

SERVICE MANUAL
up to date: June 1982 (subject to modification)

PS1 421 X
Videodisc



HANTAREX®

Electronic
Equipment
Manufacturer

HANTAREX U.S.A. LTD.

127 Prospect Avenue - DOUGLASTON - New York 11363

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LISTED

color monitor 19"

MTC 9000/E U.S.A.

horizontal and vertical

INDUSTRIAL ELECTRONICS
DATA GRAPHIC DISPLAY AND BROADCAST MONITOR
CCTV AND VIDEO-GAMES MONITOR
BLACK & WHITE / COLOUR TV



HANTAREX

electronic equipment manufacturer



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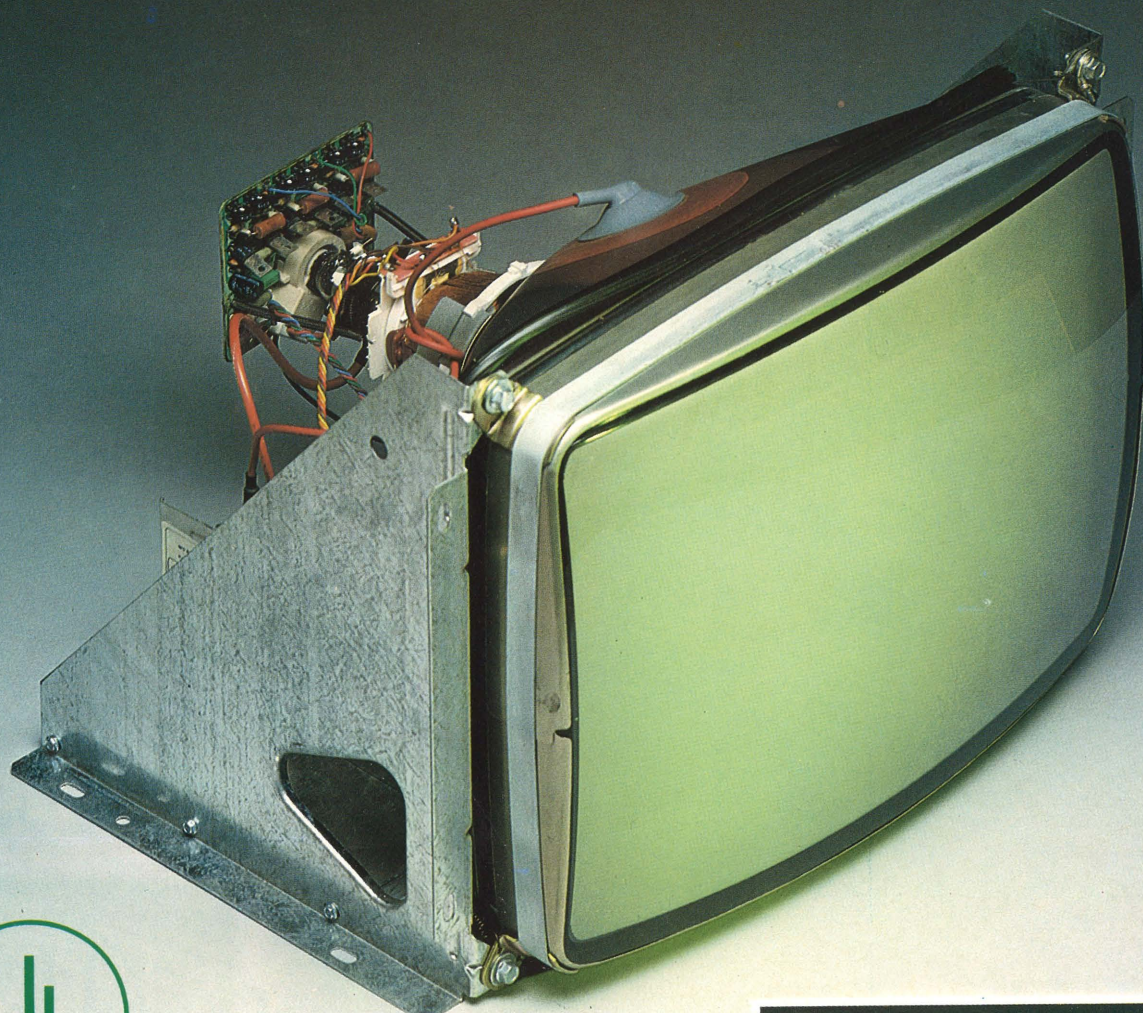
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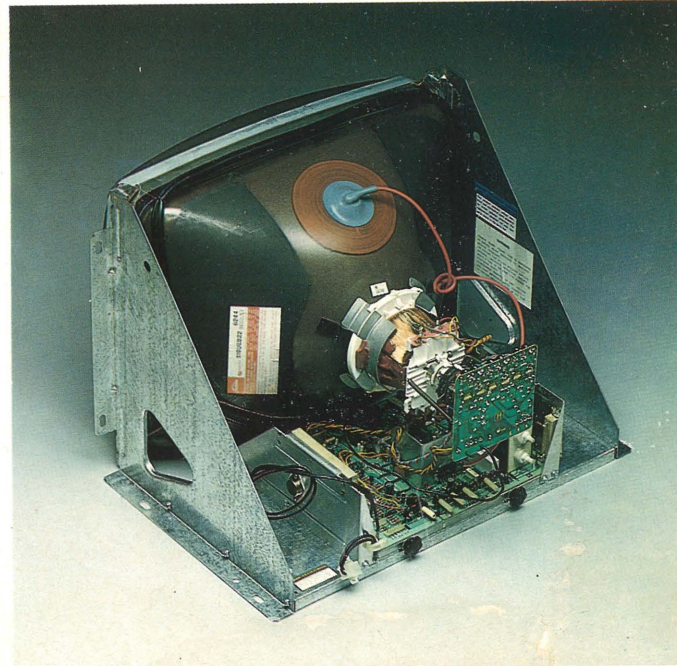
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X-RAY RADIATION
according to DHHS - U.S.A.
(21 CFR SUBCHAPTER J Section 1002.11)

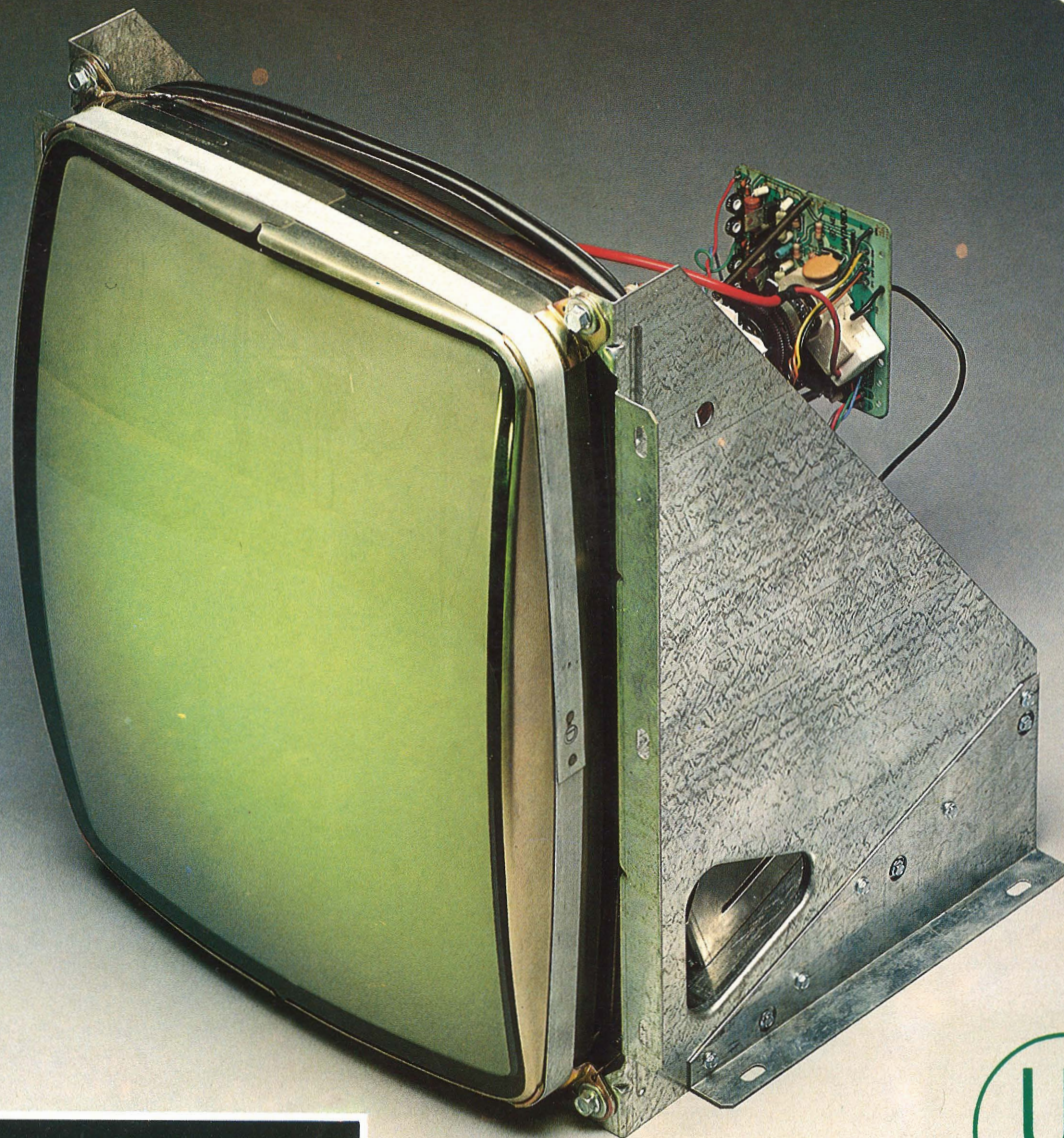


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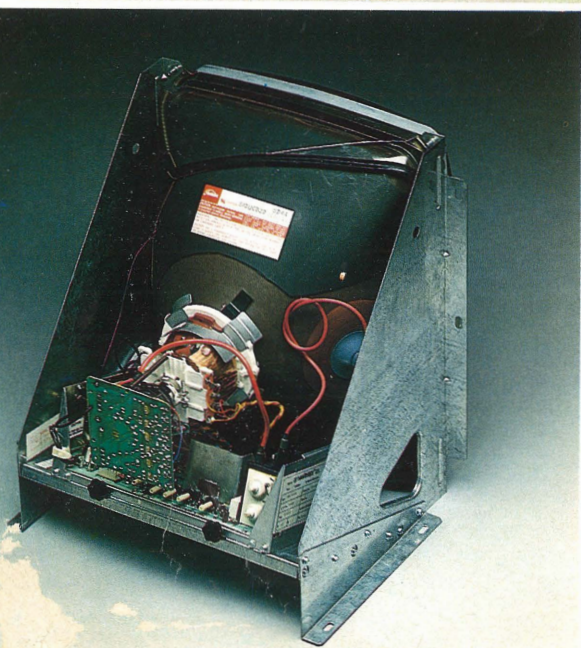
color monitor 19"
MTC 9000/E U.S.A.
horizontal



X-RAY RADIATION
according to DHHS - U.S.A.
(21 CFR SUBCHAPTER J Section 1002.11)



LISTED



color monitor 19"
MTC 900/E U.S.A.
vertical

WARNING

The chassis and the heat sinks are connected to ground. Hence, for the measurement of voltages, connect the negative terminal of the measuring instrument to the chassis.

- **X-RAYS**

the chassis has been designed to give the minimum of x-ray radiation and a special safety circuit guarantees that even in the event of failure radiation will never exceed 0.5 mR/h. For this reason it is essential not to alter the C.R.T. circuit in any way.

- **E.H.T.**

The monitor embodies sources of high voltage capable of delivering **LETHAL** amounts of energy. Hence to avoid harm to the operator, follow precautions set down for the servicing of E.H.T. equipment.

- **C.R.T.**

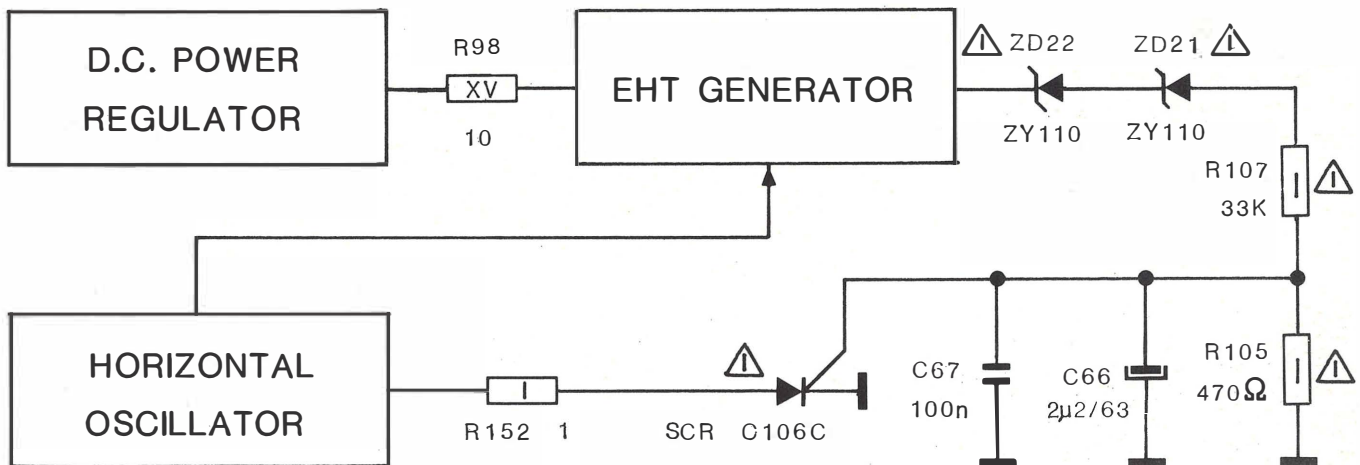
The cathode-ray tube is a high vacuum component and its surfaces are subjected to strong exterior pressure. One therefore must take care not to knock or scratch the tube as this could cause implosion. It follows that the personnel responsible for its installation must use glasses and protective clothing against flying splinters.

- **SHOCK**

To prevent the possibility of electrical discharges do not expose the monitor to rain or humidity.

PROTECTION AGAINST X-RAY RADIATION

(patent n° 91830158.4)



PROTECTION CIRCUIT

MTC 900/E includes an "X ray radiation" protection circuit. A reference voltage taken from the secondary of the E.H.T. transformer is fed via a resistive voltage divider to the gate of an S.C.R.

When the EHT voltage becomes more than 28,5 Kv, the reference voltage at the S.C.R. gate will increase sufficiently to fire the SCR which stops the Horizontal oscillator and therefore the generation of EHT.

The circuit continues blocking the oscillation until the break down has been repaired and the supply reset.

OPERATING INSTRUCTIONS

- 1) Apply a suitable power source to the monitor through an isolation transformer by means of J1
- 2) Apply a suitable signal source to the monitor by mean of connector CA
- 3) **SET UP CONTROLS**
All controls are preset at the factory, but may be adjusted to suit program material, please refer to page 8 (SETTING UP PROCEDURE)
- 4) For negative input $\overline{\text{SYNC}}$. Pulses use connector CC
pin n° 2 for $\overline{\text{VERT.}}$
pin n° 3 for $\overline{\text{HOR.}}$

PERFORMANCE AND OPERATING DATA

1) SUPPLY	min	max
VOLTAGE	98 Vac	130 Vac
FREQUENCY	44 Hz	65 Hz

NOTE: apply supply voltage through an isolation transformer with 1.5A capability

2) HIGH VOLTAGE	
for 19" models	22,5 kV – 25,5 kV

NOTE: conditions for above:

I (beam) = 0 mA
DC supply voltage = 1.15 VDC

3) INPUT SIGNAL AND PIN ASSIGNEMENTS FOR CONNECTOR CA

PIN N°	DESCRIPTION	IMPEDANCE	SIGNAL RANGE
1	red input	1k nom.	0 to 4V
2	green input	1k nom.	0 to 4V
3	blue input	1k nom.	0 to 4V
4	ground		
5	vertical sync. pulse	10k nom.	1,5V to 4V
6	horizontal sync. pulse	10k nom.	1,5V to 4V

4) SERVICE SET-UP CONTROLS

ON THE INTERFACE BOARD

RV 12 supply voltage adjustment – set to 115Vdc
RV 10 brightness control
RV 1,2,3 contrast

ON THE DEFLECTION BOARD

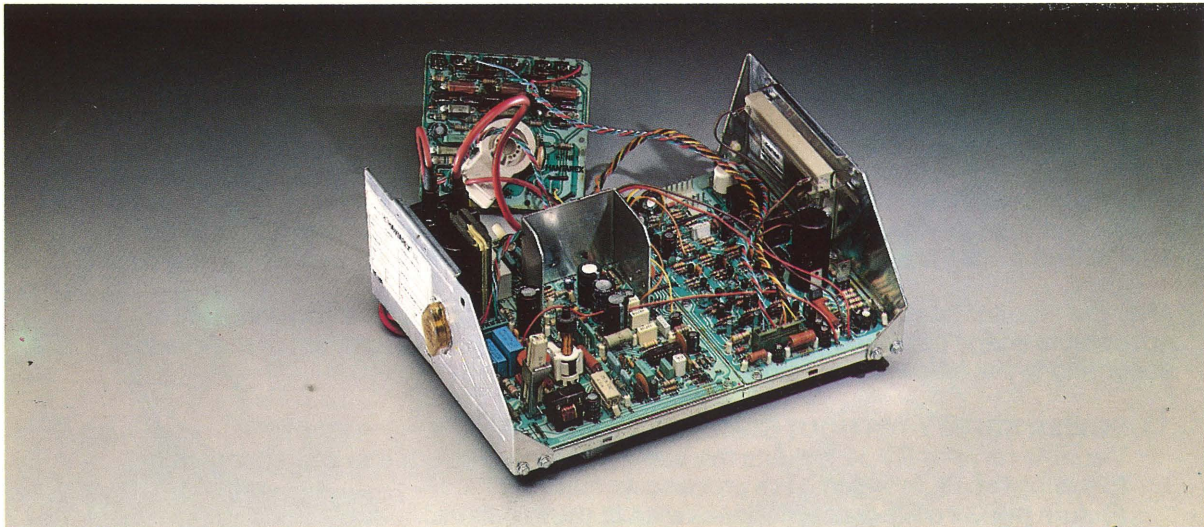
RV 13 horizontal frequency
RV 14 horizontal phase
RV 23 vertical shift
RV 17 vertical linearity
RV 15 vertical hold control
RV 16 vertical amplitude
B 4 linearity coil
B 5 width coil

ON THE EHT TRANSFORMER

— G2 – brightness preset control
— focus control

ON THE SOCKET BOARD

video drive controls – “gain”
RV4; RV6; RV8
CRT cut-off controls – “black level”
RV5; RV7; RV9



DESCRIPTION		MIN	TYP	MAX	UNITS
Supply					
INPUT ac POWER DEGAUSSING	monitor input-with isolation transformer automatic	98	117 110 117	130	Vac W Vac
Interface RGB Analog Signal TTL compatible					
VID. SIGN. INPUT SYNC. INPUT BLANKING VIDEO BEAM-LIMITER CONTROLS	RGBsignal: TTL compatible separate horizontal and vertical or composite (H+V) positive or negative Input Horizontal retrace/blanking time Frequency response (-3 db) Rise time Over shoot Beam current Brightness and contrast	1 1,5	4 4 11 8 50 0,5 1 100	5,5 5,5	Vpp Vpp μ S MHz nS % mA %
Deflection					
GEOMETRY	Horizontal linearity Vertical linearity Pincushion Horizontal scan size Vertical scan size		± 14 ± 10 ± 3 -4+10 ± 15		% % % % %
EHT					
EHT X-RAY SAFETY X-RAY	(117 Vdc O-beam current) EHT voltage which shut-off the Emission monitor	23	24 28,5	25	KV KV mR/h
CRT					
90°			19		INCHES

SETTING-UP PROCEDURE

INSTRUMENTATION REQUIRED

Digital multi-meter with input impedance of 10M Ω . An oscilloscope with a bandwidth of 10MHz and a 10/1 probe attenuator. An RGB color bar generator type HANTAREX K190E.

After the monitor has been turned on for about 5 minutes, adjust the controls until an acceptable image has been obtained and then proceed to the alignment of the chassis according to the following instructions.

1) POWER SUPPLY WITHOUT SIGNAL

Variable resistor RV 12 adjusts the supply voltage and requires adjustment only following repair, in which case proceed as follows:

- a) turn the G2 control counterclockwise to the minimum.
- b) connect digital voltmeter to SP20 and adjust RV12 to obtain a voltage of 115 Vdc

WARNING

Voltages greater than or less than nominal impair the functioning of the monitor.

2) RGB INPUT LEVELS. (signal: color bars)

Turn RV10, brightness control, to the maximum; checking on R27, R28, R31 adjust input control RV 1, 2, 3 (contrast) to obtain a 0,6 Vpp.

3) RGB VIDEO OUTPUT (signal: color bars)

- Adjust RV5; RV7; RV9 on the socket-board to obtain at KG; KR; KB, a "black level" at 140 Vdc.
- Adjust RV4; RV6; RV8 to have, at the same points, a "gain" of 50 Vpp.
- Adjust RV10 (brightness) to have, at the same points, a "black level" at 160 Vdc.
- Adjust G2 to obtain cut-off on the CRT.

4) WHITE BALANCE (signal: no signal)

With RV10 turned to make a white background visible correct the grey by means of RV5; RV7; RV9.

5) HORIZONTAL OSCILLATOR (signal: crosshatch)

Short circuit TP7 and TP8 then adjust RV13 to obtain the most stable image in the horizontal sense and then remove the short circuit.

6) VERTICAL OSCILLATOR (signal: crosshatch)

Regulate RV 15 so as to obtain a slight roll-over of the image in a downward direction. Then turn back slowly to stop this roll-over.

7) HORIZONTAL GEOMETRY (signal: crosshatch)

Set the horizontal linearity coil B4 for maximum amplitude and then adjust for the best horizontal linearity. Adjust RV14 for correct horizontal centering. Finally re-adjust horizontal amplitude by means of B5 width coil.

8) VERTICAL GEOMETRY (signal: crosshatch)

Adjust RV16 so as to reduce the image by 3 cm with respect to the height of the CRT. By means of RV23 centre the graticule vertically, and adjust RV16 again for the correct vertical amplitude and RV17 for the best linearity.

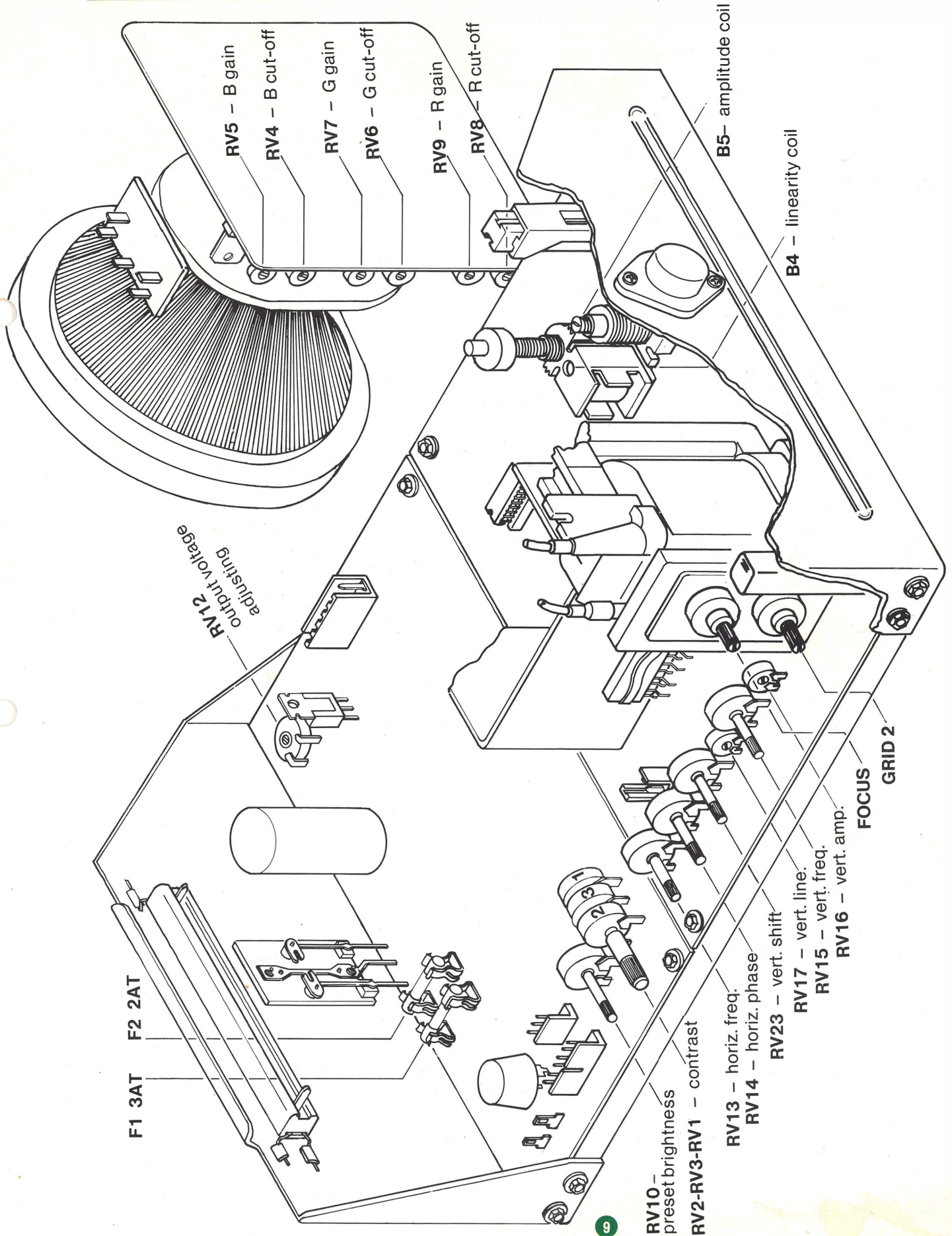
9) FOCUS (signal: crosshatch)

Adjust focus control to obtain the best visual result.

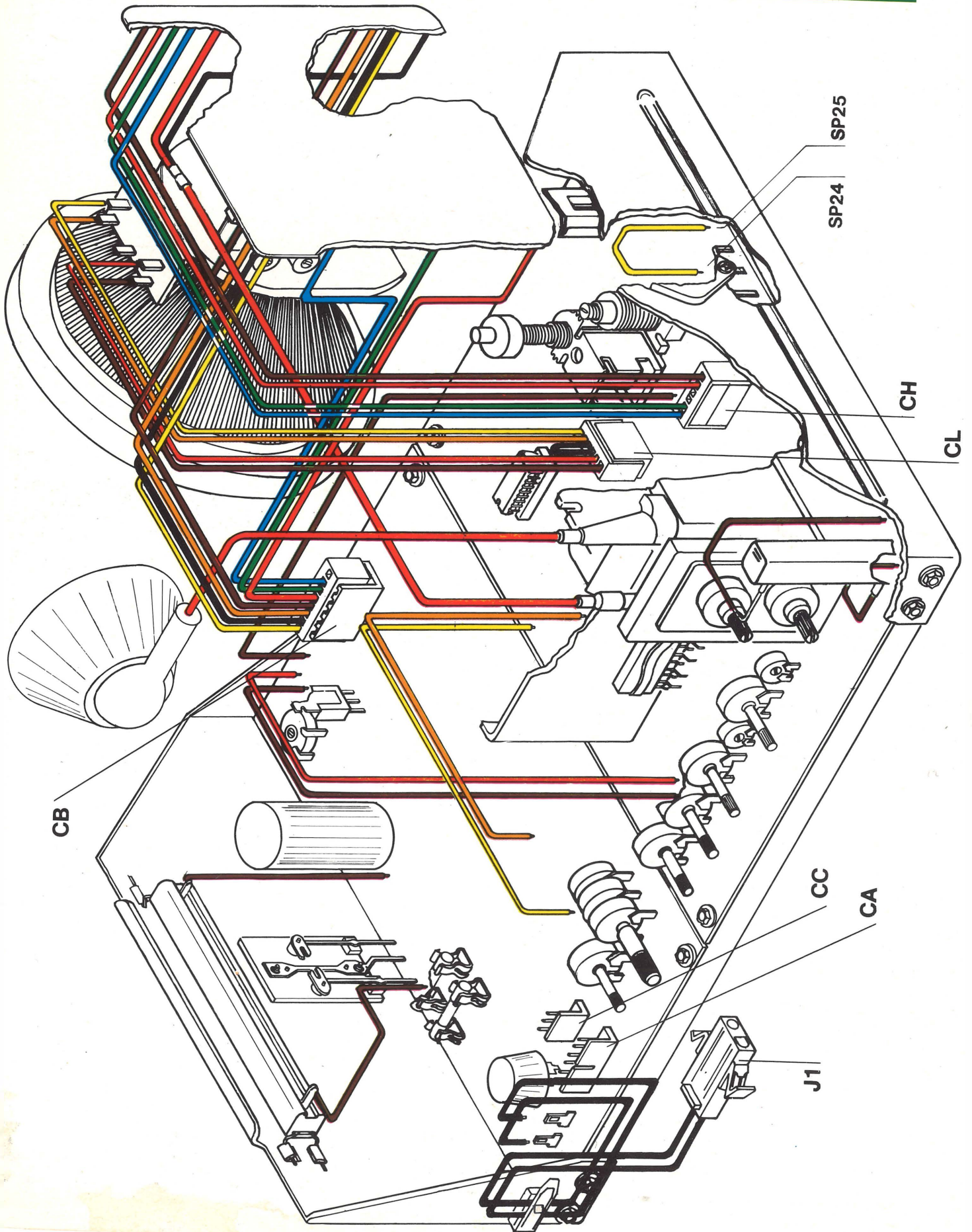
WARNING

The monitor is pre-set to work with a video active time of about 40 μ s. However, to change the video active time to 50 μ s cut the yellow jumper between points SP24; SP25 (see Diagram on page 10).

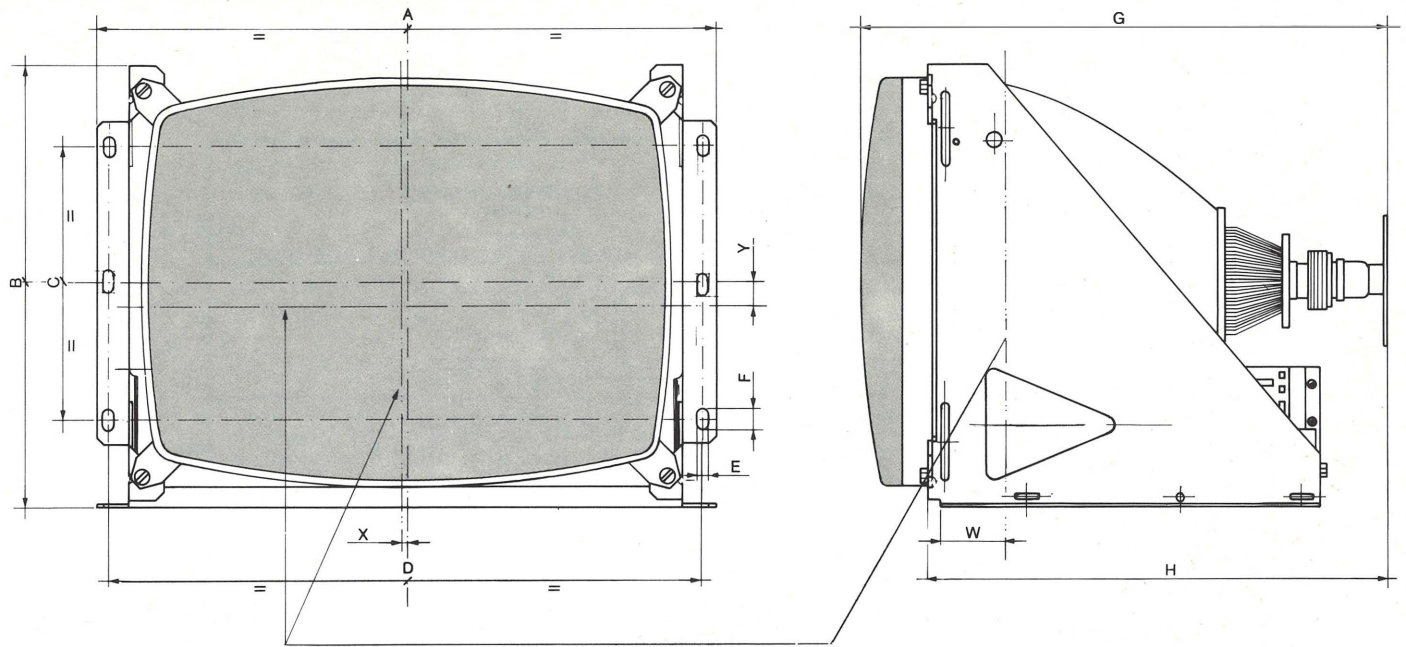
ADJUSTING TRIMMERS



CONNECTION DIAGRAM

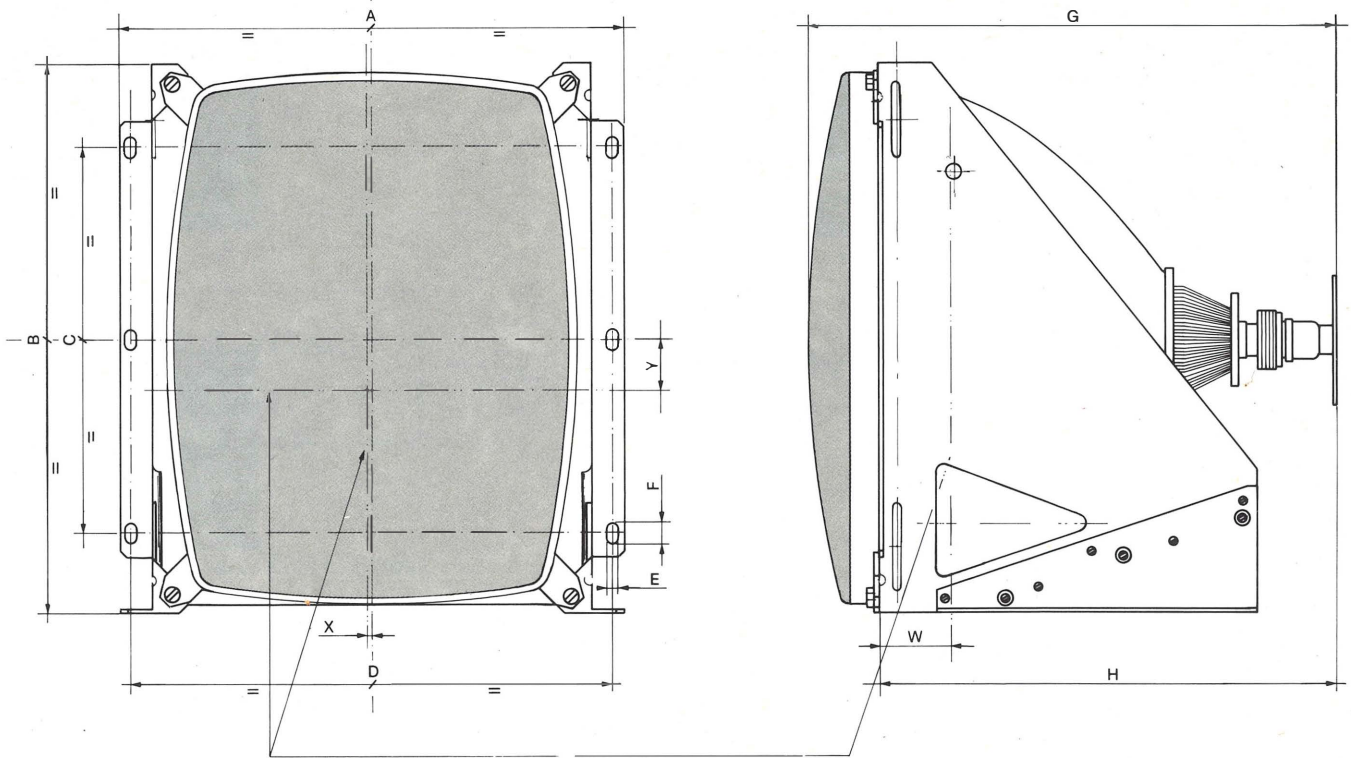


MECHANICAL DATA



Center of gravity

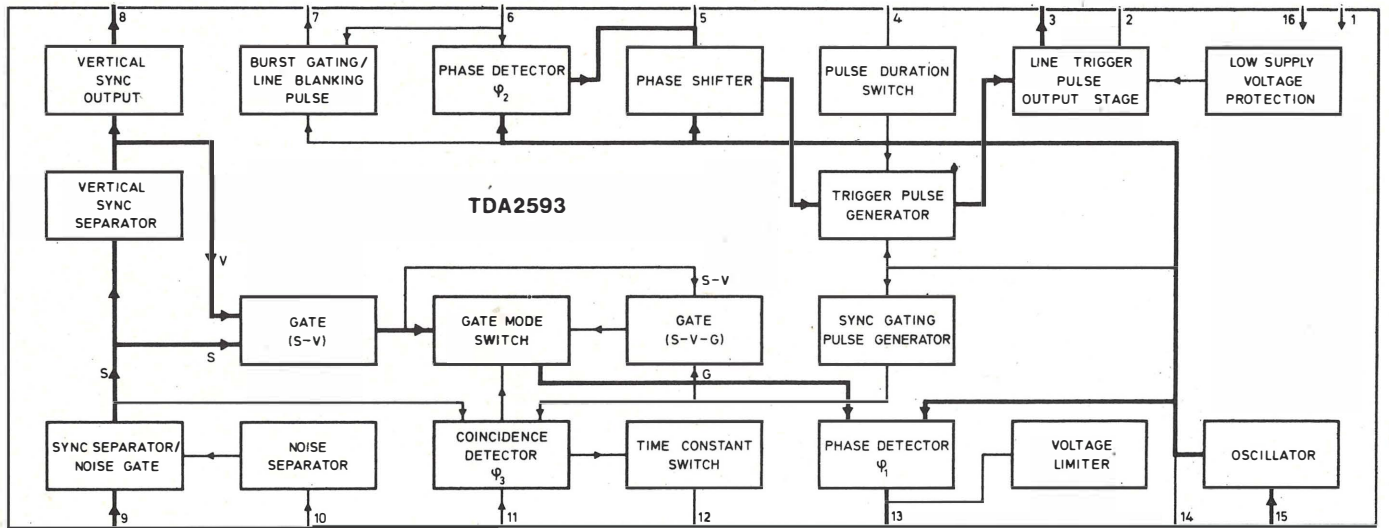
TYPE	A		B		C		D		E		F		G		H		X		Y		W	
	mm	inch.	mm	inch.	mm	inch.	mm	inch.	mm	inch.	mm	inch.	mm	inch.	mm	inch.	mm	inch.	mm	inch.	mm	inch.
19" 90°	518	20.39	364	14.33	228	8.97	498	19.60	8	0.315	16	0.6	427	16.81	355	13.97	5	0.197	22	0.866	55	2.165



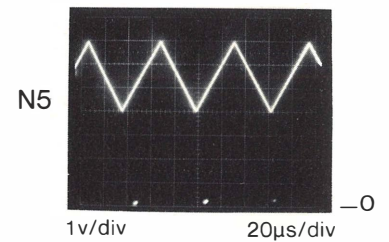
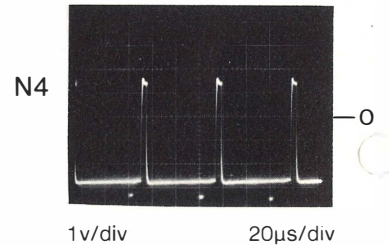
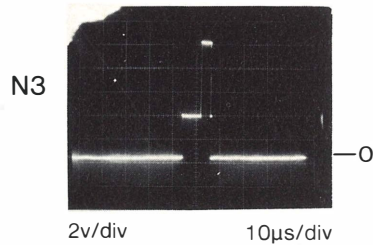
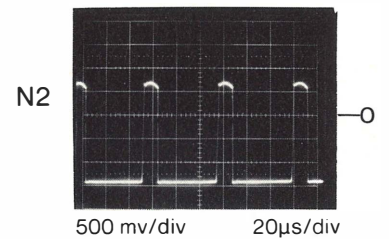
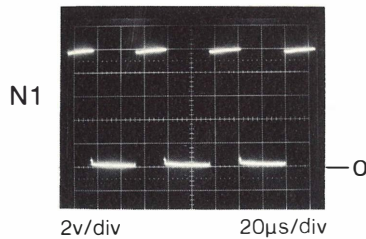
Center of gravity

TYPE	A		B		C		D		E		F		G		H		X		Y		W	
	mm	inch.	mm	inch.	mm	inch.	mm	inch.	mm	inch.	mm	inch.	mm	inch.	mm	inch.	mm	inch.	mm	inch.	mm	inch.
19" 90°	425	16.73	463	18.22	327	12.24	445	17.51	8	0.315	16	0.6	427	16.81	355	13.97	5	0.197	42	1.653	60	2.362

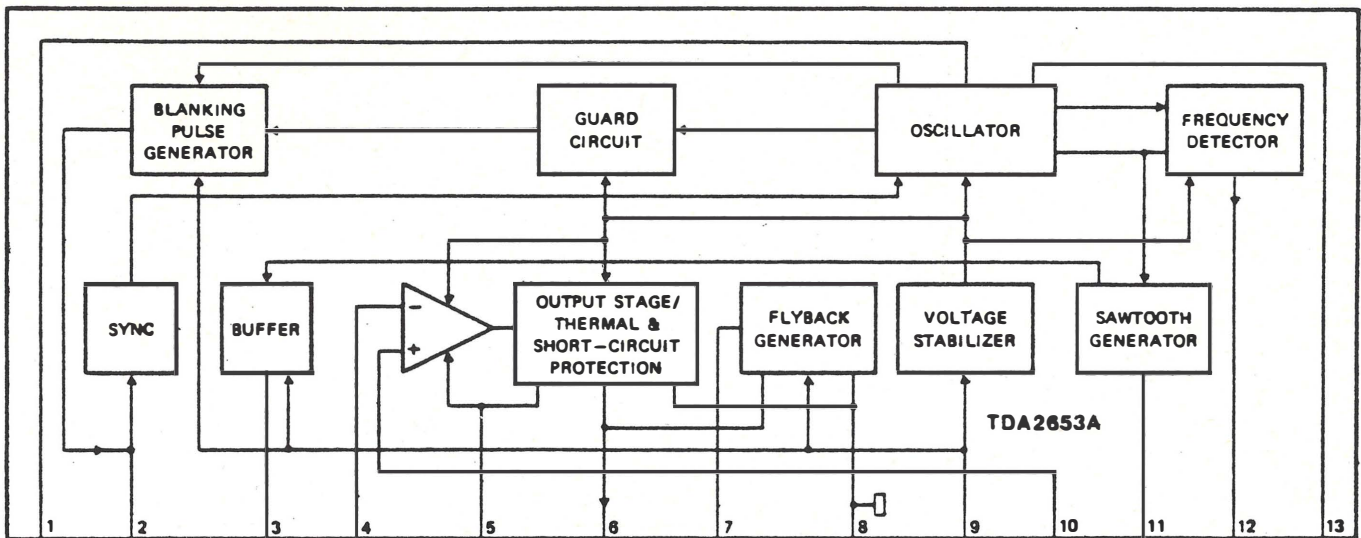
HORIZONTAL COMBINATION I.C. PHILIPS TDA 2593



- PIN 1 = +11 Vdc
- PIN 2 = +11,2 Vdc
- PIN 3 = Picture 1
- PIN 4 = GND
- PIN 5 = +6,3 Vdc
- PIN 6 = Picture 2
- PIN 7 = Picture 3
- PIN 8 = NC
- PIN 9 = Picture 4
- PIN 10 = NC
- PIN 11 = +5 Vdc
- PIN 12 = +5,48 Vdc
- PIN 13 = +5,7 Vdc
- PIN 14 = Picture 5
- PIN 15 = +5,5 Vdc
- PIN 16 = GND

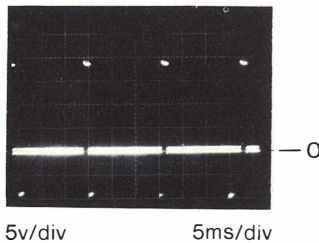


VERTICAL DEFLECTION CIRCUIT I.C. PHILIPS TDA 2653 A

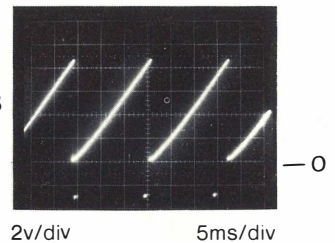


- PIN 1 = +7,24 Vdc
- PIN 2 = Picture 7
- PIN 3 = Picture 8
- PIN 4 = Picture 9
- PIN 5 = Picture 10
- PIN 6 = Picture 11
- PIN 7 = Picture 12
- PIN 8 = GND
- PIN 9 = +24,3 Vdc
- PIN 10 = 1,24 Vdc
- PIN 11 = Picture 13
- PIN 12 = NC
- PIN 13 = Picture 14

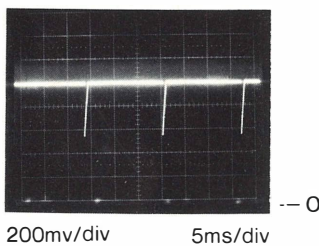
N7



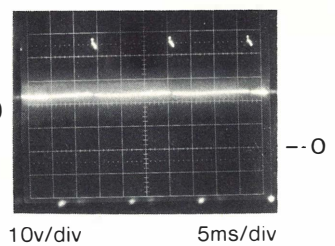
N8



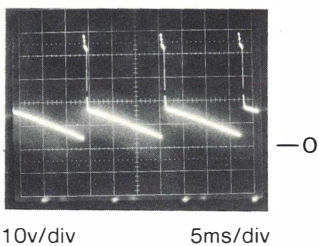
N9



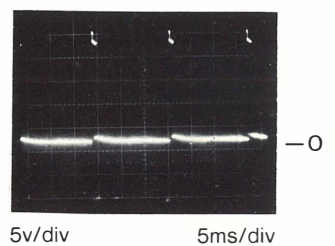
N10



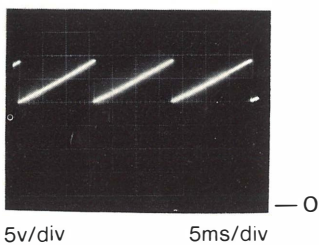
N11



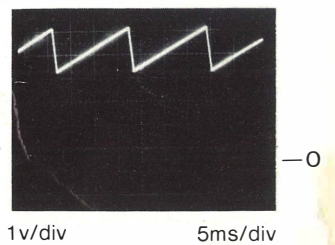
N12



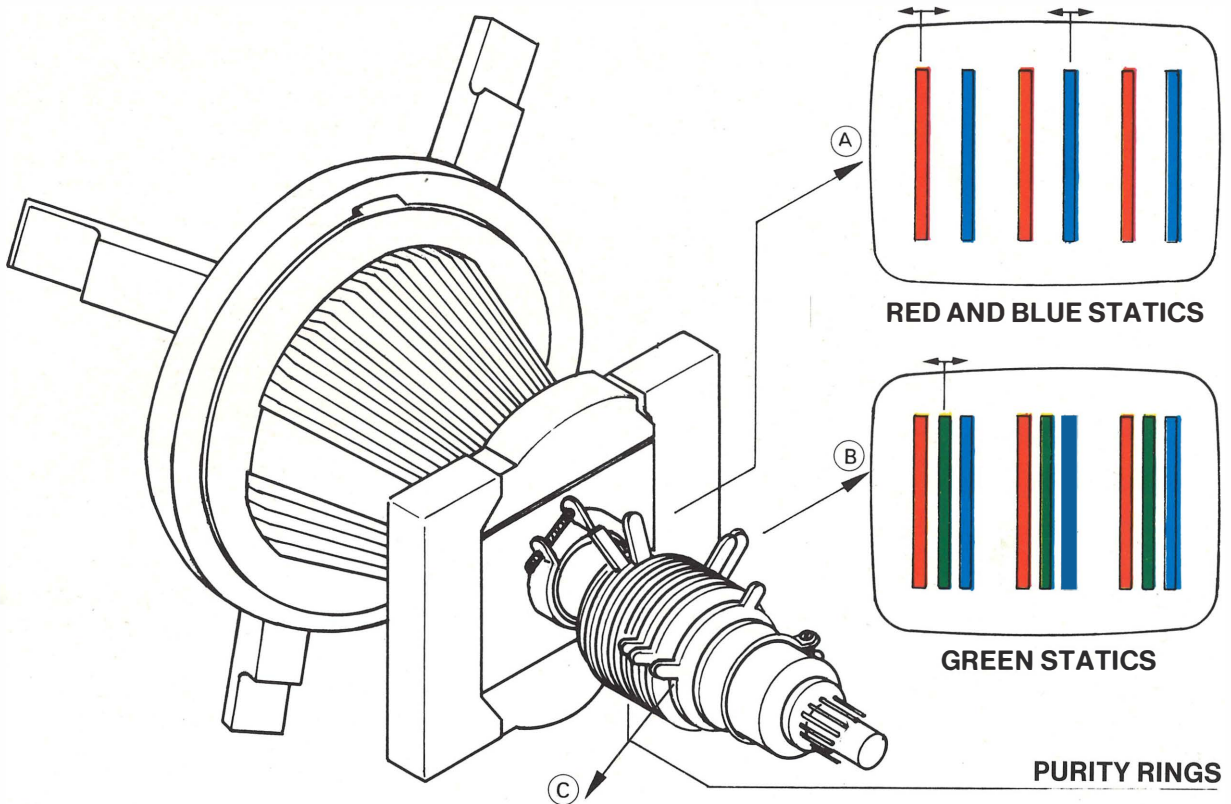
N13



N14



STATIC CONVERGENCE RINGS



The kind of picture tube used, is the toshiba 510 510 UEB 22 (TC02) selfconvergence type. All Adjustments (purity and convergence) are directly made by the tube manufacturer.

In case convergence or purity readjustments are required, you can operate as follows using a crosshatch pattern generator:

Release the rings from the fixing resin taking care not to turn them.

The rings operate with the following sequency: (see the above picture)

- A These rings adjust convergencey between red and blue.
- B These rings adjust convergencey of green respect to red/blue
- C These rings adjust points out of purity using a generator with a red field.

Before operating, please take care that the monitor is free from residual magnetic fields. Should any part of the chassis or cabinet become magnetized, it will be necessary to de-gauss the affected area by means of a manual degaussing coil.

K190E – COLOR GENERATOR



Test Signals and Controls:

- 1) 7-step grey bars from white to black: video ampl. linearity
- 2) dot: convergence
- 3) cross hatch: linearity and geometry
- 4) white field: picture tube chromatic temperature
- 5) blue/green/red/field: purity
- 6) white/yellow/orange/green purple/red/blue/black bars: RGB amplifiers video input levels.

Video Output Levels for all Signals

positive to 1V pp, 2Vpp, 4Vpp, 7Vpp (push button selection)

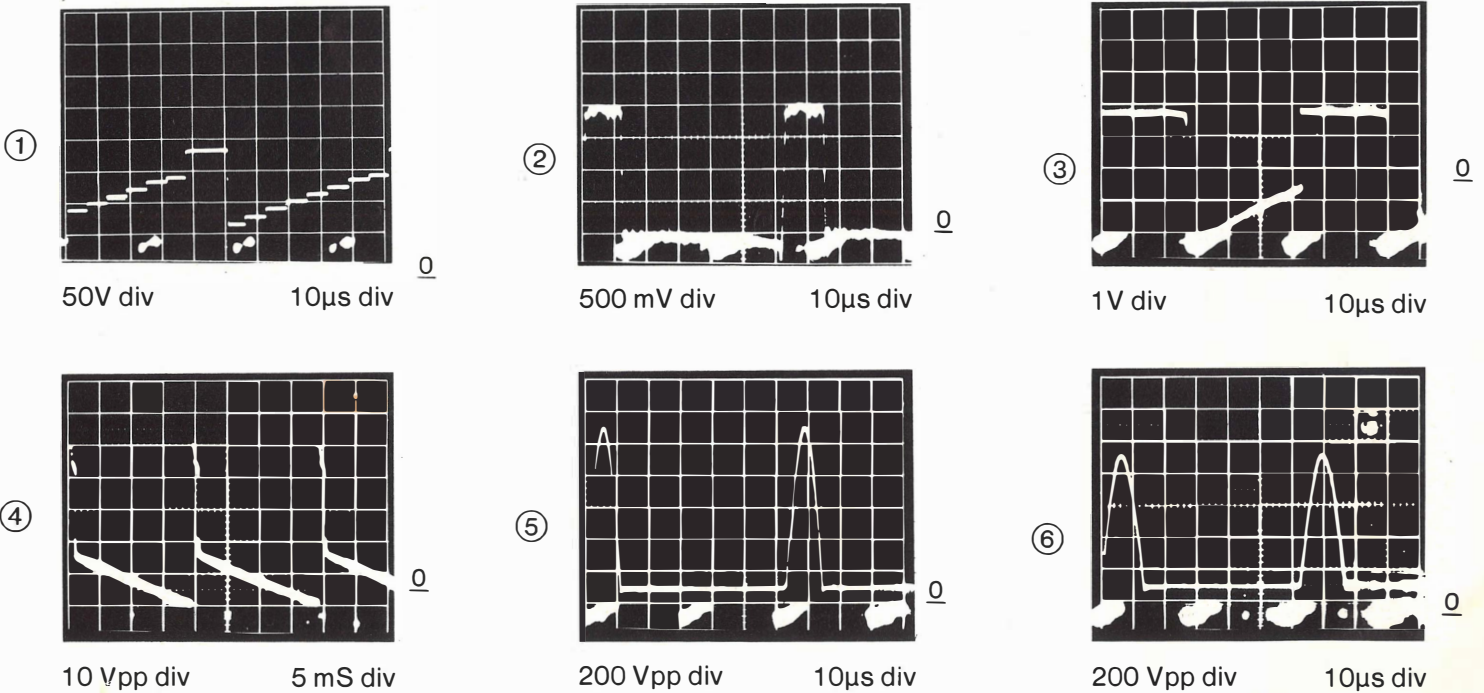
Synchronisms

horizontal and vertical, positive or negative: 5 μ s 4Vpp horizontal; 200 μ s 4Vpp vertical.

Mains Supply

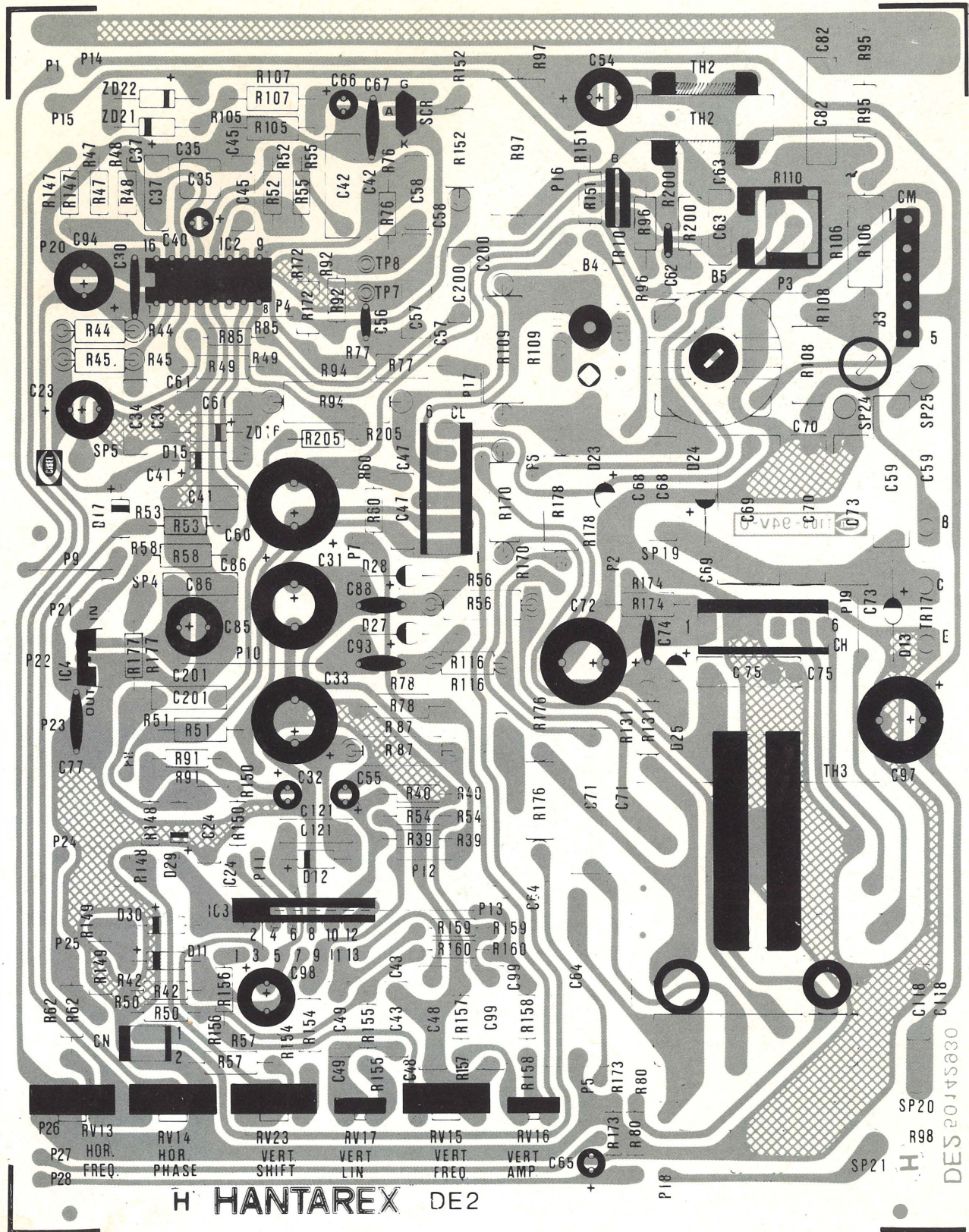
120Vac – 15 + 10% 50/60 Hz

WAVEFORMS

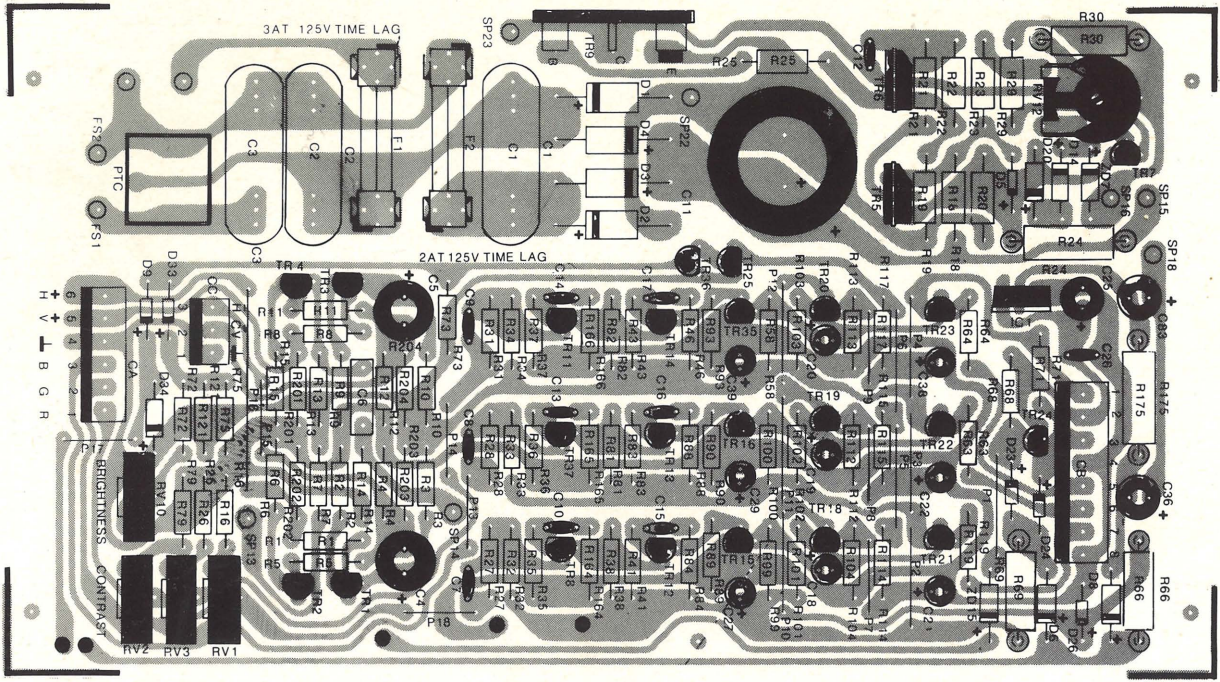


PRINTED CIRCUIT BOARD

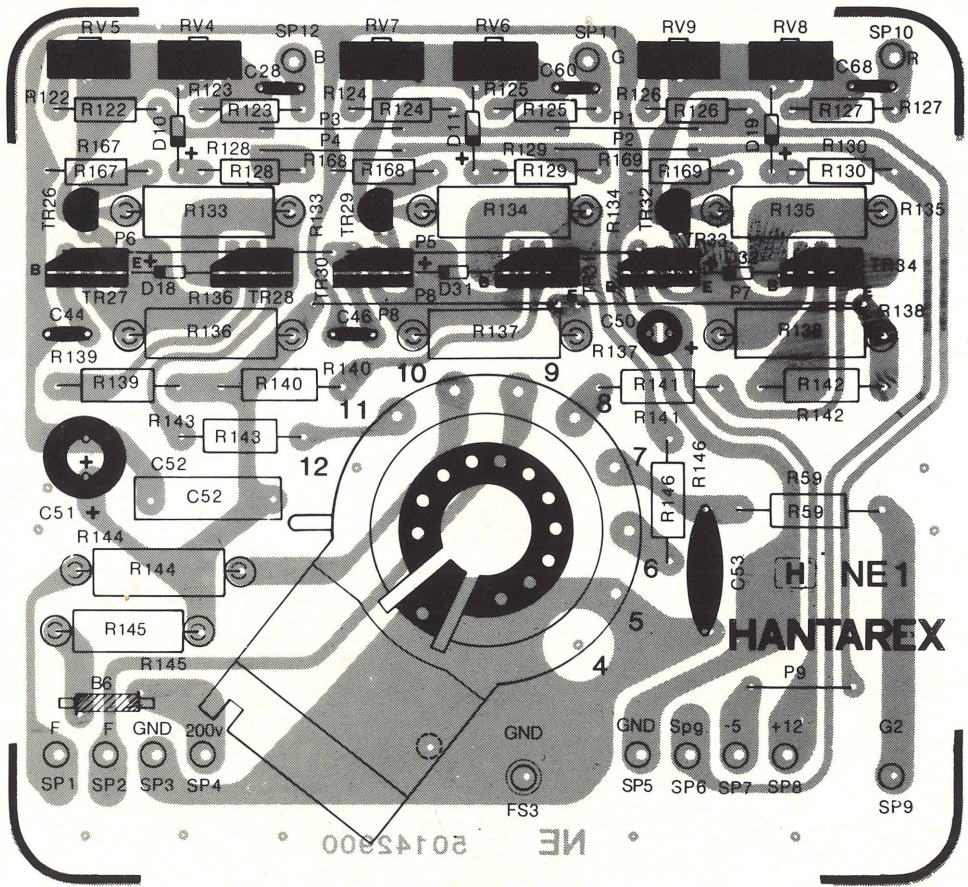
DEFLECTION BOARD DE



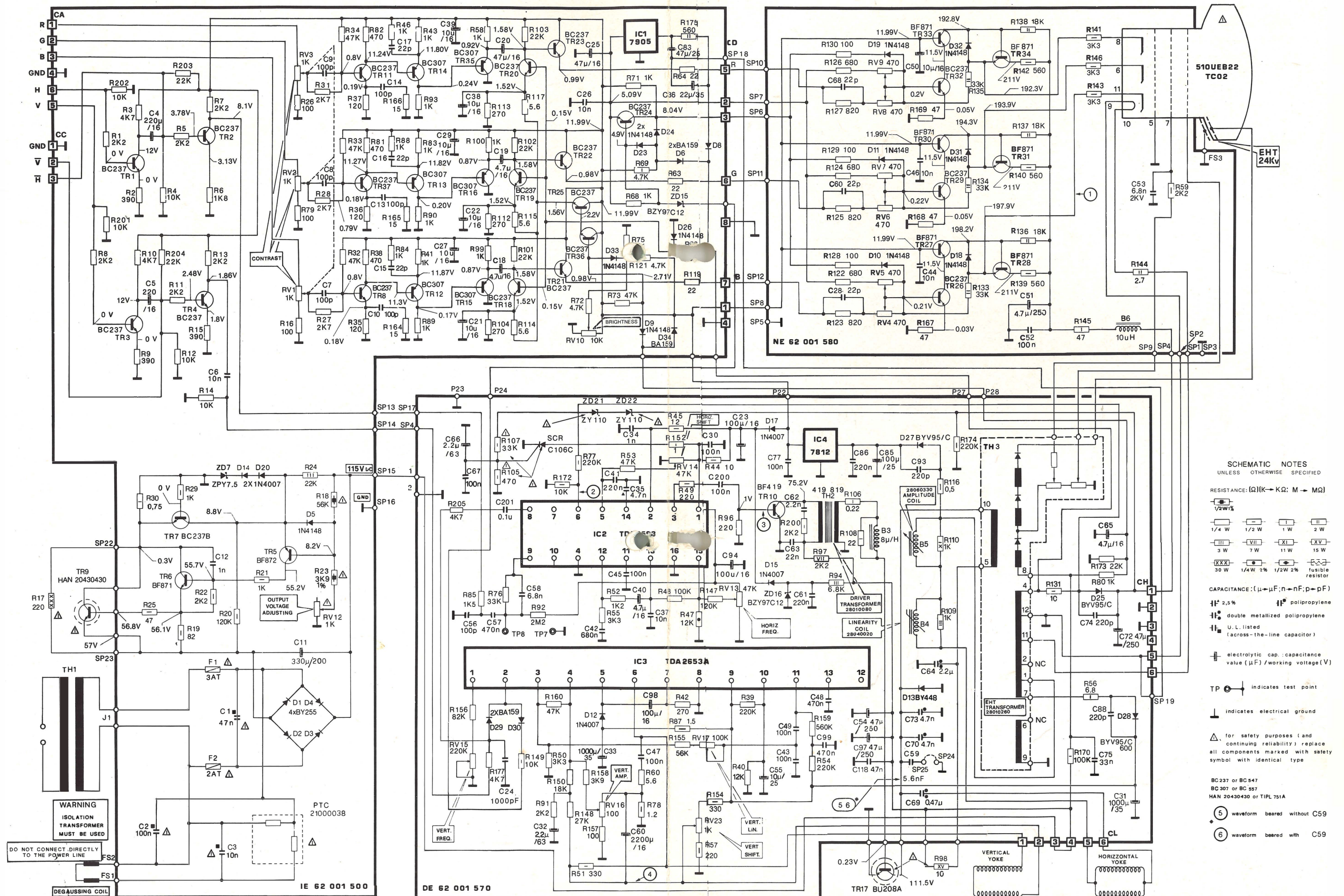
INTERFACE BOARD IE



NECK BOARD NE



SCHEMATIC DIAGRAM



- SCHEMATIC NOTES**
UNLESS OTHERWISE SPECIFIED
- RESISTANCE: (Ω) → KΩ; M → MΩ
-
- CAPACITANCE: (μ) → μF; n → nF; p → pF
-
- TP indicates test point
- ⊥ indicates electrical ground
- ⚠ for safety purposes (and continuing reliability) replace all components marked with safety symbol with identical type
- BC 237 or BC 547
BC 307 or BC 357
HAN 20430430 or TPL 751A
- ⑤ waveform bearing without C59
⑥ waveform bearing with C59



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