

Williams[®]

16-3000-100C
January, 1983

19" RASTER MONITOR TYPE C

**instruction manual
supplement**

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Call TOLL-FREE with your
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800-621-1253
In Illinois call 800-572-1324

Williams[®] 
ELECTRONICS, INC.
3401 N. California Avenue
Chicago, Illinois 60618

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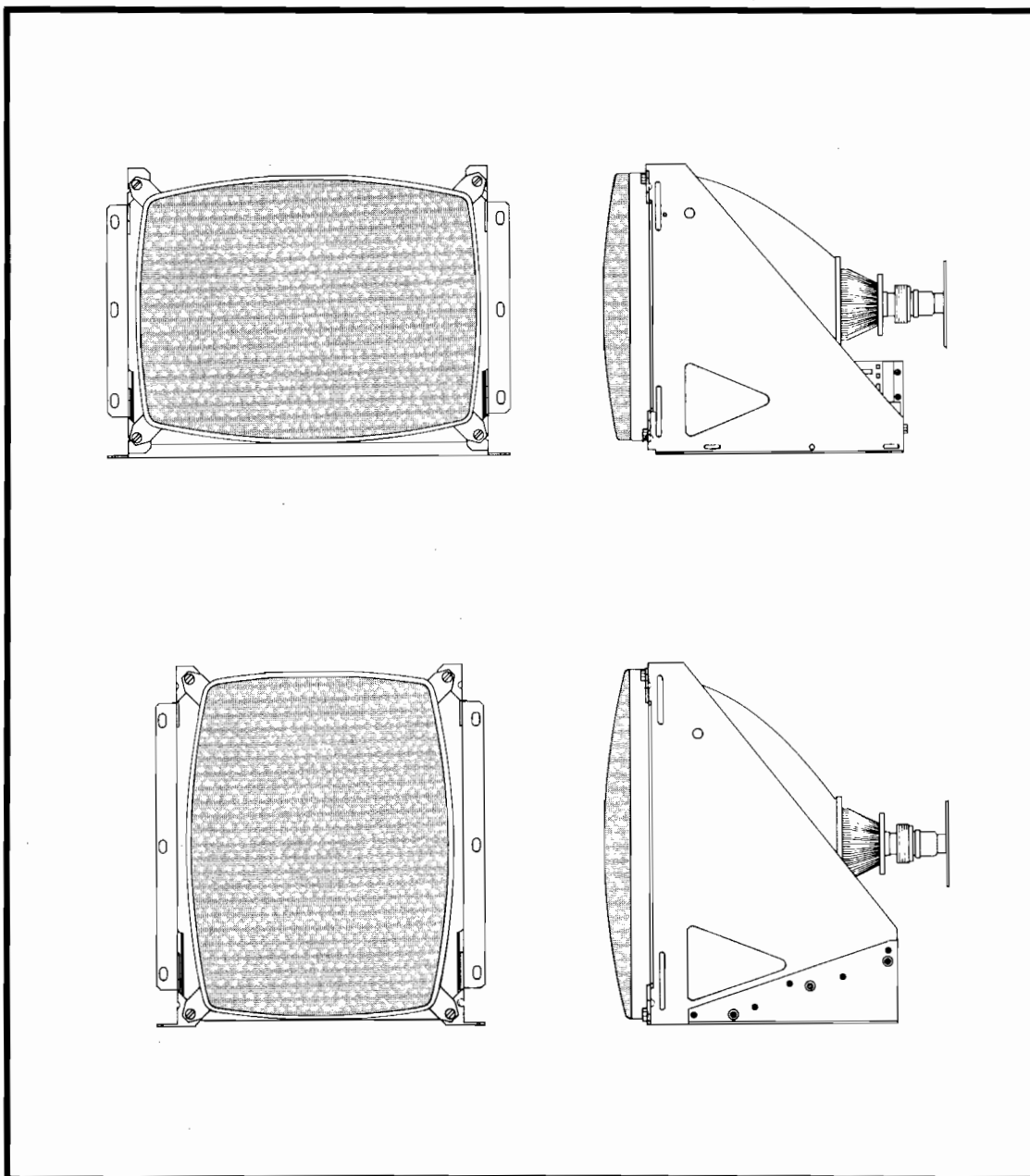
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WARNINGS

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

- **X-RAYS**

This monitor is designed for minimum X-radiation. A special safety circuit guarantees that even in the event of failure, radiation will never exceed 0.5mR/h. For this reason **NEVER** alter the CRT circuit in any way.

- **EHV**

This monitor contains high voltages capable of delivering **LETHAL** amounts of energy. Avoid harm to the operator; follow precautions set down for the servicing of EHV equipment.

- **CRT**

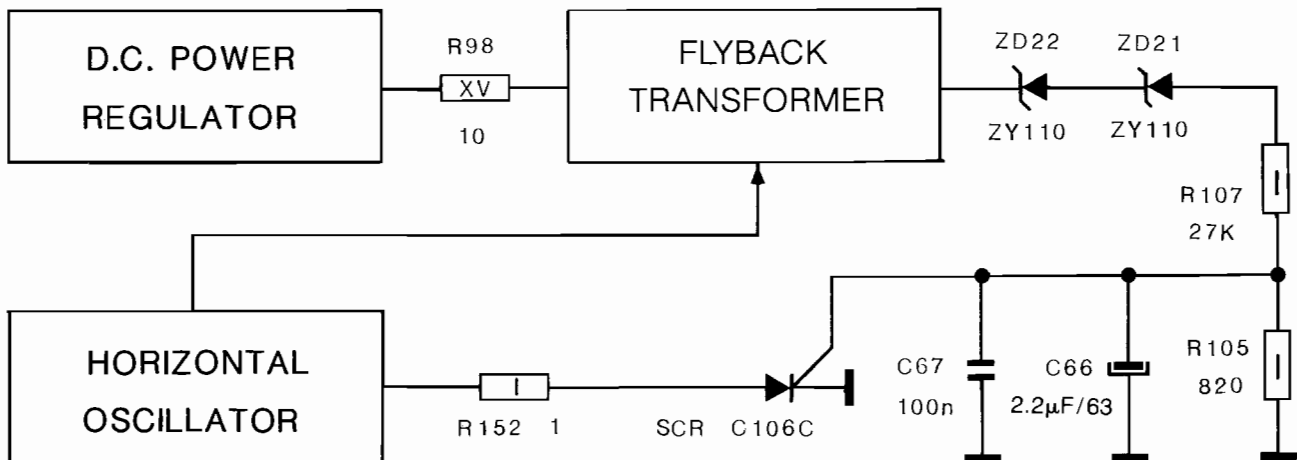
The cathode-ray tube is a high-vacuum component and its surfaces are subjected to strong exterior pressure. Take care not to knock or scratch the tube as this could cause its implosion, resulting in personal injury and property damage. Installation personnel must use safety glasses and clothing protective against flying splinters.

- **SHOCK**

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

X-RAY PROTECTION

(patent no. 91830158.4)



This monitor incorporates a special circuit to eliminate radiation exceeding the legal limit of 0.5mR/h.

A 200V reference voltage (taken from the secondary of the flyback transformer) is fed via a resistive voltage divider to the gate of an SCR. Should component failure cause the EHV to rise above 26.5kV the reference voltage will increase sufficiently to fire the SCR. The SCR then shunts horizontal oscillator Vcc to ground through a current-limiting resistor, thus preventing generation of EHV. The SCR circuit will shut off EHV before it rises to 27kV. At this point, X-radiation is only 0.15mR/h. The horizontal oscillator is disabled until the breakdown has been repaired and the supply reset.

SETUP PROCEDURE

INSTRUMENTS REQUIRED

- Digital multimeter with input impedance of 10M
- Oscilloscope with a bandwidth of 10MHz
- 10/1 probe attenuator

Turn on the monitor and let the circuitry heat up for about 5 minutes. Then adjust the controls for an acceptable image. Next align the chassis according to the following instructions.

POWER SUPPLY WITHOUT SIGNAL

Variable resistor RV 12 adjusts the **supply voltage** and requires adjustment only following repair. Proceed as follows:

- turn **brightness grid** control all the way counterclockwise.
- connect digital voltmeter to SP20 and adjust RV12 to obtain 115VDC.

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

RGB INPUT LEVELS (signal: color bars)

Turn RV10 **brightness control** up all the way; checking voltage at R27, R28, R31, adjust input control RV1/RV2/RV3 (**contrast**) to obtain 0.6Vpp for each color.

RGB VIDEO OUTPUT (signal: color bars)

—Adjust RV5, RV7 and RV9 on neckboard to obtain a **black level** of 140VDC at KG, KR and KB.

—Adjust RV4, RV6, RV8 for a gain of 50Vpp at KG, KR and KB.

—Adjust RV10 (**input brightness**) for a **black level** of 160VDC at KG, KR and KB.

—Adjust G2 to obtain CRT cutoff.

WHITE BALANCE (no signal)

With RV10 adjusted to make a white background visible, correct the gray by means of RV5, RV7 and RV9.

HORIZONTAL OSCILLATOR (signal: crosshatch)

Jumper TP7 to TP8. Adjust RV13 to obtain maximum horizontal stability. Then remove the jumper.

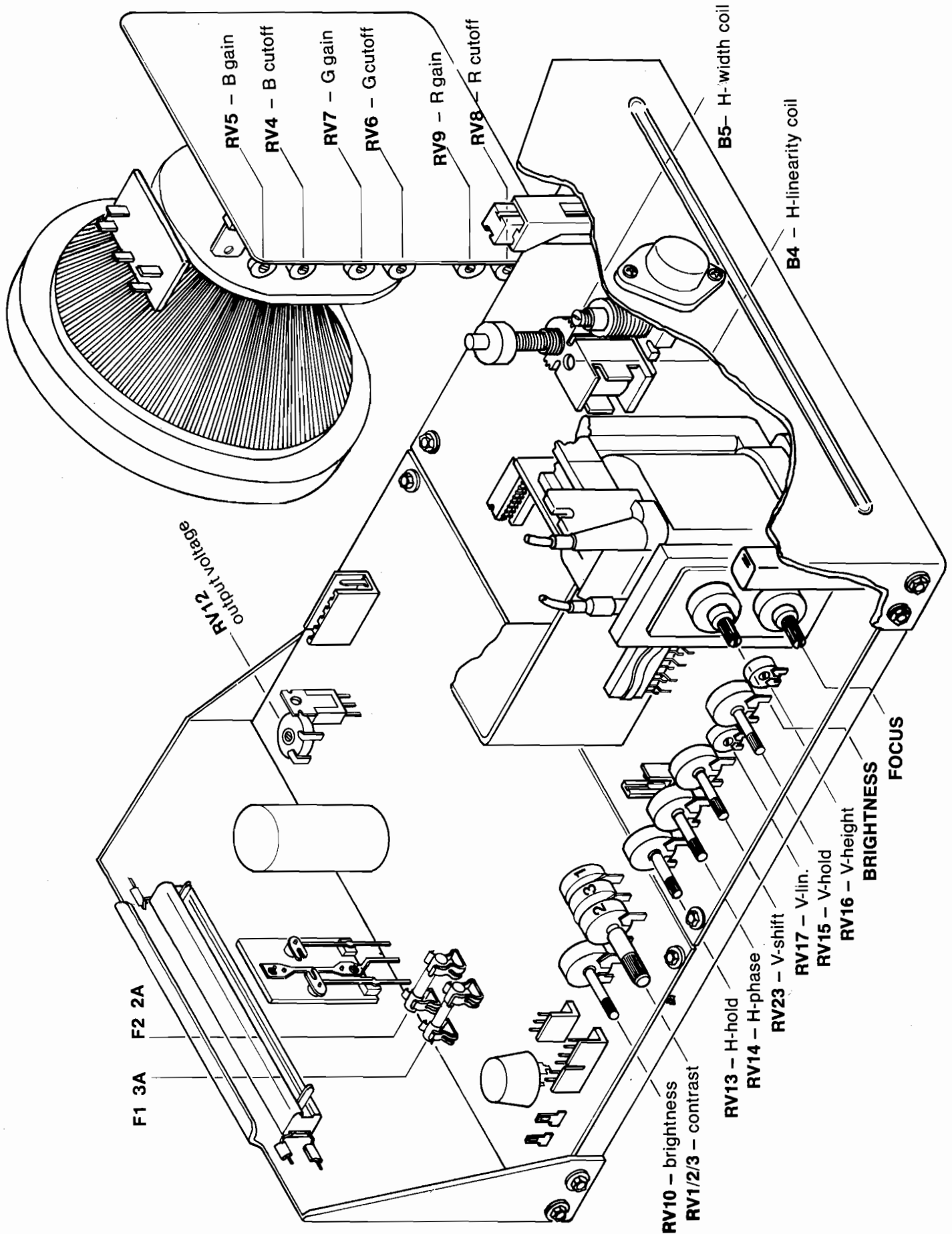
VERTICAL OSCILLATOR (signal: crosshatch)

Adjust RV15 to obtain a slight downward rollover of the image. Then turn back slowly to eliminate rollover.

FOCUS (signal: crosshatch)

Adjust **focus grid** control for clearest picture.

ADJUSTMENT CONTROLS



PERFORMANCE AND OPERATING DATA

	min	max
1) PRIMARY (HV) VOLTAGE SUPPLY		
VOLTAGE	98VAC	130VAC
FREQUENCY	44Hz	65Hz

WARNING: SHOCK HAZARD! Apply supply voltage **ONLY** through an isolation transformer with 1.5A capability.

2) EHV		
for 19" models.	22.5kV	25.5kV

NOTE: conditions for above:

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

3) CONNECTOR CA

PIN	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 SETUP CONTROLS

INTERFACE BOARD

RV 12 supply voltage adjustment—should be set for 115VDC

RV 10 brightness control

RV 1/2/3 contrast

DEFLECTION BOARD

RV 13 horizontal hold

RV 14 horizontal phase

RV 23 vertical shift

RV 17 vertical linearity

RV 15 vertical hold

RV 16 vertical height

B 4 horizontal linearity coil

B 5 horizontal width coil

FLYBACK TRANSFORMER

— G2—brightness control (preset)

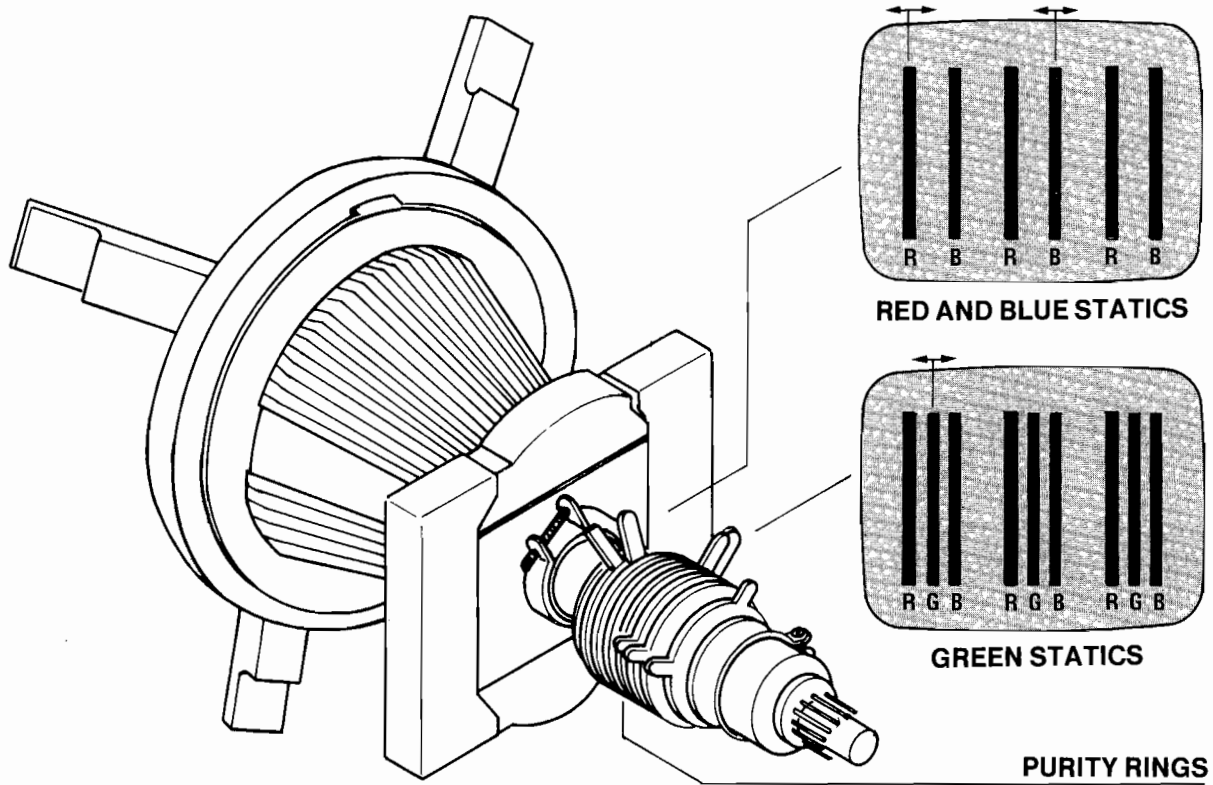
— G3—focus control

NECKBOARD

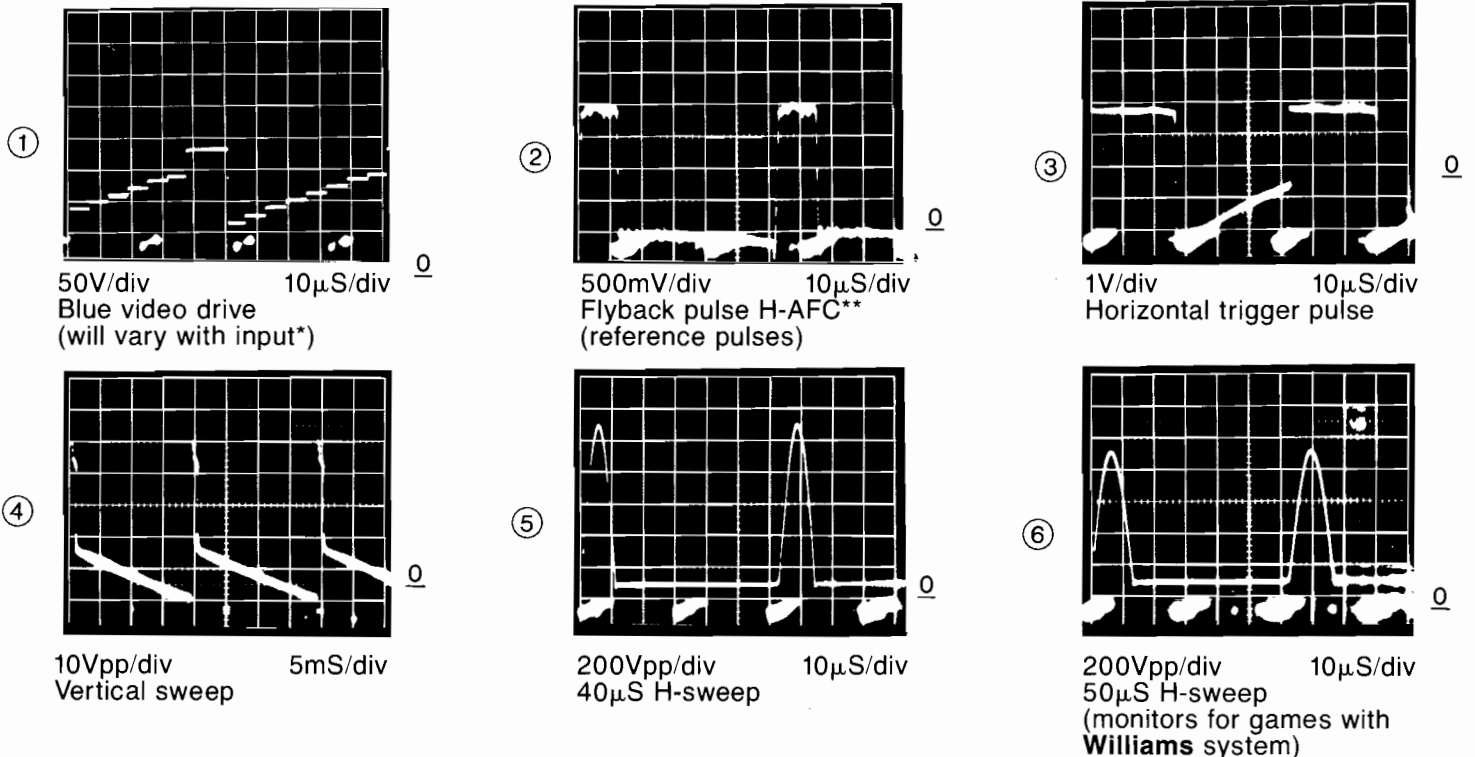
video drive (gain) controls—RV4 (blue), RV6 (green), RV8 (red)

CRT cutoff (black level) controls—RV5 (blue), RV7 (green), RV9 (red)

STATIC CONVERGENCE RINGS

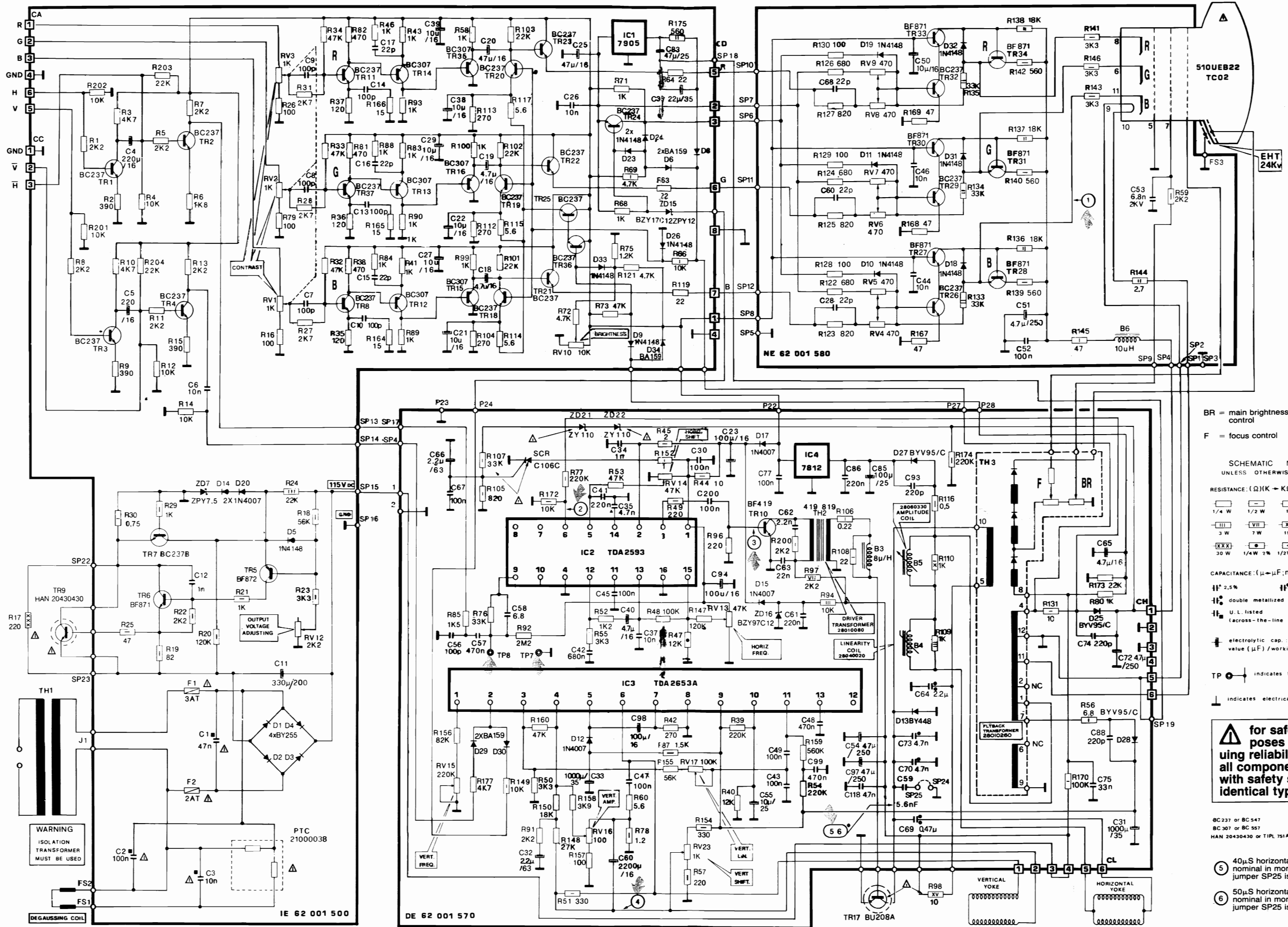


WAVEFORMS



*shown: 7-step gray bars
**H = horizontal
AFC = automatic frequency control

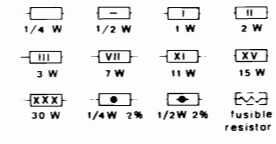
SCHEMATIC DIAGRAM



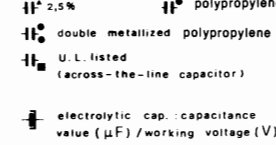
BR = main brightness (screen) control
 F = focus control

SCHEMATIC NOTES UNLESS OTHERWISE SPECIFIED

RESISTANCE: (Ω) (K → 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.

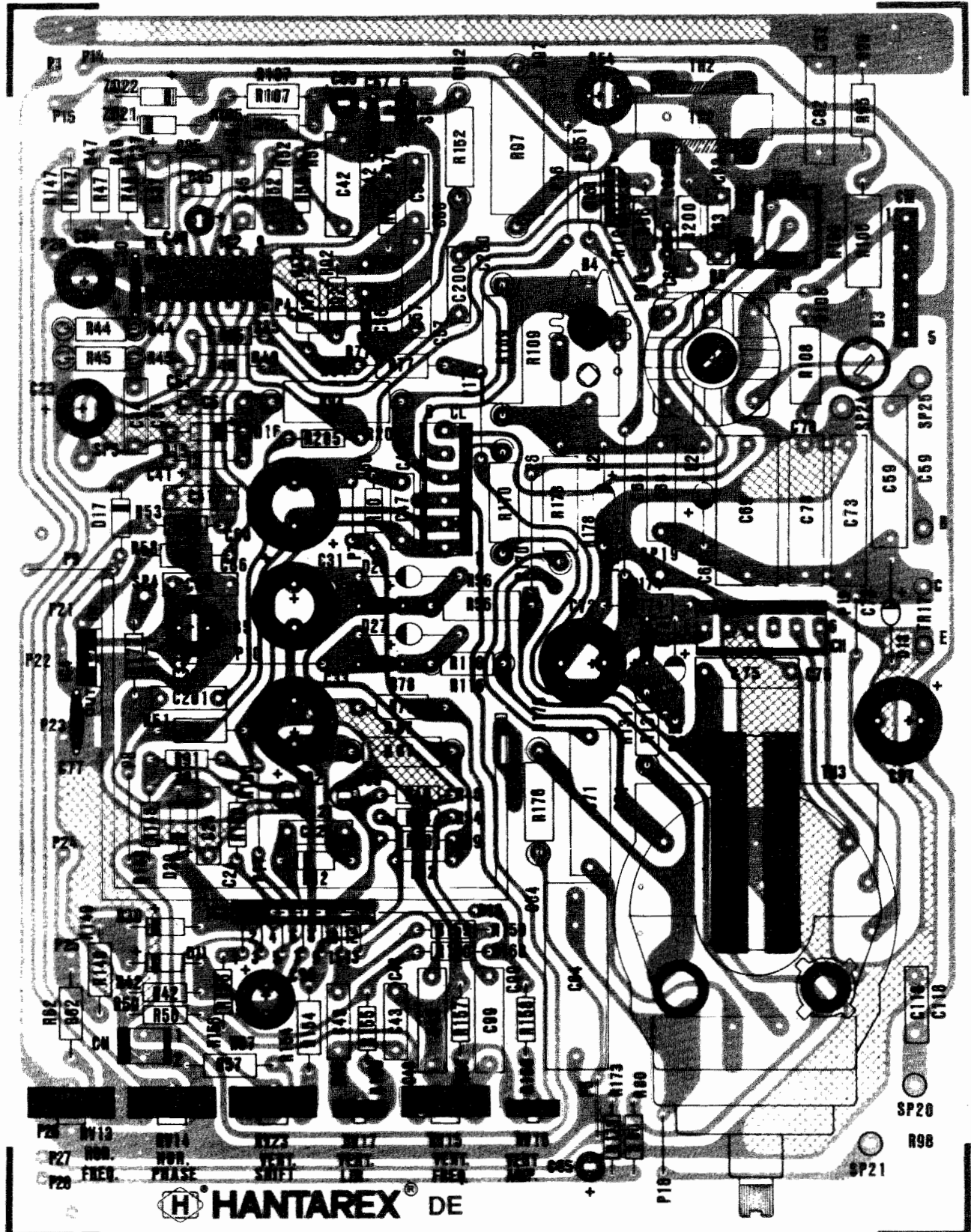
BC237 or BC547
 BC307 or BC557
 HAN 20430430 or TPL 751A

⑤ 40μS horizontal sweep is nominal in monitors where jumper SP25 is disconnected.

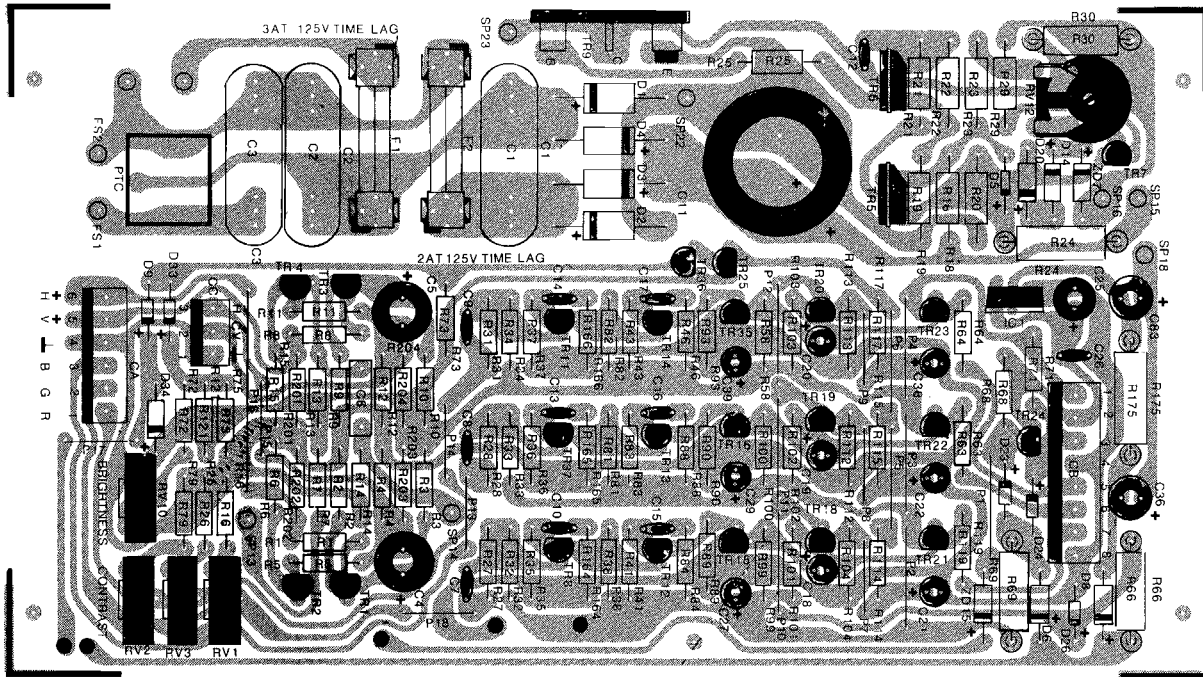
⑥ 50μS horizontal sweep is nominal in monitors where jumper SP25 is connected.

PRINTED CIRCUIT BOARDS

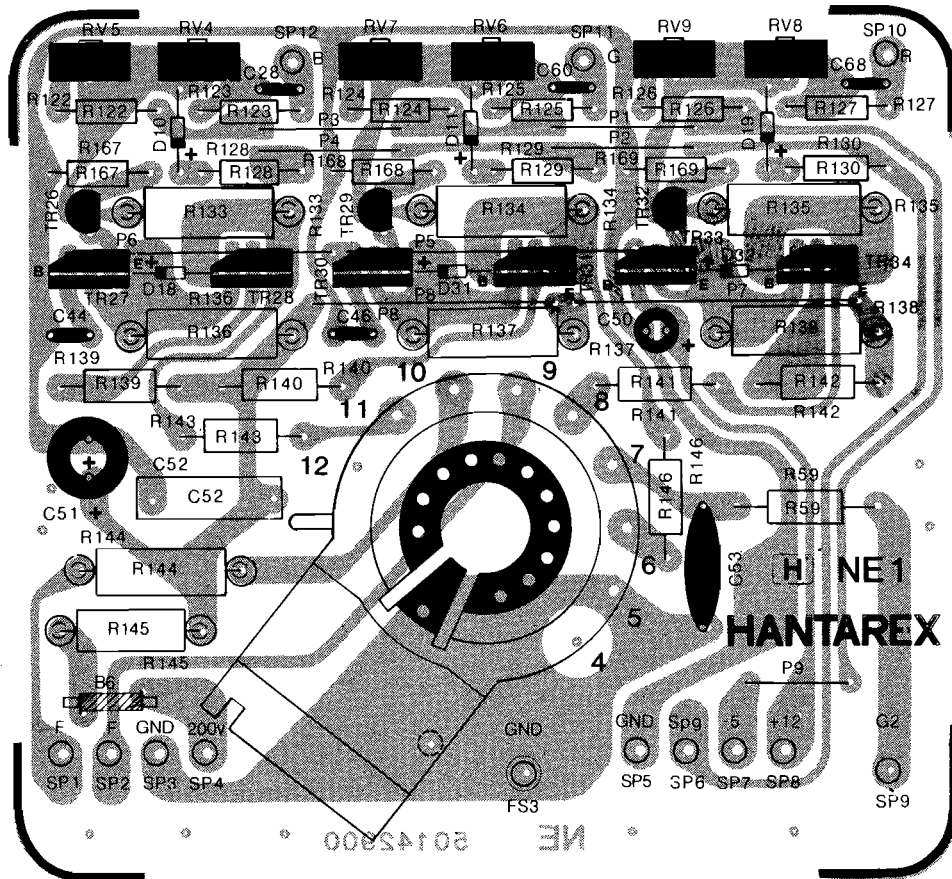
DEFLECTION BOARD DE



INTERFACE BOARD IE

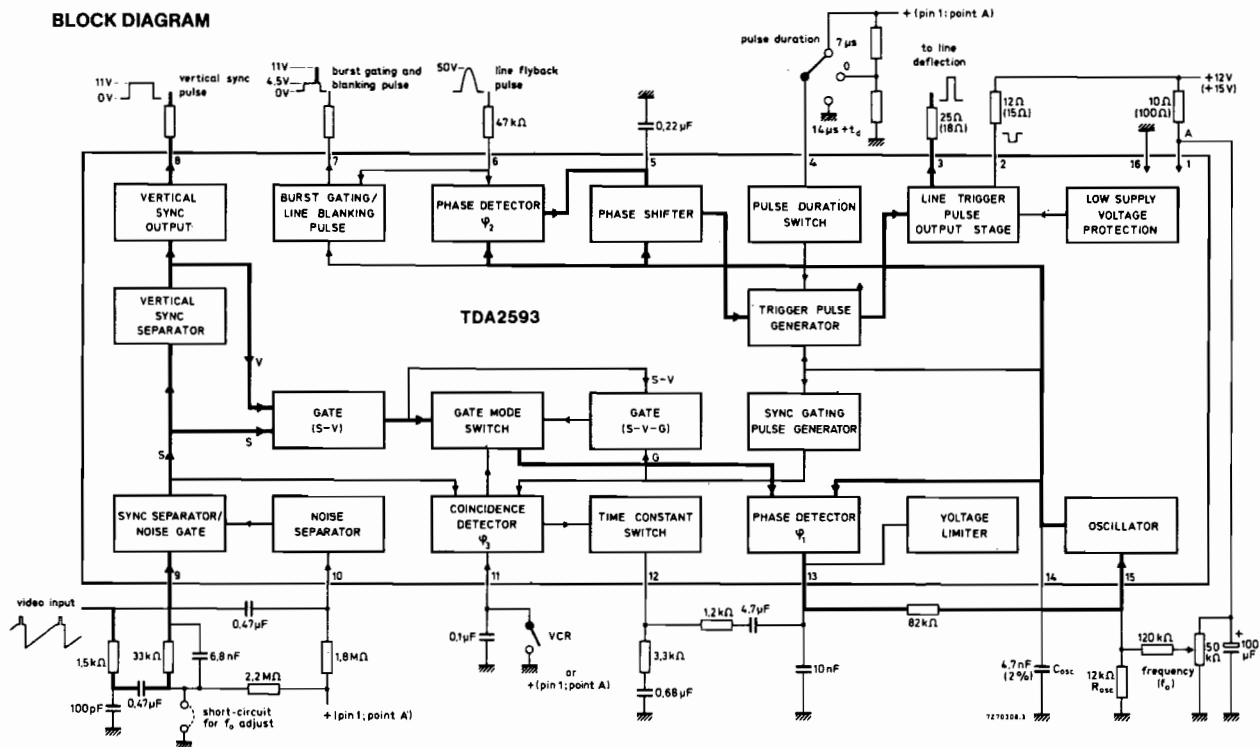


NECK BOARD NE



HORIZONTAL COMBINATION I.C. PHILIPS TDA 2593

BLOCK DIAGRAM



RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Supply voltage

at pin 1 (voltage source)	V ₁₋₁₆	max.	13.2 V
at pin 2	V ₂₋₁₆	max.	18 V

Voltages

Pin 4	V ₄₋₁₆	max.	13.2 V
Pin 9	$\pm V_{9-16}$	max.	6 V
Pin 10	$\pm V_{10-16}$	max.	6 V
Pin 11	V ₁₁₋₁₆	max.	13.2 V

Currents

Pins 2 and 3 (peak value)	I _{2M-13M}	max.	400 mA
Pin 4	I ₄	max.	1 mA
Pin 6	$\pm I_6$	max.	10 mA
Pin 7	-I ₇	max.	10 mA
Pin 11	I ₁₁	max.	2 mA
Total power dissipation	P _{tot}	max.	800 mW
Storage temperature	T _{stg}		-25 to +125 °C
Operating ambient temperature	T _{amb}		-20 to +70 °C

CHARACTERISTICS at V₁₋₁₆ = 12V; T_{amb} = 25 °C

Sync separator

Input switching voltage	V ₉₋₁₆	typ.	0.8 V
Input keying current	I _g		5 to 100 μ A
Input leakage current at V ₉₋₁₆ = 5V/I _g		<	1 μ A
Input switching current	I _g	\leq	5 μ A
Switchoff current	I _g	<	100 μ A
		typ.	150 μ A
Input signal (peak-to-peak value)	V ₉₋₁₆ (p-p)		1 to 7 V

PARTS LIST

MISCELLANEOUS PARTS

29300010	ferric beads 8 mm.		10
34020004	fast-on terminal	FS 1-FS 2	2
34023358	AMP connector 8 D 2806 1/2 1	CB	1
34025103	MOLEX connector 3190-03	CC	1
34025106	MOLEX connector 3190-06	CA	1
50142910	printed circuit interface	IE	1

NE C.R.T. BASE code 62001580

CODE	DESCRIPTION	REF. NO.	QTY.
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SEMICONDUCTORS

20100000	diode 1N4148	D 10-D 11-D 18-D 19-D 31-	
		D 32	6
20400422	transistor 8C 547 B	TR 26-TR 29-TR 32	3
20420500	transistor BF 871	TR27-TR 28-TR 30-TR 31-TR 33-TR 34	6

RESISTORS

21231000	res. 1/4 W 5% 100 Ω	R 128-R 129-R 130	3
21236800	res. 1/4 W 5% 680 Ω	R 122-R 124-R 126	3
21238200	res. 1/4 W 5% 820 Ω	R 123-R 125-R 127	3
21324700	res. 1/4 W 5% 47 Ω	R 167-R 168-R 169	3
21335600	res. 1/2 W 5% 560 Ω	R 139-R 140-R 142	3
21342200	res. 1/2 W 5% 2.2 K	R 59	1
21343300	res. 1/2 W 5% 3.3 K	R 141-R 143-R 146	3
21424700	res. 1 W 5% 47 Ω	R 145	1
21512700	res. 2 W 5% 2.7 Ω Resista W/K 5	R 144	1
21551800	res. 2 W 5% 18 K	R 136-R 137-R 138	3
21552200	metal oxide res. 2 W 5% 33 K	R 133-R 134-R 135	3
23034703	vertical trimmer PT 10 H 470 μ	R 4-RV 5-RV 6-RV 7-RV 8-RV 9	6

CAPACITORS

24321000	electrolytic capacitor EN 12.35 10 μF 16 V	C 50	1
24914700	electrolytic capacitor EN 12.35 4.7 μF 250 V	C 51	1
25461000	polyester capacitor 100 nF 10% 250 V 1.60	C 52	1
26222100	ceramic capacitor 22 pF 5% 50 V NPO	C 28-C 60-C 68	3
26468720	ceramic capacitor 6800 pF 20% 2000 V 507.6	C 53	1
26510601	ceramic capacitor 10 nF -20 + 80 50 V	C 44-C 46	2

MISCELLANEOUS PARTS

28020130	choke 10 mH with ferrite core	B 6	1
29300010	Ferric beads 8 mm		16
34020004	terminal AMP Fast-on M. 735084/2	FS3	1
50142940	socket printed circuit	NE	1

VERTICAL ALUMINUM HEAT SINK ASSEMBLY code 62001390

CODE	DESCRIPTION	REF. NO.	QTY.
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20620080	integrated circuit MA 7812	IC 4	1
20620270	integrated circuit TDA 2653 A	IC 3	1
40029065	self-tapping screw 2.9x6.5 TCC		1
50111530	aluminum heat sink		1

POWER UNIT HEAT SINK ASSEMBLY code 62001510

CODE	DESCRIPTION	REF. NO.	QTY.
------	-------------	----------	------

20430430	transistor HAN 20430430	TR 9	1
34020210	socket for transistor TO3		1
40029010	self-tapping screw 2.1x10 TCC		1
40029014	self-tapping screw	2.9x14 TCC	2
50110540	wirewound resistor 30 W 10% 220 Ω	R 17	1
50111040	heat sink 205 MO 32		1
50420120	mica insulator for TO3/500 V		1

ALUMINUM HEAT SINK ASSEMBLY code 62000613

CODE	DESCRIPTION	REF. NO.	QTY.
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20430200	transistor BU 208 A	TR 17	1
22621000	wirewound resistor 15 W 10% 10 Ω	R 98	1
34020211	socket for transistor TO3	-	1
40029010	self-tapping screw 2.9x10 TCC	-	1
40029014	self-tapping screw 2.9x14 TCC	-	2
42000070	washer 3.2x6	-	2
50110550	heat sink	-	1
50420180	mica insulator for TO3/2000 V	-	1

