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TELEVISION MONOCHROME MONITOR 8½"
Pye type 081

GENERAL AND TECHNICAL INFORMATION

BY COMMAND OF THE DEFENCE COUNCIL

J. T. Dunnett

Ministry of Defence

FOR USE IN THE
ROYAL AIR FORCE

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PYE 8½ - INCH VIDEO MONITOR

Type 081

(Part Number 848008)

This service manual is for the maintenance of Pye T.V.T. equipment. The performance figures quoted are typical and are subject to normal manufacturing and service tolerances.

The right is reserved to alter the equipment described in this manual in the light of future technical development.

SERVICE MANUAL

ISSUE 2 (MAY 1967)

PYE TVT LIMITED Coldhams Lane · Cambridge · England
Phone: Cambridge 45115 · Telex 81103

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CHAPTER 2

TECHNICAL DESCRIPTION

Note: The data throughout this description is given as a supplement to information provided by the circuit diagram which provides waveform and voltage analysis. Circuit techniques in common use are not normally described.

Video Amplifier

The video input signal required for the amplifier can be either video plus blanking or composite video (peak white positive, sync negative). Provision is made for the signal to be 'bridged through' to other monitors, or terminated in 75Ω by means of a 2-position link (PL6) on the rear panel of the monitor.

The video signal is fed into the first amplifier stage via the circuits of the protection diodes D1 and D2. These diodes are forward biassed so that signals which do not exceed the specification upper limit pass through unchanged. Signals above the upper limit bias the diodes into the 'off' condition. This prevents damage to TR1 occurring through the application of excessive signals.

TR1, the first video stage, is connected in an emitter follower circuit with bootstrap components C2 and C3. The bootstrap increases the input impedance to a value required by the 'bridged' condition. Video gain (contrast) is controlled by R152 (on the monitor front panel). This potentiometer is connected as the emitter load of TR1 with the slider feeding the signal to the base circuitry of TR2 which also functions as an emitter follower. Voltage gain is provided by TR3 in a grounded emitter stage which in turn feeds into the emitter follower circuit of TR4.

TR2, TR3 and TR4 are all d.c. coupled. To prevent d.c. drift, reduce distortion, and to produce the required frequency response, a combination of a.c. and d.c. feedback is employed. High frequency feedback from TR4 to TR2 is made variable by the trimmer C7 which acts as a peaking control, and this is preset for optimum response. The feedback also ensures that any hum present in the input signal is greatly reduced.

In order to drive the clamp transistor, TR6, more a.c. efficiency is required than is normally obtained from a simple emitter follower where efficiency is limited by power loss in the low value load resistor. This increased efficiency is provided by TR5 which is a constant current device, and acts as a large a.c. impedance in the emitter circuit of TR4. TR5 bias stabilisation is provided by potential divider R19, R20.

The clamp transistor, TR6, restores the d.c. and low frequency components of the video signal which have been lost by earlier a.c. couplings. Negative going line pulses of approximately 2μS duration are applied to the

CHAPTER I

GENERAL DESCRIPTION AND SPECIFICATION

The Pye $8\frac{1}{2}$" solid-state Monitor has been designed for use in closed-circuit television systems, and in general studio installations. Model 081 is suitable for 625 line or 525 line standard scanning systems. Inputs can be either a composite video or non-composite video with separate synchronising signal. Changeover is provided by a two-position link on the rear panel.

The E.H.T. supply of 15.5kV is stabilised, and the C.R.T. is fitted with a dark screen filter ensuring pictures of excellent contrast even in high ambient lighting conditions. Picture black level clamping circuits are also employed.

There is provision for either high impedance 'bridging' through or low impedance termination of the video line by a two-position link plug. Similar links are used to select internal or external sync condition, and also for 'bridging' or termination of the external sync line.

Controls available on the front panel include normal operator controls of on/off switch, brightness, and contrast, and also presets for vertical and horizontal hold.

A socket is fitted so that brightness and/or other functions may be remotely controlled if required.

General use of high quality components, and careful choice of the optimum performance semiconductor devices, ensure stability of operation, high picture quality, and long service.

SPECIFICATION (For 082 see Appendix 1)

Scanning System	525/625 lines, 50/60 fields per second.
Picture Dimensions	5.3" x 7.1" (13.5 x 18 cm)
Input Signals	0.25 - 2V p-p composite video waveform (peak white positive, sync negative), or 0.25 - 2V p-p video and blanking (peak white positive) and 0.2 - 5V p-p negative going complete synchronising waveform.
Input Impedance	75 ohms ±5% or high (bridged).

Video Bandwidth	8 Mc/s minimum.
Scanning Linearity	Less than 2% departure from the ideal.
Power Supply	90 - 150V a.c. r.m.s. and 180 - 240V a.c. r.m.s. at 47 - 70 c/s. Range and voltage adjustable by selector plugs.
Power Consumption	60 watts approximately.
Max. Ambient Operating Temperature	50°C.
Connectors	Power input - Bulgin P429. Video & Sync - Films & Equipment type SO-239. Ancillary Facility - Electro Methods M7S-LR-N.
Semiconductor Complement	33 transistors, 40 diodes.
Valve Complement	Two EY86.
Display Tube	$8\frac{1}{2}$ inch (21.5 cm) diagonal; 90° electrostatic focus (Mullard type M21-11W)
Overall Dimensions	Width 10 in (25.4 cm) Height $9\frac{1}{2}$ in (24.1 cm) Depth 17 in (43.2 cm)
Unpacked Weight	30 lbs (13.6 kg)
Packaging Data	Carton Sizes: Width 16 in (40.6 cm) Height $15\frac{1}{2}$ in (38.8 cm) Depth 22 in (55.9 cm)

TR11, in a grounded emitter stage, has its base d.c. potential stabilised by a conventional potential-divider network (similar to that of TR10), and in the no-signal condition is just conducting. Under conditions where a composite video signal has to be accepted, the positive portion biasses the transistor off, thus permitting only the amplified negative sync pulses to appear in the output. This biassing is provided by the self-bias components. With low level signals, however, the sync separation is not always complete and TR12 circuit, which is completely self biassing is employed to remove any residual video. The decoupling components, including Zener diode D6, obviate positive feedback which might otherwise occur via the positive supply line to TR11 emitter. Amplified composite sync pulses across the load of TR12 are fed out to the time base circuits.

TR13 is fed from L1, part of the composite load R50/L1 of TR12. The waveform across L1 consists of differentiated line pulses, and D7 removes part of this waveform to ensure that only negative going pulses are applied. Output of TR13 across R53 consists of sharp negative going line pulses which are used to switch the video and sync clamps (TR6 and TR9).

Vertical Scan Timebase

Composite sync signals from TR12 are applied to the CR network, R58/C35, in the base circuit of TR14. The time constant is such as to reduce substantially the line pulse amplitude and to pass with little change the frame pulses. Interlace diode D8 circuit provides self-bias at a level which permits only the frame pulses to pass to TR14. The output pulses of TR14 are fed to the blocking oscillator via injection components R16, R63 and D9 which ensure suitable triggering level and shape.

TR15 is a conventional blocking oscillator with transformer coupling between collector and base. The variable R153 (VERTICAL SPEED) sets the vertical speed by its effect on the time constant of TR15 base circuit. D10 provides reverse spike suppression.

Frame pulse integration is performed by R65, D11, C37 and C38. When TR15 conducts D11 is biassed so as to conduct simultaneously thus completing the discharge path for C37 and 38. During the interval between pulses C37 and 38 charge again via R65. Overall linearity is controlled by the variable R168 (VERTICAL LIN. 1) which with C37 provides feedback between TR16 emitter and base. A separate control R166 (VERTICAL LIN. 2) controls the top portion of the picture only, and is part of the network C39, R69, R166 from the collector of TR16 and chassis.

The input to TR17 is controlled by the variable R167 (VERTICAL AMPLITUDE): the title being self explanatory. R74 (VERTICAL OUTPUT SET-UP) in the base circuit of TR17, is preset to provide the optimum output waveform by removing any small residual distortion.

TR18 is a straightforward emitter follower, which feeds the vertical output stage TR24. The frame output is applied from L5, in TR24 collector circuit, to the frame coils L11. Diodes D23 and 24 across L5 restrict the reverse voltage amplitude which would otherwise apply an excessive potential to TR24 collector.

Both a.c. and d.c. feedback are applied to the vertical amplifier stages. A.C. feedback is developed across R120 which is in series with the frame coils L11. This voltage is applied across R74 in the emitter circuit of TR17 and is used to counteract the variations of resistance with temperature in the wire of the frame coils. Thus if the coil resistance increases, the voltage across R120 drops and the output of TR17, and hence of TR18 and 24, rises to compensate. D.C. feedback is applied from the emitter of TR24 to the base of TR17 and minimises the effects of any drift in d.c. conditions. D12 in series in the d.c. loop mainly compensates for any temperature effects on TR17.

Blanking pulses are supplied from the collector of TR24 via D21 to the cathode of the C.R.T. to blank out the trace during the frame flyback period. D21 prevents the line blanking pulses, which are also on the C.R.T. cathode, from feeding back into the frame circuit. Clipping of the frame pulses is also effected by D21 with the level determined by R113 and 164.

Horizontal Scan Timebase

The line timebase, prior to the output stage of TR28, comprises a phase splitter TR19, frequency discriminator D14 to 17, frequency regulator TR20, horizontal oscillator TR21, and a driver stage TR27. The first 3 stages form an a.f.c. circuit for the line oscillator.

Synchronising pulses are applied to the base of TR9. Outputs in opposite phase are fed via C47 and 48 to opposite points of the bridge circuit formed by D14 to 17. A reference sawtooth waveform is also applied to another point on the bridge circuit discriminator. The resultant d.c. output controls part of the bias on the frequency control transistor TR20. The reference sawtooth originates in pulses from the horizontal efficiency circuit transformer T4 which are integrated by C49, R126.

TR20, the frequency control transistor, has two sources of d.c. bias. One is derived from the variable R154 (HORIZONTAL SPEED) and this sets the initial frequency. A second source is the phase dependent d.c. from the frequency discriminator. This latter varies in amplitude and polarity depending on the phase relationship between the sawtooth reference and the sync signals. Thus it modifies the mean value of bias on TR20 base. R93, in the emitter of TR20, carries the resultant output voltage and this modifies the effective impedance of C54. This capacitor forms part of the tuning capacitance of the horizontal oscillator TR21, the other half being C56. The apparent changes in C54 serve to reset the frequency. A primary advantage of the system is its stability of operation.

L2, C54 and 56, form the tuned circuit between base of TR21 and chassis with feedback to the emitter from a tapping on L2. Output is sinusoidal and hence the self-biassed diode D18 in the collector circuit is used to clip the waveform into a suitable shape for driving TR27 via T2.

The driver stage, TR27, is transformer coupled on its input to the collector of TR21, and on its output to the base of TR28. The current pulse

amplitude, on its leading edge, required to switch TR28 off completely and rapidly during the flyback period is about 3 amps. L7, the horizontal pulse choke, R27 and C78, all in the collector circuit of TR27, have the combined effect of sharpening the rise time and increasing the amplitude of the turn-off pulse to ensure a really fast and complete cut-off. D25, D26, C79 and R128 in the same circuit ensure that the transistor is reverse biassed for the entire turn off period.

TR28 feeds the deflector coils L10, from its emitter via the 'S' correction capacitor C94 and the saturated reactor L8 (HORIZONTAL LINEARITY). Control of linearity is effected by an adjustable permanent magnet which controls the degree of polarisation of the saturated inductance. C74 is the main tuning capacitor for the stage across emitter and collector. Third harmonic tuning provided by L6 and C75 serves mainly to reduce peak voltage across TR28, and the amount of third harmonic permitted is controlled by the ratio of C74, C75. D37 is also employed to damp peak volts across TR28. R158 (HORIZONTAL AMPLITUDE) controls the supply volts to the output stage.

During the finish of the flyback period, energy stored in the deflector coils drives the emitter of TR28 negative with respect to chassis. At this time efficiency diode D38 conducts, charges C96 through T4 and thus produces the boost volts required for peak scanning amplitude. The charge on C96 supplies an initial part of the scanning power when TR28 is still non-conducting, thus increasing the efficiency of the stage.

E. H. T. and H. T. Generation

The generation of all high level voltages is performed in one stabilised circuit which incorporates both overload protection to limit low voltage current consumption, and protection for the C. R. T. in the event of a failure in the scanning circuit.

TR29 and 30, with the associated components, form a Class C push-pull oscillator with feedback maintained by the transformer T5. Initial start-up of the oscillator is ensured by R135. Stabilisation is effected through the reference voltage which is taken from the collector circuit of TR30. Effectively one half of the primary of T6 (the E. H. T. output transformer) is across the network D29, 30 and the filtering components. The rectified and smoothed output is applied across the potential divider R131, R132 (SET E. H. T.) and the reference diode D28. R132 sets the initial bias on TR26 and hence the initial E. H. T. level. TR26 is connected in an a. c. sense, between primary and secondary of T5 and hence its conductance modifies the oscillator feedback circuit. Changes in load on the secondary of T6 are reflected back into the primary, seen as bias changes by TR26, and thus change the oscillator feedback and reset the E. H. T. level. Without TR26, feedback is insufficient to support oscillation, thus TR26 provides the true drive for the oscillator.

R162 (OVERLOAD PROTECTION) is preset so that the current from the low voltage supply feeding the oscillator transistors cannot rise above 2 amps if the load on the oscillator should be sharply increased. This protects TR29,

TR30 from damage. The change in conditions is such as to cut off TR26 and the oscillator ceases to function.

Scan failure protection for the C.R.T. also relies on the operation of TR26. Normally D27 in the emitter circuit of TR26, is made conductive by a negative d.c. supply derived from D25 which is driven by a winding on the efficiency transformer T4. If horizontal scan fails the D25 supply is cut off, D27 becomes non-conductive, TR26 is cut off and the oscillator ceases to function until line scan is restored.

The output of T6 is voltage doubled by V1, V2 rectifier circuits giving a final output of about 16kV. Half or full value E.H.T. can be measured across C99, C111 respectively.

A further secondary winding on T6 provides via voltage doubler circuits of D33 to D36, a 400V line for C.R.T. brightness (set by R155), a 510V line for focus (set by R116), and a 100V line for TR22, 23, and 24.

L.T. Stabiliser

Almost all transistor supplies are drawn from an approximately 11V line. This is stabilised by fairly normal series regulators.

TR31 and 32 circuits form the feedback amplifier, the emitters of which are tied to the +11V line by reference diode D39. Across the stabilised output is a potential divider R146, D40, R148 (SET D.C.) and R149. D40 compensates for any temperature drift effects in TR32. R148 sets the initial d.c. level. Incremental changes in output appear across the emitter/base circuit of TR32. Thus if the voltage tends to increase TR32 becomes more conductive and the collector volts will rise. This causes TR31 to become less conductive driving the collector more negative. The collector change is passed to the base of TR33, the series regulator, via TR25, decreasing the conductance and thus bringing the output back to normal by reason of the increased voltage drop.

The 11V supply originates in the mains transformer T1 and the full wave rectifiers D41, 42. C106 is chosen for its good power factor, low impedance and high ripple rating. Substitutes must be checked to ensure that characteristics are the same as for the item in the equipment.

CHAPTER 3

INSTALLATION AND OPERATION

GENERAL INFORMATION

Power Supplies

The monitor operates on A.C. supplies at 90-150 volts and 180-240 volts r.m.s. 47-70 c/s.

Different fuse ratings are required for the two ranges. The 1 Amp fuse normally fitted is suitable for the 180-240 volts a.c. range, whilst a 1.5A fuse is required for the 90-150V a.c. range. It is essential that a fuse of the correct rating be fitted should the need for replacement arise.

INSTALLATION

Check carefully that no damage has occurred in transit and that any loose shipping items have not been discarded.

Power Input Adjustment

Adjust the two voltage selector plugs at rear of monitor (see Fig. 4) so that the sum of the two figures equals, or corresponds as nearly as possible to the voltage of the local supply. (For example, with a supply of 110V a.c. the plug settings should be '90' and '20'; for 240V the settings would read '180' and '60'.

If operating on the 90-150V a.c. range, replace the fuse, F1, (Fig. 4) for one of the correct rating, i.e. 1.5A.

To ensure adequate ventilation for the monitor it is important that the air space beneath the monitor and immediately above the top louvres is unobstructed.

Power Supply Connections

Power should be applied by means of the detachable three-contact socket supplied with the monitor.

Use a length of colour-coded three-core cable suitable for the installation and connect the 'Live' core (e.g. RED) to the terminal marked 'L'; the 'Neutral' core (e.g. BLACK) to the terminal marked 'N'; and the 'Earth'

core (e.g. GREEN) to the terminal marked 'E'. Connect a suitable plug (preferably 3-pin or contact) to the free end of the lead, ensuring that the Live, Neutral and Earth connections are in correspondence with those made at the monitor socket. The 'Earth' lead should not be left detached since its connection constitutes an important safety measure.

Input Signal Connections

If a single monitor only is required fed from a composite video source connect the video lead to the Video 'In' socket and plug the associated link into the 'Term' position. Also check that the sync plug PL5 is in the 'Internal' position.

When more than one monitor is required in a composite video system the video 'In' and 'Out' lines should be connected by means of a 'T' adaptor (F and E Part No. M358 or Greenpar 15008) which is plugged into the 'Video In' socket, and the link PL6 moved into the 'Bridge' position. The final monitor in the line should be adjusted to the 'Term' position.

When a separate sync signal is available and one monitor only is in use, the plug PL5 is set to the 'External' position, PL6 is set to 'Term' position, and the sync lead plugged into 'Sync In'. If a number of monitors are in use, sync in and out lines are plugged into the same type of 'T' adaptor mentioned above, the adaptor being plugged into 'Sync In'. Also the plugs PL4/PL6 are set to the 'Bridge' position except for the last monitor where they are left in the 'Term' position.

SETTING-UP PROCEDURE

1. Turn 'Contrast' and 'Brightness' controls fully anti-clockwise to minimum.

2. Switch on by depressing the 'On-Off' push button. Wait approximately 2 mins. to allow the picture tube to heat up before attempting adjustments.

3. Advance the 'Brightness' control to the point at which a raster (lines) become visible on the picture tube, then turn back to the point at which the raster just ceases to be visible.

4. Adjust the 'Contrast' control to provide a picture of satisfactory contrast, or, if setting up in preparation to operate a camera, adjust to approximately $\frac{3}{4}$ of maximum.

5. Adjust 'Horizontal' and 'Vertical' Hold controls (presets on front panel) if necessary, to 'lock' the picture - or the raster if no picture is available but the camera is switched on.

6. Finally adjust 'Contrast' and 'Brightness' slightly to provide optimum results.

NORMAL OPERATION

Switch 'on' and allow the monitor to warm up.

Adjust 'Contrast' if necessary to accommodate slight changes of signal strength.

Switch 'Off' by re-pressing and releasing the 'On-Off' push-button.

NOTES ON ADJUSTMENT OF CONTROLS

Upon initial installation all auxiliary controls will be checked and/or adjusted for their correct settings, and further adjustment will not normally be required. Customers who carry out their own installation and find adjustment necessary should consult the maintenance section of this book.

Pictures illustrating some effects from incorrect adjustment of readily-accessible auxiliary controls, together with an 'all-correct' picture, are however given in Fig. 1.

'On' - 'Off' Push-Button

This controls the power supply to the monitor. Depress to switch on; press again and release to switch off.

Brightness and Contrast

The precise setting of these controls may be a matter for individual preference. In general the aim of their combined adjustment is to produce a picture of correct or acceptable contrast. A sound method of obtaining this is to first set the Brightness control in the absence of a signal (i.e. Contrast at minimum) to the point at which raster lines are just invisible, followed by an adjustment of the Contrast control for optimum results.

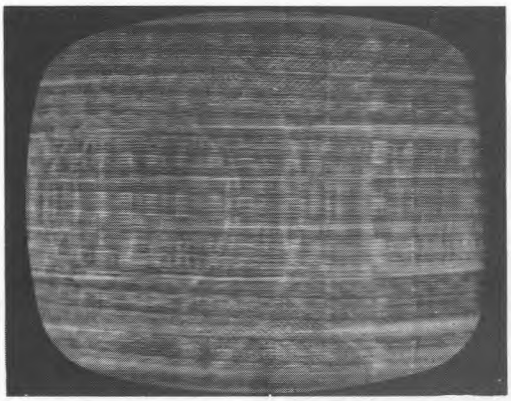
Incorrect settings of these controls will most likely result in inaccurate reproduction of shades between black and white. A comparative graduation scale is shown by the 5-square column at the centre of the test card.

Vertical Hold

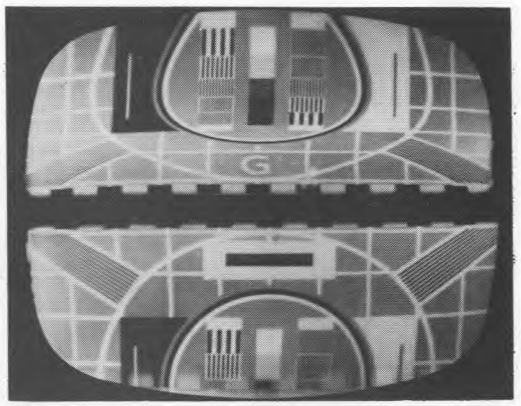
Adjust to the point where the picture is locked and where slight movement of the control in either direction is possible without movement in the vertical direction.

Horizontal Hold

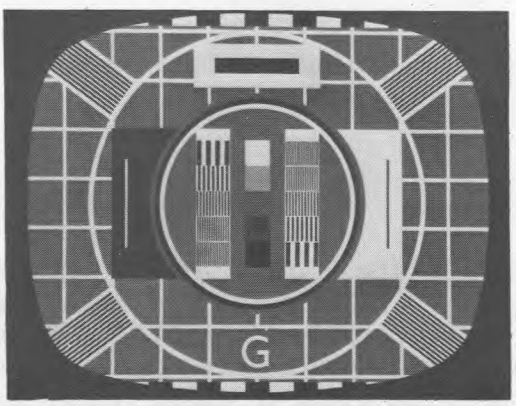
Turn to left or right until a complete picture appears, and adjust to the point giving least sideways movement of the picture. Check that the correct position has been obtained by switching off the monitor for a brief time and then switching on again - the picture should reappear locked.



Incorrect Adjustment of Horizontal Hold



Incorrect Adjustment of Vertical Hold



All Controls Correctly Adjusted

Fig. 1 Incorrect and Correct Pictures

CHAPTER 4

MAINTENANCE

PRECAUTIONS

TRANSISTORS

General

Transistors are mechanically robust and have not so far exhibited any limit to useful service life when operated under correct circuit and specified rating conditions. Due to a very low resistance, however, irreparable damage may be caused by the inadvertent application of quite low potentials. It should be noted that such potentials may exist at the terminal or between terminals of a meter or other item of test equipment, or between a soldering iron and chassis, or across an undischarged capacitor.

Non-observance of this and also of the following procedural precautions in the maintenance of transistor circuitry and in the testing of suspect units may result in their destruction.

1. Always ensure that the monitor is switched off before any other circuit connection is made or broken, and before any repairs are carried out.

2. Make sure that not only the monitor itself, but also all items of test equipment (Sig. Gen., Oscilloscope, etc.) and the soldering iron are earthed properly.

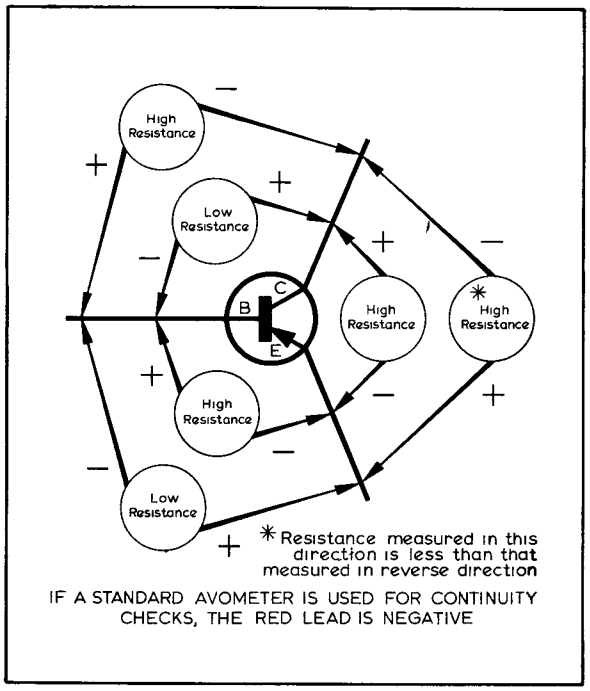
3. Observe correct polarity. The potential applied to the collector of p-n-p type transistors is always negative, to n-p-n type always positive, with respect to emitter.

4. Avoid excessive heating (see sub-section 'Soldering').

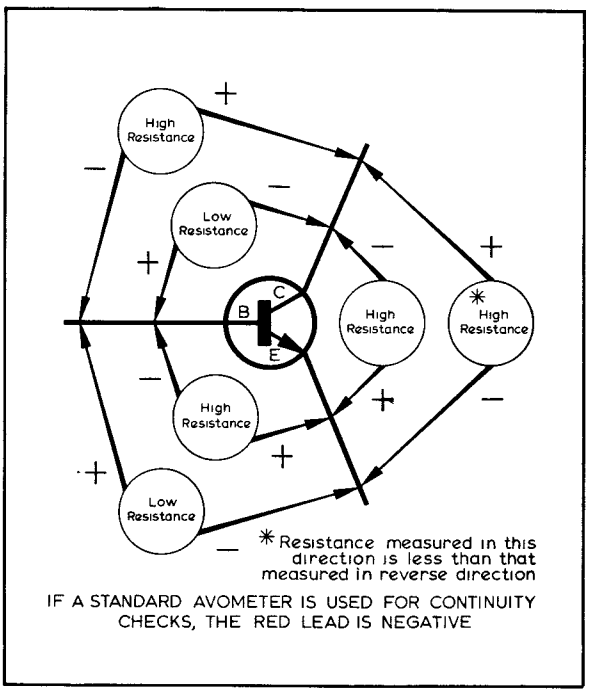
TRANSISTOR TESTING

Commercial transistor testers on which comprehensive test schedules may be performed are available in a variety of makes and types, but where this facility is not available the rough continuity test of Fig. 2, may be found useful.

1. Do not use a megger or other equivalent form of test-circuit in testing transistor continuity.



(a) P-N-P Type



(b) N-P-N Type

Fig. 2 Transistor Continuity Checks

2. Ascertain, in the ohmmeter intended for the test, the polarity of the test terminals, or if a range-switched instrument, whether the polarity of the terminals is reversed on the resistance ranges (in the standard 'Avometer' the Red Terminal is Negative) and also whether the test voltages differ on the different ranges.

3. Use a safe ohmmeter to check continuity of transistors as shown in the figure, taking care not to apply any test voltage or current in excess of the permitted maximum (as shown by the relevant specification data of the transistor) particularly in the reverse base-emitter and collector-emitter tests.

   Use an AVO meter Model 8 on the 'R' resistance range only (not on either of the ÷ 100 or x 100 ranges), or any other ohmmeter on a range with f. s. d. not greater than 1mA and output not greater than 1.5 volts.

Substitution of the suspect component by a new, or still better a proven good part, is a most satisfactory method of checking, particularly since certain dynamic performance defects may not be traceable by any other method. See section on soldering before proceeding.

CONTINUITY CHECKING

It will be appreciated that the precautions given in connection with transistor continuity tests above, apply equally to continuity checks in transistorised circuits and external wiring.

1. When checking wiring external to a unit it is safer to unplug the unit whenever possible.

2. When it is required to check resistors, capacitors, etc. and these components are shunted across the whole or part of a semi-conductor, meter readings may be affected. In these cases disconnect one end of each component under test.

SOLDERING

Poor insulation on the soldering iron can give a sufficient level of a.c. leakage to cause permanent damage to transistors. Check with a meter for the existance of a potential between the bit of the iron and the circuit earth. If present, repair the earthing of the iron, or replace.

1. Semi-conductors are temperature sensitive: do not apply an iron to the terminal wire or pin for longer than is necessary.

2. Never solder with the monitor switched on; this can lead to short-circuits disastrous to transistors, e.g. across emitter resistor.

3. Use a thermal shunt when soldering/unsoldering any transistor or diode by firmly clamping the terminal wire or pin close to the point of application, with either:-

   (a) A suitable size of approved heat-sink clip, or

   (b) Cool, smooth-jawed pliers or tweezers.

TRANSISTOR (and DIODE) REPLACEMENT

Various cooling clips are used to permit increased power dissipation. When replacing ensure that the same clip, or same size of clip, is refitted and makes close contact with the case of the semiconductor. Where mica insulating washers are used these must not be damaged (or if damaged, must be replaced - but not by any other material since this would affect adversely the transfer of heat from case to heat-sink or chassis).

A thin, even smear of silicone (and only silicone) grease on the washer prevents sticking and makes a more intimate heat bond with the sink. Insulating bushes must not be forgotten since they isolate the collector from

chassis. Tighten all mounting screw nuts evenly and hard down for good contact, since this again affects heat transfer, but take care not to strip threads. Some diodes are mounted in cradles to space the component from the panel on which it is mounted. The cradle should be retained whenever replacements of the diode is needed.

TEST EQUIPMENT

1. Earth all test equipment.

2. Some signal generators may give outputs in excess of the transistor rating. Care should be taken to reduce the output to minimum before connecting, and ensure that the safe level is not subsequently exceeded.

3. Connect test equipment earth lead first and then touch the other lead to earth (to discharge any capacitor that may be charged) before connecting it into the equipment on test.

4. Discharge test capacitors also in the same way.

PRINTED CIRCUITRY

The techniques employed in the servicing of printed circuit boards are basically similar to those in use with wired chassis. The following points should, however, be noted and the warning concerning the soldering of semiconductors always observed.

1. The copper circuitry is covered with a protective layer of polyurethene and to avoid damage to this, needle point test probes should be used when making measurements from this side of the board.

2. When soldering, care should be taken to avoid the application of excessive heat which will soften the thermoplastic adhesive under the copper foil. Best results are obtained by the use of a hot iron (rating below 50 watts) applied for the shortest possible time.

3. Use as little force as possible in removing faulty components. Wires bent over against the copper foil should be gently levered up - thesolder being molten during this operation to prevent lifting of the copper foil from the board.

4. The leads of replacement components should be carefully cleaned before being inserted through the holes in the panel. They should then be cut to length and bent over against the copper foil. Soldering should be as rapid as possible using 60/40 resin-cored solder.

5. Avoid excessive deposits of solder; these may cause short-circuits and intermittent faults difficult to locate.

6. Should it be necessary to clean the circuitry before soldering, a small glass fibre or wire brush should be used. After soldering, the exposed copper foil should be re-coated with polystyrene dope or similar preservative (e.g. Durofix) to keep out moisture.

7. Microscopic cracks may be satisfactorily repaired with solder, but in general tinned copper wire should be used to bridge the damaged circuitry.

MONITOR TESTING AND READJUSTMENT OF CONTROLS

General

When servicing the equipment, the usual precautions should be taken to avoid accidental contact with high voltages, and especially with the E. H. T. voltage.

In handling the c.r.t., e.g. during replacement, care should be exercised to avoid the danger of implosion, and eyes should be protected by industrial safety spectacles or goggles.

Voltages and Waveforms

This information, and the conditions under which they are obtained, is set out on the circuit diagram. Most normal faults can be traced from this data. The information which follows deals with points which are not always obvious from the circuit.

Controls

The controls available are listed below together with their general location in the monitor.

Code	Function	Location
R26	Clamp Set-up	Video & Sync Separator Panel
R74	Vertical Output Set-up	Hor. & Vert. Timebase Panel
R116	Focus	By L. T. Stabiliser Panel
R132	Set E. H. T.	E. H. T. & Hor. Output Panel
R148	Set D.C. (IIV)	L. T. Stabiliser Panel
R152	Contrast	Monitor Front Panel
R153	Vertical Hold	Monitor Front Panel
R154	Horizontal Hold	Monitor Front Panel
R155	Brightness	Monitor Front Panel
R157	Preset Brightness	Monitor Right Hand - tube mount
R158	Horizontal Amplitude	Monitor Rear Panel
R162	Overload Protection (E. H. T.)	E. H. T. & Hor. Output Panel
R166	Vertical Linearity 2	Monitor Rear Panel
R167	Vertical Amplitude	Monitor Rear Panel
R168	Vertical Linearity 1	Monitor Rear Panel

Code (Cont)	Function	Location
C7	H.F. Peaking (Video)	Video & Sync Separator Panel
L1	Clamp Pulse Width	Video & Sync Separator Panel
L2	Horizontal Oscillator	Hor. & Vert. Timebase Panel
L6	Third Harmonic tuning (line flyback control)	E.H.T. & Hor. Output Panel
L8	Horizontal Linearity control	On metal screen near C.R.T.
	Centring & correction magnets	Parts of Deflector Coil Assembly

Note: Presets will not require adjustment unless some component failure has affected the value of associated components, or replacements are made.

Simpler Servicing Adjustments

The following adjustments are those which will be necessary after the c.r.t. has been replaced, or after the replacement of one of the controls mentioned. For most of these a linear test pattern source is needed, with composite video input (or with separate syncs) within the monitors specification limits (see Chapter 1).

1) Vertical Hold (R153) Adjust to centre of arc in which no up or down movement of the picture occurs.

2) Horizontal Hold (R154) Control has a range over which picture remains locked by reason of the a.f.c. circuit: set to the centre of this range. Check that lock is still satisfactory after monitor is switched off and then on again.

3) Picture Orientation Loosen deflection coil assembly clamp and adjust without allowing coils to move back along the neck. Tighten clamp.

4) Centring Magnets (M1, M2) See Fig. 11. With correctly orientated picture adjust M1, M2 independently to achieve optimum centring.

5) Raster Correction Magnets (M3-6) With linear test pattern and with foregoing adjustments completed, set the magnets by gentle bending or twisting to give best geometry on each appropriate edge of the picture.

   Replacement magnets must be positioned with the correct polarity as shown in Fig. 11.

6) Focus Control (R116) This is positioned inside the monitor on the left hand side, close to the L.T. Stabiliser Panel. Adjust slide contact for best focus.

7) Vertical Amplitude and Linearity R167 controls amplitude, R166 controls the top picture linearity only, and R168 controls overall linearity. Foregoing adjustments should be completed.

Some interdependance exists between the three controls, therefore, set R166, 168 initially to mid-position, adjust R167, and linearity controls last.

8) Horizontal Amplitude and Linearity R158 controls amplitude. L8, positioned on metal screen just above stem of c.r.t., controls linearity. The knurled ring is held between finger and thumb, and pushed or pulled to move on the centre rod. A twisting motion makes small movements easier to obtain.

Video Tests

Test Equipment

(a) Video Oscillator. Minimum frequency range 100 kc/s to 9 Mc/s. Attenuator range to -40dB approx. (on 1V p-p). Suitable item - Wayne Kerr, type 0.22B.

(b) High Impedance Crystal Voltmeter to read between 0 and 100 volts peak-peak. Accurate over frequency range as in (a).

(c) 27k ohm resistor with leads and miniature clips.

Sensitivity

Temporarily disconnect lead to tag 18 on rear of Video and Sync Separator Panel. Cover end of lead to prevent short circuits. Clip 27k ohm resistor between slider of R26 (on this panel) and base of TR7 - top end of C12 is a convenient point. Connect Crystal Voltmeter between c.r.t. grid (pin 2) and chassis.

Inject 100 kc/s signal from Video Oscillator at SK2 (PL6 set to Terminate position). Set attenuator for a level of -37dB on 1V p-p.

Switch on. Set Contrast control to maximum. The level on the Crystal Voltmeter should be more than 20V p-p, representing a minimum gain of 63dB.

Frequency Response

Conditions are as for sensitivity check.

Adjust video oscillator attenuator for exactly 20V p-p on Crystal Voltmeter.

Increase input by 10dB and adjust R26 (Clamp Set-up) for maximum output which should be about 60V p-p.

Readjust attenuator to return output to exactly 20V.

Set input frequency to 7 Mc/s and adjust trimmer C7 (on same panel as R26) to give 20V p-p output.

Check the video response between 100 kc/s and 7 Mc/s, say at 100 kc/s, 500 kc/s and in 1 Mc/s steps. This should be flat within ±1dB. Check response at 8 Mc/s and 9 Mc/s. This should be between +1dB and -3dB on the output at 100 kc/s.

Switch off and disconnect all test items. Carefully resolder lead to tag 18.

Inject at SK2 a composite video signal, preferably from a linear test pattern source. Switch on. Adjust contrast control so that the signal is just visible. R26 (Clamp Set-up) is now reset so that it is just retarded from the position where black level clipping occurs.

Other Tests

The following abbreviated data is provided to cover tests required following the replacement of controls not dealt with in the check outlined above.

CONTROL	CONDITIONS	ADJUST FOR
R157	As at completion of Video Tests. R155 fully a.c.w.	Mid-grey level just visible on white ground.
L1	As for R157. C.R.O. across tag 18 and chassis.	Clamp pulse width at 50% level -2μS.
R74	L1 check completed. C.R.O. now across R120. Adjust in sequence R74, R167, R166, R168.	Max. undistorted saw-tooth waveform 1.1V ±0.1V p-p.
L6	Normal signal input. R158 fully a.c.w. C.R.O. via X 10 probe to TR28 emitter and chassis.	Flyback pulse shape as per circuit diagram. R158 set to give 250V pulse.
L2	Normal signal input. Voltmeter to TR20 base and chassis. Lead to tag 39 disconnected (Timebase Panel).	R154 to give 1.5V on Voltmeter. L2 for picture trying to lock. Reconnect tag 39 lead. Set R154 to centre of locked range.
R162	R155, 157 fully a.c.w. R162 set to mid-position. 10 amp meter in series with L9.	R155, 157 set to just give 2 amp reading. R162 to cut E.H.T. at just over 2 amps.

Note: R26 may have to be adjusted to achieve 2 amps (or just over), if so readjust R26 after this check as in last paragraph of Video Tests.

MECHANICAL INFORMATION

Removing Covers

Each side cover is held by two screws, accessible on the bottom edge of the cover.

Remove these screws. Hinge side cover upwards until the top lip can be disengaged from its channel in the section carrying the monitor handle.

Access to Components (see Figs. 12 and 13)

On the left hand side the complete assembly holding the Video and Sync Separator, and the Horizontal and Vertical Timebase panel can be hinged outwards after merely pressing outwards the two springs into which the tapered spiggots engage.

The L. T. Stabiliser Panel will need removing only if access is needed to the printed copper wiring, or to L5 which is mounted behind this panel. Remove the two screws holding the brackets which carry this panel. The assembly can then be drawn forward.

The Video Output Panel requires only to be drawn backwards off the end of the c. r. t. taking care not to exert pressure on the panels components in this process. It is fixed to the base connector.

On the right hand side of the monitor, access to E. H. T. output components is achieved by merely removing the four screws one at each corner of the metal screen over the rear compartment.

If it is necessary to gain access to the rear of the Horizontal Output and E. H. T. Panel, the four screws, one at each top corner and one on each edge towards the bottom must be removed.

Removing C. R. T.

Unplug e. h. t. cap connector.

Carefully remove c. r. t. base connector and the Video Output Panel.

Loosen the deflector coil clamp screw so that c. r. t. (when freed) will be able to slide forwards easily.

Loosen the c. r. t. band screw - at top of monitor just behind front panel.

Remove Brightness and Contrast control knobs on front panel. Turn monitor on to its right hand side.

Remove screws holding front panel to main assembly - two at top near handle assembly and two underneath chassis.

Front panel and c.r.t. can now be drawn forward until c.r.t. is clear of unit. C.R.T. and mask can now be withdrawn from the front panel.

Refitting C.R.T.

Before fitting mask to new tube ensure e.h.t. terminal is on the correct side (left hand viewed from rear).

Having seated the c.r.t. and its mask in the front plate, pass the c.r.t. stem into the main unit sliding deflector coils on to the neck in the process.

Turn monitor on to its right hand side. Replace fixing screws. Finger tighten top two then screw fully home the underneath screws. Finally tighten top two.

Turn monitor into normal position and fit Brightness and Contrast knobs.

Tighten c.r.t. band screw ensuring that rubber seating is flat and fitting correctly around c.r.t. C109 earthing tag is held by this band - take care that C109 wire is not accidentally fractured.

Position deflection coils tightly up on to the flare of the c.r.t. and lightly lock clamp screw.

Refit e.h.t. cap connector, and place base connector and Video Output Panel back in position.

Ensure that satisfactory contact is made with Aquadag external coating by the spring provided.

Note: When this process is completed turn to Chapter 3, Setting-Up Procedure Section, then to Chapter 4, the section under Simpler Servicing Adjustments.

Screen Cleaning

Only the outer glass screen will need cleaning. Use a clean duster, lightly damped cloth, or sponge. This item should be kept for the purpose to ensure that it is free from abrasive material.

Ordering of Spare Parts

To avoid delays, and possible errors in the supply of spare parts, the Pye reference numbers shown in these parts lists should be quoted in all orders.

Special Notes

1) Many components in these lists are selected (in part) for their physical suitability on printed circuit boards. Plug-in types of resistors and capacitors used as replacements should be of the same size and type to avoid damaging the boards when resoldering.

2) Components denoted as "(epoxy)" are expoxy resin sealed to exclude moisture. Components marked "expoxy cased" should not be replaced by metal cased types.

3) At the time of compilation the capacitors used for C97 and C106 are available from one manufacturer only. Unsuitable alternatives could severely affect performance and even produce damage to associated components.

RESISTORS

Code	Value (ohms)	Tolerance(%)	Watts at 70°C	Remarks	Part No.
R1 & 2	75	5	1/4	Hi-stability	PE75065
3	10k	10	1/5		NG10313
4 & 5	7.5k	10	1/5		NG75213
6 & 7	3.9k	10	1/5		NG39213
8 & 10	470	10	1/5		NG47113
9	3.9k	10	1/5		NG39213
11	100k	10	1/5		NG10413
12	4.7k	10	1/5		NG47213
13	2.2k	10	1/5		NG22213
14 & 15	1k	10	1/5		NG10213
16	220	10	1/5		NG22113
17	4.7k	10	1/5		NG47213
18	68	10	1/5		NG68013
19	1.2k	10	1/5		NG12213
20	270	10	1/5		NG27113
21	47	10	1/5		NG47013
22	390	10	1/5		NG39113
23	100k	10	1/5		NG10413
24	33k	10	1/5		NG33313
25	1k	10	1/5		NG10213
26	500	Preset Potentiometer	"Clamp Set-up"		PL03470
27	470	10	1/5		NG47113
28	68	10	1/5		NG68013
29	39	10	1/5		NG39013
31	680	10	1/5		NG68113
32	330	10	1/5		NG33113
33 & 34	15k	10	1/5		NG15313
35 & 37	1k	10	1/5		NG10213
36 & 38	10k	10	1/5		NG10313
39	390	10	1/5		NG39113
40	47k	10	1/5		NG47313
41	2.2k	10	1/5		NG22213
42	4.7k	10	1/5		NG47213
43	750	10	1/5		NG75113
44 & 46	10k	10	1/5		NG10313
45	220	10	1/5		NG22113
47	470	10	1/5		NG47113
48	3.3k	10	1/5		NG33213
49	12k	10	1/5		NG12313
50	270	10	1/5		NG27113
51	470	10	1/5		NG47113
52 & 56	10k	10	1/5		NG10313
53	750	10	1/5		NG75113
54		Not used			
55		Not used			
57	1M	10	1/5		NG10513
58	10k	10	1/5		NG10313
59	220	10	1/5		NG22113
60	2.2k	10	1/5		NG22213
61	47k	10	1/5		NG47313

RESISTORS (Cont.)

Code	Value (ohms)	Tolerance(%)	Watts at 70°C	Remarks	Part No.
62	150k	10	1/5		NG15413
63	1.2k	10	1/5		NG12213
64	10k	10	1/5		NG10313
65	100k	10	1/5		NG10413
66	8.2k	10	1/5		NG82213
67 & 68	2.2k	10	1/5		NG22213
69	3.9k	10	1/5		NG39213
70	3.3k	10	1/5		NG33213
71	1k	10	1/5		NG10213
72	330	10	1/5		NG33113
73	820	10	1/5		NG82113
74	500	Potentiometer		"Vertical Output Set-up"	PL03470
75	2.2k	10	1/5		NG22213
76	47	10	1/5		NG47013
77	1k	10	1/5		NG10213
78	1.8k	10	1/5		NG18213
79	150	10	1/5		NG15113
80	100	10	1/5		NG10113
81	10k	10	1/5		NG10313
82		Not used			
83 (082)	2.2k	10	1/4		NG22204
84	3.9k	10	1/5		NG39213
85	4.7k	10	1/5		NG47213
86 & 87	470	10	1/5		NG47113
88	47k	10	1/5		NG47313
89	3.3k	10	1/5		NG33213
90 *	27k	10	1/5		NG27313
91, 92, 93	1k	10	1/5		NG10213
94	220	10	1/5		NG22113
95	1.2k	10	1/5		NG12213
96	2.7k	10	1/5		NG27213
97 & 99	220	10	1/5		NG22113
98	10k	10	1/5		NG10313
100	560	10	1/5		NG56113
101	10	10	1/5		NG10013
102 (082)	15k	10	1/4		NG15304
103		Not used			
104	2.7k	5	6	Wirewound	PE27209
105	47	10	1/5		NG47013
106	47	10	1/5		NG47013
107	330k	10	1/5		NG33413
108	4.7k	10	1/5	L3 wound on this	NG47213
109	4.7k	10	1/5		NG47213
110	680k	10	1/5		NG68413
111	33k	10			NG33304
112	10k	10	1/5		NG10313
113	47k	10	1/4		NG47304
114	82	10	1/4		NG82004
115	15k	10	1/4		NG15304
116	2M	Preset potentiometer		"Focus"	PL03996
117	1.2M	10	1/4		NG12504

(* 1k on 081)

RESISTORS (Cont.)

Code	Value(ohms)	Tolerance(%)	Watts at 70°C	Remarks	Part No.
118	33k	10	1/4		NG33304
119	1	10	1/2	Metal Oxide	PG01013
120	1	10	1/2	Metal Oxide	PG01013
121(082)	100k	10	1/2		PL22692
122	33	10	1/4		NG33004
123	10k	10	1/5		NG10313
124	470	5	1/2		NE47117
125	820	5	1/5		NE82113
126	2.7k	10	1/5		NG27213
127	39	10	1/5		NG39013
128	82	5	3		JS01678
129	22	10	1/5		NG22013
130	390	10	1/5		NG39113
131	68	10	1/5		NG68013
132	500	Preset potentiometer		"SET EHT"	PL02489
133	820	10	1/5		NG82113
134	680	10	1/5		NG68113
135	47k	10	1/5		NG47313
136	750	10	1/5		NG75113
137, 138	5	5	1/5		NE05013
139 (082)	390	10	1/4		NG39104
140 (082)	330	10	1/4		NG33104
141	47	10	1/4		NG47004
142		Not used			
143	5.6k	10	1/5		NG56213
144	56	5	6	Wirewound	PL21304
145	8.2k	10	1/5		NG82213
146	820	10	1/5		NG82113
147, 149	470	10	1/5		NG47113
148	500	Preset potentiometer		"Set D.C."	PL02489
150		Not used			
151 (082)	6	Preset potentiometer	20	405 width preset	PL26504
152	1k	Potentiometer, Log		"Contrast"	PL02645
153	100k	Preset potentiometer		"Vertical Speed"	PL05366
154	500	Preset potentiometer		"Horizontal Speed"	PL05352
155	500k	Potentiometer		"Brightness"	PL02646
156	47k	10	1/5		NG47313
157	1M	Potentiometer		"Preset Brightness"	PL02504
158	3	Potentiometer	4	"Hoz. Amplitude"	PL06056
159	1M	10	1/5		PL02504
160, 161	150	10	1/4		NG15104
162	2k	Preset potentiometer		"Overload Protection"	PL02657
163	5.6	10	1	Wirewound	PL21348
164	330k	10	1/4		NG33404
165	39k	10	4		NG39304
166	22k	Preset potentiometer		"Vertical LinearityNo.2"	PL03524
167	2.2k	Preset potentiometer		"Vertical Amplitude"	PL03526
168	22k	Preset potentiometer		"Vertical LinearityNo.1"	PL03524
169	220k	10	1/2		NG22404
170	39k	10	1/2		NG39300
171	39k	10	1/2		NG39300
172	1.2	5	3		PE01216
173	100	5	1/2		PL22074
174	1000	5	1/2		PL22364

*081 only

CAPACITORS

Code	Value	Tolerance(%)	Working Voltage	Type	Part No.
1	8μF	-20+50	150	Min. Electrolytic	PS22064
2 to 5	50μF	-20+50	12	Plug-in Electrolytic	PS33086
6	100μF	-20+50	15	Min. Electrolytic	PS38075
7	3-15pF			Trimmer	PV05113
8	100μF	-20+100	6	Plug-in Electrolytic	PS38119
9	4.7pF	5	350	Silver Mica	PP01770
10	50μF	-20+100	12	Plug-in Electrolytic	PS33086
11, 12	0.1μF	10	160	Min. Tubular (epoxy)	PR19540
13	50μF	-20+100	12	Plug-in Electrolytic	PS33086
14	0.1μF	20	30	Min. Tubular	PQ32000
15	250μF	-20+50	15	Min. Electrolytic	PS41016
16	0.1μF	20	30	Min. Tubular	PQ32000
17		Not used			
18		Not used			
19	50μF	-20+100	12	Plug-in Electrolytic	PS33086
20	0.15μF	10	160	Min. Tubular (epoxy)	PR20000
21	200pF	10	350	Polystyrene	PQ10012
22	0.1μF	10	160	Min. Tubular (epoxy)	PR19540
23	1μF	10	160	Min. Tubular (epoxy)	PR25508
24	0.01μF	10	400	Min. Tubular (epoxy)	PR14024
25, 27	50μF	-20+100	12	Plug-in Electrolytic	PS33086
26	25μF	-20+50	15	Min. Electrolytic	PS28054
28	0.1μF	20	30	Min. Tubular	PQ32000
29, 30	1μF	10	160	Min. Tubular (epoxy)	PR25508
31, 33	200μF	-20+100	12	Plug-in Electrolytic	PS40067
32	1μF	10	160	Min. Tubular (epoxy)	PR25508
34	0.01μF	20	500	Ceramic	PN50316
35	2.2nF	20	400	Epoxy cased	PR05001
36 to 39	1μF	10	160	Min. Tubular (epoxy)	PR25508
40	50μF	-20+100	12	Plug-in Electrolytic	PS33086
41	0.01μF	10	400	Min. Tubular (epoxy)	PR14024
42	100μF	-20+100	6	Plug-in Electrolytic	PS38119
43	1nF	100	400	Epoxy cased	PR01008
44		Not used			
45(082)	22nF	10	160	Epoxy cased	PR16001
46	4.7nF	10	400	Epoxy cased	PR09500
*47, 48	0.01μF	10	400	Min. Tubular (epoxy)	PR14024
49	47nF	20	160	Min. Tubular (epoxy)	PR18456
50	0.22μF	10	160	Min. Tubular (epoxy)	PR21351
51	50μF	-20+100	12	Plug-in Electrolytic	PR33086
52	10μF	-20+50	16	Min. Electrolytic	PS23057
53	47nF	20	160	Min. Tubular (epoxy)	PR18456
54, 56	0.02μF	5	125	Min. Tubular Polystyrene	PQ26512
55	50μF	-20+100	12	Plug-in Electrolytic	PS33086
57	50μF	-20+100	12	Plug-in Electrolytic	PS33086
58	0.01μF	10	400	Min. Tubular (epoxy)	PR14024
59	0.47μF	10	160	Min. Tubular (epoxy)	PR23500
60		Not used			
61		Not used			
62	50μF	-20+100	12	Plug-in Electrolytic	PS33086

* 081 only.

CAPACITORS

Code	Value	Tolerance(%)	Working Voltage	Type	Part No.
63	1000pF	10	350	Polystyrene	PQ13010
64	1μF	10	160	Min. Tubular(epoxy)	PR25508
65	0.1μF	10	400	Min. Tubular(epoxy)	PR19516
66	5μF	-20+50	30	Electrolytic	PS19041
67	0.47μF	20	400	Min. Tubular(epoxy)	PR23507
68	50μF	-20+50	150	Electrolytic	PS33078
69	1μF	10	160	Metal Tubular(epoxy)	PR25508
70	0.01μF	10	160	Metal Tubular	PR19540
71	2000μF	-20+50	16	Electrolytic	PS53016
72 (082)	0.1μF	2½	350	Polystyrene	PQ32079
73 (082)	16μF	-20+50	350	Electrolytic	PS25101
74	30nF	2½	350	Polystrene	PQ28006
75	20nF	2½	350	Polystrene	PQ26513
76	27nF	2½	350	Polystrene	PQ27701
77, 78	0.1μF	10	160	Min. Tubular(epoxy)	PR19540
79	50μF	-20+100	12	Plug-in Electrolytic	PS33086
80	0.1μF	10	160	Min. Tubular(epoxy)	PR19540
81, 82	25μF	-20+50	15	Min. Electrolytic	PS28054
83, 84	5μF	-20+50	15	Min. Electrolytic	PS19036
85	1μF	10	160	Metal Tubular(epoxy)	PR25508
86, 87	10nF	20	750	Silvered Ceramic	PN50001
88	1μF	10	160	Micropack Electrolytic	PR25508
89	1μF	10	160	Min. Tubular(epoxy)	PR25508
90, 91	10nF	20	750	Silvered Ceramic	PN50001
92	Not used				
93(082)	6μF	10	150		PR29002
94	4μF	20	150	Electrolytic	PR28013
95	0.1μF	10	160	Min. Tubular(epoxy)	PR19540
96	500μF	-20+50	40	Electrolytic	PS46074
97	2000μF	-20+100	15	Alternatives NOT to be used	PS53015
98	2000μF	-20+100	16	Electrolytic	PS53016
99	1000μF	-20+50	20kV	Ceramicon	PN26311
100	1μF	10	160	Min. Tubular	PR25508
101	Not used				
102	50μF	-20+50	30	Min. Electrolytic	PS33068
103	1μF	10	160	Min. Tubular(epoxy)	PR25508
104	250μF	-20+50	15	Electrolytic	PS41016
105	0.1μF	10	400	Min. Tubular(epoxy)	PR19516
106	8000μF	-20+50	30	Alternatives must NOT be used	PS62000
107, 108	2000μF	-20+50	16	Electrolytic	PS52016
109, 110	0.1μF	20	1kV	Tubular Paper	PR19505
111	1000pF	-20+50	20kV	Ceramicon	PN26311
112	0.1μF	10	160	Min. Tubular(epoxy)	PR19540
113	1.0μF	10	160	Min. Tubular(epoxy)	PR25508
114	0.1μF	-20+50	500		PN62306

SEMICONDUCTORS, LAMPS, ETC.

Code	Type	Maker	Function	Part No.
TR1	2S512	Texas	Video input stage	FV09837
TR2	2S512	Texas	Video amplifier	FV09837
TR3	2S512	Texas	Video amplifier	FV09837
TR4	2S512	Texas	Video amplifier feedback stage	FV09837
TR5	2S512	Texas	TR4 load circuit	FV09837
TR6	2G302	Texas	Video clamp	FV09779
TR7	2S512	Texas	Clamp buffer stage	FV09837
TR8	40231	R.C.A.	Sync input stage	FV07572
TR9	2G302	Texas	Sync clamp	FV09779
TR10	2S512	Texas	Clamp buffer stage	FV09837
TR11	2G302	Texas	Sync separator	FV09779
TR12	40231	R.C.A.	Sync separator	FV07572
TR13	2G302	Texas	Clamp pulse driver	FV09779
TR14	2S322C	Texas	Sync amplifier	FV09836
TR15	2S512	Texas	Vertical blocking oscillator	FV09837
TR16	2S512	Texas	Phase inverter	FV09837
TR17	40231	R.C.A.	Vertical amplifier	FV07572
TR18	40231	R.C.A.	Vertical amplifier	FV07572
TR19	40231	R.C.A.	Sync phase splitter	FV07572
TR20	2S512	Texas	Line frequency controller	FV09837
TR21	40231	R.C.A.	Horizontal oscillator	FV07572
TR22	2N2102	Texas	Video output stage	FV07562
TR23	U.2154/1	Fairchild	Video output driver	FV07774
TR24	40250	R.C.A.	Vertical output	FV07563
TR25	40250	R.C.A.	L.T. regulator driver	FV07563
TR26	2S512	Texas	E.H.T. regulator	FV09837
TR27	2N2147	R.C.A.	Horizontal driver	FV07560
TR28	2N3731	R.C.A.	Horizontal output	FV07561
TR29	2N2147	R.C.A.	E.H.T. oscillator	FV07560
TR30	2N2147	R.C.A.	E.H.T. oscillator	FV07560
TR31	2S322C	Texas	L.T. feedback amplifier	FV09836
TR32	2S322C	Texas	L.T. feedback amplifier	FV09836
TR33	40251	R.C.A.	L.T. regulator	FV07559
D1	1S132	Texas	Protection diode (video)	FV09076
D2	1S132	Texas	Protection diode (video)	FV09076
D3	1S130	Texas	D.C. compensation	FV09028
D4	1S132	Texas	Protection diode (sync)	FV09076
D5	1S132	Texas	Protection diode (sync)	FV09076
D6	1S2082A	Texas	TR11 reference diode	FV09804
D7	1S130	Texas	Sync separator clipper	FV09028
D8	1S130	Texas	Interlace filter	FV09028
D9	1S130	Texas	TR15 catching diode	FV09028
D10	1S130	Texas	Vertical clipping	FV09028
D11	1S130	Texas	Vertical integration	FV09028
D12	1S130	Texas	Vertical d.c. compensation	FV09028
D13		Not used		
D14	1S44	Texas	Horizontal frequency discriminator	FV09818
D15	1S44	Texas	Horizontal frequency discriminator	FV09818
D16	1S44	Texas	Horizontal frequency discriminator	FV09818
D17	1S44	Texas	Horizontal frequency discriminator	FV09818

SEMICONDUCTORS, LAMPS, ETC. (Cont.)

Code	Type	Maker	Function	Part No.
D18	IS130	Texas	Horizontal clipping diode	FV09836
D19	IS130	Texas	Video d.c. compensation	FV09836
D20		Not used		
D21	IS134	Texas	Blanking diode (vertical)	FV09750
D22	IS132	Texas	Blanking diode (horizontal)	FV09076
D23	IS132	Texas	Vertical clipping	FV09076
D24	Z3B240.CF	S.T.C.	Vertical clipping	FV09963
D25	IS134	Texas	Scan failure protection	FV09750
D26	IS920	Texas	Horizontal pulse forming	FV05129
D27	IS130	Texas	Scan failure protection	FV09028
D28	IS2056A	Texas	E.H.T. reference	FV09796
D29	IS920	Texas	E.H.T. regulator detection	FV09028
D30	IS920	Texas	E.H.T. regulator detection	FV09028
D31	IN2071	Texas	-400V rectifier	FV09882
D32	IN2071	Texas	-400V rectifier	FV09882
D33	IN2069	Texas	100V rectifier	FV09877
D34	IN2069	Texas	100V rectifier	FV09877
D35	IN2071	Texas	510V rectifier	FV09882
D36	IN2071	Texas	510V rectifier	FV09882
D37	IN4785	R.C.A	Horizontal damping	FV07564
D38	BY.118	Mullard	Efficiency diode	FV05125
D39	IS2056A	Texas	L.T. reference	FV09796
D40	IS130	Texas	L.T. compensation	FV09028
D41	BYZ13	Mullard	L.T. rectifier	FV05000
D42	BYZ13	Mullard	L.T. rectifier	FV05000
D43(082)	IN2071	Texas		FV09882
D44	IS923		Diodes	FV09839
D45	IS923		Diodes	FV09839
F1	L338/1A	Beswick	A.C. input (200-240V)	FF00752
F2	L1055/5	Belling & Lee	11V supply (-ve line)	FF00823
F3	L1055/1	Belling & Lee	+11V (main panels)	FF00816
F4	L1055/3	Belling & Lee	+11V (EHT Osc.)	FF00821
F5	L1055/3	Belling & Lee	+11V (Line output)	FF00821
V1,2	EY.86	Mullard	E.H.T. rectifier	FV00620
V3	M21-11W	Mullard	Cathode Ray Tube	FV04575

PLUGS AND SOCKETS

PLUGS

Part No.	and Description
FP00031	2pin
FP01406	3pin

SOCKETS

Part No.	and Description
FS16064	Coaxial
FS43155	Remote Control 7 way

WOUND ASSEMBLIES

Part No.	Code	Description
AL22311	T1	Transformer (Vert. Block Osc.)
AL22310	T2	Transformer (Horizontal Pulse)
AL22309	T3	Horizontal Driver Transformer
AL22308	T4	Efficiency Circuit Transformer
AL22307	T5	E.H.T. Feedback Transformer
AL20142	T6	Transformer (EHT)
AL21561	T7	Mains Transformer
AL06093	L1	Coil (Pulse Sharpening)
AL06403(081)	L2	Coil (Horizontal Osc.)
AL06091	L3/R108	Video Correction Coil
790380/A	L4	Choke
AL51100	L5	Choke (Vert. Output)
AL06092	L6	Third Harmonic Tuning Coil
AL51101	L7	Horizontal Pulse Choke
AL06095(081)	L8	Saturated Reactor
AL51102	L9	Choke
FT06040	L10, 11	Deflector Coil Assy
AL06404(082)	L12	Coil (Horizontal Osc. 625 line)
AL06405(082)	L2	Coil (Horizontal Osc. 405 line)
AL06403(082)	L8	Saturated Reactor

Note: For connections and d.c. resistance data see diagram at rear of this manual.

HOLDERS, CRADLES, HEAT SINKS, ETC.

Description	Part No.
Transistor Mounting Pad	QA05661
Nylon Diode Cradle	QA05669
Heat Sink (TO. 18)	EA15156
Heat Sink (TO. 5)	EA15164
Tube Base	FH02626
Heat Sink	BJ21594
Fuseholder 4-way (near C.R.T. Base)	BT31974
Fuse Cover	430666
Insulating Bush (For TO. 3)	QA05675
Lampholder (Without Grommet)	FH03008
Valveholder	BG05140
E.H.T. Valve Cover	BG05145
Valveholder	FH02593
Clip	QA00513
Clip	QA00517
Heat Sink (Modified)	BJ21595

MISCELLANEOUS

Description	Part No.
Video & Sync Sep. Panel Assembly (Complete) No. AG. 26927	
Washer I.D. 0.116" x O.D. 0.25 x 1/16" thick	BE24010
Spacers 5/16" long O.D. 3/16" I.D. 0.1285"	BQ12220
Spacer $\frac{1}{4}$" long O.D. 3/16" I.D. 0.1285"	BQ12216
Full Nut 6BA	QA11006/A
6BA Shakeproof Washer	QA13301/T
Screw 6BA x $\frac{5}{8}$" CH. HD.	RW11010/A
Vertical & Horizontal T.B. Panel Assy (Complete) No. AG. 26929	
Screening Can with tag retention	FC00099
Printed Panel Mtg. Frame Assy (Complete) No. AG. 26923 (For Video & Sync Sep. and Vert. & Horizontal T.B. Panels)	
Support Frame	BC26362
Spire Screw No. 4 x $\frac{1}{4}$" Pan Hd	QJ08135
Spire Nuts	QA00190
Pivot Pins	BA24517
Video Output Panel Assembly (Complete) No. AG. 26931	
Full Nut 8BA	QA11008/A
Washer Shakeproof 8BA	QA13300/T
Screw 8BA x $\frac{3}{8}$" CH. HD	RY11006/A
Vertical Output & Blanking Assembly No. AG. 26922	
R.H. Fixing Bracket Assembly	AG27044
L.H. Fixing Bracket Assembly	AG27045
Tie Bracket Assembly	AG27046
Insulating Washer 4BA	BE21957
Grommet	FG02237
Feed Thru Bushes	FJ00046
Turret Lug	FT03811
Capacitor Clip 1"	QA00065
Plastic Clip	QA00501
Pins 1/16" Square $\frac{3}{4}$" long	QA08175
Spire Screw No. 8 x $\frac{3}{8}$" Pan Hd	QJ07019
E.H.T. & Hor. Output Assembly (Complete) No. AG. 26924	
Horizontal Output Screen Assembly	AG27050
Spacer	310742
E.H.T. Case Cover	BC26351

Description (Cont.)	Part No.
Screening plate	BC26356
Capacitor Clip $\frac{3}{4}$"	QA00056
Capacitor Clip 1"	QA00065
Plastic Clip	QA00510
Anode Clip	QA00585
Valve Top Connector	QA00743
Anode Clip Cover	QA00586
Mica Washer	QA05676
Insulating Bushes	QA05677
Anode Top Cap	QA03092

E.H.T. & Hor. Output Panel Assembly (Complete) No. AG. 26933

Coil Adjusting Bracket	BC26346
Ferrox Rod	FC02362

Back Plate Assembly (Complete) No. AG. 26921

Voltage Selector Plug Assembly	730326
Video & Sync Plate Assembly	744630
Voltage Tapping Plate Assembly	744631
$8\frac{1}{2}$" Monitor Back Panel Assembly	AG27043
Preset Pot Assembly (Complete)	AG26925
Knob Assembly (Black)	AG25138
Spacer $1\frac{5}{8}$" x 4BA	310625
Label	BC26372
Transformer Mtg Bracket	BC26358
Plate (Insulation)	BT19311
Transformer Shroud	FT02805
Pot Mtg Plate	BC26355
Escutcheon	BC26349

Tube Clamp Support Assembly (Complete) No. AG. 26920

Tube Clamp Support Assy	AG27052
Switch Assy	AG26016
Tube Rubber Band	430803
Washers	BE22139
Knobs	BG10012
Springs (for Knobs)	QA00052
Tube Support Bracket	BC26357
Tube Clamp	BC26363
Spark Gap Connector	FT10507

Video Monitor Main Assembly Items

$8\frac{1}{2}$" Monitor Base Assy	AG27051
R.H. Pivot Bracket Assy (Complete)	AG27048
L.H. Pivot Bracket Assy (Complete)	AG27049

Description	Part No.
Video Monitor Main Assembly Items (Cont.)	
Monitor Front (Casting)	326271
Window Clip	430674
Capacitor Clip $1\frac{3}{4}$"	408092
Modified Foot	481202
Spring (Tube Earth)	708463
R.H. Side Cover	BC26360
L.H. Side Cover	BC26361
Front Nameplate	BC26343
Earthing Bar	BC26352
$8\frac{1}{2}$" Window	BE22138
Tube Mask	BJ21596
Wire Spill Connector	FC00673
Strap Handle 10" x $\frac{3}{4}$" Fittings	FH00097
Sleeve (P.T.F.E.)	FS22568
Insulug 4BA	FT02147
Turret Lug	FT03810
Pivot Pin	BA24517
Leaf Spring	BC26344
Frame Catch	BC26345
Pivot Bracket R.H.	BC26337
Pivot Bracket L.H.	BC26338
Embellishing Strip	
Capacitor Clip 1"	QA00065
Connector Clip (Side Entry)	QA00593
Connector Clip (Side Entry) Cover	QA00594
Capacitor Clip $\frac{3}{4}$"	QA04404
Full Nuts 4BA	QA11004/A
Full Nuts 6BA	QA11006/A
Full Nuts $\frac{1}{4}$-20 NC	QA11086/A
Lokut Plastic Nut	QA12717
Screw No. 10 x 5/16" Self Tap Rd. Hd.	QQ21505
Spire Screw No. 8 x $\frac{3}{8}$" Pan Hd	QJ07019
Screw 4BA x $\frac{3}{8}$" Mush Hd	RU61006/C
Screw 4BA x $\frac{1}{2}$" Ch Hd	RU11008/A
Screw 4BA x $\frac{3}{8}$" Ch Hd	RU11006/A
Screw 4BA x 3/16" Ch Hd	RU11003/A
Screw 6BA x $\frac{1}{4}$" Ch Hd	RW11004/A
Screw 6BA x 5/16" Ch Hd	RW11005/A
Screw 6BA x 6BA Inst. Hd	RW51006/C
Screw 6-32 x " Mush Hd	UW61006/C
Top Tie Assembly (with Locating Plate	AG27042
Ferroxcube Bead	FC0213877
LOOSE SHIPPING ITEMS	
Coaxial Plugs	FP00136
Mains Socket	FS17200

AMENDMENTS

This Manual incorporates information previously contained in Amendments 1 and 2.

APPENDIX 1

Circuit Changes in Type 082 Monitor

Switching of systems is achieved by a three positioned rotary switch having a central "Off" position.

Operational components on the 625 line system are similar to the standard 081 model with the exception of the horizontal oscillator. The required inductance of the tuning circuit is achieved by parallel connection of L2 (405 line osc. coil) with L12.

In order to protect the horizontal output transistor TR28 and switch contacts in the output stage, a break-before-make contact is used on the switch to remove horizontal drives, thus ensuring that switching of the output components is effected under a non-operational condition. To achieve a constant horizontal flyback ratio on both systems the flyback compacitor has to be increased in type 082 for 405 line operation.

Because of the lower flyback voltage required (approximately proportional to the drop in frequency) the third harmonic tuning circuit is not used. A short circuit is placed across C75, L6 & C76, and this adds C72 to the existing tuning capacitor C74.

With the lower flyback and boost voltages required, a drop in d.c. voltage is arranged by adding a preset width control (R151) in series with the manual width control.

The 'S' correction capacitor needs increasing in order to maintain the same degree of correction on both systems, C93 is therefore paralleled with C94 & C100.

A transient voltage suppression has been incorporated in the horizontal output stage to prevent peak voltages damaging TR28 during switching.

During normal operation on one system C73 is charged up by D43 to a potential equal to the amplitude of the flyback pulse. With the large time constant provided by C73 & R121, any short duration pulses presented across the circuit during switching and exceeding this flyback potential will be clipped by D43.

The adjustment of the biasing circuit for line scan failure protection is arranged by shunting R124 with R140.

Additional Test Data for Monitor 082

Note: This supplements the section "Monitor Testing and Adjustment of Controls" in the main book and follows on from this.

1. Disconnect the lead from tag (39) on the Vertical and Horizontal Timebase Panel.

   Connect a voltmeter between the base of TR20 and chassis. Adjust the horizontal hold control R154 to give +2 volts on the meter. Adjust the 405 line oscillator coil L2 so that the picture is just "running through" at line frequency.

   Rotate standards switch into the 625 line position. Connect a 625 line grid pattern.

   Adjust the 625 line oscillator coil L12 so that the picture is just "running through" at line frequency.

   Reconnect the lead to tag (39).

   Check the pull-in range, this should be better than 450 c/s either way on 625 lines, and better than 300 c/s either way on the 405 line system.

2. With the 625 line grid pattern connected and the standards switch in the 625 line position, adjust horizontal linearity and width controls to have a fully scanned picture set to optimum linearity.

   Switch to 405 line position and connect the 405 line grid pattern.

   Adjust R151, 405 Preset Width Control to have the same scanning width as for 625 lines.

Item Changes additional to those marked "(082)" on main book

Parts List

R92	RESISTOR	680 ohms	±10%	NG68113
R124	RESISTOR	330 ohms	±10%	NG33114
	Label			BJ21245
	SHAFT SUPPORT			BC30241
	SWITCH MOUNTING BRACKET			BC30242
	FEEDTHRU BUSHES			FJ00046
	6 POLE SWITCH			FS02083
	KNOB			FK00053
	BINDING SLEEVES			FS22540
	SCREEN CAN			FC00144

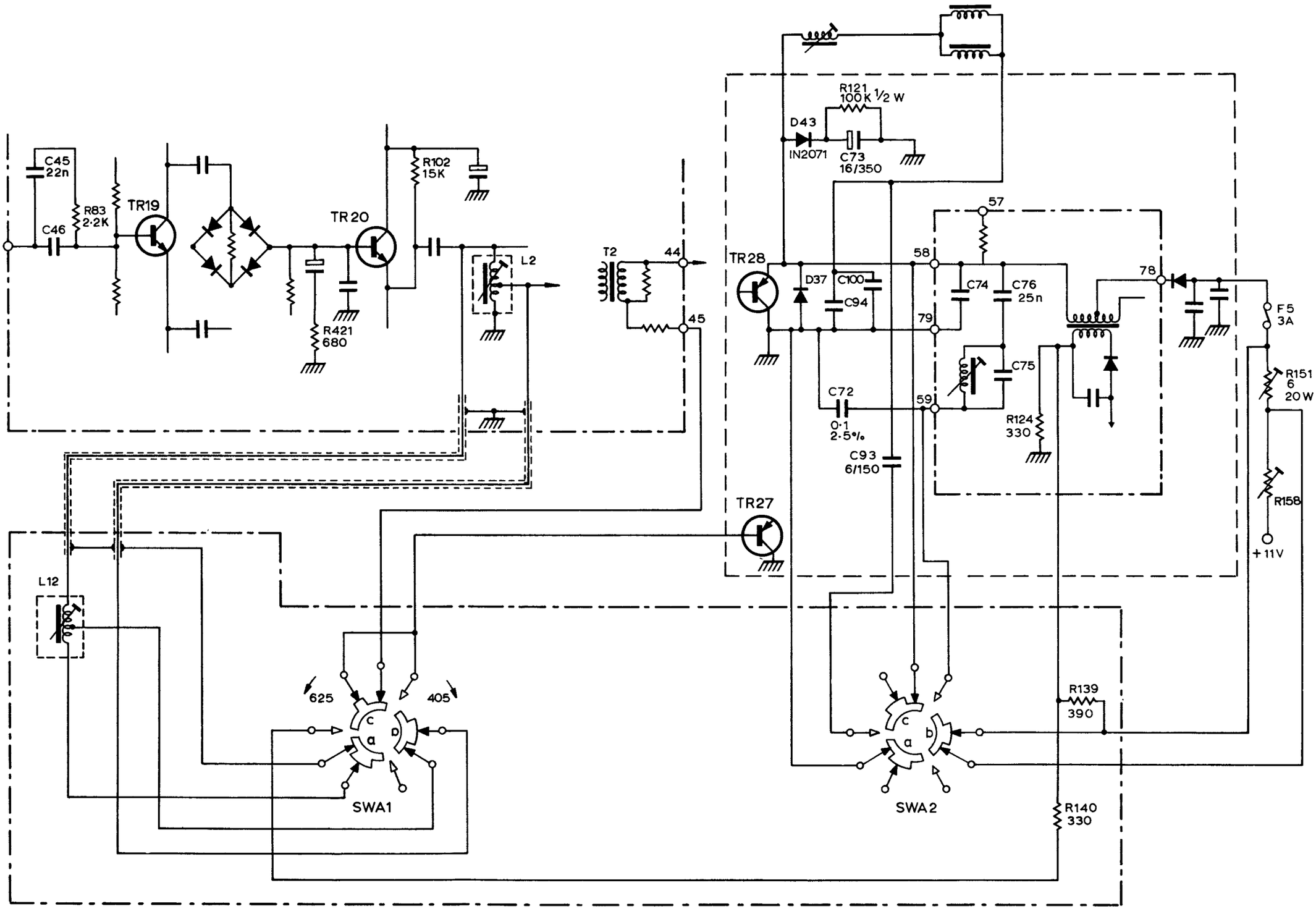


Fig. 14 CIRCUIT DIAGRAM (TYPE 082)

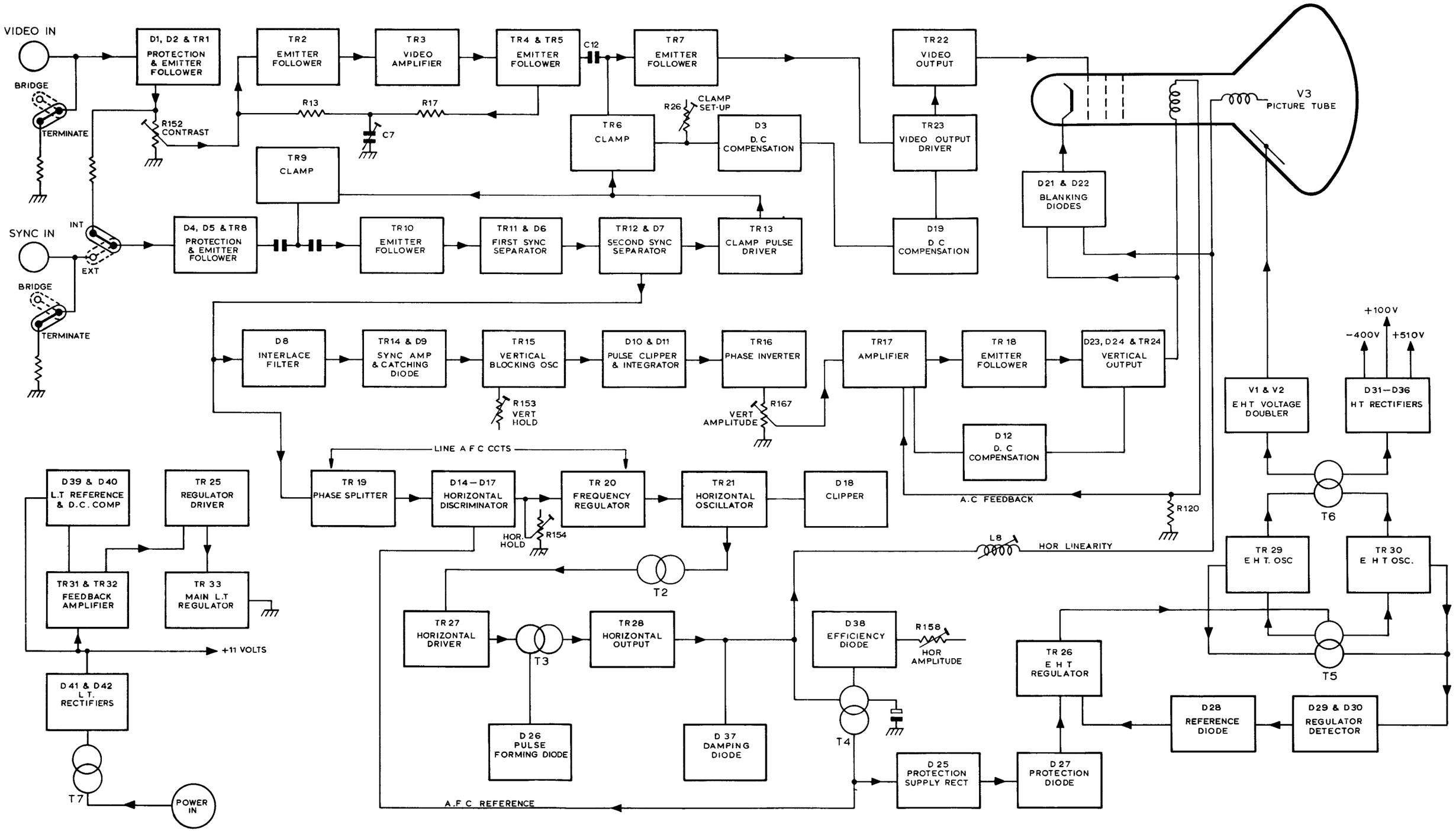


Fig. 3 BLOCK SCHEMATIC DIAGRAM

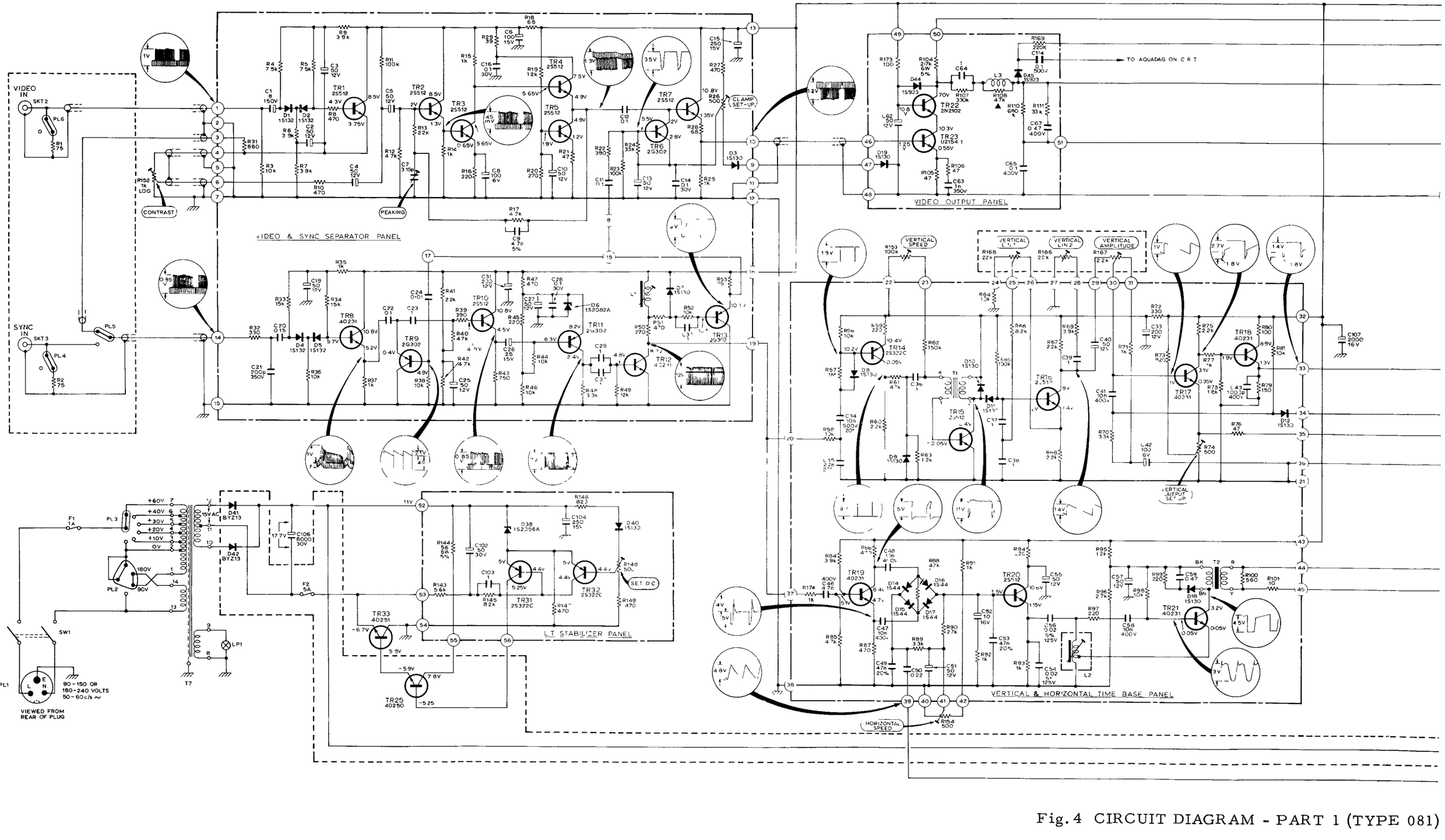


Fig. 4 CIRCUIT DIAGRAM - PART 1 (TYPE 081)

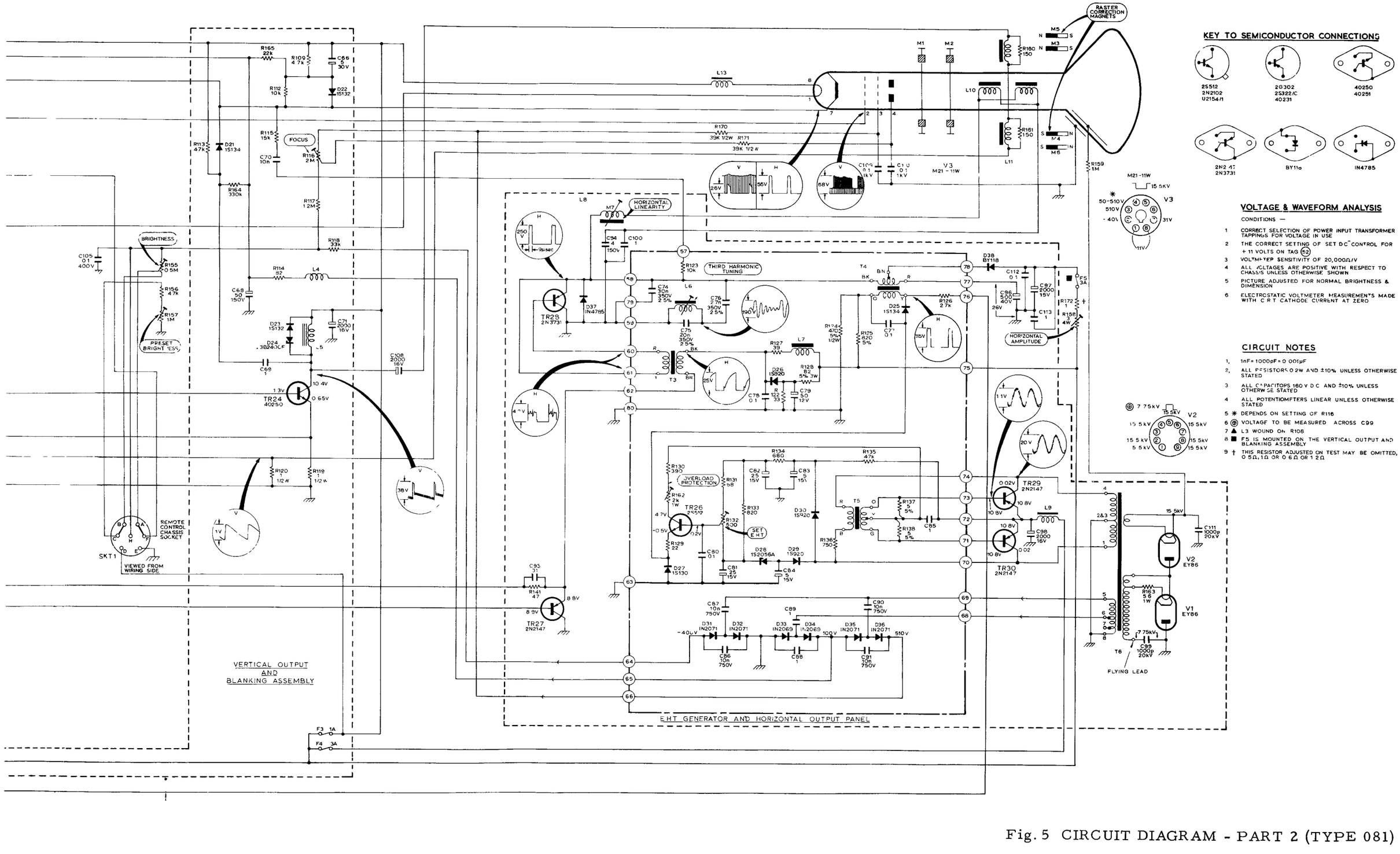


Fig. 5 CIRCUIT DIAGRAM - PART 2 (TYPE 081)

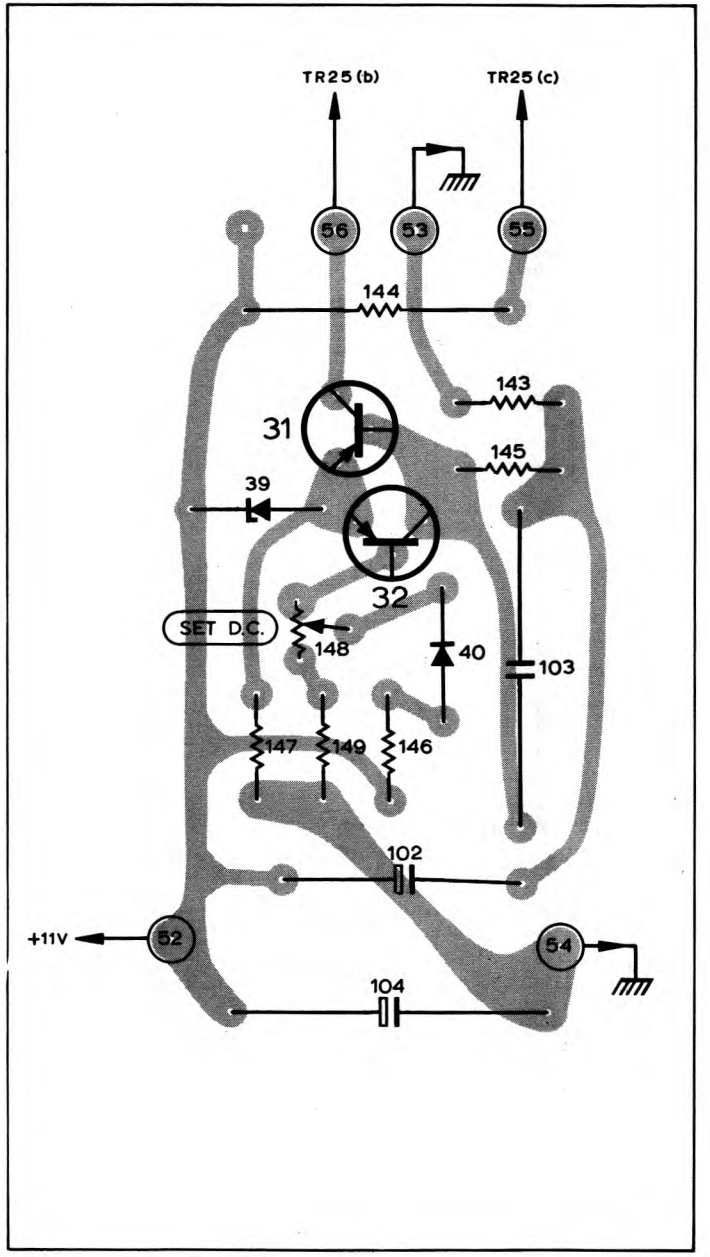
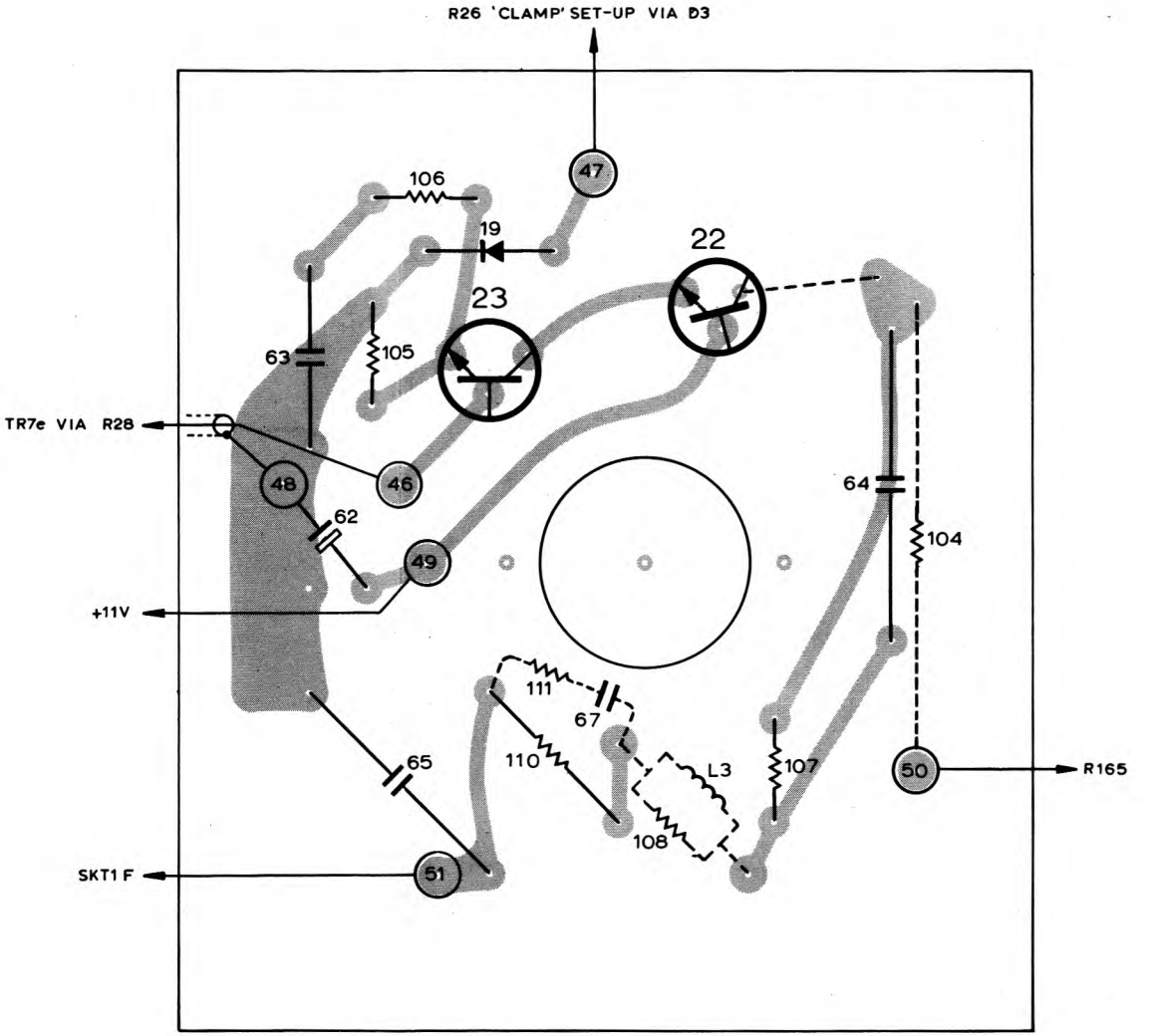


Fig. 6 L.T. STABILISER PANEL



NOTE R104, R111, C67, L3 (MOUNTED ON R108) ARE ON REAR OF PANEL

Fig. 7 VIDEO OUTPUT PANEL

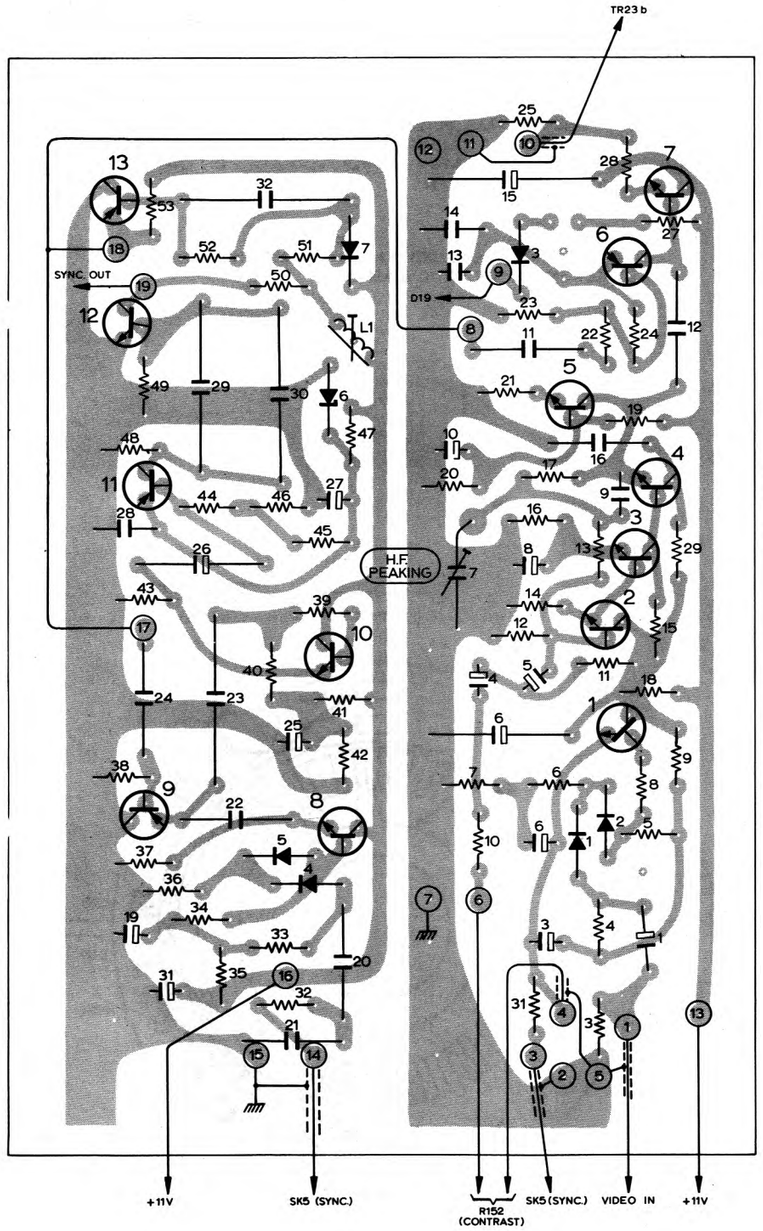


Fig. 8 SYNC SEPARATOR & VIDEO PANEL

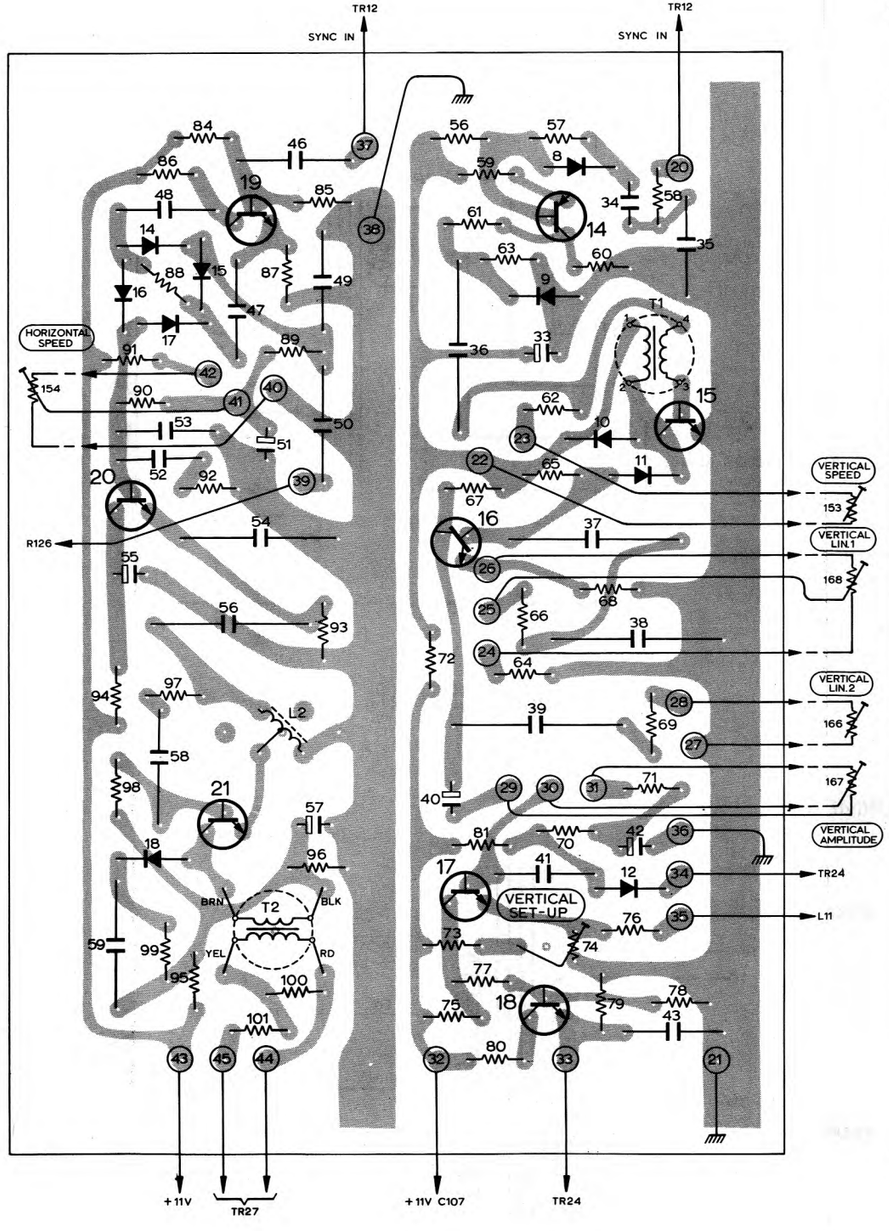


Fig. 9 HORIZONTAL & VERTICAL T.B. PANEL

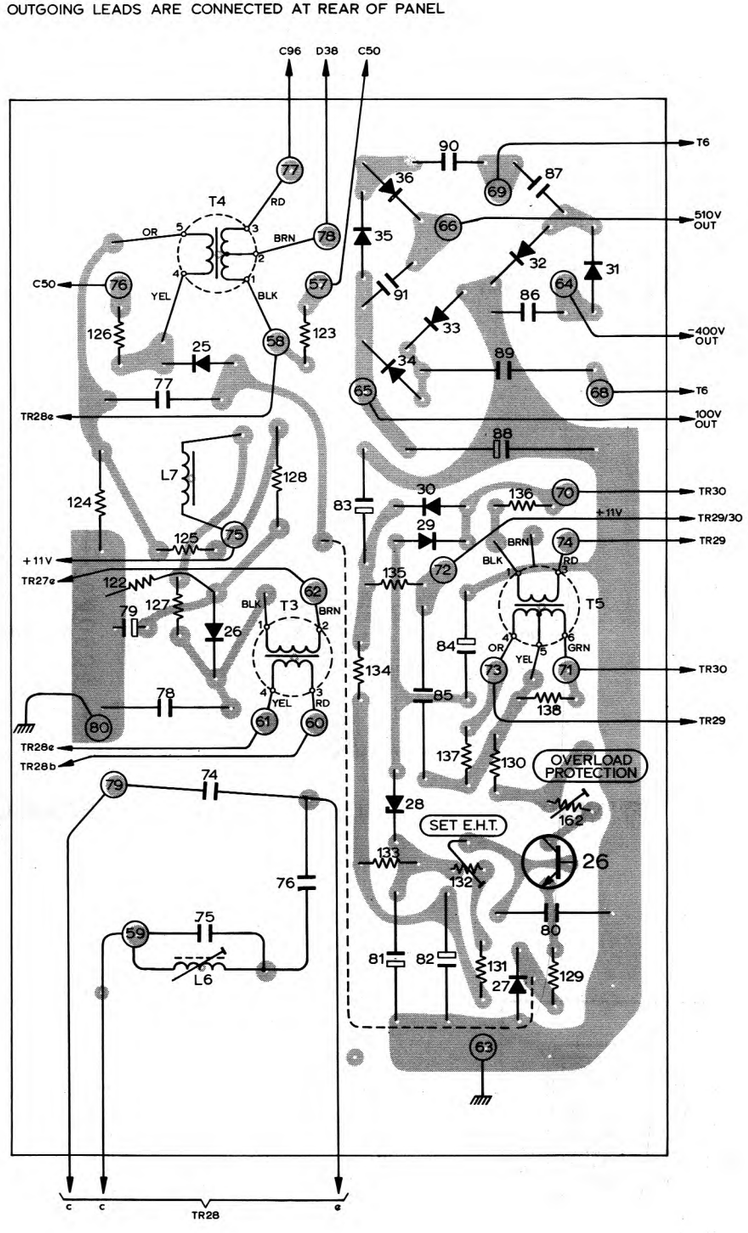
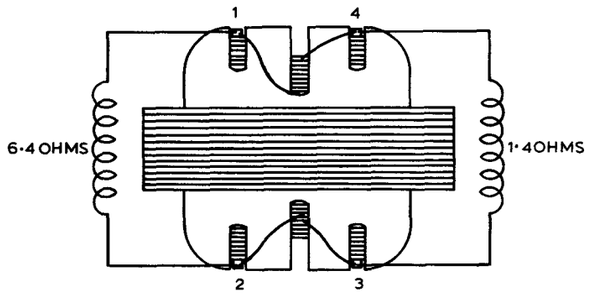


Fig. 10 HORIZONTAL OUTPUT & E.H.T. PANEL

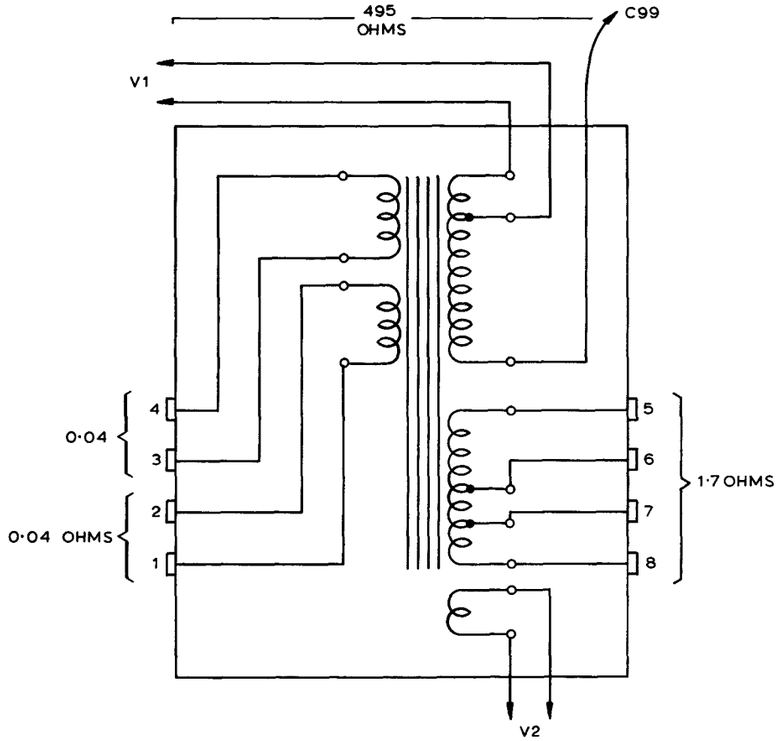
TRANSFORMERS

T1,6,7 SEE DIAGRAMS. TAG NUMBERS ARE IN BRACKETS

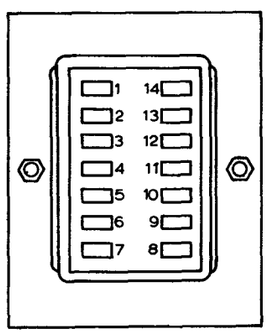
T2	HORIZONTAL PULSE	
	(1) BLACK — (2) BROWN	2·0 OHMS
	(3) RED — (4) YELLOW	0·41 OHMS
T3	HORIZONTAL DRIVER	
	(1) BLACK — (2) BROWN	0·5 OHMS
	(3) RED — (4) YELLOW	0·18 OHMS
T4	EFFICIENCY CIRCUIT	
	(1) BLACK — (2) BROWN	0·03 OHMS
	BROWN — (3) RED	0·10 OHMS
	(4) YELLOW — (5) ORANGE	0·73 OHMS
T5	E.H.T. FEEDBACK	
	(1) BLACK — (3) RED	2·25 OHMS
	BLACK — (2) BROWN	1·125 OHMS
	(4) ORANGE — (6) GREEN	0·34 OHMS
	(5) YELLOW IS HALFWAY TAP	

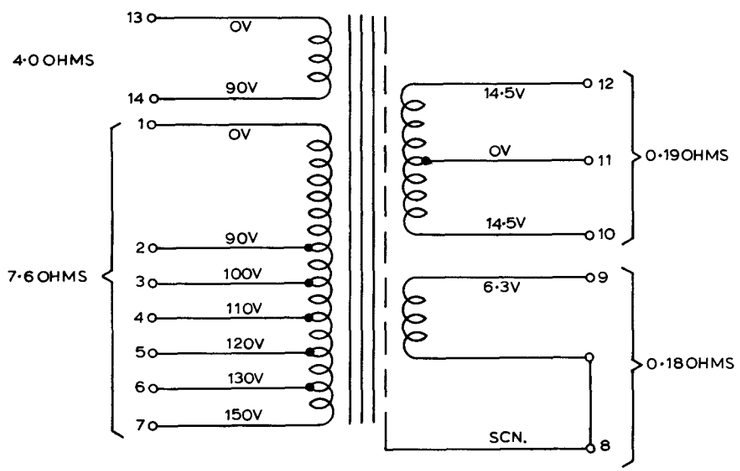


T1 VERTICAL BLOCKING OSCILLATOR TRANSFORMER



T6 E.H.T. OUTPUT TRANSFORMER



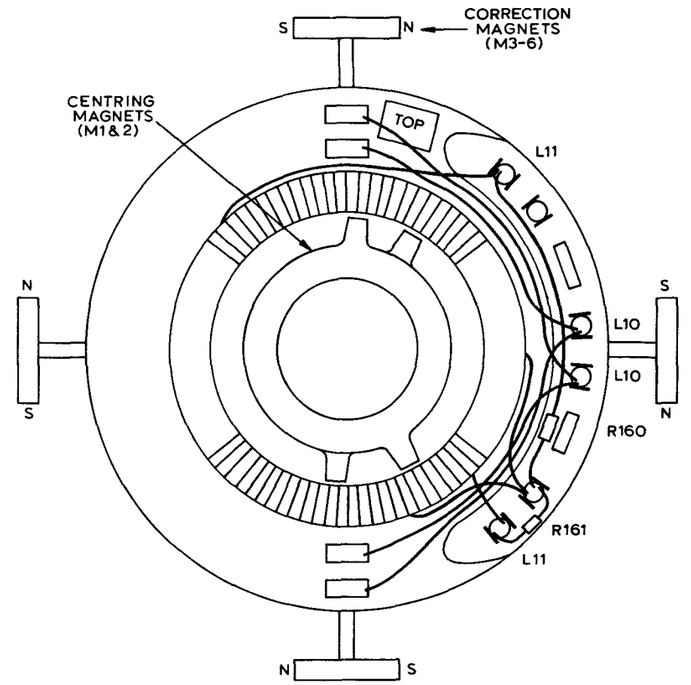


T7 POWER SUPPLY TRANSFORMER

CHOKES

L1	PULSE SHARPENING	
L2	HORIZONTAL OSCILLATOR	
	TERMINALS 1-3	47·0 OHMS APPROX.
	TERMINALS 1-2	9·5 OHMS APPROX.
L3	VIDEO CORRECTION (WOUND ON R108)	1·6 OHMS APPROX.
L4	100V LINE DECOUPLING	
L5	VERTICAL OUTPUT	0·87 OHMS
L6	THIRD HARMONIC	0·05 OHMS
L7	HORIZONTAL PULSE	0·43 OHMS
L8	HORIZONTAL LINEARITY	0·065 OHMS
L9	E.H.T. OSCILLATOR SUPPLY	0·1 OHMS
L10 / L11	SEE DIAGRAM	

NOTE
IF ACCURATE MEASUREMENT OF RESISTANCE IS MADE
TOLERANCES OF ± 10% APPLY



DEFLECTOR COILS L10 L11 VIEWED FROM REAR FACE

L10 (2 COILS IN PARALLEL) 0·225 OHMS
L11 7·2 OHMS

Fig. 11 D. C. RESISTANCE & CONNECTIONS (of wound assemblies)

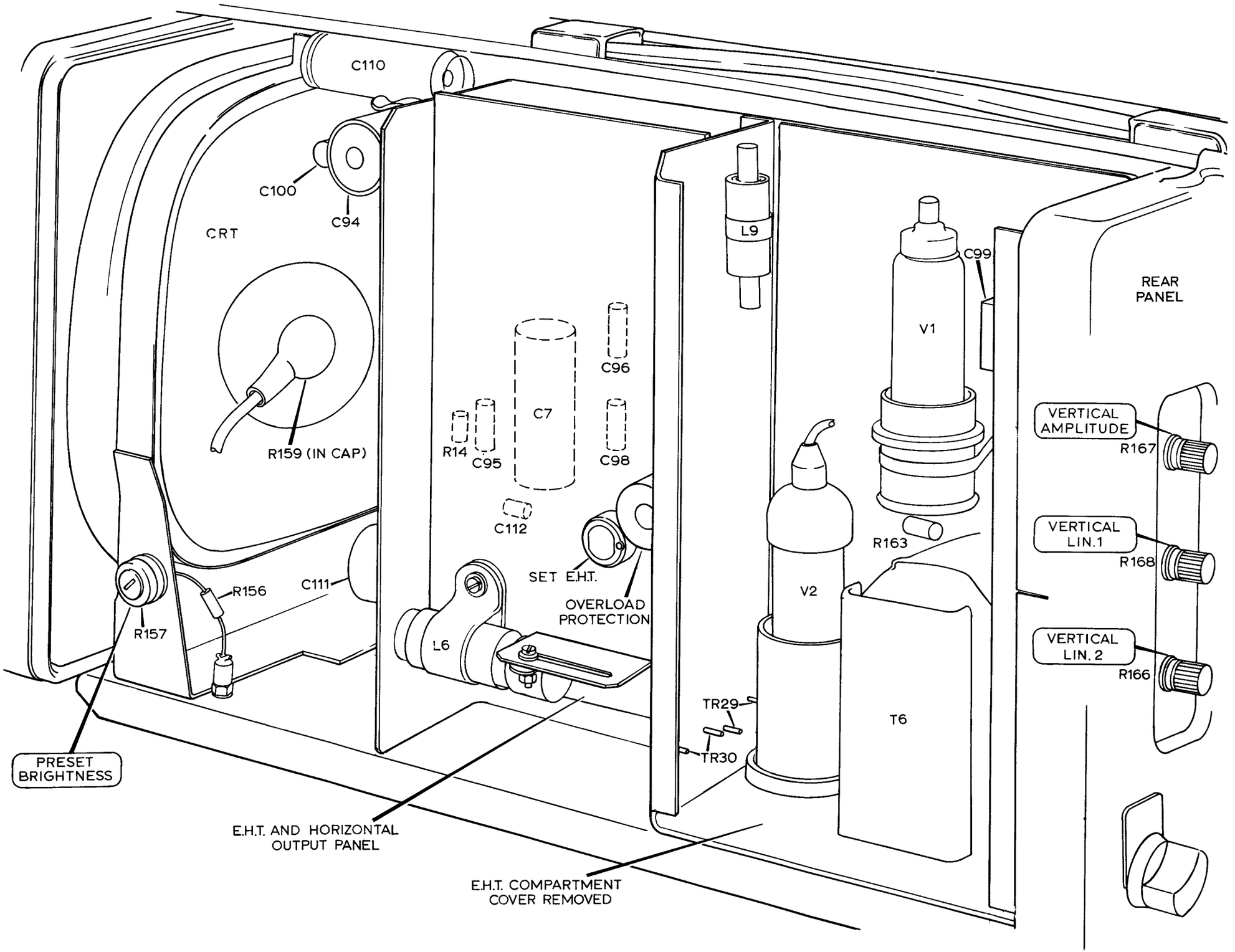


Fig. 12 COMPONENT LOCATION R.H. SIDE

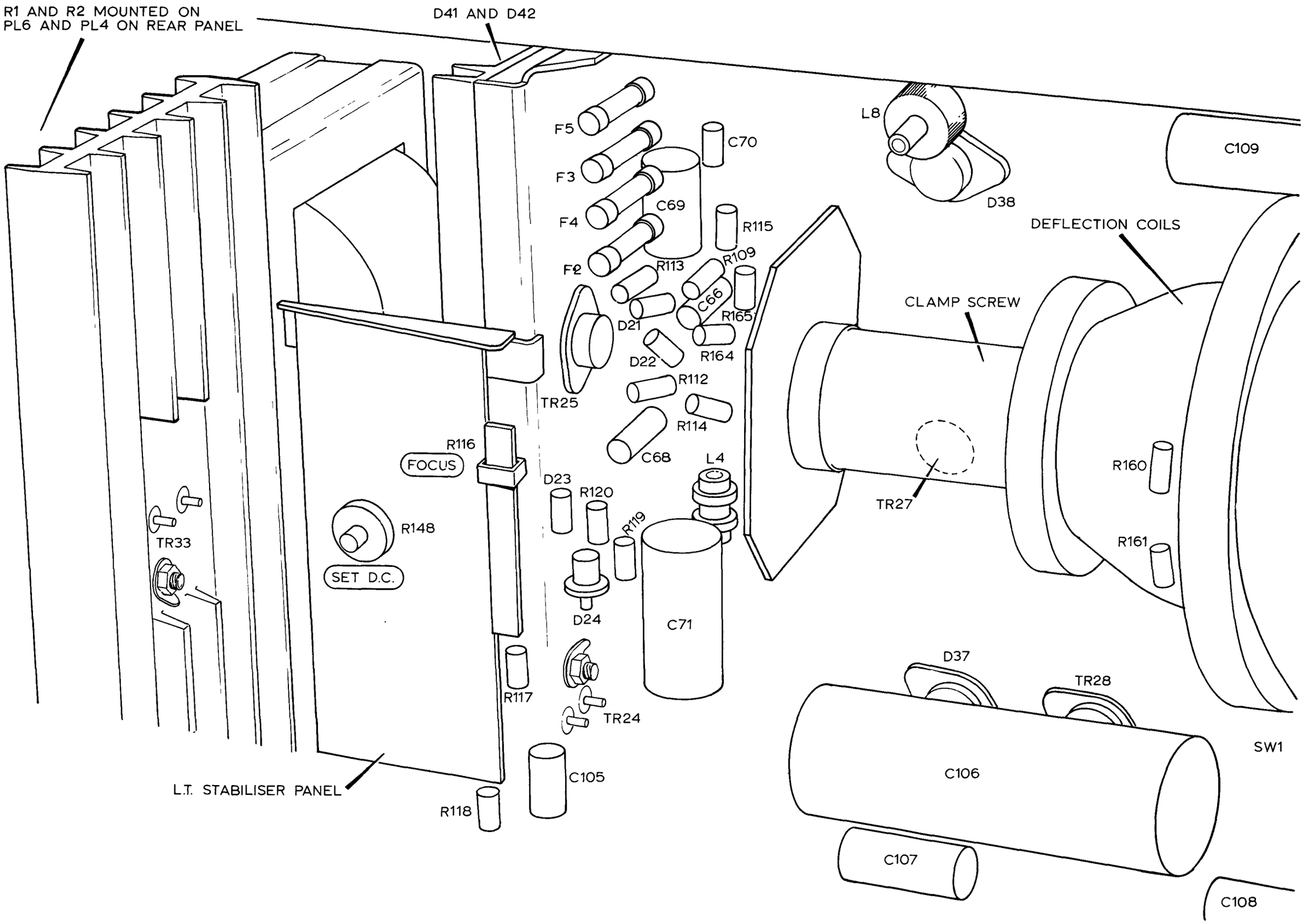


Fig. 13 COMPONENT LOCATION L.H. SIDE

Monitors Type 081, or 082

Part No. 84 8008/00, /01

Amendments

This data covers changes which will be found on some monitors, with the part numbers for alternative items for replacements.

C106	10,0001F	30V		PS64008
L10, L11		Deflector Coil Assembly		FT06099

For Serial No. 696 onwards

R44	1.8k ohm	10%		NG18213
C20	1μF	10%	160V	PR25508
R112	10k	New Part Number		PM00237
R113	47k	New Part Number		PM00245
R114	82	New Part Number		PM00212
R115	15k	New Part Number		PM00239
R117	1.2M	New Part Number		PM00262
R118	33k	New Part Number		PM00243
R164	330k	New Part Number		PM00255
R141	47	New Part Number		PM00209
R110	680k	New Part Number		PM00259
R111	33k	New Part Number		PM00243
R122	33	New Part Number		PM00207
R159	1M	New Part Number		PM00261
R160b, R161b	120	New Part Number		PM00214
R172		Deleted		
R175, 176	1k	± 5%		PL22364
R177	470	± 5%		PL22357
C83, 84	5μF	25V		PS19053
L10,11	Deflection Coil (new type) (Damping resistors are now provided with the coil Assembly).			8213 263 00232
	Voltage Tapping Plate 744631 Pt. of AG. 26921 replaced by Fuse Plate AG58716			
D41, D42	BYX38	Mullard		FV05202
D46	1S44	Texas (addition)		FV09818
TR6,9,11,12		NTG 302	Newmarket	FV06715
TR33		NKT3055/5B	Newmarket	FV06589
V3	M21-13W			FV04889
SG1-3	Spark Gaps			FC01533

Amendments

Changes and additions for 84 8008/01 are as follows:

LP1	6V	0.36W	FL17752 replaced by:
LP1	12-14V	0.75W	FL16402
R179	270 ± 10%	1/4W	NG27104
R180	2.2M		NG22510
L13	40μH		CJ24358

This monitor is normally used only as a viewfinder for the studio camera, teletutor, Type 8006, part number 84 8006/00

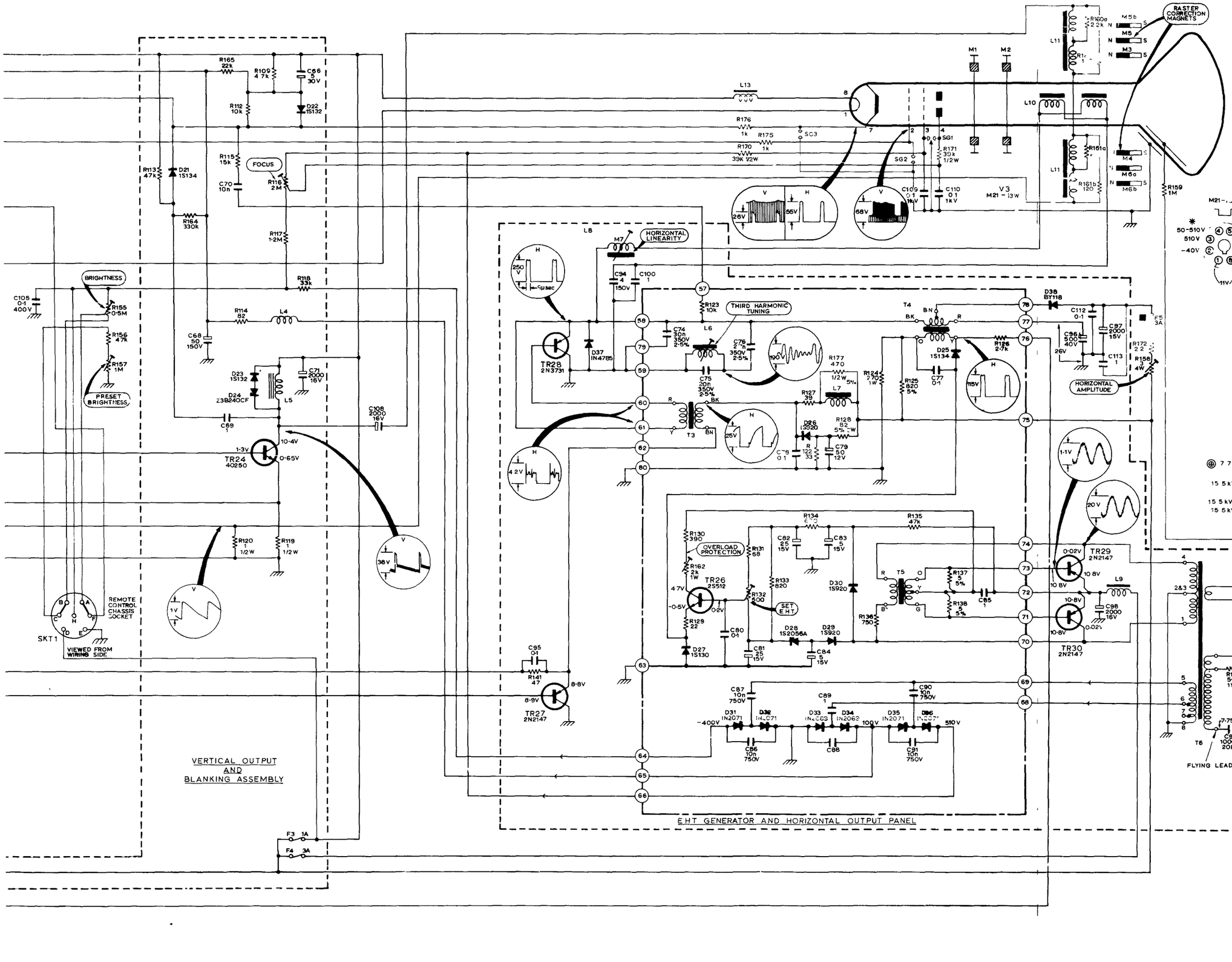
VIDEO & SYNC SEPARATOR PANEL

VIDEO OUTPUT PANEL

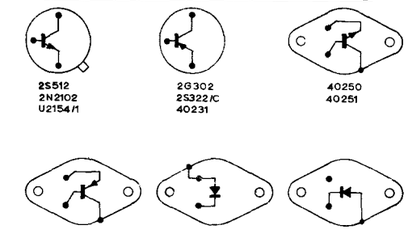
LT STABILIZER PANEL

VERTICAL & HORIZONTAL TIME BASE PANEL

VIEWED FROM REAR OF PLUG.



KEY TO SEMICONDUCTOR CONNECTIONS



VOLTAGE & WAVEFORM ANALYSIS

CONDITIONS :—

1. CORRECT SELECTION OF POWER INPUT TRANSFORMER TAPPINGS FOR VOLTAGE IN USE
2. THE CORRECT SETTING OF "SET D.C." CONTROL FOR + 11 VOLTS ON TAG (52).
3. VOLTMETER SENSITIVITY OF 20,000Ω/V
4. ALL VOLTAGES ARE POSITIVE WITH RESPECT TO CHASSIS UNLESS OTHERWISE SHOWN
5. PICTURE ADJUSTED FOR NORMAL BRIGHTNESS & DIMENSION
6. ELECTROSTATIC VOLTMETER MEASUREMENTS MADE WITH C.R.T. CATHODE CURRENT AT ZERO

CIRCUIT NOTES

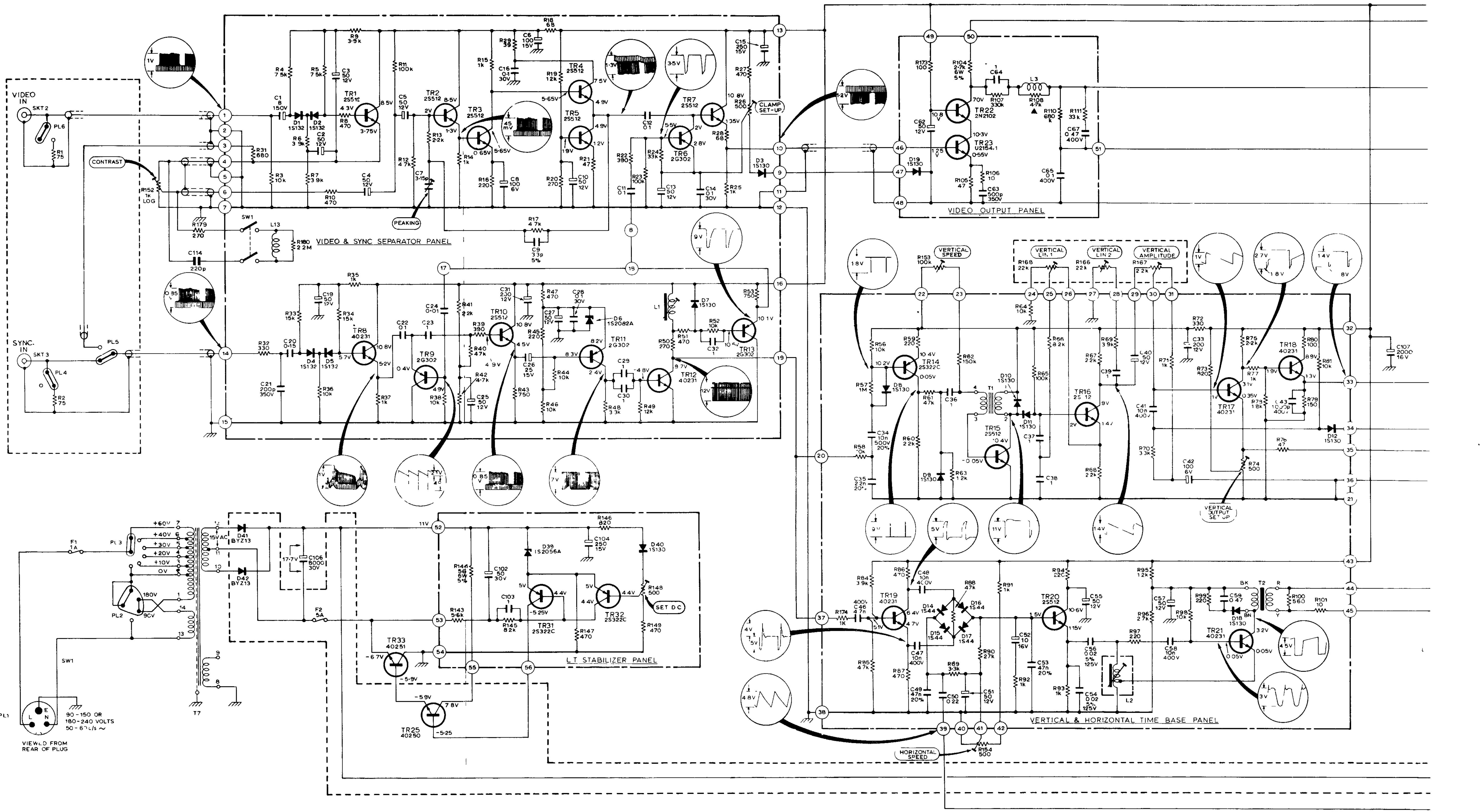
1. 1nF = 1000pF = 0·001μF
2. ALL RESISTORS 0·2W AND ±10% UNLESS OTHERWISE STATED
3. ALL CAPACITORS 180 V D.C. AND ±10% UNLESS OTHERWISE STATED
4. ALL POTENTIOMETERS LINEAR UNLESS OTHERWISE STATED
5. ✱ DEPENDS ON SETTING OF R116
6. ⓥ VOLTAGE TO BE MEASURED ACROSS C99
7. ▲ L3 WOUND ON R108
8. ■ F5 IS MOUNTED ON THE VERTICAL OUTPUT AND BLANKING ASSEMBLY

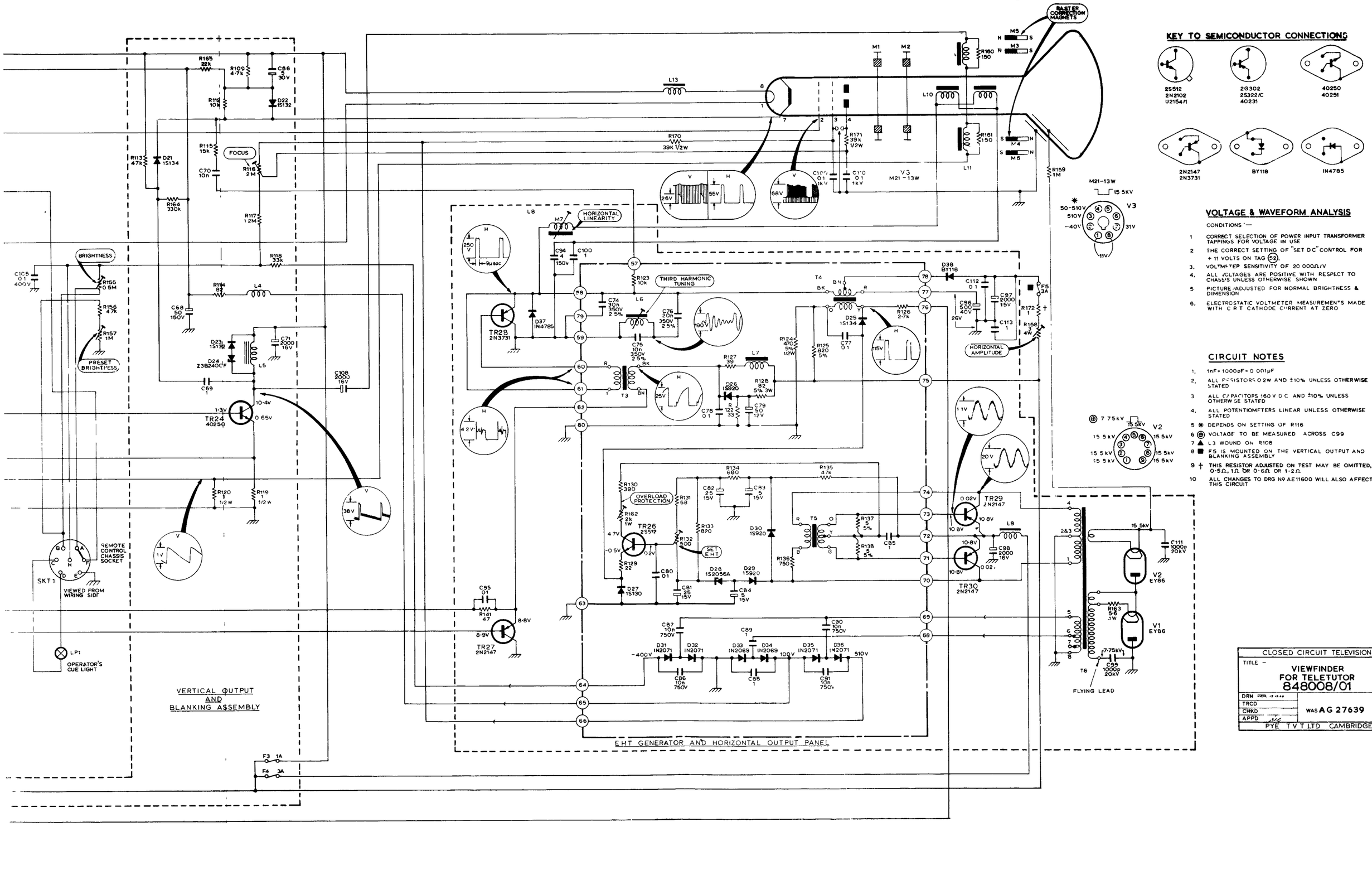
CLOSED CIRCUIT TELEVISION

TITLE — 8½ INCH TRANSISTOR MONITOR TYPE 08

DRN [illegible]	DRNG No 84300-
TRCD.	WAC AE11600
CHKD M.R.A.M.	
APPD [illegible]	

PYE T.V. LTD. CAMBRIDGE


VIDEO & SYNC SEPARATOR PANEL
VIDEO OUTPUT PANEL
VERTICAL & HORIZONTAL TIME BASE PANEL
L.T. STABILIZER PANEL
VIDEO IN
SKT 2
SYNC. IN
SKT 3
CONTRAST
PEAKING
CLAMP SET-UP
VERTICAL SPEED
VERTICAL LIN 1
VERTICAL LIN 2
VERTICAL AMPLITUDE
VERTICAL OUTPUT SET UP
HORIZONTAL SPEED
SET DC
90-150 OR
180-240 VOLTS
VIEWED FROM
REAR OF PLUG
TR1
TR2
TR3
TR4
TR5
TR6
TR7
TR8
TR9
TR10
TR11
TR12
TR13
TR14
TR15
TR16
TR17
TR18
TR19
TR20
TR21
TR22
TR23
TR25
TR31
TR32
TR33



KEY TO SEMICONDUCTOR CONNECTIONS

VOLTAGE & WAVEFORM ANALYSIS

CONDITIONS :—

1. CORRECT SELECTION OF POWER INPUT TRANSFORMER TAPPINGS FOR VOLTAGE IN USE
2. THE CORRECT SETTING OF "SET D C" CONTROL FOR + 11 VOLTS ON TAG (52).
3. VOLTMETER SENSITIVITY OF 20 000Ω/V
4. ALL VOLTAGES ARE POSITIVE WITH RESPECT TO CHASSIS UNLESS OTHERWISE SHOWN
5. PICTURE ADJUSTED FOR NORMAL BRIGHTNESS & DIMENSION
6. ELECTROSTATIC VOLTMETER MEASUREMENTS MADE WITH C R T CATHODE CURRENT AT ZERO

CIRCUIT NOTES

1. 1nF = 1000pF = 0·001μF
2. ALL RESISTORS 0·2W AND ±10% UNLESS OTHERWISE STATED
3. ALL CAPACITORS 160 V D C AND ±10% UNLESS OTHERWISE STATED
4. ALL POTENTIOMETERS LINEAR UNLESS OTHERWISE STATED
5. ✱ DEPENDS ON SETTING OF R116
6. Ⓥ VOLTAGE TO BE MEASURED ACROSS C99
7. ▲ L3 WOUND ON R108
8. ■ F5 IS MOUNTED ON THE VERTICAL OUTPUT AND BLANKING ASSEMBLY
9. † THIS RESISTOR ADJUSTED ON TEST MAY BE OMITTED, 0·5Ω, 1Ω OR 0·6Ω OR 1·2Ω
10. ALL CHANGES TO DRG Nº AE11600 WILL ALSO AFFECT THIS CIRCUIT

CLOSED CIRCUIT TELEVISION

TITLE –

VIEWFINDER FOR TELETUTOR 848008/01

DRN	WAS **AG 27639**
TRCD	
CHKD	
APPD	

PYE T V T LTD CAMBRIDGE