

Änderungsmitteilung

HM 203-4 Modification

HM 203-4

Jan. 1984

Netzspannungsumschaltung

(Vergl. Seite M2 und S1)

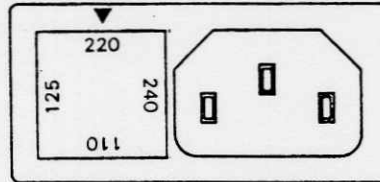
Die eingestellte Netzspannung ist jetzt **unter** dem Dreieck abzulesen. Dieses befindet sich nun an der oberen Kante des Sicherungshalters (sh. Skizze).

Jan. 1984

Mains/Line Voltage change

(refer to page M2, M3 and S1)

The set value is now readable **below** the triangle, which has been relocated on the upper edge of the fuse holder (see figure).

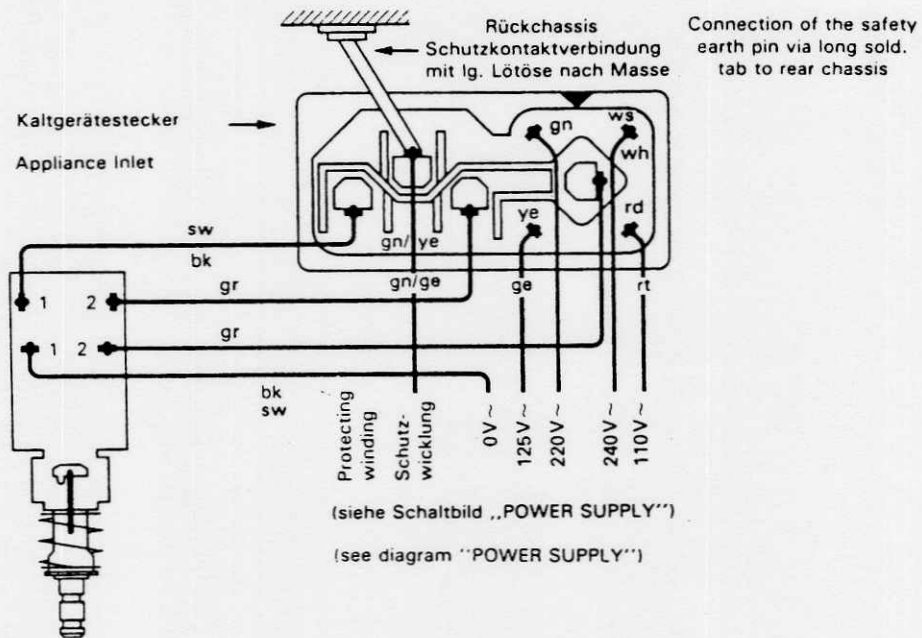


Seite S3, S4

Die Anschlußbelegung des Kaltgerätesteckers wurde geändert. Die neue Anschlußfolge ist aus untenstehender Skizze ersichtlich. Dies ist besonders wichtig bei einem evtl. **Austausch des Netztrafos**.

Page S3, S4

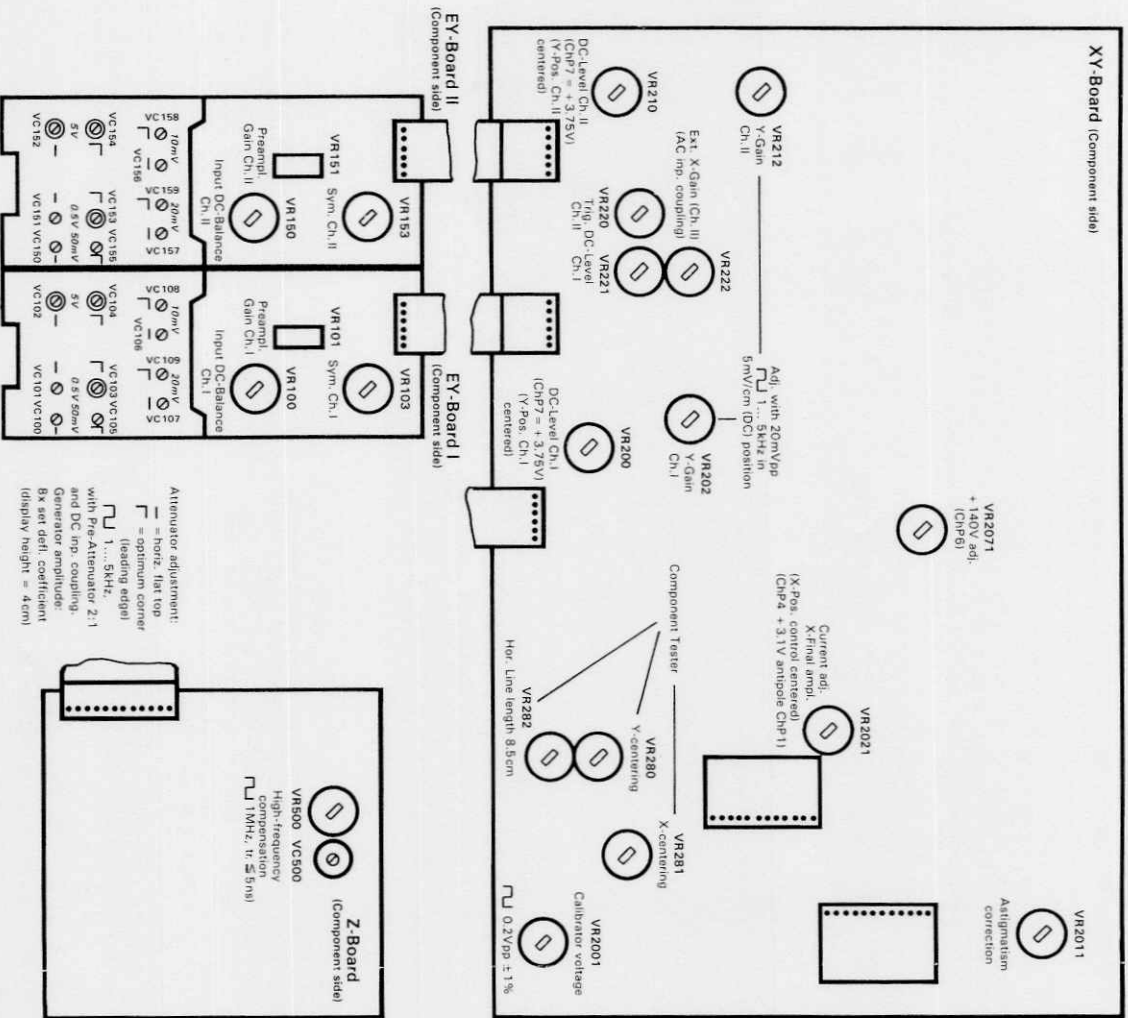
As a result of modifying the appliance inlet there is now a new terminal sequence, which can be referred to in the figure below. This is very important when **replacing the mains/line transformer**.



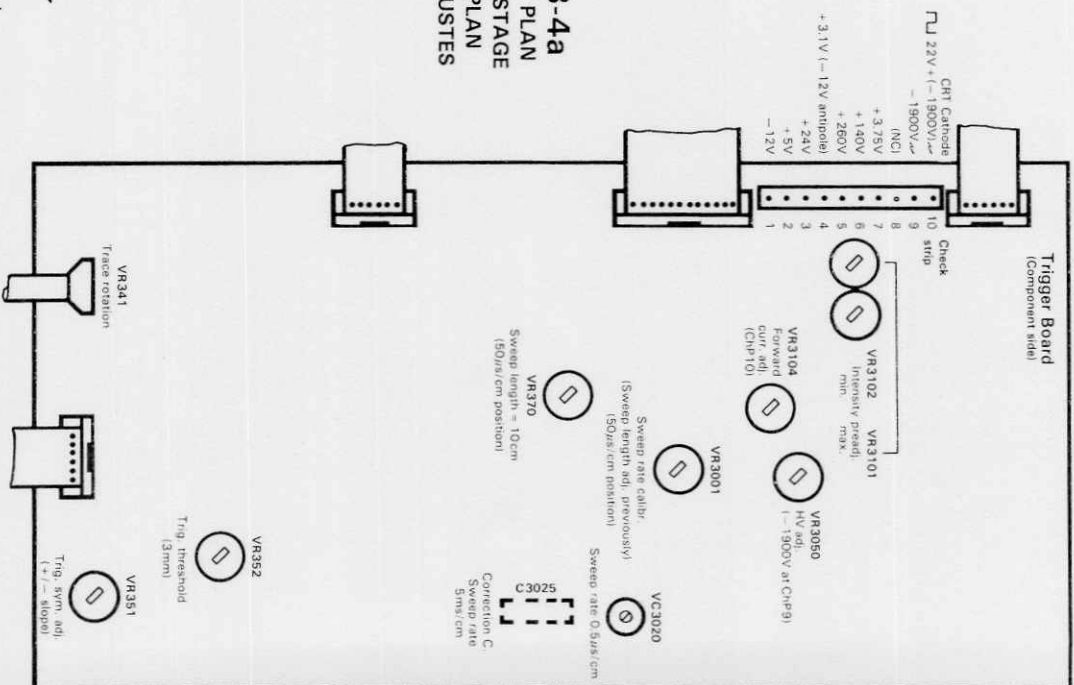
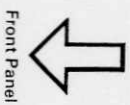
Rückansicht Netzschalter und Kaltgerätestecker mit Sicherung-Spannungswähler

Rear View of Power Switch and Appliance Inlet with Voltage Selector and Fuse

XY-Board (Component side)

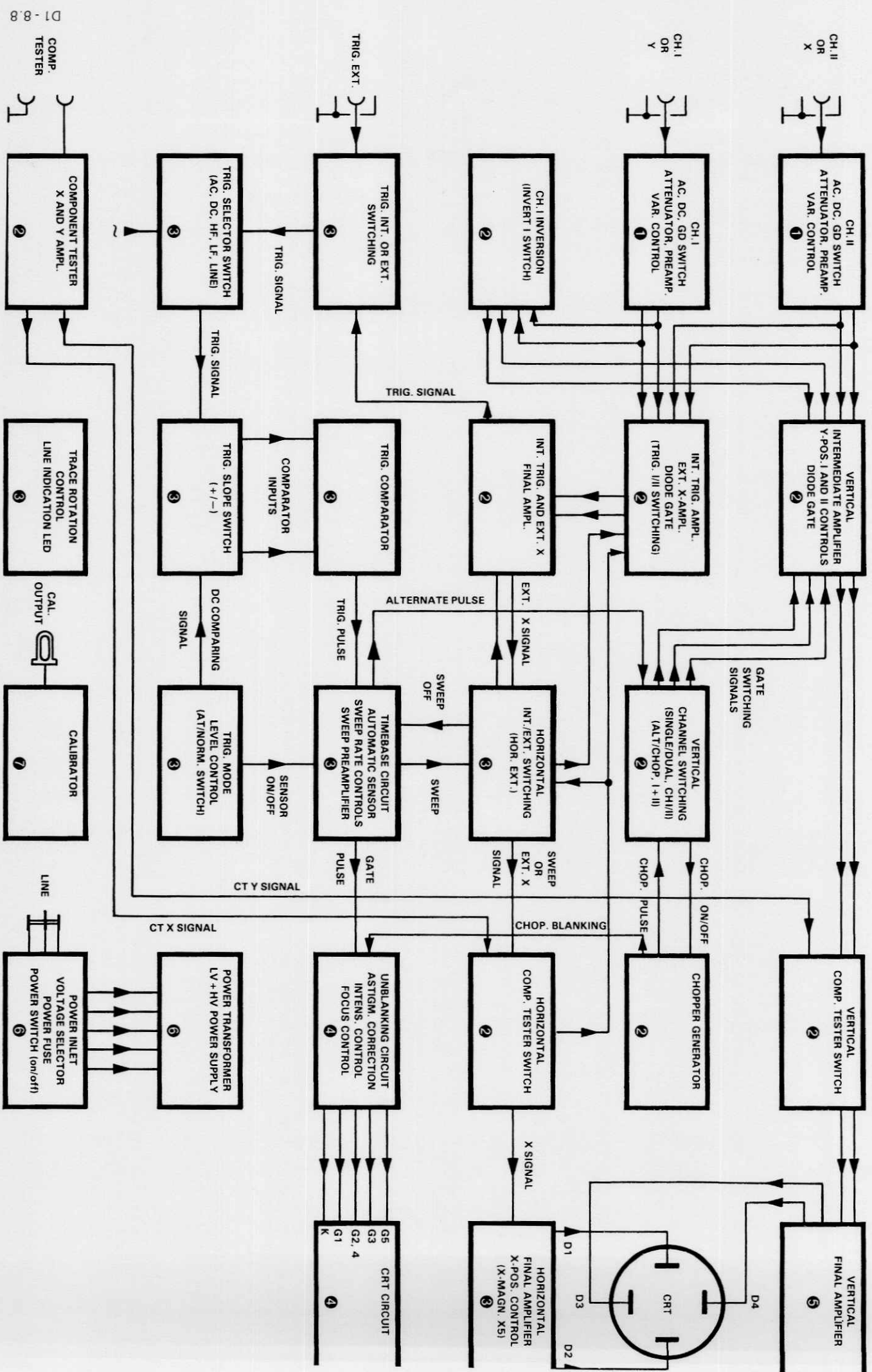


**HM 203-4a ADJUSTING PLAN
 PLAN D'AJUSTAGE
 ABGLEICHPLAN
 PLAN DE AJUSTES**



BASIC BLOCK DIAGRAM OF THE HM 203-4a

The number in the block indicates the relevant circuit diagram.



IDENTIFICATION OF ELECTRICAL COMPONENTS HM 203-4a

Electrical components on certain parts of the HM 203-4 are marked such that the first numeral is on:

- | | | |
|---|-----|--|
| Chassis
Y-Input, Trig. ext. input, Component tester connector, Eyelet (Calibrator), Trace rotation coil, LED, Applance Inlet, Power switch, Power transformer | 0.. | Abbreviations
Al... Appliance inlet
BR... Bridge rectifier (Silicium)
C... Capacitor (fixed)
ChP... Check point
CN... Connector
CRT... Cathode-ray tube
D... Diode (Silicium)
E... Eyelet (Calibrator)
F... Fuse
IC... Integrated Circuit
L... Inductor, Coil
LED... Light emitting diode
P... Plug
R... Resistor (fixed)
S... Switch
T... Transistor (Silicium)
TR... Transformer
VC... Variable capacitor
VR... Variable resistor
W... Wire
Z... Z-Diode |
| EY-Board I + II
Attenuator and preamplifier Ch.1 + II | 1.. | |
| XY-Board
Y-Intermediate amplifier Ch.1 + II, Channel selection flip-flop, Y-Gate driver stages, Chopper generator, Trig. and ext. X-Signal amplifier, Trig. gate driver stages, Component tester, X-Final amplifier, LV-Power, Calibrator | 2.. | |
| Trigger Board (T-Board)
Trigger circuit, Timebase circuit, Trigger signal final amplifier, Unblanking circuit, HV-Power, LV-Power 12VT, Check point strip | 3.. | |
| Z-Board
Y-Final amplifier | 5.. | |
| CRT-Board
CRT | 6.. | |
| TS-Board
Trigger selector | 7.. | |

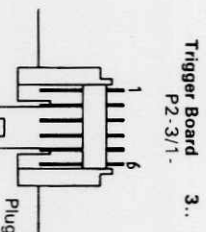
Resistor Identification

- Resistor 0.25W 2% (carbon film)
- Resistor 0.25W 1% tc = 50 · 10⁻⁶/K (metal film)
- Resistor 0.25W 0.5% tc = 50 · 10⁻⁶/K (metal film)
- Resistor 0.5W 2% (or for HV) (carbon film)
- Resistor 4W 2% tc = 400 · 10⁻⁶/K (metal oxide film)

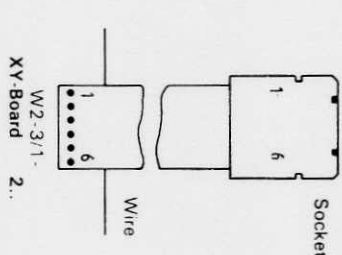
Check strip on Trigger Board

- | | | |
|----|---|-----------------------|
| 10 | • | CRT Cathode |
| 9 | • | 22V □ □ + (-1900V) ~ |
| 8 | • | -1.9kV ~ |
| 7 | • | (NC) |
| 6 | • | +3.75V |
| 5 | • | +140V |
| 4 | • | +260V |
| 3 | • | +3.1V (-12V antipole) |
| 2 | • | +24V |
| 1 | • | +5V |
| | • | -12V |
- Front

Meaning of Connection Abbreviations



Example: P2-3/1-5 or W2-3/1-5 respectively.
 P = Flat cable plug (soldered on board).
 W = Flat cable wiring (directly soldered on board) with socket (movable).
 2-3 = Connection between Board 2 (XY-Board) and Board 3 (Trigger-Board)
 1 = First flat cable connection between Board 2 and 3.
 5 = Serial number of the wire (in the flat cable).
 5 = Serial number of the wire (in the diagram).

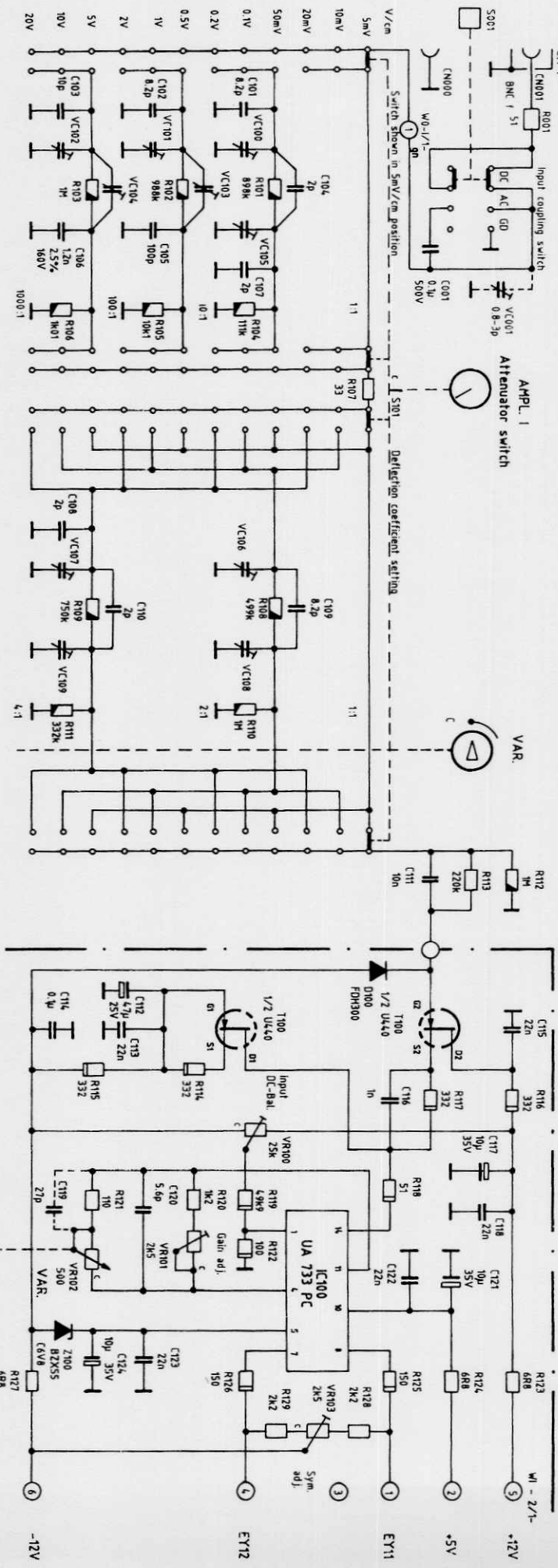
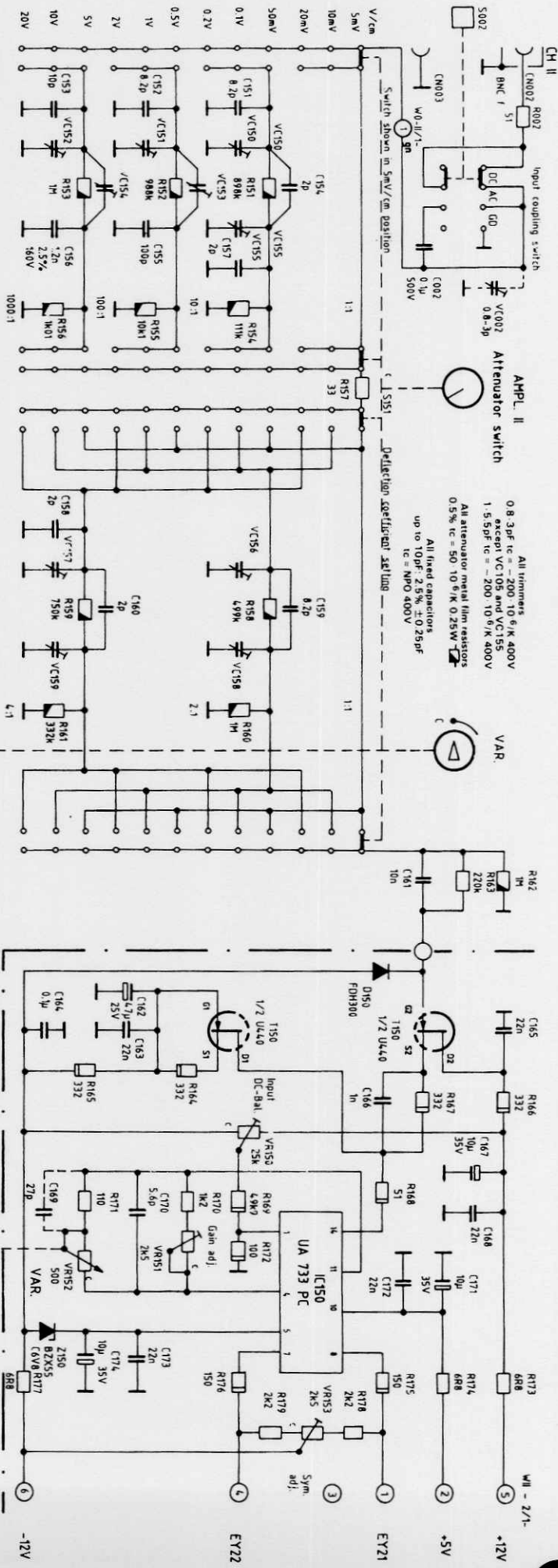


Color-Abbreviations for insulated wire

bk = black	ye = yellow	gr = grey
bn = brown	gn = green	wh = white
rd = red	bl = blue	trp = transparent
or = orange	vl = violet	gn/ye = green/yellow stripe

Types and Terminals of Transistors and some ICs	Bottom View	Top View
BC237B BC550C BC557B BF297		
BF199 BF440		
BF422 BF423		
BF458 BF459 BUX86/87 BD232		
BSX 19		
U440		
78XXCU <small>The -12V Regulator requires an insulation for package and screw to the chassis.</small>		

Y-INPUT AND ATTENUATOR CH. I AND CH. II HM 203-4a

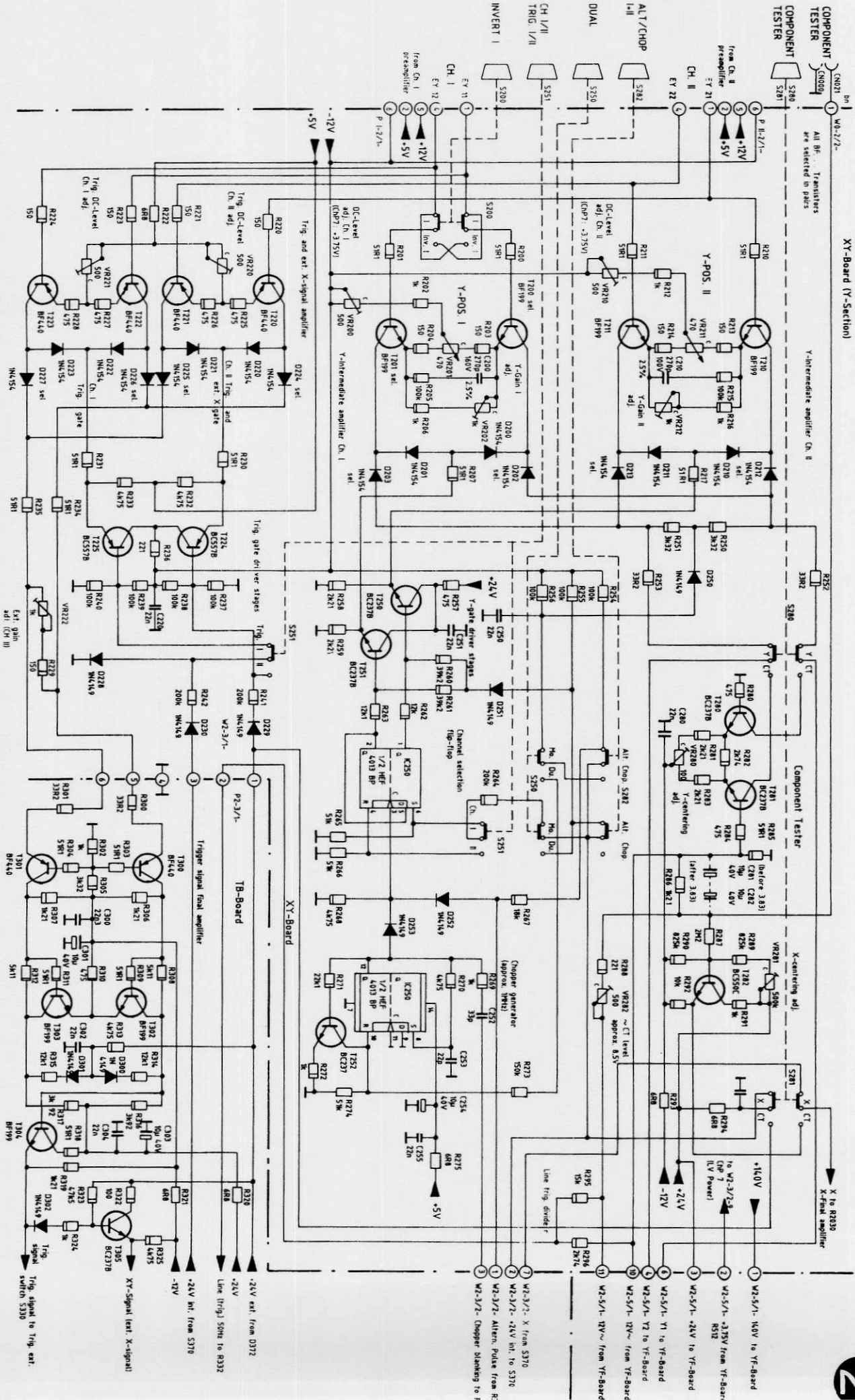


All connections on XY-Board (Y-Section)

All connections on XY-Board (Y-Section)

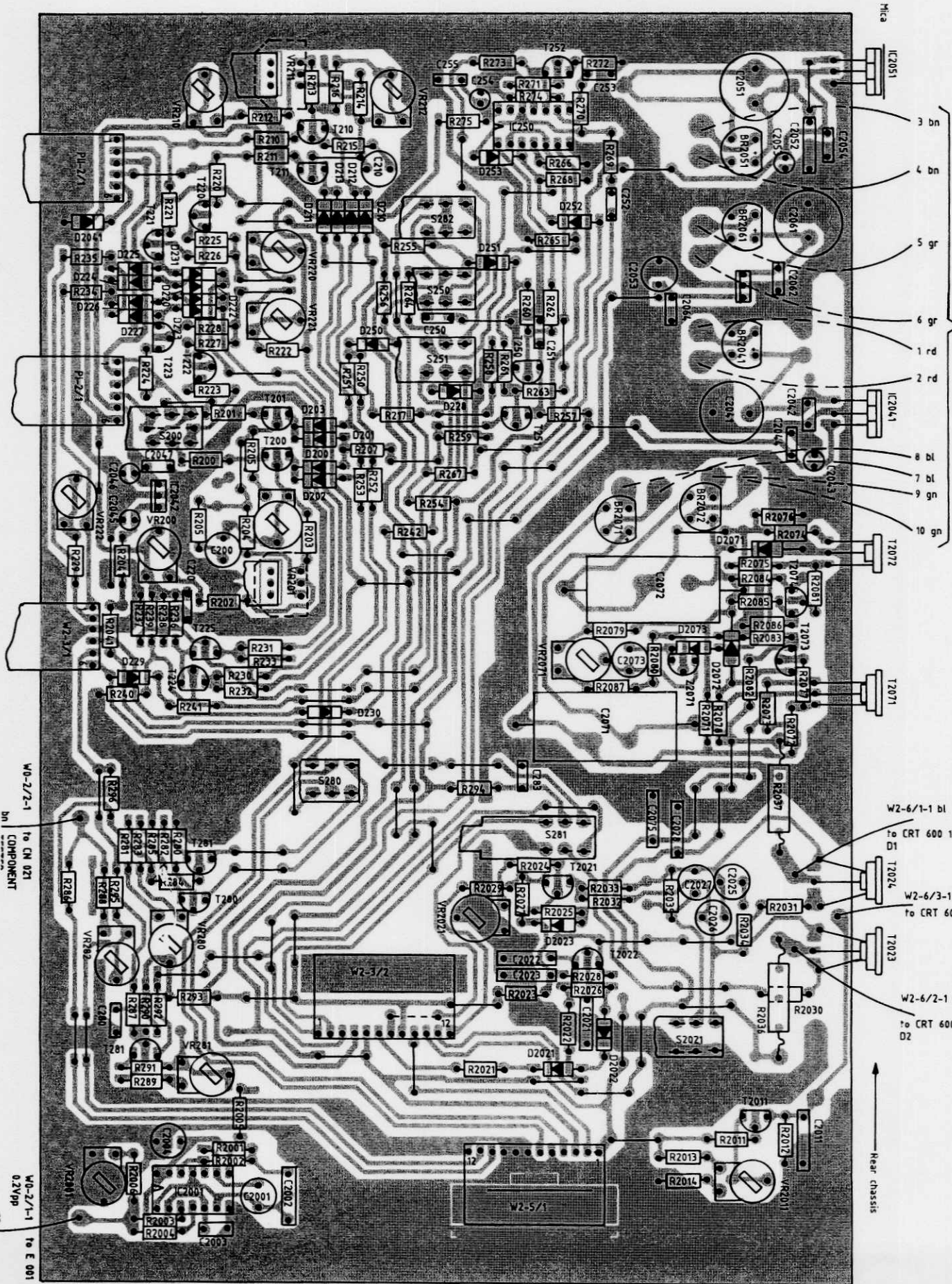
Y-INTERMEDIATE AMPL. CH.I+II, CHANNEL FLIP-FLOP, CHOPPER GENERATOR, GATES, TRIG. AND X-SIGNAL AMPL., TRIG. SIGNAL FINAL AMPL., COMPONENT TESTER

HM 203-4a



COMPONENT LOCATIONS XY-BOARD HM 203-4a

W0-2/3 - from TR001



- 3 bn
- 4 bn
- 5 gr
- 6 gr
- 1 rd
- 2 rd
- 8 bl
- 7 bl
- 9 gn
- 10 gn

- W2-6/1-1 bl
to CRT 600 13
D1
- W2-6/3-1 gn
to CRT 600 12
- W2-6/2-1 bl
to CRT 600 11
D2

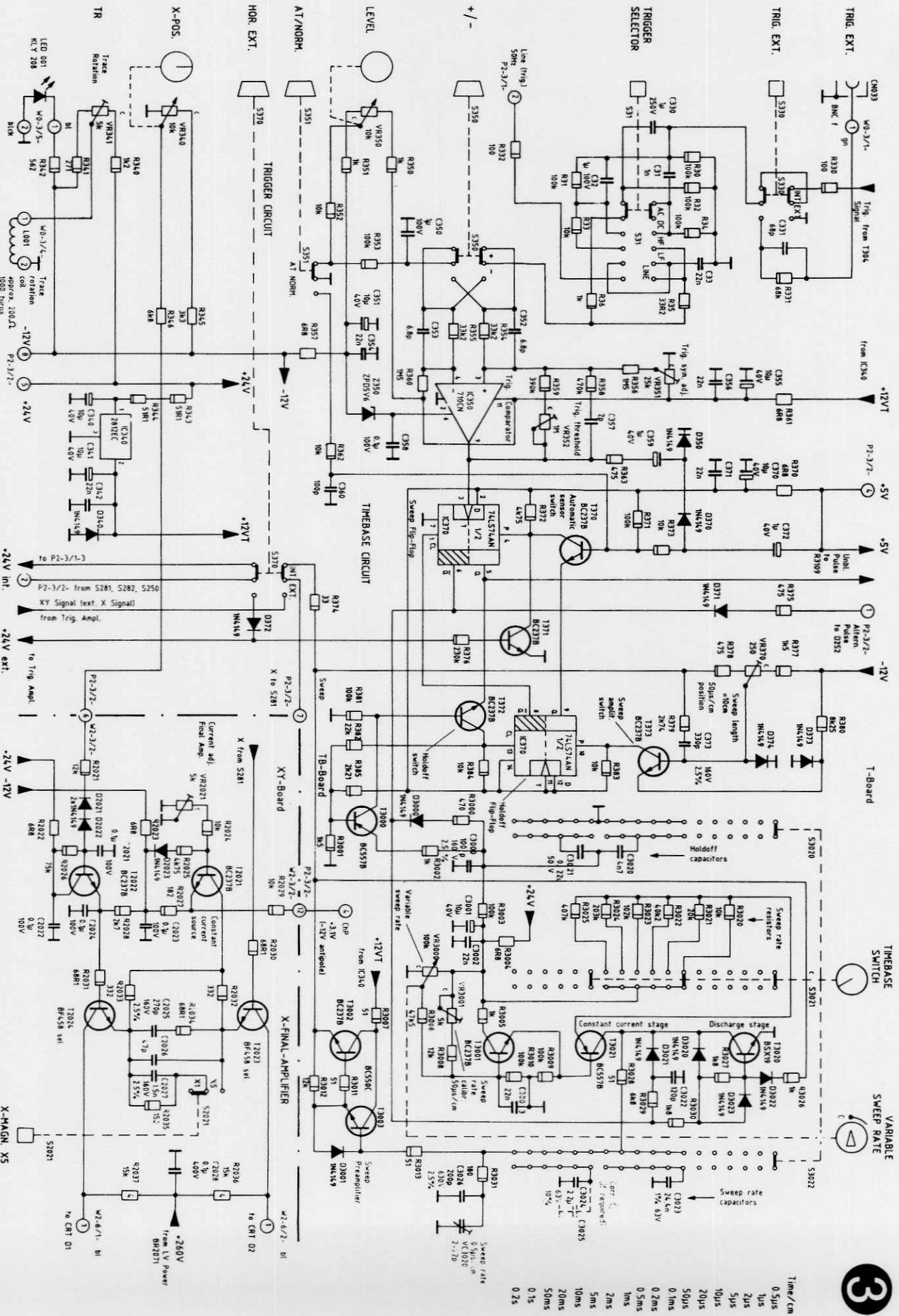
↑ Near chassis

W0-2/2-1
bn
to CN 021
COMPONENT

W0-2/1-1
0.2Vpp
to E 001

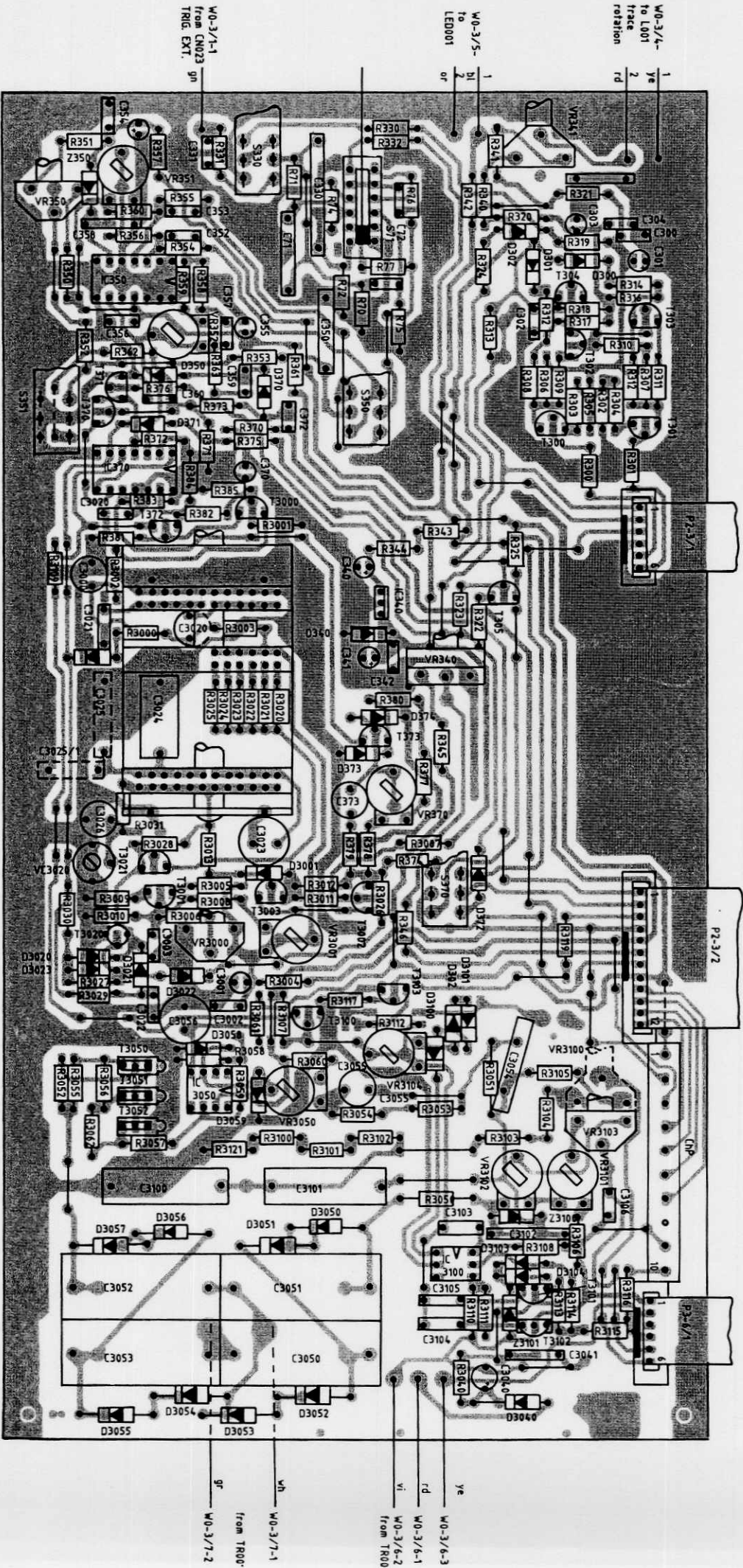
TRIGGER CIRCUIT, TIMEBASE CIRCUIT, X-FINAL AMPLIFIER, LV-POWER 12VT, TRACE ROTATION

HM 203-4a

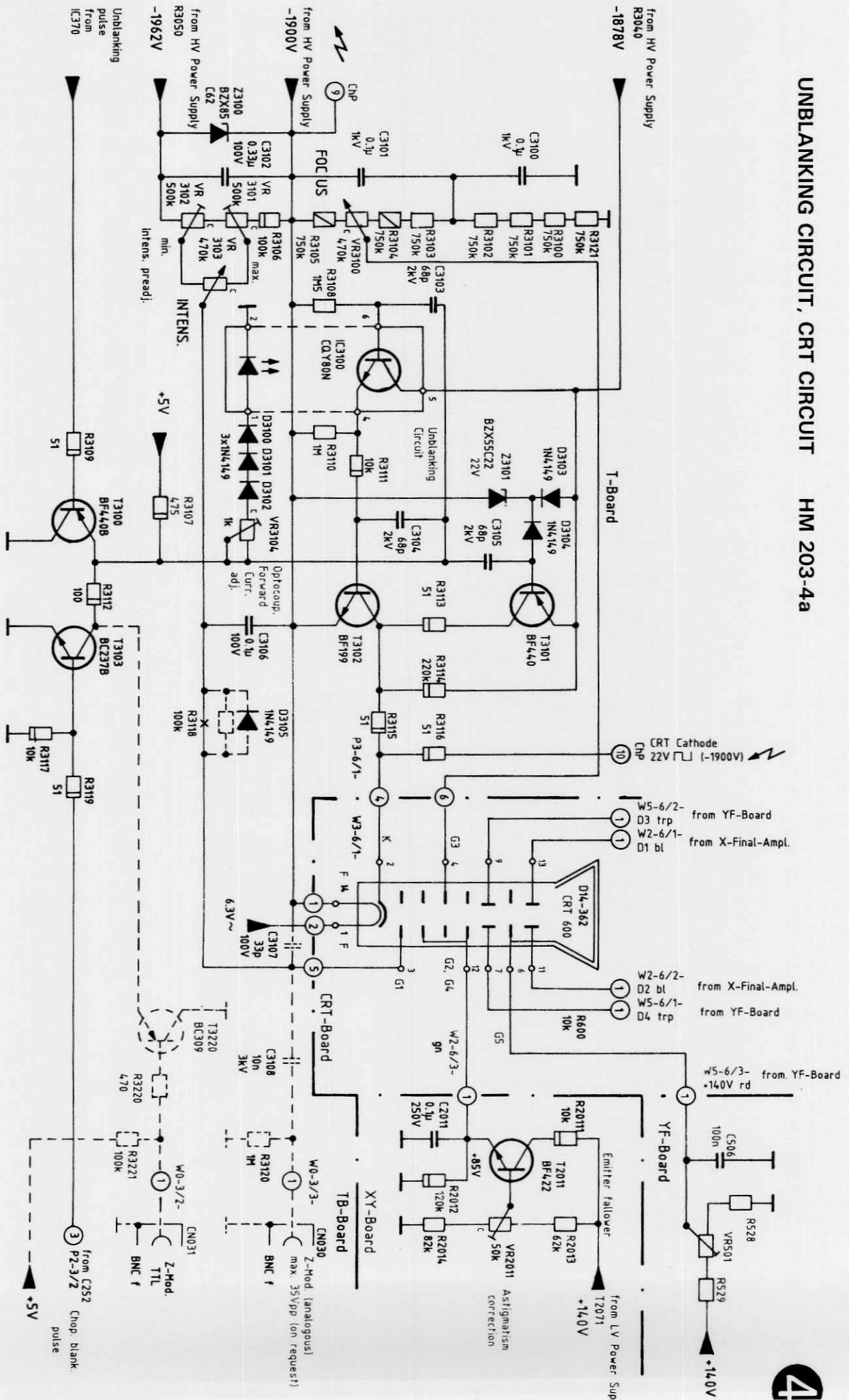


Time/cm	Variable Sweep Rate
0.5us	
1us	
2us	
5us	
10us	
20us	
50us	
0.2ms	
0.5ms	
1ms	
2ms	
5ms	
10ms	
20ms	
50ms	
0.1s	
0.2s	

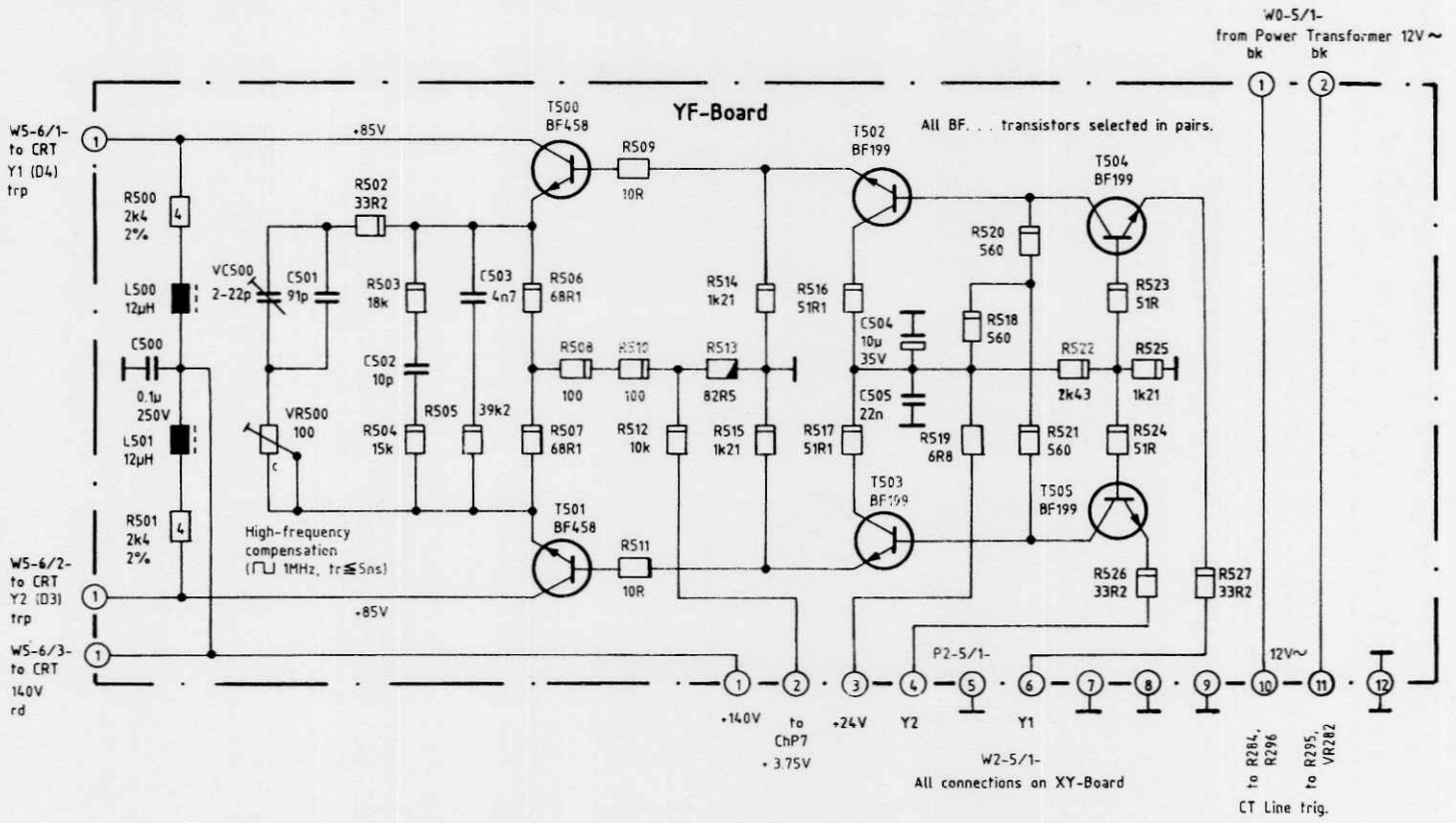
COMPONENT LOCATIONS T-BOARD HM 203-4a



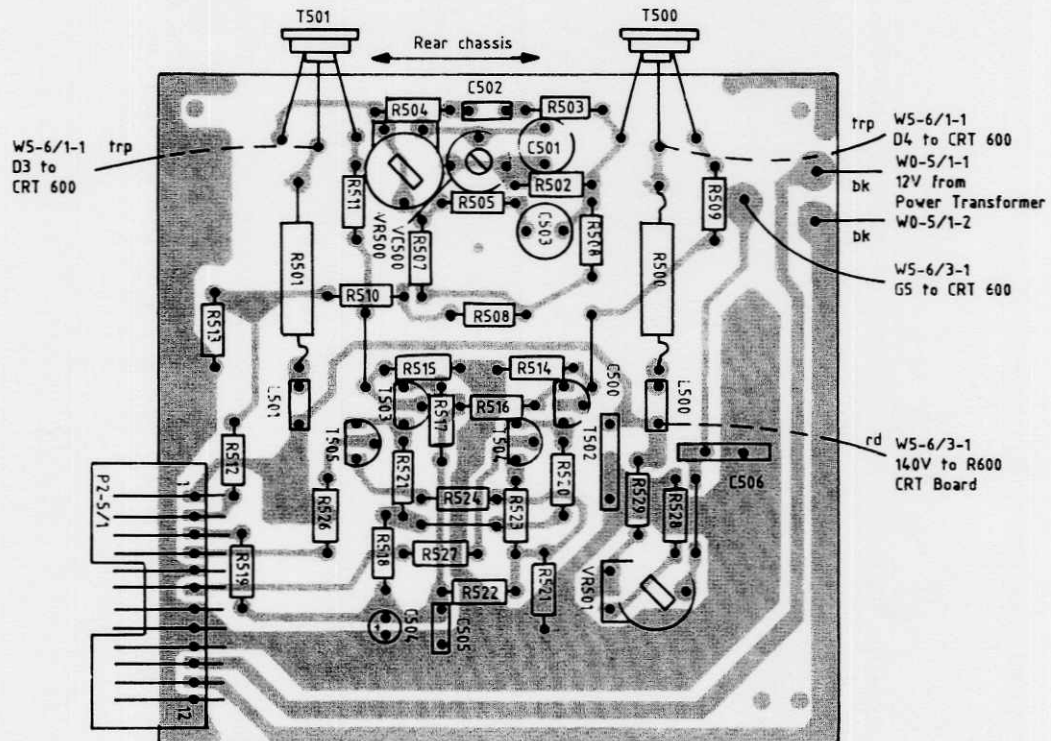
UNBLANKING CIRCUIT, CRT CIRCUIT HM 203-4a



Y-FINAL AMPLIFIER HM 203-4a
Z-Board

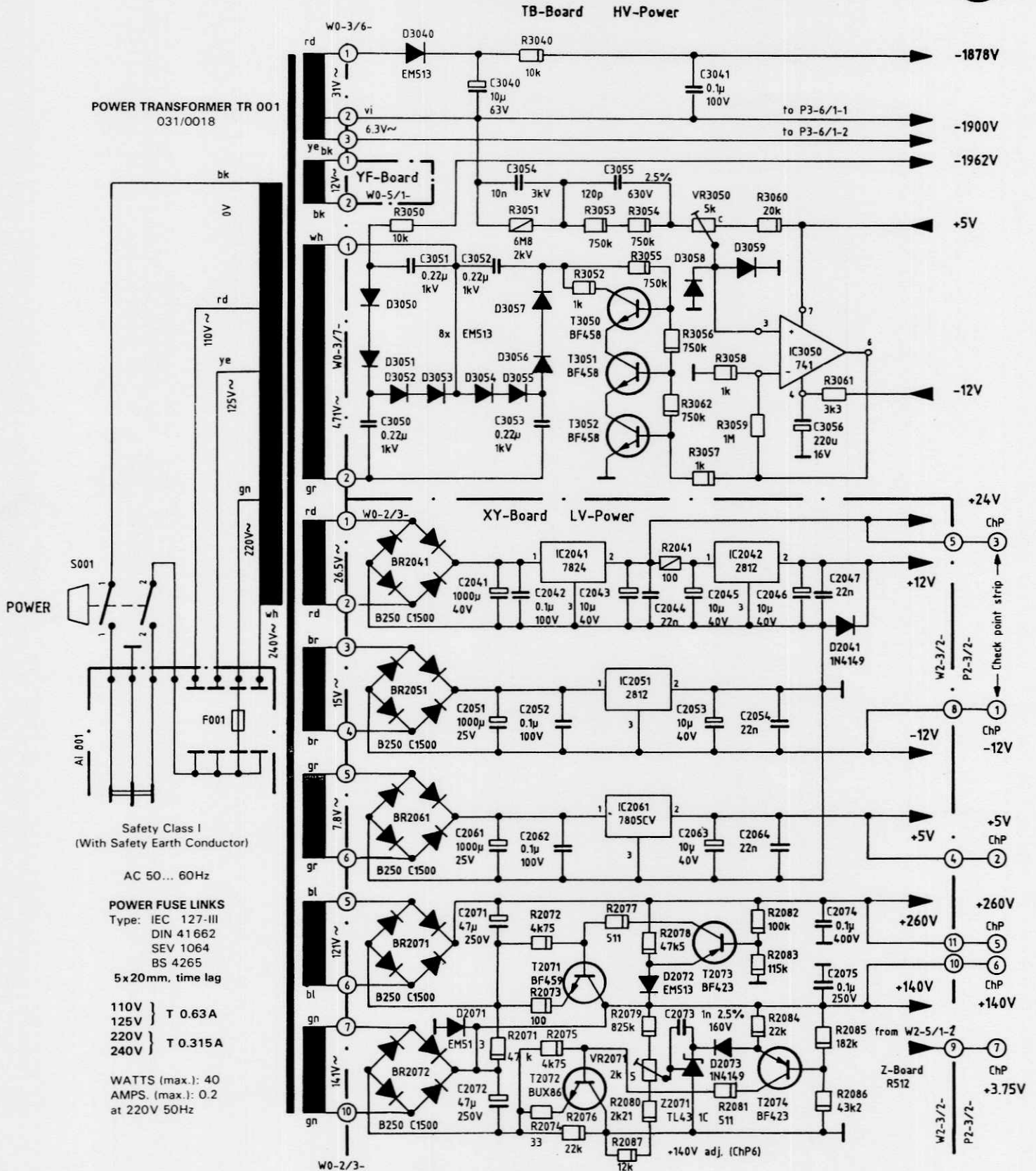


COMPONENT LOCATIONS Z-BOARD

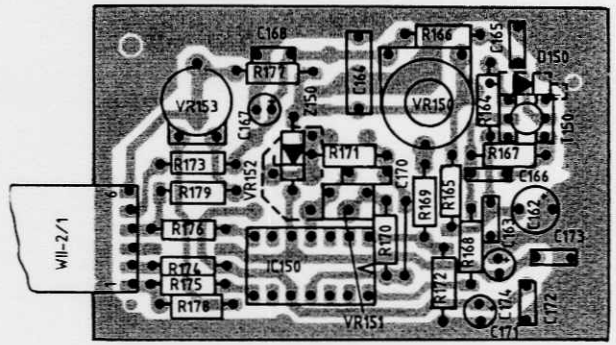
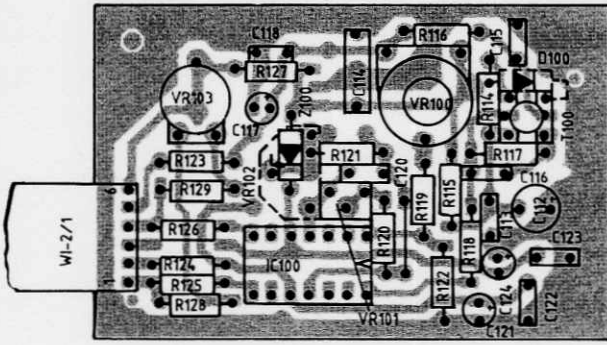


LV + HV POWER SUPPLY HM 203-4a

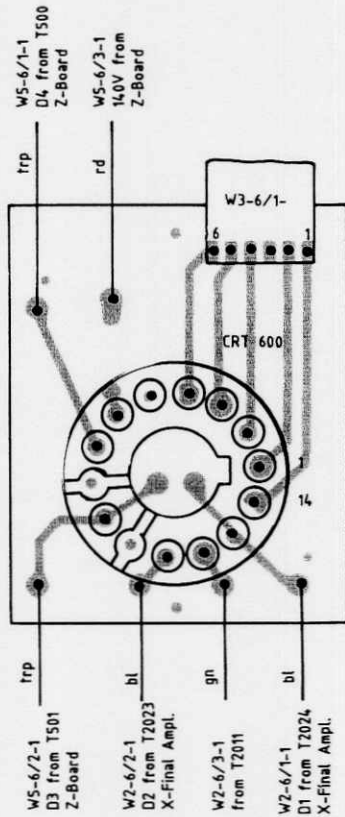
6



Preamplifier CH. I



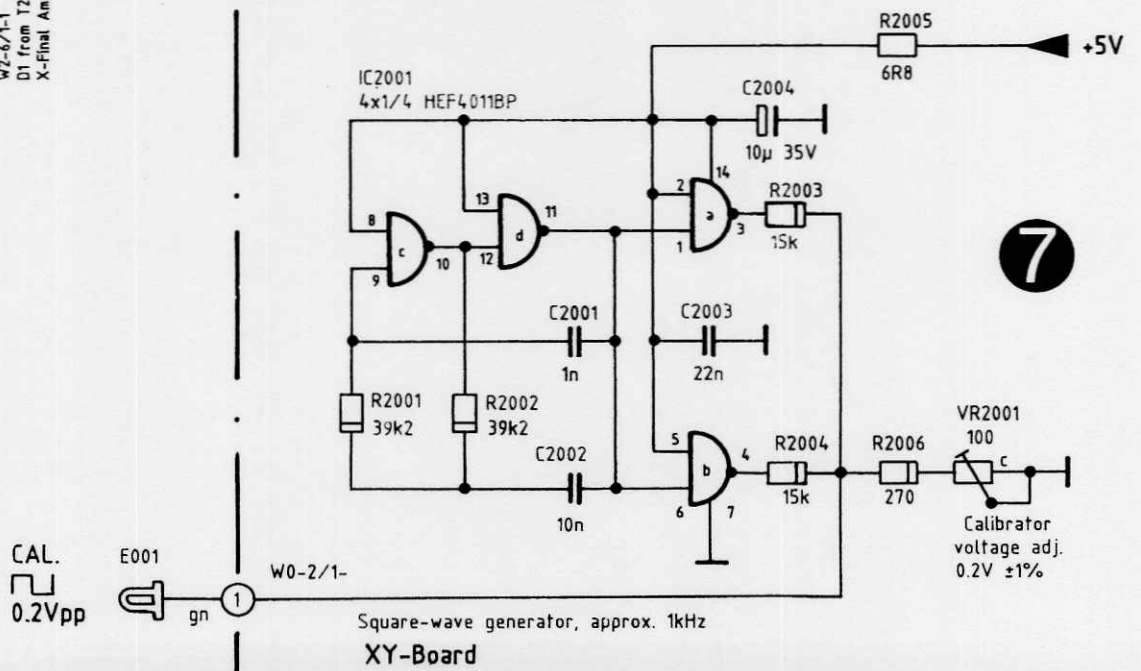
CRT-Board



CRT-Board wiring side



Calibrator



ADJUSTING ADVICES HM 203-4a

(see Adjusting Plan on page A1)

Check of the Unblinking Pulse on ChP 10

Pulse amplitude $22V_{pp} \pm 5\%$ added with $-1900V$ (Caution!).
Check with **test oscilloscope** by means of a **10X probe with 10nF 2kV capacitor between ChP 10 and probe input tip.**

HM203-4 settings: Input coupling to **GD** (no input signal), **50 μ s/cm**, int. **Auto** triggering (free running).

Test scope settings: **1V/cm (DC)**, **0.1ms/cm**, **internal automatic triggering.**

Display on test scope:

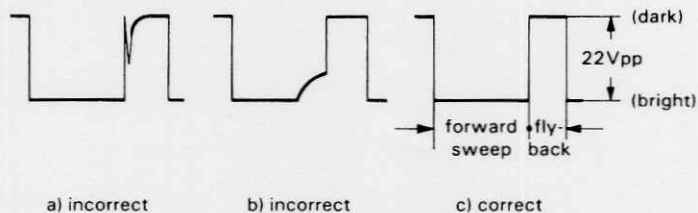
Negative pulse tops exactly horizontal (forward sweep = bright trace on HM203-4).
Positive pulse tops approx. horizontal (fly back = blanked trace).

Readjustment of VR3104

Adjust the forward current of the optocoupler diode in the middle of the following points:

- bright spot on left side of the trace (screen of the HM203-4),
 - shortening on right side of the trace (screen of the HM203-4).
- Between these two points is a wide range (needed for int. temperature variation). With correct adjustment, the edges of the square-wave should not be visible on the test scope. Then change both **TIMEBASE** settings to **0.5 μ s/cm** (HM203-4) and **1 μ s/cm** (test scope). Now steep square-wave edges must be visible on the test scope screen.

Unblinking pulse on ChP10
(triggering: free run),
seen on test oscilloscope.



Baseline on HM203-4 screen:



Sequence for important adjustments

Balance CH. I: Adj. **VR100** (see page M3).
Adj. **VR103** using **INVERT I** button (see page T1).
Balance CH. II: Adj. **VR150** (see page M3).
Adj. **VR153** using **Y-POS. II** control (see page T1).

Gain CH. II: Normally, **VR151** is adj. If not, 20mVpp 1kHz sq.-wv. to **CH. II** input, **DC**, depress **CH. I/II** button. Check preamp. output on EY21 (PII-2/1-1) with test scope via 10X probe. Adj. **VR151** for approx. 360mVpp on EY21. Then adj. **VR212** for a display of 4cm on HM203-4 screen.

X gain (CH. II): Set **AC** input coupling, release all buttons in the Y-section, depress **HOR. EXT.** button with same input signal. Two points are visible in the horizontal axis. Adj. **VR222** for 4cm spacing.

Gain CH. I: If necessary, adj. **VR101** (in same way as CH. II) for approx. 360mVpp on EY11 (PI-2/1-1). Then adj. **VR202** for 4cm display height on HM203-4 screen.

Automatic Triggering: Set **CH. I** attenuator to 10mV/cm, input 30mV 50kHz sine (3cm display height). Set attenuator to 0.1V/cm (3mm display height). Adj. **VR352** (**AT/NORM.** button out) for just triggering. Attenuator to 0.2V/cm: No triggering must be possible. Depress **+/-** button, attenuator to 0.1V/cm, adj. **VR351** for same trigger threshold. Repeat triggering adjustments.

Normal Triggering: Depress **AT/NORM.** button, adj. **LEVEL** control.

Check normal trigger mode using **LEVEL** control with **+/-** button depressed and released. Check triggering at 20MHz in same way.

DC triggering: **TRIGGER SELECTOR** to **AC**, depress **AT/NORM.** button, **CH. I** with **DC** input coupling, input signal 50kHz sine 3mm display height (see above Automatic Triggering), adj. **LEVEL** control. Then **TRIGGER SELECTOR** to **DC**, adj. **VR221**. Repeat this adj. sequence for **CH. II**, adj. **VR220**.

X-Y sensitivity: Depress **CH. I/II-TRIG. I/II** button, set **CH. II** input coupl. to **AC**, attenuator to **5mV/cm**, apply 50kHz sine for 6cm display height. Depress **DUAL, ALT/CHOP, X-Y** buttons. Now display shows a horizontal and a crossing sloping line. Adj. **X-POS.** and **Y-POS. I** and **II** controls so that the horizontal and the sloping line are centered. Length of horizontal line and (projected) height of sloping line should be 6cm. The point of intersection should be approx. in center of graticule.