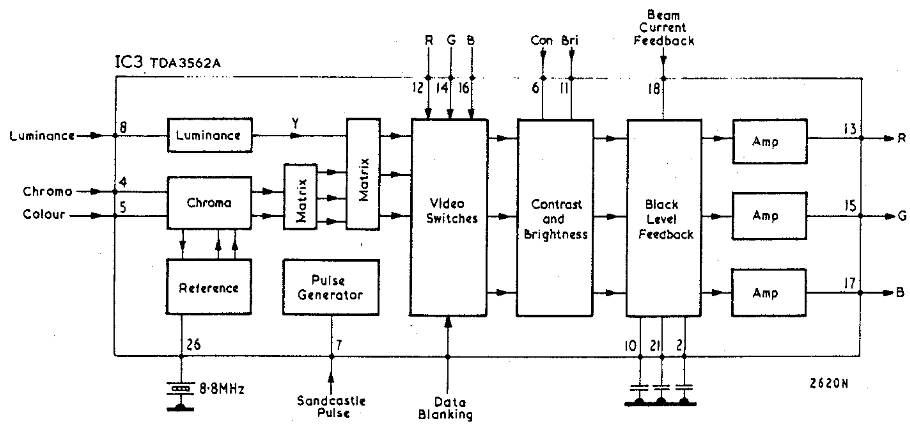
The 20V supply feed is applied to pin 10 of IC5 via safety resistor R95. Composite video plus intercarrier sound, is fed direct from the vision IC2 to the ceramic filter CF1. The output of the filter is connected to the input of IC5. PL35, on pin 2 of IC5, is provided for a sound IF input muting connection when the IC is fed from an external audio source via PL36.

By adjustment of RV11, the volume is controlled electronically by varying the d.c. voltage feed to pin 6. Tone controls, when fitted, are connected via PL16. If treble and bass controls are fitted, LK3 and C86 are removed. R91 and C93 are incorporated to ensure stability under all conditions by providing the necessary phase shift. An audio output, unaffected by the receiver volume control, is provided at PL21.

IC5 contains internal overheating protection; when it reaches a temperature of 150°C, the output stage shuts down until the temperature decreases.



VIDEO/CHROMA PROCESSING AND VIDEO OUTPUT



In addition to providing luma/chroma processing, IC3 eliminates the need for the three background adjustment controls as an automatic beam current adjusting system is incorporated within the IC. Another feature of IC3 is that the inserted RGB signals are contrast controlled.

Luminance

After passing through the delay line DL2, the luma signal is applied to IC3 at pin 8. Before being passed to the matrix circuits, the luminance component is black level clamped and an artificial black level is then added. Contrast and brightness control is carried out after the matrixing process.

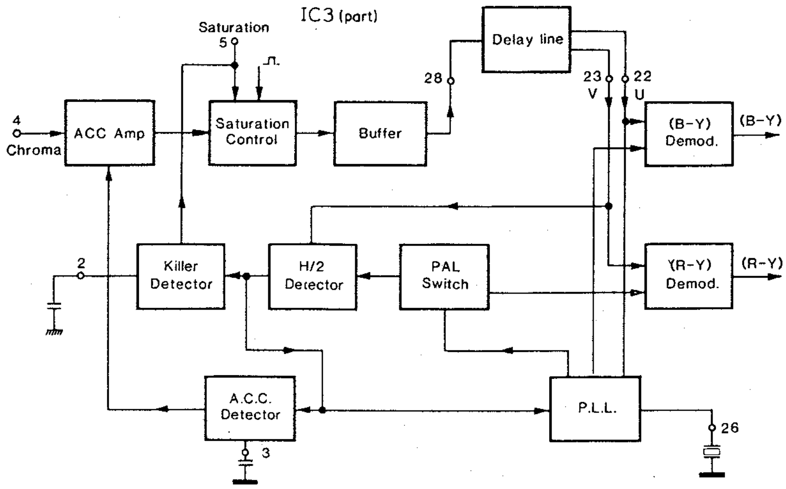
Chrominance

After filtering out the chroma signal from the composite video, it is applied to pin 4 of IC3. After ACC and amplification processing, the chroma signal leaves via pin 28 and passes through the chroma delay line DL1.

Up to this point the chroma signal amplitude has been affected by adjustment of the colour control but because the chroma delay line is inside the ACC loop the amplitude of the burst remains unaffected by the colour control as the burst amplitude is maintained at a constant level by the ACC loop.

The chroma delay line separates the chroma into its U and V components which are then returned to IC3 via pins 22 and 23 respectively. Subcarrier phase control is achieved by reference to the U signal. The crystal oscillator is a one-pin configuration, connected to pin 26. The oscillator operates at twice subcarrier frequency in order that the 90° phase shift necessary between the U and V references can be achieved digitally, that is, without external components. Ident, ACC and colour killing are achieved conventionally by using the subcarrier phase control error signal.

After demodulation, the R-Y and B-Y are matrixed to give the G-Y, and these three signals are then applied to the RGB matrix block where luminance is added.



2602P

Video Amplifiers

Once the RGB signals have been produced, an internal switch selects either these internal RGB signals or external signal data applied to pins 12, 14 and 16. The choice is governed by the voltage applied to pin 9; 0V for internal, 1V for external data. The selected signals are then contrast and brightness controlled after which they are amplified and finally passed through black level feedback clamping circuits, leaving IC3 on pins 13, 15 and 17.

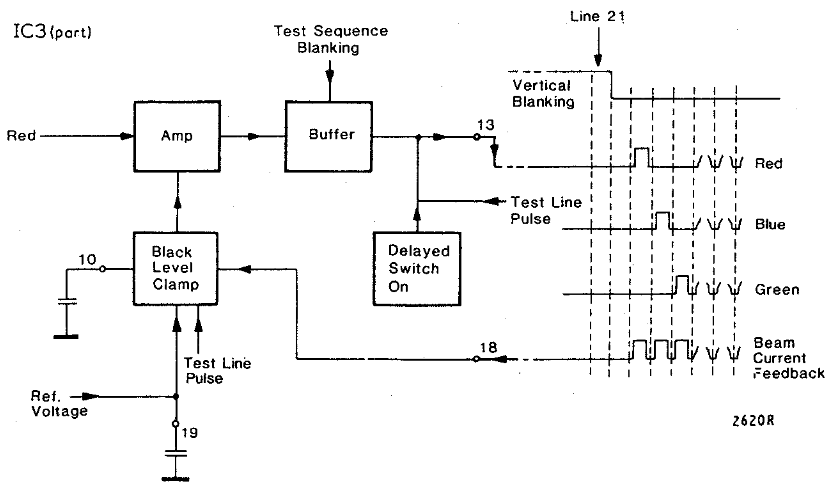
Automatic Black Level Adjustment

This system, also known as automatic CRT cut-off, replaces the background adjustments that are found in conventional receivers. Since each gun will require a different cathode voltage for cut-off, this system automatically sets these voltages. It achieves this by sending out a test line and adjusting the cathode voltage to produce a beam current of approximately 10μA for the duration of the test line. Cut-off is therefore, not absolute. Although very faint, 10μA beam current is nevertheless visible, and the test lines are therefore inserted at the top of the picture during lines 23, 24 and 25. These lines are produced in IC3 by first blanking the video and then inserting a pulse during line 23 for the red gun, line 24 for the blue and line 25 for the green. This portion of the picture is normally lost due to overscan.

Beam current control is therefore carried out sequentially with the video output circuit arranged to detect beam current. During the test lines, pin 18 of the IC3 changes state internally. The video amplifiers provide approximately 5 volts to pin 18, this being proportional to the beam current. Should this voltage be outside the predetermined limits, the feedback amplifiers inside IC3 modify the output voltage until the result is inside the limit. The error signals are then stored on external capacitors C45, C50 and C51, so that the state remains constant until the next set of test lines one frame later.

After switching on, the CRT takes time to warm up. Under the arrangement just described, the 10μA would initially be missing. IC3 would sense that the CRT was not being driven hard enough and would adjust the cathode voltages, effectively to peak white. As the CRT warmed up, the effect would be that of a peak white raster slowly drifting down to a normal picture as the automatic system took control. To avoid this undesirable state of affairs, a special start-up sequence is used.

Immediately after switch on, IC3 transmits a series of test lines, approximately 20 per field. As soon as beam current is detected, the test lines are switched off and an internal timer is enabled. The picture is blanked for the duration of the timer; four seconds approx., during which time the warm up of the CRT is completed. When the timer sequence ends, normal operation is resumed and the picture information is released to the CRT.



2620R

VIDEO OUTPUT AMPLIFIERS

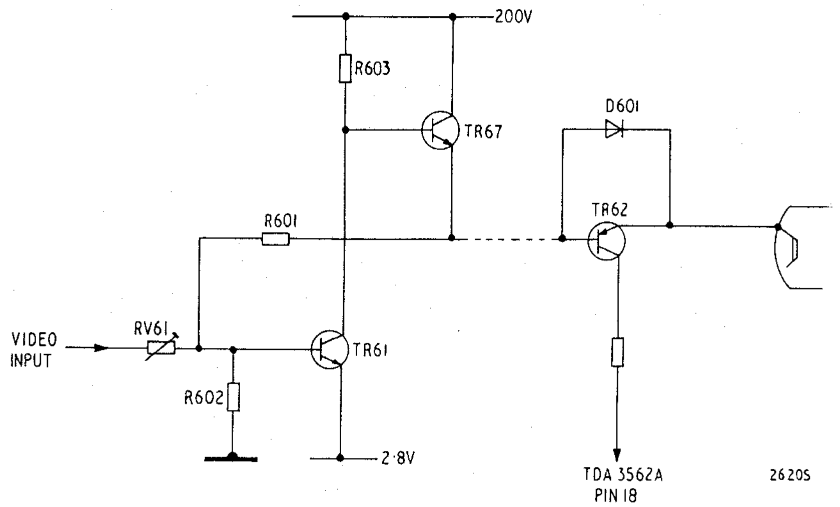
The video output amplifiers are fitted on the tube base PCB.

Since the three amplifiers are identical, reference will be made to the green channel for description purposes.

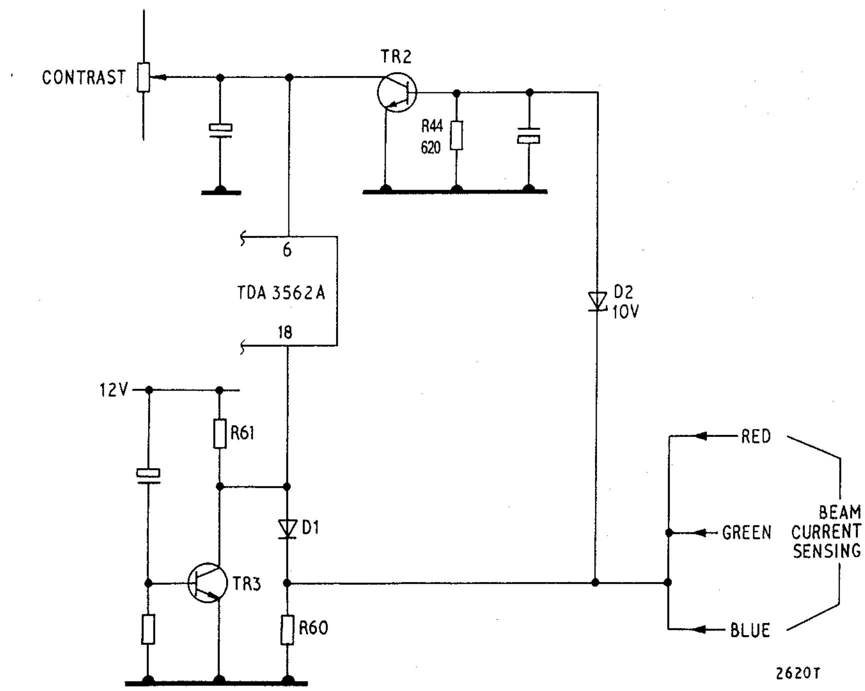
Amplifier TR61, with high value load resistor R603, is assisted by emitter follower TR67. The gain is stabilised by feedback through resistor R601 and set by the ratio R601:RV61 to about 20.

TR62 senses the beam current. Under steady state conditions, beam current flows out of the CRT cathode, through TR62 and thence to the network connected to pin 18 of IC3. Under dynamic conditions, the cathode voltage is raised by current flowing through TR67 and D601 into the cathode capacitance. The cathode voltage is lowered by current flowing out of the cathode capacitance through TR62. This current is controlled by the voltage on the base of TR62. It can be seen, therefore, that when charging up the cathode capacitance, TR62 is reverse biased, thus beam current cannot be sensed.

The video amplifiers have a swing of 100V from black level to peak white.



BEAM CURRENT LIMITING

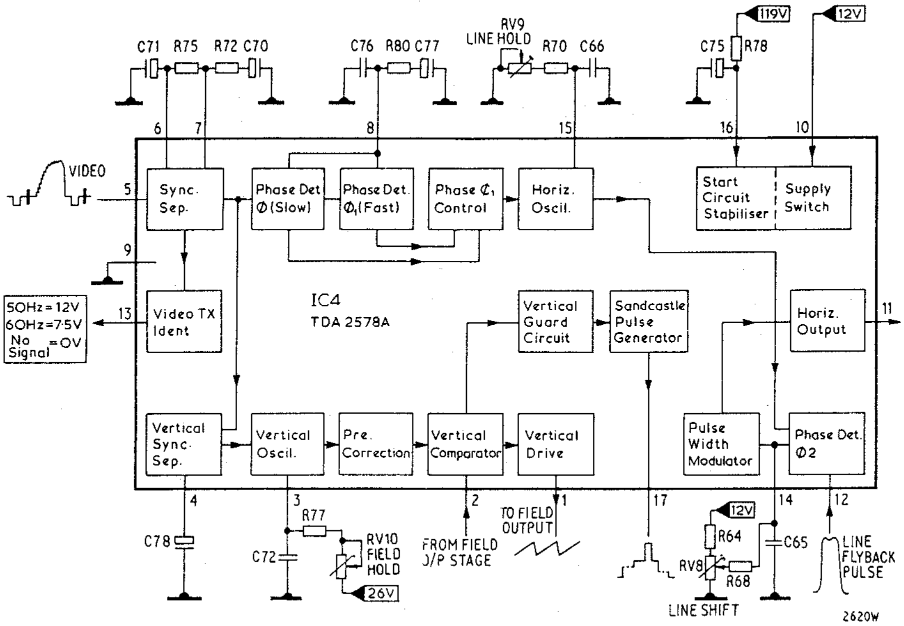


Beam current is presented to pin 18 of IC3 via diode D1. During switch-on there are many stray currents associated with rising supply lines which could confuse the logic on pin 18. To prevent this, pin 18 is shorted to ground by TR3 for the first 1·5 seconds after switch on. Beyond this time, TR3 plays no part and can be considered as open circuit.

For most of the frame period, pin 18 of IC3 is isolated from the beam current by D1. Total beam current from the CRT cathodes pass through R60 producing a voltage across it. When this voltage exceeds 10V, D2 is turned on and the beam current flow is through D2 and R44. The voltage developed across R44 finally turns TR2 on and pulls the contrast control voltage down. This in turn, reduces the beam current, and the loop is completed. Beam current limits at approximately 1mA.

When the test lines, to which reference has previously been made, are transmitted for the automatic black level system, pin 18 of IC3 is switched on internally. 10μA of beam current then flows into the network R61, D1 and R60 generating about 5V, this then stabilises the background loop. 5 volts is insufficient to turn on D2 and the beam limiter circuitry is therefore disconnected.

SYNC PROCESSING, LINE AND FIELD OSCILLATORS



IC4 combines the functions of a noise gated sync separator, line and field oscillator and sandcastle pulse generator. It takes the composite TV signal and extracts the vertical and horizontal sync pulses. These are then utilised to synchronise its own internal line and field oscillators.

Horizontal Oscillator

The horizontal oscillator with its peripheral components C66, R70 and RV9 on pin 15, and output at pin 11, can start operating at a low supply current, typically ⩾4mA at pin 16, and is thus fed direct from the main HT rail. At 4mA the voltage at pin 16 is 5.5V and the line oscillator will start under these conditions. The duty factor of the horizontal output signal during this start up period is approximately 65%. At this stage pin 10 of IC4 is at zero potential since the line derived 12V supply is fed via a delay stage (TR12 and associated components) to ensure correct start up procedure for the IC.

The start of other IC4 functions is dependent on this main 12V supply at pin 10. As the supply volts rise, at the 5·5V point all IC functions with the exception of the second phase detector (oscillator to flyback pulse) start working. The output voltage of the second phase detector at pin 14 is clamped internally, ensuring that the duty factor of the line drive at pin 11 stays at 65%.

As the voltage on pin 10 rises to 8·8V, the supply current for the line oscillator and output stage is now delivered via pin 10, freeing pin 16 of most of its load and allowing it to rise and stabilise at 8·7V. This change removes the clamping on pin 14 and this activates the second phase detector. From this point on, the automatic correction for switch off delays (storage time) in the horizontal output stage is operative. Good stability is achieved by means of two feedback loops. In the first loop, the phase of the horizontal sync signal is compared with a waveform, of which the rising edge is referred to the top of the horizontal oscillator signal. In the second, the phase of the flyback pulse, which is derived from the collector of the line output transistor, is fed to pin 12 and compared with another reference waveform—the timing of which is such that the top of the flyback pulse is situated symmetrically on the horizontal blanking interval of the video signal.

The first phase detector is gated with a signal composed of the flyback pulse and a pulse derived from the horizontal output signal. This gating (slow time constant) is switched off during the acquisition of a signal. The output current of the phase detector is increased fivefold during this acquisition time and also under VCR conditions (fast time constant).

This means that the first loop has good noise immunity, whilst the second loop can be as fast as desired for compensation of switch off delays in the horizontal output stage.

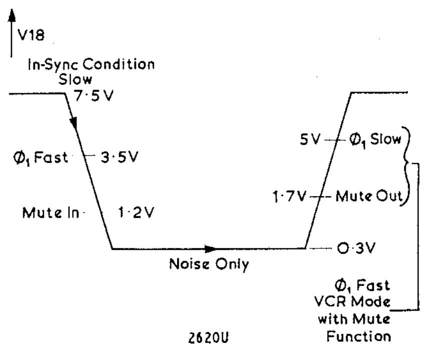
The first phase detector is inhibited during the retrace time of the vertical oscillator.

Horizontal picture shift is achieved by charging or discharging C65, connected to pin 14 of IC4.

Video and Sync Separator

Composite video is fed to pin 5 of IC4 via the low pass filter R63 and C63. The slicing level of the sync separator is set by R75 connected between pins 6 and 7. This level is independent of the amplitude of the sync pulse at the input of the IC. Nominal black level is 3·1V, the amplitude selective noise inverter becomes operative at 0·7V.

Vertical sync separation is accomplished with the aid of C78 on pin 4 of IC4.



The 'in-sync', 'out-of-sync', or 'no video' condition is detected by a valid signal identification/coincidence detector circuit at pin 18 of IC4. The voltage on pin 18 defines the time constant and gating of the first phase detector. To obtain correct operation of the IC for VCR and other AV functions, pin 18 is forced to a particular d.c. voltage by R69. If 12V is applied to the base of TR11 by selection of AV either at a channel selector button or by remote control, TR11 conducts and effectively earths R69. Thus under off-air reception conditions, the voltage at pin 18 is 6·9V. For AV operations the voltage is reduced to 3·0V.

Continued . . .

If the valid signal identification circuit senses that there is no valid signal available, it pulls pin 13 low, causing D23 to effectively mute the sound. The muting function is equally applicable when the incoming signal, or lack of it, is VCR derived.

Pin 13 of IC4 is a tri-state pin. One of the operating conditions being as described previously, that is with the pin at zero potential, sound muting is achieved. The other two states will be described later.

Vertical Oscillator

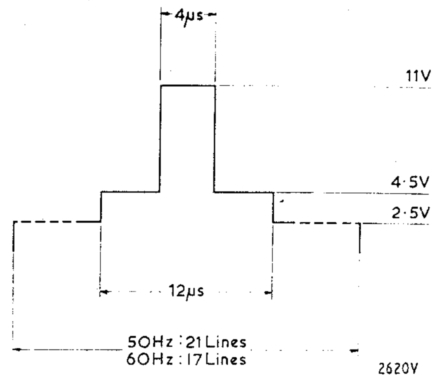
IC4 also contains a synchronised vertical oscillator and sawtooth generator. The oscillator signal is connected to the internal comparator, the other side of which is connected to pin 2 via an inverter and amplitude divider stage. The output of the comparator drives an emitter follower output stage internally connected to pin 1. To ensure a linear sawtooth at the oscillator, the load resistance at pin 3, R77 and the frame hold control RV10, is fed from the 26V supply and is connected directly to the charging capacitor C72. This ensures that the sawtooth amplitude is not affected by the supply at pin 10.

Feedback from the frame output stage is applied at pin 2 of IC4, and is compared with the sawtooth signal at pin 3. To optimise linearity and minimise picture bounce, the sawtooth signal is internally pre-corrected by 6% (convex), referred to pin 2. The linearity of the vertical deflection current depends on the oscillator signal at pin 3 and the feedback signal at pin 2.

A stabilised 6·5V reference source is provided within IC4 for the supply and reference of the vertical oscillator and comparator stage. This minimises interaction between horizontal and vertical components within the IC.

The output drive signal from pin 1 is also modified by the 50Hz/60Hz detector internally. This involves tri-state pin 13. Reception of a normal valid 50Hz signal leaves this pin at 12V whilst a valid 60Hz signal causes it to drop to 7·5V. The amplitude from pin 1 is thereby adjusted so that the picture height remains constant whilst in either mode.

IC4 also incorporates a vertical guard circuit, which monitors the vertical feedback signal at pin 2. If this level falls below 3·35V, or rises above 5·15V, the guard circuit inserts a continuous level of 2·5V into the sandcastle output signal at

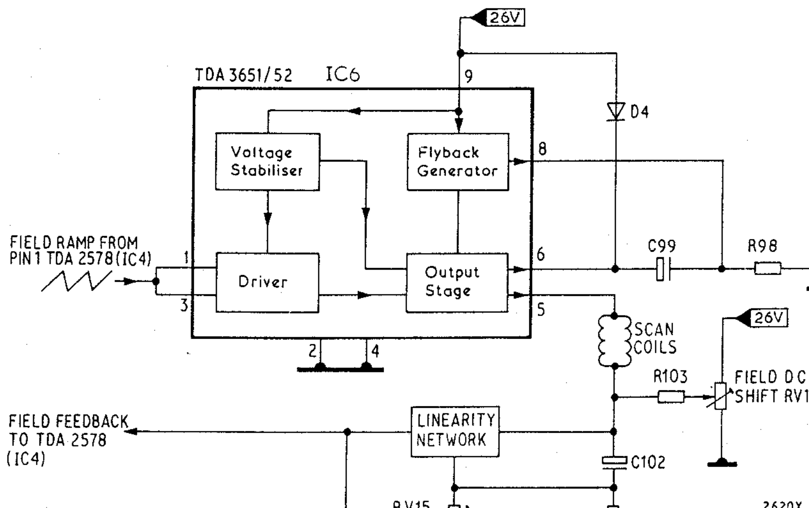


pin 17. This will result in complete blanking of the screen. The sandcastle pulse generated at pin 17, has three different levels. The highest level 11V, is used for burst gating and black level clamping. The second level 4·6V, is obtained from the horizontal flyback pulse at pin 12 and is used for horizontal blanking. The third level 2·5V, is used for vertical blanking and is derived by counting the horizontal frequency pulses. For 50Hz the blanking pulse duration is 21 lines, for 60Hz it is 17 lines. The blanking pulse duration and sawtooth amplitude are automatically adjusted via the 50Hz/60Hz detector.

FIELD OUTPUT STAGE

The field output stage comprises the field output IC6, a linearity/feedback network, d.c. shift and the appropriate feeds to the diode modulator stage in the 110° receiver. The field output IC6 is a TDA3651 for the 90° tube version and a TDA3652 for the 110° tube version. The ICs differ only in mechanical construction, and in the peak to peak current they can deliver to the scan coils. The drive signal from IC4 is connected to pin 1 and pin 3 which is also the input of a switching circuit. When flyback starts, this switching circuit rapidly turns off the lower output stage and so limits turn-off dissipation. It also allows the flyback generator to quick start.

In order to scan from a comparitively low supply rail, a flyback generator is incorporated in the IC. During scan, C99 at pin 6, is charged to a maximum voltage which is equal to the supply voltage of 26V applied to pin 9. When the flyback starts and the voltage at the output pin 5 exceeds that at pin 9, the flyback generator is activated. Then the supply voltage is connected in series, via pin 8, with voltage across C99. The voltage at the supply pin 6 of the output stage would then be twice the supply voltage. R98 on pin 8 adjusts this voltage so that the maximum rating of the IC is not exceeded.

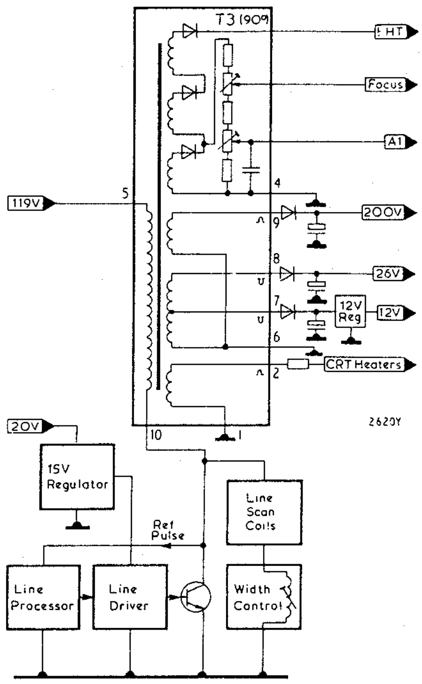


A thermal protection circuit is incorporated within the IC to protect against too high a dissipation. This circuit is active at 175°C which then reduces the deflection current in order to decrease dissipation.

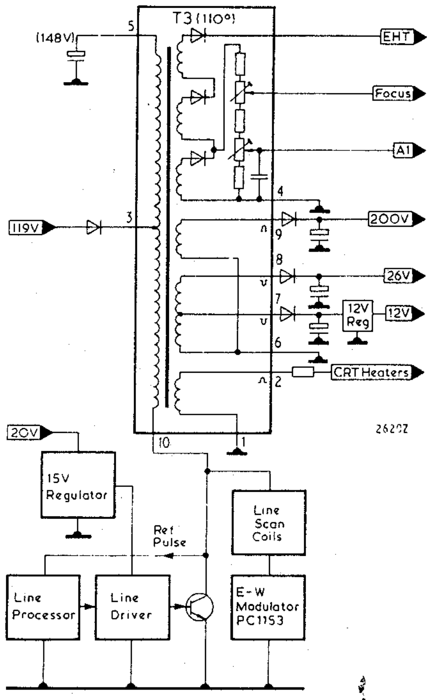
The output waveform from pin 5 is connected to the scan coils, then to the coupling capacitor, and finally to the feedback resistor R105. The height potentiometer is connected across this resistor and feeds back, via R99, to the summing point of the linearity adjusting network R100, R101, R102, C101. R102 is fixed in 90° tube versions but is replaced by RV5 in 110°. The feedback is finally returned to the comparator at pin 2 of IC4.

Vertical picture shift is accomplished by bleeding in d.c. from RV16 and R103 to one side of the scan coils.

LINE OUTPUT STAGE



90° Tube Receivers



110° Tube Receivers

The line drive from IC4 is a.c. coupled to the line driver transistor TR8. IC9 provides a regulated 15V supply derived from the 20V rail of the switched mode power supply. The regulator has internal current limiting at 500mA and thermal shutdown protection, making the driver stage safe under fault conditions.

The driver transformer T2 provides all the necessary drive and base current shaping for the line output transistor TR10. R129 and C127 limit the peak collector voltage on the driver transistor TR8.

The diode split line output transformer T3 provides the line scan current and EHT. T3 also generates the following four supply lines from auxiliary windings:

Pin 9 provides the video output supply of 200V, rectified by D19 and smoothed by C130.

Pin 7 is the small signal 16V supply, rectified by D21 and smoothed by C135 and further processed by IC8 to produce 12V. IC8 contains current limiting and thermal overload protection. A take-off from pin 7 of the transformer, via R135, also provides a negative going line reference pulse for auxiliary control circuitry.

Pin 8 provides the frame output stage 26V supply, rectified by D25 and smoothed by C136.

Pin 2 is the CRT heater a.c. supply. Since not all CRTs have identical heater current requirements, the series resistor R622, which may be varied in value, is fitted on the CRT base PCB.

The line output transformer T3, also rectifies two variable supplies internally for focus and A1 potentials. Two presets on the line output transformer assembly control these supplies, which are fed directly to the CRT base PCB.

The 90° tube version of the chassis has an HT supply of 119V. During flyback, both the line output transistor TR10, and the recovery diode D26, are off and the LOPT T3 is tuned by C134. Immediately after flyback, TR10 is turned on and both TR10 and D26 conduct. As the line scan current becomes positive, D26 turns off, leaving TR10 to complete the rest of the scan. C137 couples the line scan coils to provide 'S' correction.

The network C138, D24 and R138 maintains a constant charge on C137 during flyback at high beam currents. L18 provides linearity correction and is a preset coil which requires no adjustment. L19 is a variable inductor for width adjustment.

The line output stage of the 110° tube version of the chassis differs in that an HT supply of 148V is required. This is achieved by boosting the main HT rail to 148V within the line output transformer, C139 acting as smoothing capacitor. Adjustment is made by the SET HT potentiometer (RV13) for 148V, as measured on pin 5 of T3 at zero beam current.

Some other components change to support the higher scan currents required by 110° CRTs. Inspection of the main circuit diagram will show that it has been drawn for a 90° chassis, with annotations where 110° scanning necessitates changes.

Some CRTs used with the TX100 chassis require East-West raster correction. This is achieved in production by removing link 33 and fitting link 79 instead of L19 and R142 (width adjustment). The diode modulator board PC1153 is then fitted in order to provide the necessary correction.

DIODE MODULATOR BOARD, PC1153 (110° tube versions)

TR71 and TR72 on the diode modulator board PC1153, form a differential amplifier driving directly into the Darlington pair TR73. TR73 is the active element which provides width correction; it is adjusted by RV72.

To overcome the pincushion distortion factor of the CRT, more line width is required at the centre of the frame scan than at the top and bottom. The frame current parabola provides the necessary correction signal and this is fed to TR72 base via R712. TR71 is given an opposing signal via R708 from the pincushion correction potentiometer RV71. RV71 is fed with both frame parabola and frame ramp waveforms, the wiper controlling the proportion of each waveform applied for correction.

The varying influence of TR73, effectively in series with the scan coils, would normally cause the EHT to vary. This is overcome by the use of a diode modulator. The flyback tuning, which controls the EHT, is determined by the series capacitance of C134 and C702. In the first limit case, when TR73 is fully off, the tuning capacitance will be approximately 6·8nF. In the second limit case, when TR73 is fully on, C702 will be short circuited by TR73 through L701 and L702. Thus the tuning capacitance will be determined by C134 only, that is 10nF. Variations within these limits will provide EHT control. D26 and D701 discharge the two capacitors C134 and C702 after flyback, and also share the initial scan current with TR10. The tracking of this circuit with width variation provides a constant level of EHT. L701 stands off the reactance of C703, thus preventing it from affecting the tuning capacitance. C703 passes the major part of the scan current, whilst a proportion is fed to TR73, through L702, for width control.

COMPONENT DETAILS & FUNCTIONS

⚠ **Denotes safety components.**

Main Board (PC1150)

The PCB assembly is not available separately but is supplied as part of the TX100 basic chassis assembly.

90° tube version without remote control (PC1150-001)

90° tube version with remote control (PC1150-011)

110° tube version (PC1150-111)

**These components differ between 90° tube versions and 110° tube versions. The 110° tube versions are shown in brackets.*

RESISTORS

R1 47kΩ 5% 0·25W, R5470-GF02-01RG
Sets the AFC range (with R3 and Z1)

R2 1kΩ 5% 0·25W, R4100-GF02-01RG
AFC defeat switch feed

R3 2·2MΩ 5% 0·5W, R7220-GF05-04RG
See R1

R4 68kΩ 5% 0·25W, R5680-GF02-01RG
AFC reference voltage divider (with R5)

R5 68kΩ 5% 0·25W, R5680-GF02-01RG
See R4

R6 3·3kΩ 5% 0·25W, R4330-GF02-01RG
RF AGC potential divider (with R10)

R8 330kΩ 5% 0·25W, R6330-GF02-01RG
AGC threshold level

R10 1kΩ 5% 0·25W, R4100-GF02-01RG
See R6

R13 390Ω 5% 0·25W, R3390-GF02-01RG
Impedance matching (with C19)

R14 330Ω 5% 0·25W, R3330-GF02-01RG
RF AGC feed

R15 100Ω 5% 0·25W, R3100-GF02-01RG
Video mute feed

R16 680Ω 5% 0·25W, R3680-GF02-01RG
AGC filter (with C22, C24)

R17 2·2kΩ 5% 0·25W, R4220-GF02-01RG
Part 6MHz trap (with L5, C56, C57)

R18 1·5kΩ 5% 0·25W, R4150-GF02-01RG
Video feed to sweep tune board

R19 2·2kΩ 5% 0·25W, R4220-GF02-01RG
Damping for 6MHz trap

R20 100Ω 5% 0·25W, R3100-GF02-01RG
TR1 base feed

R21 470Ω 5% 0·25W, R3470-GF02-01RG
TR1 emitter load

R22 910Ω 5% 0·25W, R3910-GF02-01RG
D L termination and trap isolation (with R23)

R23 910Ω 5% 0·25W, R3910-GF02-01RG
See R22

R24 1·5kΩ 5% 0·25W, R4150-GF02-01RG
Chroma feed pot down (with R26)

R25 39kΩ 5% 0·25W, R5390-GF02-13RG
AGC decoupling (with C18, IC2)

R26 15kΩ 5% 0·25W, R5150-GF02-01RG
See R24

R27 560Ω 5% 0·25W, R3560-GF02-01RG
Luma feed pot down (with R28)

R28 1·5kΩ 5% 0·25W, R4150-GF02-01RG
See R27

R29 39kΩ 5% 0·25W, R5390-GF02-01RG
Part of colour control network (with R30, R31)

R30 15kΩ 5% 0·25W, R5150-GF02-01RG
See R29

R31 68kΩ 5% 0·25W, R5680-GF02-01RG
See R29

R32 47kΩ 5% 0·25W, R5470-GF02-01RG
Contrast control feed

R33 18kΩ 5% 0·25W, R5180-GF02-01RG
Contrast control pot divider (with R34)

R34 68kΩ 5% 0·25W, R5680-GF02-01RG
See R33

⚠ **R35** 10Ω 5% 0·25W, R2100-GXP2-W097
HT fusible resistor

R36 18kΩ 5% 0·25W, R5180-GF02-01RG
Brightness control feed

R37 8·2kΩ 5% 0·25W, R4820-GF02-01RG
Brightness control pot divider (with R38)

R38 100kΩ 5% 0·25W, R6100-GF02-01RG
See R37

R39 390Ω 5% 0·25W, R3390-GF02-01RG
Chroma delay line feed

R40 470Ω 5% 0·25W, R3470-GF02-01RG
Pot divider for D L balance adjustment (with RV4)

R41 470Ω 5% 0·25W, R3470-GF02-01RG
D L 1 impedance matching

R42 100Ω 5% 0·25W, R3100-GF02-01RG
TR2 emitter load

R43 100Ω 5% 0·25W, R3100-GF02-01RG
TR61 base feed

R44 620Ω 5% 0·25W, R3620-GF02-01RG
Beam current sensing resistor

R46 100Ω 5% 0·25W, R3100-GF02-01RG
TR63 base feed

R48 180kΩ 5% 0·25W, R6180-GF02-01RG
Line reference pulse current limiting

R49 4·7kΩ 5% 0·25W, R4470-GF02-01RG
AFC line decoupling (with C17)

R50 15kΩ 5% 0·25W, R5150-GF02-01RG
Start-up delay bias (with R51)

R51 15kΩ 5% 0·25W, R5150-GF02-01RG
See R50

R52 820Ω 5% 0·25W, R3820-GF02-01RG
D.C. feed to pin 7 of IC2

R54 33kΩ 5% 0·25W, R5330-GF02-01RG
Phase detector d.c. load

R55 1kΩ 5% 0·25W, R4100-GF02-01RG
Phase detector damping

R56 33kΩ 5% 0·25W, R5330-GF02-01RG
Phase detector d.c. load

R57 220Ω 5% 0·25W, R3220-GF02-01RG
Data blanking pull-down

R58 15kΩ 5% 0·25W, R5150-GF02-01RG
Part of 12V delay circuit to IC4 (with C62)

R59 1kΩ 5% 0·25W, R4100-GF02-01RG
Sandcastle pulse feed

R60 82kΩ 5% 0·25W, R5820-GF02-01RG
Automatic cut-off bias (with R61)

R61 130kΩ 5% 0·25W, R6130-GF02-01RG
See R60

R62 100Ω 5% 0·25W, R3100-GF02-01RG
TR65 base feed

R63 1·5kΩ 5% 0·25W, R4150-GF02-01RG
Part video low-pass filter (with C63)

R64 47kΩ 5% 0·25W, R5470-GF02-01RG
Part d.c. divider network for line shift

R65 6·8kΩ 5% 0·25W, R4680-GF02-01RG
Part TR11 base bias (with R67)

R66 47Ω 5% 0·25W, R2470-GF02-01RG
24V HT feed dropper

R67 1·8kΩ 5% 0·25W, R4180-GF02-01RG
See R65

R68 82·5kΩ 1% 0·25W, R5825-BM02-08RG
Line shift d.c. feed

R69 270kΩ 5% 0·25W, R6270-GF02-01RG
Coincidence detector level set

R70 36·5kΩ 1% 0·25W, R5365-BM02-08RG
Part line oscillator network (with C66, RV9)

R71 15kΩ 5% 0·25W, R5150-GF02-01RG
Valid signal detector pull-up resistor

R72 82Ω 5% 0·25W, R2820-GF02-01RG
Sync separator time constant (with C70)

R73 9·1kΩ 5% 0·25W, R4910-GF02-01RG
Horizontal output, IC4 pin 11 load

R74 100Ω 5% 0·25W, R3100-GF02-01RG
Horizontal output drive buffer

R75 5·6kΩ 5% 0·25W, R4560-GF02-01RG
Sync slicing level set (with C71)

R76 220Ω 5% 0·25W, R3220-GF02-01RG
Sandcastle pulse output buffer

R77 180kΩ 5% 0·25W, R6180-GF02-01RG
Part field oscillator (with RV10, C72)

R78 18kΩ 5% 2W, R5180-GX02-30RG
HT series dropper for IC4

***R79** 27kΩ 5% 0·5W, R5270-GC05-10RG
(24kΩ 5% 0·5W, R5240-GC05-10RG)
Line fly-back pulse pot divider (with R139, R140, R141)

R80 470Ω 5% 0·25W, R3470-GF02-01RG
Part phase detector time constant (with C77)

R82 82kΩ 5% 0·25W, R5820-GF02-01RG
Damping of sound quadrature coil

R83 470Ω 5% 0·25W, R3470-GF02-01RG
Sound IF input impedance matching

R84 470Ω 5% 0·25W, R3470-GF02-01RG
IC5 input matching

R85 4·7kΩ 5% 0·25W, R4470-GF02-01RG
Part load and de-emphasis for low level audio (with C80)

R86 1kΩ 5% 0·25W, R4100-GF02-01RG
Minimum volume tracking

R87 1kΩ 5% 0·25W, R4100-GF02-01RG
Part of treble control network (with C86, C87, C88, RV12)

R88 150Ω 5% 0·25W, R3150-GF02-01RG
Audio frequency response network (with C91)

R89 39kΩ 5% 0·25W, R5390-GF02-01RG
Audio gain setting (with R90)

R90 5·6kΩ 5% 0·25W, R4560-GF02-01RG
See R89

⚠ **R91** 4·7Ω 5% 0·5W, R1470-GXP5-W090
Audio output damping (with C93)

R92 15kΩ 5% 0·25W, R5150-GF02-01RG
12V supply limiting to IC5 pin 6

R93 470Ω 5% 0·25W, R3470-GF02-01RG
External volume/mute option

R94 1·2Ω 5% 0·25W, R1120-GM02-07RG
Part field output damping network (with R104, C103)

⚠ **R95** 2·2Ω 5% 0·25W, R1220-GXP2-W102
Supply smoothing

R96 6·8kΩ 5% 0·25W, R4680-GF02-01RG
Field ramp drive network (with C95)

⚠ ***R97** 4·7Ω 5% 0·25W, R1470-GM02-19RG
(0·68Ω 5% 0·25W, R0680-GM02-RS29)
26V feed resistor to IC6

***R98** 820Ω 5% 0·25W, R3820-GF02-17RG
(560Ω 5% 0·25W, R3560-GF02-01RG)
Field fly-back boost resistor

***R99** 27kΩ 5% 0·25W, R5270-GF02-01RG
(18kΩ 5% 0·25W, R5180-GF02-01RG)
Part field linearity network (with R100, R101, R102)

***R100** 47kΩ 5% 0·25W, R5470-GF02-01RG
(27kΩ 5% 0·25W, R5270-GF02-01RG)
See R99

***R101** 8·2kΩ 5% 0·25W, R4820-GF02-01RG
(6·8kΩ 5% 0·25W, R4680-GF02-01RG)
See R99

***R102** 510Ω 5% 0·25W, R3510-GF02-01RG
(RV5)
See R99

***R103** 470Ω 5% 0·5W, R3470-GF05-04RG
(220Ω 5% 0·5W, R3220-GF05-04RG)
D.C. feed for field shift

R104 390Ω 5% 0·25W, R3390-GF02-01RG
See R94

***R105** 1·5Ω 5% 0·5W, R1150-GXP5-W090
(0·68Ω 5% 0·5W, R0680-GXP5-W090)
Field output current feedback resistor

R106 1·8Ω 10% 3W, R1180-SW03-W093
Mains surge current limiting

R107 1MΩ 20% 0·5W, R7100-WC05-10RG
Part of RFI suppression network (with C109, L13)

R108 220Ω 5% 0·25W, R3220-GF02-01RG
Start-up timing component (with C112)

R109 1·2kΩ 5% 0·25W, R4120-GF02-01RG
Part of SET HT pot divider (with R110, RV13)

R110 12kΩ 5% 0·25W, R5120-GF02-01RG
See R109

R111 100kΩ 5% 0·25W, R6100-GF02-01RG
Holds standby pin in ON condition

R112 10kΩ 5% 0·25W, R5100-GF02-01RG
Gives 'zero crossing' information to IC7

R113 100Ω 5% 2W, R3100-GX02-30RG
Part delay on 'zero crossing' (with C115)

R114 0·68Ω 5% 0·25W, R0680-GM02-RS29
Ensures correct TR6 base drive

R115 300kΩ 5% 0·5W, R6300-GM05-MU21
Provides facsimile of collector current to IC7 (with C118)

R116 4·7kΩ 5% 4W, R4470-GW04-22RG
Supplies initial start-up current

R117 100kΩ 5% 0·25W, R6100-GF02-01RG
Provides SCR1 gate current (with R118)

R118 100kΩ 5% 0·25W, R6100-GF02-01RG
See R117

Continued . . .

R119 560Ω 5% 0·25W, R3560-GF02-01RG
Zener stand-off resistor, after start-up

R120 1kΩ 5% 0·25W, R4100-GF02-01RG
Pre-load for 9V supply during standby

R121 27Ω 5% 0·25W, R2270-GF02-01RG
Part of TR6 base drive network

R122 6·8kΩ 5% 4W, R4680-GW04-21RG
Pre-load for HT rail during standby

⚠*R123 10MΩ 5% 0·5W, R8100-GF05-RS31
(3·3MΩ 5% 0·5W, R7330-GF05-RS31)
Chassis leakage (with C122)

R124 10kΩ 5% 0·25W, R5100-GF02-01RG
TR7 base bias (with R125)

R125 100Ω 5% 0·25W, R3100-GF02-01RG
See R124

*R126 Replaced by LK77
(47Ω 5% 0·25W, R2470-GF02-01RG)
Part of height network

R127 8·2kΩ 5% 0·25W, R4820-GF02-01RG
TR8 base load

R128 27kΩ 5% 0·25W, R5270-GF02-01RG
TR9 base bias

R129 120Ω 5% 0·25W, R3120-GF02-01RG
Part of T2 tuning (with C127)

R130 150Ω 5% 1W, R3150-GF10-E193
Set relay current

R131 6·8Ω 5% 0·5W, R1680-GF05-04RG
Part of T3 tuning (with C133, L17)

R132 47Ω 5% 0·25W, R2470-GF02-01RG
TR10 base load

R133 0·22Ω 5% 0·25W, R0220-GM02-RS29
26V rail surge limiting

R134 1·2kΩ 5% 7W, R4120-GW07-VM84
Discharges C120 during TR6 ON period

R135 56kΩ 5% 0·25W, R5560-GF02-01RG
Fly-back pulse pot divider (with R137)

R136 1kΩ 5% 1·5W, R4100-GX01-W107
L18 'Q' limiting

R137 39kΩ 5% 0·25W, R5390-GF02-01RG
See R135

*R138 3·3kΩ 5% 0·5W, R4330-GF05-04RG
(Deleted)
Part of 'S' correction damping network (with C137 C138, D24)

*R139 Replaced by LK85
(24kΩ 5% 0·5W, R5240-GC05-10RG)
See R79

R140 100kΩ 5% 1W, R6100-GM10-MU20
See R79

*R141 6·8kΩ 5% 0·25W, R4680-GF02-17RG
(5·6kΩ 5% 0·25W, R4560-GF02-01RG)
See R79

*R142 1kΩ 5% 1·5W, R4100-GX01-W107
(LK79)
L19 'Q' limiting

*R143 27Ω 5% 0·25W, R2270-GF02-17RG
(15Ω 5% 0·5W, R2150-GXP5-W090)
Driver current limiting

Z1 VDR P15 2/1R, 00E5-146-PD1
See R1

Z2 Dual PTC Thermistor, 00E5-147-MU1
Degauss PTC

VARIABLE RESISTORS

RV4 1kΩ Lin. 10mm preset pot., 00E1-131-410-PH1
Chroma D/L balance adjustment

*RV5 Replaced by R102 in 90° chassis
(4.7kΩ Lin. 10mm preset pot., 00E1-131-447-PH1)
Field linearity adjustment

RV8 47kΩ Lin. 10mm preset pot., 00E1-131-547-PH1
Line phase adjustment

RV9 10kΩ Lin. 10mm preset pot., 00E1-137-510-PH4
Line hold adjustment

RV10 220kΩ Lin. 10mm preset pot., 00E1-131-622-PH1
Field hold adjustment

RV13 4.7kΩ Lin. 10mm preset pot., 00E1-131-447-PH1
Set HT adjustment

RV15 100Ω Lin. 10mm preset pot., 00E1-131-310-PH1
Height adjustment

RV16 1kΩ W/W hor. preset pot., 90E1-014-410-EG1
Field shift adjustment

CAPACITORS

C1 100nF +80% −20% 16V, C6100-EW216-MAK6
AFC decoupling

C3 10nF +80% −20% 50V, C5100-EW250-MAK3
AFC defeat line coupling

C5 10nF +80% −20% 50V, C5100-EW250-MAK3
Tuning voltage decoupling

C6 22μF 20% 50V Elec., CE222-MS250-10CG
Tuner AGC voltage decoupling

C7 220nF 10% 100V, C6220-SS310-04CG
Tuning voltage decoupling

C9 100μF 20% 16V Elec., CE310-MS216-10CG
12V rail decoupling

C10 68pF 5% 50V, C2680-GG250-TY16
Bottom end coupling

C11 150pF 5% 50V, C3150-GG250-MAK5
Part preamp input circuit (with C12, L1)

C12 18pF 5% 50V, C2180-GG250-MAP4
See C11

C13 15pF 5% 50V, C2150-GG250-MAJ4
Video shaping

C15 10nF +80% −20% 50V, C5100-EW250-MAK3
IC1 12V supply decoupling

C16 1μF 20% 50V Elec., CE110-MS250-10CG
IC1 AGC decoupling

C17 100nF +80% −20% 16V, C6100-EW216-MAK6
See R49

C18 1μF 20% 50V Elec., CE110-MS250-10CG
See R25

C19 10nF 30% 25V, C5100-TT225-TY14
See R13

C20 100nF 10% 63V, C6100-SS263-17CG
IC2 12V supply RF decoupling

C21 10nF 30% 25V, C5100-TT225-TY14
D.C. feedback loop decoupling

C22 1μF 20% 50V Elec., CE110-MS250-10CG
See R16

C23 56pF 5% 50V, C2560-GG250-SI26
L2 tuning

C24 10nF +80% −20% 50V, C5100-EW250-MAK3
See R16

C25 82pF 5% 50V, C2820-GG250-SI26
L3 tuning

C26 56pF 5% 50V, C2560-GG250-MAJ7
Makes the noise in the AFC circuit symmetrical

C27 10pF 5% 50V, C2100-GG250-TY15
Part of 4·43MHz filter (with L6)

C28 1μF 20% 50V Elec., CE110-MS250-10CG
Luma input feed

C29 10nF 30% 25V, C5100-TT225-TY14
Chroma input feed

C30 120pF 5% 50V, C3120-GG250-MAK5
Chroma filter tuning (with L7)

C31 100nF 10% 63V, C6100-SS263-17CG
Colour control decoupling

C32 47μF 20% 16V Elec., CE247-MS216-10CG
Contrast control decoupling

C33 33μF 20% 25V Elec., CE233-MS225-10CG
HT decoupling

C34 100nF 10% 63V, C6100-SS263-17CG
HT decoupling

C35 22μF 20% 50V Elec., CE222-MS250-10CG
Brightness control decoupling

C36 10nF +80% −20% 50V, C5100-EW250-MAK3
Chroma D/L coupling

C37 10nF +80% −20% 50V, C5100-EW250-MAK3
Chroma D/L matrix drive

C39 470nF 20% 50V Elec., CE047-MS250-10CG
Beam limiter loop damping

C40 27pF 5% 50V, C2270-GG250-TY15
Luminance compensation

C43 4·7μF 20% 50V Elec., CE147-MS250-10CG
ACC time-constant

C44 330nF 10% 63V, C6330-SS263-17CG
Ident time-constant

C45 470nF 10% 63V, C6470-SS263-17CG
Green black level storage

C46 100nF 10% 63V, C6100-SS263-17CG
Phase detector HF filter

C47 2·2μF 20% 25V Elec., CE122-MS225-14CG
Phase detector LF filter

C48 100nF 10% 63V, C6100-SS263-17CG
Phase detector HF filter

C50 470nF 10% 63V, C6470-SS263-17CG
Blue black level storage

C51 470nF 10% 63V, C6470-SS263-17CG
Red black level storage

C52 1μF 20% 50V Elec., CE110-MS250-11CG
Leakage current storage

C53 100pF 5% 50V, C3100-GG250-MAJ7
Twice subcarrier trap

C54 47μF 20% 25V Elec., CE247-MS225-10CG
Start-up delay

C56 330pF 5% 630V, C3330-GG363-RBF9
See R17

C57 330pF 5% 630V, C3330-GG363-RBF9
See R17

C62 22μF 20% 50V Elec., CE222-MS250-10CG
See R58

C63 150pF 10% 50V, C3150-SS250-TY12
See R63

C64 100nF 10% 63V, C6100-SS263-17CG
Coincidence detector filter

C65 47nF 10% 250V, C5470-SS325-04CG
Second phase detector filtering

C66 2·2nF 1% 160V, C4220-BB316-RBF9
See R70

C67 100nF 10% 63V, C6100-SS263-17CG
12V supply decoupling

C68 220μF 20% 16V Elec., CE322-MS216-20CG
12V supply decoupling

C69 10μF 20% 50V Elec., CE210-MS250-10CG
Valid signal detector decoupling

C70 22μF 20% 50V Elec., CE222-MS250-10CG
See R72

C71 1μF 20% 50V Elec., CE110-MS250-10CG
See R75

C72 470nF 10% 63V, C6470-SS263-05CG
See R77

C73 100nF 10% 63V, C6100-SS263-17CG
HT supply decoupling

C74 1nF 10% 50V, C4100-SS250-TY12
Flyback pulse coupling

C75 1μF 20% 50V Elec., CE110-MS250-10CG
HT supply decoupling

C76 330nF 10% 63V, C6330-SS263-17CG
IC4 pin 8 decoupling

C77 10μF 20% 50V Elec., CE210-MS250-10CG
See R80

C78 10μF 20% 50V Elec., CE210-MS250-10CG
Field sync integrating capacitor

C79 33pF 5% 50V, C2330-GG250-TY15
Decoupling capacitor, sound take-off

C80 10nF 30% 25V, C5100-TT225-TY14
See R85

C81 22nF 30% 16V, C5220-TT216-TY25
IF decoupling

C82 5·6pF 10% 50V, C1560-SS250-TY15
Part of sound detector coil tuning

C83 47μF 20% 16V Elec., CE247-MS216-10CG
Ripple decoupling

C84 1μF 20% 50V Elec., CE110-MS250-10CG
Volume control decoupling

C86 6·8nF 20% 25V, C4680-WW225-TY14
See R87

C87 2·2nF 20% 50V, C4220-WW250-TY19
See R87

C88 22nF 30% 16V, C5220-TT216-TY25
See R87

C89 220nF 10% 63V, C6220-SS263-17CG
20V supply decoupling, IC5 pin 10

C90 1000μF 20% 35V Elec., CE410-MS235-21CG
20V supply smoothing

C91 47μF 20% 16V Elec., CE247-MS216-10CG
See R88

C92 22nF 30% 16V, C5220-TT216-TY25
Bass boost capacitor

C93 68nF 10% 63V, C5680-SS263-17CG
See R91

C94 470μF 20% 50V Elec., CE347-MS250-21CG
D.C. blocking, LS coupling

C95 10nF +80% −20% 50V, C5100-EW250-MAK3
See R96

C96 390pF 10% 50V, C3390-SS250-TY12
Parasitic quencher

C97 100nF 10% 63V, C6100-SS263-17CG
26V supply rail decoupling

C98 220μF 20% 35V Elec., CE322-MS235-01CG
26V supply rail smoothing

C99 100μF 20% 25V Elec., CE310-MS225-10CG
Field flyback boost capacitor

C100 2·7nF 10% 50V, C4270-SS250-MAG1
HF decoupling

*C101 10μF 20% 50V Elec., CE210-MS250-23CG
(3·3μF 20% 50V Elec., CE133-MS250-23CG)
Part of field linearity network

C102 1000μF 20% 25V Elec., CE410-MS225-01CG
Field output coupling capacitor

*C103 100nF 10% 100V, C6100-SS310-MUJ4
(330nF 10% 63V, C6330-SS263-17CG)
See R94

C104 470pF 10% 2kV, C3470-SS420-MAM1
Part diode bridge transient protection network (with C105, C106, C107)

C105 470pF 10% 2kV, C3470-SS420-MAM1
See C104

C106 470pF 10% 2kV, C3470-SS420-MAM1
See C104

C107 470pF 10% 2kV, C3470-SS420-MAM1
See C104

⚠C108 100nF 20% 250V a.c., C6100-WW325-RBF4
Mains filter

⚠C109 100nF 20% 275V a.c., C6100-WW327-RF13
See R107

C110 150μF +50% −10% 385V Elec., CE315-MS338-SM21
334V unstabilised rail reservoir
C111 100nF 10% 400V, C6100-SS340-04CG
334V rail decoupling
C112 22μF 20% 50V Elec., CE222-MS250-10CG
See R108
C113 1μF 20% 50V Elec., CE110-MS250-10CG
Facsimile reservoir capacitor
C114 100pF 5% 50V, C3100-GG250-MAJ7
Frequency stabilizing for overload and no-load
C115 8·2nF 5% 160V, C4820-GG316-LC61
See R113
C117 100μF 20% 16V Elec., CE310-MS216-10CG
Ensures correct base drive to TR6
C118 8·2nF 5% 160V, C4820-GG316-LC61
See R115
C119 22μF 20% 50V Elec., CE222-MS250-10CG
D12 reservoir
C120 1·8nF 10% 1·5kV, C4180-SS415-RF12
Prevents over-dissipation in TR6 by reducing the rise-time of the collector volts.
C121 4·7μF 20% 160V Elec., CE147-MS316-RYH4
119V supply reservoir
⚠**C122** 4700pF 20% 250V AC, C4470-WW325-RF14
See R123
C123 470μF 20% 35V Elec., CE347-MS235-21CG
20V supply rail reservoir
C124 220μF 20% 25V Elec., CE322-MS225-20CG
9V supply reservoir
C125 100nF 10% 63V, C6100-SS263-17CG
TR8 base coupling
C126 330nF 10% 63V, C6330-SS263-17CG
IC9 input decoupling
C127 10nF +80% −20% 50V, C5100-EW250-MAK3
See R129
C128 2·2μF 10% 160V, C7220-SS316-02CG
119V rail decoupling
C129 100μF 20% 160V Elec., CE310-MS316-01CG
119V rail smoothing
C131 100nF 10% 63V, C6100-SS263-17CG
IC8 output decoupling
C132 100nF 10% 63V, C6100-SS263-17CG
IC8 input decoupling
C133 22nF 10% 250V, C5220-SS325-MUF6
See R131
***C134** 7·5nF 5% 1500V, C4750-GG415-MUH8
(10nF 5% 2kV, C5100-GG420-MUH9)
Line flyback tuning
C135 4·7μF 40V Elec., CE147-MV240-RBB5
16V smoothing
C136 2200μF 40V Elec., CE422-MS240-01CG
26V smoothing
***C137** 470nF 10% 250V, C6470-SS325-RBG6
(330nF 5% 400V, C6330-GG340-10CG)
'S' corrector – see R138
***C138** 1μF 20% 160V Elec., CE110-MS316-NNC1
(Deleted)
See R138
***C139** (100μF 200V Elec., CE310-MS320-RYH1)
T3 pin 5 smoothing
C140 12pF 10% 2kV, C2120-SS420-MAM1
Optimises line shift
C141 10μF 20% 50V Elec., CE210-MS250-10CG
15V rail decoupling
C143 4·7μF 20% 50V Elec., CE147-MS250-10CG
Phase feed-back

CV49 2-22pF trimmer, 00E4-114-MU1
Crystal frequency adjustment

TRANSISTORS

TR1 BC237B, 00TR-001-203-1TG
Video emitter follower
TR2 BC237B, 00TR-001-203-1TG
Beam limiter
TR3 BC237B, 00TR-001-203-1TG
Start-up delay
TR6 T9063V, 01V0-958
Chopper transistor
TR7 ZTX650/STZA, 00V1-638
Switches off teletext during standby
TR8 BC372, 09V1-343
Line driver
TR9 BC237B, 00TR-001-203-1TG
Switches off relay during standby
***TR10** T6071V, 01V0-973
(T6073V, 01V0-978)
Line output transistor
TR11 BC237B, 00TR-001-203-1TG
AV inverter
TR12 BC307C, 00TR-004-204-1TG
Part of 12V delay circuit

SCR1 T1CP 106D, 01V0-975
IC7 start-up switching

DIODES

D1 Type 425, 00DD-001-001-1DG
Automatic cut-off isolation
D2 BZX79C/83C, 00DZ-0020-2105-1DG
Beam limiter feed
D3 Type 425, 00DD-001-001-1DG
Start-up delay catching
D4 IN4002, 00DP-002-001-1DG
Field flyback boost diode
D5 BY133GP, 03V4-117-200
Part of mains bridge rectifier (with D6-D8)
D6 BY133GP, 03V4-117-200
See D5
D7 BY133GP, 03V4-117-200
See D5
D8 BY133GP, 03V4-117-200
See D5
D9 RGP5020, 02V4-725-200
Facsimile rectifier
D10 Type 425, 00DD-001-001-1DG
SCR1 gate supply; switches off during normal working
D11 BZX79C83C, 00DZ-0020-1565-1DG
Set minimum gate voltage
D12 RGP5020, 02V4-725-200
IC7 supply rectifier
D13 IN4001, 00DP-001-001-1DG
Improves shape of TR6 base drive pulse
D14 RGP10M, 01V4-786-200
Quick charge-up of C120 when TR6 is off
D15 BY299, 03V4-143-200
119V supply rectifier
D16 IN5401, 02V4-517-200
9V supply rectifier
D17 Type 425, 00DD-001-001-1DG
Sets standby threshold (with D18)
D18 Type 425, 00DD-001-001-1DG
See D17
D19 RGP5100, 02V4-712-200
200V supply rectifier
D20 IN4001, 00DP-001-001-1DG
Back EMF protection
D21 RGP10G, 01V4-783-200
16V supply rectifier
D22 RGP30B, 02V4-736-200
20V supply rectifier
D23 Type 425, 00DD-001-001-1DG
Audio muting diode
***D24** RGP5040, 02V4-737-200
(Deleted)
See R138
D25 BYV95B, 03V4-148-200
26V supply rectifier
***D26** BY127G, 03V4-123-200
(BY228, 00DP-010-001-1DG)
Efficiency diode
***D28** (BY299, 03V4-143-200)
Isolates pin 3 of T3 from 119V rail
D29 Type 425, 00DD-001-001-1DG
Beam limiter feed to brightness control
***D31** (Type 425, 00DD-001-001-1DG)
(D31 replaces LK86)
Reference diode

INTEGRATED CIRCUITS

IC1 SL1432, 00V3-610
SAW Filter preamp and RF AGC
IC2 TDA3540, 00V3-672
Vision IF amplifier and demodulator
IC3 TDA3562A, 00V3-673
Luma-chroma processor and data input
IC4 TDA2578A, 00V3-739
Sync and line processor
IC5 TDA1701, 00V3-674
Sound IF and output
***IC6** TDA3651, 00V3-679
(TDA3652, 00V3-644)
Field output
IC7 TDA4600-2, 00V3-571
Chopper control
IC8 MC7812CT, 00IC-011-901-1IG
12V regulator
IC9 MC78M15CT, 00V3-737
15V regulator

SF1 SW153A/F1045A, 00IC-009-301-1IG
SAW Filter

INDUCTORS

L1 Band pass coil, 06D0-254-002-TK1
Part band-pass pair with tuner output coil
L2 Carrier tank coil, 06D0-255-002-TK1
Vision reference carrier
L3 AFC coil, 06D0-256-002-TK1
AFC demodulator
L4 3·3μH 20% Axial lead, L1330-WA000-01LG
Vision harmonic suppressor
L5 5·5/6·0MHz Filter, 06D0-257-002-TK1
Part bridge tee filter
L6 4·4MHz rejector, 00D0-913-002-TK1
4·43MHz filter
L7 Pre-chroma delay line coil, 00D0-919-002-TK1
Chroma input filter
L9 Pre-chroma delay line coil, 00D0-919-002-TK1
Phase adjustment
L10 Post-chroma delay line coil, 00D0-920-002-TK1
Balance adjustment
L12 6MHz Quadrature coil, 06D0-214-002-TK1
Sound detector coil
L13 RFI Choke spec. T1011L, 00D4-241-001-DN1
RF interference suppression
L14 6·8μH 10% Axial lead, L1680-SA000-01LG
Anti-radiation choke
L15 2·2μH 20% Axial lead, L1220-WA000-01LG
TR6 base drive inductor
L16 6·8μH 1A 20% Axial, L1680-WA000-TD3
Anti-radiation choke
L17 Harmonic tuning choke, 06D0-261-001-TK1
See R131
***L18** Linearity coil, 06D4-026-001
(Linearity coil, 06D4-028-001)
Linearity adjustment
***L19** Width coil, 06D4-024-001
(Deleted)
Width adjustment
L21 6·8μH 1A 20% Axial, L1680-WA000-TD3
Anti-radiation choke
L23 Filter choke, 06D4-031-001
RFI suppressor

T1 PSU ISO Switched mode transformer, 06D3-082-001
Pulse transformer
T2 Line driver transformer, 06D4-023-001
Line drive
***T3** Diode split LOPT, 06D3-083-001
(Diode split LOPT, 06D3-087-001)
Line output and EHT transformer

MISCELLANEOUS

CF1 6·0MHz ceramic filter, 00E5-992-MA3
Provides rejection of unwanted frequencies

DL1 Chroma delay line, 00E5-931-001-01G
Chroma delay line
DL2 Luminance delay line, 00E5-966-TD1
Luminance delay line

FB1 Ferrite bead assembly, 06D4-030-001
Anti-radiation choke

FS1 Fuse T1·6A time lag, 00E6-041-160-WN1
Mains input fuse

XL1 Crystal 8·8MHz, 00E5-941-001-01G
Reference oscillator, runs at twice subcarrier frequency

RL1 OMI TS112M, 00D6-013-001
Switches HT off during standby

CRT Base Board

90° tube version (PC1174)

110° 30AX tube version (PC1173)

Although the two versions of the PCB have physical differences, the components are identical and have the same circuit reference.

RESISTORS

R601 100kΩ 5% 0·5W, R6100-GF05-04RG
Green feedback
R602 2·2kΩ 5% 0·25W, R4220-GF02-01RG
Green bias
R603 15kΩ 5% 2W, R5150-GX02-30RG
Green load
⚠**R604** 1kΩ 5% 0·25W, R4100-GXP2-WO97
Green beam current sampling feed
R605 100kΩ 5% 0·5W, R6100-GF05-04RG
Blue feedback

Continued . . .

R606 2·2kΩ 5% 0·25W, R4220-GF02-01RG
Blue bias
R607 15kΩ 5% 2W, R5150-GX02-30RG
Blue load
⚠ **R608** 1kΩ 5% 0·25W, R4100-GXP2-WO97
Blue beam current sampling feed
R609 100kΩ 5% 0·5W, R6100-GF05-04RG
Red feedback
R610 2·2kΩ 5% 0·25W, R4220-GF02-01RG
Red bias
R611 15kΩ 5% 2W, R5150-GX02-30RG
Red load
⚠ **R612** 1kΩ 5% 0·25W, R4100-GXP2-WO97
Red beam current sampling feed
R613 4·7kΩ 5% 0·25W, R4470-GF02-14RG
Video output reference voltage setting (with R618)
⚠ **R614** 47Ω 5% 0·25W, R2470-GF02-RS28
Base feed, green
⚠ **R615** 47Ω 5% 0·25W, R2470-GF02-RS28
Base feed, blue
⚠ **R616** 47Ω 5% 0·25W, R2470-GF02-RS28
Base feed, red
R617 1kΩ 5% 0·25W, R4100-GF02-14RG
Video output reference feed
R618 820Ω 5% 0·25W, R3820-GF02-01RG
See R613
R619 100kΩ 5% 1W, R6100-GM10-MU20
A1 stand-off
R620 10kΩ 10% 0·5W, R5100-SC05-10RG
Grid pot-down (with R623)
R621 2·7kΩ 10% 0·5W, R4270-SC05-10RG
Blue stand-off
R622 3·3Ω 10% 1·5W fusible, R1330-SX01-W104
Heater dropper
R623 15kΩ 10% 0·5W, R5150-SC05-10RG
See R620
R624 2·7kΩ 10% 0·5W, R4270-SC05-10RG
Green stand-off
R625 2·7kΩ 10% 0·5W, R4270-SC05-10RG
Red stand-off

VARIABLE RESISTORS

RV61 10kΩ lin. 10mm hor. pot., 00E1-131-510-PH2
Green gain adjustment
RV62 10kΩ lin. 10mm hor. pot., 00E1-131-510-PH2
Blue gain adjustment
RV63 10kΩ lin. 10mm hor. pot., 00E1-131-510-PH2
Red gain adjustment

CAPACITORS

C601 39pF 5% 50V, C2390-GG250-TY15
Green compensation
C602 39pF 5% 50V, C2390-GG250-TY15
Blue compensation
C603 39pF 5% 50V, C2390-GG250-TY15
Red compensation
C604 1μF 20% 50V Elec., CE110-MS250-23CG
Video output reference decoupling
C605 4·7μF 20% 250V Elec., CE147-MS325-01CG
HT decoupling
C606 10pF 5% 500V, C2100-GG350-MAR4
Decoupling
C607 10pF 5% 500V, C2100-GG350-MAR4
Decoupling
C608 10pF 5% 500V, C2100-GG350-MAR4
Decoupling
C609 1nF 20% 50V, C4100-WW250-TY13
Green compensation
C610 1nF 20% 50V, C4100-WW250-TY13
Blue compensation
C611 1nF 20% 50V, C4100-WW250-TY13
Red compensation
C612 100nF 10% 250V, C6100-SS325-15CG
Grid decoupling
C613 10nF +80% −20% 2kV, C5100-EW420-MAK8
A1 decoupling
C614 220μF 20% 15V Elec., CE322-MS216-26CG
LT decoupling

TRANSISTORS

TR60 BC308C, 00TR-005-404-1TG
Video output bias
TR61 BF787, 00TR-033-801-1TG
Green amplifier
TR62 BF493S, 09V1-367
Green beam current sensing
TR63 BF787, 00TR-033-801-1TG
Blue amplifier
TR64 BF493S, 09V1-367
Blue beam current sensing
TR65 BF787, 00TR-033-801-1TG
Red amplifier
TR66 BF493S, 09V1-367
Red beam current sensing
TR67 BF392, 00TR-027-401-1TG
Green emitter follower
TR68 BF392, 00TR-027-401-1TG
Blue emitter follower
TR69 BF392, 00TR-027-401-1TG
Red emitter follower

DIODES

D601 Type 425, 00DD-001-001-1DG
Green cathode feed
D602 Type 425, 00DD-001-001-1DG
Blue cathode feed
D603 Type 425, 00DD-001-001-1DG
Red cathode feed

MISCELLANEOUS

* **TB61** 90° CRT socket, 00F6-389-001
(110° CRT socket, 00F6-305-002)
* **TG61** Snap in tag 00K8-009
(Earth blade, 06B1-437-001)
TG62 Earth blade, 06B1-437-001

Diode Modulator Board (PC1153) — 110° Only

RESISTORS

R702 221kΩ 1% 0·25W, R6221-BM02-08RG
Part TR72 base bias network (with R703, R712)
R703 27kΩ 5% 0·25W, R5270-GF02-01RG
See R702
R704 3·3kΩ 5% 0·25W, R4330-GF02-01RG
Differential amplifier emitter load
R706 39kΩ 5% 0·25W, R5390-GF02-01RG
Part TR71 base bias (with R708)
R707 12kΩ 5% 0·25W, R5120-GF02-01RG
Part of HF limiting network (with C704)
R708 8·66kΩ 1% 0·25W, R4866-BM02-08RG
See R706
R709 221kΩ 1% 0·25W, R6221-BM02-08RG
Provides negative feedback and determines gain
R710 3 3kΩ 5% 0·25W, R4330-GF02-01RG
TR72 collector load
R711 2·7Ω 5% 0·25W, R1270-GXP2-W100
TR73 emitter load
R712 2·7kΩ 5% 0·25W, R4270-GF02-01RG
See R702

VARIABLE RESISTORS

RV71 1kΩ lin. 10mm preset pot., 00E1-131-410-PH1
Pincushion adjustment
RV72 4·7kΩ lin. 10mm preset pot., 00E1-131-447-PH1
Width adjustment

CAPACITORS

C701 100μF 20% 35V Elec., CE310-MS235-20CG
Field sensing coupling capacitor
C702 22nF 10% 400V, C5220-SS340-RBE9
Part of diode modulator tuning network
C703 2·2μF 10% 100V, C7220-SS310-RF08
Line coupling
C704 1nF 10% 50V, C4100-SS250-MAH3
See R707
C705 470nF 10% 160V, C6470-SS316-AR21
HT ripple sensing network

TRANSISTORS

TR71 BC309C, 00TR-006-204-1TG
Half differential amplifier (with TR72)
TR72 BC309C, 00TR-006-204-1TG
See TR71
TR73 TIP110, 00TR-030-801-1TG
Diode modulator driver

DIODES

D701 SK4G4/04, 02V4-711-200
Part of efficiency diode network

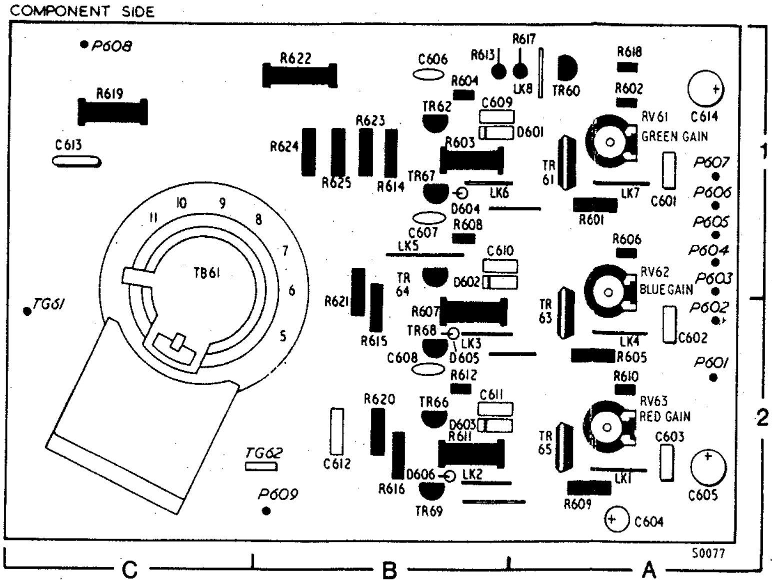
INDUCTORS

L701 Diode mod. choke, 90D4-090-001-01G
Provides impedance between line stage and diode modulator
L702 Diode mod. choke, 90D4-091-001-01G
Provides impedance between C703 and line tuning

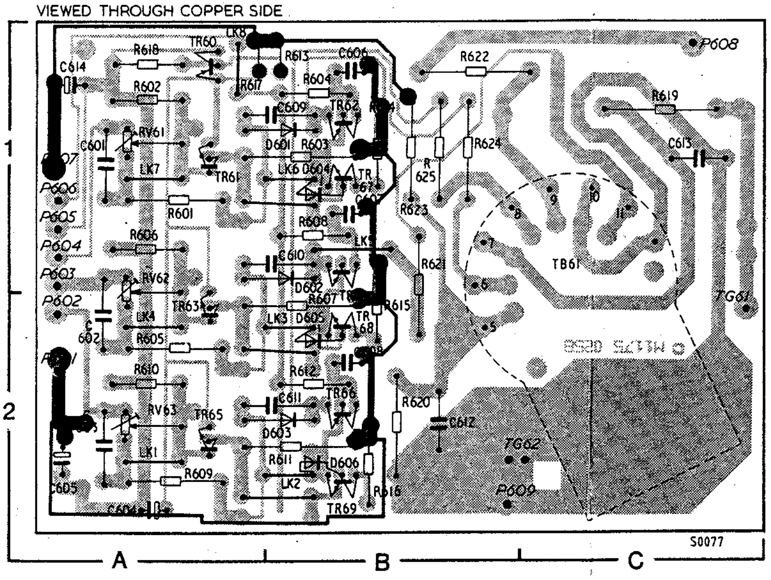
MISCELLANEOUS

SK70 7-way edge connector, 90F6-023-005

COMPONENT SIDE

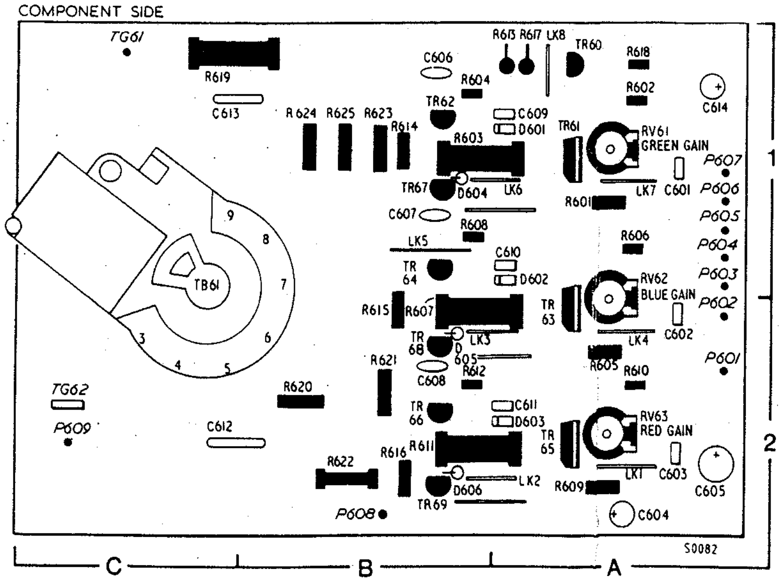


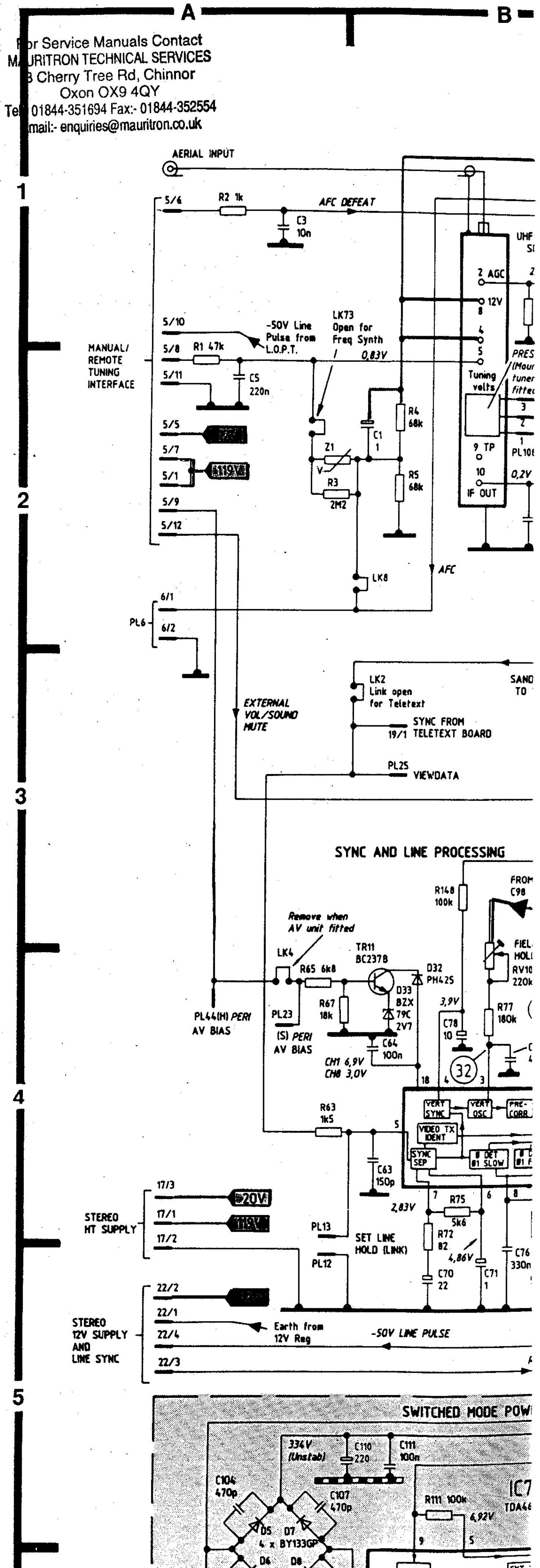
VIEWED THROUGH COPPER SIDE

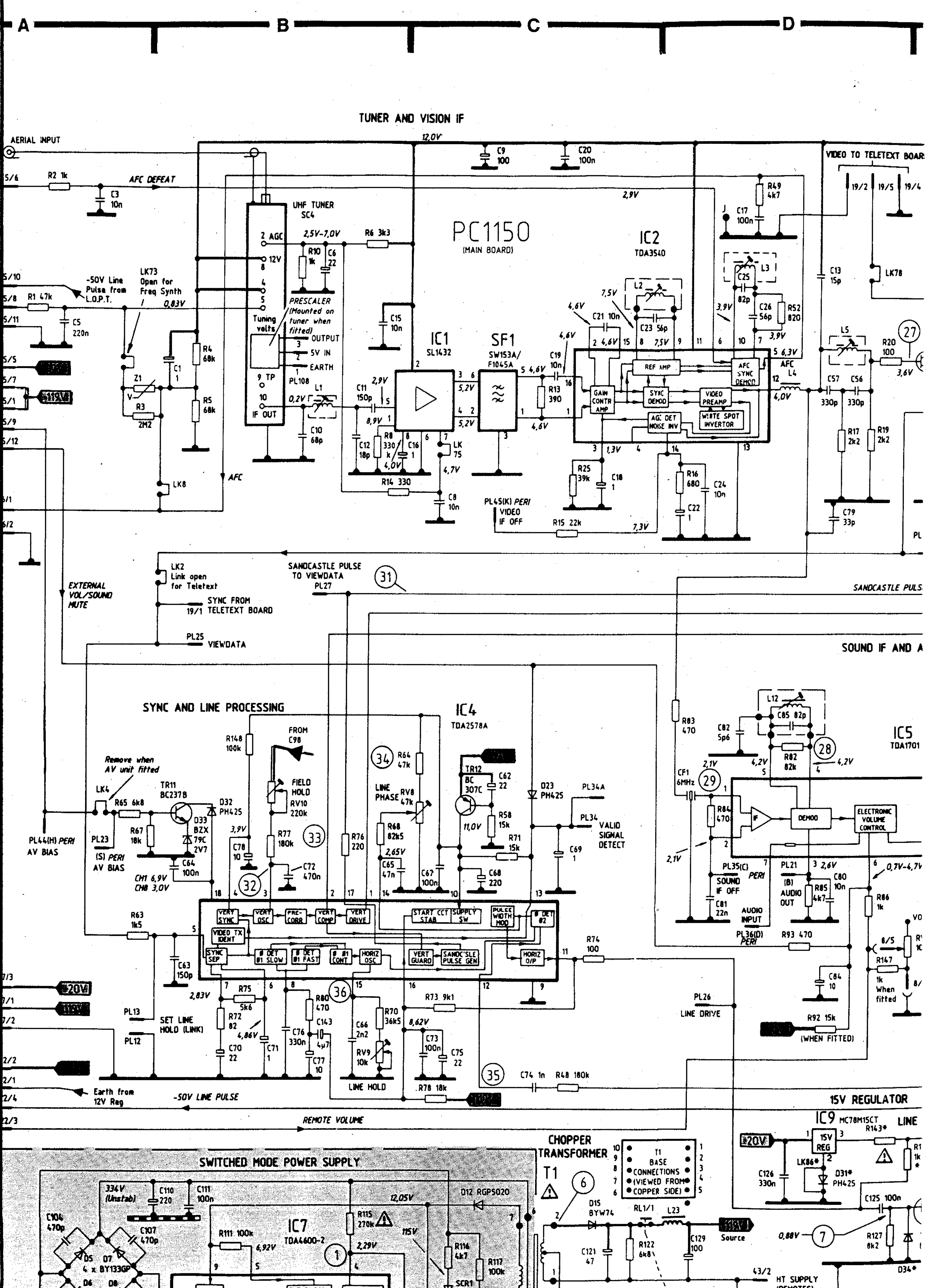


Tube Base Board, PC1175 (59cm 110° FST-A59EAS and 22-inch 110° non FST-A56701X)

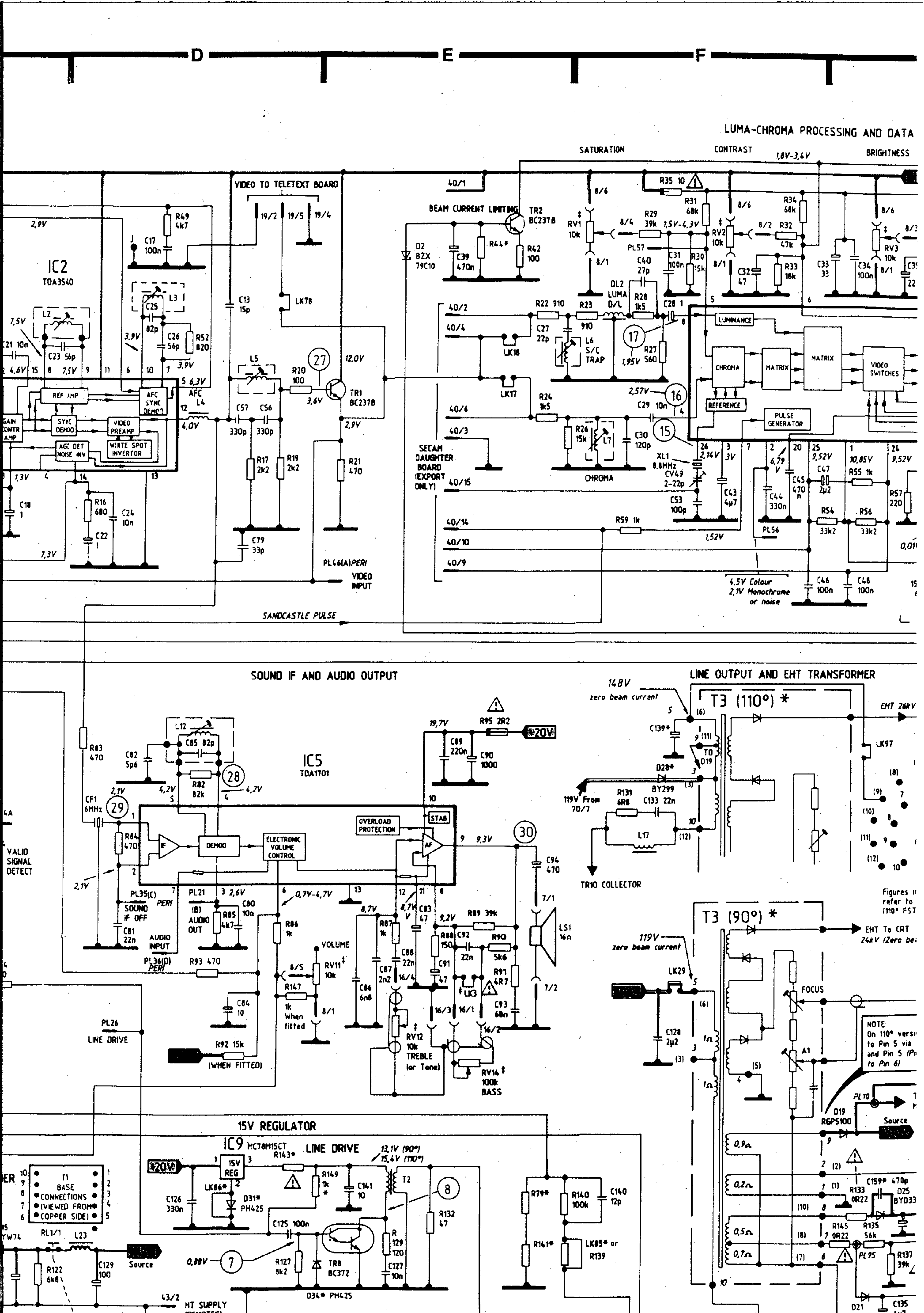
COMPONENT SIDE



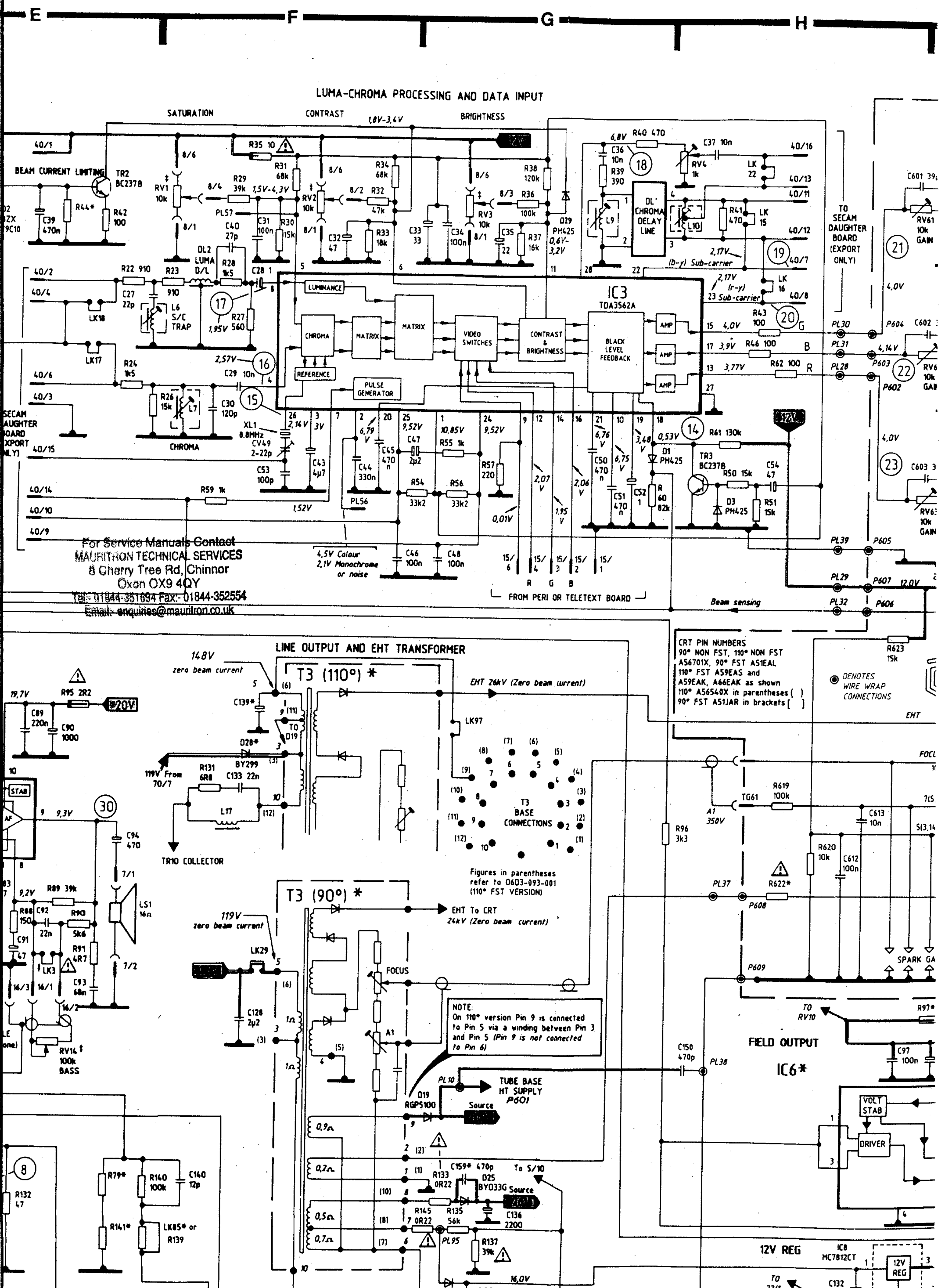


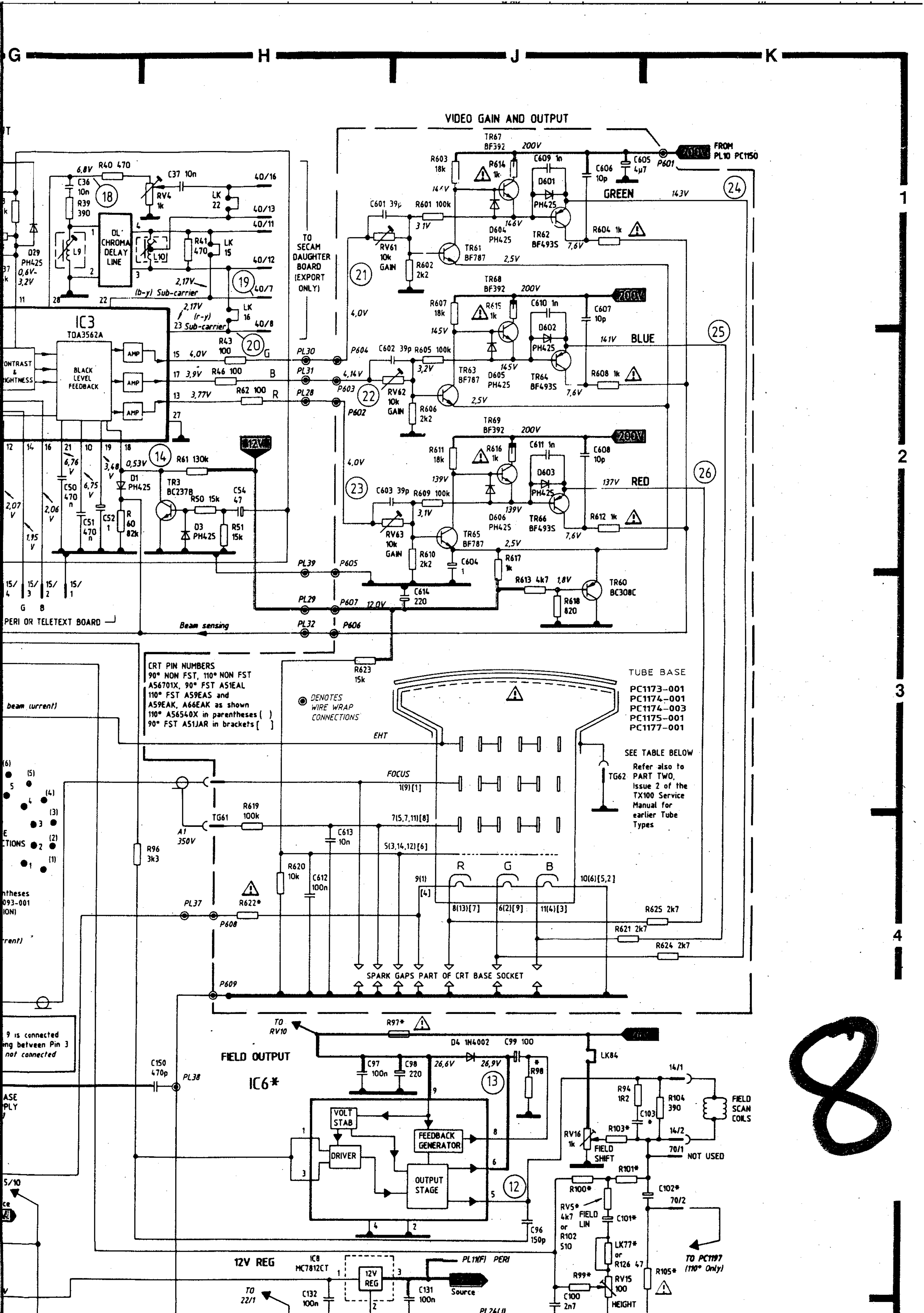


A
B
C
D
TUNER AND VISION IF
AERIAL INPUT
12,0V
C9 100
C20 100n
VIDEO TO TELETEXT BOARD
19/2
19/5
19/4
R2 1k
AFC DEFEAT
C3 10n
UHF TUNER SC4
2,9V
R49 4k7
C17 100n
PC1150
(MAIN BOARD)
IC2
TDA3540
2 AGC
2,5V-7,0V
R6 3k3
R10 1k
C6 22
12V
-50V Line Pulse from L.O.P.T.
LK73 Open for Freq Synth
R1 47k
0,83V
C5 220n
PRESCALER (Mounted on tuner when fitted)
OUTPUT
5V IN
EARTH
PL108
Tuning volts
C15 10n
IC1
SL1432
SF1
SW153A/ F1045A
L2
L3
C25 82p
C26 56p
R52 820
C13 15p
LK78
C21 10n
C23 56p
C19 10n
R13 390
R4 68k
R5 68k
C1 1
Z1
R3 2M2
C11 150p
C12 18p
R8 330k
C16 1
LK 75
C10 68p
L1
IF OUT
REF AMP
AFC SYNC DEMOD
GAIN CONTR AMP
SYNC DEMOD
VIDEO PREAMP
WHITE SPOT INVERTOR
AGC DET NOISE INV
L4
L5
R20 100
C57 330p
C56 330p
R17 2k2
R19 2k2
R25 39k
C18 1
R16 680
C24 10n
C22 1
C79 33p
R14 330
C8 10n
LK8
AFC
PL45(K) PERI VIDEO IF OFF
R15 22k
7,3V
LK2 Link open for Teletext
SANDCASTLE PULSE TO VIEWDATA
PL27
SANDCASTLE PULSE
EXTERNAL VOL/SOUND MUTE
SYNC FROM 19/1 TELETEXT BOARD
PL25 VIEWDATA
SOUND IF AND A
SYNC AND LINE PROCESSING
IC4
TDA2578A
R148 100k
FROM C98
FIELD HOLD RV10 220k
R64 47k
LINE PHASE RV8 47k
TR12 BC 307C
C62 22
D23 PH425
PL34A
PL34
VALID SIGNAL DETECT
R58 15k
R71 15k
C69 1
R68 82k5
C65 47n
C67 100n
C68 220
R76 220
R77 180k
C78 10
C72 470n
Remove when AV unit fitted
LK4
R65 6k8
TR11 BC237B
D32 PH425
D33 BZX 79C 2V7
R67 18k
C64 100n
PL44(H) PERI AV BIAS
PL23 (S) PERI AV BIAS
CH1 6,9V CH8 3,0V
VERT SYNC
VERT OSC
PRE-CORR
VERT COMP
VERT DRIVE
START CCT STAB
SUPPLY SW
PULSE WIDTH MOD
φ DET #2
VIDEO TX IDENT
SYNC SEP
φ DET #1 SLOW
φ DET #1 FAST
φ #1 CONT
HORIZ OSC
VERT GUARD
SANDC'SLE PULSE GEN
HORIZ O/P
R63 1k5
C63 150p
R74 100
R75 5k6
R72 82
C70 22
C71 1
C76 330n
R80 470
C143 4μ7
C77 10
C66 2n2
R70 36k5
RV9 10k
LINE HOLD
R73 9k1
C73 100n
C75 22
PL26 LINE DRIVE
PL13
SET LINE HOLD (LINK)
PL12
R78 18k
C74 1n
R48 180k
Earth from 12V Reg
-50V LINE PULSE
REMOTE VOLUME
R83 470
C82 5p6
L12
C85 82p
R82 82k
IC5
TDA1701
CF1 6MHz
R84 470
IF
DEMOD
ELECTRONIC VOLUME CONTROL
PL35(C) PERI SOUND IF OFF
C81 22n
AUDIO INPUT
PL36(D) PERI
PL21 (B) AUDIO OUT
R85 4k7
C80 10n
R86 1k
R93 470
C84 10
R147 1k When fitted
R92 15k (WHEN FITTED)
15V REGULATOR
IC9 MC78M15CT
LINE
R143*
15V REG
LK86*
D31* PH425
C126 330n
C125 100n
R127 8k2
D34*
CHOPPER TRANSFORMER
T1
T1 BASE CONNECTIONS (VIEWED FROM COPPER SIDE)
D15 BYW74
RL1/1
L23
C129 100
Source
C121 47
R122 6k8
43/2
HT SUPPLY
SWITCHED MODE POWER SUPPLY
334V (Unstab)
C110 220
C111 100n
12,05V
D12 RGP5020
C104 470p
C107 470p
4 x BY133GP
R111 100k
IC7
TDA4600-2
R115 270k
115V
R116 4k7
R117 100k
SCR1
6,92V
2,29V
0,88V

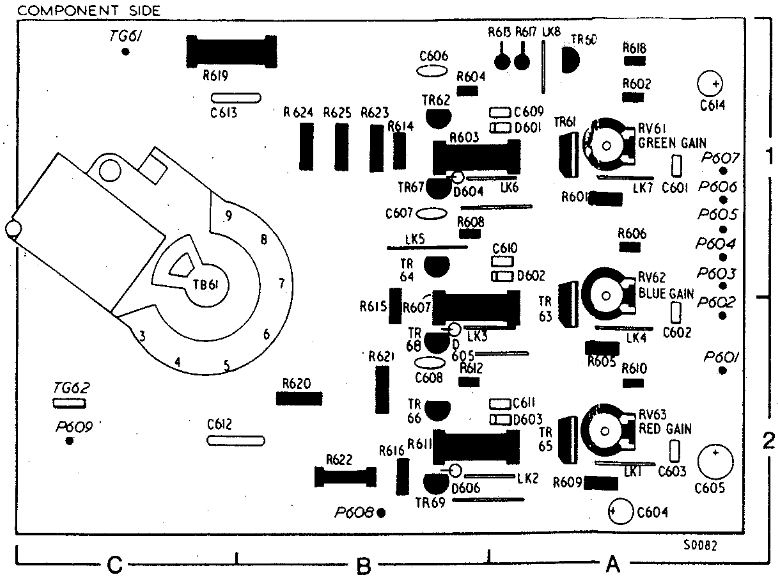


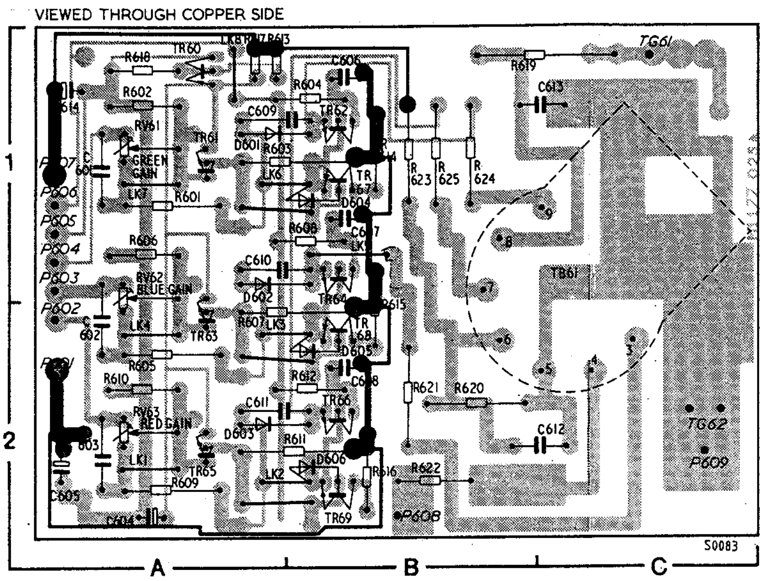
D
E
F
LUMA-CHROMA PROCESSING AND DATA
SATURATION
CONTRAST
BRIGHTNESS
VIDEO TO TELETEXT BOARD
BEAM CURRENT LIMITING
TR2 BC237B
IC2
TDA3540
REF AMP
SYNC DEMOD
VIDEO PREAMP
AFC SYNC DEMOD
AGC DET NOISE INV
WHITE SPOT INVERTOR
GAIN CONTR AMP
TR1 BC237B
SECAM DAUGHTER BOARD (EXPORT ONLY)
LUMA D/L
L6 S/C TRAP
CHROMA
LUMINANCE
MATRIX
VIDEO SWITCHES
REFERENCE
PULSE GENERATOR
XL1 8.8MHz
4,5V Colour
2,1V Monochrome or noise
PL46(A) PERI
VIDEO INPUT
SANDCASTLE PULSE
SOUND IF AND AUDIO OUTPUT
IC5
TDA1701
IF
DEMOD
ELECTRONIC VOLUME CONTROL
OVERLOAD PROTECTION
STAB
AF
VALID SIGNAL DETECT
SOUND IF OFF
AUDIO INPUT
AUDIO OUT
VOLUME
TREBLE (or Tone)
BASS
LS1 16Ω
PL26 LINE DRIVE
(WHEN FITTED)
LINE OUTPUT AND EHT TRANSFORMER
T3 (110°) *
148V zero beam current
EHT 26kV
119V From 70/7
TR10 COLLECTOR
T3 (90°) *
119V zero beam current
EHT To CRT 24kV (Zero beam current)
FOCUS
A1
NOTE: On 110° version to Pin 5 via ... and Pin 5 (P... to Pin 6)
D19 RGP5100
15V REGULATOR
IC9 MC78M15CT
LINE DRIVE
15V REG
T1 BASE CONNECTIONS (VIEWED FROM COPPER SIDE)
TR8 BC372
D34* PH425
HT SUPPLY
Source


E
F
G
H
LUMA-CHROMA PROCESSING AND DATA INPUT
SATURATION
CONTRAST
BRIGHTNESS
1,8V-3,4V
BEAM CURRENT LIMITING
TR2 BC237B
IC3
TDA3562A
LUMINANCE
CHROMA
MATRIX
REFERENCE
PULSE GENERATOR
VIDEO SWITCHES
CONTRAST & BRIGHTNESS
BLACK LEVEL FEEDBACK
AMP
DL CHROMA DELAY LINE
DL2 LUMA D/L
L6 S/C TRAP
CHROMA
(b-y) Sub-carrier
(r-y) Sub-carrier
TO SECAM DAUGHTER BOARD (EXPORT ONLY)
TR3 BC237B
D1 PH425
D3 PH425
XL1 8.8MHz
4,5V Colour
2,1V Monochrome
or noise
FROM PERI OR TELETEXT BOARD
R G B
Beam sensing
LINE OUTPUT AND EHT TRANSFORMER
148V
zero beam current
T3 (110°) *
EHT 26kV (Zero beam current)
LK97
119V From 70/7
TR10 COLLECTOR
T3 BASE CONNECTIONS
Figures in parentheses refer to 0603-093-001 (110° FST VERSION)
CRT PIN NUMBERS
90° NON FST, 110° NON FST
A56701X, 90° FST A51EAL
110° FST A59EAS and
A59EAK, A66EAK as shown
110° FST A56540X in parentheses ( )
90° FST A51JAR in brackets [ ]
DENOTES WIRE WRAP CONNECTIONS
EHT
T3 (90°) *
119V
zero beam current
EHT To CRT
24kV (Zero beam current)
FOCUS
NOTE:
On 110° version Pin 9 is connected to Pin 5 via a winding between Pin 3 and Pin 5 (Pin 9 is not connected to Pin 6)
TUBE BASE HT SUPPLY
P601
Source
D19 RGP5100
To S/10
D25 BYD33G
FIELD OUTPUT
IC6*
VOLT STAB
DRIVER
SPARK GAP
12V REG
IC8 MC7812CT
LS1 16Ω
RV14 100k BASS
+20V
+12V

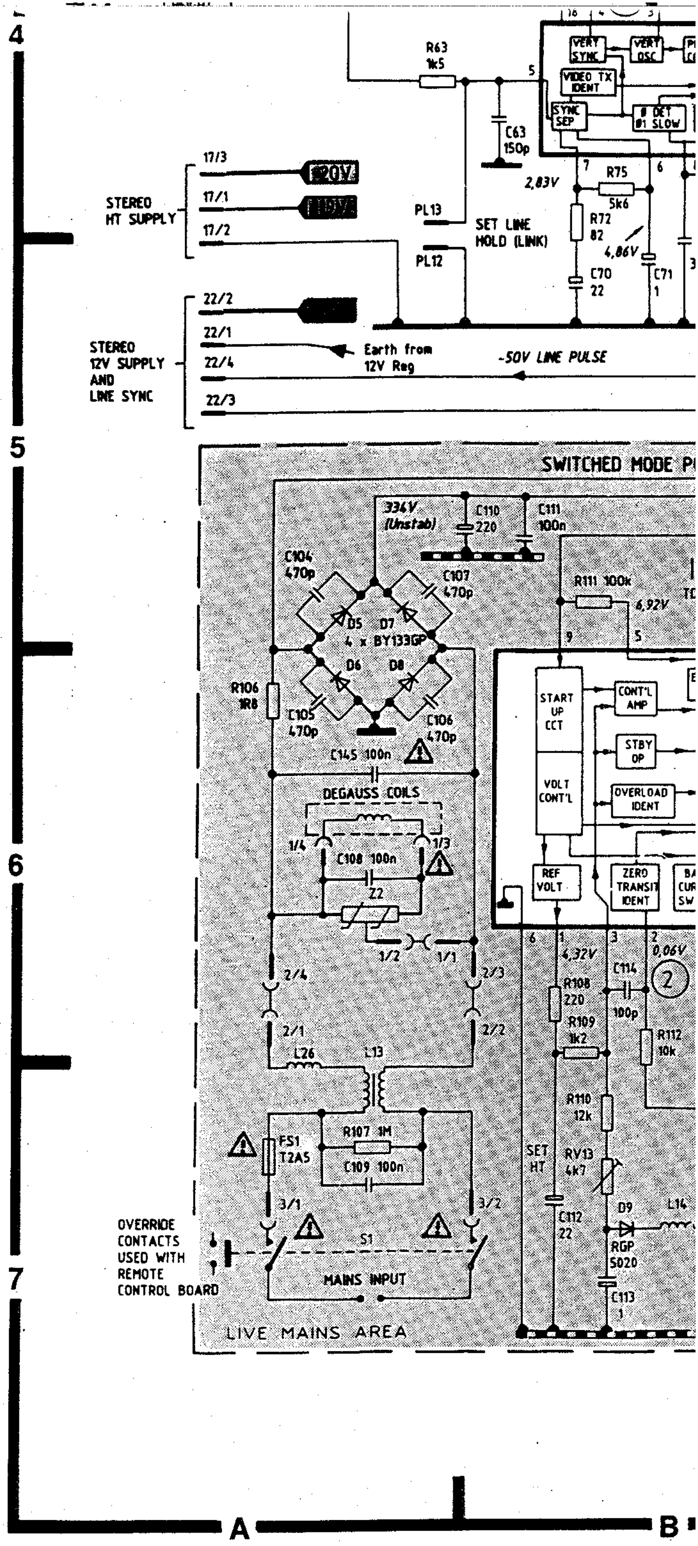


G
H
J
K
1
2
3
4
VIDEO GAIN AND OUTPUT
FROM PL10 PC1150
200V
P601
GREEN
BLUE
RED
TR67 BF392
TR68 BF392
TR69 BF392
TR61 BF787
TR62 BF493S
TR63 BF787
TR64 BF493S
TR65 BF787
TR66 BF493S
TR60 BC308C
RV61 10k GAIN
RV62 10k GAIN
RV63 10k GAIN
TO SECAM DAUGHTER BOARD (EXPORT ONLY)
IC3 TDA3562A
BLACK LEVEL FEEDBACK
AMP
CONTRAST & BRIGHTNESS
DL CHROMA DELAY LINE
(b-y) Sub-carrier
(r-y) Sub-carrier
TR3 BC237B
D1 PH425
D3 PH425
PERI OR TELETEXT BOARD
Beam sensing
CRT PIN NUMBERS
90° NON FST, 110° NON FST
A56701X, 90° FST A51EAL
110° FST A59EAS and
A59EAK, A66EAK as shown
110° A56540X in parentheses ( )
90° FST A51JAR in brackets [ ]
DENOTES WIRE WRAP CONNECTIONS
TUBE BASE
PC1173-001
PC1174-001
PC1174-003
PC1175-001
PC1177-001
EHT
FOCUS
SEE TABLE BELOW
Refer also to PART TWO, Issue 2 of the TX100 Service Manual for earlier Tube Types
TG61
TG62
A1 350V
SPARK GAPS PART OF CRT BASE SOCKET
FIELD OUTPUT
IC6*
VOLT STAB
DRIVER
FEEDBACK GENERATOR
OUTPUT STAGE
D4 1N4002
TO RV10
FIELD SCAN COILS
NOT USED
FIELD SHIFT
FIELD LIN
HEIGHT
TO PC1197 (110° Only)
12V REG
IC8 MC7812CT
Source
PL11(F) PERI
TO 22/1
8





Tube Base Board, PC1177 (51cm 90° FST-A51JAR)



GRID REFERENCES

The circuit diagram location is followed by the printed panel location.

PC1150

- **R1** A2,C4
- **R2** A1,D4
- **R3** A2,C3
- **R4** A2,C3
- **R5** A2,C3
- **R6** B1,C2
- **R8** B2,D1
- **R10** B1,C4
- **R13** C2,D2
- **R14** B2,D4
- **R15** C2,C2
- **R16** D2,C2
- **R17** D2,C3
- **R19** D2,D3
- **R20** D2,D4
- **R21** E2,D3
- **R22** E1,E3
- **R23** F1,E3
- **R24** E2,F3
- **R25** C2,D2
- **R26** F2,F2
- **R27** F2,E2
- **R28** F1,E2
- **R29** F1,E2
- **R30** F1,E2
- **R31** F1,E2
- **R32** F1,E2
- **R33** F1,E2
- **R34** F1,E2
- **R35** F1,E3
- **R36** G1,E2
- **R37** G1,E2
- **R38** G1,E2
- **R39** G1,G2
- **R40** G1,G2
- **R41** H1,F3
- **R42** E1,G1
- **R43** H2,F1
- **R44** E1,G1
- **R46** H2,F1
- **R48** C5,J6
- **R49** D1,D3
- **R50** H2,F1
- **R51** H2,G1
- **R52** D2,D3
- **R54** G2,G2
- **R55** G2,G2
- **R56** G2,G2
- **R57** G2.E1
- **R58** C4,E4
- **R59** F2,F1
- **R60** G2,F1
- **R61** H2,F1
- **R62** H2,F1
- **R63** A4,G5
- **R64** C3,H5
- **R65** A4,H6
- **R67** A4,H6
- **R68** B4,J5
- **R70** B4,J5
- **R71** C4,H5
- **R72** B4,G5
- **R73** C4,H5
- **R74** C4,H5
- **R75** B4,G5
- **R76** B4,F3
- **R77** B4,G5
- **R78** C5,G6
- **R79** E5,F6
- **R80** B4,G5
- **R82** D3,E5
- **R83** D3,E4
- **R84** D4,F5
- **R85** D4,F5
- **R86** D4,E4
- **R87** E4,E5
- **R88** E4,E6
- **R89** E4,E6
- **R90** E4,E6
- **R91** E4,E5
- **R92** D4,E4
- **R93** D4,E4
- **R94** K5,F4
- **R95** E3,D6
- **R96** H4,G6
- **R97** J4,F5
- **R98** J5,F5
- **R99** J5,G4
- **R100** J5,F4
- **R101** K5,F4
- **R102** J5,F4
- **R103** J5,F4
- **R104** K5,F4
- **R105** K5,G4
- **R106** A6,B3
- **R107** A7,B2
- **R108** B6,B4
- **R109** B6,B4
- **R110** B7,B4
- **R111** B5,B5
- **R112** B6,B4
- **R113** B6,B5
- **R114** B6,A5
- **R115** B5,A4
- **R116** C5,B6
- **R117** C5,B6
- **R118** C6,B5
- **R119** C6,B5
- **R120** C6,D5
- **R121** B7,A5
- **R122** C5,C6
- **R123** C7,B4
- **R124** C7,D5
- **R125** D6,D5
- **R126** J5,G4
- **R127** D5,J5
- **R128** C6,D6
- **R129** E5,J5
- **R130** D6,D6
- **R131** F3,H3
- **R132** E5,J4
- **R133** G5,J3
- **R135** G5,E3
- **R136** G7,J4
- **R137** G5,E3
- **R138** G6,H4
- **R139** F5,H4
- **R140** F5,J5
- **R141** E6,E6
- **R142** G7,G3
- **R143** D5,J6
- **R145** G5,H2
- **R146** D6,D6
- **R147** D4,E2
- **R148** B3,H6
- **R149** E5,H4

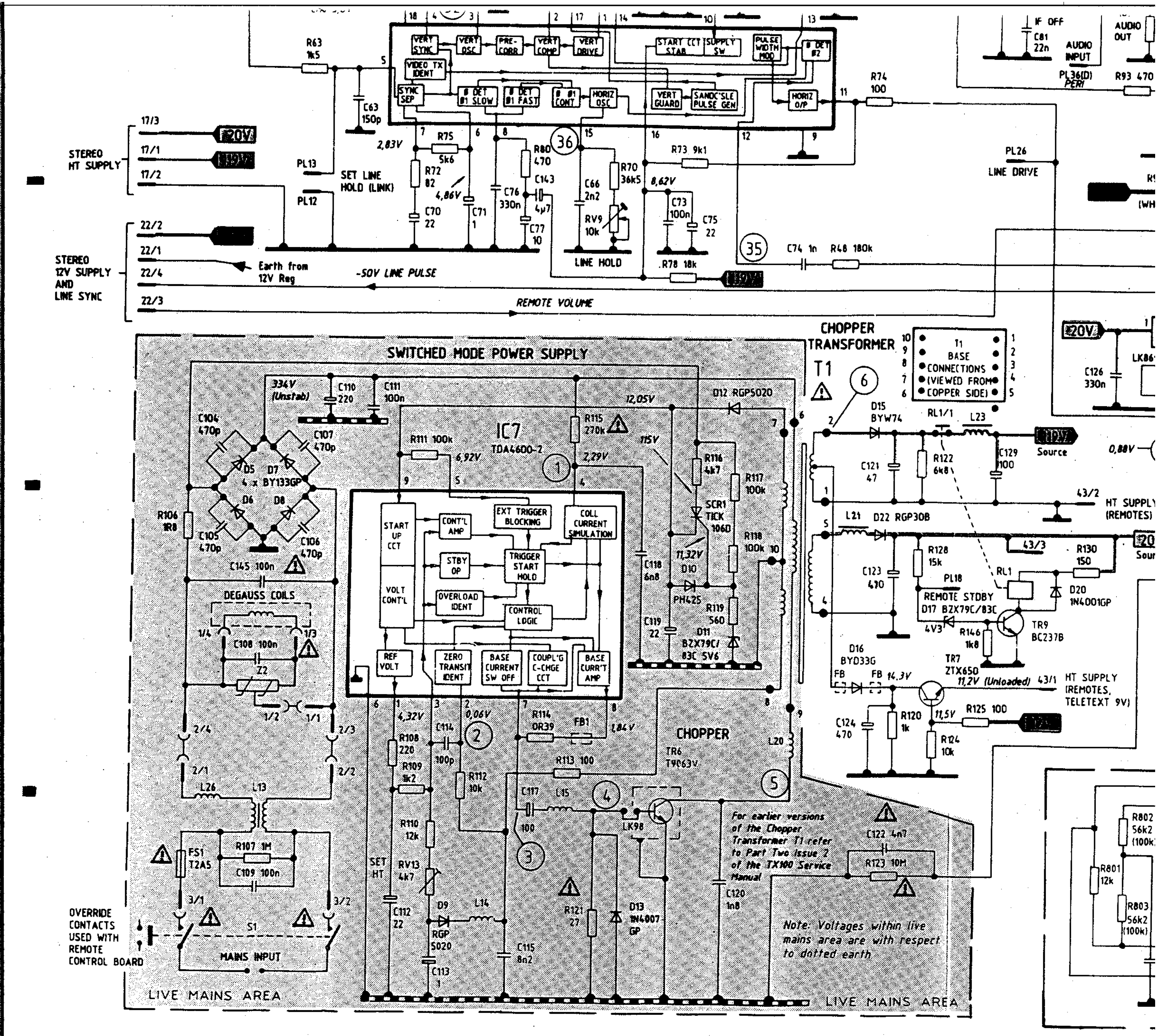
- **Z1** A2,C3
- **Z2** A6,A3

- **RV1** F1,*
- **RV2** F1,*
- **RV3** G1,*
- **RV4** H1,G2
- **RV5** J5,F4
- **RV8** C4,J5
- **RV9** B5,J5
- **RV10** B4,G5
- **RV11** E4,*
- **RV12** E4,*
- **RV13** B7,B4
- **RV14** E5,*
- **RV15** J5,G4
- **RV16** J5,F4

- **C1** A2,C3
- **C3** A1,D3
- **C5** A2,C1
- **C6** B1,C2
- **C8** C2,D3
- **C9** C1,C1
- **C10** B2,C1
- **C11** B2,D1
- **C12** B2,D1
- **C13** D1,C3
- **C15** B2,D1
- **C16** B2,D1
- **C17** D1,D3
- **C18** C2,D2
- **C19** C2,C2
- **C20** C1,C2
- **C21** C2,D2
- **C22** D2,C1
- **C23** C2,D2
- **C24** D2,C2
- **C25** D1,D3
- **C26** D2,D3
- **C27** E2,E3
- **C28** F1,E1
- **C29** F2,F2
- **C30** F2,F2
- **C31** F1,F2
- **C32** F1,F1
- **C33** G1,E2
- **C34** G1,F2
- **C35** G1,E1
- **C36** G1,G2
- **C37** H1,G3
- **C39** E1,G1
- **C40** F1,D2
- **C43** F2,E2
- **C44** F2,E3
- **C45** F2,F1
- **C46** G3,G1
- **C47** G2,F2
- **C48** G3,G1
- **C50** G2,F1
- **C51** G2,E1
- **C52** G2,G1
- **C53** F2,F2
- **C54** H2,G1
- **C56** D2,D3
- **C57** D2.C3
- **C62** C3,E4
- **C63** B4,G5
- **C64** B4,J6
- **C65** B4,H5
- **C66** B5,J6
- **C67** C4,H5
- **C68** C4,H5
- **C69** C4,G5
- **C70** B5,G5
- **C71** B5,G5
- **C72** B4,H5
- **C73** C5,H6
- **C74** C5,H5
- **C75** C5,H6
- **C76** B5,G5
- **C77** B5,G6
- **C78** B4,G5
- **C79** D2,D4
- **C80** D4,F5
- **C81** D4,E5
- **C82** D3,E6
- **C83** E4,E5
- **C84** D4,E6
- **C86** E4,E4
- **C87** E4,E4
- **C88** E4,E4
- **C89** E3,E6
- **C90** E3,E6
- **C91** E4,E6
- **C92** E4,E6
- **C93** E4,E5
- **C94** E4,E5
- **C96** J5,G5
- **C97** H5,F5
- **C98** J5,F5
- **C99** J4,F5
- **C100** J6,H5
- **C101** K5,G4
- **C102** K5,G4
- **C103** K5,F4
- **C104** A5,B3
- **C105** A6,B3
- **C106** A6,B3
- **C107** A5,B3
- **C108** A6,A4
- **C109** A7,B2
- **C110** B5,B4
- **C111** B5,A4
- **C112** B7,B4
- **C113** B7,B4
- **C114** B6,B4
- **C115** B7,B5
- **C117** B7,A5
- **C118** C6,A4
- **C119** C6.B5
- **C120** C7,A6
- **C121** C5,D6
- **C122** C7,B4
- **C123** C6,D5
- **C124** C6,D5
- **C125** D5,H5
- **C126** .... D
- **C127** .... E
- **C128** .... F
- **C129** .... D
- **C131** .... J
- **C132** .... H
- **C133** .... F
- **C134** .... G
- **C135** .... G
- **C136** .... G
- **C137** .... G
- **C138** .... G
- **C139** .... F
- **C140** .... F
- **C141** .... E
- **C143** .... B
- **C145** .... A
- **C150** .... H
- **C151** .... G
- **C159** .... G

- **CV49** .... F

- **TR1** .... E
- **TR2** .... E
- **TR3** .... H
- **TR6** C
- **TR7** C
- **TR8** .... E
- **TR9** .... D
- **TR10** .... G



A — B — C — D

...G1,*
H1,G2
.J5,F4
C4,J5
.B5,J5
B4,G5
... E4,*
... E4,*
B7,B4
... E5,*
J5,G4
.J5,F4

A2,C3
A1,D3
A2,C1
B1,C2
C2,D3
C1,C1
B2,C1
B2,D1
B2,D1
D1,C3
B2,D1
B2,D1
D1,D3
C2,D2
C2,C2
C1,C2
C2,D2
D2,C1

C23 .... C2,D2
C24 .... D2,C2
C25 .... D1,D3
C26 .... D2,D3
C27 .... E2,E3
C28 .... F1,E1
C29 .... F2,F2
C30 .... F2,F2
C31 .... F1,F2
C32 .... F1,F1
C33 .... G1,E2
C34 .... G1,F2
C35 .... G1,E1
C36 .... G1,G2
C37 .... H1,G3
C39 .... E1,G1
C40 .... F1,D2
C43 .... F2,E2
C44 .... F2,E3
C45 .... F2,F1
C46 .... G3,G1
C47 .... G2,F2
C48 .... G3,G1
C50 .... G2,F1
C51 .... G2,E1
C52 .... G2,G1
C53 .... F2,F2
C54 .... H2,G1
C56 .... D2,D3
C57 .... D2.C3

C62 .... C3,E4
C63 .... B4,G5
C64 .... B4,J6
C65 .... B4,H5
C66 .... B5,J6
C67 .... C4,H5
C68 .... C4,H5
C69 .... C4,G5
C70 .... B5,G5
C71 .... B5,G5
C72 .... B4,H5
C73 .... C5,H6
C74 .... C5,H5
C75 .... C5,H6
C76 .... B5,G5
C77 .... B5,G6
C78 .... B4,G5
C79 .... D2,D4
C80 .... D4,F5
C81 .... D4,E5
C82 .... D3,E6
C83 .... E4,E5
C84 .... D4,E6
C86 .... E4,E4
C87 .... E4,E4
C88 .... E4,E4
C89 .... E3,E6
C90 .... E3,E6
C91 .... E4,E6
C92 .... E4,E6

C93 .... E4,E5
C94 .... E4,E5
C96 .... J5,G5
C97 .... H5,F5
C98 .... J5,F5
C99 .... J4,F5
C100 ..... J6,H5
C101 .... K5,G4
C102 .... K5,G4
C103 ..... K5,F4
C104 ..... A5,B3
C105 ..... A6,B3
C106 ..... A6,B3
C107 ..... A5,B3
C108 ..... A6,A4
C109 ..... A7,B2
C110 ..... B5,B4
C111 ..... B5,A4
C112 ..... B7,B4
C113 ..... B7,B4
C114 ..... B6,B4
C115 ..... B7,B5
C117 ..... B7,A5
C118 ..... C6,A4
C119 ..... C6.B5
C120 ..... C7,A6
C121 ..... C5,D6
C122 ..... C7,B4
C123 ..... C6,D5
C124 ..... C6,D5
C125 ..... D5,H5

C126 ..... D5,J6
C127 ..... E5,J5
C128 ..... F4,J3
C129 ..... D5,C6
C131 ..... J5,G3
C132 ..... H5,G3
C133 ..... F3,H3
C134 ..... G6,G3
C135 ..... G6,G3
C136 ..... G5,J3
C137 ..... G6,H4
C138 ..... G6,H4
C139 ..... F3,H2
C140 ..... F5,J5
C141 ..... E5,J5
C143 ..... B4,G6
C145 ..... A6,A3
C150 ..... H5,J3
C151 ..... G7,G3
C159 ..... G5,J4

CV49 .... F2,G2

TR1 .... E2,E4
TR2 .... E1,G1
TR3 .... H2,F1
TR6 .... C6,A6
TR7 .... C6,D5
TR8 .... E5,H4
TR9 .... D6,D6
TR10 ..... G6,H4

TR11 ..... B4,H6
TR12 ..... C3,F4

SCR1 .... C6,B5

D1 .... G2,F1
D2 .... E1,G1
D3 .... H2,G1
D4 .... J4,F5
D5 .... A5,B3
D6 .... A6,B3
D7 .... A5,A3
D8 .... A6,B3
D9 .... B7,B4
D10 .... C6,B5
D11 .... C6,B6
D12 .... C5,B6
D13 .... B7,A5
D15 .... C5,D5
D16 .... C6,D5
D17 .... C6,D6
D19 .... G5,H3
D20 .... D6,C6
D21 .... G6,G2
D22 .... C6,D5
D23 .... C4,G6
D24 .... G6,H5
D25 .... G5,J3
D26 .... F6,G4
D28 .... F3,J2
D29 .... G1,E1

D31 .... D5,J6
D32 .... B4,H6
D33 .... B4,J6
D34 .... E6,H4

IC1 .... C2,D1
IC2 .... C1,D2
IC3 .... G2,F1
IC4 .... C3,H5
IC5 .... D3,E5
IC6 .... H5,F5
IC7 .... B5,B5
IC8 .... H5,G3
IC9 .... D5,J6

SF1 .... C2,D1

L1 .... B2,C1
L2 .... C1,D3
L3 .... D1,D3
L4 .... D2,C2
L5 .... D2,D3
L6 .... F2,E3
L7 .... F2,F2
L9 .... G1,F2
L10 .... H1,F2
L12 .... D3,F5
L13 .... A6,B2
L14 .... B7,B4
L15 .... B6,A5
L17 .... F4,H3

L18 .... G7,J4
L19 .... G7,G3
L20 .... C6,B5
L21 .... C6,D5
L23 .... D5,C6
L26 .... A7,A2
L27 .... G6,J4

T1 .... C5,C5
T2 .... E5,J5
T3 .... F3,H2

CF1 .... D3,E5
DL1 .... G1,F2
DL2 .... F1,D2
FB1 .... B6,A5
FB4 .... G6,H4
FS1 .... A7,B1
XL1 .... F2,F2
RL1 .... D6,C6
S1 .... A7,*

PL1 .... A6,A3
PL2 .... A6,A3
PL3 .... A7,B2
PL4 .... —,D1
PL5 .... A1,C4
PL6 .... A2,D4
PL7 .... E4,E5
PL8 .... F1,E2
PL9 .... G6,H4

PL10 ..... G5,J3
PL11 ..... J5,F3
PL12 ..... A5,G5
PL13 ..... A4,G5
PL14 ..... K5,F4
PL15 ..... G3,E1
PL16 ..... E4,D4
PL17 ..... A4,D6
PL18 ..... D6,D5
PL19 ..... D1,D3
PL21 ..... D4,F5
PL22 ..... A5,E3
PL23 ..... A4,D5
PL24 ..... J6,F4
PL25 ..... B3,D4
PL26 ..... D4,H5
PL27 ..... B3,F3
PL28 ..... H2,F1
PL29 ..... H3,F1
PL30 ..... H2,F1
PL31 ..... H2,F1
PL32 ..... H3,F1
PL33 ..... —,F6
PL34 ..... C4,G4
PL34A ... C4,G5
PL35 ..... D4,F5
PL36 ..... D4,E6
PL37 ..... H4,J3
PL38 ..... H5,J3
PL39 ..... H2,F1
PL40 ..... E2,F3

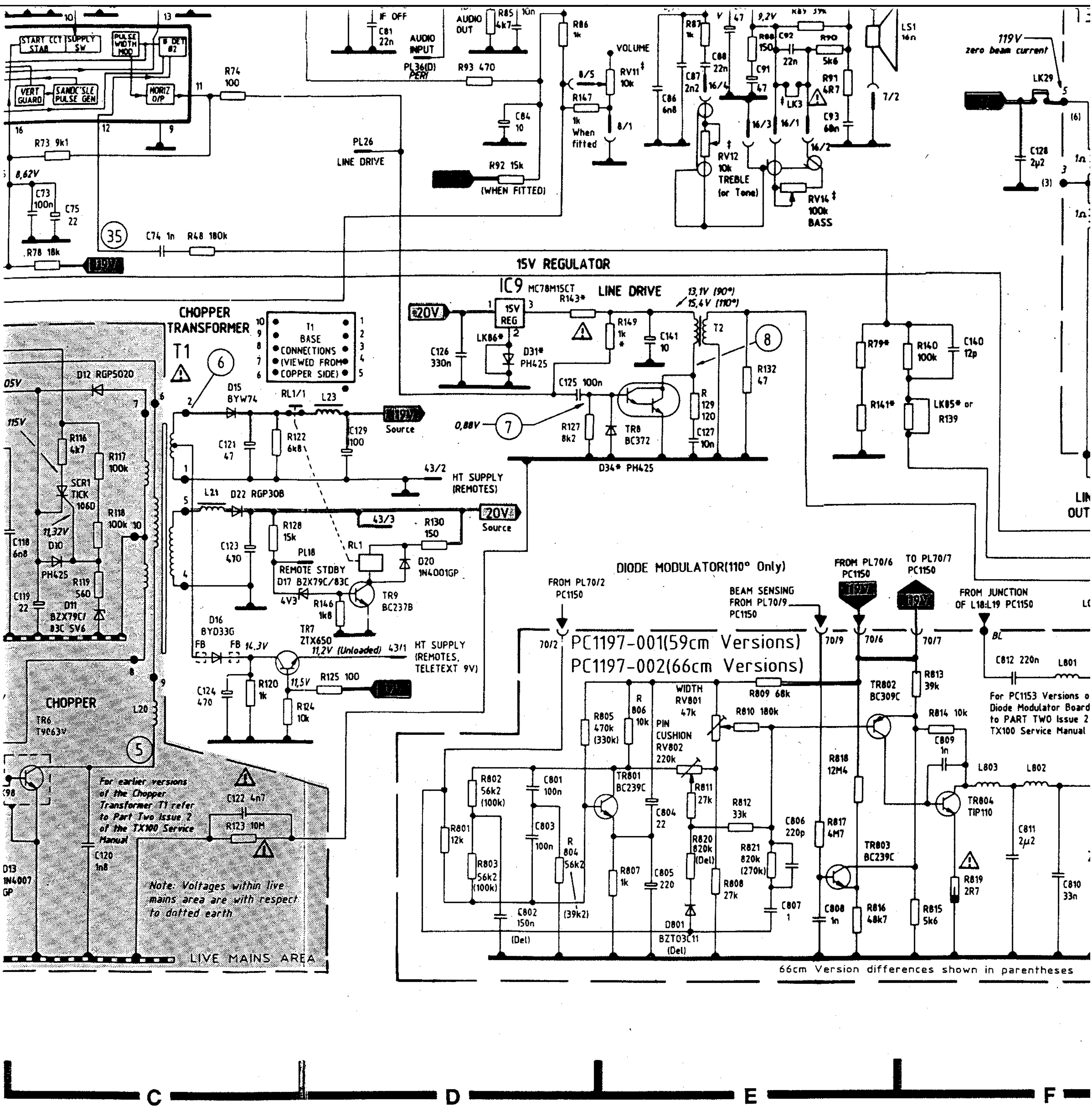
PL43 ..... D6,D5
PL44 ..... A4,D4
PL45 ..... C2,C4
PL46 ..... E3,E3
PL55 ..... —,J3
PL56 ..... F2,F2
PL57 ..... F1,F2
PL70 ..... E6,G1
PL95 ..... G5,H3
PL96 ..... G7,G4

LK2 .... B3,E4
LK3 .... E4,D4
LK4 .... A4,D4
LK8 .... B2,C3
LK15 ..... H1,F3
LK16 ..... H1,F3
LK17 ..... E2,F3
LK18 ..... E2,F3
LK22 ..... H1,G3
LK29 ..... F4,H2
LK33 ..... F7,H1
LK42 ..... G6,J4
LK73 ..... A1,C4
LK78 ..... D1,D4
LK79 ..... G7,G3
LK84 ..... J5,F5
LK85 ..... F5,H4
LK86 ..... D5,J6
LK98 ..... B7,B6

*Fro
if fit

PC
R80
R80
R80
R80
R80
R80
R80
R80
R80
R81
R81
R81
R81
R81
R81
R81
R81
R81
R81
R82
R821

RV80
RV80



D31 .... D5,J6
D32 .... B4,H6
D33 .... B4,J6
D34 .... E6,H4

IC1 .... C2,D1
IC2 .... C1,D2
IC3 .... G2,F1
IC4 .... C3,H5
IC5 .... D3,E5
IC6 .... H5,F5
IC7 .... B5,B5
IC8 .... H5,G3
IC9 .... D5,J6

SF1 .... C2,D1

L1 .... B2,C1
L2 .... C1,D3
L3 .... D1,D3
L4 .... D2,C2
L5 .... D2,D3
L6 .... F2,E3
L7 .... F2,F2
L9 .... G1,F2
L10 .... H1,F2
L12 .... D3,F5
L13 .... A6,B2
L14 .... B7,B4
L15 .... B6,A5
L17 .... F4,H3

L18 .... G7,J4
L19 .... G7,G3
L20 .... C6,B5
L21 .... C6,D5
L23 .... D5,C6
L26 .... A7,A2
L27 .... G6,J4

T1 .... C5,C5
T2 .... E5,J5
T3 .... F3,H2

CF1 .... D3,E5
DL1 .... G1,F2
DL2 .... F1,D2
FB1 .... B6,A5
FB4 .... G6,H4
FS1 .... A7,B1
XL1 .... F2,F2
RL1 .... D6,C6
S1 .... A7,*

PL1 .... A6,A3
PL2 .... A6,A3
PL3 .... A7,B2
PL4 .... —,D1
PL5 .... A1,C4
PL6 .... A2,D4
PL7 .... E4,E5
PL8 .... F1,E2
PL9 .... G6,H4

PL10 ..... G5,J3
PL11 ..... J5,F3
PL12 ..... A5,G5
PL13 ..... A4,G5
PL14 ..... K5,F4
PL15 ..... G3,E1
PL16 ..... E4,D4
PL17 ..... A4,D6
PL18 ..... D6,D5
PL19 ..... D1,D3
PL21 ..... D4,F5
PL22 ..... A5,E3
PL23 ..... A4,D5
PL24 ..... J6,F4
PL25 ..... B3,D4
PL26 ..... D4,H5
PL27 ..... B3,F3
PL28 ..... H2,F1
PL29 ..... H3,F1
PL30 ..... H2,F1
PL31 ..... H2,F1
PL32 ..... H3,F1
PL33 ..... —,F6
PL34 ..... C4,G4
PL34A ... C4,G5
PL35 ..... D4,F5
PL36 ..... D4,E6
PL37 ..... H4,J3
PL38 ..... H5,J3
PL39 ..... H2,F1
PL40 ..... E2,F3

PL43 ..... D6,D5
PL44 ..... A4,D4
PL45 ..... C2,C4
PL46 ..... E3,E3
PL55 ..... —,J3
PL56 ..... F2,F2
PL57 ..... F1,F2
PL70 ..... E6,G1
PL95 ..... G5,H3
PL96 ..... G7,G4

LK2 .... B3,E4
LK3 .... E4,D4
LK4 .... A4,D4
LK8 .... B2,C3
LK15 ..... H1,F3
LK16 ..... H1,F3
LK17 ..... E2,F3
LK18 ..... E2,F3
LK22 ..... H1,G3
LK29 ..... F4,H2
LK33 ..... F7,H1
LK42 ..... G6,J4
LK73 ..... A1,C4
LK78 ..... D1,D4
LK79 ..... G7,G3
LK84 ..... J5,F5
LK85 ..... F5,H4
LK86 ..... D5,J6
LK98 ..... B7,B6

*Front Control if fitted

PC1197

R801 ..... D7,B1
R802 ..... D7,B1
R803 ..... D7,B1
R804 ..... D7,B1
R805 ..... D6,B1
R806 ..... E6,A1
R807 ..... E7,B1
R808 ..... E7,A1
R809 ..... E6,A1
R810 ..... E6,A1
R811 ..... E7,A1
R812 ..... E7,A1
R813 ..... F6,A2
R814 ..... F6,A2
R815 ..... F7,A2
R816 ..... E7,A2
R817 ..... E7,B2
R818 ..... E6,B2
R819 ..... F7,A2
R820 ..... E7,A1
R821 ..... E7,B1

RV801 ... E6,A1
RV802 ... E6,A1

C801 ..... D7,B1
C802 ..... D7,B1
C803 ..... D7,B1
C804 ..... E7,B1
C805 ..... E7,B1
C806 ..... E7,B1
C807 ..... E7,B1
C808 ..... E7,B2
C809 ..... F6,A2
C810 ..... F7,B2
C811 ..... F7,B2
C812 ..... F6,B1

TR801 ... E7,B1
TR802 ... E6,A2
TR803 ... E7,A2
TR804 ... F7,A2

D801 ..... E7,A2
D802 ..... F7,B2

L801 ...... F6,A1
L802 ...... F7,B2
L803 ...... F7,A2

SK70 ..... E6,B2

PC1173

R601 ...... J1,C2
R602 ...... J1,C2
R603 ...... J1,B2
R604 ...... J1,B2
R605 ...... J2,C1
R606 ...... J2,C1
R607 ...... J1,C1
R608 ...... J2,B2
R609 ...... J2,C1
R610 ...... J2,C1
R611 ...... J2,C1
R612 ...... J2,C1
R613 ...... J3,B2
R614 ...... J1,B2
R615 ...... J1,B1
R616 ...... J2,B1
R617 ...... J2,C2
R618 ...... J3,C2
R619 ..... H4,A1
R620 ..... H4,A1
R621 ...... J4,A1
R622 ..... H4,A2
R623 ..... H3,A2
R624 ..... K4,A2
R625 ..... K4,B2

RV61 .... H1,C2
RV62 ..... J2,C1
RV63 ..... J2,C1

C601 ..... H1,C2
C602 ..... H2,C1
C603 ..... H2,C1
C604 ...... J2,C1
C605 ...... J1,C1
C606 ...... J1,B2
C607 ...... J1,B2
C608 ...... J2,B1
C609 ...... J1,C2
C610 ...... J1,C1
C611 ...... J2,C1
C612 ..... H4,A1
C613 ...... J4,B2
C614 ...... J3,C2

TR60 ...... J3,C2
TR61 ...... J1,C2
TR62 ...... J1,B2
TR63 ...... J2,C1
TR64 ...... J2,B1
TR65 ...... J2,C1
TR66 ...... J2,B1
TR67 ...... J1,B2
TR68 ...... J1,B1
TR69 ...... J2,B1

D601 ...... J1,C2
D602 ...... J2,C1
D603 ...... J2,C1
D604 ...... J1,C2
D605 ...... J2,C1
D606 ...... J2,C1

TB61 ..... —,A2

TG61 .... H4,A1
TG62 ...... J3,—

P601 ..... K1,C1
P602 ..... H2,C1
P603 ..... H2,C1
P604 ..... H2,C2
P605 ..... H2,C2
P606 ..... H3,C2
P607 ..... H3,C2
P608 ..... H4,A2
P609 ..... H4,B2

PC1174

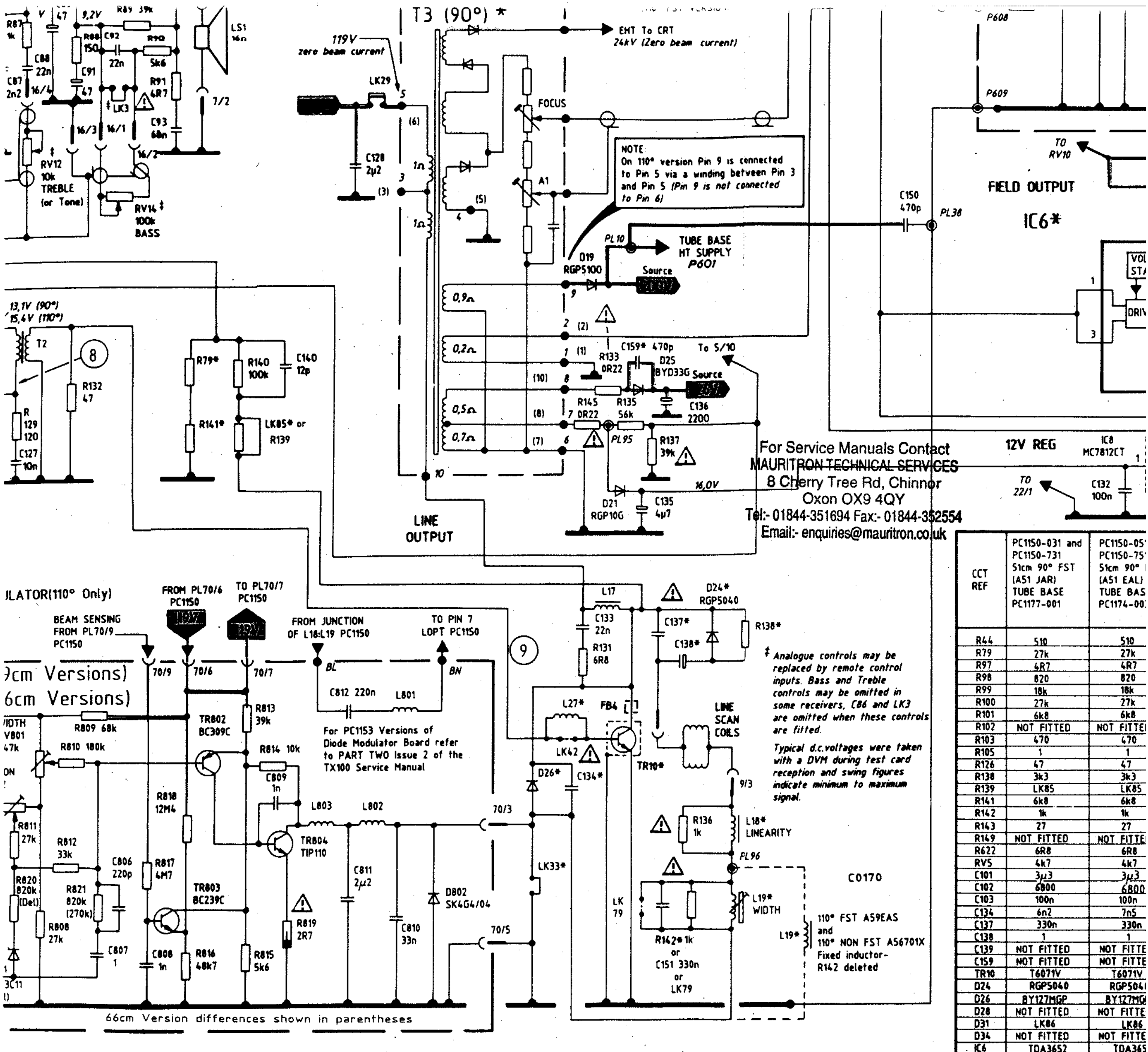
R601 ...... J1,A1
R602 ...... J1,A1
R603 ...... J1,B1
R604 ...... J1,B1
R605 ...... J2,A2
R606 ...... J2,A1
R607 ...... J1,B1
R608 ...... J2,B1
R609 ...... J2,A2
R610 ...... J2,A2
R611 ...... J2,B2
R612 ...... J2,B2
R613 ...... J3,B1
R614 ...... J1,B1
R615 ...... J1,B2
R616 ...... J2,B2
R617 ...... J2,B1

R618 ....
R619 ....
R620 ....
R621 ....
R622 ....
R623 ....
R624 ....
R625 ....

RV61 ....
RV62 ....
RV63 ....

C601 ....
C602 ....
C603 ....
C604 ....
C605 ....
C606 ....
C607 ....
C608 ....
C609 ....
C610 ....
C611 ....
C612 ....
C613 ....
C614 ....

TR60 ....
TR61 ....
TR62 ....



CCT REF	PC1150-031 and PC1150-731 51cm 90° FST (A51 JAR) TUBE BASE PC1177-001	PC1150-05 PC1150-75 51cm 90° (A51 EAL) TUBE BAS PC1174-00
R44	510	510
R79	27k	27k
R97	4R7	4R7
R98	820	820
R99	18k	18k
R100	27k	27k
R101	6k8	6k8
R102	NOT FITTED	NOT FITTE
R103	470	470
R105	1	1
R126	47	47
R138	3k3	3k3
R139	LK85	LK85
R141	6k8	6k8
R142	1k	1k
R143	27	27
R149	NOT FITTED	NOT FITTE
R622	6R8	6R8
RV5	4k7	4k7
C101	3µ3	3µ3
C102	6800	6800
C103	100n	100n
C134	6n2	7n5
C137	330n	330n
C138	1	1
C139	NOT FITTED	NOT FITTE
C159	NOT FITTED	NOT FITTE
TR10	T6071V	T6071V
D24	RGP5040	RGP504
D26	BY127MGP	BY127MG
D28	NOT FITTED	NOT FITTE
D31	LK86	LK86
D34	NOT FITTED	NOT FITTE
IC6	TDA3652	TDA365
L18	06D4-026-001	06D4-026-
L19	06D4-034-001	06D4-034-
L27	NOT FITTED	NOT FITTE
T3	00D3-507-001	06D3-088-
LK33	LINK FITTED	LINK FITTE

*TX100 Basic Chassis component differences, including 90° and 110° FST, also 90° and 110° non FST Tube versions

E F G H

R604......J1,B2
R605......J2,C1
R606......J2,C1
R607......J1,C1
R608......J2,B2
R609......J2,C1
R610......J2,C1
R611......J2,C1
R612......J2,C1
R613......J3,B2
R614......J1,B2
R615......J1,B1
R616......J2,B1
R617......J2,C2
R618......J3,C2
R619.....H4,A1
R620.....H4,A1
R621......J4,A1
R622.....H4,A2
R623.....H3,A2
R624.....K4,A2
R625.....K4,B2

RV61 ....H1,C2
RV62 .....J2,C1
RV63 .....J2,C1

C601.....H1,C2
C602.....H2,C1
C603.....H2,C1
C604......J2,C1
C605......J1,C1
C606......J1,B2
C607......J1,B2
C608......J2,B1
C609......J1,C2
C610......J1,C1
C611......J2,C1
C612.....H4,A1
C613......J4,B2
C614......J3,C2

TR60......J3,C2
TR61......J1,C2
TR62......J1,B2
TR63......J2,C1
TR64......J2,B1
TR65......J2,C1
TR66......J2,B1
TR67......J1,B2
TR68......J1,B1
TR69......J2,B1

D601......J1,C2
D602......J2,C1
D603......J2,C1
D604......J1,C2
D605......J2,C1
D606......J2,C1

TB61 ..... —,A2

TG61 .... H4,A1
TG62 ......J3,—

P601 ..... K1,C1
P602 ..... H2,C1
P603 ..... H2,C1
P604 ..... H2,C2
P605 ..... H2,C2
P606 ..... H3,C2
P607 ..... H3,C2
P608 ..... H4,A2
P609 ..... H4,B2

PC1174

R601...... J1,A1
R602...... J1,A1
R603...... J1,B1
R604...... J1,B1
R605...... J2,A2
R606...... J2,A1
R607...... J1,B1
R608...... J2,B1
R609...... J2,A2
R610...... J2,A2
R611...... J2,B2
R612...... J2,B2
R613...... J3,B1
R614...... J1,B1
R615...... J1,B2
R616...... J2,B2
R617...... J2,B1
R618...... J3,A1
R619..... H4,C1
R620.....H4,B2
R621..... J4,B1
R622.....H4,B1
R623.....H3,B1
R624.....K4,B1
R625.....K4,B1

RV61 .....H1,A1
RV62 ..... J2,A1
RV63 ..... J2,A2

C601 .....H1,A1
C602 .....H2,A1
C603 .....H2,A2
C604 ..... J2,A2
C605 ..... J1,A2
C606 ..... J1,B1
C607 ..... J1,B1
C608 ..... J2,B2
C609 ..... J1,B1
C610 ..... J1,B1
C611 ..... J2,B2
C612 .....H4,B2
C613 .... H4,C1
C614 ..... J3,A1

TR60 ..... J3,A1
TR61 ..... J1,A1
TR62 ..... J1,B1
TR63 ..... J2,A1
TR64 ..... J2,B1
TR65 ..... J2,A2
TR66 ..... J2,B2
TR67 ..... J1,B1
TR68 ..... J1,B2
TR69 ..... J2,B2

D601 ..... J1,B1
D602 ..... J2,A1
D603 ..... J2,B2
D604 ..... J1,A1
D605 ..... J2,A2
D606 ..... J2,A2

TB61 ..... —,C1

TG61 .... H4,C2
TG62 ..... J3,C2

P601......K1,A2
P602......H2,A1
P603......H2,A1
P604......H2,A1
P605......H2,A1
P606......H3,A1
P607......H3,A1
P608..... H4,C1
P609..... H4,C2

PC1175

R601 ......J1,A1
R602 ......J1,A1
R603 ......J1,B1
R604 ......J1,B1
R605 ......J2,A2
R606 ......J2,A1
R607 ......J1,B2
R608 ......J2,B1
R609 ......J2,A2
R610 ......J2,A2
R611 ......J2,B2
R612 ......J2,B2
R613 ......J3,B1
R614 ......J1,B1
R615 ......J1,B2
R616 ......J2,B2
R617 ......J2,A1
R618 ......J3,A1
R619 .....H4,C1
R620 .....H4,B2
R621 ......J4,B1
R622 .....H4,B1
R623 .....H3,B1
R624 ..... K4,B1
R625 ..... K4,B1

RV61 .....H1,A1
RV62 ......J2,A1
RV63 ......J2,A2

C601 .....H1,A1
C602 .....H2,A2
C603 .....H2,A2
C604 ......J2,A2
C605 ......J1,A2
C606 ......J1,B1
C607 ......J1,B1
C608 ......J2,B2
C609 ......J1,B1
C610 ......J1,B1
C611 ......J2,B2
C612 .....H4,B2
C613 .....H4,C1
C614 ......J3,A1

TR60 ......J3,A1
TR61 ......J1,A1
TR62 ......J1,B1
TR63 ......J2,A2
TR64 ......J2,B1
TR65 ......J2,A2
TR66 ......J2,B2
TR67 ......J1,B1
TR68 ......J1,B2
TR69 ......J2,B2

D601 ......J1,B1
D602 ......J2,B1
D603 ......J2,B2
D604 ......J1,B1
D605 ......J2,B2
D606 ......J2,B2

TB61 ......—,C1

TG61.....H4,C2
TG62..... J3,C2

P601 ..... K1,A2
P602 .....H2,A2
P603 .....H2,A1
P604 .....H2,A1
P605 .....H2,A1
P606 .....H3,A1
P607 .....H3,A1
P608 .....H4,C1
P609 .....H4,B2

PC1177

R601 ......J1,A1
R602 ......J1,A1
R603 ......J1,A1
R604 ......J1,B1
R605 ......J2,A2
R606 ......J2,A1
R607 ......J1,A2
R608 ......J2,B1
R609 ......J2,A2
R610 ......J2,B2
R611 ......J2,B2
R612 ......J2,B2
R613 ......J3,A1
R614 ......J1,B1
R615 ......J1,B2
R616 ......J2,B2
R617 ......J2,A1
R618 ......J3,A1
R619 ..... H4,B1
R620 .....H4,B2
R621 ......J4,B2
R622 ..... H4,B2
R623 ..... H3,B1
R624 ..... K4,B1
R625 ..... K4,B1

RV61.....H1,A1
RV62......J2,A1
RV63......J2,A2

C601.....H1,A1
C602.....H2,A2
C603.....H2,A2
C604......J2,A2
C605......J1,A2
C606......J1,B1
C607......J1,B1
C608......J2,B2
C609......J1,A1
C610......J1,A1
C611......J2,A2
C612.....H4,
C613.....H4,
C614......J3,

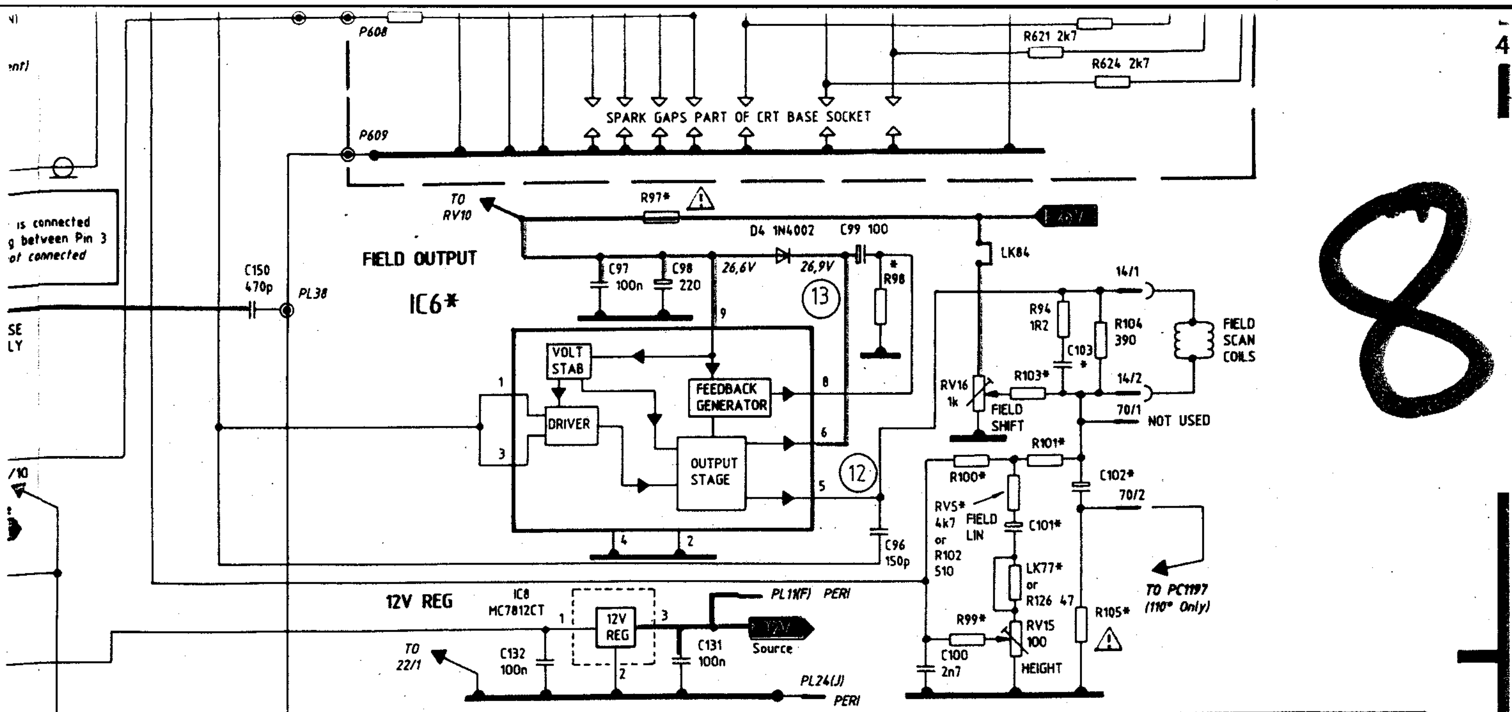
TR60......J3,
TR61......J1,
TR62......J1,
TR63......J2,
TR64......J2,
TR65......J2,
TR66......J2,
TR67......J1,
TR68......J1,
TR69......J2,

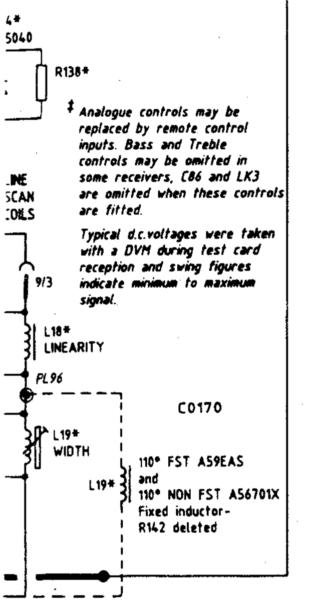
D601......J1,
D602......J2,
D603......J2,
D604......J1,
D605......J2,
D606......J2,

TB61...... —,

TG61 ....H4,
TG62 .....J3,

P601 ..... K1,
P602 .....H2,
P603 .....H2,
P604 .....H2,





‡ *Analogue controls may be replaced by remote control inputs. Bass and Treble controls may be omitted in some receivers, C86 and LK3 are omitted when these controls are fitted.*

Typical d.c.voltages were taken with a DVM during test card reception and swing figures indicate minimum to maximum signal.

CCT REF	PC1150-031 and PC1150-731 51cm 90° FST (A51 JAR) TUBE BASE PC1177-001	PC1150-051 and PC1150-751 51cm 90° FST (A51 EAL) TUBE BASE PC1174-003	PC1150-131 and PC1150-831 59cm and 66cm 110° FST (A59EAK or A66EAK) TUBE BASE PC1174-003	PC1150-841 59cm 110° FST (A59EAS) TUBE BASE PC1175-001	PC1150-014 20" 90° NON FST (A51 590X or A51 427X) TUBE BASE PC1174-001	PC1150-111 22" and 26" 110° NON FST (A56 540X 22" or A66 540X 26") TUBE BASE PC1173-001	PC1150-121 22" 110° NON FST (A56 701X) TUBE BASE PC1175-001
R44	510	510	430	430	510	510	510
R79	27k	27k	24k	24k	27k	24k	24k
R97	4R7	4R7	0R68	1R2	4R7	0R68	1R2
R98	820	820	560	620	820	560	560
R99	18k	18k	15k	18k	27k	18k	18k
R100	27k	27k	27k	27k	47k	27k	27k
R101	6k8	6k8	3k3	6k8	8k2	6k8	6k8
R102	NOT FITTED	NOT FITTED	NOT FITTED	NOT FITTED	510	NOT FITTED	NOT FITTED
R103	470	470	220	470	470	220	470
R105	1	1	0R68	0R68	1R5	0R68	1
R126	47	47	47	47	LK77	47	47
R138	3k3	3k3	3k	NOT FITTED	3k3	NOT FITTED	NOT FITTED
R139	LK85	LK85	24k	24k	LK85	24k	24k
R141	6k8	6k8	5k6	5k6	6k8	5k6	5k6
R142	1k	1k	C151	NOT FITTED	1k	LK79	NOT FITTED
R143	27	27	6R8	6R8	27	6R8	6R8
R149	NOT FITTED	NOT FITTED	1k	1k	NOT FITTED	1k	1k
R622	6R8	6R8	6R8	2R7	6R8	3R0	2R7
RV5	4k7	4k7	1k	4k7	R102	4k7	4k7
C101	3µ3	3µ3	6µ8	3µ3	10µ	3µ3	3µ3
C102	6800	6800	6800	4700	1000	6800	4700
C103	100n	100n	330n	330n	100n	330n	330n
C134	6n2	7n5	9n53	10n5	7n5	10n	9n53
C137	330n	330n	820n	330n	470n	330n	330n
C138	1	1	3µ3	NOT FITTED	1	NOT FITTED	NOT FITTED
C139	NOT FITTED	NOT FITTED	100	100	NOT FITTED	100	100
C159	NOT FITTED	NOT FITTED	470p	NOT FITTED	NOT FITTED	NOT FITTED	NOT FITTED
TR10	T6071V	T6071V	T9063V	T9063V	T6071V	T9063V	T9063V
D24	RGP5040	RGP5040	RGP5040	NOT FITTED	RGP5040	NOT FITTED	NOT FITTED
D26	BY127MGP	BY127MGP	BY228	BY228	BY127MGP	BY228	BY228
D28	NOT FITTED	NOT FITTED	BY299	BY299	NOT FITTED	BY299	BY299
D31	LK86	LK86	TYPE 425	TYPE 425	LK86	TYPE 425	TYPE 425
D34	NOT FITTED	NOT FITTED	TYPE 425	TYPE 425	NOT FITTED	TYPE 425	TYPE 425
IC6	TDA3652	TDA3652	TDA3652	TDA3652	TDA3651	TDA3652	TDA3652
L18	06D4-026-001	06D4-026-001	06D4-038-001	06D4-028-001	06D4-026-001	06D4-028-001	06D4-028-001
L19	06D4-034-001	06D4-034-001	NOT FITTED(C151)	06D4-036-001	06D4-034-001	NOT FITTED(C151)	06D4-036-001
L27	NOT FITTED	NOT FITTED	L1680-WA000-TD4	L1680-WA000-TD4	NOT FITTED	L1680-WA000-TD4	L1680-WA000-TD4
T3	00D3-507-001	06D3-088-001	06D3-093-001	06D3-093-001	06D3-083-002	06D3-087-001	06D3-084-001
LK33	LINK FITTED	LINK FITTED	NOT FITTED	NOT FITTED	LINK FITTED	NOT FITTED	NOT FITTED

differences, including 90° and 110°
Tube versions

H J K

C601 .....H1,A1
C602 .....H2,A2
C603 .....H2,A2
C604 ......J2,A2
C605 ......J1,A2
C606 ......J1,B1
C607 ......J1,B1
C608 ......J2,B2
C609 ......J1,B1
C610 ......J1,B1
C611 ......J2,B2
C612 ....H4,B2
C613 .....H4,C1
C614 ......J3,A1

TR60 ......J3,A1
TR61 ......J1,A1
TR62 ......J1,B1
TR63 ......J2,A2
TR64 ......J2,B1
TR65 ......J2,A2
TR66 ......J2,B2
TR67 ......J1,B1
TR68 ......J1,B2
TR69 ......J2,B2

D601 ......J1,B1
D602 ......J2,B1
D603 ......J2,B2
D604 ......J1,B1

D605 ......J2,B2
D606 ......J2,B2

TB61 ......—,C1

TG61 .....H4,C2
TG62 ..... J3,C2

P601 ..... K1,A2
P602 .....H2,A2
P603 .....H2,A1
P604 .....H2,A1
P605 .....H2,A1
P606 .....H3,A1
P607 .....H3,A1
P608 .....H4,C1
P609 .....H4,B2

PC1177

R601 ......J1,A1
R602 ......J1,A1
R603 ......J1,A1
R604 ......J1,B1
R605 ......J2,A2
R606 ......J2,A1
R607 ......J1,A2
R608 ......J2,B1
R609 ......J2,A2
R610 ......J2,B2
R611 ......J2,B2
R612 ......J2,B2
R613 ......J3,A1
R614 ......J1,B1
R615 ......J1,B2
R616 ......J2,B2
R617 ......J2,A1
R618 ......J3,A1
R619 ..... H4,B1
R620 ..... H4,B2
R621 ......J4,B2
R622 ..... H4,B2
R623 ..... H3,B1
R624 ..... K4,B1
R625 ..... K4,B1

RV61 ..... H1,A1
RV62 ......J2,A1
RV63 ......J2,A2

C601 ..... H1,A1
C602 ..... H2,A2
C603 ..... H2,A2
C604 ......J2,A2
C605 ......J1,A2
C606 ......J1,B1
C607 ......J1,B1
C608 ......J2,B2
C609 ......J1,A1
C610 ......J1,A1
C611 ......J2,A2

C612 ..... H4,C2
C613 ..... H4,C1
C614 ......J3,A1

TR60 ......J3,A1
TR61 ......J1,A1
TR62 ......J1,B1
TR63 ......J2,A2
TR64 ......J2,B1
TR65 ......J2,A2
TR66 ......J2,B2
TR67 ......J1,B1
TR68 ......J1,B2
TR69 ......J2,B2

D601 ......J1,A1
D602 ......J2,A1
D603 ......J2,A2
D604 ......J1,B1
D605 ......J2,B2
D606 ......J2,B2

TB61 ...... —,C1

TG61 ....H4,C1
TG62 .....J3,C2

P601 ..... K1,A1
P602 ..... H2,A1
P603 ..... H2,A1
P604 ..... H2,A1

P605 ..... H2,A1
P606 ..... H3,A1
P607 ..... H3,A1
P608 ..... H4,B2
P609 ..... H4,C2

02P1-844-018
(Part of 02P1-844)

OSCILLOGRAMS

The trace pictures were taken from a typical receiver at the points indicated by encircled numbers.
The oscillograms are shown in PART TWO Issue 1 of the TX100 Service Manual.

THORN EMI

FERGUSON TX

Colour Television Service Manual

TX100

PART TWO

Issue 3 June 1987

INSTALLATION and ACCESS FOR SERVICE

SAFETY COVER

As indicated on the circuit diagram an area of the main printed circuit board, PC1150, carries live mains. This area is protected by a moulded plastic cover, which should not be removed unless absolutely necessary. Adequate precautions must be taken when servicing in this area.

Mains Connection

The receiver operates from a.c. mains supplies 185V-265V 50Hz. No input adjustment is required.

The chassis is isolated. As indicated on the top printing, an area of the printed circuit board carries live mains and this is protected above and below by plastic covers which should not be removed unless absolutely necessary.

Fuse

FS1 mains input T2A5 (20mm cartridge type).

Degaussing

The built-in degaussing circuit operates whenever the receiver is switched on from cold, neutralizing all but the most severe cases of magnetization.

On installation, the receiver may be manually degaussed with an external coil should this be considered necessary.

Aerial

A wide bandwidth aerial is required and careful siting and orientation are necessary for the best signal strength with freedom from ghosting on all available channels. This is particularly important when installing a receiver fitted with teletext facilities. Low-loss 75Ω coaxial feeder should be used.

Automatic Inter-Station Muting

When switched on with the aerial disconnected, or if the receiver is not tuned into a station with the aerial connected, the usual background noise is automatically silenced. There is, therefore, no background noise between stations during the tuning-in procedure.

Removing Cabinet Back

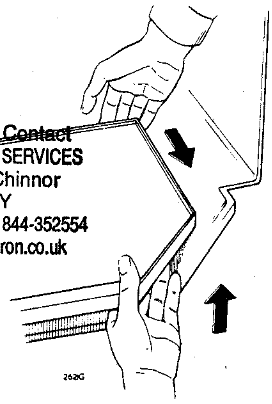
The cabinet back moulding hooks into slots in the cabinet base, and is held at the top by either plastic screws or a simple barb and catch arrangement. Press down on the barb whilst pulling the top of the back away from the cabinet. Swing back the top to free the back moulding from the slots in the cabinet base.

Chassis Removal

The chassis frame is positioned in the bottom of the cabinet by lugs on either side of the frame which locate in slots at the bottom of the cabinet. The chassis is latched into the cabinet base by a lip on each of the rear lugs.

On certain models the chassis is further secured to the cabinet base by the addition of three or four screws. It is important to replace these screws if they are removed during servicing.

To remove the chassis, unscrew the securing screws (if fitted) and lift the right-hand side rear of the chassis frame in order to detach it. With the other hand, push the right-hand side front of the chassis frame towards the rear of the cabinet; refer to diagram. Repeat this procedure with the left-hand side of the chassis frame after which the chassis may be removed or fitted into the servicing position.



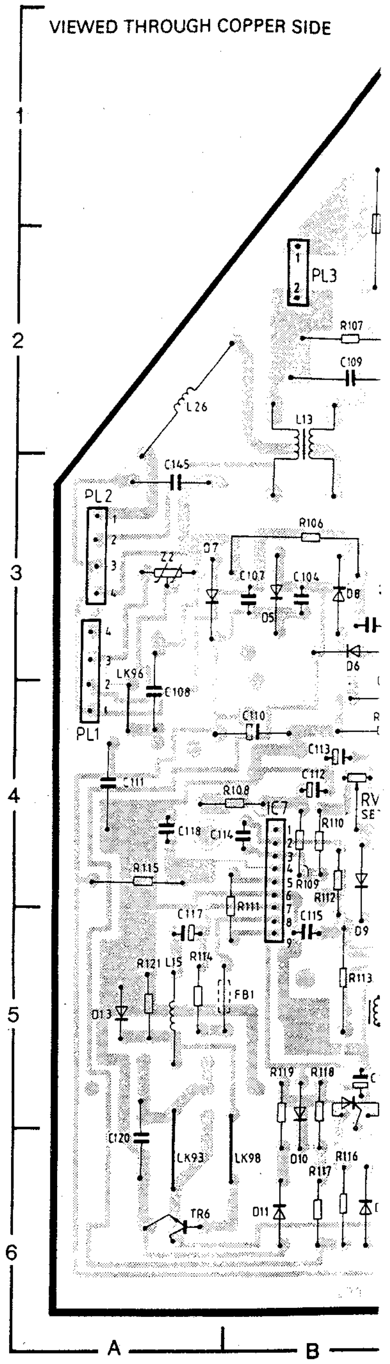
Removing Chassis from Cabinet

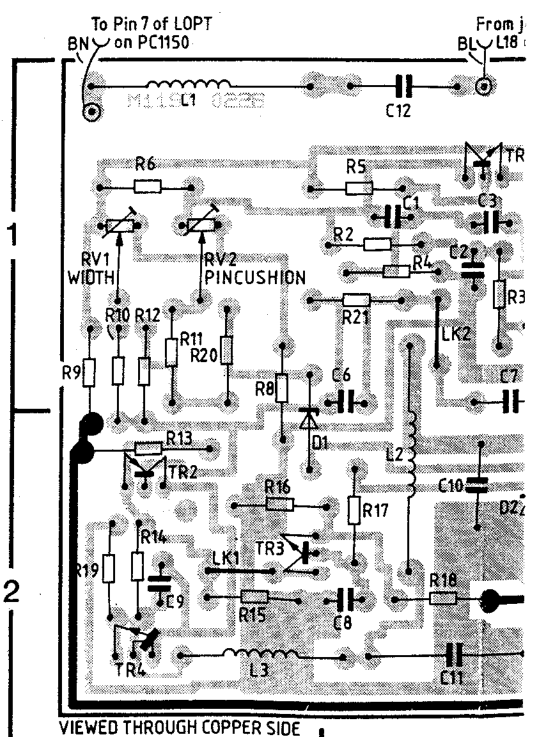
Chassis Servicing Position

The chassis may be fitted into a sloping position to enable the printed circuit board to be easily serviced whilst in an operational mode, both component and copper sides being accessible. The two protruding lugs at the front of the chassis frame slot into the cabinet base.

Component Differences for the 66cm Version of PC1197-(002)

R802	100k 5%
R803	100k 5%
R804	39.2k 1%
R805	330k 5%
R821	270k 5%
R820	Deleted
C802	Deleted





SEMICONDUCTOR BASES

ALL BASES EXCEPT *

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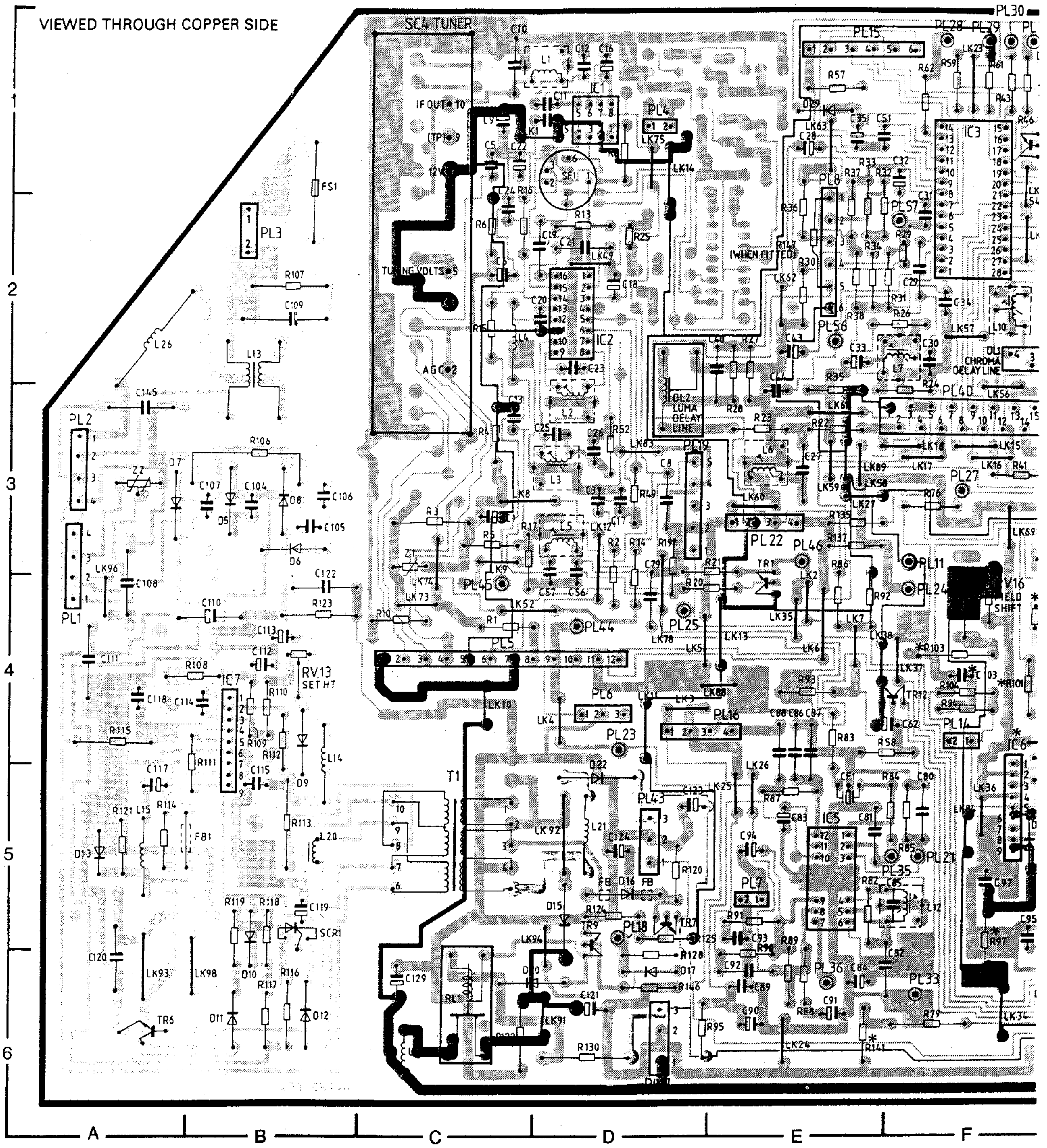

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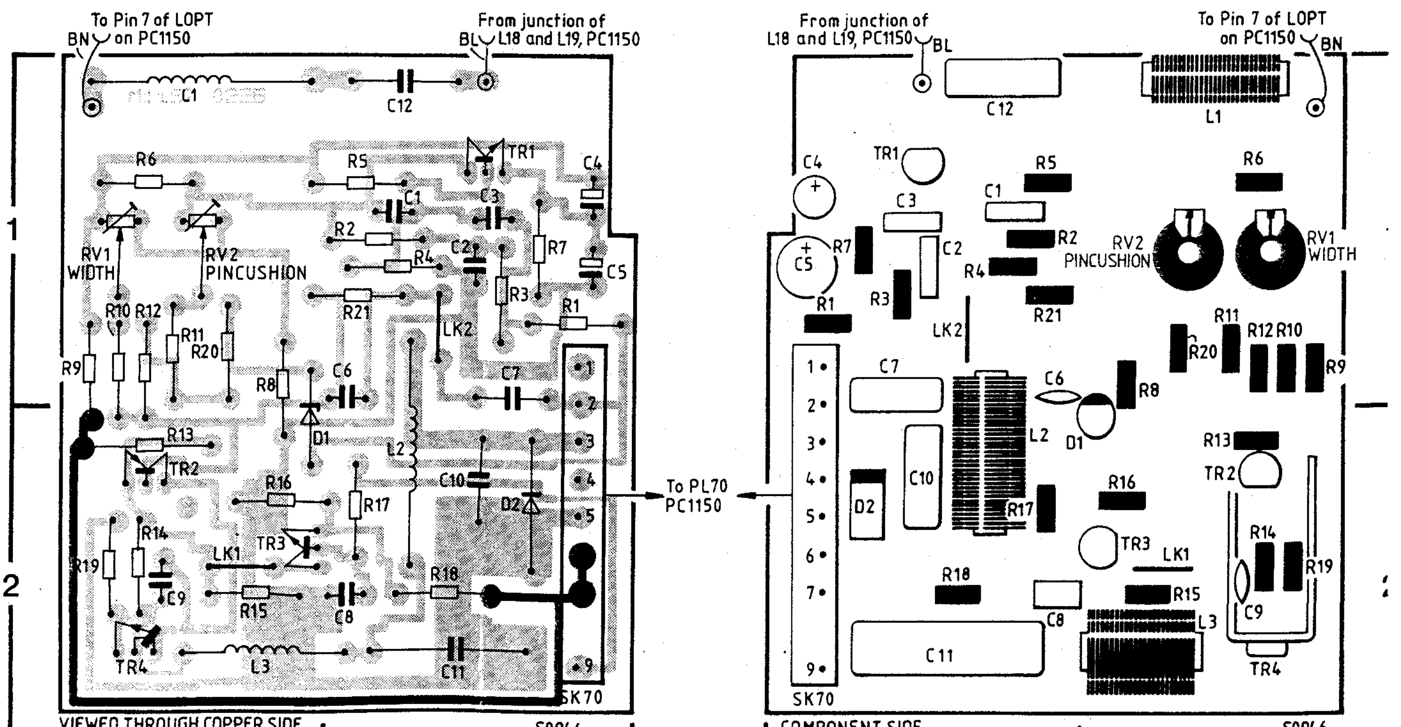

ences for ersion of 197-(002)

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.... 100k 5%
...39.2k 1%
.... 330k 5%
.... 270k 5%
..... Deleted
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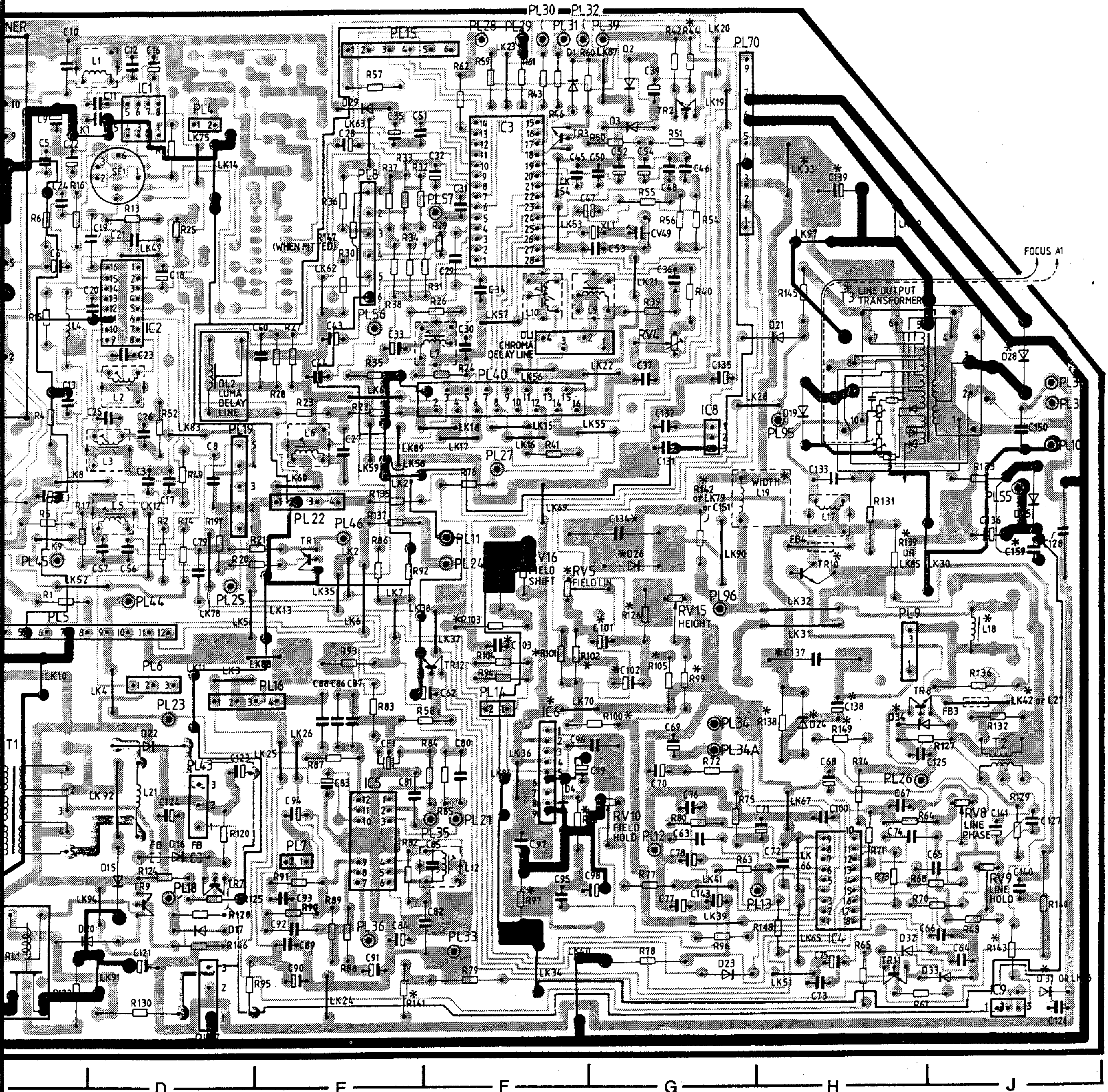

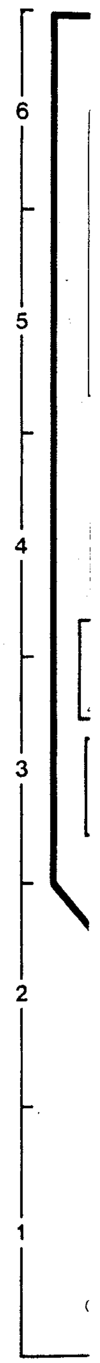

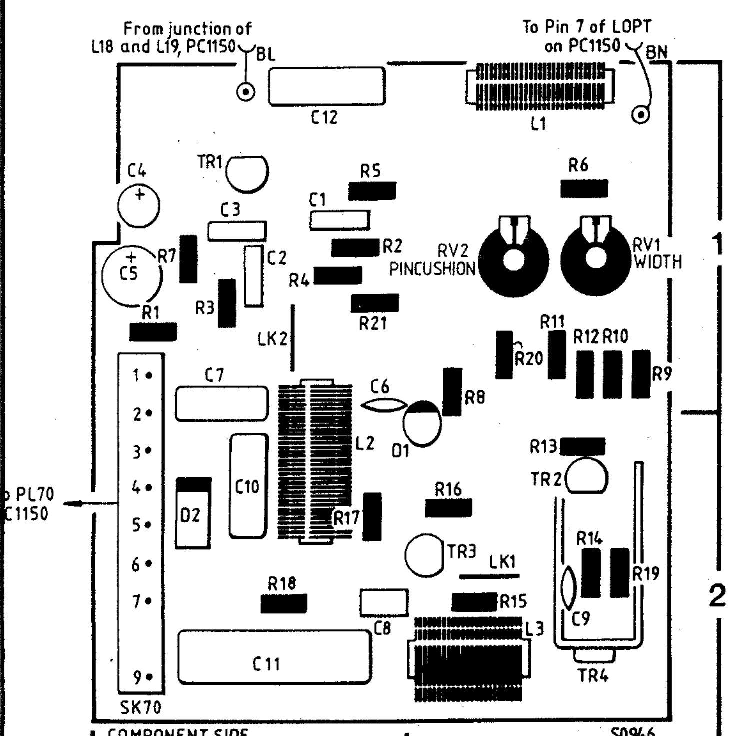

Main Board, PC1150 (*all versions)
*Component differences for various versions of the Main Board PC1150 are shown in the table overleaf

SERVICING ADJUSTMENTS

Full adjustment procedures, some of which may require the use of an oscilloscope etc; are given in the Main Chassis information section.

WARNING

EHT Shock Hazard

The EHT must be safely discharged before attempting to disconnect the EHT lead from the tube anode.

Clip one end of a convenient lead, such as a meter lead, to the tube earthing strap on the tube body, fold back the suction cap and discharge the EHT

Field Linearity (

Adjust RV5 for b
top and bottom

Line linearity is f

Picture Shift (R

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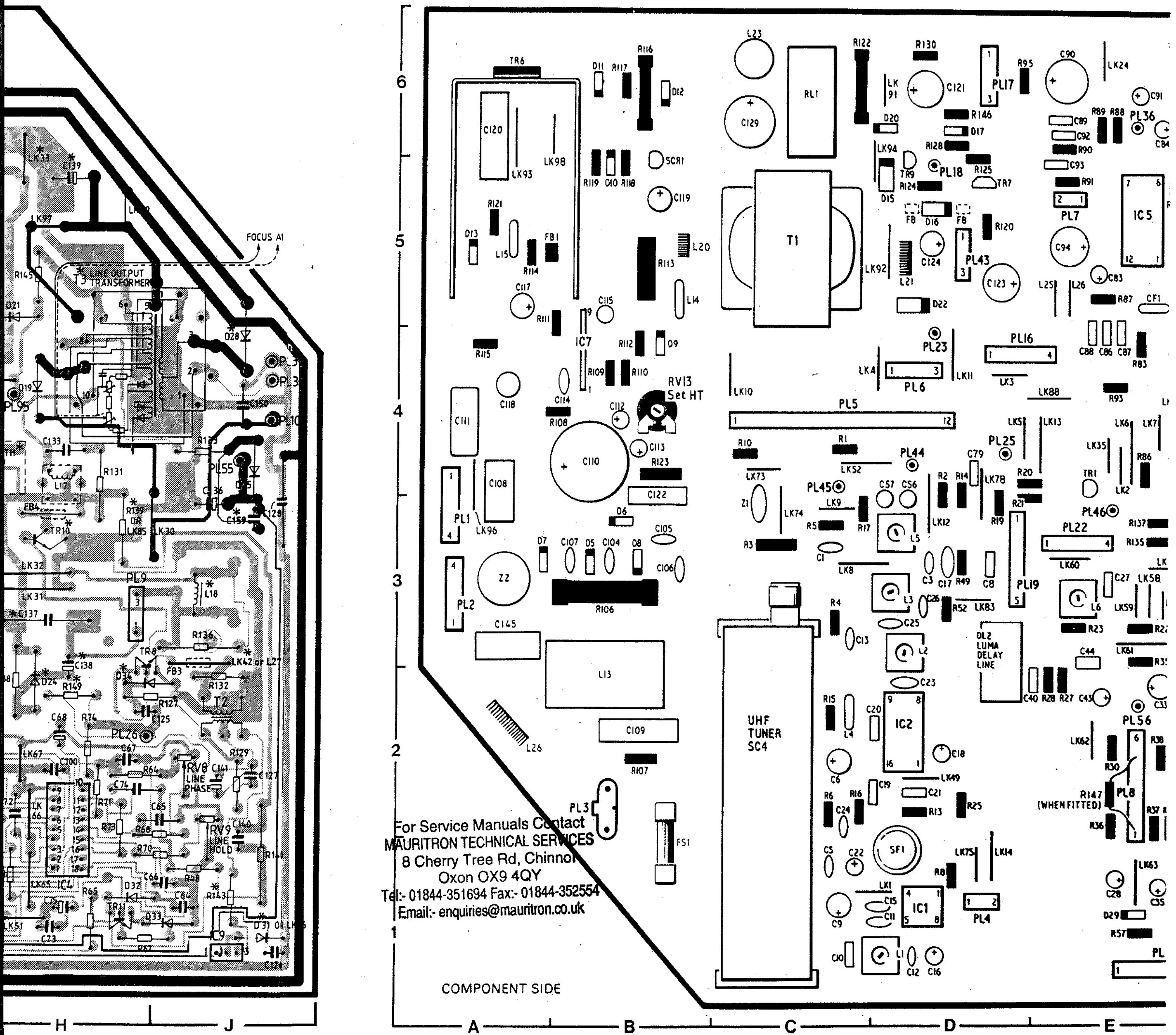

…rd, PC1150 (*all versions)
…ent differences for various versions of the
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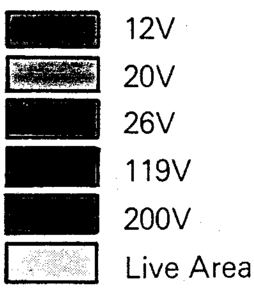

⚠ indicates critical safety components, and identical components should be used for replacement.

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Line linearity is fixed.

Picture Shift (RV8 and RV16)

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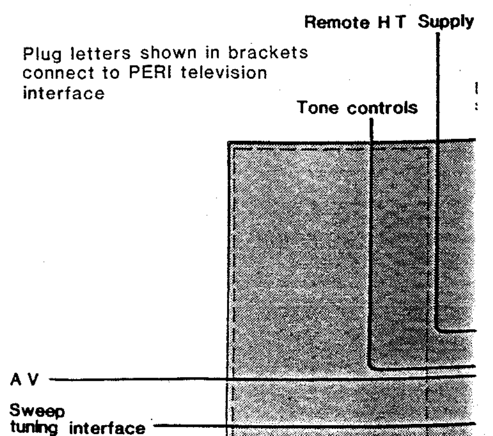

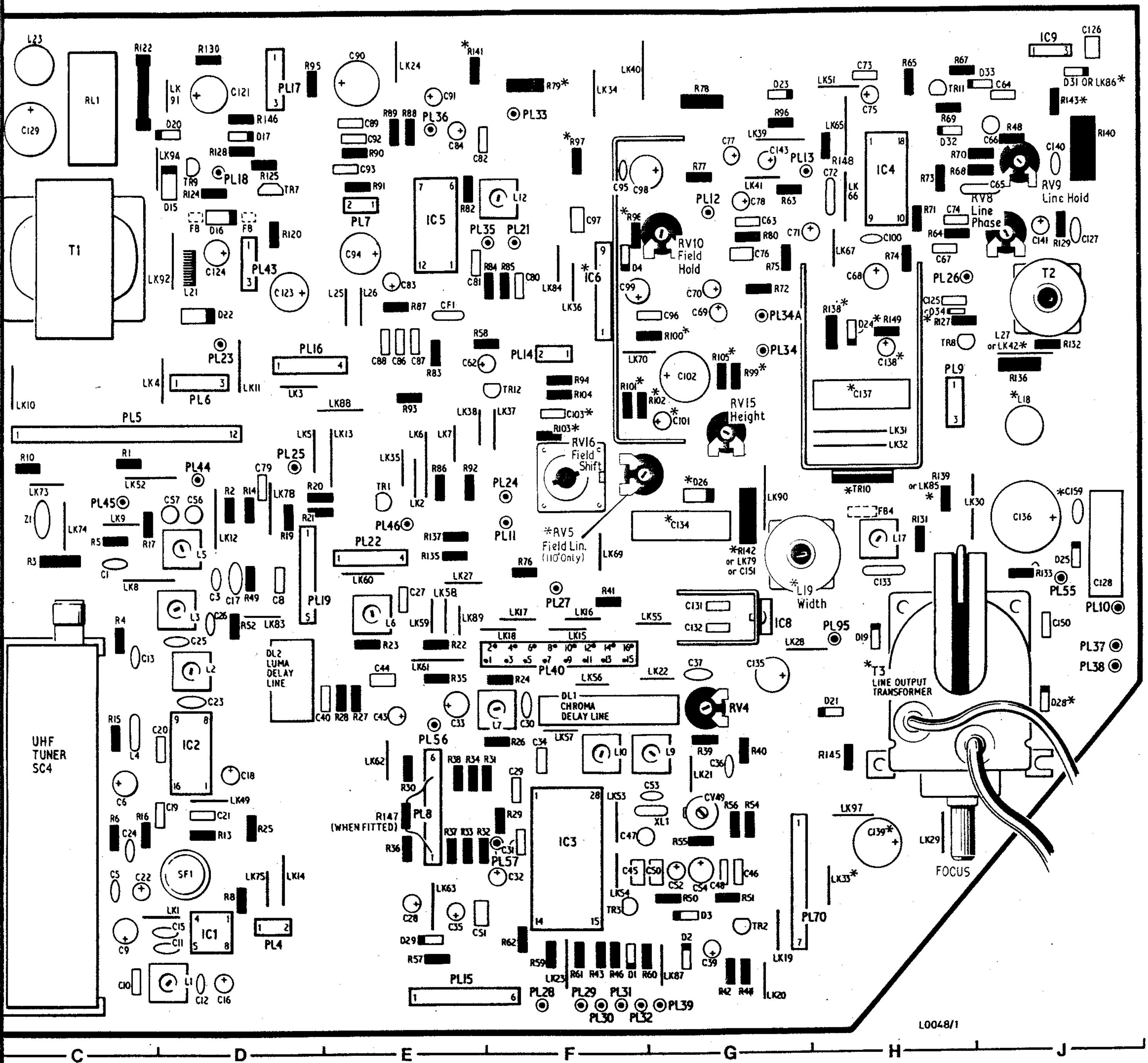

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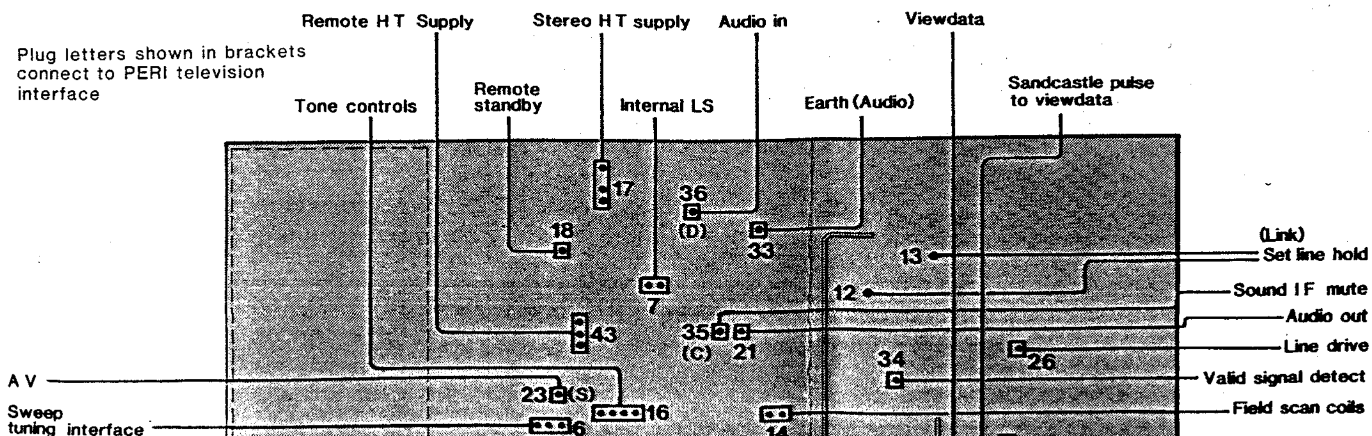
MAIN CHASSIS PLUG IDENTIFICATION



Automatic Inter-Station Muting

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Chassis Servicing Position

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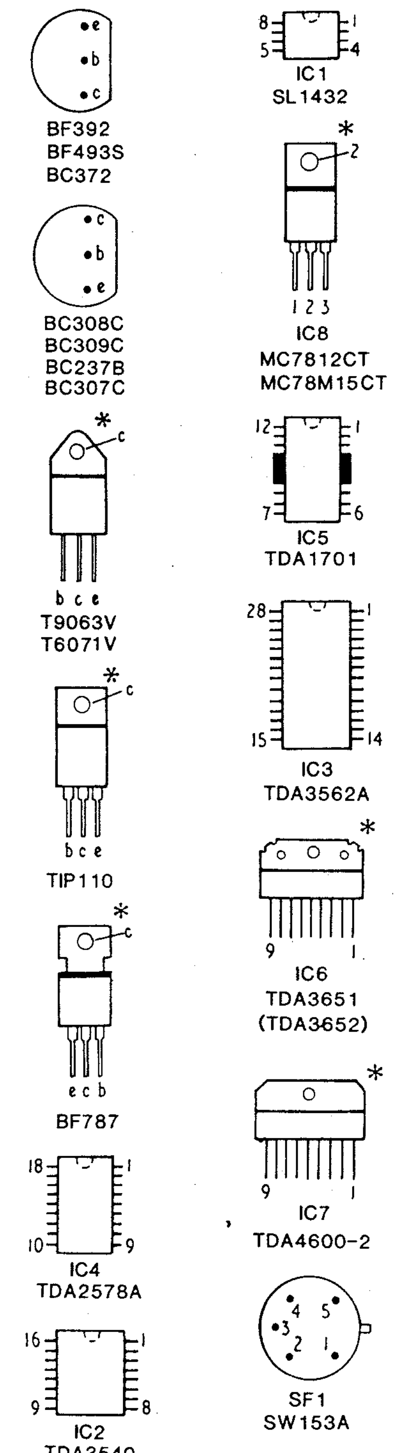
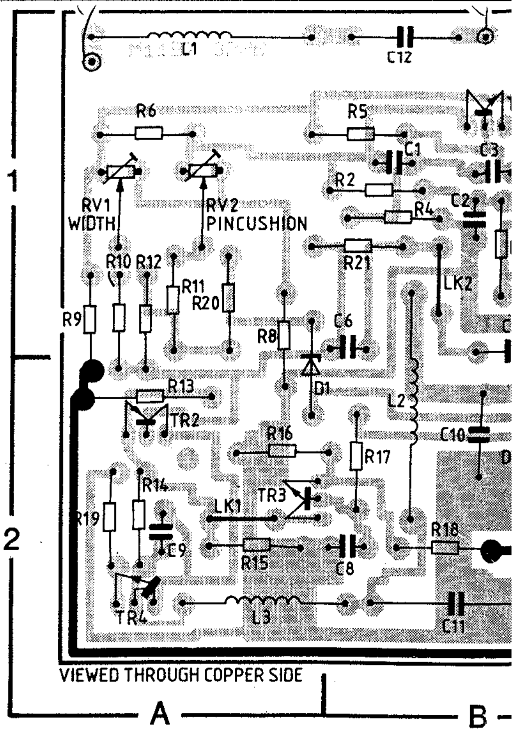
R803	100k 5%
R804	39.2k 1%
R805	330k 5%
R821	270k 5%
R820	Deleted
C802	Deleted
D801	Deleted

SEMICONDUCTOR BASES

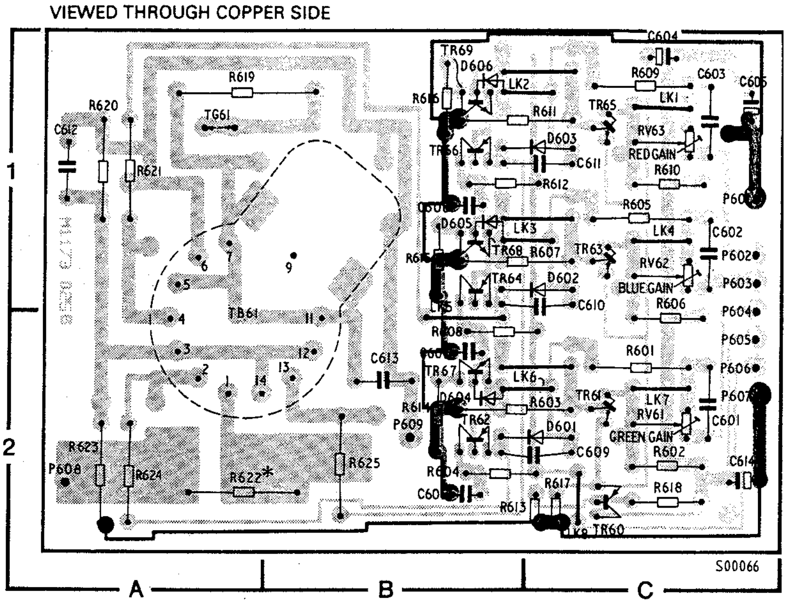
ALL BASES EXCEPT * VIEWED FROM UNDERSIDE





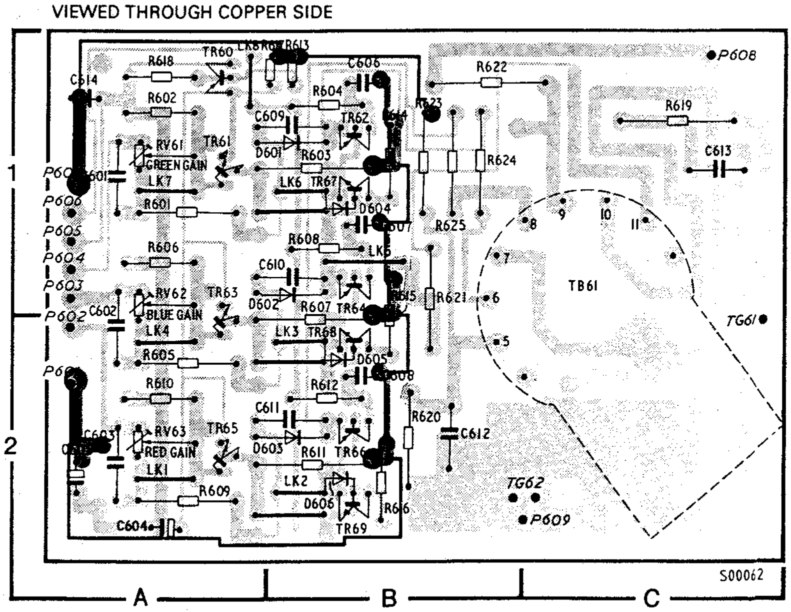
Diode Modulat
and PC1197-0

VIEWED THROUGH COPPER SIDE

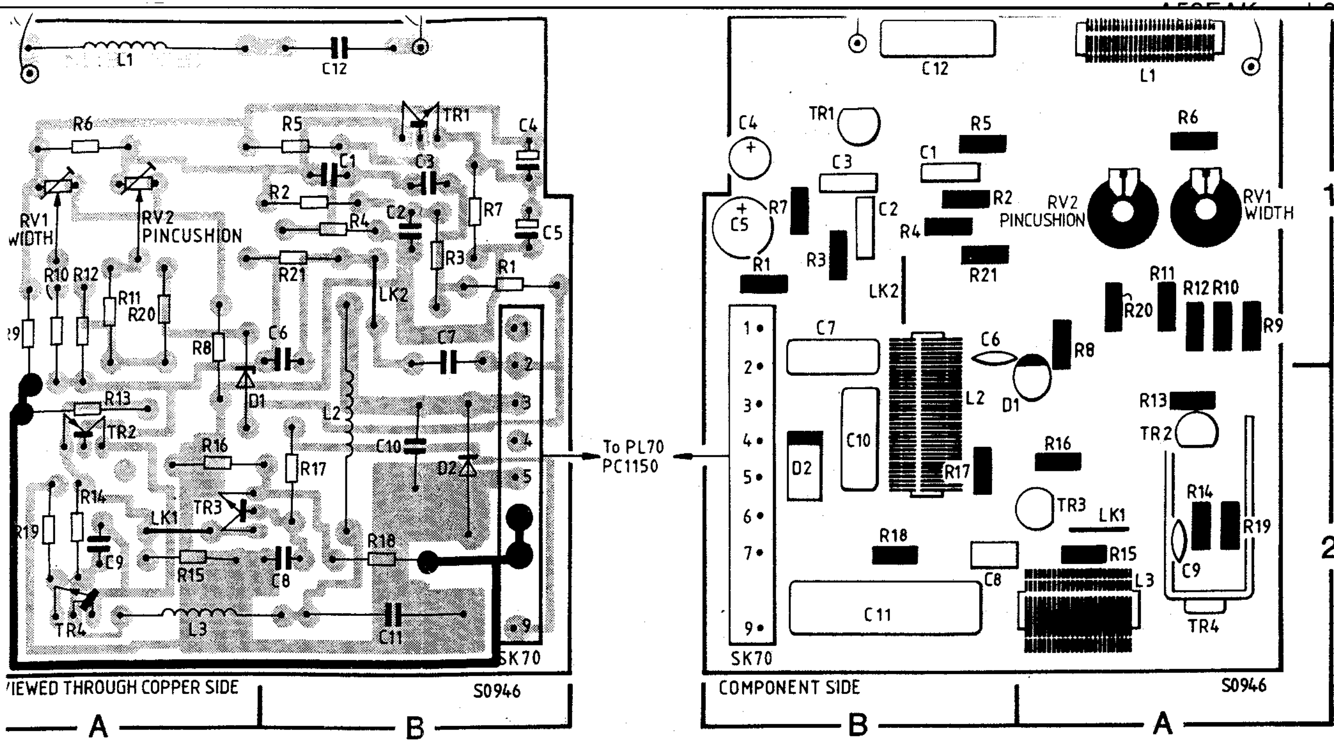


Tube Base Board, PC117
and 26-inch 110° non FS

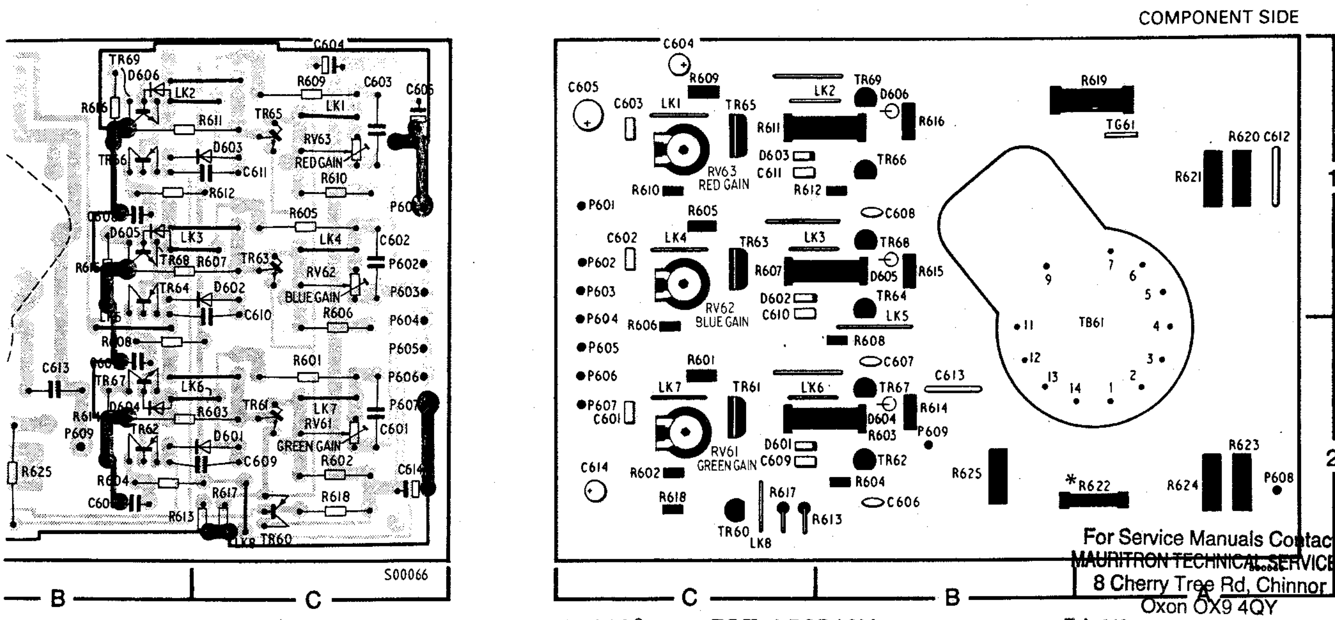
VIEWED THROUGH COPPER SIDE



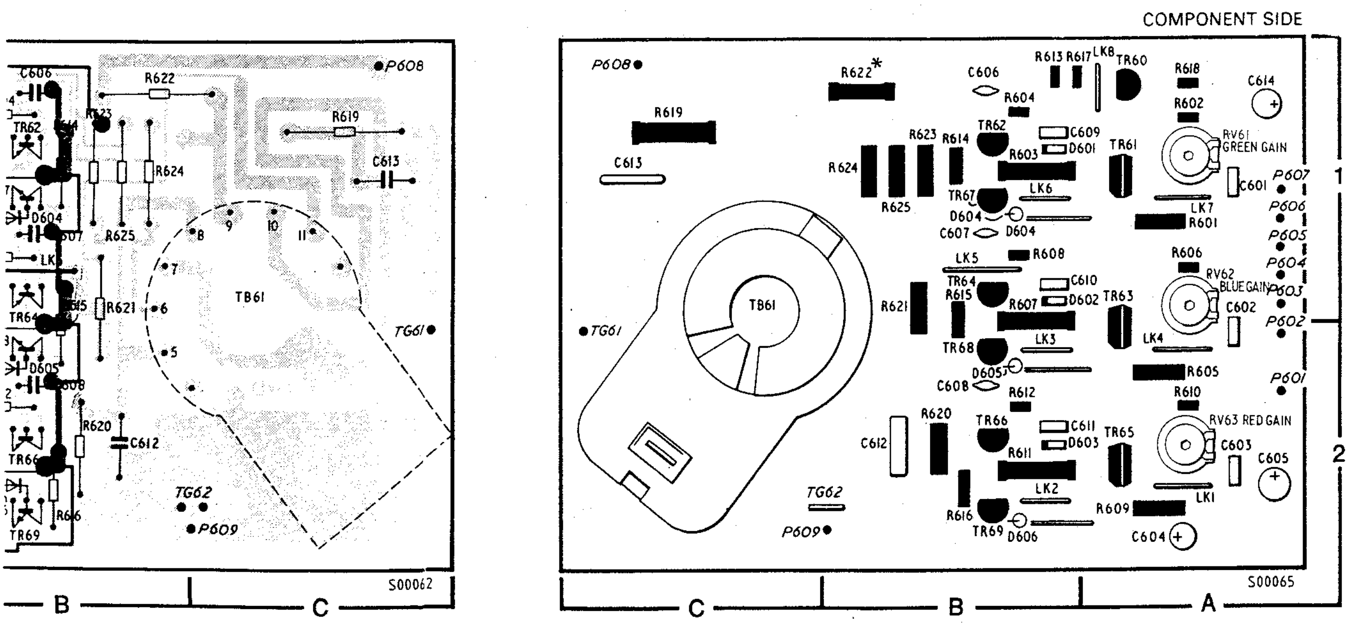
Tube Base Board, PC1174-001
and A51427X) PC1174-003 (51
A59EAK and 66cm 110° FST-A



Diode Modulator Board, PC1197-001 (59cm 110° versions) and PC1197-002 (66cm 110° versions)



Tube Base Board, PC1173 (22-inch 110° non FST-A56540X and 26-inch 110° non FST-A66540X)



Tube Base Board, PC1174-001 (20-inch 90° non FST-A51590X and A51427X) PC1174-003 (51cm 90° FST-A51EAL, 59cm 110° FST-A59EAK and 66cm 110° FST-A66EAK)

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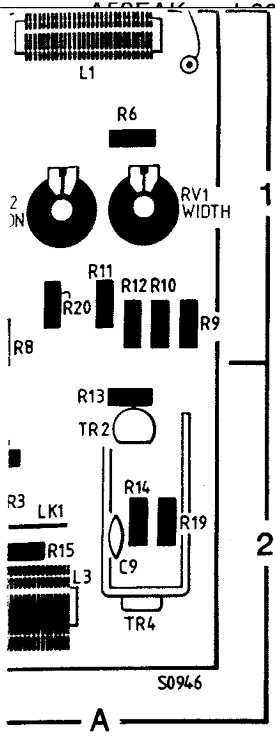
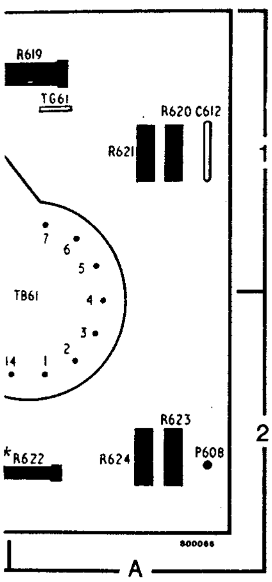
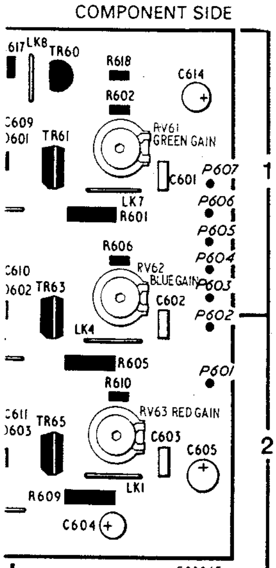


COMPONENT SIDE



COMPONENT SIDE



Main Board PC1150 are shown in the table overleaf

- 20V
- 26V
- 119V
- 200V
- Live Area

SERVICING ADJUSTMENTS

Full adjustment procedures, some of which may require the use of an oscilloscope etc; are given in the Main Chassis information section.

WARNING

EHT Shock Hazard

The EHT must be safely discharged before attempting to disconnect the EHT lead from the tube anode.

Clip one end of a convenient lead, such as a meter lead, to the tube earthing strap on the tube body, fold back the suction cap and discharge the EHT through the lead.

Press in one side of the spring clip which projects into the tube cavity to ease removal of the EHT connector.

IMPORTANT

Do not disturb the tube neck adjustments as these have been set for optimum performance during tube manufacture.

Before attempting the following adjustments the receiver should be tuned if possible to a test card with the brightness, contrast and colour controls adjusted for the best picture, unless stated otherwise.

Receivers fitted with remote facilities should be normalized by switching off and on again before adjusting the preset controls. On certain receivers some of the analogue controls, i.e., brightness, contrast etc., may be presets on the remote control receiver board.

The adjustments should be carried out in the following order for convenience.

Set HT (RV13)

Turn contrast and brightness controls to minimum for zero beam current. Check voltage at pin 5 of LOPT with a 20kΩ/volt meter of 2% accuracy. If necessary, adjust RV13 for 119V (90° tube) or 148V (110° tube). Adjust contrast and brightness for best picture.

Picture Geometry

Line Hold (RV9)

Link PL12 and PL13 together. Adjust RV9 for the best floating but resolved display attainable. The display will lock when the link is removed.

Field Hold (RV10)

Starting with RV10 fully counter-clockwise, adjust for a steady picture and note the position. Continue rotation until the picture suddenly increases in height. Then back off until approximately half way between these two positions.

Pincushion (RV802-110° only)

Adjust RV802 for straight verticals at the edges of the display.

Field Linearity (RV5)

Adjust RV5 for best field linearity at the top and bottom of the display.

Line linearity is fixed.

Picture Shift (RV8 and RV16)

Adjust Line Phase RV8, and Field Shift RV16 to centre the display.

Picture Size (L19, RV15 and RV801)

Adjust Height control RV15 in conjunction with Width control L19 for 90° or RV801 for 110°, for full scan consistent with a correctly proportional display.

Focus

Adjust for optimum overall resolution.

Grey Scaling Procedure

Video Output Gain (RV61, RV62 and RV63)

Ensure that the three video output gain presets RV61, RV62 and RV63 are set to mid position.

Highlights Final Adjustment

With a suitable picture displayed inspect the highlights for colouration.

If green, turn down RV61.

If red, turn down RV63.

IMPORTANT: Do not readjust the blue output gain preset RV62. If highlights are blue, turn up red and green presets.

A1 Preset

With a normal picture displayed, ensure that the A1 preset is at mid position. Rotate the A1 preset clockwise until the picture begins to lose contrast and note the position of the screwdriver slot.

Rotate the A1 preset counter-clockwise until the picture again begins to lose contrast or loses one colour, and note the position of the screwdriver slot. The approximate position of the A1 preset should be midway between the two noted positions of the screwdriver slot.

4·43MHz Chroma Trap (L6)

Adjust L6 for minimum chroma patterning on the picture with the colour control at minimum.

Chroma Input Filter (L7)

Measure the d.c. volts on pin 2 of IC3. Display a locked colour picture and adjust L7 for maximum d.c.

NOTE: The meter must not load pin 2 appreciably.

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20V
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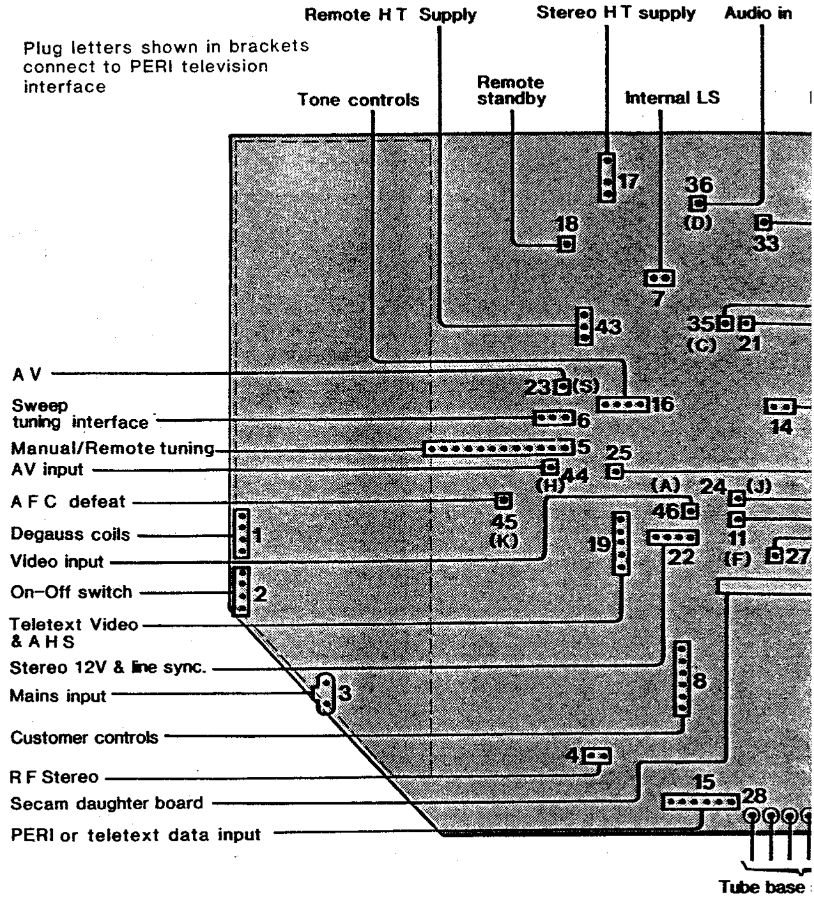
Live Area

⚠ indicates critical safety components, and identical components should be used for replacement.

MAIN CHASSI



Many of these plugs are only used in certain specifications such as Remote Co

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Field Linearity (RV5)

Adjust RV5 for best field linearity at the top and bottom of the display.

Line linearity is fixed.

Picture Shift (RV8 and RV16)

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Chroma Input Filter (L7)

Measure the d.c. volts on pin 2 of IC3. Display a locked colour picture and adjust L7 for maximum d.c.

NOTE: The meter must not load pin 2 appreciably.

Chrominance Adjustments

The following setting up adjustments are carried out with the receiver operated from an off-air colour bar signal or UHF colour bar generator connected to the aerial socket.

Set the customer controls as follows: brightness to the centre of its range, contrast and colour to approximately two-thirds of their maximum setting.

Subcarrier Oscillator (CV49)

Short circuit R31 in order to override the colour killer and colour control. Whilst looking at a colour picture, attenuate the aerial signal. Using a non-metallic trimming tool, adjust the trimmer CV49 to achieve colour lock on the weakest signal possible, occasionally interrupting the signal in order to indicate correct colour pull-in.

Reconnect the aerial and disconnect the short circuit.

Alternatively:

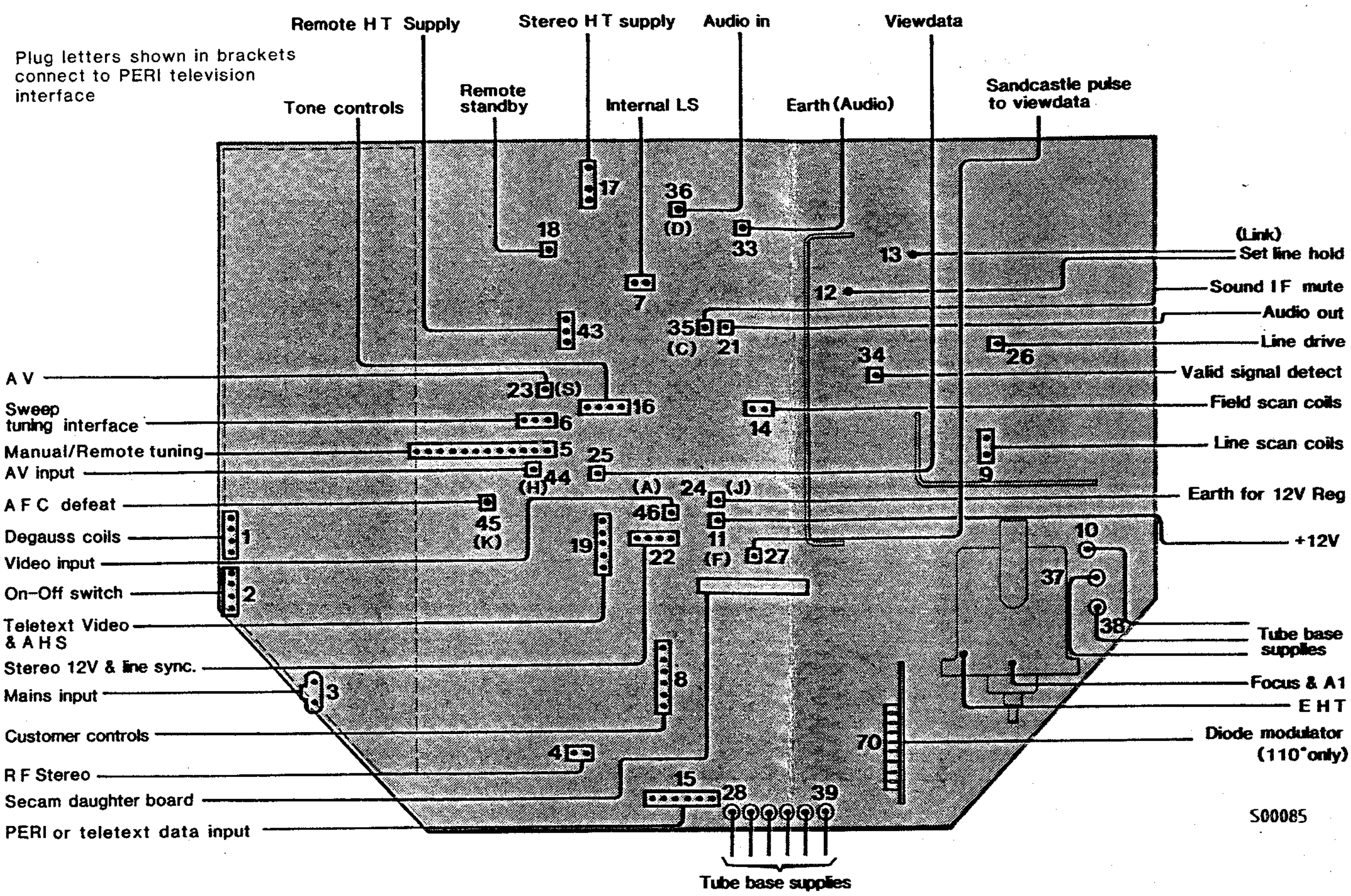
Short circuit R31 and link pins 24 and 25 of IC3 together. Using a non-metallic trimming tool adjust CV49 for zero frequency run through. Remove the links.

Chroma Delay Line Termination (RV4, L9 and L10)

Set L10 core one and a half turns dow from the top of the former and adjust RV4 and L9 for minimum venetian blin effect. In a very few cases balance ma be unattainable by adjustment of L9. I so, adjust L9 for the best setting and t L10 for balance.

⚠ indicates critical safety components, and identical components should be used for replacement.

MAIN CHASSIS PLUG IDENTIFICATION



Many of these plugs are only used in certain specifications such as Remote Control, Teletext, Sweep-Tune etc.

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SERVICING NOTES

Please observe the usual precautions for handling ICs and removing components from the PCB (see servicing notes in Main Chassis information section).

Replacing chopper and line output transistors TR6 and TR10. These transistors are mounted on heatsinks. The transistors are secured to the heatsinks by spring clips. To remove the clip, simply press it out from the inside of the heatsink. It is not necessary to remove the heatsink from the PCB.

Before replacing the transistors, inspect the insulating washers and replace if necessary. Secure the transistors to the heatsink by pressing the spring clip firmly in position.

Replacing ICs Mounted on Heatsinks. In the majority of cases, when replacing the ICs that are mounted on heatsinks, it is easier to remove both the heatsink and IC from the PCB, then remove the IC from the heatsink. Before replacing the IC, clean off the old heatsink compound from the heatsink and insulating washer (if fitted), and apply fresh compound to both sides. Always ensure the IC retaining screw is secured tightly.

TX100

COLOUR TV

20

66H3 59H3 59H2 51H3 51H2

Receivers fitted with:
Tuning and Analogue Control Systems (TACS)

Including:

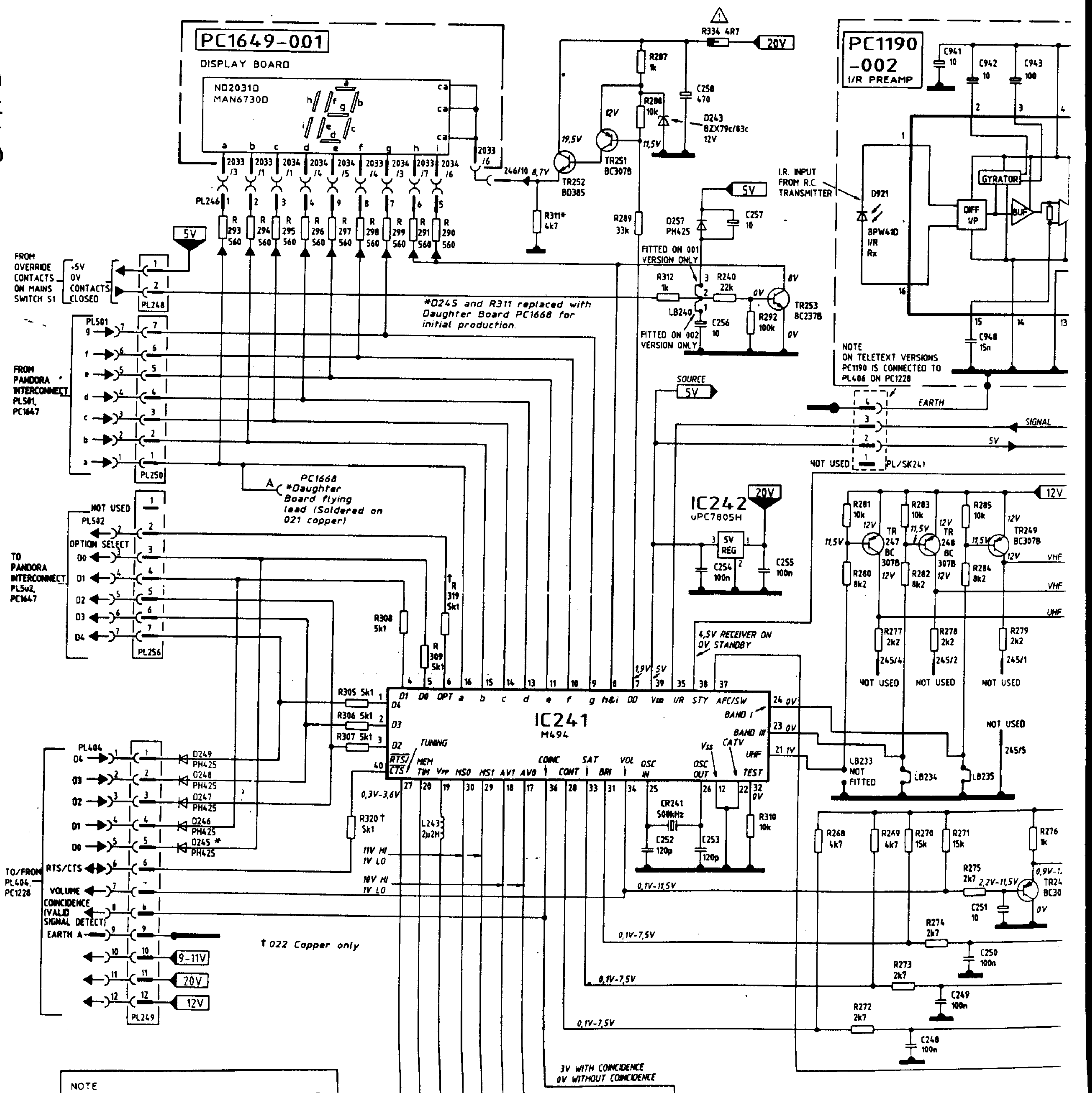
Models 51H2 and 59H2

TACS with Remote Control
Using T780 Remote Control Transmitter

Models 51H3, 59H3 and 66H3

TACS with Remote Control and FASTEXT
Using T785 Remote Control Transmitter

H1564



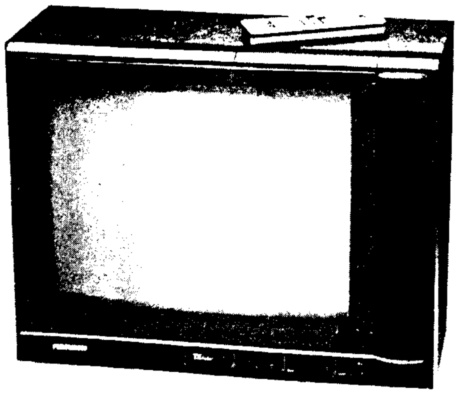
Receivers fitted with:
Tuning and Analogue Control Systems (TACS)
Including:

Models 51H2 and 59H2

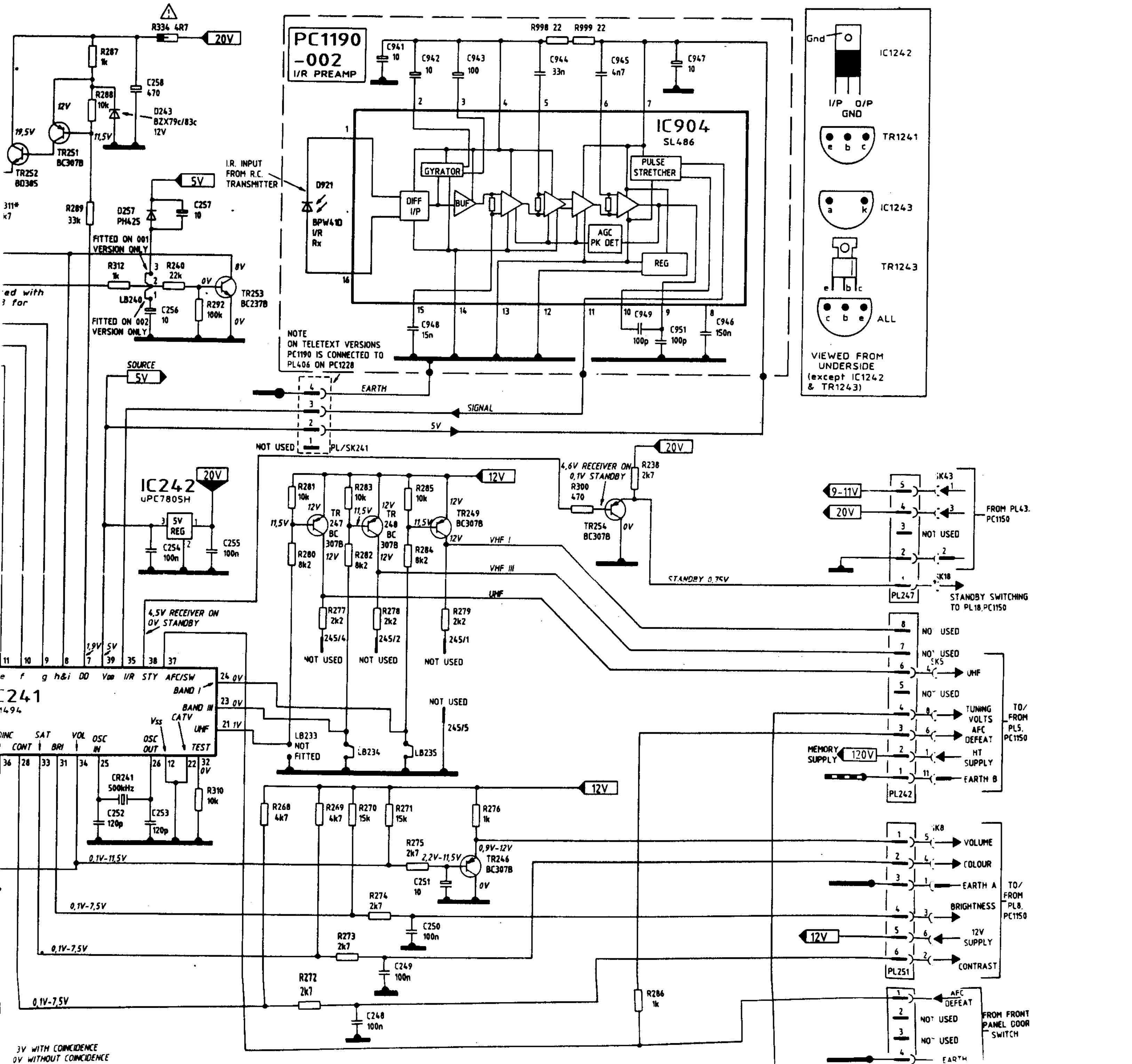
TACS with Remote Control
Using T780 Remote Control Transmitter

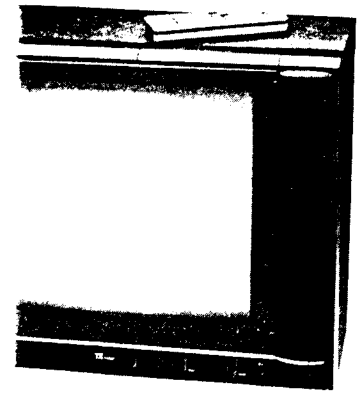
Models 51H3, 59H3 and 66H3

TACS with Remote Control and FASTEXT
Using T785 Remote Control Transmitter

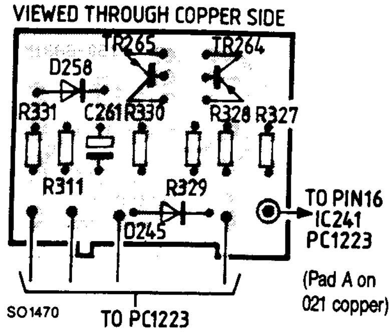


Typical TX100 Series Receiver (Model 51H3) incorporating TACS, Remote Control and FASTEXT.

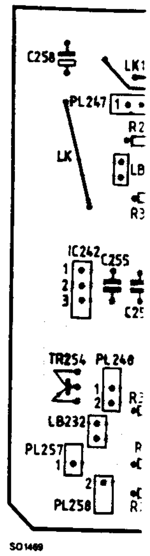


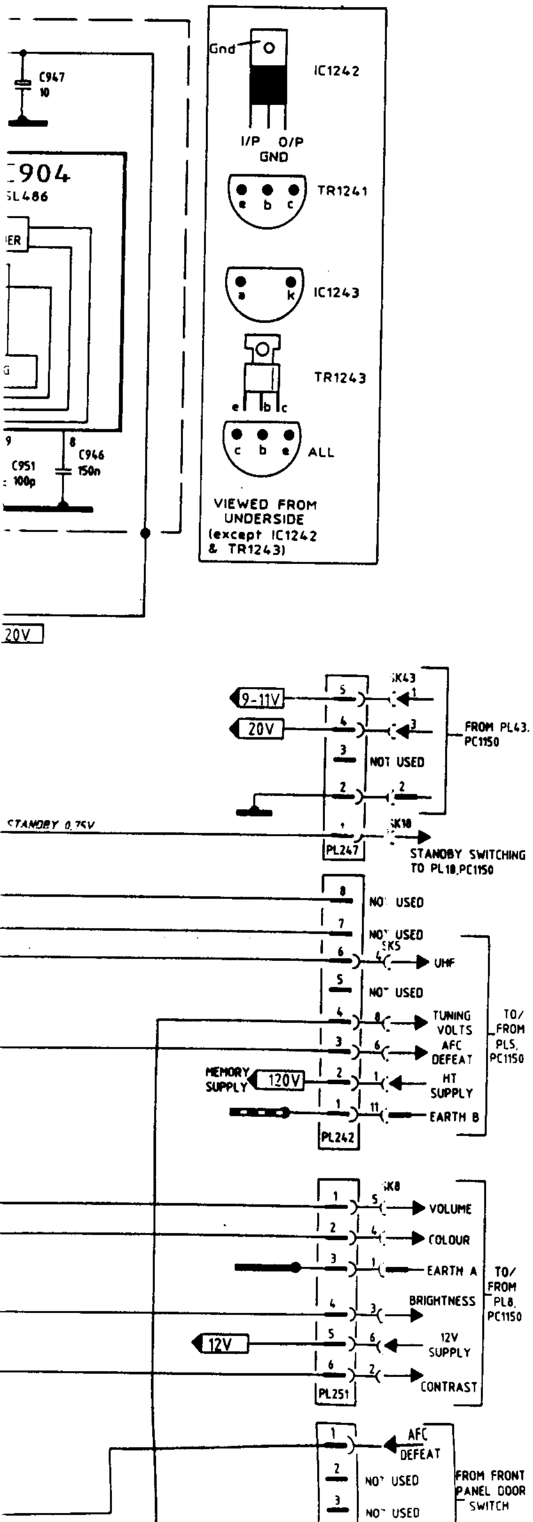


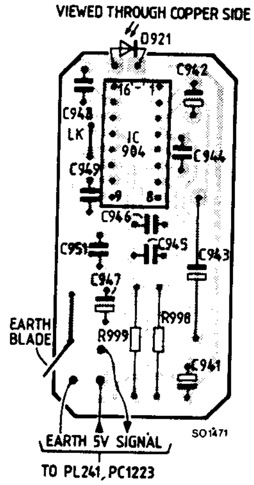
ies Receiver (Model 51H3)
:S, Remote Control and FASTEXT.



Anti-LED Off Board PC1668
(Fitted on all models) Component Layout

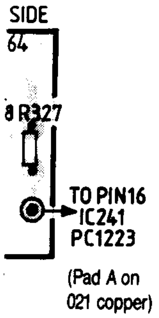




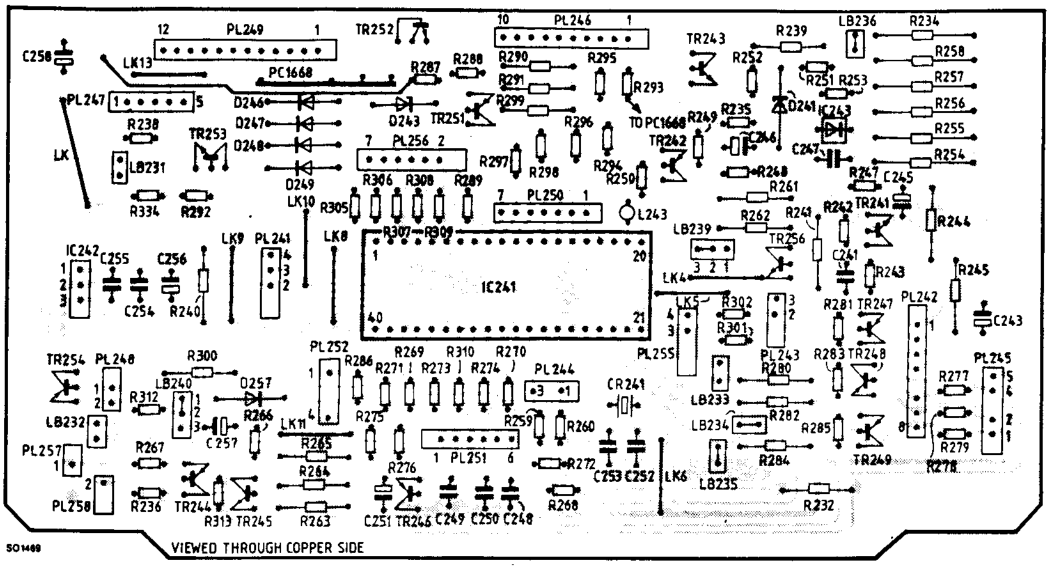


Infra-red Preamplifier PC1190-002
(Fitted on all models) Component Layout

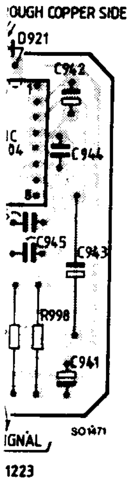
For Service Manuals Contact
MAURITRON TECHNICAL SERVICES
8 Cherry Tree Rd, Chinnor
Oxon OX9 4QY
Tel:- 01844-351694 Fax:- 01844-352554
Email:- enquiries@mauritron.co.uk



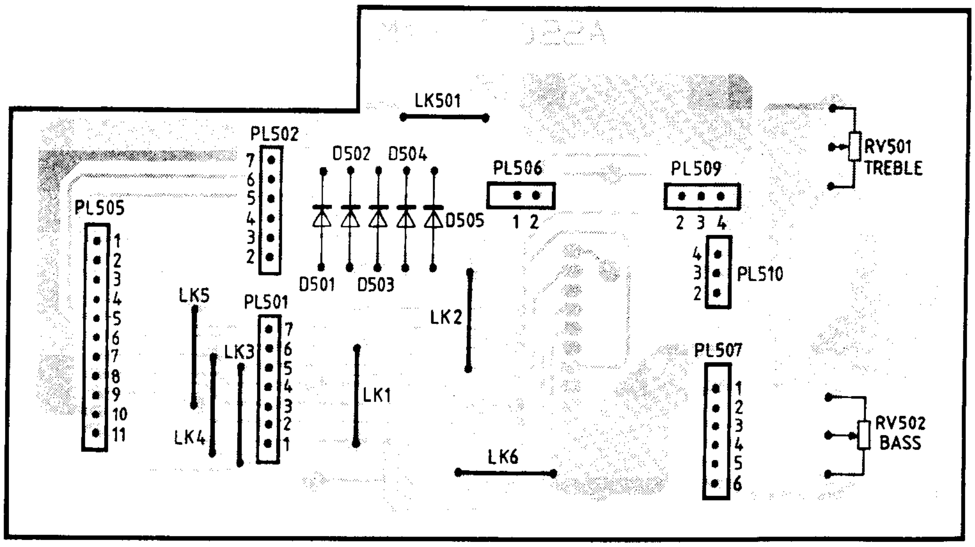
1668
omponent Layout



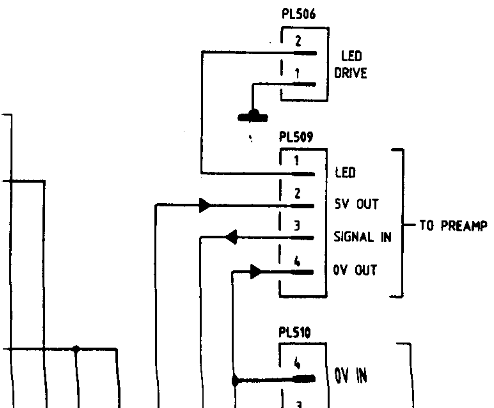
TACS Control Board PC1223-002
(Fitted on all models) Component Layout
shown to 021 copper standard

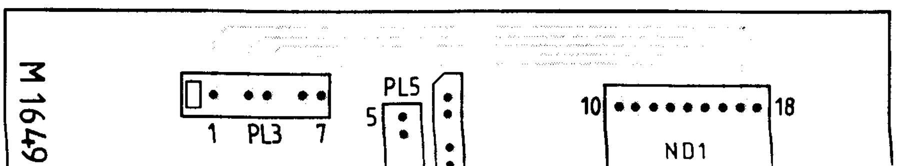


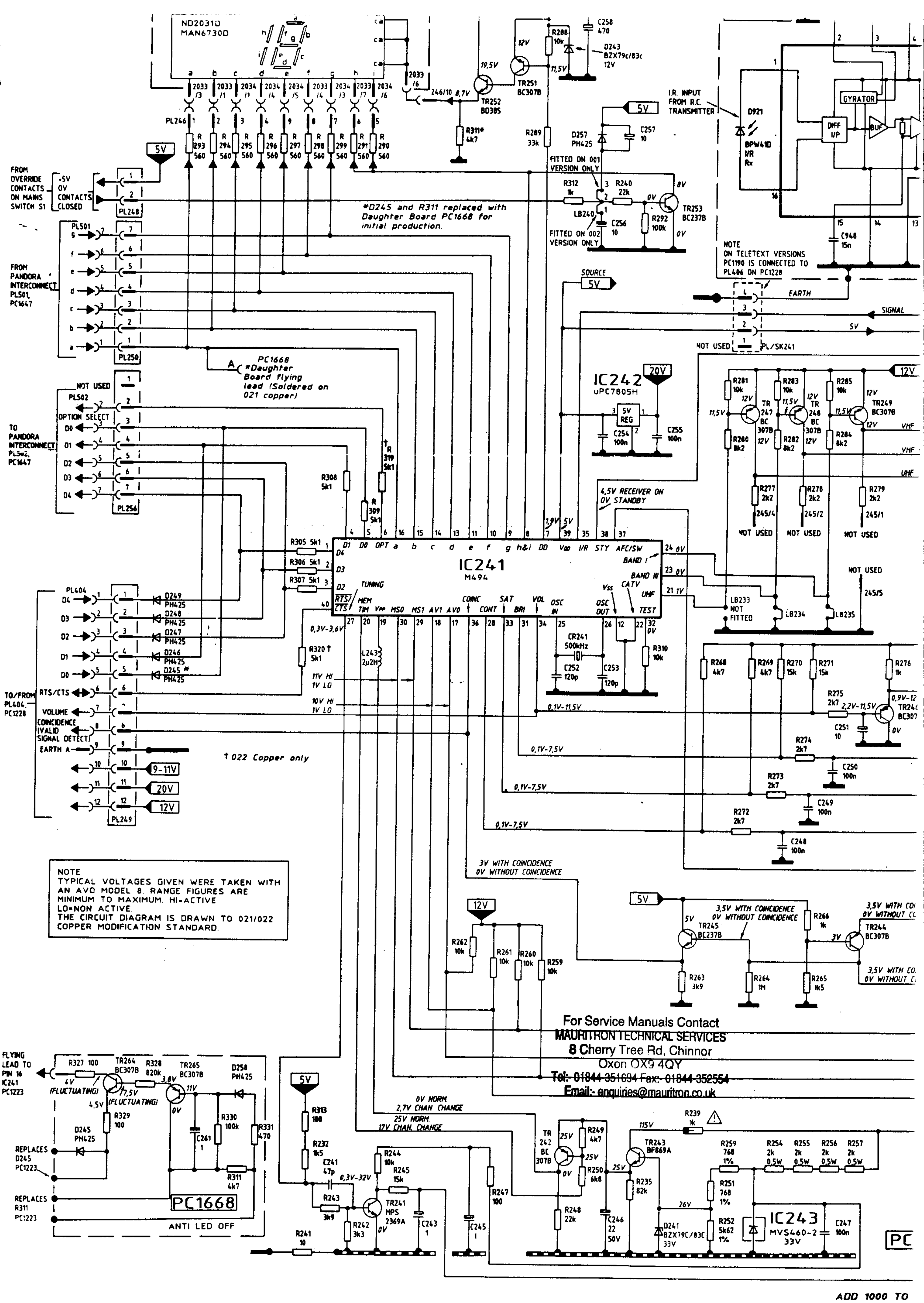
C1190-002
›mponent Layout



Control Interface
PC1647-002 Component Location Diagram

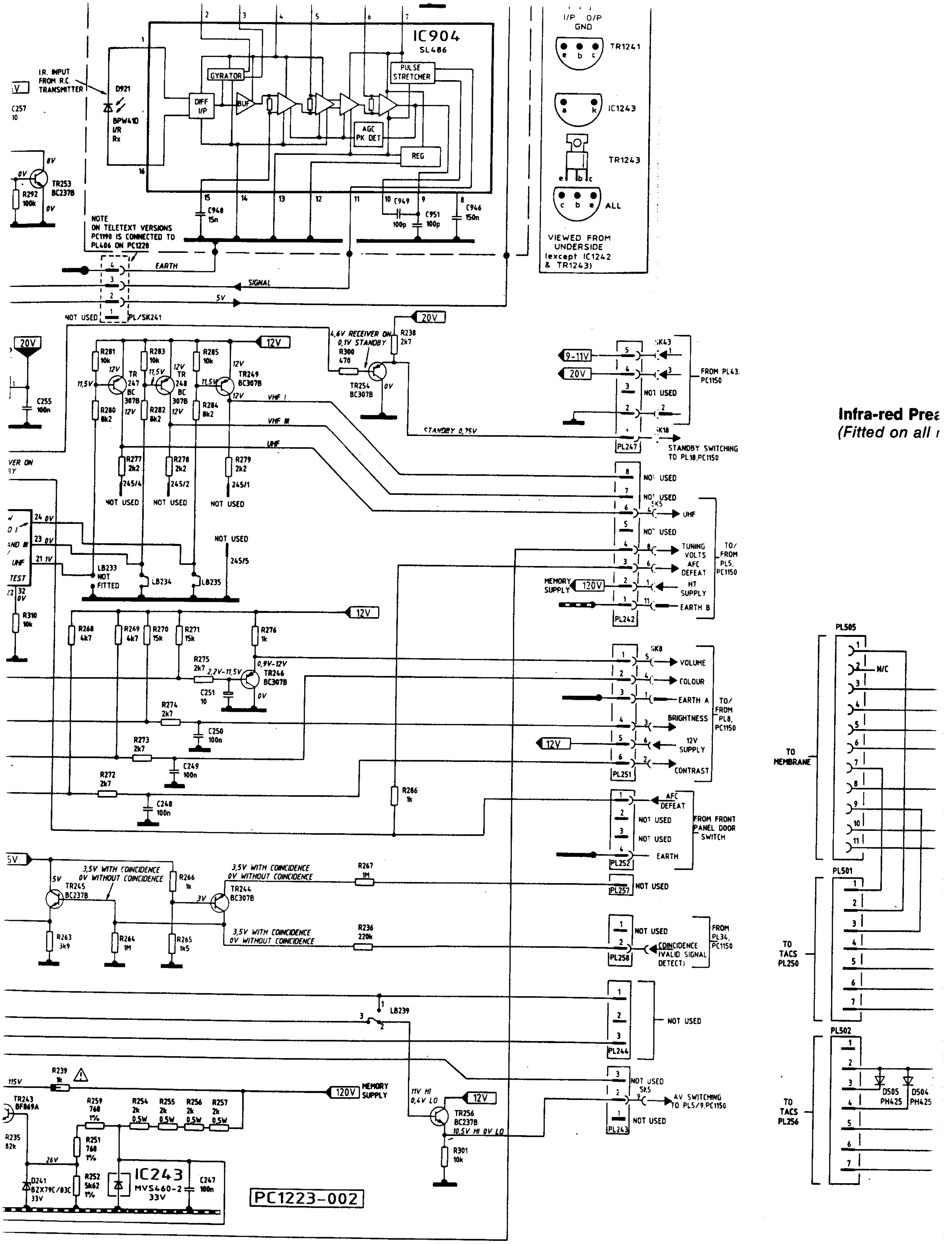






TACS Control Board PC1223-002, Anti-LED off PC1668, Channel Display Board PC1649-001 and Infra-Red Preamplifier Board PC1190-002

(All models)



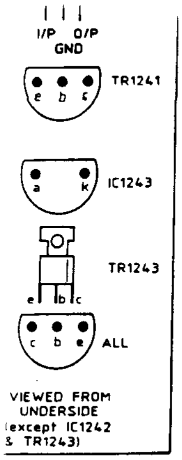
ADD 1000 TO ALL COMPONENT REFERENCES

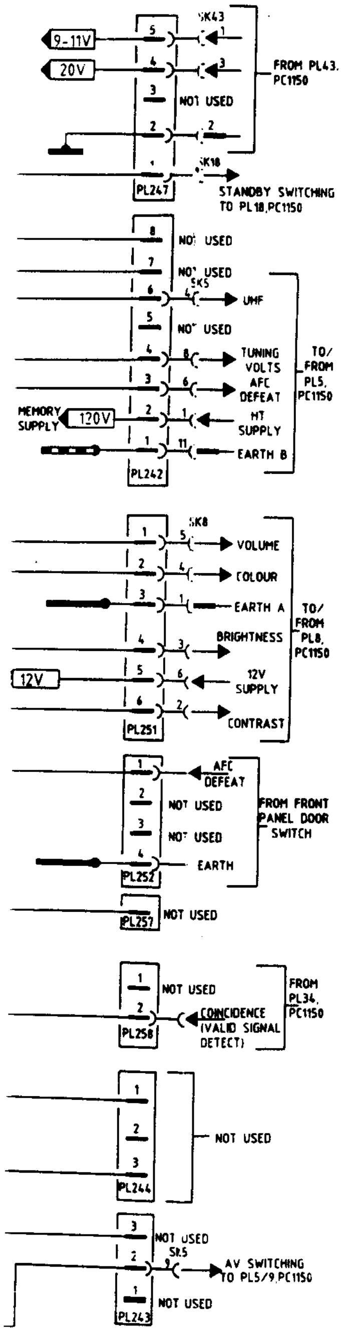
Infra-red Pre

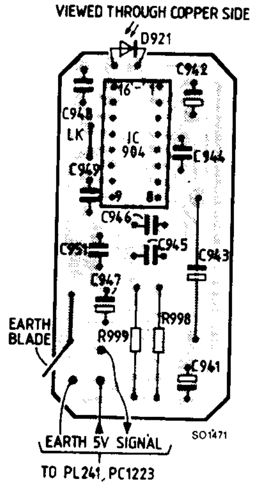
(Fitted on all

f PC1668,

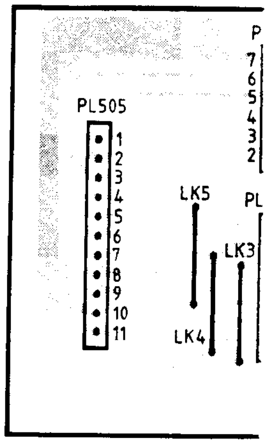
Red Preamplifier Board PC1190-002



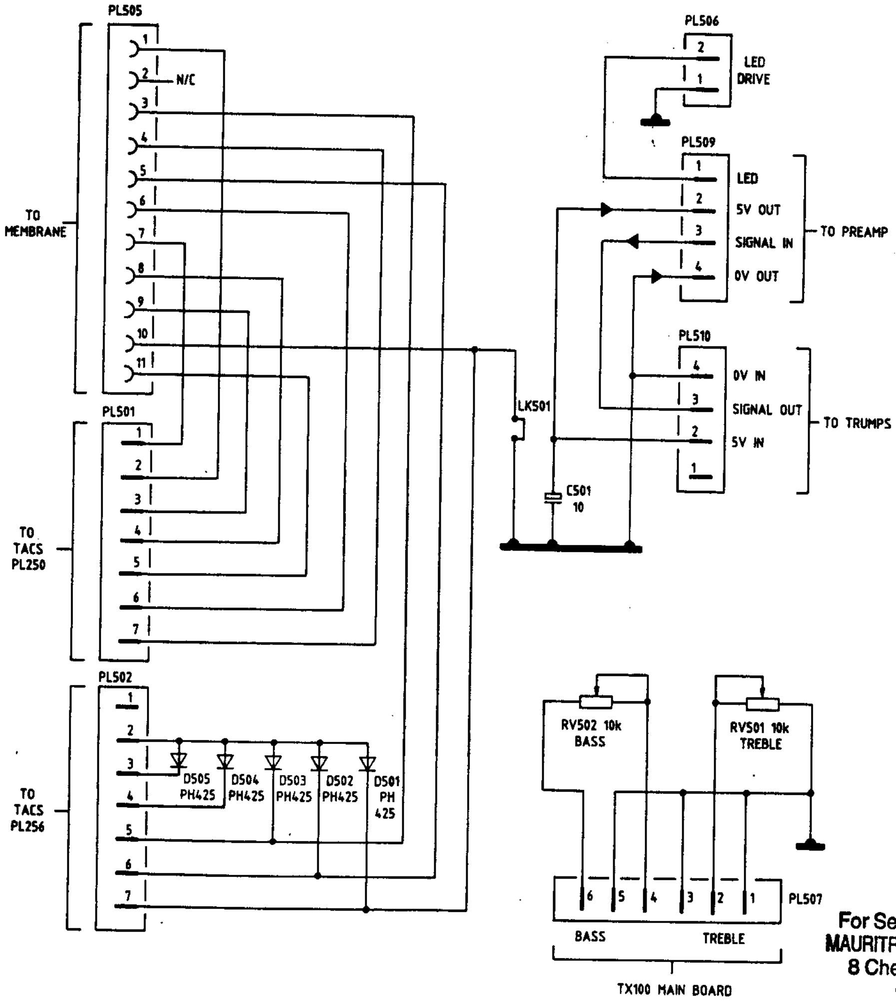


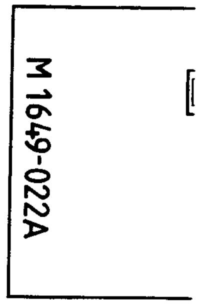


Infra-red Preamplifier PC1190-002
(Fitted on all models) Component Layout



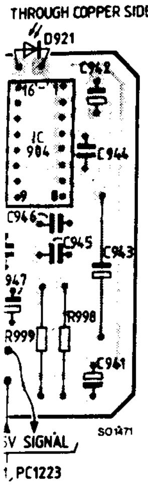
Cc
PC



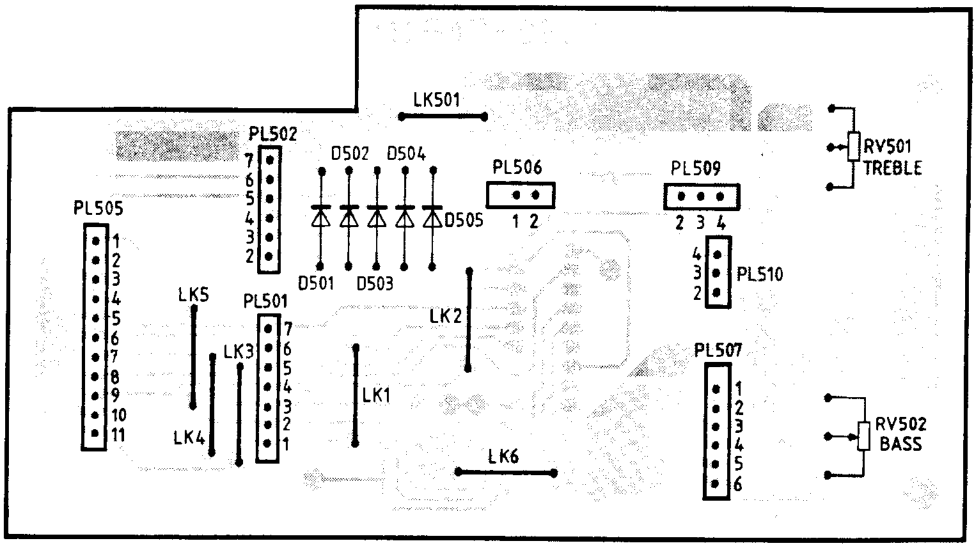


Ch
(Fit

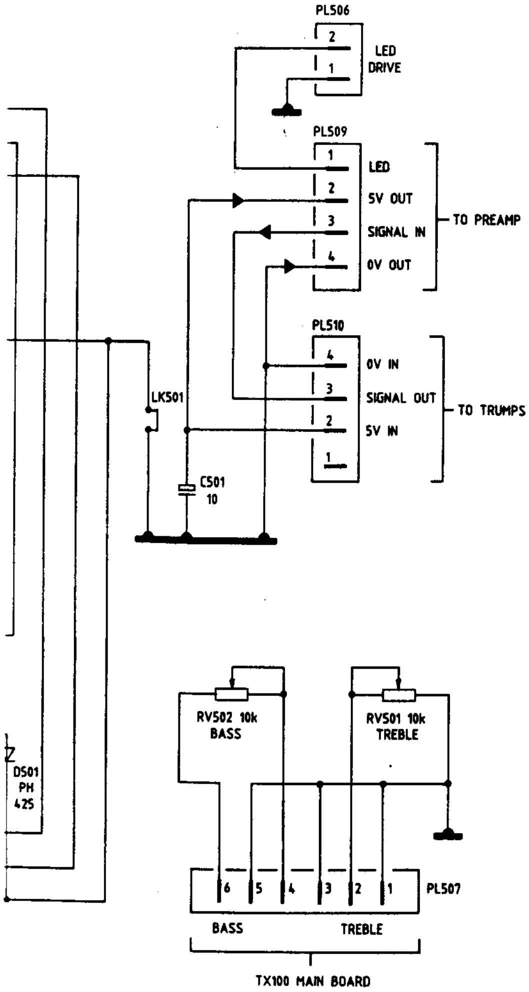
Control Interface Board
PC1647-002



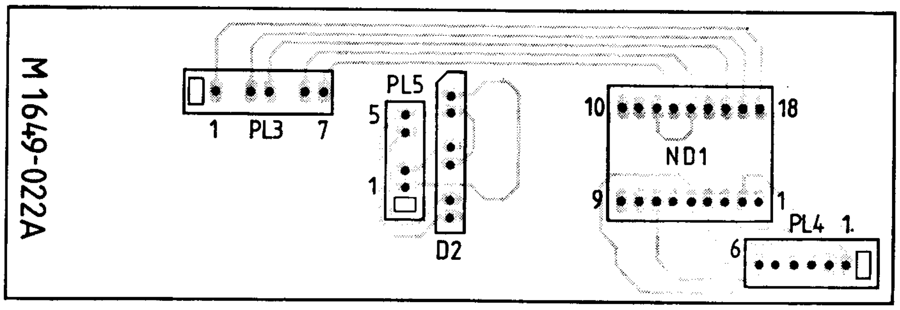
PC1190-002
Component Layout



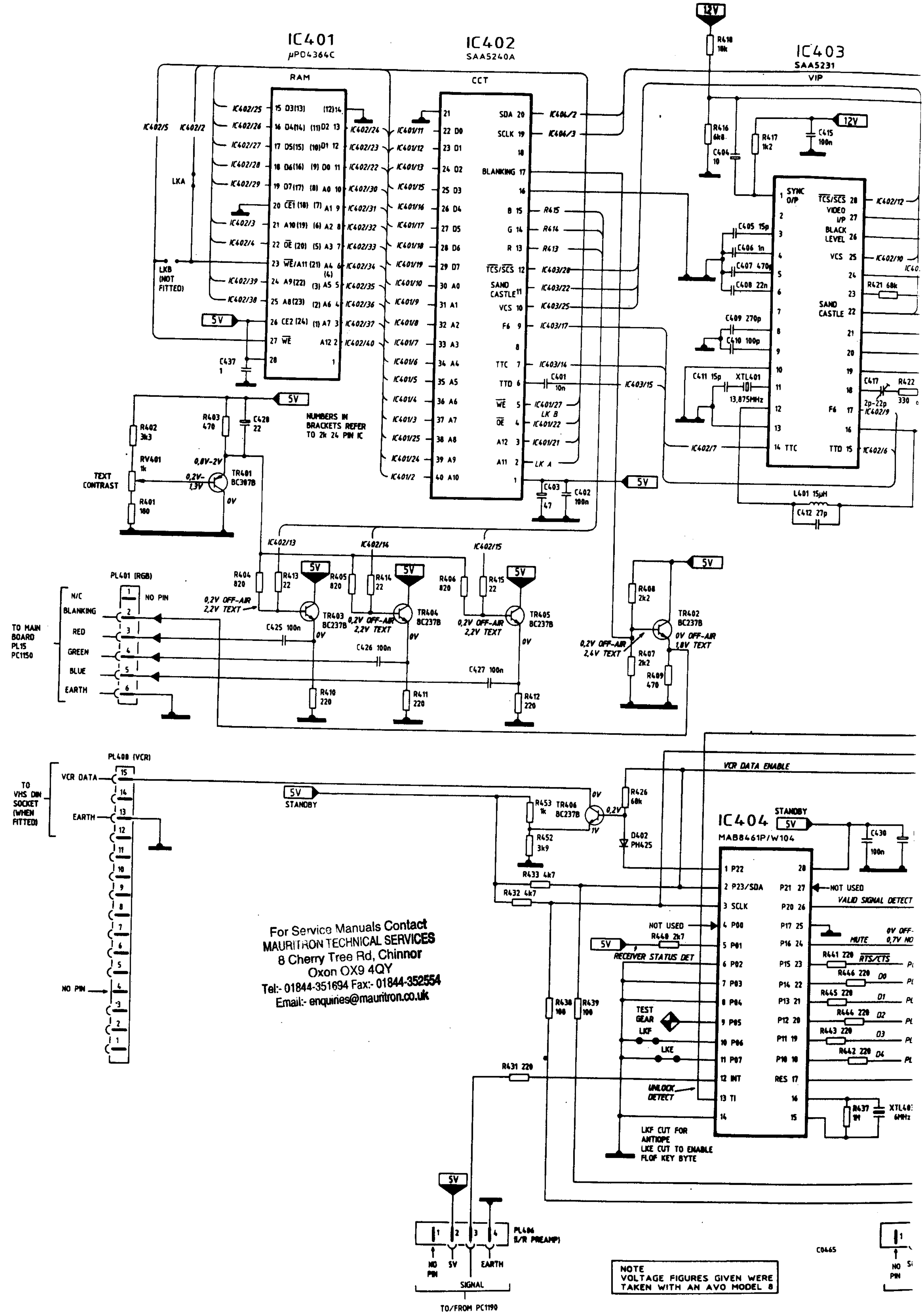
Control Interface
PC1647-002 Component Location Diagram

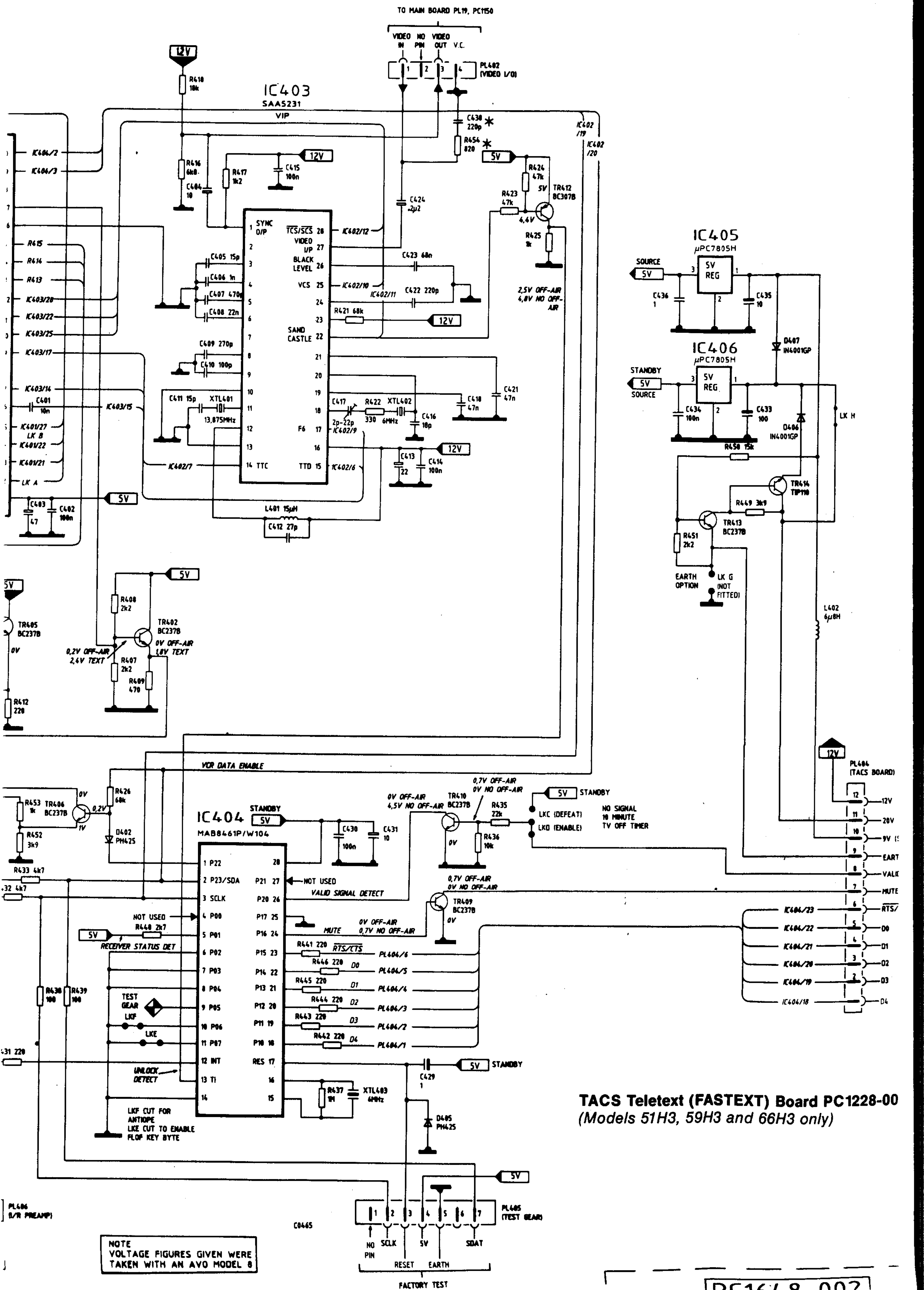


trol Interface Board
647-002

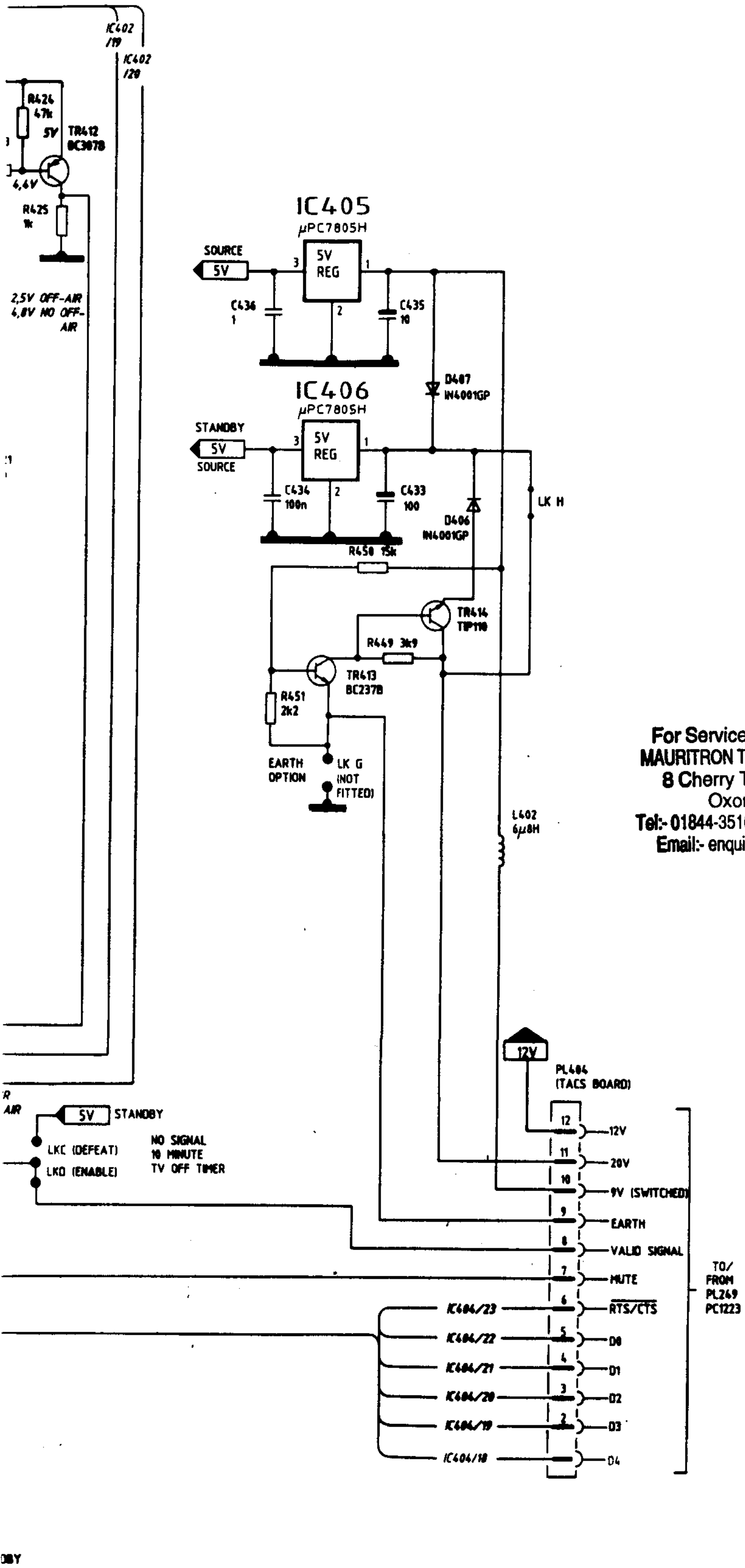


Channel Display Board PC1649-001
(Fitted on all models) Component Layout


IC401
μPD4364C
RAM
IC402
SAA5240A
CCT
IC403
SAA5231
VIP
IC404
MAB8461P/W104
12V
5V
STANDBY
NUMBERS IN BRACKETS REFER TO 2k 24 PIN IC
TEXT CONTRAST
TR401 BC307B
TR402 BC237B
TR403 BC237B
TR404 BC237B
TR405 BC237B
TR406 BC237B
PL401 (RGB)
N/C
NO PIN
BLANKING
RED
GREEN
BLUE
EARTH
TO MAIN BOARD PL15 PC1150
0,2V OFF-AIR 2,2V TEXT
0V OFF-AIR 1,8V TEXT
0,2V OFF-AIR 2,4V TEXT
PL408 (VCR)
VCR DATA
TO VHS DIN SOCKET (WHEN FITTED)
NO PIN
VCR DATA ENABLE
VALID SIGNAL DETECT
NOT USED
RECEIVER STATUS DET
TEST GEAR
MUTE
RTS/CTS
UNLOCK DETECT
LKF CUT FOR ANTIOPE
LKE CUT TO ENABLE FLOF KEY BYTE
PL406 (I/R PREAMP)
SIGNAL
TO/FROM PC1190
C0465
NOTE
VOLTAGE FIGURES GIVEN WERE TAKEN WITH AN AVO MODEL 8



TACS Teletext (FASTEXT) Board PC1228-00
(Models 51H3, 59H3 and 66H3 only)



TACS Teletext (FASTEXT) Board PC1228-001
(Models 51H3, 59H3 and 66H3 only)

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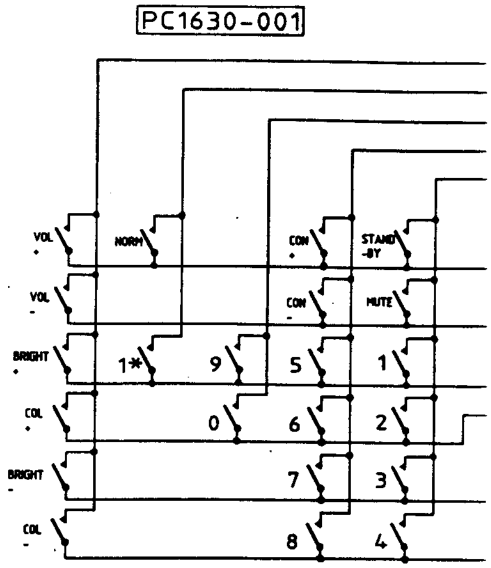
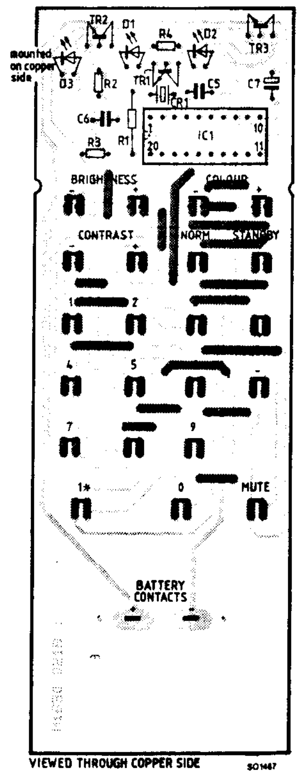
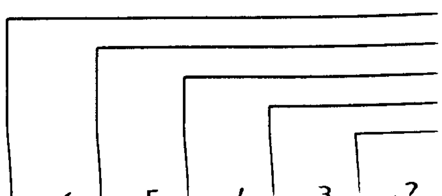
MAURITRON TECHNICAL SERVICES
8 Cherry Tree Rd, Chinnor
Oxon OX9 4QY
Tel:- 01844-351694 Fax:- 01844-352554
Email:- enquiries@mauritron.co.uk

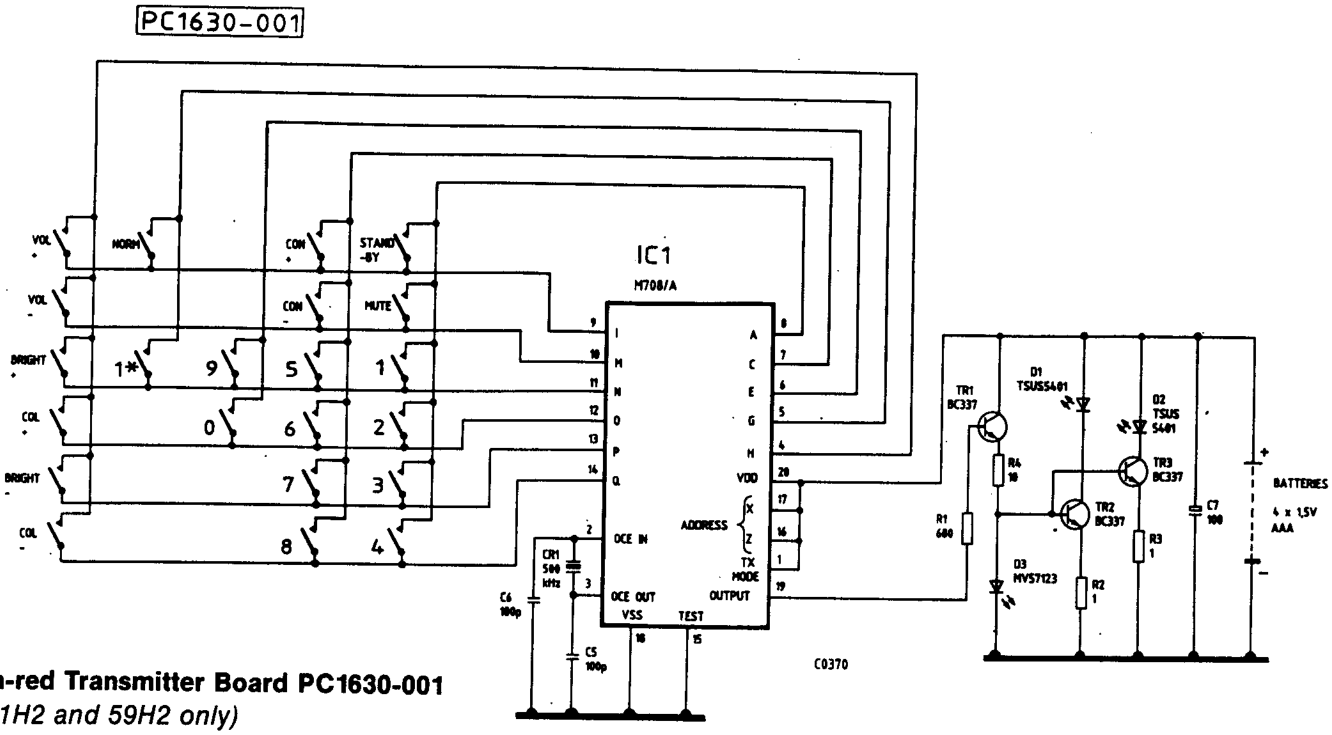


T780 Infra-red Transmitter Board PC1630-001
(Models 51H2 and 59H2 only)

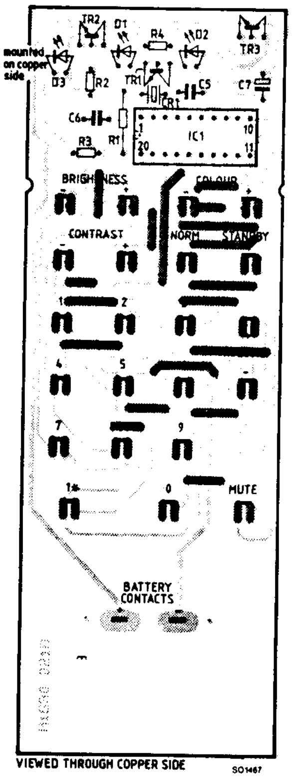


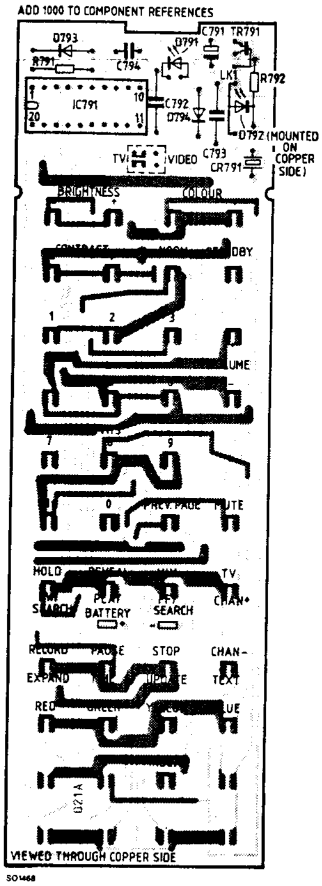
T780 Transmitter
(Models 51H2 and 59H2 only) Component Layout





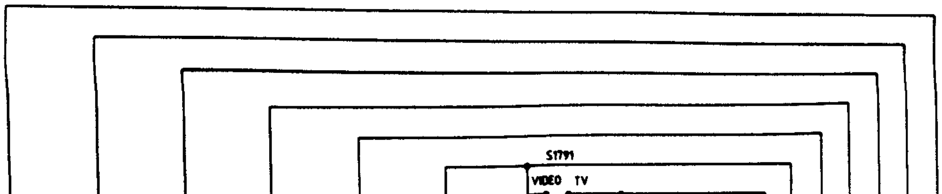
'80 Infra-red Transmitter Board PC1630-001
lodels 51H2 and 59H2 only)

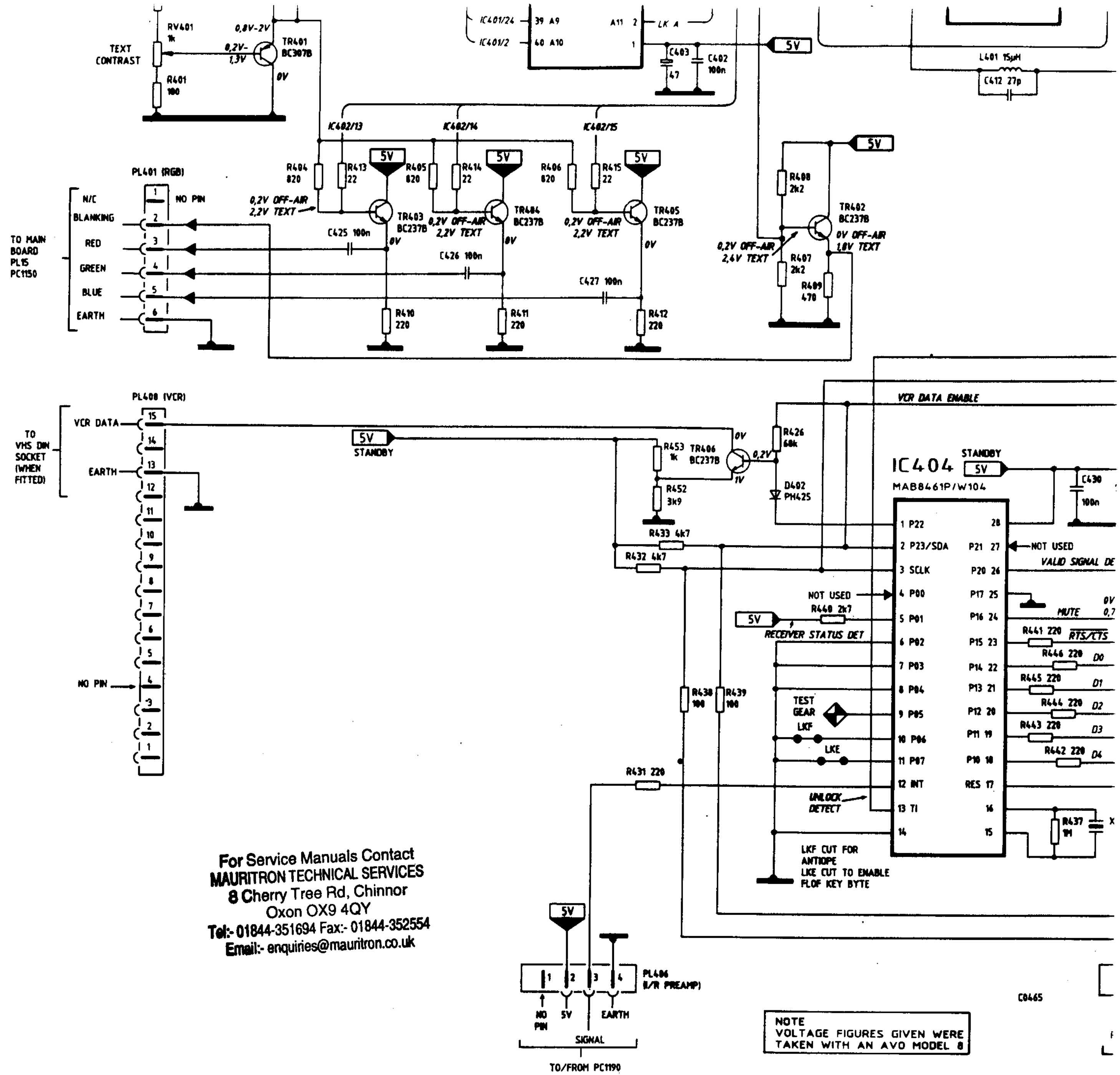




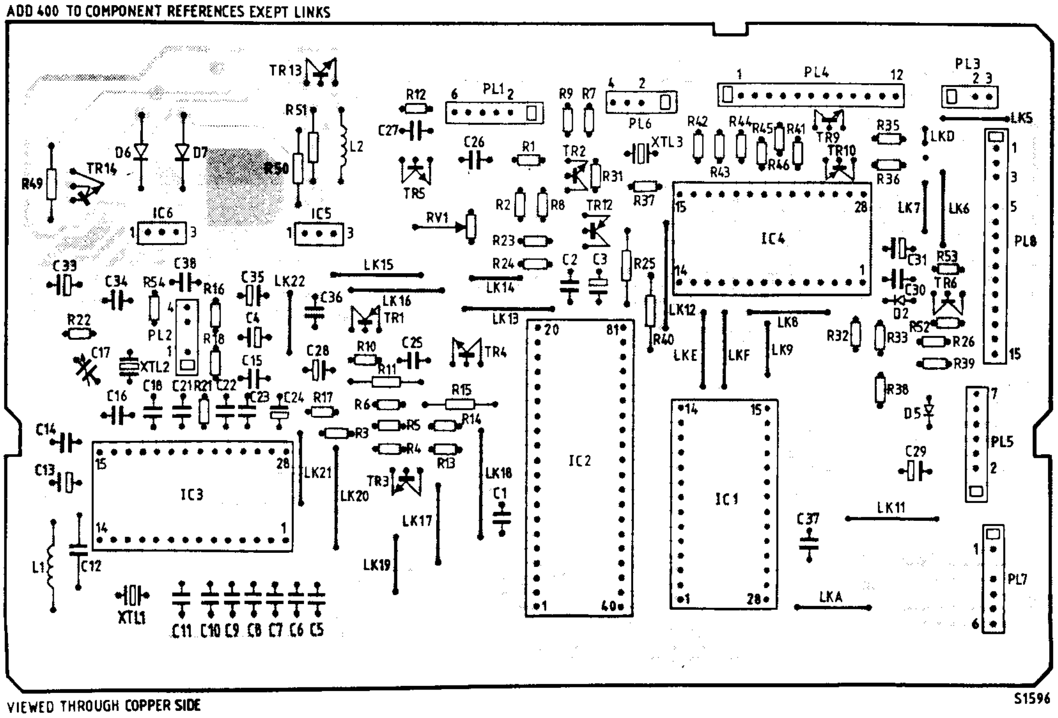
30 Transmitter
odels 51H2 and 59H2 only) Component Layout

T785 Transmitter
(Models 51H3, 59H3 and 66H3 only) Component Layout

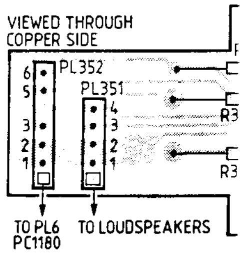




ADD 400 TO COMPONENT REFERENCES EXEPT LINKS



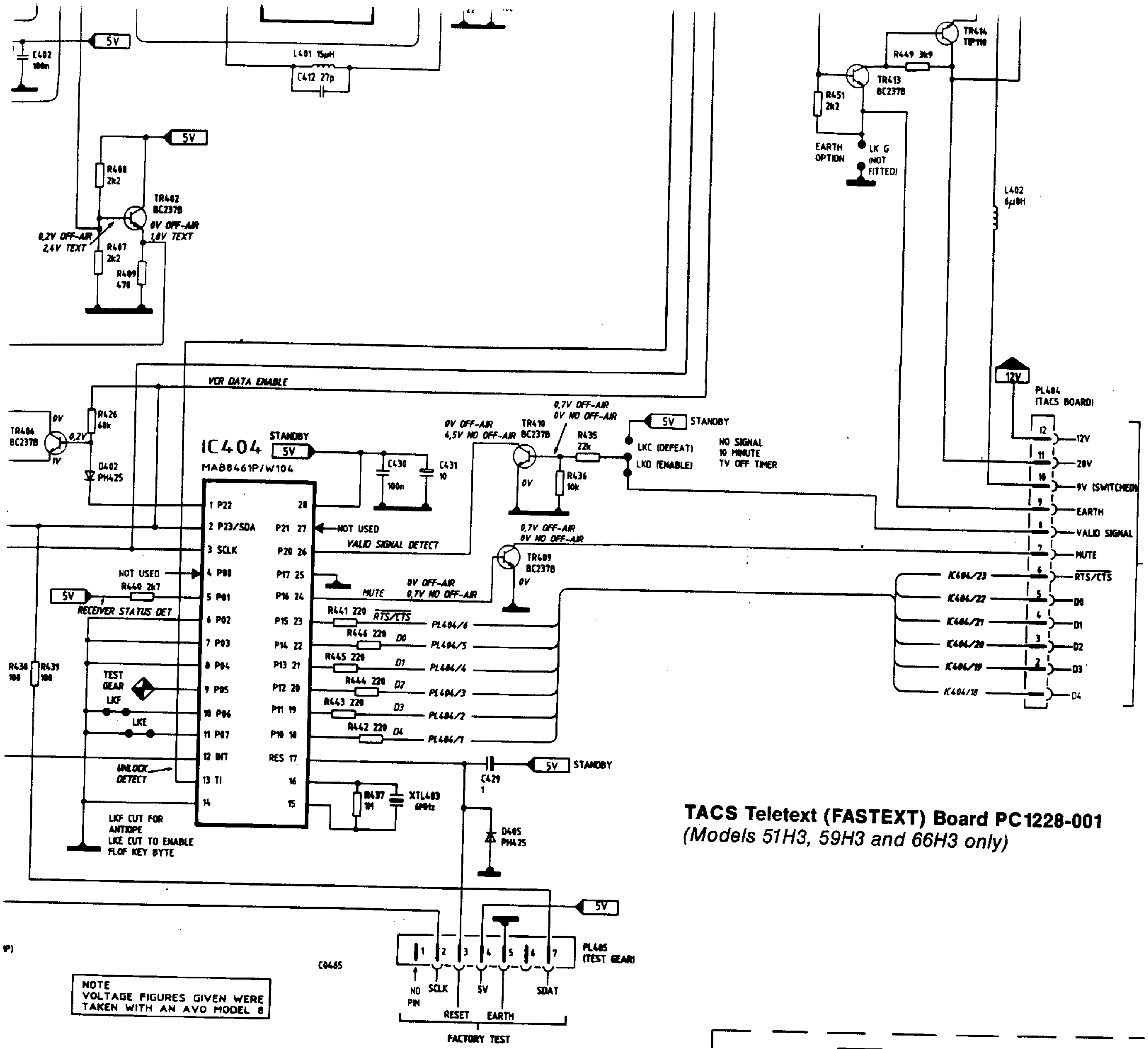
VIEWED THROUGH COPPER SIDE



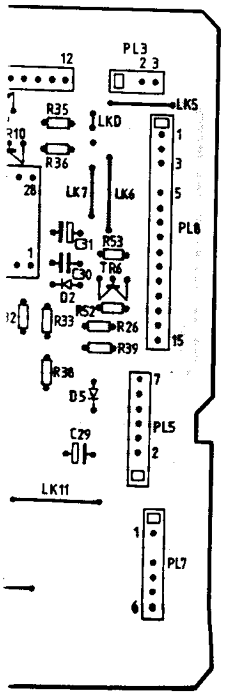
PC1648-002 Comp

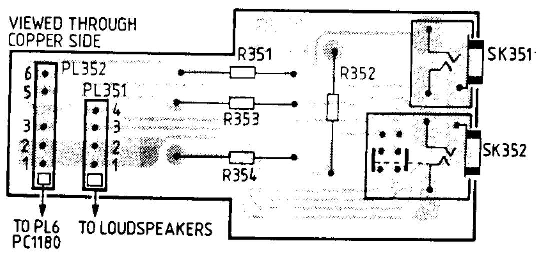
PC1228-002 Component

(Models 51H3, 59H3 and



TACS Teletext (FASTEXT) Board PC1228-001
(Models 51H3, 59H3 and 66H3 only)

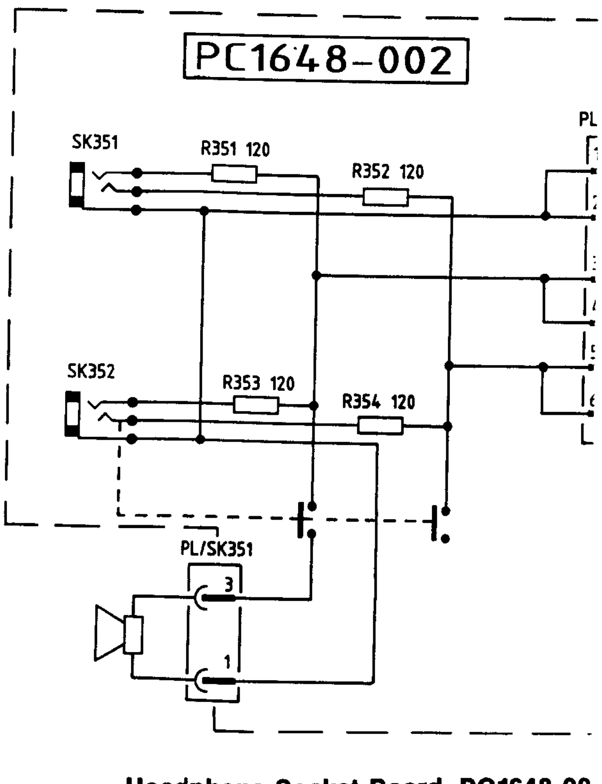




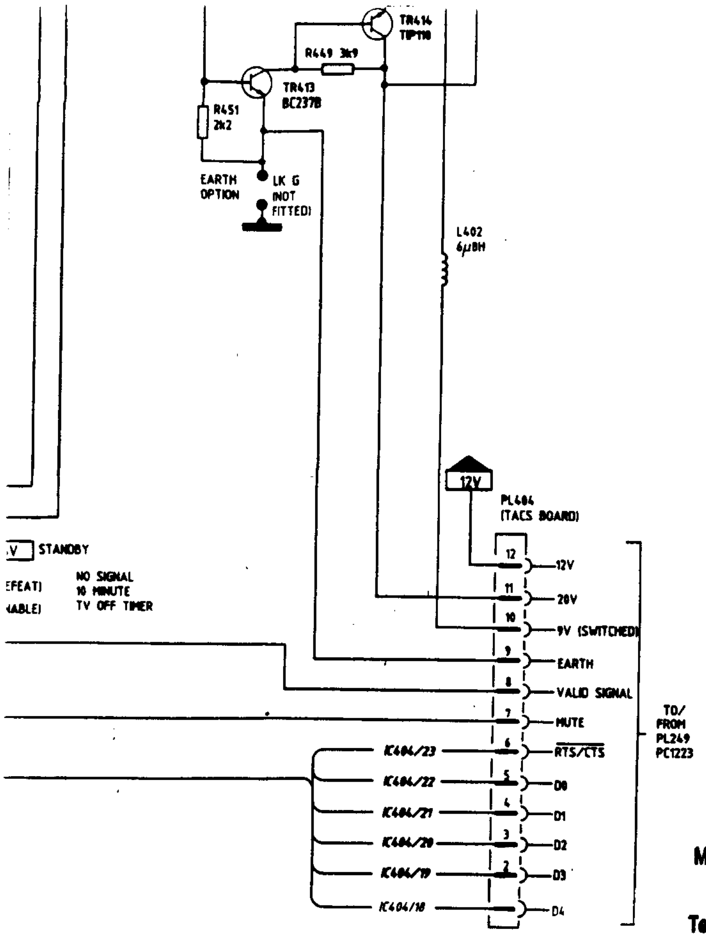
PC1648-002 Component Location Diagram

PC1228-002 Component Layout
(Models 51H3, 59H3 and 66H3 only)

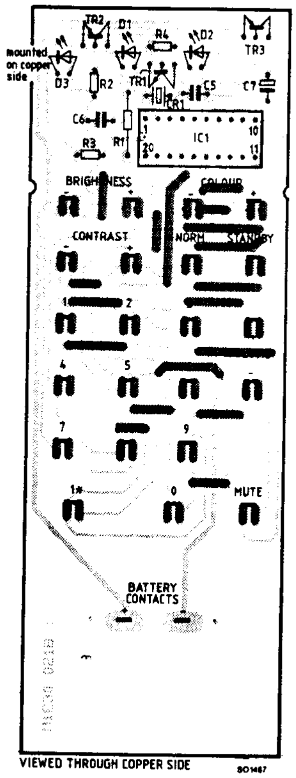
S1596



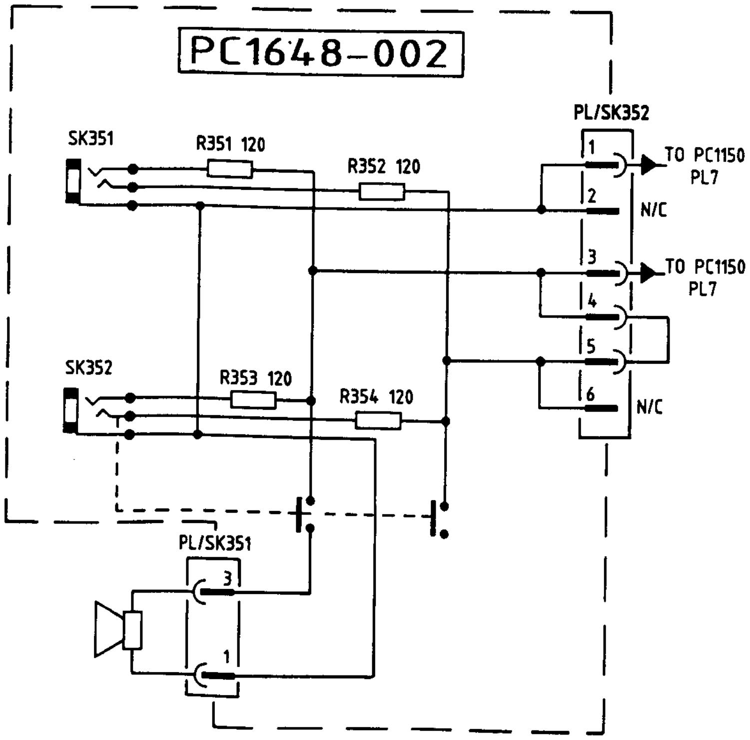
Headphone Socket Board, PC1648-00



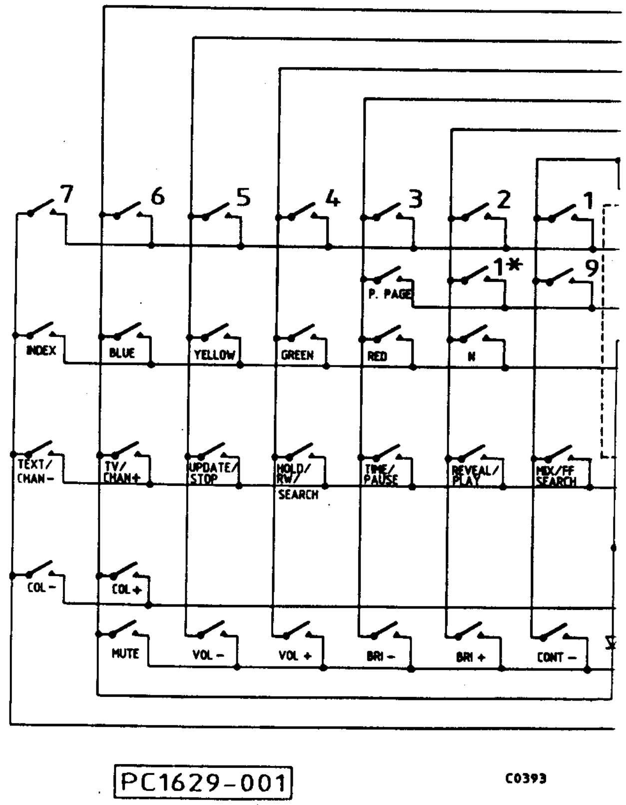
TACS Teletext (FASTEXT) Board PC1228-001
(Models 51H3, 59H3 and 66H3 only)



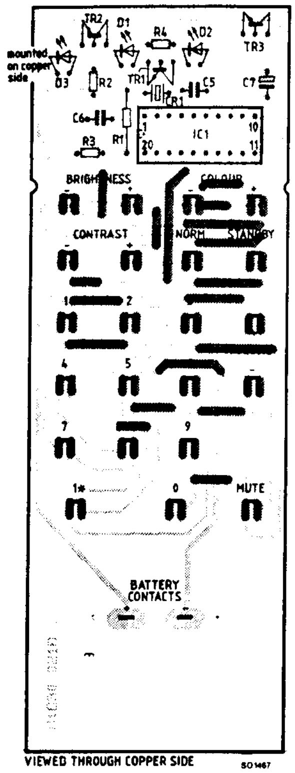
T780 Transmitter
(Models 51H2 and 59H2 only) Component Layout



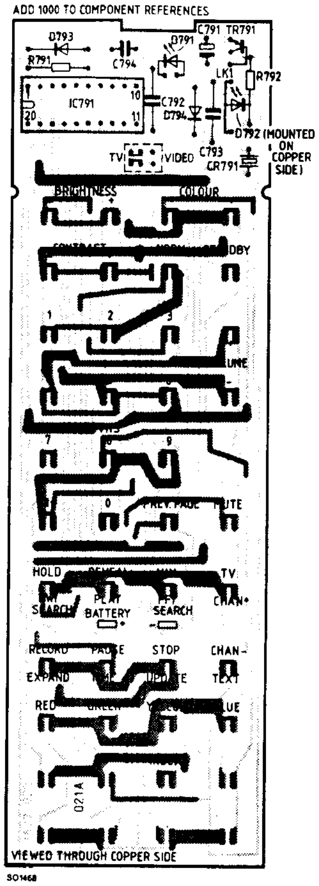
Headphone Socket Board, PC1648-002



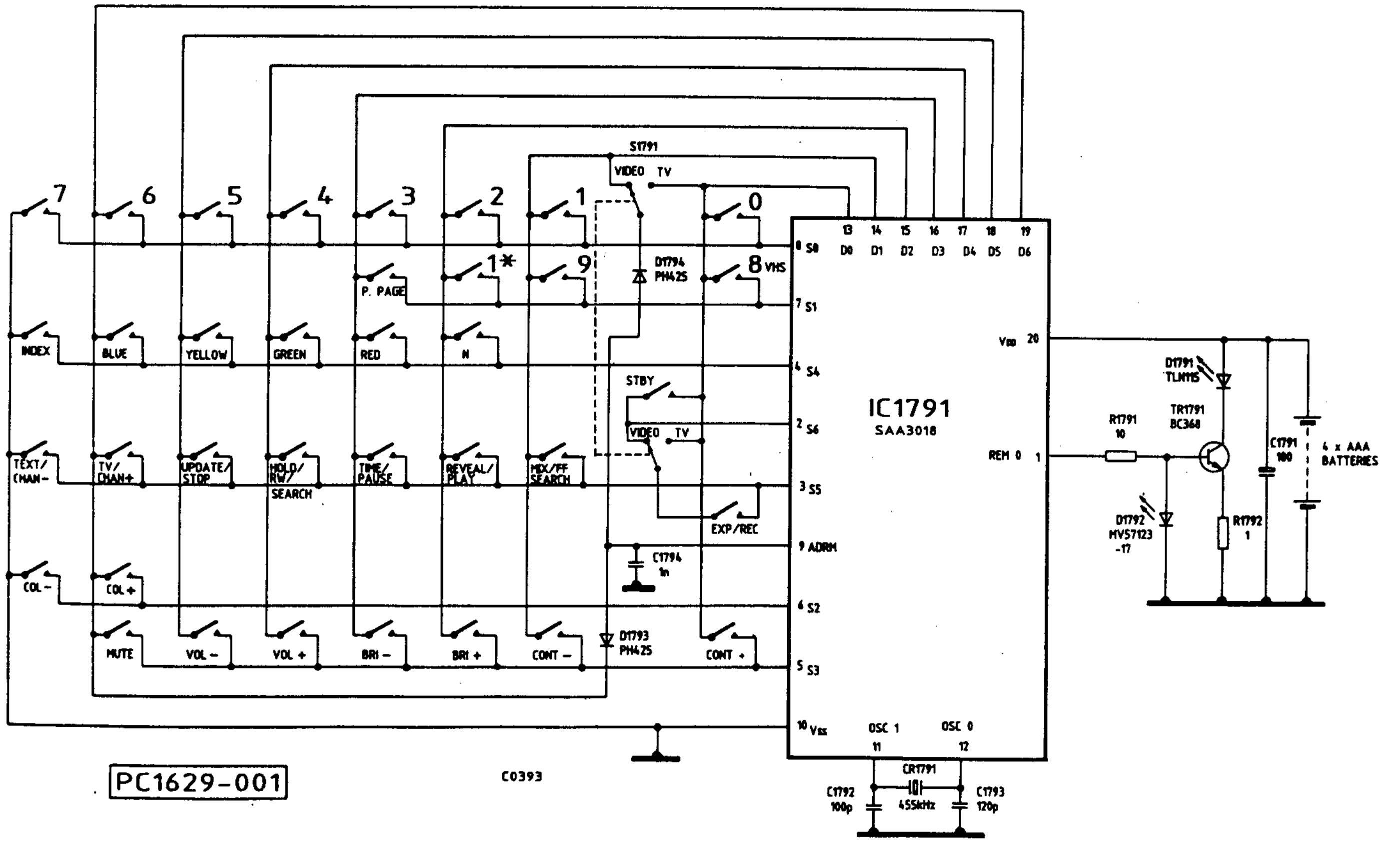
T785 Infra-red Transmitter Board PC1629-001
(Models 51H3, 59H3 and 66H3 only)



) Transmitter
dels 51H2 and 59H2 only) Component Layout



T785 Transmitter
(Models 51H3, 59H3 and 66H3 only) Component Layout



5 Infra-red Transmitter Board PC1629-001
dels 51H3, 59H3 and 66H3 only)