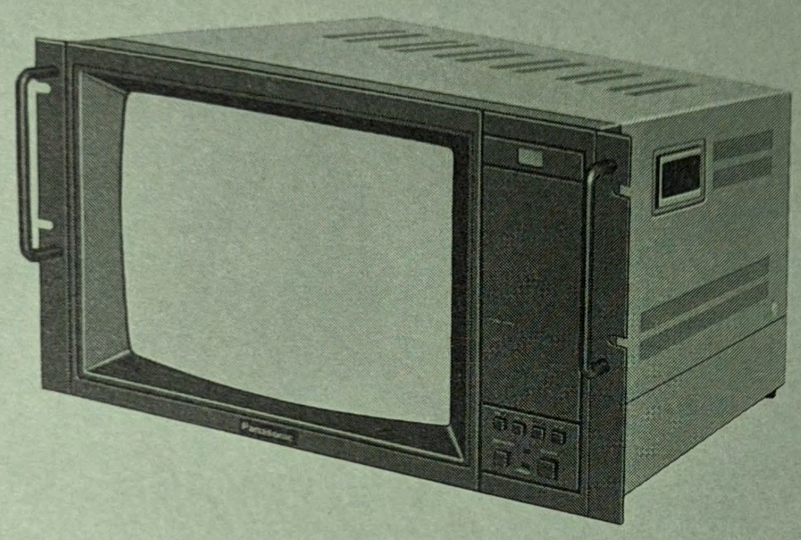
Service Manual

Color Video Monitor

BT-M1310Y

H01M chassis



CAUTION

This installation should be made by a qualified service person and should conform to all local codes.

- **PRODUCT COMPLIES WITH DHHS RULES 21 CFR SUBCHAPTER J IN EFFECT AS OF DATE OF MANUFACTURE.**

IMPORTANT SAFETY NOTICE

There are special components used in Panasonic Monitor sets which are important for safety. These parts are shaded on the schematic diagram. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent X-RADIATION, shock, fire, or other hazards. Do not modify the original design without permission of PANASONIC COMMUNICATIONS & SYSTEMS COMPANY.

SAFETY PRECAUTIONS

GENERAL GUIDELINES

1. It is advisable to insert an isolation transformer in the AC supply before servicing a hot chassis.
2. When servicing, observe the original lead dress, especially the lead dress in the high voltage circuits. If a short circuit is found, replace all parts which have been overheated or damaged by the short circuit.
3. After servicing, see to it that all the protective devices such as insulation barriers, insulation papers, shields, and isolation R-C combinations, are properly installed.
4. Before turning the monitor on, measure the resistance between B+ line and cold side chassis ground. Connect the ⊖ side of an ohmmeter to the B+ lines, and the ⊕ side to chassis ground. Each line should have more resistance than specified, as follows:

B+ Line	Minimum Resistance
1kV (TPD4)	3kΩ
160V (TPD120)	4kΩ
100V (TPD91)	3kΩ
24V (TPD24)	400Ω
17V (IC801 ① pin)	400Ω
12V (TPD12)	400Ω

5. When the monitor is not used for a long period of time, unplug the power cord from the AC outlet.
6. Potentials, as high as 26.0 kV are present when this monitor is in operation. Operation of the monitor without the rear cover involves the danger of a shock hazard from the monitor power supply. Servicing should not be attempted by anyone who is not thoroughly familiar with the precautions necessary when working on high voltage equipment. Always discharge the anode of the picture tube to chassis ground before handling the tube.
7. After servicing, make the following leakage current checks to prevent the customer from being exposed to shock hazards.

LEAKAGE CURRENT COLD CHECK

1. Unplug the AC cord and connect a jumper between the two prongs on the plug.
2. Turn on the monitor's power switch.
3. Measure the resistance value, with an ohmmeter, between the jumpered AC plug and each exposed metallic cabinet part on the monitor, such as screwheads, connectors, control shafts, etc.
   When the exposed metallic part has a return path to the chassis, the reading should be more than 1MΩ.
   When the exposed metal does not have a return path to the chassis, the reading must be ∞.

LEAKAGE CURRENT HOT CHECK (See Fig. 7)

1. Plug the AC cord directly into the AC outlet. Do not use an isolation transformer for this check.
2. Connect a 1.5 kΩ, 10 watt resistor, in parallel with a 0.15 μF capacitor, between each exposed metallic part on the set and a good ground such as a water pipe, as shown in Fig. 7.
3. Use a high impedance AC voltage meter to measure the potential across the resistor.
4. Check each exposed metallic part, and measure the voltage at each point.
5. Reverse the AC plug in the AC outlet and repeat each of the above measurements.
6. The potential at any point should not exceed 0.75 volts RMS. A leakage current tester (Simpson Model 229 or equivalent) may be used to make the hot checks, leakage current must not exceed 500μA. In case a measurement is outside of the limits specified, there is a possibility of a shock hazard, and the monitor should be repaired and rechecked before it is returned to the customer.

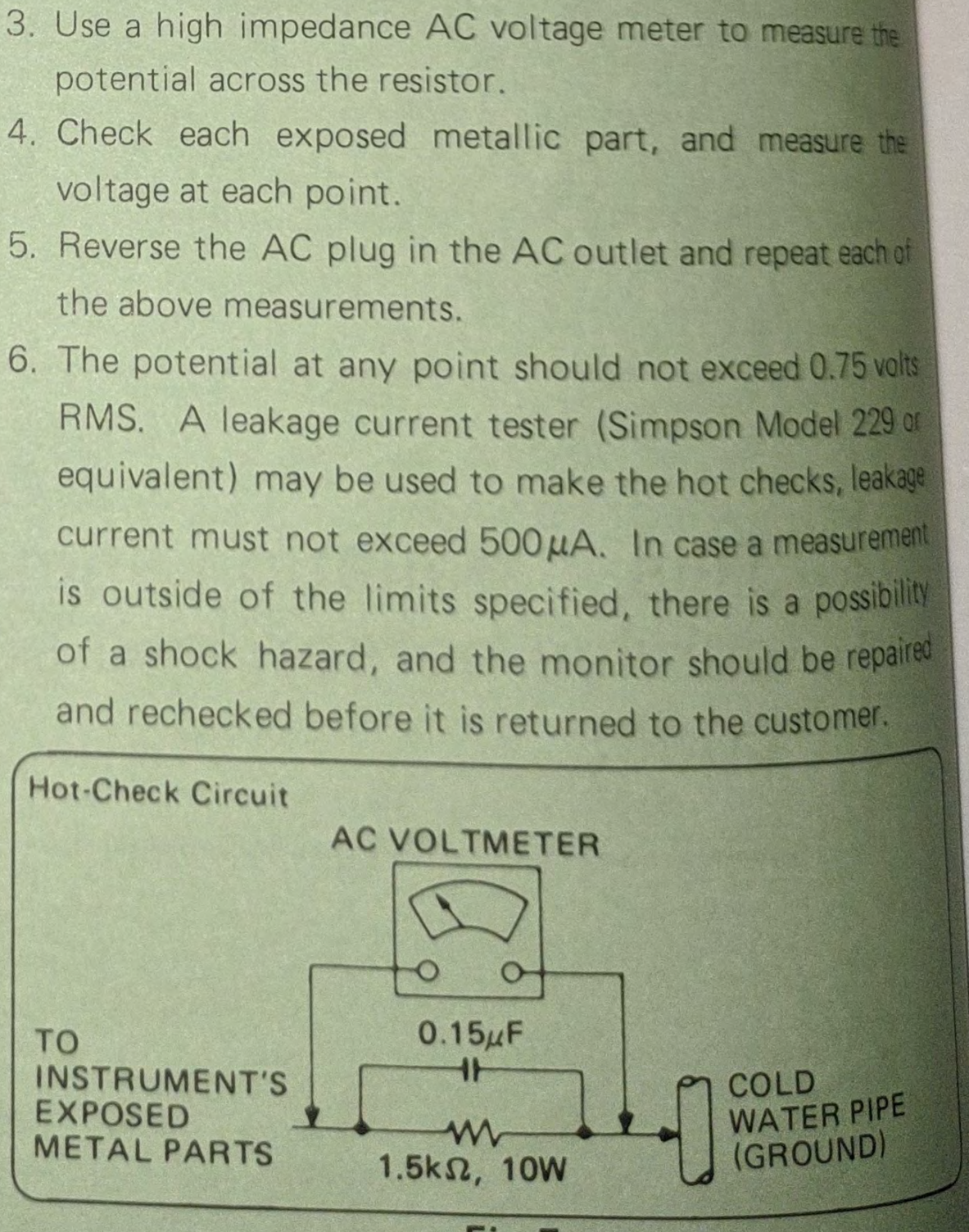


Fig. 7

X-RADIATION

WARNING: 1. The potential source of X-Radiation in Monitor set is the High Voltage section and picture tube.

2. When using a picture tube test jig for service, make sure that the jig is capable of handling 26.0 kV without causing X-Radiation.

NOTE: It is important to use an accurate, periodically calibrated high voltage meter.

1. Turn the Set-up switch (SW5806) and Under scan switch ▣ to the ON position.
2. Turn the Brightness control (R5824) fully counter-clockwise.
3. Set the SERVICE switch (S401) to the SERVICE position.
4. Measure the High Voltage. The meter (electrostatic type) reading should indicate 24.5 kV $^{+1.5\ kV}_{-1.2\ kV}$ If the meter indication is out of tolerance, immediate service and correction is required to prevent the possibility of premature component failure.
5. To prevent an X-Radiation possibility, it is essential to use the specified picture tube.

HORIZONTAL OSC. DISABLE CIRCUIT TEST

This test must be made as a final check before the set is returned to the customer.

1. With the rear cover removed, supply a nominal 120V AC to the set, turn on the power switch.
2. Set the customer controls to their normal operating position.
3. Make short circuit TPD91 and pin ④ of IC551 with a 3kΩ resistor.
4. If this does not occur, the Horizontal Osc. Disable Circuit is not operating. Follow the Horizontal Oscillator Disable Circuit Repair Procedures before the set is returned to customer.

REPAIR PROCEDURES OF HORIZONTAL OSCILLATOR DISABLE CIRCUIT

1. Connect a DC voltmeter between capacitor C573 ⊕ on the A-board and chassis ground. If nearly +24.7V is not present on that point, find the cause.
   Check R570, C573 and D557.
2. Connect a DC voltmeter between pin ⑫ of IC501 on the A-board and chassis ground.
   If nearly +2.1V is not present on that point, check R5631, R511, R512, R513, D510, IC551 and IC501.
3. Carefully check the above specified parts and related circuits and parts. When the circuit is repaired, the Horizontal Oscillator Disable Circuit Test must be made again.

CIRCUIT EXPLANATION

HORIZONTAL OSCILLATOR DISABLE CIRCUIT

The positive DC voltage supplied from the cathode of D557 for monitoring the high voltage is applied to pin ④ of IC551 through R570 and to the base of Q903 through R909.

The voltage at the emitter of Q903 is regulated by Zener Diode D901. Under normal conditions, the voltage applied across the base and emitter of Q903 is not sufficient to cause emitter current to flow and holds the transistor cut off.

If the high voltage exceeds the specified level, the positive DC voltage supplied from the cathode of D557 increases. The voltage through D557 is dividing by R909 and R908, and applied to the base of Q903. If Vbe is nearly more than +0.7V, the transistor Q903 turns on, and the collector voltage of Q903 lowers which is connected to the base of Q902.

Therefore Q902 turns on, and the collector voltage of Q902 increases, which is connected to the base of Q901. Consequently Q901 turns on, and collector current of Q901, which is connected to the pin ⑫ of IC501, begins to flow simultaneously. This causes the horizontal oscillator frequency to increase, and also causes loss of horizontal synchronization. (Fig. 8)

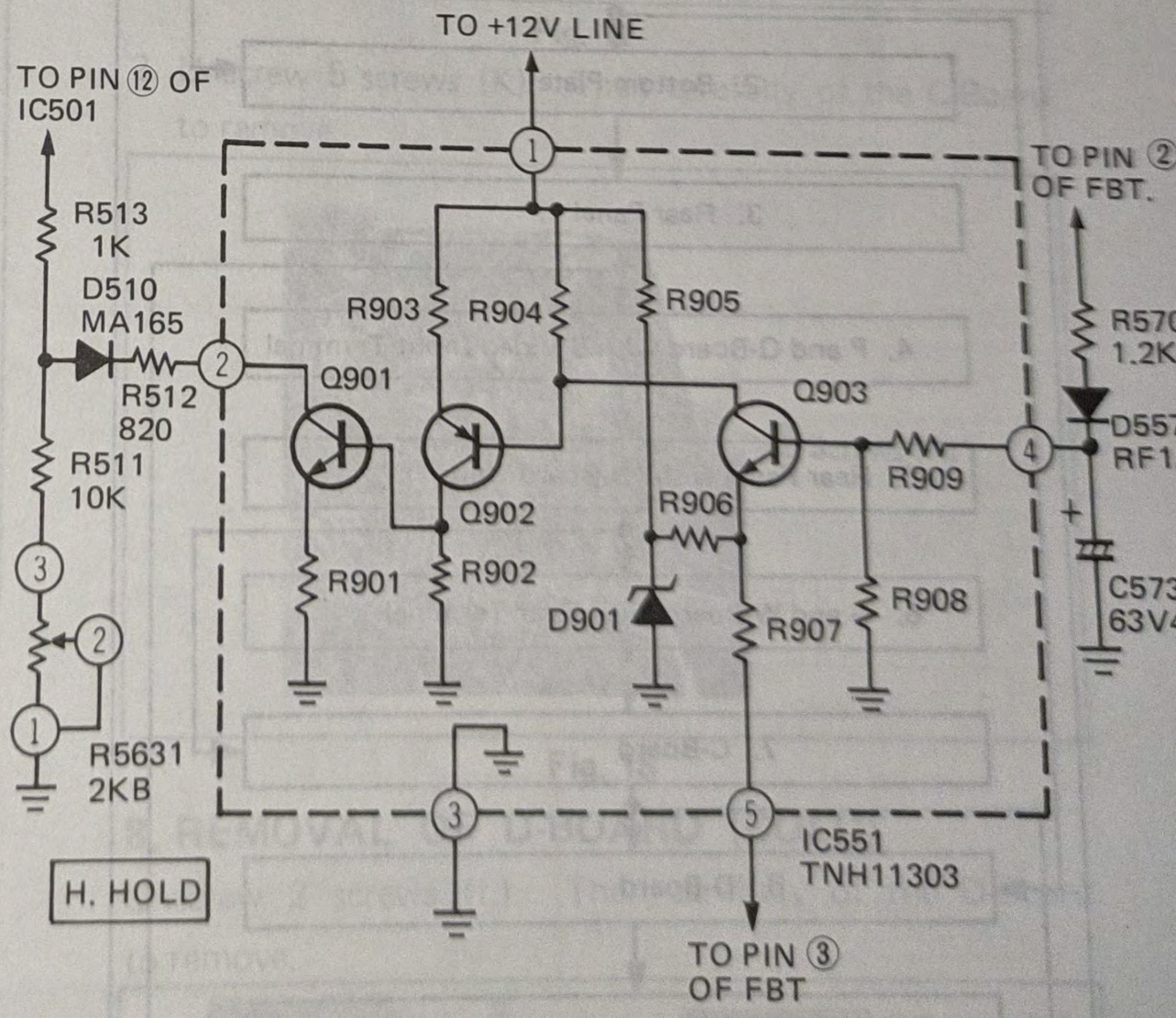


Fig. 8

DISASSEMBLY INSTRUCTIONS

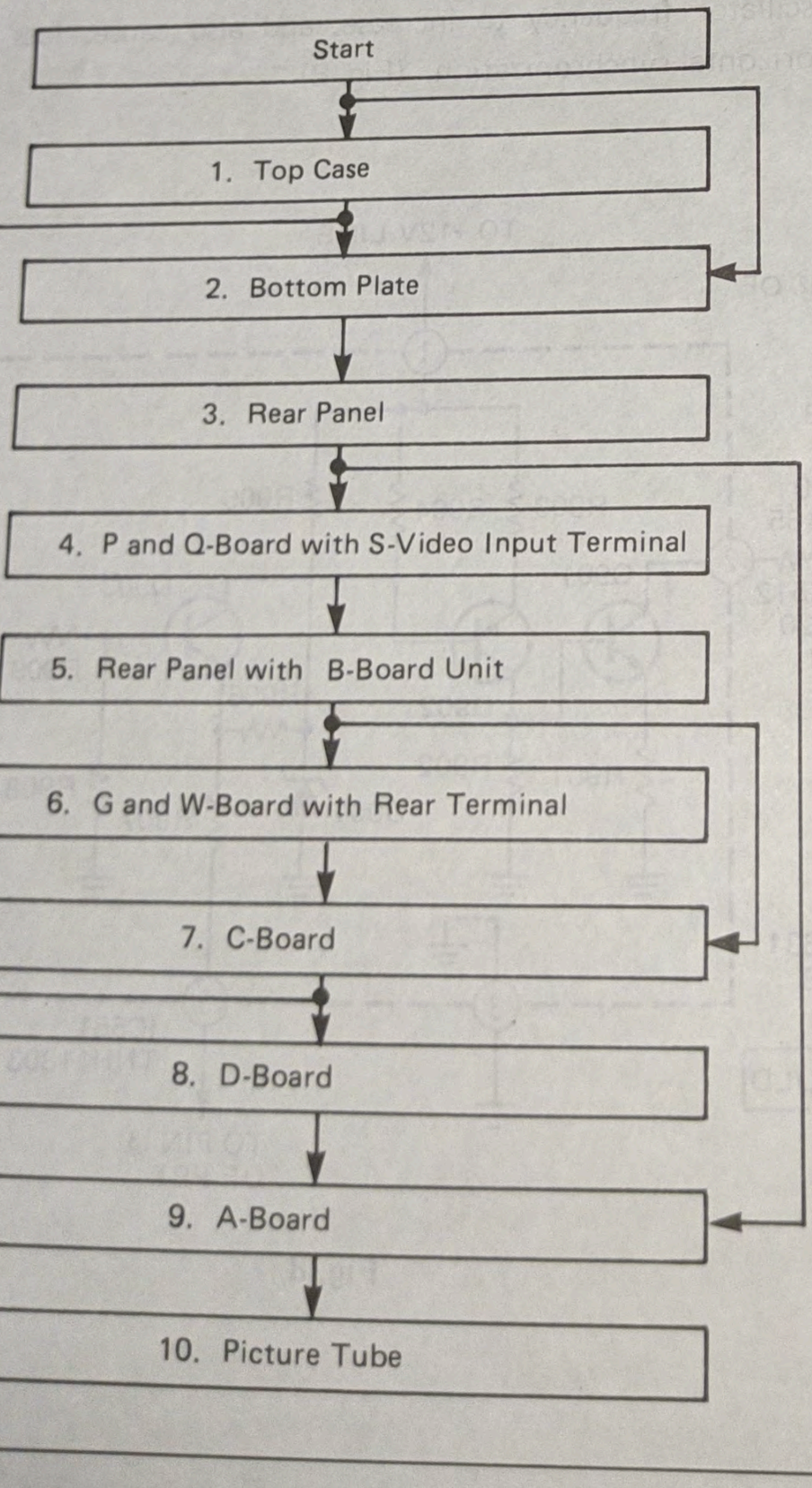
WARNING:

1. When turning over a P.C. Board to adjust it, be sure to lay on insulating material under it in order to prevent shorting.
2. P.C. Boards and wires should not be pulled forcibly, but be handled carefully.
3. Before disassembly, remove the AC plug from the wall outlet.
4. When removing the top cover take care not to damage the neck of the CRT.
5. Printed boards and connectors should be handled with care-aviod handling them forcibly!.
6. When handling the A-Board with the power ON, there is a risk of an Electric shock if you use the COLD side heat sink while working on the HOT side of the chassis.

DISASSEMBLY FLOWCHART

This flowchart indicates disassembly items of the cabinet parts and Circuit Boards in order to find the items necessary for servicing.

When reassembling, perform the steps in the reverse order.



1. REMOVAL OF TOP CASE

1. Unscrew 6 screws (A).

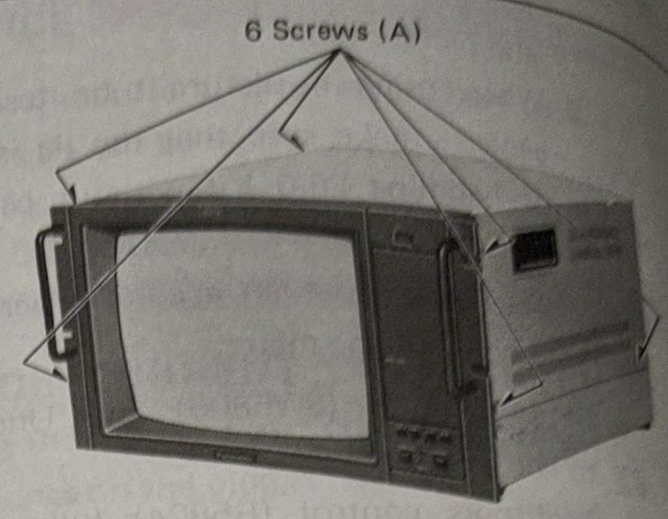


Fig. 9

2. Unscrew 5 screws (B). Then carefully lift the rear of the Top Case to remove.

Fig. 10

2. REMOVAL OF BOTTOM PLATE

Unscrew 2 screws (C). Then carefully remove the Bottom Plate.

Note: Place the cushion under the Front portion of the set to avoid damaging.

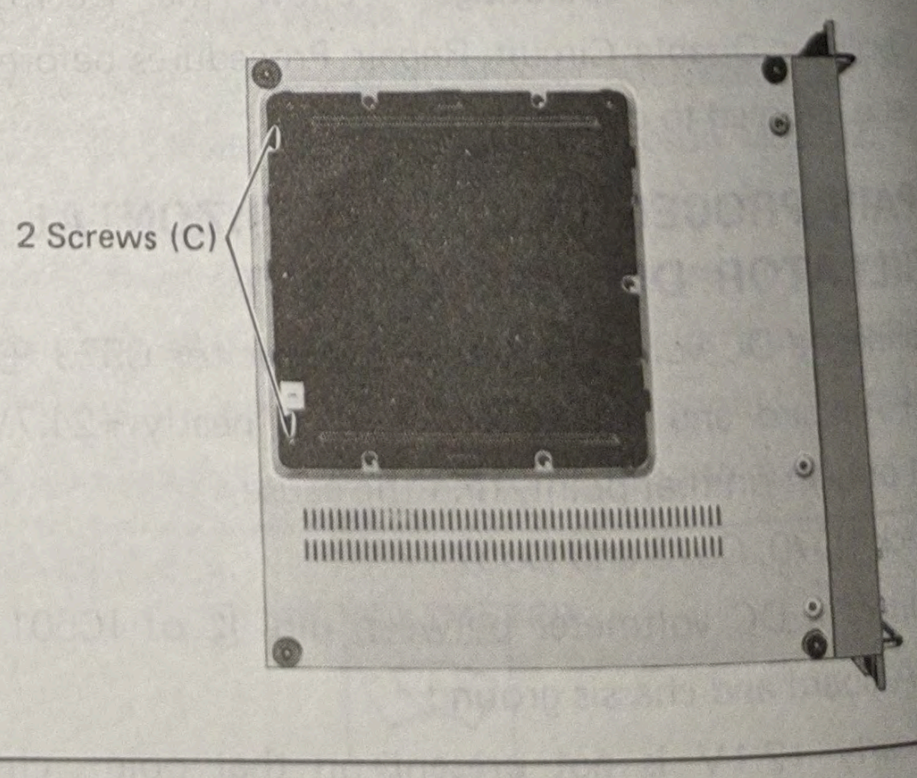


Fig. 11

3. REMOVAL OF REAR PANEL

Unscrew 4 screws (D). Then carefully lift the Rear Panel to remove.

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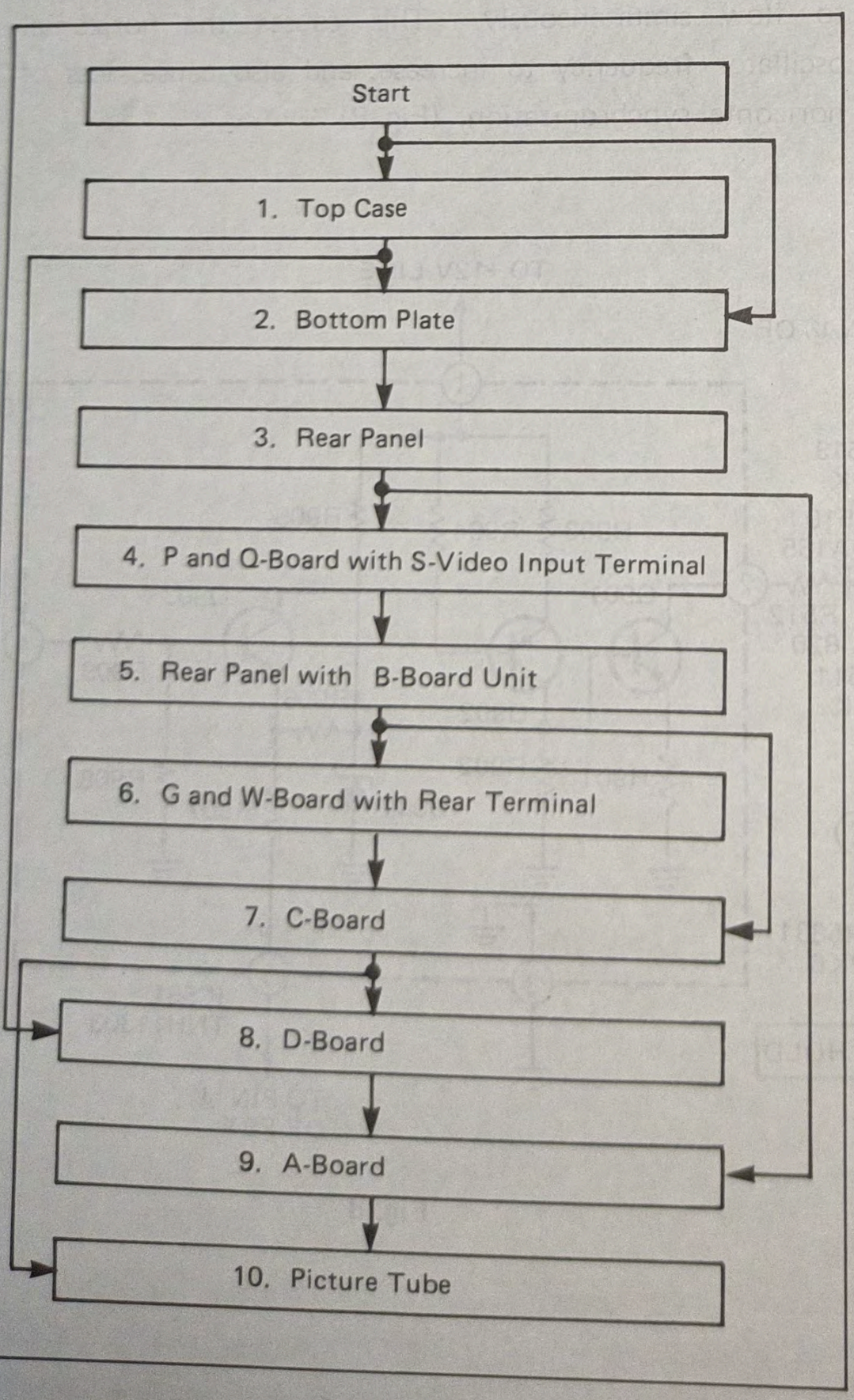

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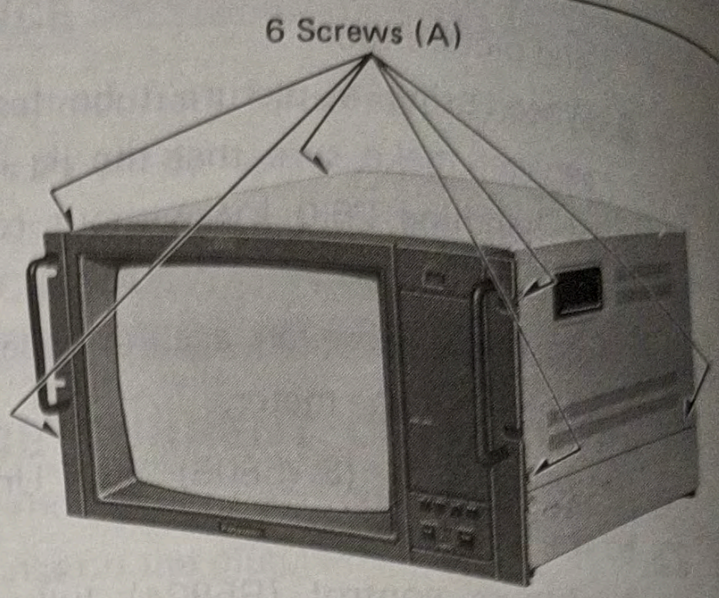


Fig. 9

2. Unscrew 5 screws (B). Then carefully lift the rear of the Top Case to remove.

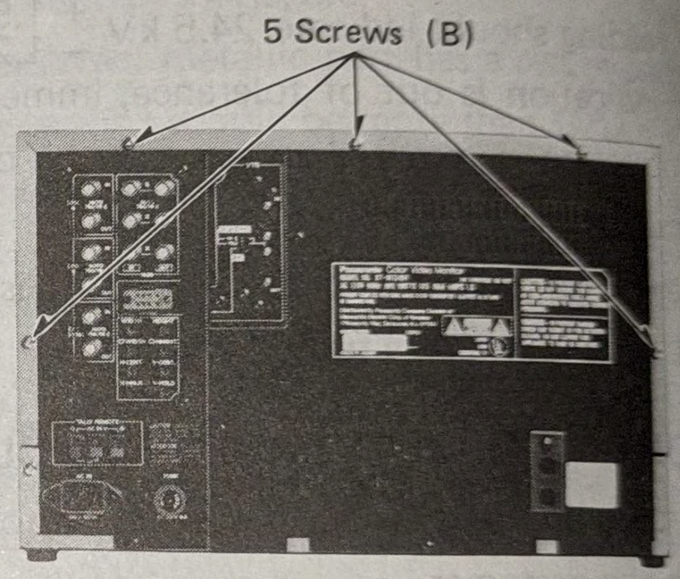


Fig. 10

2. REMOVAL OF BOTTOM PLATE

Unscrew 2 screws (C). Then carefully remove the Bottom Plate.

Note: Place the cushion under the Front portion of the set to avoid damaging.

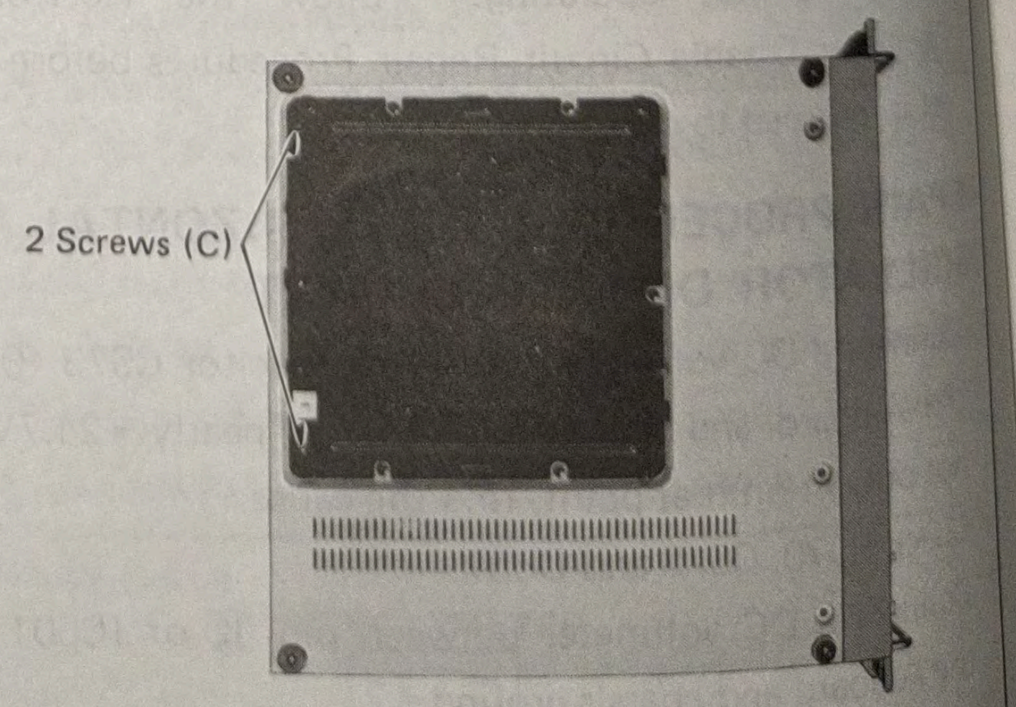


Fig. 11

3. REMOVAL OF REAR PANEL

Unscrew 4 screws (D). Then carefully lift the Rear Panel to remove.

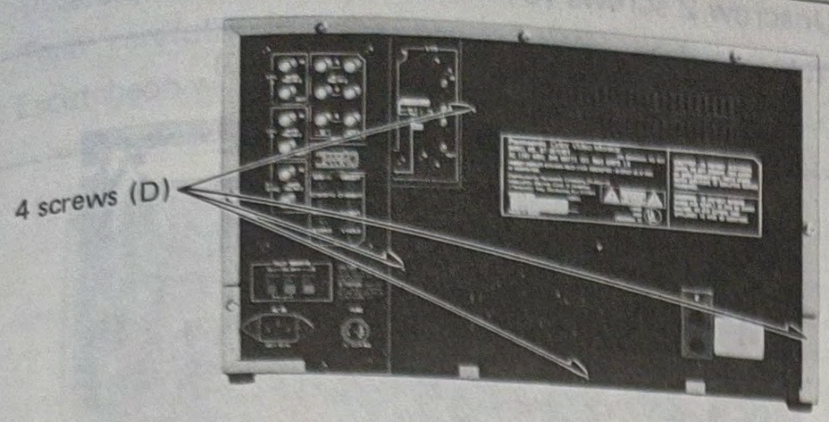


Fig. 12

4. REMOVAL OF P AND Q-BOARD WITH S-VIDEO INPUT TERMINAL (COLD).

Unscrew 2 screws (E). Then carefully remove the P and Q-Board with S-Video Input Terminal.

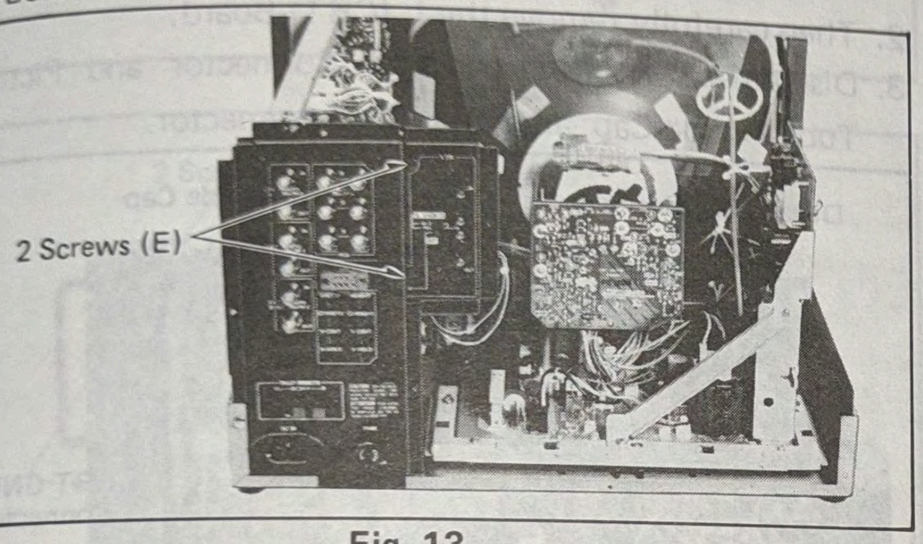


Fig. 13

5. REMOVAL OF REAR PANEL WITH B-BOARD UNIT (HOT AND COLD)

1. Unscrew 2 screws (F).

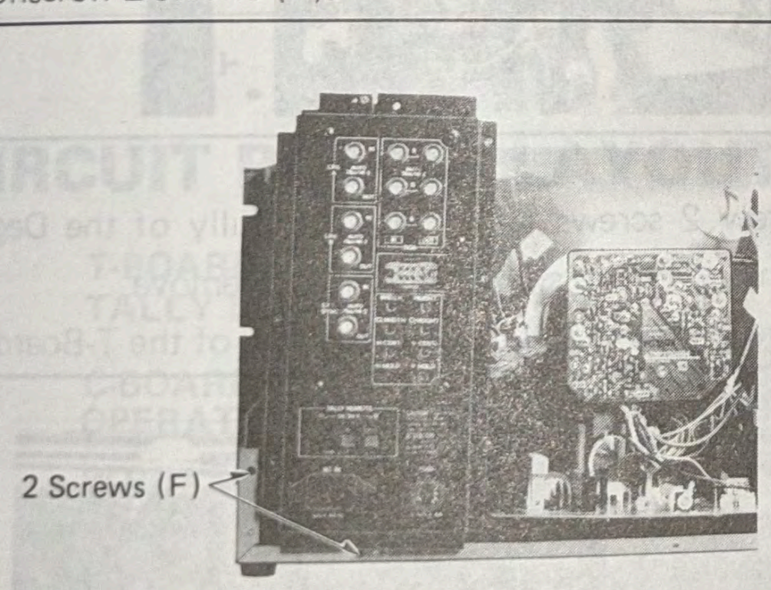


Fig. 14

2. Unscrew 2 screws (G) and unlock the 2 locking portions (H)

   Then carefully lift off the Rear Panel with B-Board Unit to remove.

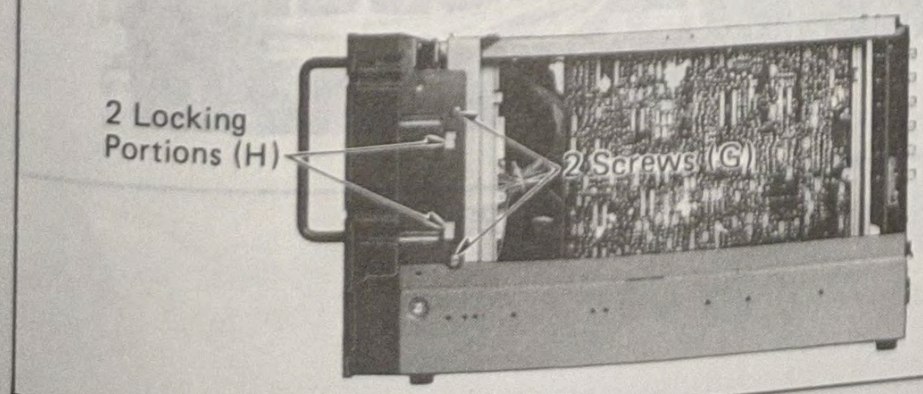


Fig. 15

6. G AND W-BOARD WITH REAR TERMINAL (COLD)

1. Unscrew 2 screws (I). Then carefully of the G and W-Board with Rear Terminal Bracket to remove.
2. Unscrew 4 screws (J). Then carefully of the G and W-Board with Rear Terminal.

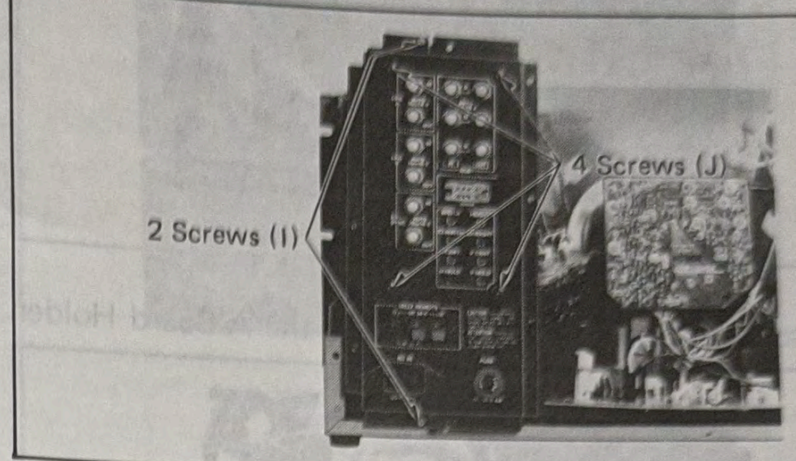


Fig. 16

7. REMOVAL OF C-BOARD (COLD)

1. Remove 5 control knob.

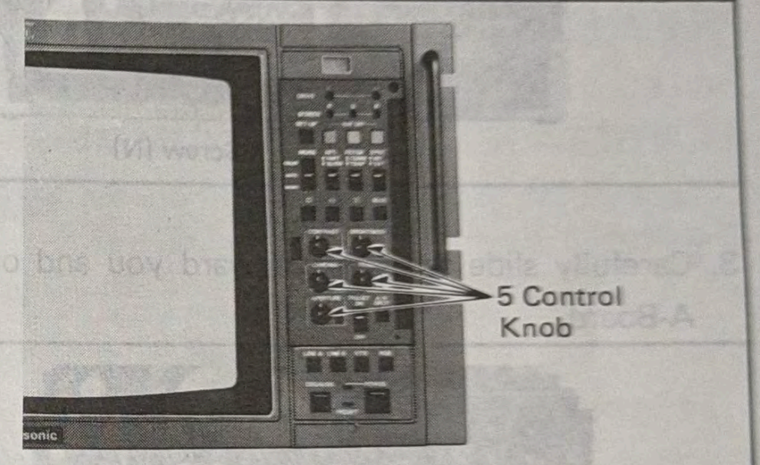


Fig. 17

2. Unscrew 5 screws (K). Then carefully of the C-Board to remove.

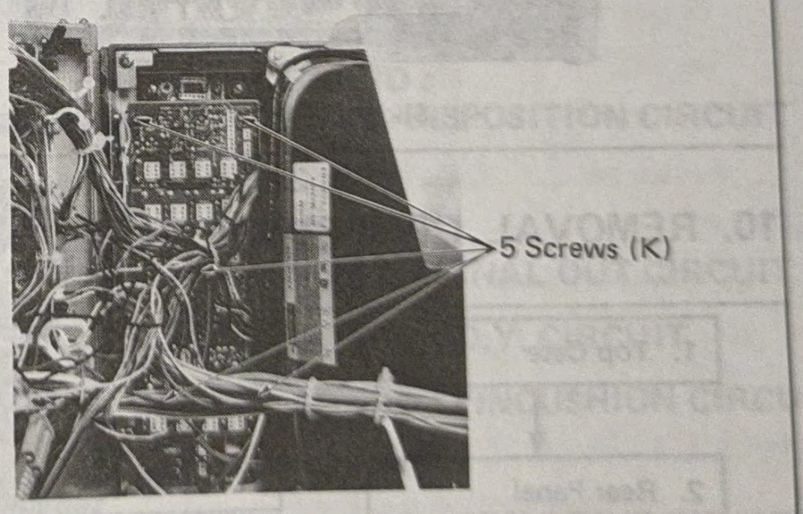


Fig. 18

8. REMOVAL OF D-BOARD (COLD)

Unscrew 2 screws (L). Then carefully of the D-Board to remove.

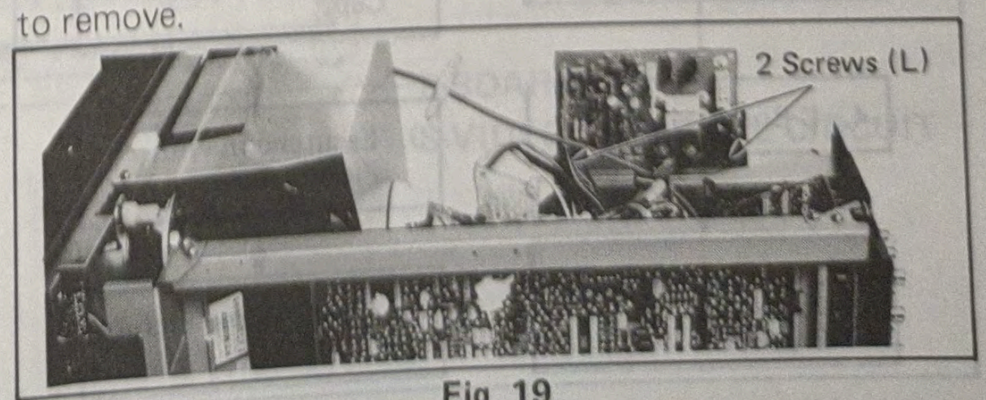


Fig. 19

9. OPENING OF A-BOARD (HOT AND COLD)

1. Unscrew 4 screws (M), and remove the reinforcing angle.

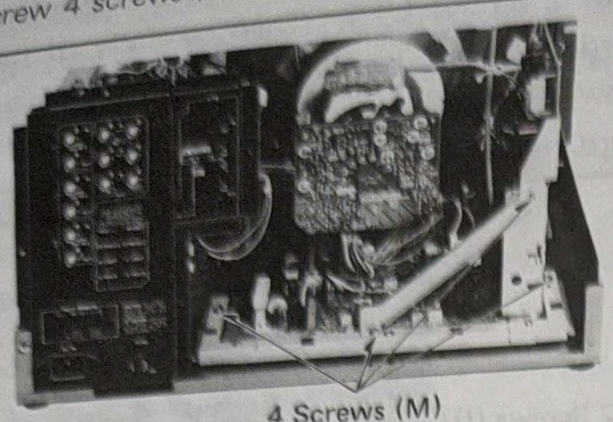


Fig. 20

2. Unscrew a screw (N), and remove the A-Board Holder.

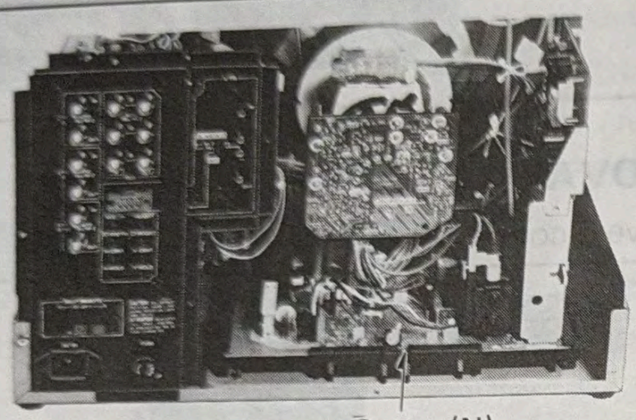


Fig. 21

3. Carefully slide the board toward you and opening the A-Board.

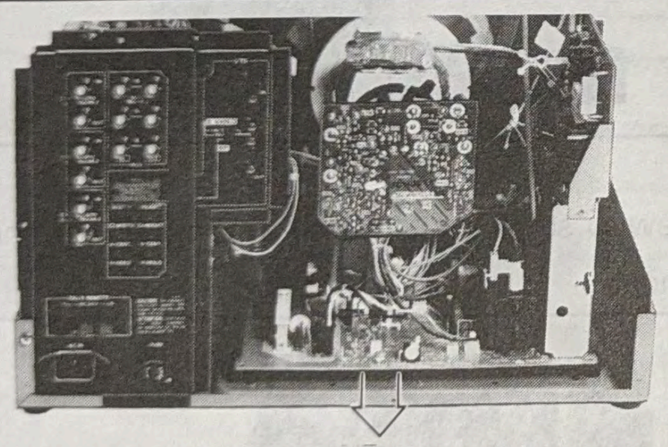


Fig. 22

10. REMOVAL OF PICTURE TUBE

1. Top Case
2. Rear Panel
3. Rear Panel with B-Board Unit
4. C-Board
5. Degauss Switch and Power Switch Bracket
6. T-Board
7. Shield Plate
8. L-Board A15, Degaussing CRT GND Connector and Picture Tube Anode Cap.
9. Escutcheon with Picture Tube
10. Remove the Picture Tube

1. Unscrew 2 screws (O) and remove the shield plate.

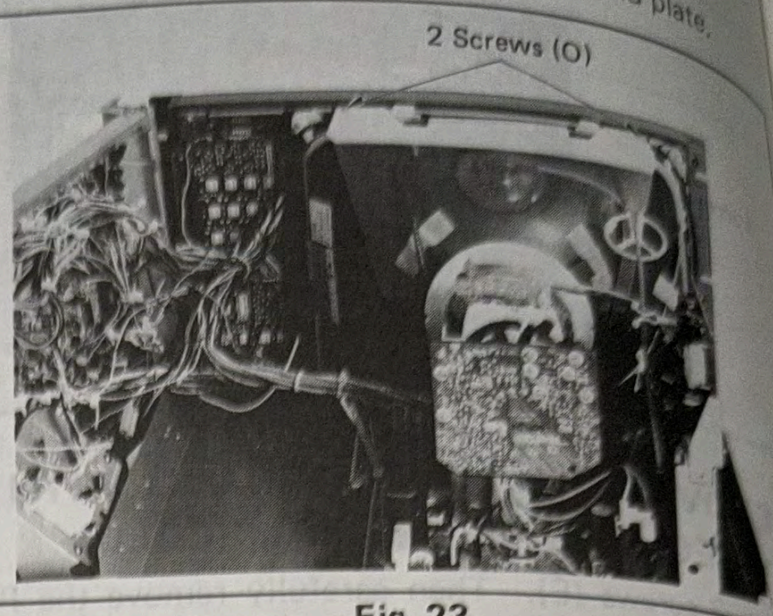


Fig. 23

2. Then carefully remove the L (CRT)-Board.
3. Disconnect A15, Degaussing Connector and Picture Tube Anode Cap, and CRT GND connector.

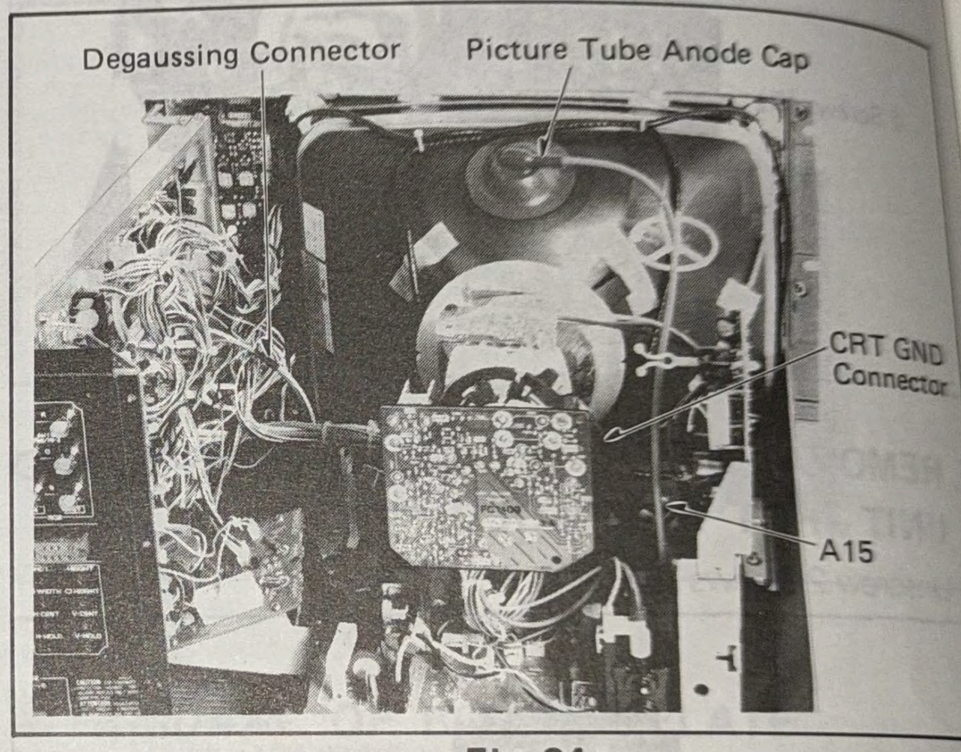


Fig. 24

4. Unscrew 2 screws (P). Then carefully of the Degauss switch and Power switch Bracket to remove.
5. Unscrew a screw (Q). Then carefully of the T-Board.

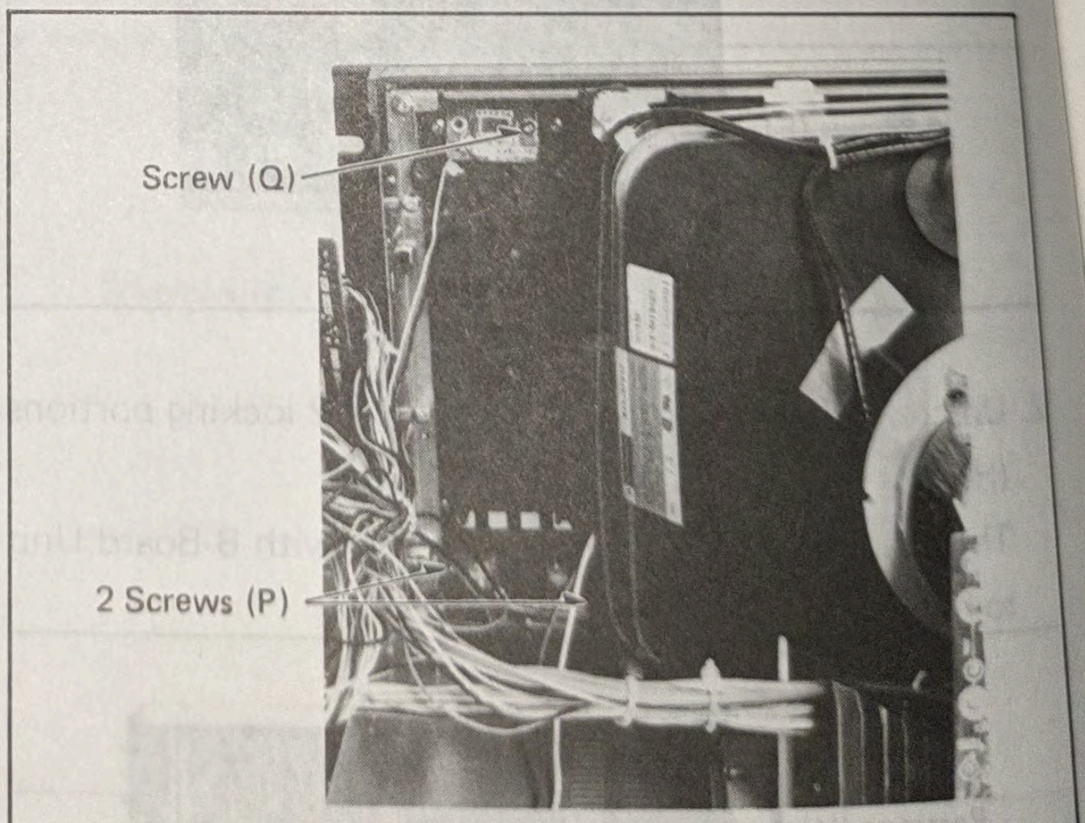


Fig. 25

6. Unscrew 3 screws (R) and 2 screws (S). Then carefully lift the toward you and remove the Escutcheon with Picture Tube.

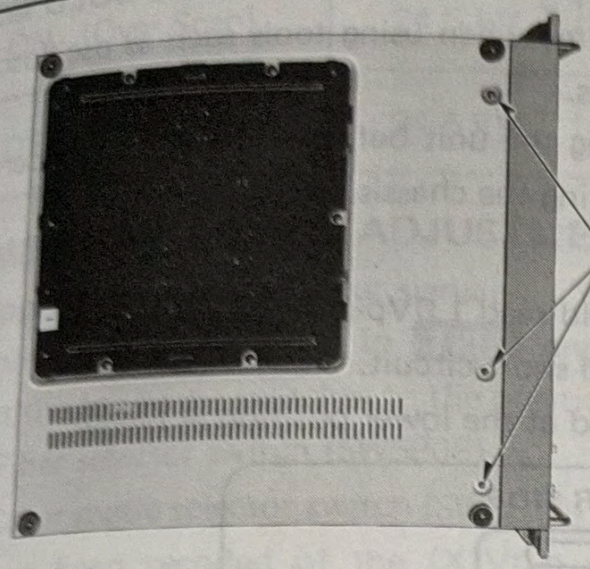


Fig. 26

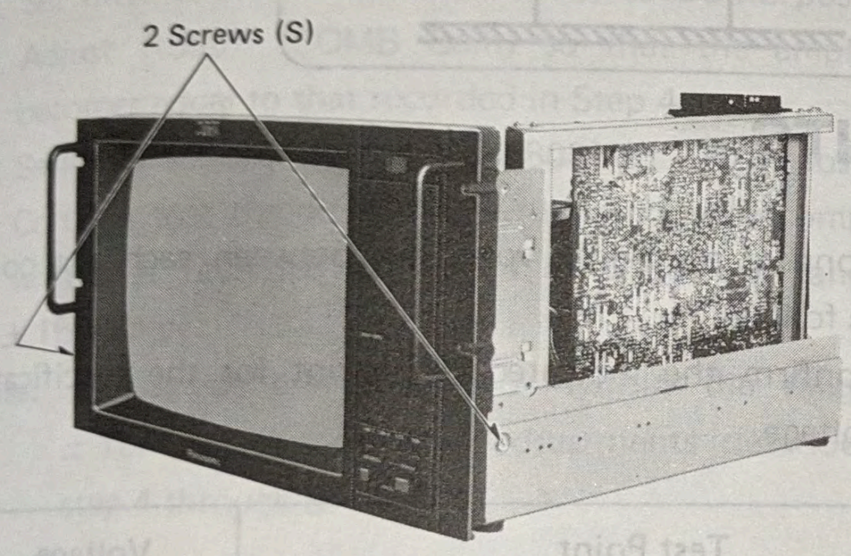


Fig. 27

7. Unscrew 4 screws (T). Then carefully lift top of Picture Tube to remove.

Note: Place the cushion under the picture tube for not being damaged the CRT of the picture tube.

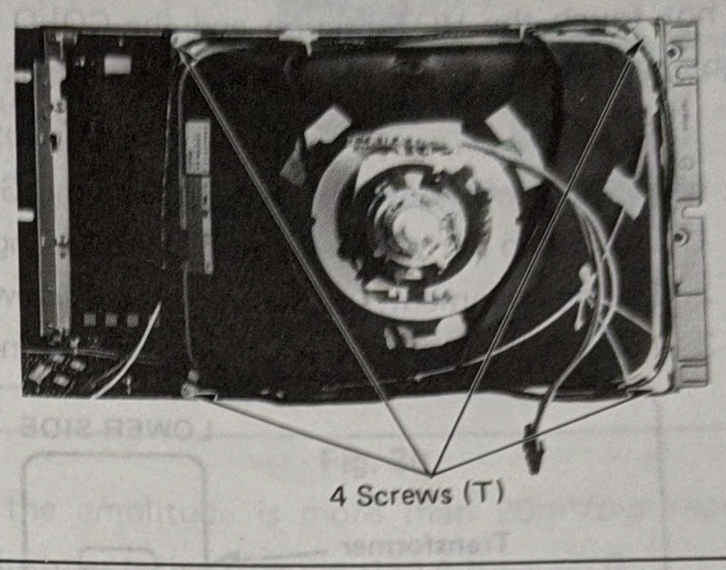
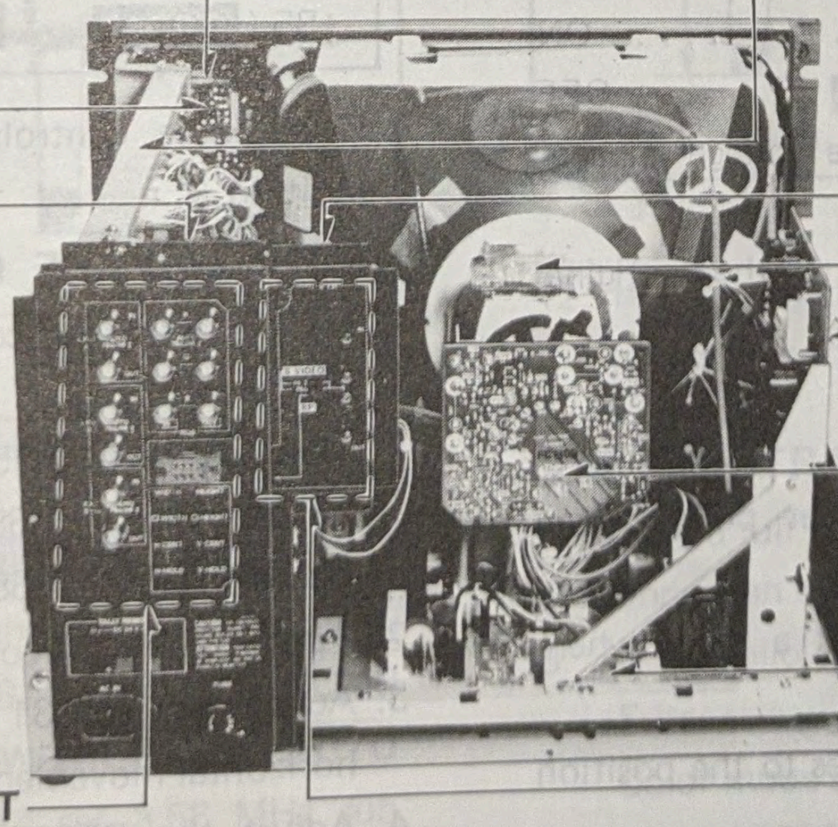


Fig. 28

CIRCUIT BOARD LAYOUT



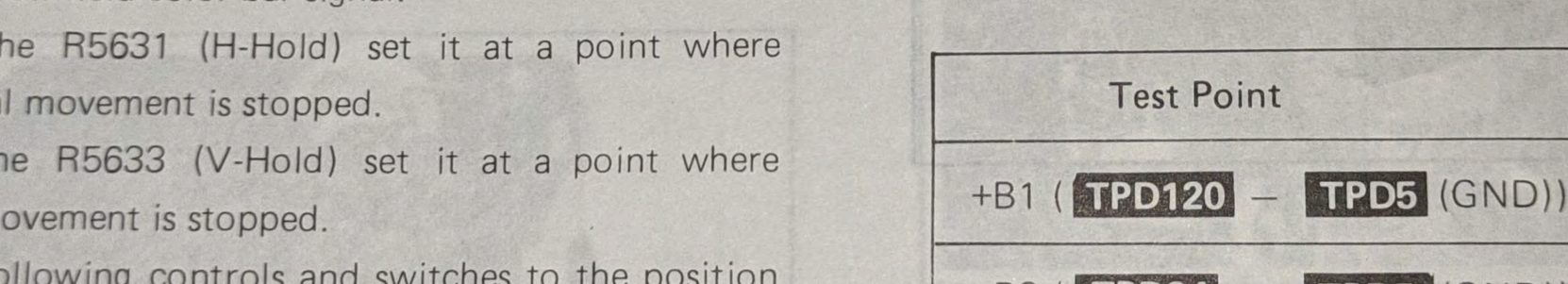
CAUTION FOR SERVICING

This model has a section that does not share a common sections are referred to as the HOT section and the ground with the power supply section. The different COLD section in the precautions below.

1. Do not touch the HOT section and the COLD section at the same time. You may receive an electric shock.
2. Do not short the HOT section to the COLD section. This could blow the fuse or even damage parts.
3. Never measure the HOT section and the COLD section at the same time when using tools such as oscilloscopes or multimeters.
4. Always unplug the unit before beginning any operation such as removing the chassis.

Note: (Application for both Field Alignment and General Alignment)

1. Use Video pattern Generator for following alignments. (Video input should read 1.0Vp-p.)
2. During alignment, use a non-metallic screwdriver to prevent an unexpected short circuit.
3. The transformer core which has two tuning peak points, should be adjusted at the lower position as below:



MEASUREMENTS AND ADJUSTMENTS

NOTE: VR . . . . . Volume Control

B+ VOLTAGE (+100V) ADJUSTMENT

1. Connect an digital voltmeter between **TPD91** and **TPD5** (GND).
2. Apply a full field color bar signal.
3. Adjust the R5631 (H-Hold) set it at a point where horizontal movement is stopped.
4. Adjust the R5633 (V-Hold) set it at a point where vertical movement is stopped.
5. Set the following controls and switches to the position indicated.

   Brightness VR (R5824) . . . . . fully counterclockwise
   Service switch (S401) . . . . . service
   Set-up switch (SW5806) . . . . . ON
   Preset switch (SW5815) . . . . . OFF
6. Adjust R806 (+B2 Adj.) so that the voltage **TPD91** becomes 100.0V ± 0.5V.
7. Return the controls and switches to their original position.

B+ VOLTAGE CONFIRMATION

1. Apply a full field color bar signal.
2. Adjust the R5631 (H-Hold) set it at point where horizontal movement is stopped.
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   Service switch (S401) . . . . . service
   Set-up switch (SW5806) . . . . . ON
   Preset switch (SW5815) . . . . . OFF
5. Connect an digital voltmeter between each test point as follows.
6. Confirm the indicated test point for the specificated voltage.

Test Point	Voltage
+B1 (**TPD120** – **TPD5** (GND))	160V ± 10V
+B3 (**TPD24** – **TPD5** (GND))	25.0V ± 2.0V
+B4 (**TPB10** – **TPD5** (GND))	$14.0V^{+1.0}_{-0.5}V$
+B5 (**TPD12** – **TPD5** (GND))	12.0V ± 0.5V

7. Return the controls and switches to their original position.

HIGH VOLTAGE CONFIRMATION

1. Set the following controls and switches to the position indicated.

   Set-up switch (SW5806) . . . . . ON
   Preset switch(SW5815) . . . . . OFF
   Brightness VR(R5824) . . . . . fully counterclockwise
2. Apply a full field color bar signal.
3. Adjust the R5631 (H-Hold) set it at a point where horizontal movement is stopped.
4. Adjust the R5633 (V-Hold) set it at a point where vertical movement is stopped.
5. Connect a High voltage meter (electrostatic type) to the anode for the picture tube.

6. Confirm the indicated for the specified voltage.

Switch Position ◻	Voltage
ON (Over Scan)	24.5 kV $^{+1.5}_{-1.2}$ kV
OFF (Under Scan)	24.5 kV $^{+1.5}_{-1.2}$ kV

COMB/TRAP LEVEL ADJUSTMENT

1. Apply a full field color bar signal.
2. Connect an oscilloscope to **TPB7** and GND.
3. Set the following switches to the position indicated.
   Filter selector switch (SW5808) . . . . . TRAP
   Color mode selector switch (SW5810) . . . . . AUTO
4. Then keep recoded of the (X)Vp-p on the waveform as shown in Fig. 29.
5. Set filter selector switch (SW5808) to COMB position.
6. Adjust R5997 (COMB Gain) so that the amplitude becomes equal to that recorded in Step 4.
7. Set filter selector switch (SW5808) to TRAP position.
8. Confirm that the difference in the amplitude compared with that recorded in step 4 is within the range of ± 15mVp-p.

Note: If the difference is not within the range of ± 15mVp-p repeat the adjustments described in step 4 through 8.

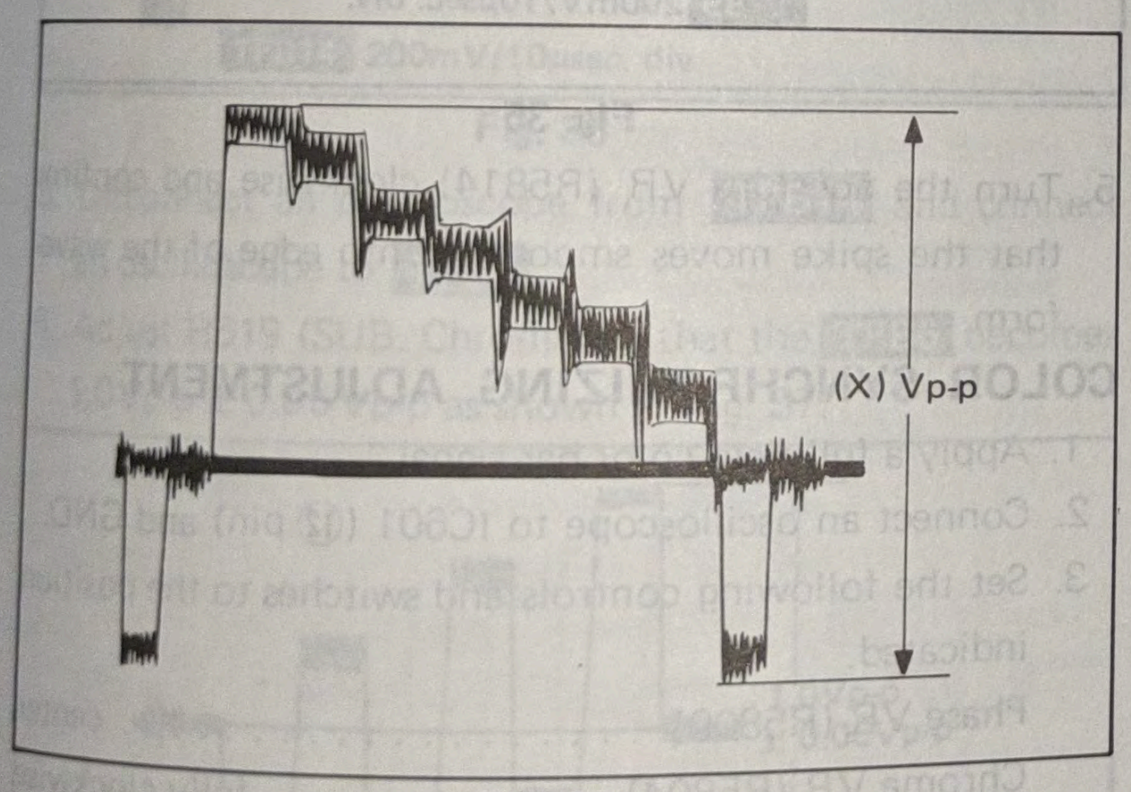


Fig. 29

COMB FILTER ADJUSTMENT

1. Apply a full field color bar signal.
2. Connect an oscilloscope to **TPB23** and GND.
3. Set the following switches to the position indicated.
   Filter selector switch (SW5808) . . . . . COMB
   Color mode selector switch (SW5810) . . . . . AUTO
4. Adjust R5002 (COMB Level) to set 3.58 MHz sub carrier at the minimum amplitude.
5. Adjust L5002 to set 3.58 MHz sub carrier at the minimum amplitude as shown in Fig. 30.
6. Confirm that 3.58 MHz sub carrier portion of the magenta is less than 20mVp-p as shown in Fig. 30.

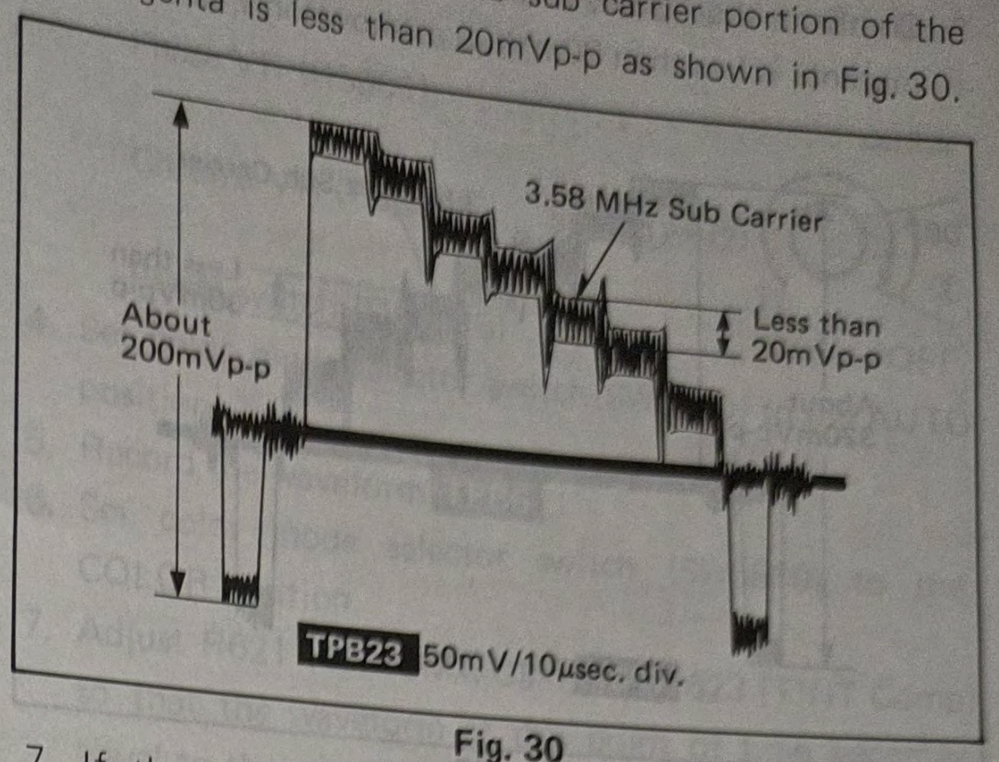


Fig. 30

7. If the amplitude is more than 20mVp-p repeat the adjustments described in step 4 through 6.
8. Disconnect an oscilloscope from **TPB23** and connect an oscilloscope to **TPB7**.
9. Adjust R5040 (CW. Level) to set 3.58 MHz sub carrier at the minimum amplitude.
10. Adjust C5010 to set 3.58 MHz sub carrier at the minimum amplitude.
11. Confirm that 3.58 MHz sub carrier portion of the magenta is less than 20mVp-p as shown in Fig. 31.

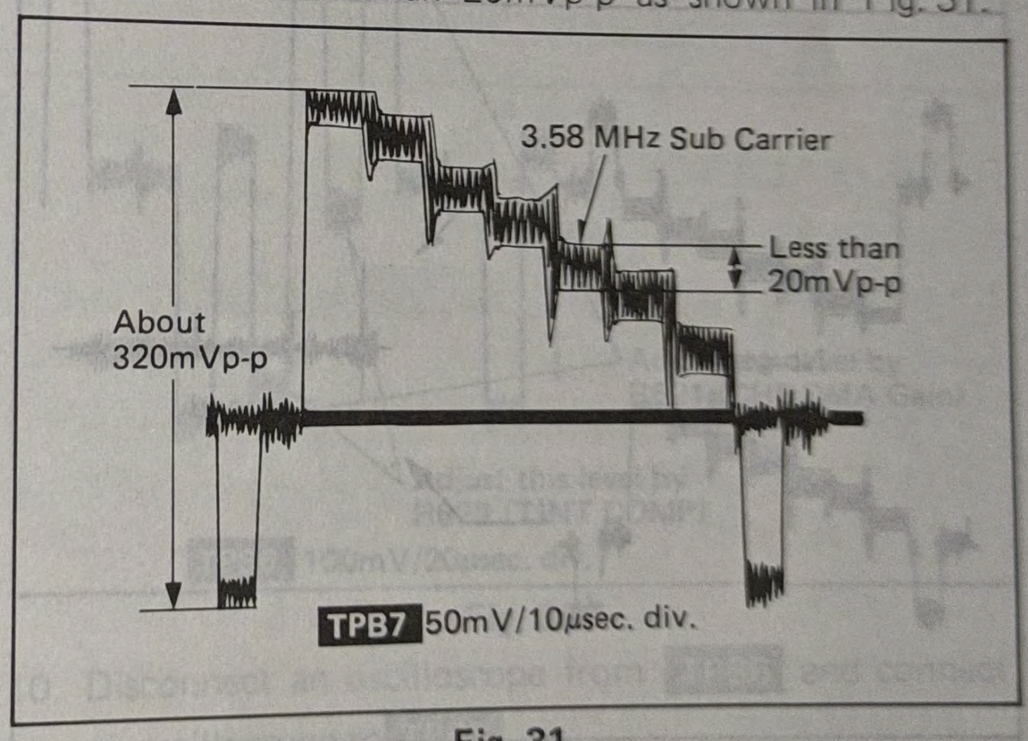


Fig. 31

12. If the amplitude is more than 20mVp-p repeat the adjustments described in step 9 through 11.

3.58 MHz TRAP FILTER ADJUSTMENT

1. Apply a full field color bar signal.
2. Connect an oscilloscope to **TPB7** and GND.
3. Set the following switches to the position indicated.
   Filter selector switch (SW5808) . . . . . TRAP
   Color mode selector switch (SW5810) . . . . . AUTO
4. Adjust L5004 to set 3.58 MHz sub carrier at the minimum amplitude as shown in Fig. 32.

5. Comfirm that 3.58 MHz sub carrier portion of the magenta is less than 30mVp-p as shown in Fig. 32.

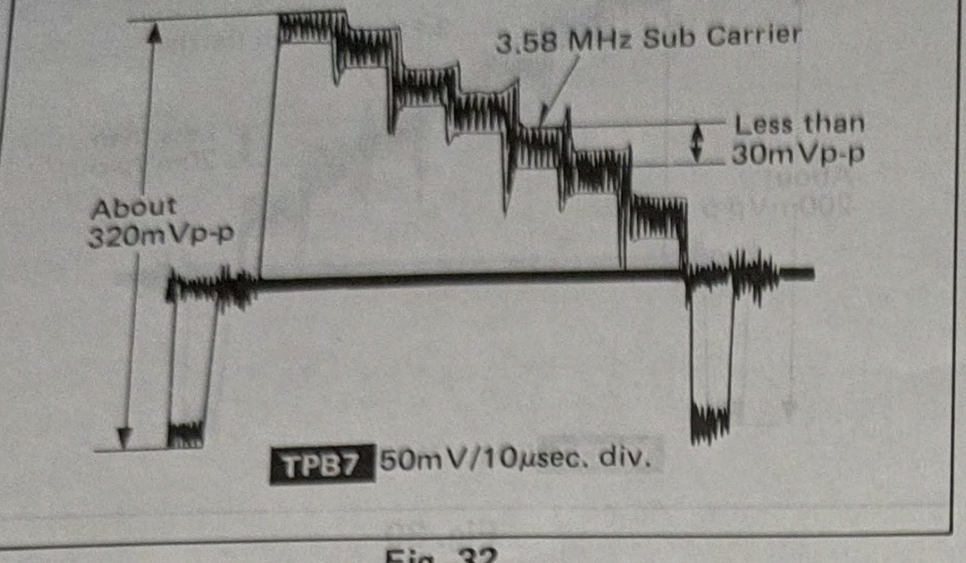


Fig. 32

APERTURE BALANCE ADJUSTMENT

1. Apply a black and white signal.
2. Connect an oscilloscope to **TPB8** and GND.
3. Set the following controls and switches to the position indicated.
   Filter selector switch (SW5808) . . . . . COMB
   Color mode selector switch (SW5810) . . . . . AUTO
4. Adjust R326 (APERTURE Balance) so that the waveform **TPB8** becomes as shown in Fig. 33.

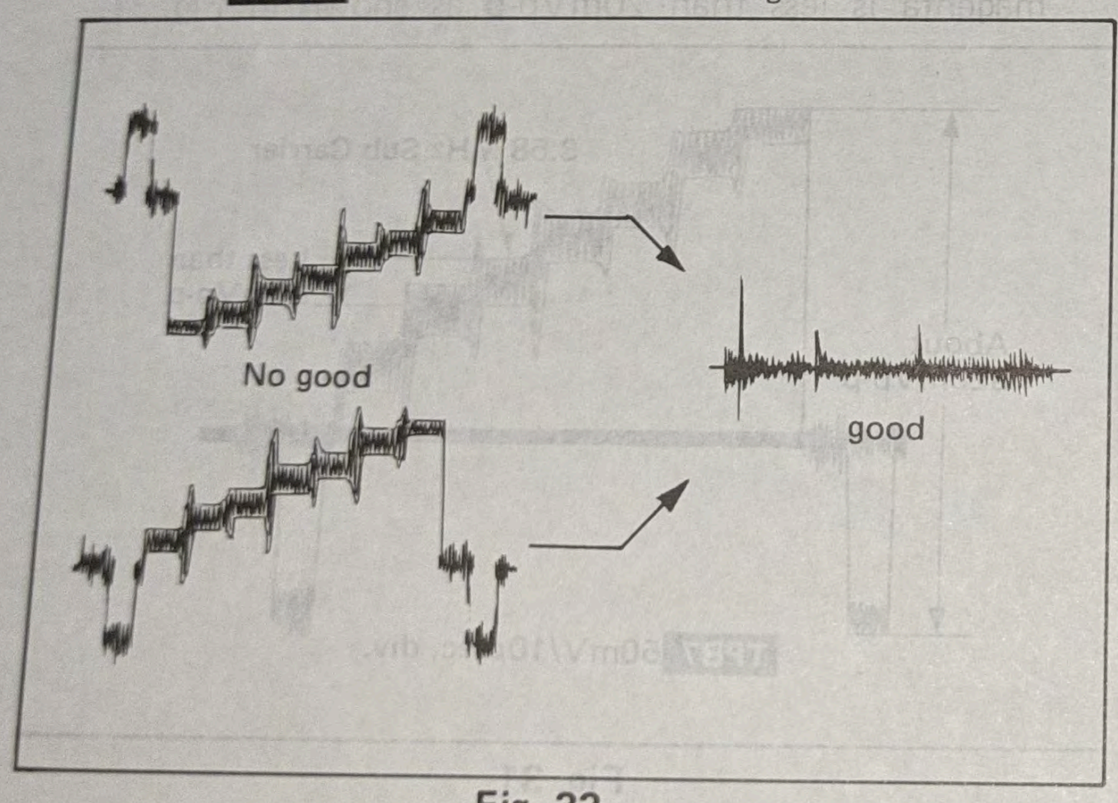


Fig. 33

APERTURE LEVEL ADJUSTMENT

1. Apply a CROSS-HATCH pattern signal.
2. Connect an oscilloscope to **TPB8** and GND.
3. Set the following control and switches to the position indicated.
   Aperture VR (R5814). . . . . fully counterclockwise
   Filter selector switch (SW5808) . . . . . COMB
   Color mode selector switch (SW5810) . . . . . AUTO
   Preset switch (SW5815) . . . . . OFF
4. Adjust R329 (APERTURE Adj.) so that the **TPB8** becomes 350mVp-p ± 20mVp-p as shown in Fig. 34.

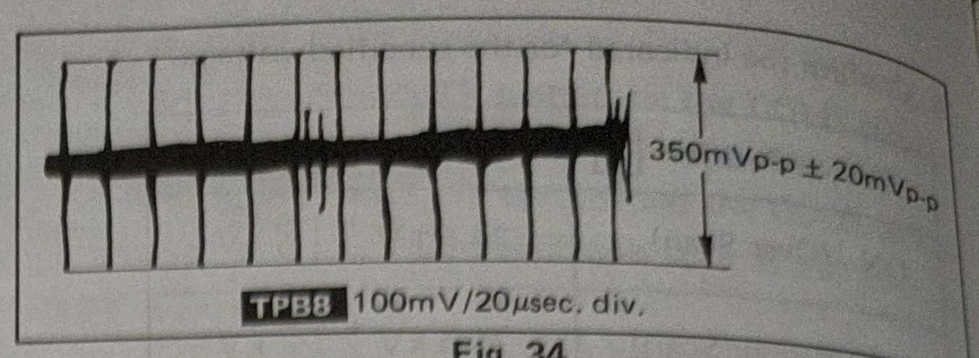


Fig. 34

Y (LUMINANCE) LEVEL ADJUSTMENT

1. Apply a full field color bar signal.
2. Connect an oscilloscope to **TPB9** and GND.
3. Set the following controls and switches to the position indicated.
   Aperture VR (R5814) . . . . . fully counterclockwise
   Filter selector switch (SW5808) . . . . . COMB
   Color mode selector switch (SW5810) . . . . . AUTO
   Preset switch (SW5815) . . . . . OFF
4. Adjust R324 (Y-Level) so that the **TPB9** becomes 1.00Vp-p ± 0.05Vp-p as shown in Fig. 35.

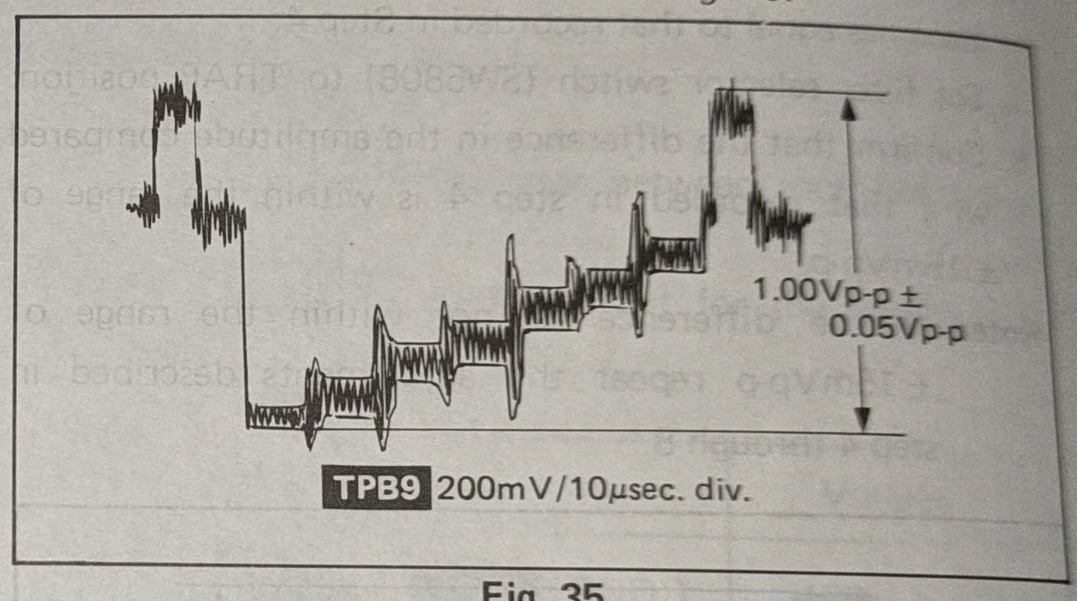


Fig. 35

5. Turn the aperture VR (R5814) clockwise and confirm that the spike moves smoothly onto edge of the waveform.

COLOR SYNCHRONIZING ADJUSTMENT

1. Apply a full field color bar signal.
2. Connect an oscilloscope to IC601 (⑫ pin) and GND.
3. Set the following controls and switches to the position indicated.
   Phase VR (R5809). . . . . center
   Chroma VR (R5804) . . . . . fully clockwise
   Filter selector switch (SW5808) . . . . . COMB
   Color mode selector switch (SW5810) . . . . . AUTO
   Preset switch (SW5815) . . . . . OFF
4. Confirm that the color bar signal is present. If it is not, adjust R626 (COLOR Sync) so that the color bar signal appears.
5. Measure and record the voltage of IC601 (⑫ pin) at this moment.
6. Turn the color bar signal to black and white signal.
7. Adjust R626 (COLOR Sync) so that the difference between the voltage of IC601 (⑫ pin) at this moment

and the voltage recorded is Step 4 is within the range of ± 0.020V.

8. Turn the color bar output to the color signal.
9. Turn phase VR (R5809) both ways to confirm that the color does not disappear.
10. Confirm that the color is put on without delay when the color bar output is switched-over from the black and white signal to the color signal.

SUB CHROMA ADJUSTMENT

1. Apply a full field color bar signal.
2. Connect an oscilloscope to **TPB14** and GND.
3. Set the following switches to the position indicated.

   Filter selector switch (SW5808) . . . . . COMB
   Color mode selector switch (SW5810) . . . . . AUTO
   Preset switch (SW5815) . . . . . OFF
   H-Delay switch ⊟ . . . . . OFF
   V-Delay switch ⊟ . . . . . OFF

4. Adjust phase VR (R5809) and Chroma VR (R5804) so that the waveform **TPB14** becomes as shown in Fig. 36.

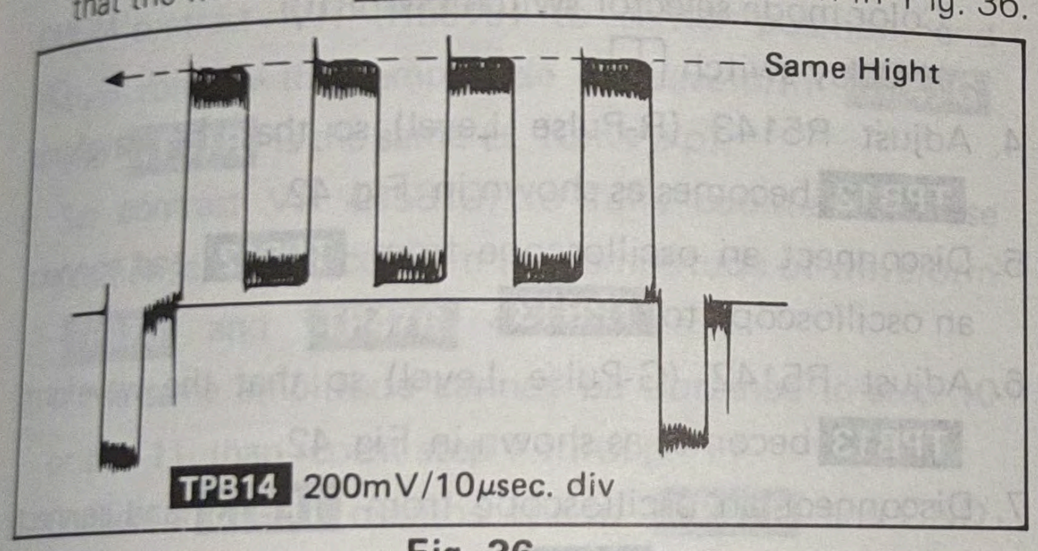


Fig. 36

5. Disconnect an oscilloscope from **TPB14** and connect an oscilloscope to **TPB6**.
6. Adjust R619 (SUB. Chroma) so that the **TPB6** becomes 1.0Vp-p ± 0.05Vp-p as shown in Fig. 37.

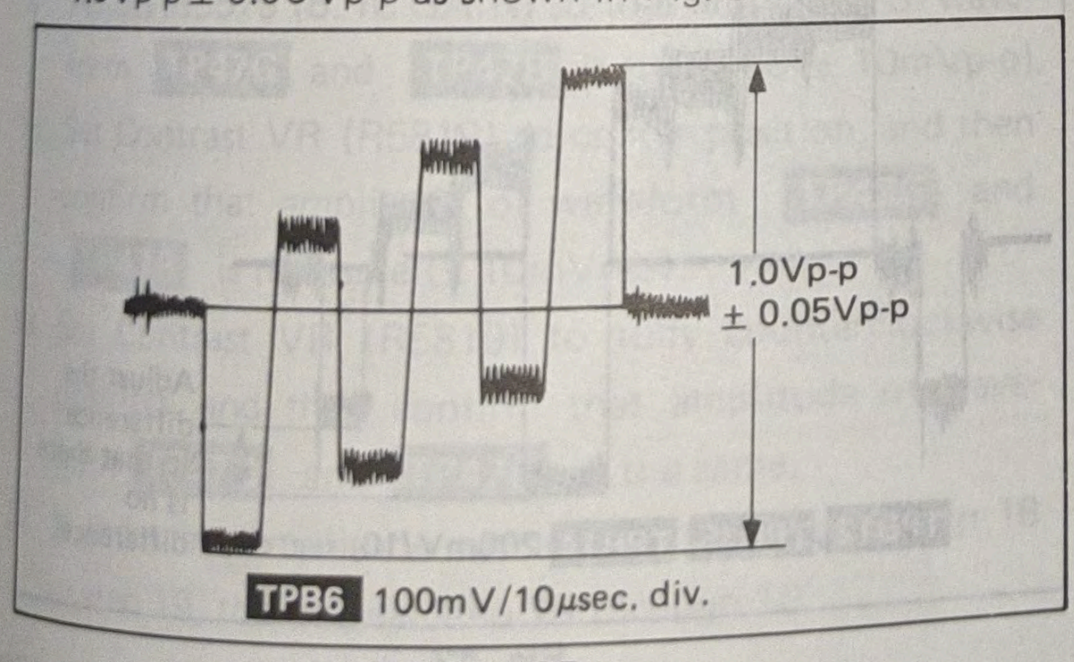
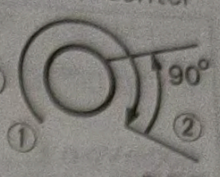


Fig. 37

COLOR GAIN AND PHASE ADJUSTMENT

1. Apply a full field color bar signal.
2. Connect an oscilloscope to **TPB6** and GND.
3. Set the following controls and switches to the position indicated.

   Phase VR (R5809). . . . . center
   Chroma VR (R5804) . . . Step ①→②



   Preset switch (SW5815) . . . . . OFF

4. Set color mode selector switch (SW5810) to the AUTO position.
5. Record the waveform **TPB6**.
6. Set color mode selector switch (SW5810) to the COLOR position.
7. Adjust R621 (CHROMA Gain) and R623 (TINT Comp) so that the waveform at this point of time becomes equal to that recorded in Step 5 as shown in Fig. 38.
8. Set color mode selector switch (SW5810) to the AUTO position.
9. Confirm that the waveform at this point of time is equal to the waveform recorded in Step 7.

NOTE: In case a difference in the waveform is observed, repeat the adjustment described in Step 5 through 9.

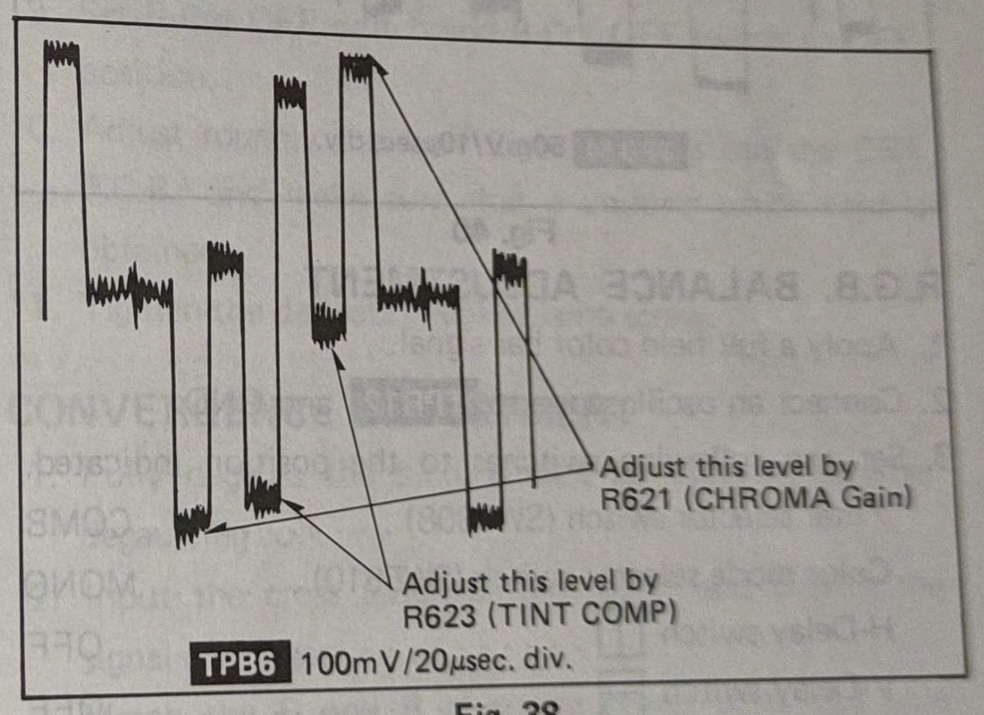


Fig. 38

10. Disconnect an oscilloscope from **TPB6** and connect an oscilloscope to **TPB5**.
11. Turn the color mode switch (SW5810) to AUTO and COLOR several times. Confirm that there is no difference in waveform at each position. Also, while watching the display on the screen, confirm that there is no change in hue and saturation.

SUB COLOR ADJUSTMENT

1. Apply a full field color bar signal.
2. Connect an oscilloscope to **TPB14** and GND.
3. Set the following switches to the position indicated.

   Filter selector switch (SW5808) . . . . . COMB
   Color mode selector switch (SW5810) . . . . . AUTO
   Preset switch (SW5815) . . . . . OFF
   H-Delay switch ⊟ . . . . . OFF
   V-Delay switch ⊟ . . . . . OFF

and the voltage recorded is Step 4 is within the range of ± 0.020V.

8. Turn the color bar output to the color signal.
9. Turn phase VR (R5809) both ways to confirm that the color does not disappear.
10. Confirm that the color is put on without delay when the color bar output is switched-over from the black and white signal to the color signal.

SUB CHROMA ADJUSTMENT

1. Apply a full field color bar signal.
2. Connect an oscilloscope to **TPB14** and GND.
3. Set the following switches to the position indicated.

   Filter selector switch (SW5808) . . . . . COMB
   Color mode selector switch (SW5810) . . . . . AUTO
   Preset switch (SW5815) . . . . . OFF
   H-Delay switch ◫ . . . . . OFF
   V-Delay switch ⊟ . . . . . OFF

4. Adjust phase VR (R5809) and Chroma VR (R5804) so that the waveform **TPB14** becomes as shown in Fig. 36.

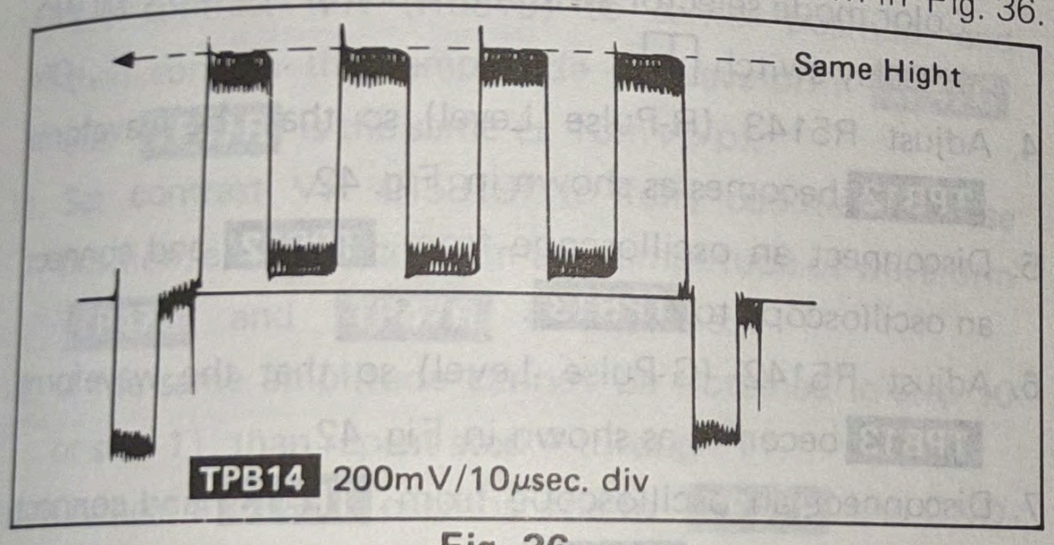


Fig. 36

5. Disconnect an oscilloscope from **TPB14** and connect an oscilloscope to **TPB6**.
6. Adjust R619 (SUB. Chroma) so that the **TPB6** becomes 1.0Vp-p ± 0.05 Vp-p as shown in Fig. 37.

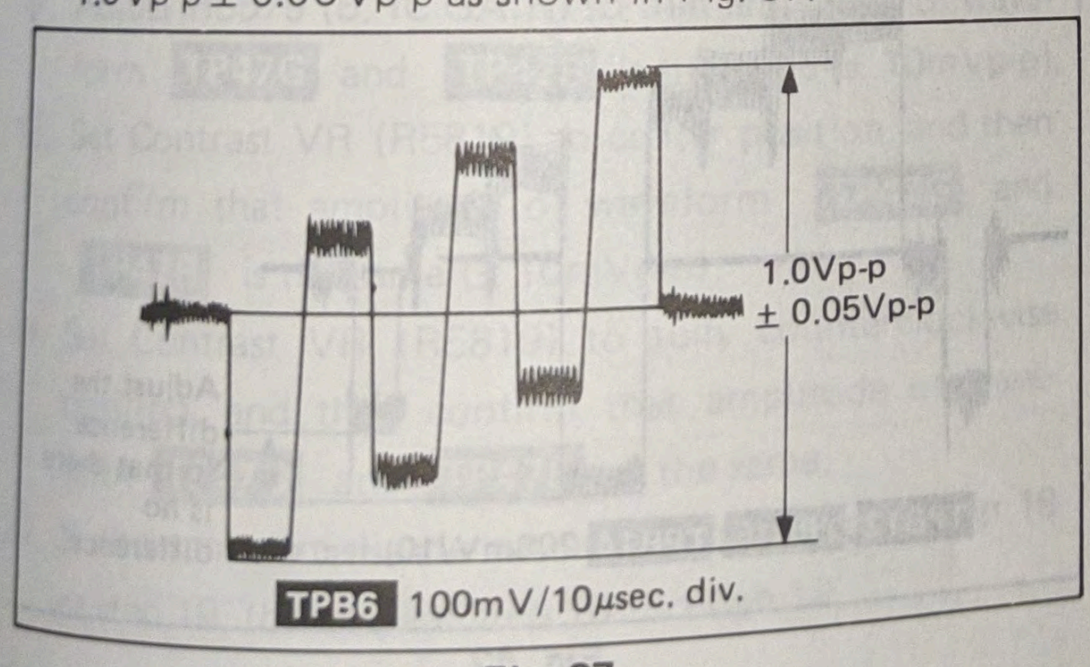
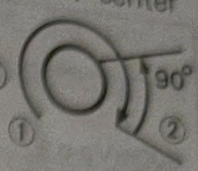


Fig. 37

COLOR GAIN AND PHASE ADJUSTMENT

1. Apply a full field color bar signal.
2. Connect an oscilloscope to **TPB6** and GND.
3. Set the following controls and switches to the position indicated.

   Phase VR (R5809). . . . . center
   Chroma VR (R5804) . . . Step ①→②
   Preset switch (SW5815) . . . . . OFF



4. Set color mode selector switch (SW5810) to the AUTO position.
5. Record the waveform **TPB6**.
6. Set color mode selector switch (SW5810) to the COLOR position.
7. Adjust R621 (CHROMA Gain) and R623 (TINT Comp) so that the waveform at this point of time becomes equal to that recorded in Step 5 as shown in Fig. 38.
8. Set color mode selector switch (SW5810) to the AUTO position.
9. Confirm that the waveform at this point of time is equal to the waveform recorded in Step 7.

NOTE: In case a difference in the waveform is observed, repeat the adjustment described in Step 5 through 9.

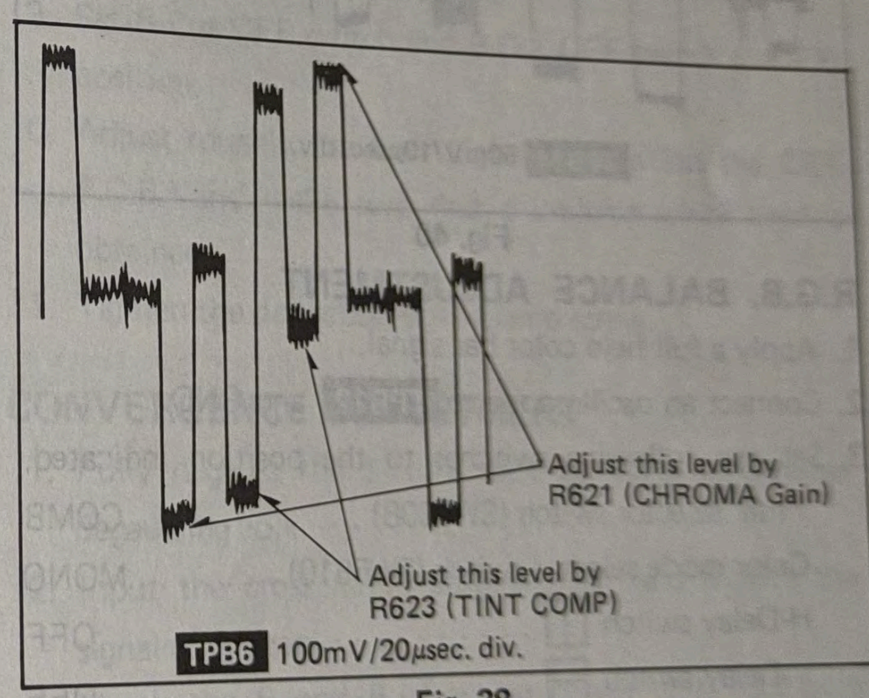


Fig. 38

10. Disconnect an oscilloscope from **TPB6** and connect an oscilloscope to **TPB5**.
11. Turn the color mode switch (SW5810) to AUTO and COLOR several times. Confirm that there is no difference in waveform at each position. Also, while watching the display on the screen, confirm that there is no change in hue and saturation.

SUB COLOR ADJUSTMENT

1. Apply a full field color bar signal.
2. Connect an oscilloscope to **TPB14** and GND.
3. Set the following switches to the position indicated.

   Filter selector switch (SW5808) . . . . . COMB
   Color mode selector switch (SW5810) . . . . . AUTO
   Preset switch (SW5815) . . . . . OFF
   H-Delay switch ◫ . . . . . OFF
   V-Delay switch ⊟ . . . . . OFF

4. Adjust chroma VR (R5804) and Phase VR (R5809) so that the waveform **TPB14** becomes as shown in Fig. 39.

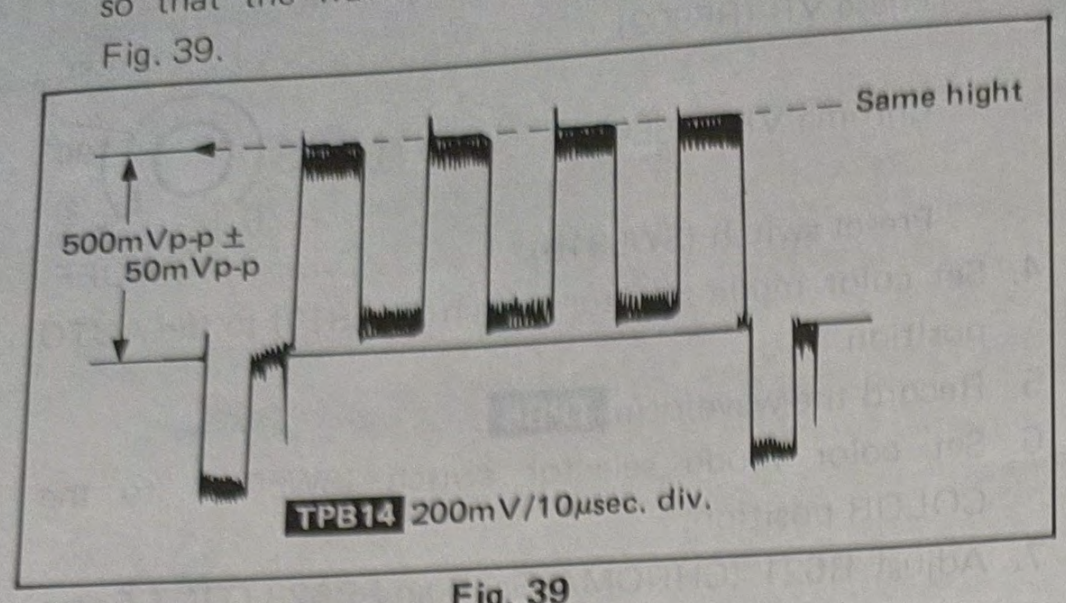


Fig. 39

5. Set chroma VR (R5804) to fully clockwise position.
6. Adjust R5106 (Sub. Color) so that the waveform **TPB14** becomes 1.05Vp-p ± 0.05V as shown in Fig. 40.

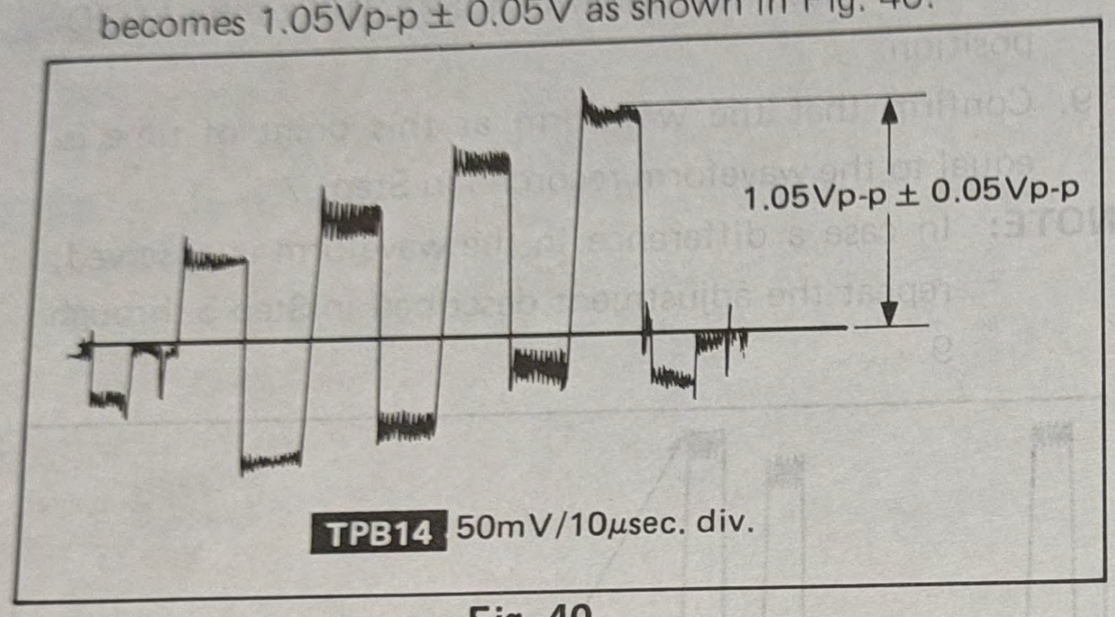


Fig. 40

R.G.B. BALANCE ADJUSTMENT

1. Apply a full field color bar signal.
2. Connect an oscilloscope to **TPB12** and GND.
3. Set the following switches to the position indicated.
   - Filter selector switch (SW5808) . . . . . COMB
   - Color mode selector switch (SW5810) . . . . . MONO
   - H-Delay switch ◫ . . . . . OFF
   - V-Delay switch ⊟ . . . . . OFF
4. Measure and record the amplitude of the waveform **TPB12** as shown in Fig. 41.

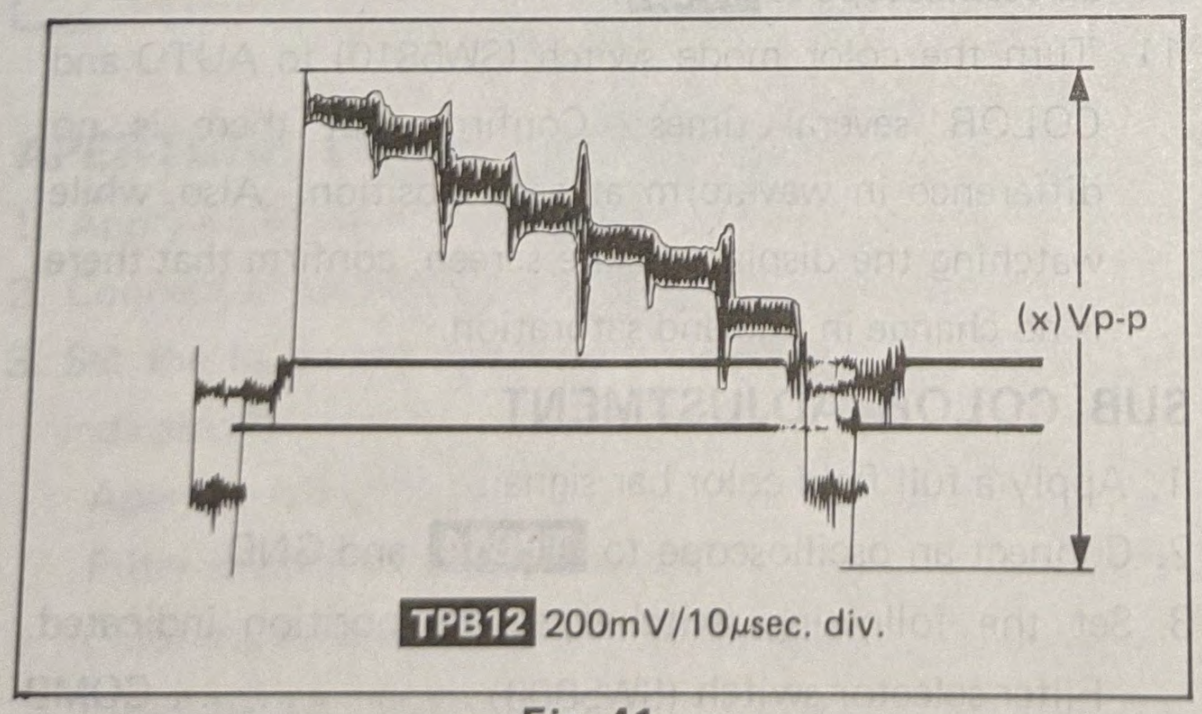


Fig. 41

5. Disconnect an oscilloscope from **TPB12** and connect an oscilloscope to **TPB13**.
6. Adjust R5115 (G-Level) so that the amplitude of **TPB13** becomes equal to the amplitude (**TPB12**) recorded in Step 4.
7. Disconnect an oscilloscope from **TPB13** and connect and oscilloscope to **TPB14**.
8. Adjust R5116 (B-Level) so that the amplitude of **TPB14** becomes equal to the amplitude (**TPB12**) recorded in Step 4.
9. Confirm that the difference in amplitude among **TPB12**, **TPB13** and **TPB14** is within the range of ± 0.02Vp-p.

NOTE: If the difference in amplitude is more than ± 0.02Vp-p repeat the adjustments of Step 4 through 9.

H/V DELAY WHITE BALANCE ADJUSTMENT

1. Apply a full field color bar signal.
2. Connect an oscilloscope to **TPB12** and GND.
3. Set the following switches to the position indicated.
   - Filter selector switch (SW5808) . . . . . COMB
   - Color mode selector switch (SW5810) . . . . . MONO
   - H-Delay switch ◫ . . . . . ON
4. Adjust R5143 (R-Pulse Level) so that the waveform **TPB12** becomes as shown in Fig. 42.
5. Disconnect an oscilloscope from **TPB12** and connect an oscilloscope to **TPB13**.
6. Adjust R5142 (G-Pulse Level) so that the waveform **TPB13** becomes as shown in Fig. 42.
7. Disconnect an oscilloscope from **TPB13** and connect an oscilloscope to **TPB14**.
8. Adjust R5144 (B-Pulse Level) so that the waveform **TPB14** becomes as shown in Fig. 42.

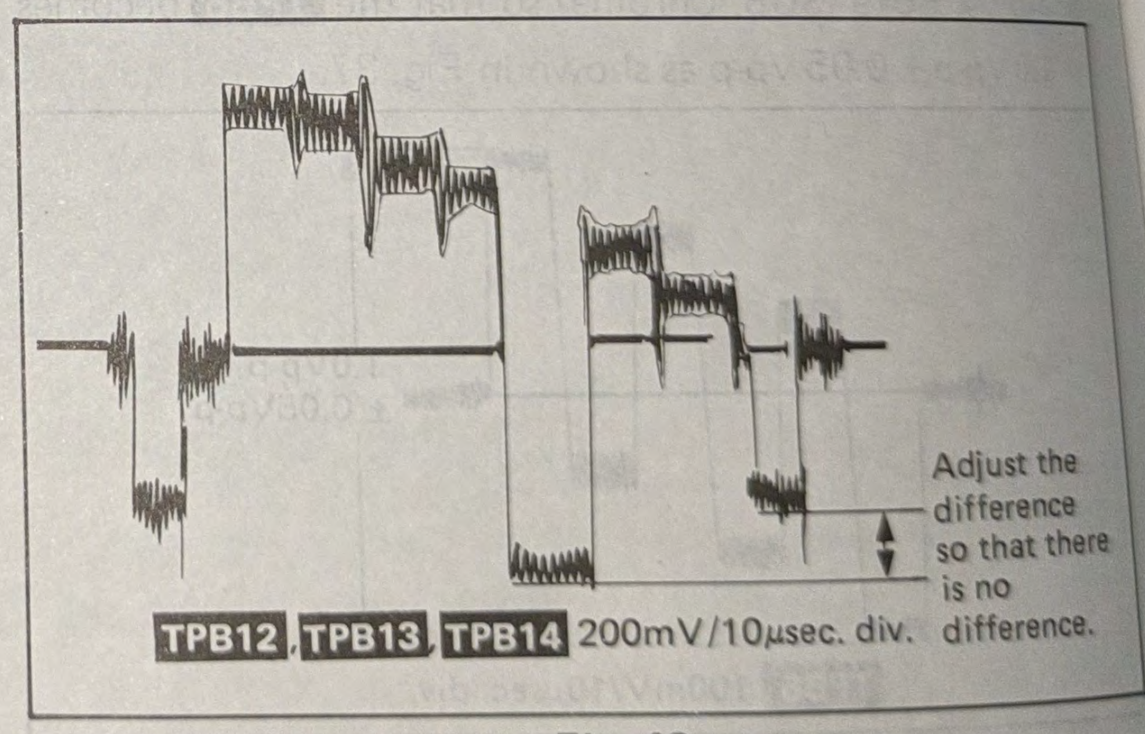


Fig. 42

9. While watching the display on the screen, confirm that there is no significant change in the white balance on the entire screen when the H-Delay switch ◫ is turn ON and OFF several times.

4. Adjust chroma VR (R5804) and Phase VR (R5809) so that the waveform **TPB14** becomes as shown in Fig. 39.

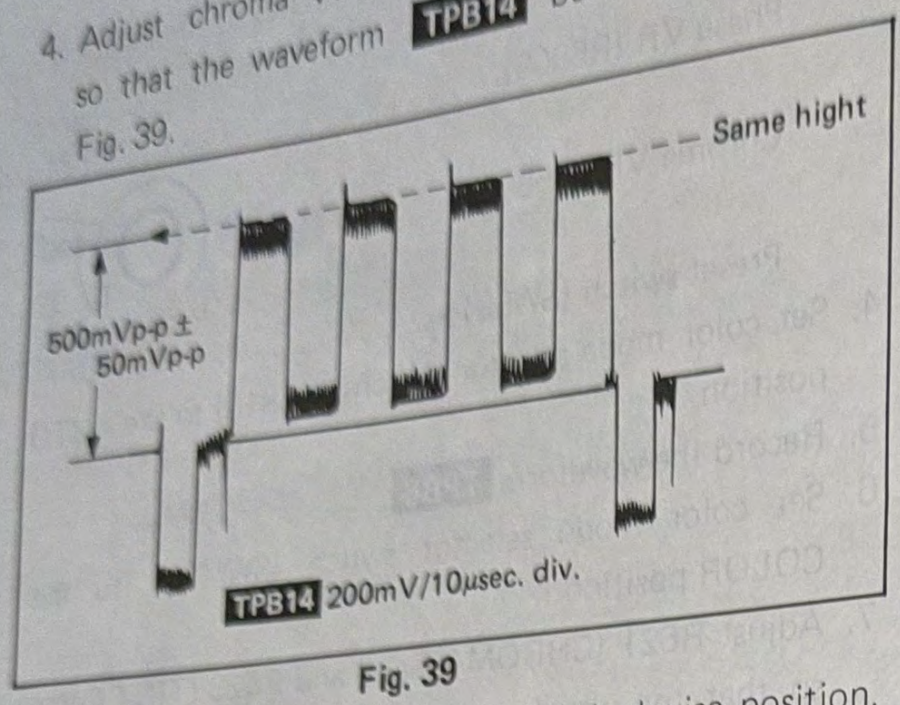


Fig. 39

5. Set chroma VR (R5804) to fully clockwise position.
6. Adjust R5106 (Sub. Color) so that the waveform **TPB14** becomes 1.05Vp-p ± 0.05V as shown in Fig. 40.

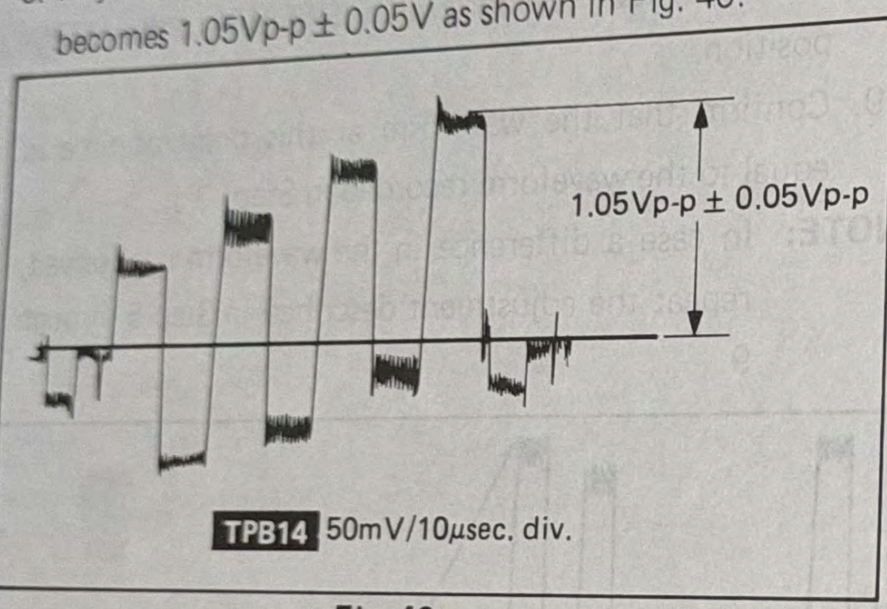


Fig. 40

R.G.B. BALANCE ADJUSTMENT

1. Apply a full field color bar signal.
2. Connect an oscilloscope to **TPB12** and GND.
3. Set the following switches to the position indicated.
   Filter selector switch (SW5808) . . . . . COMB
   Color mode selector switch (SW5810) . . . . . MONO
   H-Delay switch ⊞ . . . . . OFF
   V-Delay switch ⊟ . . . . . OFF
4. Measure and record the amplitude of the waveform **TPB12** as shown in Fig. 41.

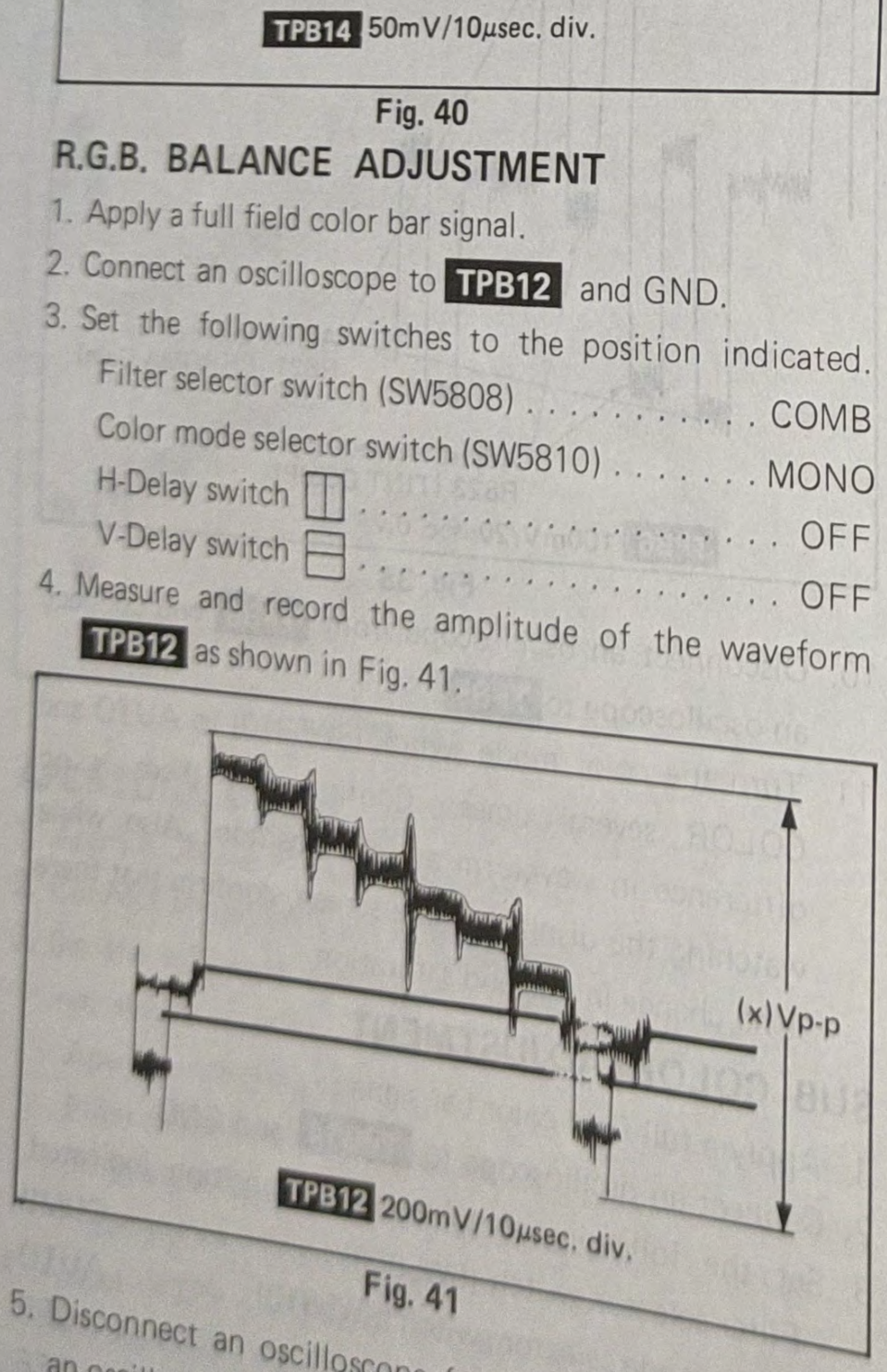


Fig. 41

5. Disconnect an oscilloscope from **TPB12** and connect an oscilloscope to **TPB13**.
6. Adjust R5115 (G-Level) so that the amplitude of **TPB13** becomes equal to the amplitude (**TPB12**) recorded in Step 4.
7. Disconnect an oscilloscope from **TPB13** and connect and oscilloscope to **TPB14**.
8. Adjust R5116 (B-Level) so that the amplitude of **TPB14** becomes equal to the amplitude (**TPB12**) recorded in Step 4.
9. Confirm that the difference in amplitude among **TPB12** **TPB13** and **TPB14** is within the range of ± 0.02Vp-p.

NOTE: If the difference in amplitude is more than ± 0.02Vp-p repeat the adjustments of Step 4 through 9.

H/V DELAY WHITE BALANCE ADJUSTMENT

1. Apply a full field color bar signal.
2. Connect an oscilloscope to **TPB12** and GND.
3. Set the following switches to the position indicated.
   Filter selector switch (SW5808) . . . . . COMB
   Color mode selector switch (SW5810) . . . . . MONO
   H-Delay switch ⊞ . . . . . ON
4. Adjust R5143 (R-Pulse Level) so that the waveform **TPB12** becomes as shown in Fig. 42.
5. Disconnect an oscilloscope from **TPB12** and connect an oscilloscope to **TPB13**.
6. Adjust R5142 (G-Pulse Level) so that the waveform **TPB13** becomes as shown in Fig. 42.
7. Disconnect an oscilloscope from **TPB13** and connect an oscilloscope to **TPB14**.
8. Adjust R5144 (B-Pulse Level) so that the waveform **TPB14** becomes as shown in Fig. 42.

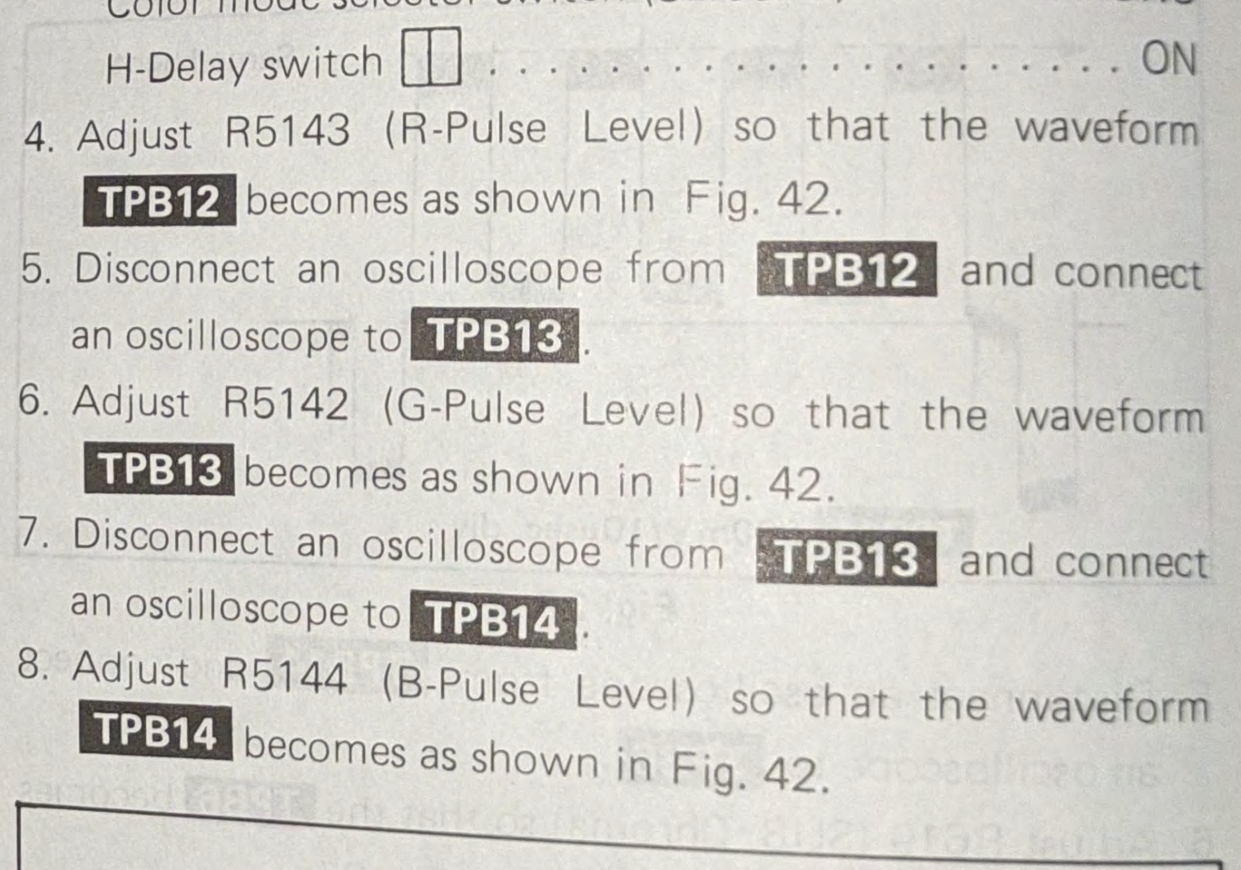


Fig. 42

9. While watching the display on the screen, confirm that there is no significant change in the white balance on the entire screen when the H-Delay switch ⊞ is turn ON and OFF several times.

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ADJUSTMENT

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IC GAIN ADJUSTMENT

1. Apply a window pattern signal.
2. Connect a CH-A of oscilloscope to TPB13 and GND.
3. Connect a CH-B of oscilloscope to TPB12 and GND.
4. Set the following controls switches to the position indicated:
   - Contrast VR (R5819) . . . . . Center
   - Preset switch (SW5815) . . . . . OFF
   - Blue signal only switch (SW5809) . . . . . OFF
   - H/V Delay switch . . . . . OFF
5. Confirm that amplitude of waveform TPB12, TPB13 and TPB14 is the same.
6. Disconnect an oscilloscope from TPB12 and TPB13 and connect an oscilloscope to TP47G and TP47R.
7. Adjust R5542 (R. IC BIAS) so that amplitude of waveform TP47G and TP47R is the same (±10mVp-p).
8. Set contrast VR (R5819) to fully clockwise position.
9. Adjust R5577 (R. IC GAIN) so that amplitude of waveform TP47G and TP47R is the same (±10mVp-p).
10. Set contrast VR (R5819) to center position, and then confirm that amplitude of waveform TP47G and TP47R is the same (± 10mVp-p).
11. Set contrast VR (R5819) to fully counterclockwise position, and then confirm that amplitude of waveform TP47G and TP47R is the same.
12. If the same amplitude cannot be obtained in step 10 or step 11, than repeat step 7 through 11.
13. Connect a CH-B of oscilloscope to TP47B and GND.
14. Set Contrast VR (R5819) to center position.
15. Adjust R5546 (B. IC BIAS) so that amplitude of waveform TP47G and TP47B is the same (± 10mVp-p).
16. Set Contrast VR (R5819) to fully clockwise position.
17. Adjust R5579 (B. IC GAIN) so that amplitude of waveform TP47G and TP47B is the same (± 10mVp-p).
18. Set Contrast VR (R5819) to center position, and then confirm that amplitude of waveform TP47G and TP47B is the same (± 10mVp-p).
19. Set Contrast VR (R5819) to fully counterclockwise position, and then confirm that amplitude of waveform TP47G and TP47B is the same.
20. If the same amplitude cannot be obtained in step 18 or step 19, then repeat step 14 through 19.

COLOR PURITY ADJUSTMENT

1. Operate the monitor over 30 minutes.
2. Fully degauss the picture tube by using an external degaussing coil.
3. Apply a crosshatch pattern signal and adjust roughly the static convergence magnets.
4. Apply a video signal of white full field.
5. Set R-Cut OFF switch and B-Cut OFF switch to ON position.
6. Loosen the deflection yoke clamp screw and move the deflection yoke as close to the purity magnets as possible.
7. Remove the silicone sealer and adjust the purity magnets so that a green circle field is obtained at the center of the screen as shown in Fig. 43.

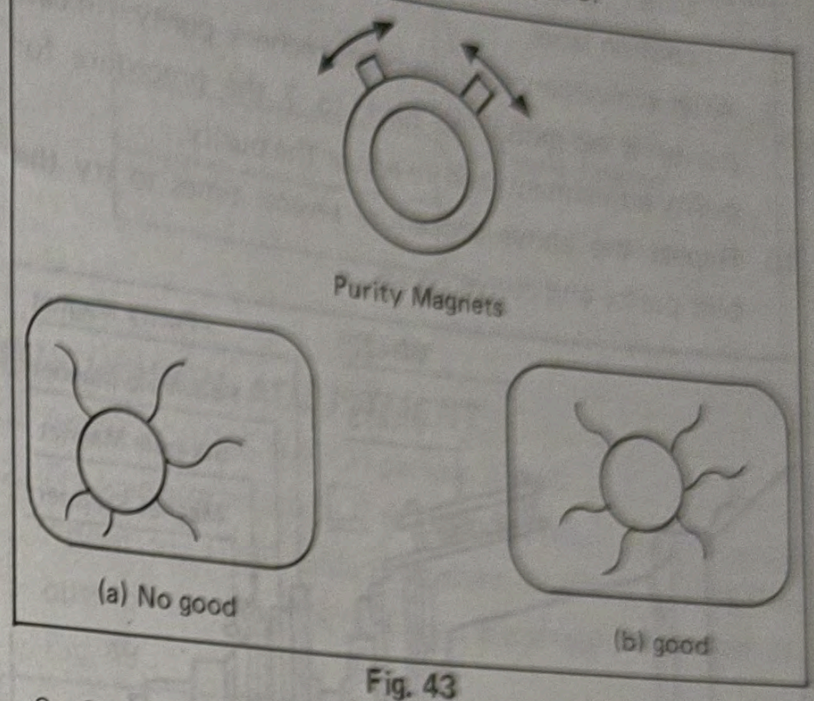


Fig. 43

8. Slowly position the deflection yoke and set it where a uniform green field is obtained.
9. Set R-Cut OFF switch and B-Cut OFF switch to OFF position.
10. Adjust roughly the Low Light controls (on the CRT P.C.B.) and make sure that a uniform white field is obtained.
11. Tighten the deflection yoke clamp screw.

CONVERGENCE ADJUSTMENT

1. Fully degauss the picture tube by using an external degaussing coil.
2. Input the cross hatch pattern of R and B with the signal generator.
3. Match the R and B at screen center with four pole magnet. (Rotate the two ring magnets to move the red, blue dots circularly in the opposite derection.)
4. Input the cross hatch pattern of R.G.B. with the signal generator.
5. At the screen center, match R and B to G with the six-pole magnet.
6. Fine tune the D.Y. location to get good convergence on the whole screen.
7. Adjust the convergence of the fringe area (four corners), using R472 and R473 as shown in Fig. 44.

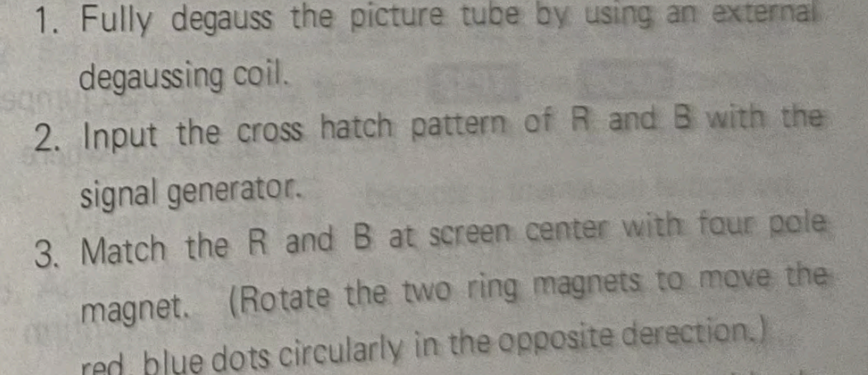


Fig. 44

GAIN ADJUSTMENT

1. Apply a window pattern signal.
2. Connect a CH-A of oscilloscope to **TPB13** and GND.
3. Connect a CH-B of oscilloscope to **TPB12** and GND.
4. Set the following controls switches to the position indicated:

Contrast VR (R5819)	Center
Preset switch (SW5815)	OFF
Blue signal only switch (SW5809)	OFF
H/V Delay switch	OFF

5. Confirm that amplitude of waveform **TPB12**, **TPB13** and **TPB14** is the same.
6. Disconnect an oscilloscope from **TPB12** and **TPB13** and connect an oscilloscope to **TP47G** and **TP47R**.
7. Adjust R5542 (R. IC BIAS) so that amplitude of waveform **TP47G** and **TP47R** is the same (± 10mVp-p).
8. Set contrast VR (R5819) to fully clockwise position.
9. Adjust R5577 (R. IC GAIN) so that amplitude of waveform **TP47G** and **TP47R** is the same (± 10mVp-p).
10. Set contrast VR (R5819) to center position, and then confirm that amplitude of waveform **TP47G** and **TP47R** is the same (± 10mVp-p).
11. Set contrast VR (R5819) to fully counterclockwise position, and then confirm that amplitude of waveform **TP47G** and **TP47R** is the same.
12. If the same amplitude cannot be obtained in step 10 or step 11, than repeat step 7 through 11.
13. Connect a CH-B of oscilloscope to **TP47B** and GND.
14. Set Contrast VR (R5819) to center position.
15. Adjust R5546 (B. IC BIAS) so that amplitude of waveform **TP47G** and **TP47B** is the same (± 10mVp-p).
16. Set Contrast VR (R5819) to fully clockwise position.
17. Adjust R5579 (B. IC GAIN) so that amplitude of waveform **TP47G** and **TP47B** is the same (± 10mVp-p).
18. Set Contrast VR (R5819) to center position, and then confirm that amplitude of waveform **TP47G** and **TP47B** is the same (± 10mVp-p).
19. Set Contrast VR (R5819) to fully counterclockwise position, and then confirm that amplitude of waveform **TP47G** and **TP47B** is the same.
20. If the same amplitude cannot be obtained in step 18 or step 19, then repeat step 14 through 19.

COLOR PURITY ADJUSTMENT

1. Operate the monitor over 30 minutes.
2. Fully degauss the picture tube by using an external degaussing coil.
3. Apply a crosshatch pattern signal and adjust roughly the static convergence magnets.
4. Apply a video signal of white full field.
5. Set R-Cut OFF switch and B-Cut OFF switch to ON position.
6. Loosen the deflection yoke clamp screw and move the deflection yoke as close to the purity magnets as possible.
7. Remove the silicone sealer and adjust the purity magnets so that a green circle field is obtained at the center of the screen as shown in Fig. 43.

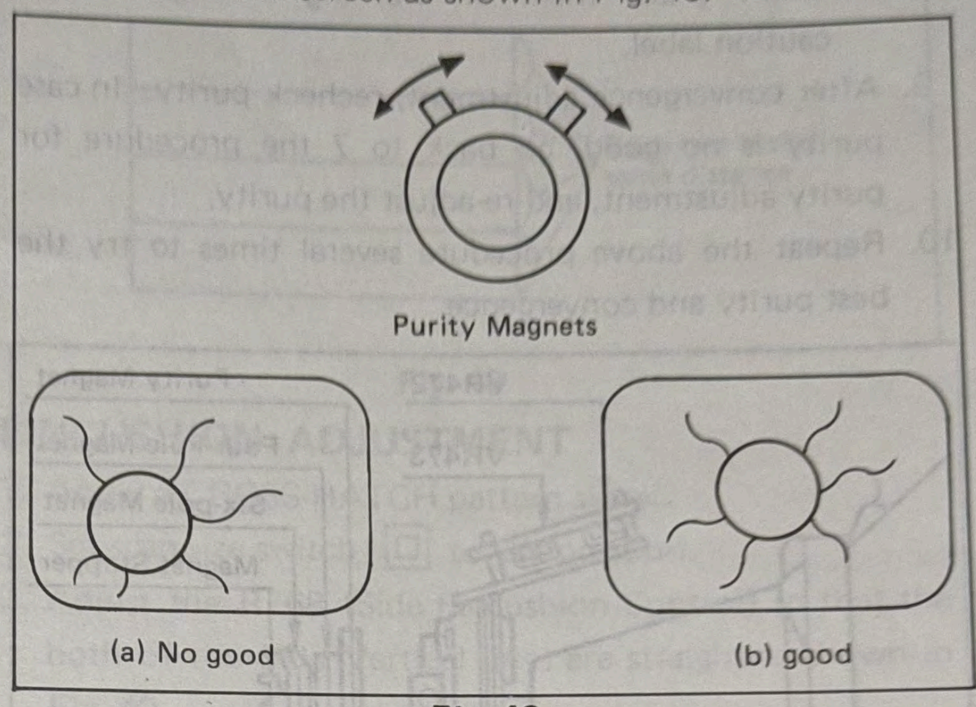


Fig. 43

8. Slowly position the deflection yoke and set it where a uniform green field is obtained.
9. Set R-Cut OFF switch and B-Cut OFF switch to OFF position.
10. Adjust roughly the Low Light controls (on the CRT P.C.B.) and make sure that a uniform white field is obtained.
11. Tighten the deflection yoke clamp screw.

CONVERGENCE ADJUSTMENT

1. Fully degauss the picture tube by using an external degaussing coil.
2. Input the cross hatch pattern of R and B with the signal generator.
3. Match the R and B at screen center with four pole magnet. (Rotate the two ring magnets to move the red, blue dots circularly in the opposite derection.)
4. Input the cross hatch pattern of R.G.B. with the signal generator.
5. At the screen center, match R and B to G with the six-pole magnet.
6. Fine tune the D.Y. location to get good convergence on the whole screen.
7. Adjust the convergence of the fringe area (four corners), using R472 and R473 as shown in Fig. 44.

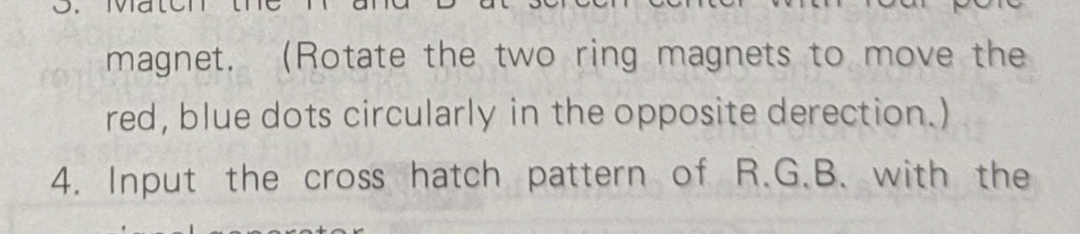


Fig. 44

A/B SPLIT POSITION ADJUSTMENT

1. Apply a full field color bar signal to the LINE A IN terminal on the rear panel.
2. Apply a full field color bar signal to the LINE B IN terminal on the rear panel.
3. Set the following controls and switches to the position indicated.
   - H-Delay switch ◫ . . . . . OFF
   - V-Delay switch ⊟ . . . . . OFF
   - Under scan switch ▣ . . . . . OFF
   - Sync. switch . . . . . INT
   - A/B Split switch . . . . . OFF
4. Set sync. switch to the EXT. position.
5. Confirm that there is no difference in screen.
6. Set sync. switch to the INT. position.
7. Set A/B split switch (SW5805) to ON position.
8. Adjust R5991 (A/B split position) so that the dividing line on the screen becomes a half and half as shown in Fig. 51.

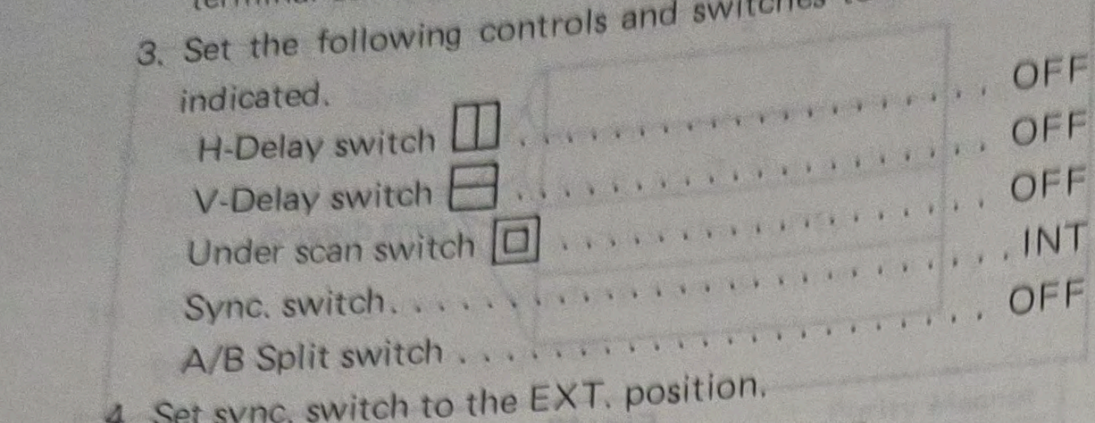


Fig. 51

S-VIDEO CHROMA ADJUSTMENT

1. Apply a full field color bar signal to the LINE A IN terminal on the rear panel.
2. Apply a Y/C signal (Full Field color bar) to the S-Video IN terminal on the rear panel.
3. Connect an oscilloscope to **TPB6** and **TPB11** (GND).
4. Set the following controls and switches to the position indicated.
   - Chroma VR (R5804) . . . . . fully clockwise
   - Phase VR (R5809). . . . . center
   - Pre-set switch (SW5815) . . . . . OFF
   - Color mode selector switch (SW5810) . . . . . AUTO
   - 8P S-Video selector switch (SW5201) 75Ω
5. Set input selector switch (SW5801) to LINE A position.
6. Measure and record the amplitude of the waveform **TPB6** as shown in Fig. 52.

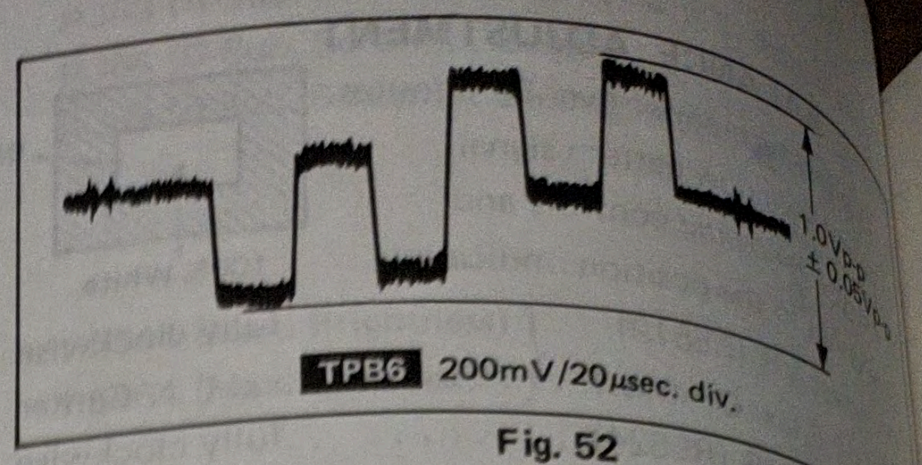


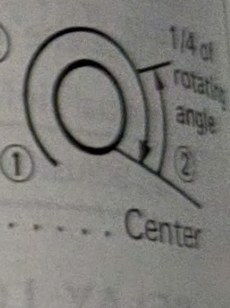
Fig. 52

7. Set input selector switch (SW5801) to VTR position.
8. Adjust R5216 (S-VHS Chroma) so that the amplitude of **TPB6** becomes equal to that of Step 6.
9. Turn input selector switch (SW5801) to LINE A and VTR several times. Confirm that there is no difference in waveform at each position, also, while watching the display on the screen, confirm that there is no change in chroma.

PRESET ADJUSTMENT

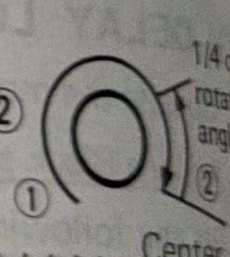
1. Apply a SMPTE color bar signal.
2. Fully degauss the picture tube by using an external degaussing coil.
3. Set preset switch (SW5815) to ON position.

Preset Contrast (R5817) . . Step ① → ②



Preset Brightness (R5822). . . . . Center

Preset Chroma (R5802) . . Setp ① → ②



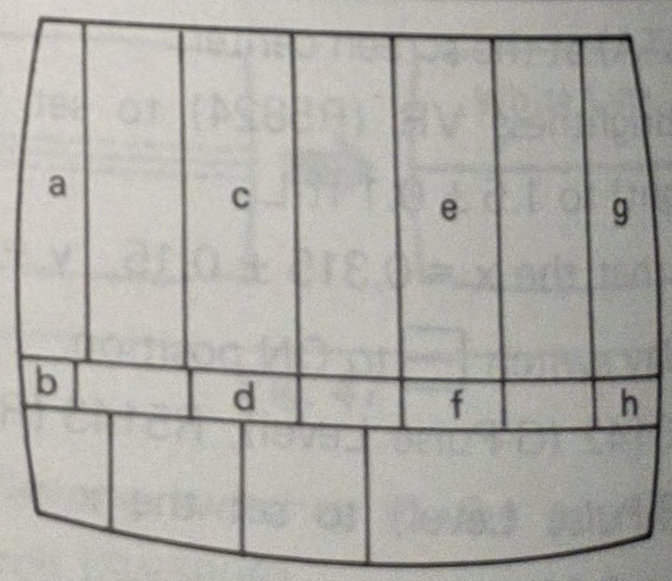
Preset Phase (R5807) . . . . . Center

Preset Aperture (R5812). . . . fully counterclockwise

Blue signal/Only switch (SW5809) . . . . . ON

Under scan switch ▣ . . . . . OFF (Over Scan)

5. Adjust preset chroma (R5802), preset phase (R5807) so that the luminance at SMPTE color bar pattern (on the displayed) becomes Fig. 53.



Make adjustments to obtain the same level of brightness at each section from (a) through (h).

Fig. 53

A/B SPLIT POSITION ADJUSTMENT

1. Apply a full field color bar signal to the LINE A IN terminal on the rear panel.
2. Apply a full field color bar signal to the LINE B IN terminal on the rear panel.
3. Set the following controls and switches to the position indicated.
   - H-Delay switch ◫ ..... OFF
   - V-Delay switch ⊟ ..... OFF
   - Under scan switch ▣ ..... OFF
   - Sync. switch ..... INT
   - A/B Split switch ..... OFF
4. Set sync. switch to the EXT. position.
5. Confirm that there is no difference in screen.
6. Set sync. switch to the INT. position.
7. Set A/B split switch (SW5805) to ON position.
8. Adjust R5991 (A/B split position) so that the dividing line on the screen becomes a half and half as shown in Fig. 51.

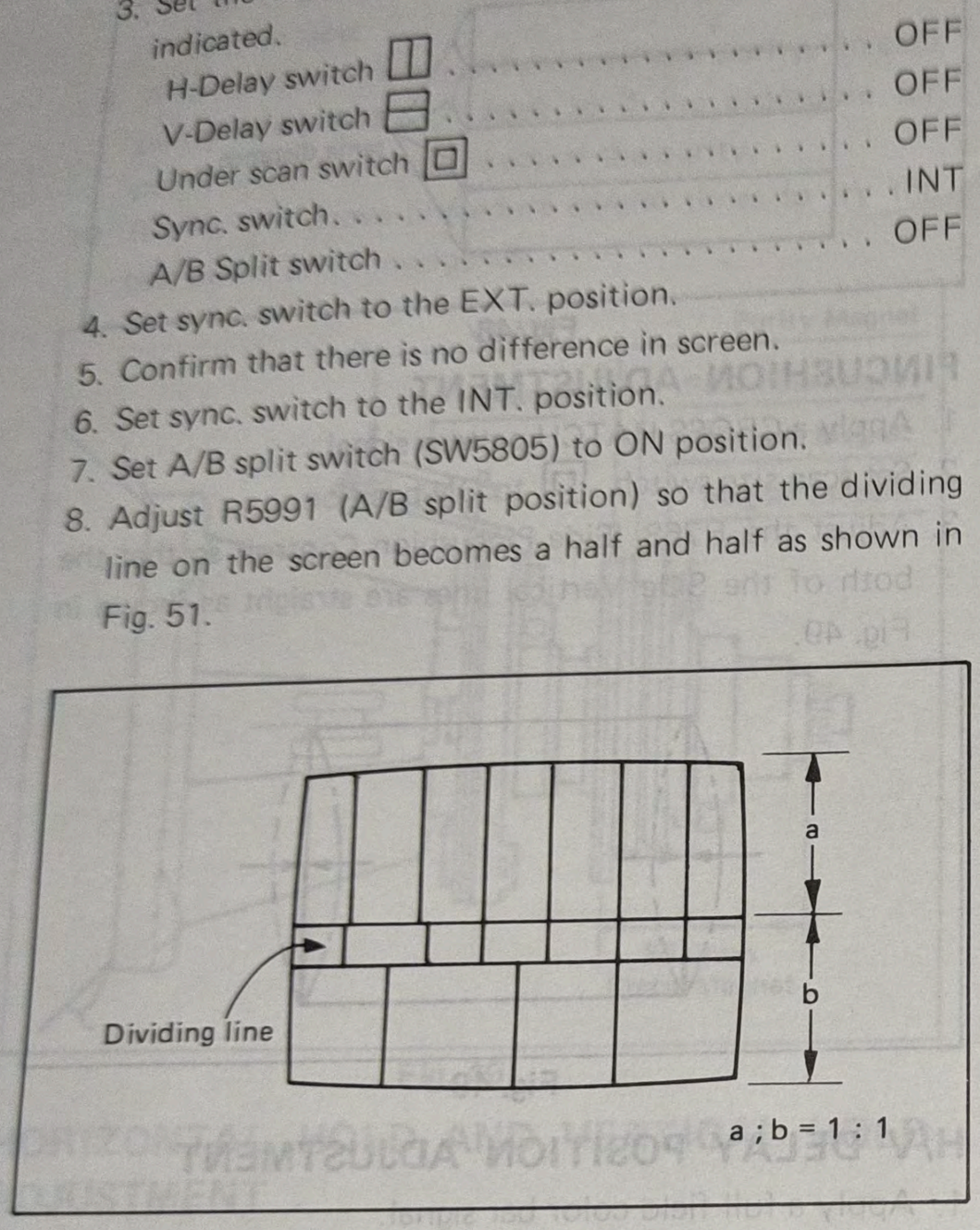


Fig. 51

S-VIDEO CHROMA ADJUSTMENT

1. Apply a full field color bar signal to the LINE A IN terminal on the rear panel.
2. Apply a Y/C signal (Full Field color bar) to the S-Video IN terminal on the rear panel.
3. Connect an oscilloscope to **TPB6** and **TPB11** (GND).
4. Set the following controls and switches to the position indicated.
   - Chroma VR (R5804) ..... fully clockwise
   - Phase VR (R5809) ..... center
   - Pre-set switch (SW5815) ..... OFF
   - Color mode selector switch (SW5810) ..... AUTO
   - 8P S-Video selector switch (SW5201) 75Ω
5. Set input selector switch (SW5801) to LINE A position.
6. Measure and record the amplitude of the waveform **TPB6** as shown in Fig. 52.

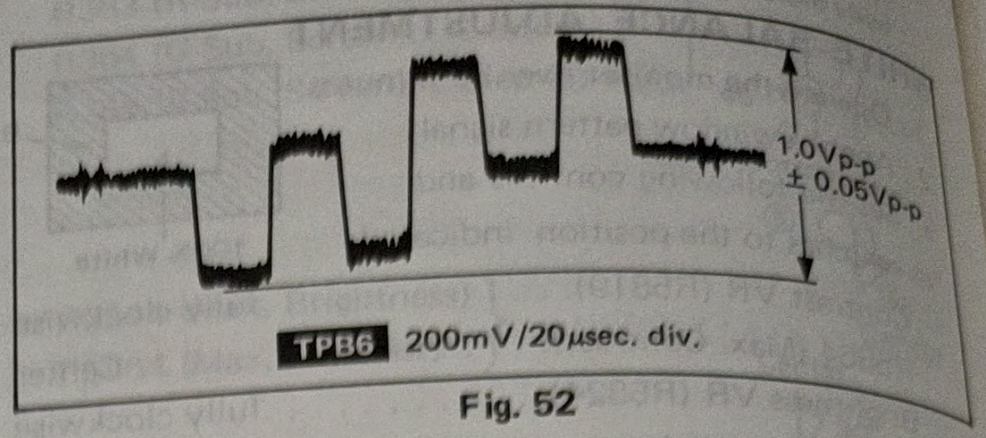


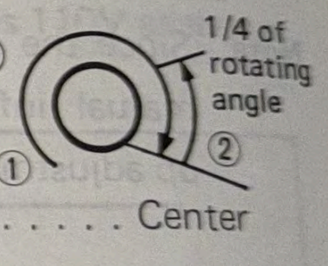
Fig. 52

7. Set input selector switch (SW5801) to VTR position.
8. Adjust R5216 (S-VHS Chroma) so that the amplitude of **TPB6** becomes equal to that of Step 6.
9. Turn input selector switch (SW5801) to LINE-A and VTR several times. Confirm that there is no difference in waveform at each position, also, while watching the display on the screen, confirm that there is no change in chroma.

PRESET ADJUSTMENT

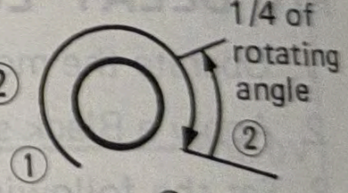
1. Apply a SMPTE color bar signal.
2. Fully degauss the picture tube by using an external degaussing coil.
3. Set preset switch (SW5815) to ON position.

Preset Contrast (R5817) . . Step ①→②



Preset Brightness (R5822) ..... Center

Preset Chroma (R5802) . . Setp ①→②



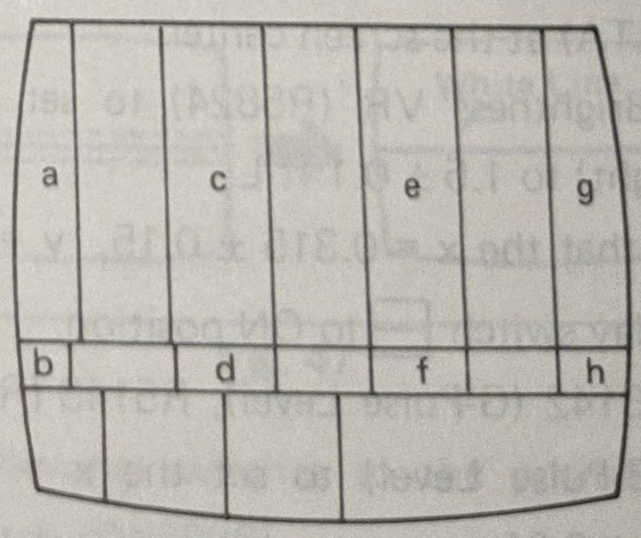
Preset Phase (R5807) ..... Center

Preset Aperture (R5812) . . . fully counterclockwise

Blue signal/Only switch (SW5809) ..... ON

Under scan switch ▣ ..... OFF (Over Scan)

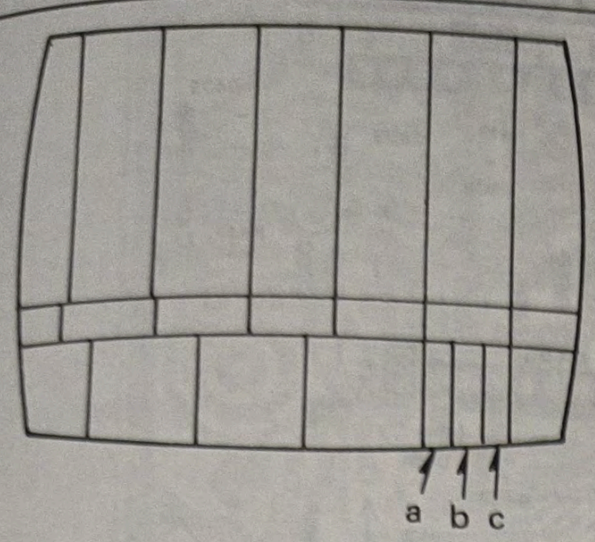
5. Adjust preset chroma (R5802), preset phase (R5807) so that the luminance at SMPTE color bar pattern (on the displayed) becomes Fig. 53.



Make adjustments to obtain the same level of brightness at each section from (a) through (h).

Fig. 53

6. Set blue signal only switch (SW5809) to OFF position.
7. Adjust brightness VR (R5822) so that the brightness at SMAPTE color bar pattern (On the displayed) becomes Fig. 54.



Only bar "C" can be observed dimly.

Fig. 54

8. Apply a window pattern signal.
9. Set the beam receiving part of TV-Color Analyzer (MINOLTA) to the window.
10. Adjust preset contrast (R5817) to set the luminance to the 30 ft-L.
11. Connect the positive lead of a DC ammeter to **TPD1** (+), and the negative lead to **TPD2** (–).
12. Confirm so that the DC ammeter is within a range of 225 ± 65μA.
13. Apply a crosshatch pattern signal.
14. Connect an oscilloscope to **TPB9** and **TPB11** (GND).
15. Adjust preset aperture (R5812) so that the **TPB9** becomes 0.85Vp-p ± 0.05Vp-p as shown in Fig. 55.

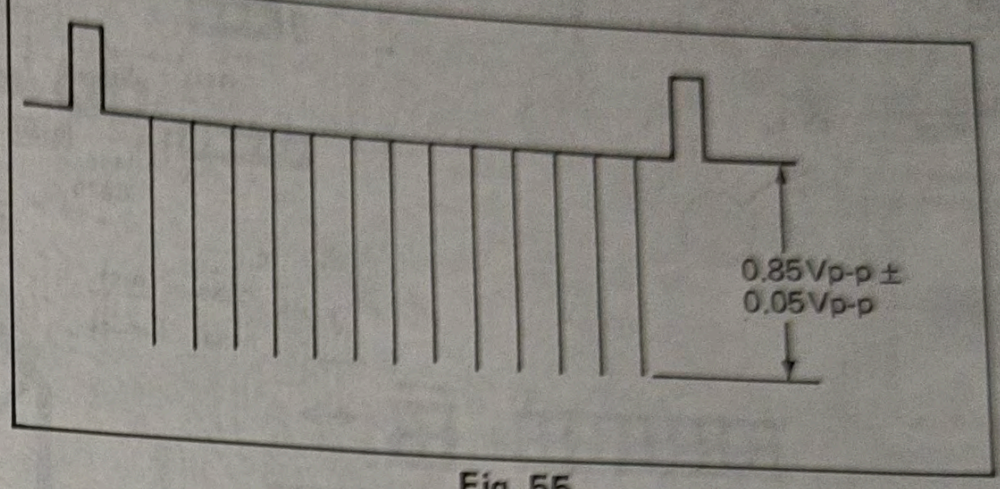


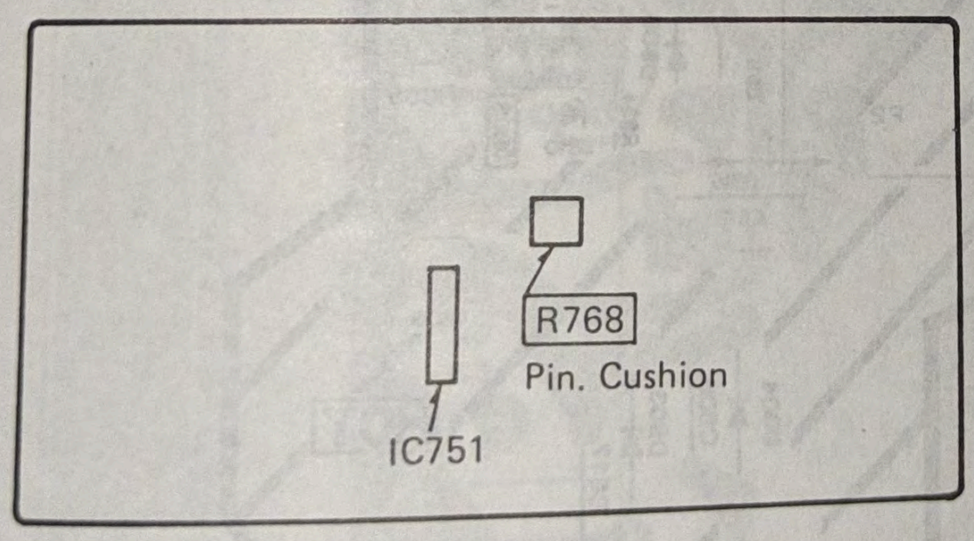
Fig. 55

FOCUS ADJUSTMENT

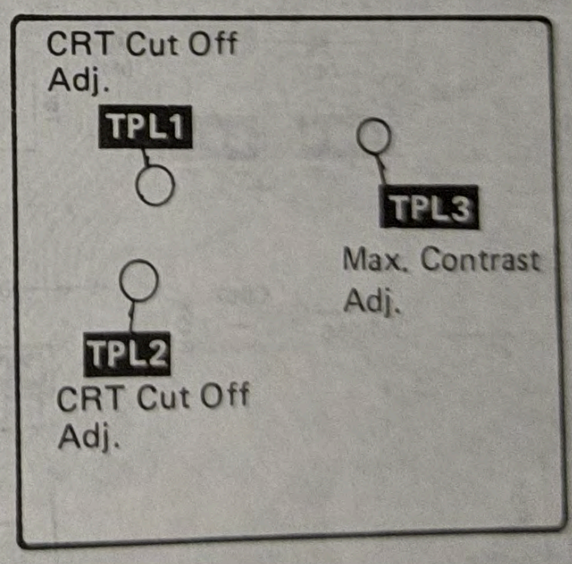
Adjustment the Focus control (on the FBT) to obtain a sharpest and clearest picture.

LOCATION OF TEST POINT AND CONTROLS

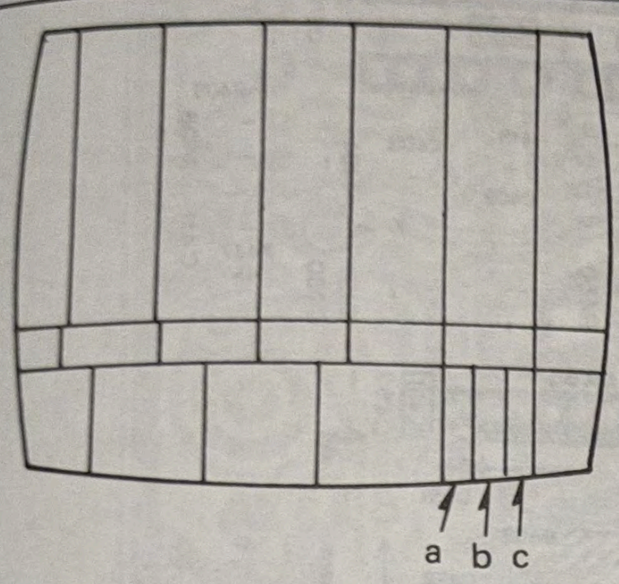
D-BOARD



L-BOARD



6. Set blue signal only switch (SW5809) to OFF position.
7. Adjust brightness VR (R5822) so that the brightness at SMAPTE color bar pattern (On the displayed) becomes Fig. 54.



Only bar "C" can be observed dimly.

Fig. 54

8. Apply a window pattern signal.
9. Set the beam receiving part of TV-Color Analyzer (MINOLTA) to the window.
10. Adjust preset contrast (R5817) to set the luminance to the 30 ft-L.
11. Connect the positive lead of a DC ammeter to **TPD1** (+), and the negative lead to **TPD2** (–).
12. Confirm so that the DC ammeter is within a range of 225 ± 65μA.
13. Apply a crosshatch pattern signal.
14. Connect an oscilloscope to **TPB9** and **TPB11** (GND).
15. Adjust preset aperture (R5812) so that the **TPB9** becomes 0.85Vp-p ± 0.05Vp-p as shown in Fig. 55.

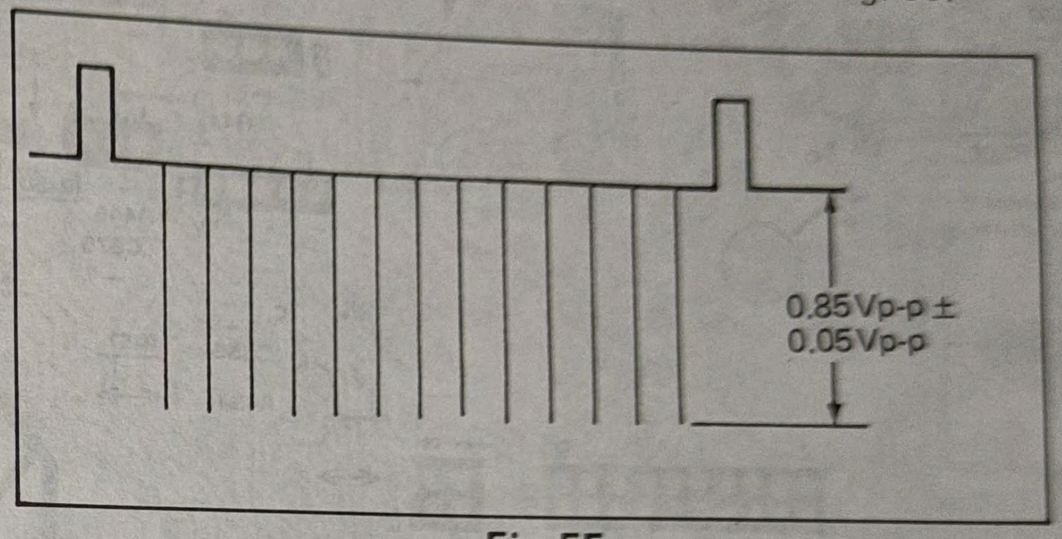


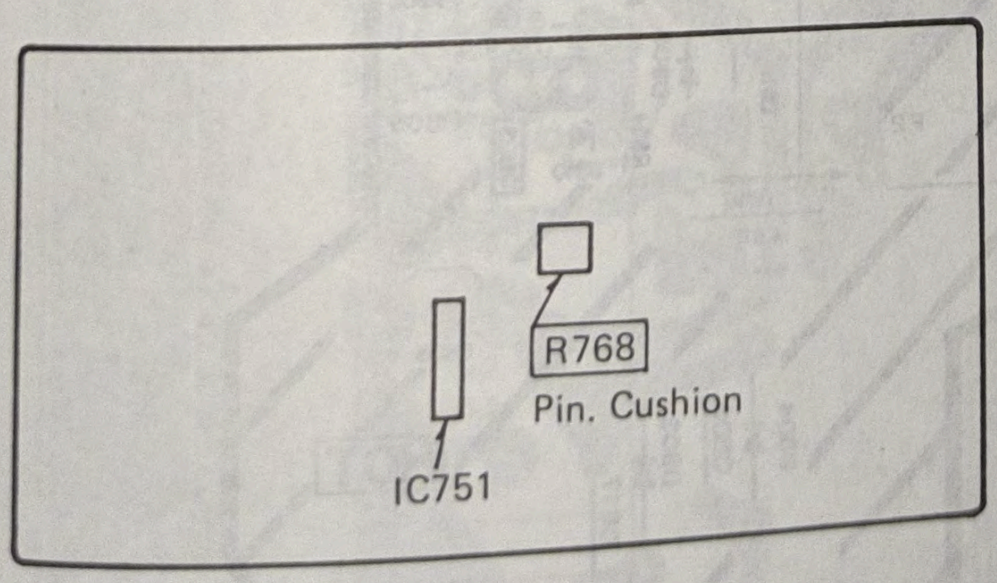
Fig. 55

FOCUS ADJUSTMENT

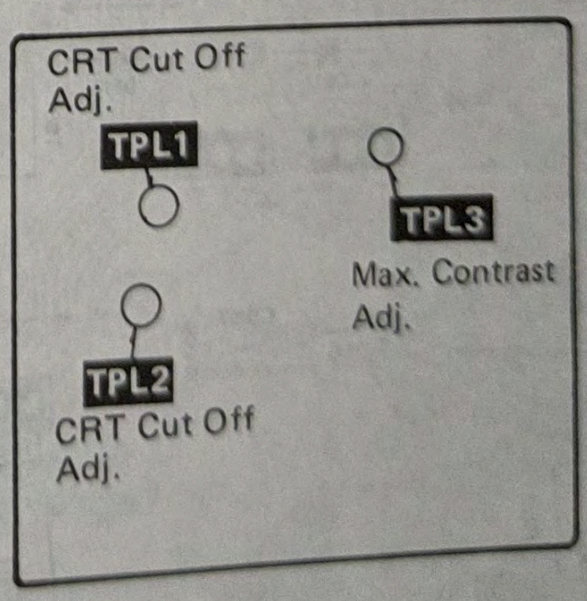
Adjustment the Focus control (on the FBT) to obtain a sharpest and clearest picture.

LOCATION OF TEST POINT AND CONTROLS

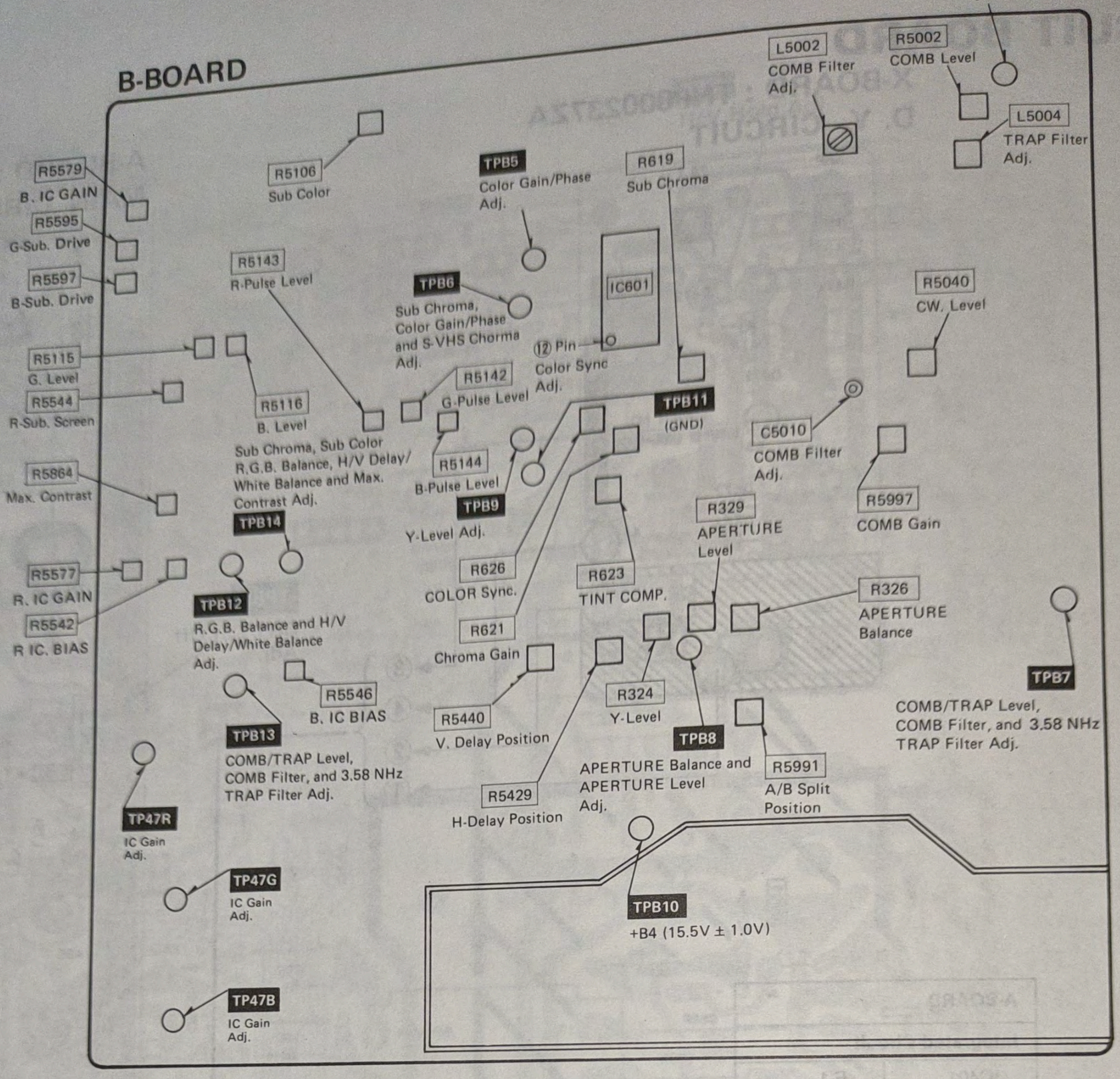
D-BOARD



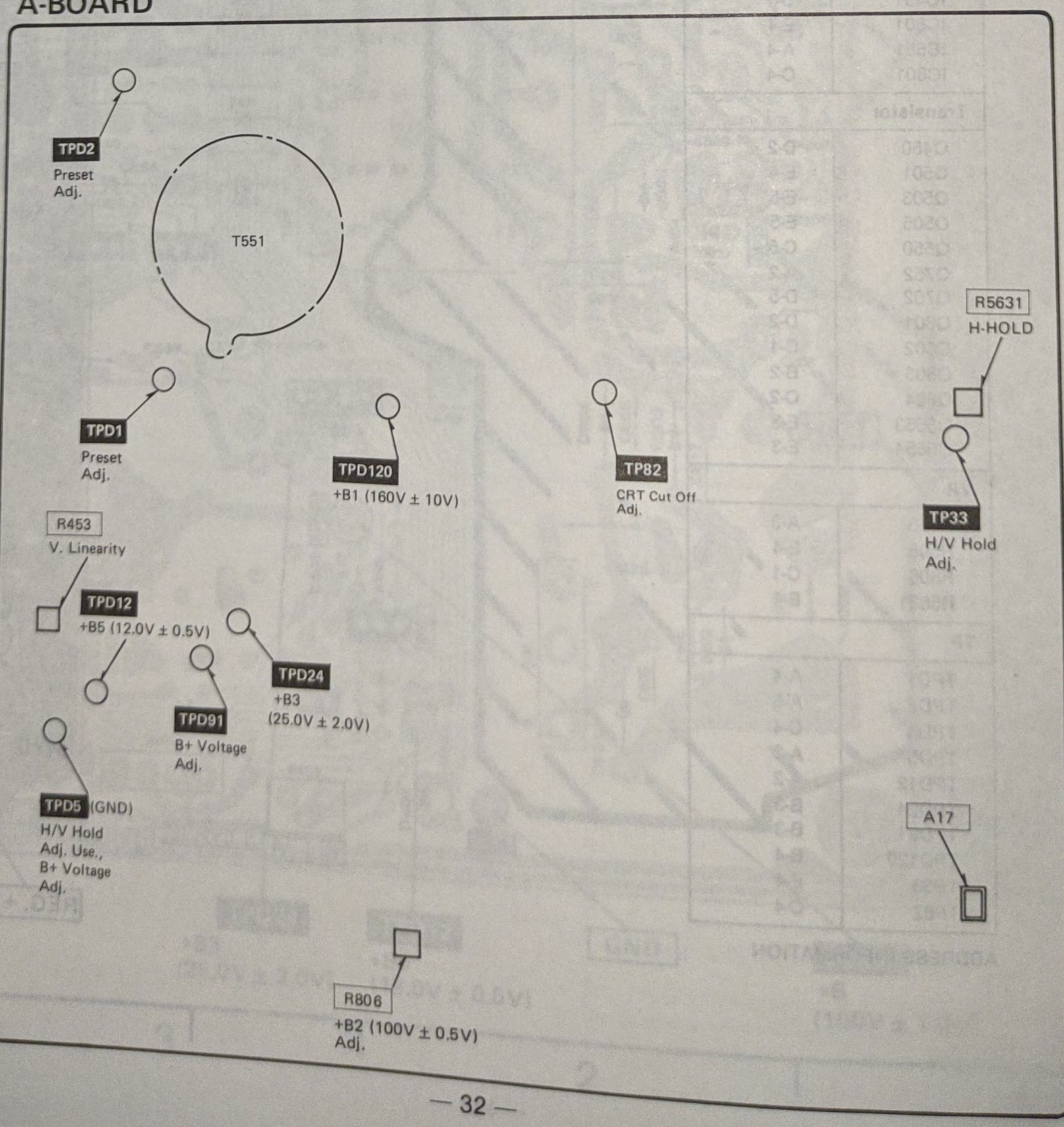
L-BOARD



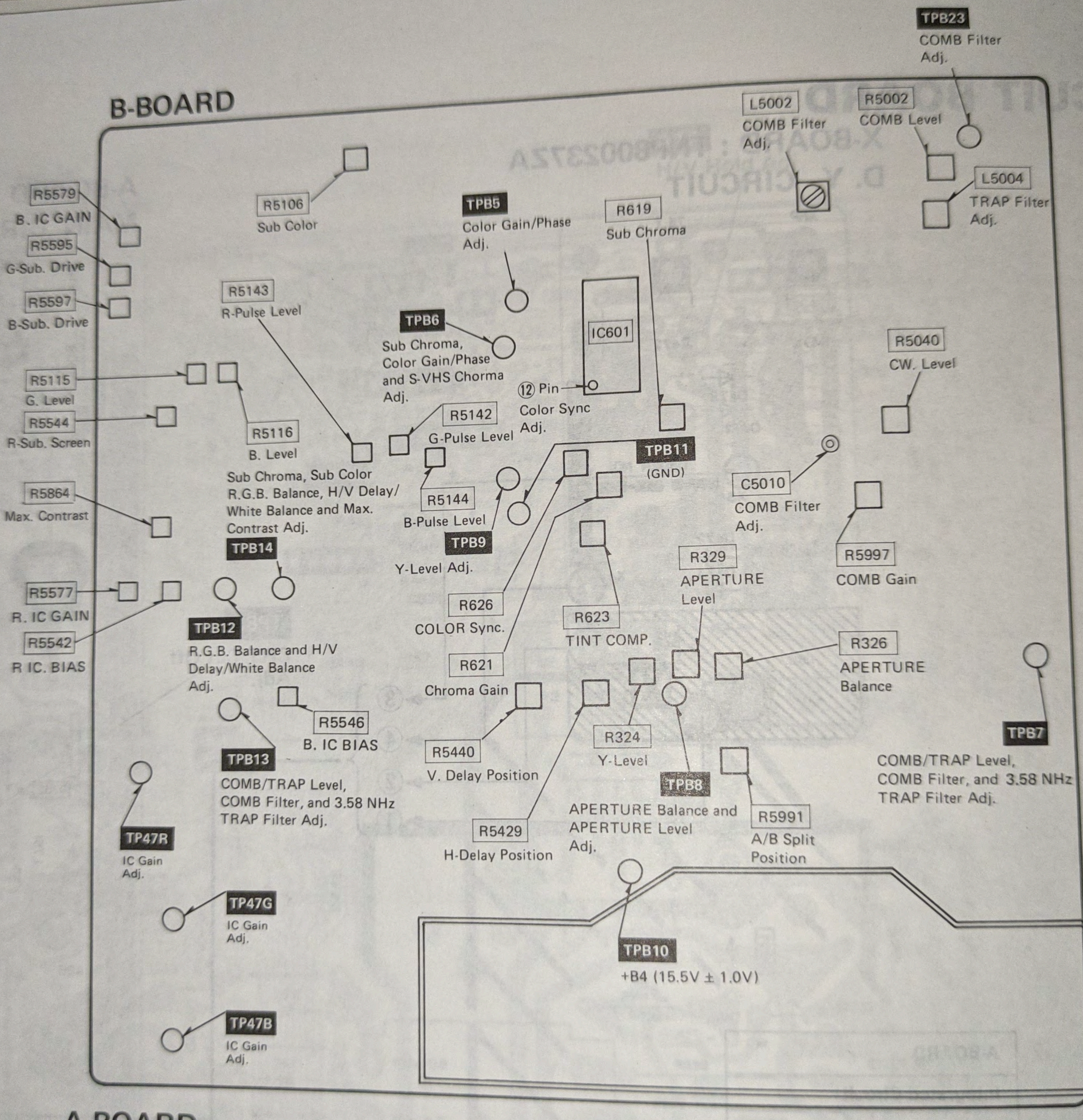
B-BOARD



A-BOARD



B-BOARD



A-BOARD

R IC. BIAS

Adj.

R5546

B. IC BIAS

TPB13

COMB/TRAP Level,
COMB Filter, and 3.58 NHz
TRAP Filter Adj.

R5440

V. Delay Position

R5429

H-Delay Position

Y-Level

TPB8

APERTURE Balance and
APERTURE Level
Adj.

R5991

A/B Split
Position

COMB Filter, and 3.58 NHz
TRAP Filter Adj.

TP47R

IC Gain
Adj.

TP47G

IC Gain
Adj.

TP47B

IC Gain
Adj.

TPB10

+B4 (15.5V ± 1.0V)

A-BOARD

TPD2

Preset
Adj.

T551

TPD1

Preset
Adj.

TPD120

+B1 (160V ± 10V)

TP82

CRT Cut Off
Adj.

R5631

H-HOLD

TP33

H/V Hold
Adj.

R453

V. Linearity

TPD12

+B5 (12.0V ± 0.5V)

TPD24

+B3
(25.0V ± 2.0V)

TPD91

B+ Voltage
Adj.

TPD5 (GND)

H/V Hold
Adj. Use.,
B+ Voltage
Adj.

A17

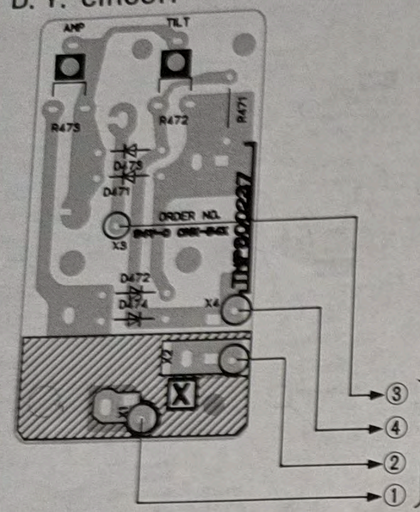
R806

+B2 (100V ± 0.5V)
Adj.

CIRCUIT BOARD

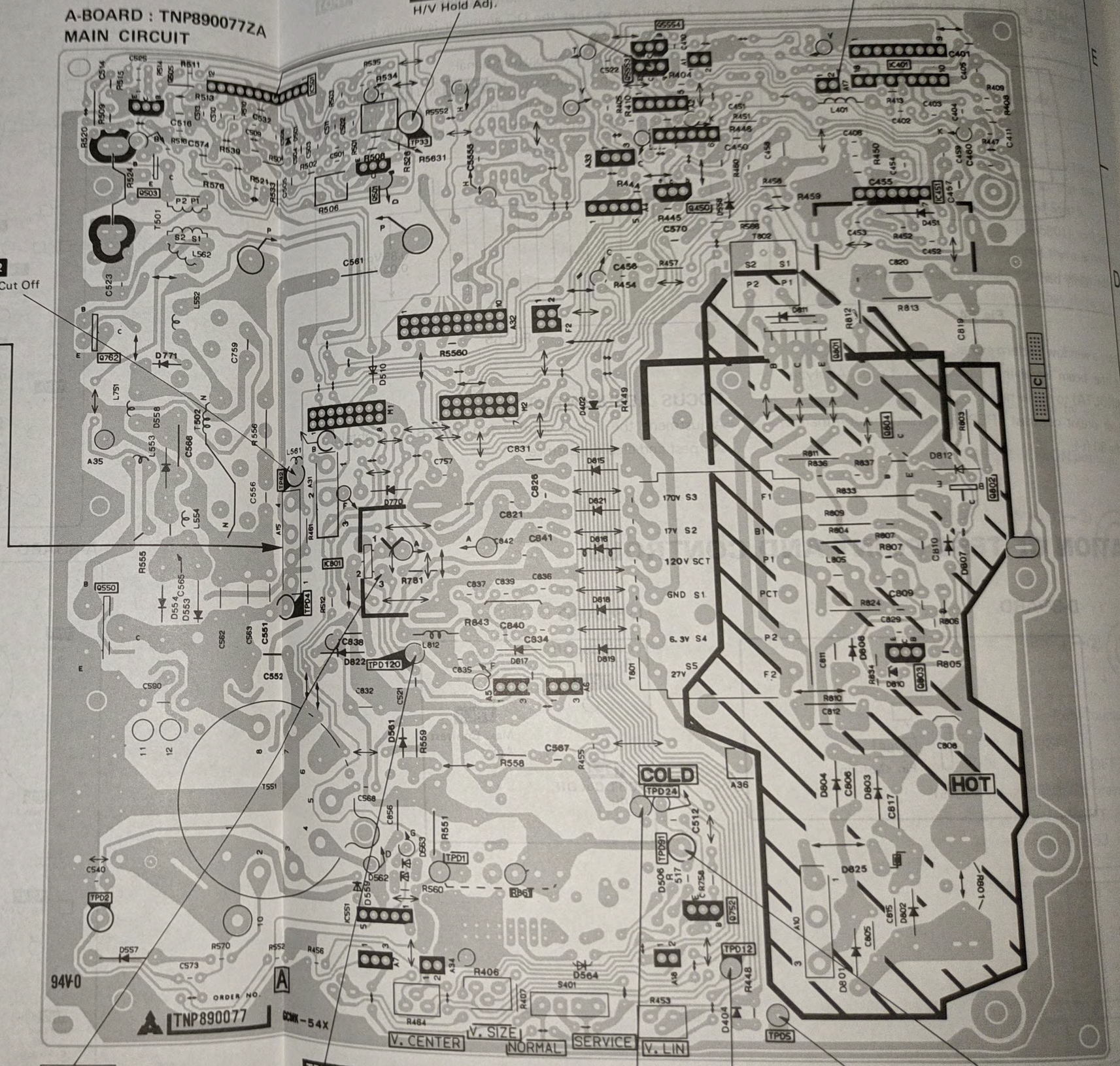
X-BOARD : TNP800237ZA

D. Y. CIRCUIT



A-BOARD : TNP890077ZA

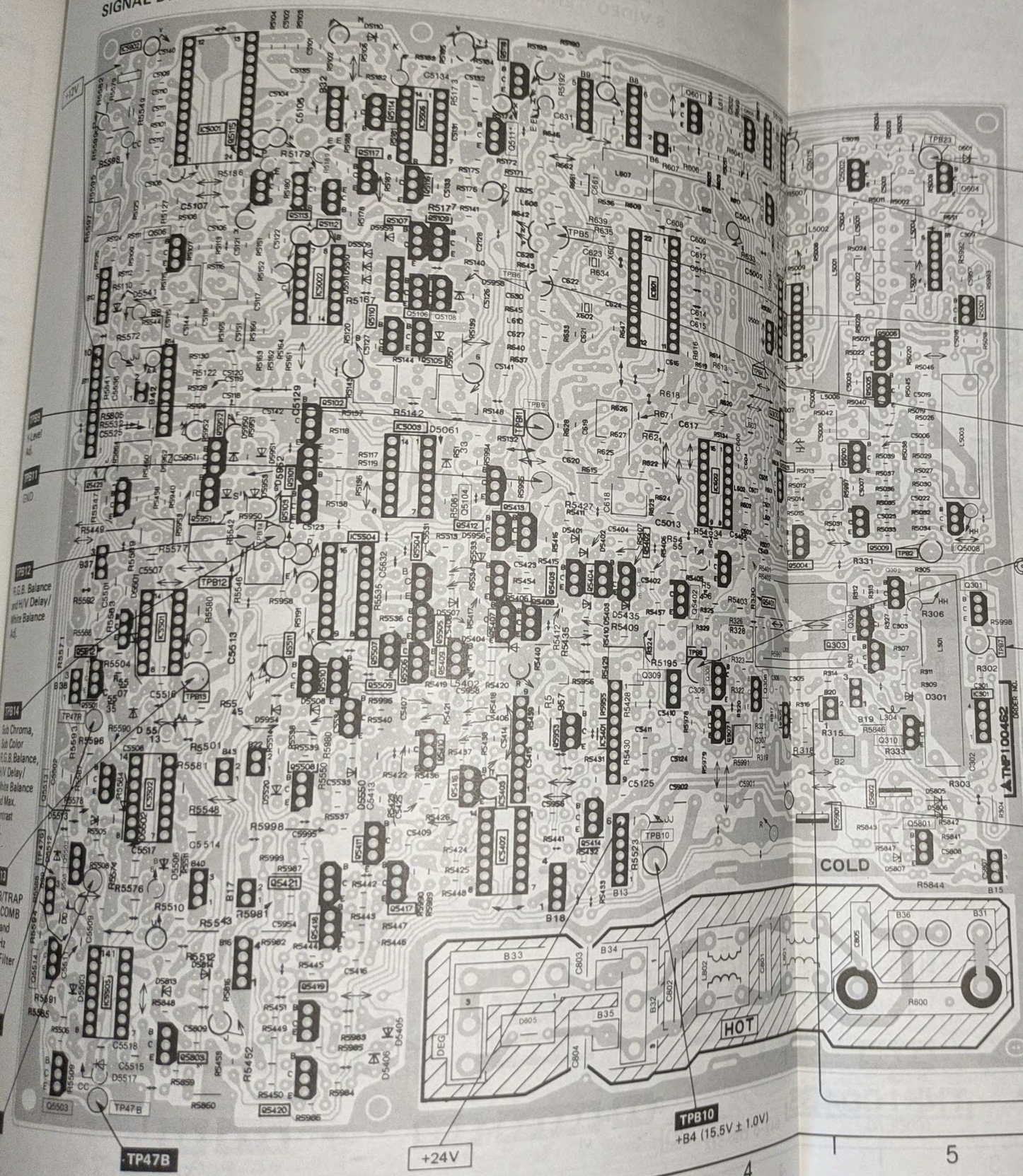
MAIN CIRCUIT



A-BOARD	
Integrated Circuit	
IC401	E-1
IC451	D-1
IC501	E-4
IC551	A-4
IC801	C-4
Transistor	
Q450	D-2
Q501	E-4
Q503	E-5
Q505	E-5
Q550	C-5
Q752	A-2
Q762	D-5
Q801	D-2
Q802	C-1
Q803	B-2
Q804	C-2
Q5553	E-3
Q5554	E-3
VR	
R453	A-3
R506	E-4
R806	C-1
R5631	E-4
TP	
TPD1	A-4
TPD2	A-5
TPD4	C-4
TPD5	A-2
TPD12	A-2
TPD24	B-3
TPD91	B-3
TPD120	B-4
TP33	E-4
TP82	C-4

ADDRESS INFORMATION

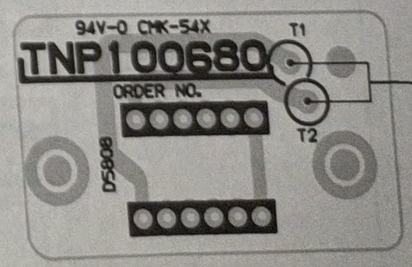
B-BOARD : TNP100462ZA
SIGNAL DISPOSITION CIRCUIT



B-BOARD					
Integrated Circuit		Q5108	D-3	**VR**	
IC301	B-5	Q5109	D-3	R324	C-4
IC601	D-3	Q5110	D-2	R328	C-4
IC602	C-4	Q5111	E-3	R329	C-4
IC603	D-4	Q5112	D-2	R619	D-4
IC5001	E-2	Q5113	D-2	R621	C-3
IC5002	D-2	Q5114	E-2	R623	C-3
IC5003	C-2	Q5115	D-2	R625	C-3
IC5401	B-3	Q5116	D-2	R5002	D-5
IC5402	B-3	Q5118	E-3	R5040	D-5
IC5403	B-3	Q5401	C-4	R5106	E-2
IC5501	B-1	Q5402	C-3	R5115	D-1
IC5502	B-1	Q5403	C-3	R5116	D-2
IC5503	A-1	Q5404	C-3	R5142	C-3
IC5504	C-2	Q5406	C-3	R5143	D-2
IC5506	E-2	Q5407	B-3	R5144	D-2
IC5901	B-4	Q5408	C-3	R5429	B-3
5902	E-1	Q5409	B-3	R5440	B-3
		Q5410	B-3	R5544	D-1
Transistor		Q5411	B-2	R5545	C-2
Q300	C-4	Q5412	C-3	R5546	C-2
Q301	C-5	Q5413	C-3	R5884	C-1
Q302	C-5	Q5414	B-3	R5991	B-4
Q303	C-5	Q5416	B-3	R5997	C-4
Q304	C-5	Q5417	B-2	C5010	C-4
Q305	B-4	Q5418	A-2	L5002	E-4
Q306	B-4	Q5419	A-2	L5004	E-5
Q307	B-4	Q5420	A-2		
Q308	B-4	Q5421	B-2	**TP**	
Q309	C-4	Q5422	C-4	TPB2	C-5
Q310	B-5	Q5423	C-1	TPB4	D-4
Q601	E-4	Q5501	B-1	TPB5	D-3
Q605	E-4	Q5502	B-1	TPB6	D-3
Q606	D-1	Q5503	A-1	TPB7	C-5
Q5001	D-5	Q5504	C-2	TPB8	B-4
Q5002	E-5	Q5505	C-3	TPB9	C-3
Q5003	C-4	Q5506	B-2	TPB10	B-3
Q5004	C-4	Q5507	B-2	TPB11	C-3
Q5005	D-5	Q5508	B-2	TPB12	C-2
Q5006	D-5	Q5509	B-2	TPB13	B-2
Q5007	E-4	Q5510	B-2	TPB14	C-2
Q5008	C-5	Q5511	B-2	TPB23	E-5
Q5009	C-5	Q5512	B-1	TPB47B	A-1
Q5010	C-5	Q5513	B-1	TPB47G	B-1
Q5101	C-2	Q5514	A-1	TPB47R	B-1
Q5102	C-2	Q5801	B-5		
Q5103	C-2	Q5802	B-5		
Q5104	C-3	Q5803	A-2		
Q5105	D-2	Q5951	C-2		
Q5106	D-2	Q5952	C-2		
Q5107	D-2	Q5953	B-3		

ADDRESS INFORMATION

T-BOARD : TNP100680
TALLY LED CIRCUIT



ter

n/Phase

oma, Color
se and S-VHS
Adj.

RE Balance and
RE Level

RAP Level,
ter, and
TRAP Filter

B-BOARD

Integrated Circuit

IC301	B-5
IC601	D-3
IC602	C-4
IC603	D-4
IC5001	E-2
IC5002	D-2
IC5003	C-2
IC5401	B-3
IC5402	B-3
IC5403	B-3
IC5501	B-1
IC5502	B-1
IC5503	A-1
IC5504	C-2
IC5506	E-2
IC5901	B-4
5902	E-1

Transistor

Q300	C-4
Q301	C-5
Q302	C-5
Q303	C-5
Q304	C-5
Q305	B-4
Q306	B-4
Q307	B-4
Q308	B-4
Q309	C-4
Q310	B-5
Q601	E-4
Q605	E-4
Q606	D-1
Q5001	D-5
Q5002	E-5
Q5003	C-4
Q5004	C-4
Q5005	D-5
Q5006	D-5
Q5007	E-4
Q5008	C-5
Q5009	C-5
Q5010	C-5
Q5101	C-2
Q5102	C-2
Q5103	C-2
Q5104	C-3
Q5105	D-2
Q5106	D-2
Q5107	D-2
Q5108	D-3
Q5109	D-3
Q5110	D-2
Q5111	E-3
Q5112	D-2
Q5113	D-2
Q5114	E-2
Q5115	D-2
Q5116	D-2
Q5118	E-3
Q5401	C-4
Q5402	C-3
Q5403	C-3
Q5404	C-3
Q5406	C-3
Q5407	B-3
Q5408	C-3
Q5409	B-3
Q5410	B-3
Q5411	B-2
Q5412	C-3
Q5413	C-3
Q5414	B-3
Q5416	B-3
Q5417	B-2
Q5418	A-2
Q5419	A-2
Q5420	A-2
Q5421	B-2
Q5422	C-4
Q5423	C-1
Q5501	B-1
Q5502	B-1
Q5503	A-1
Q5504	C-2
Q5505	C-3
Q5506	B-2
Q5507	B-2
Q5508	B-2
Q5509	B-2
Q5510	B-2
Q5511	B-2
Q5512	B-1
Q5513	B-1
Q5514	A-1
Q5801	B-5
Q5802	B-5
Q5803	A-2
Q5951	C-2
Q5952	C-2
Q5953	B-3

VR

R324	C-4
R326	C-4
R329	C-4
R619	D-4
R621	C-3
R623	C-3
R626	C-3
R5002	D-5
R5040	D-5
R5106	E-2
R5115	D-1
R5116	D-2
R5142	C-3
R5143	D-2
R5144	D-2
R5429	B-3
R5440	B-3
R5544	D-1
R5545	C-2
R5546	C-2
R5864	C-1
R5991	B-4
R5997	C-4
C5010	C-4
L5002	E-4
L5004	E-5

TP

TPB2	C-5
TPB4	D-4
TPB5	D-3
TPB6	D-3
TPB7	C-5
TPB8	B-4
TPB9	C-3
TPB10	B-3
TPB11	C-3
TPB12	C-2
TPB13	B-2
TPB14	C-2
TPB23	E-5
TPB47B	A-1
TPB47G	B-1
TPB47R	B-1

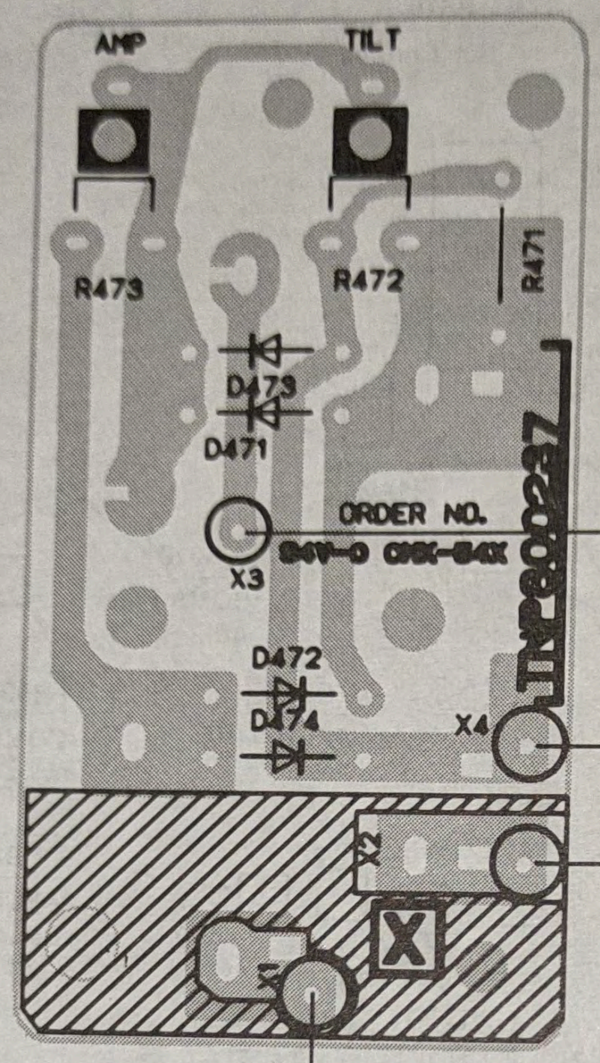
A-BOARD	
Integrated Circuit	
IC401	E-1
IC451	D-1
IC501	E-4
IC551	A-4
IC801	C-4
Transistor	
Q450	D-2
Q501	E-4
Q503	E-5
Q505	E-5
Q550	C-5
Q752	A-2
Q762	D-5
Q801	D-2
Q802	C-1
Q803	B-2
Q804	C-2
Q5553	E-3
Q5554	E-3
VR	
R453	A-3
R506	E-4
R806	C-1
R5631	E-4
TP	
TPD1	A-4
TPD2	A-5
TPD4	C-4
TPD5	A-2
TPD12	A-2
TPD24	B-3
TPD91	B-3
TPD120	B-4
TP33	E-4
TP82	C-4

ADDRESS INFORMATION

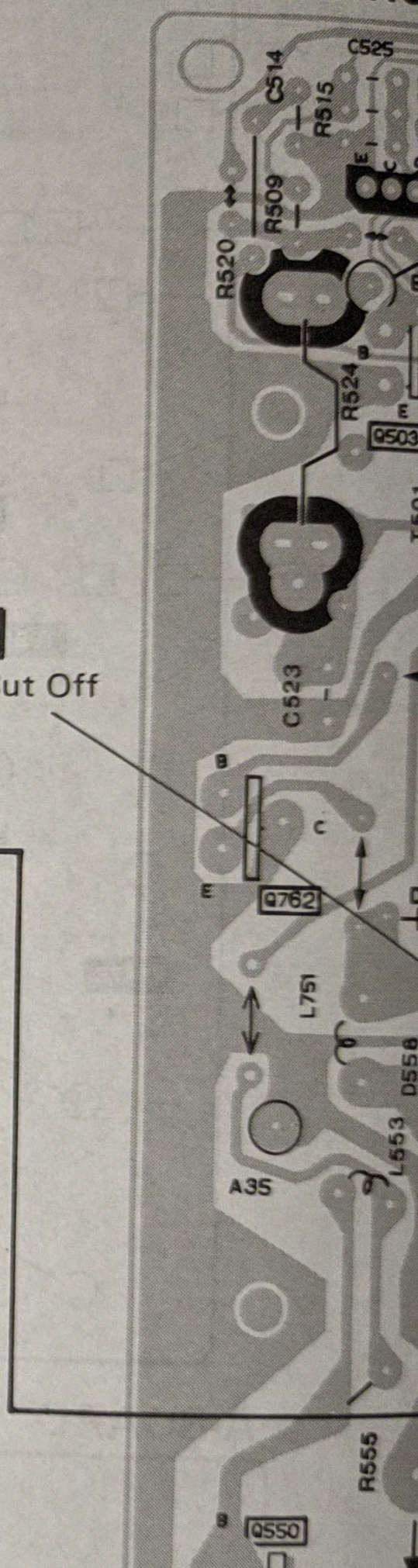
CIRCUIT BOARD

X-BOARD : TNP800237ZA

D. Y. CIRCUIT



A-BOARD :
MAIN CIRC



TP82
CRT Cut Off
Adj.

A-BOARD	
Integrated Circuit	
IC401	E-1
IC451	D-1
IC501	E-4
IC551	A-4
IC801	C-4
Transistor	
Q450	D-2
Q501	E-4
Q503	E-5
Q505	E-5
Q550	C-5
Q752	A-2
Q762	D-5
Q801	D-2
Q802	C-1
Q803	B-2
Q804	C-2
Q5553	E-3
Q5554	E-3
VR	
R453	A-3
R506	E-4
R806	C-1
R5631	E-4
TP	

MAIN CIRCUIT

TNP890077ZA

TP82
CRT Cut Off Adj.

3
4
2
1

TNP890077

94V-0

GCMK-54X

TPD120

V. CENTER

V. SIZE

NORMAL

SERVICE

A-BOARD : TNP8900772A
MAIN CIRCUIT

TP33
H/V Hold Adj.

TP82
CRT Cut Off Adj.

③
④
②
①

TPD120

94V-0

ORDER NO.
TNP890077A

GCMK-54X

V. CENTER

V. SIZE

NORMAL

SERVICE

TP33
H/V Hold Adj.

A17
H/V Hold Adj.

COLD

HOT

V. CENTER

V. SIZE

NORMAL

SERVICE

V. LIN

170V S3

17V S2

120V SCT

GND S1

6.3V S4

27V S5

TPD120
+B1
(160V ± 10V)

TPD24
+B3
(25.0V ± 2.0V)

TPD12
+B5
(12.0V ± 0.5V)

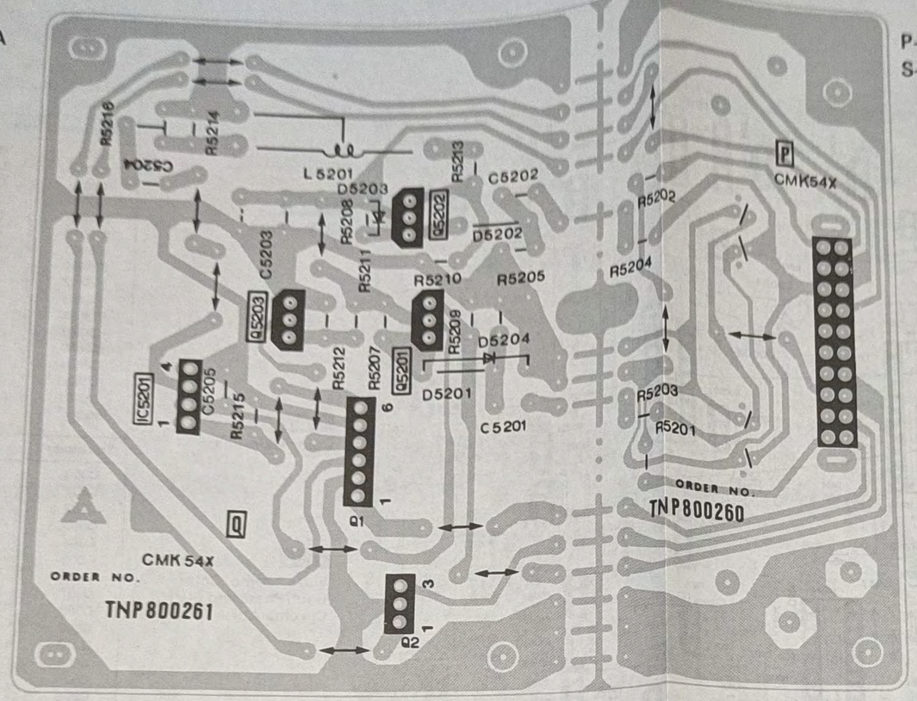
GND

TPD91
+B
(100V ± 1.0V)

Q-BOARD : TNP800261ZA
S-VIDEO SIGNAL OUT CIRCUIT

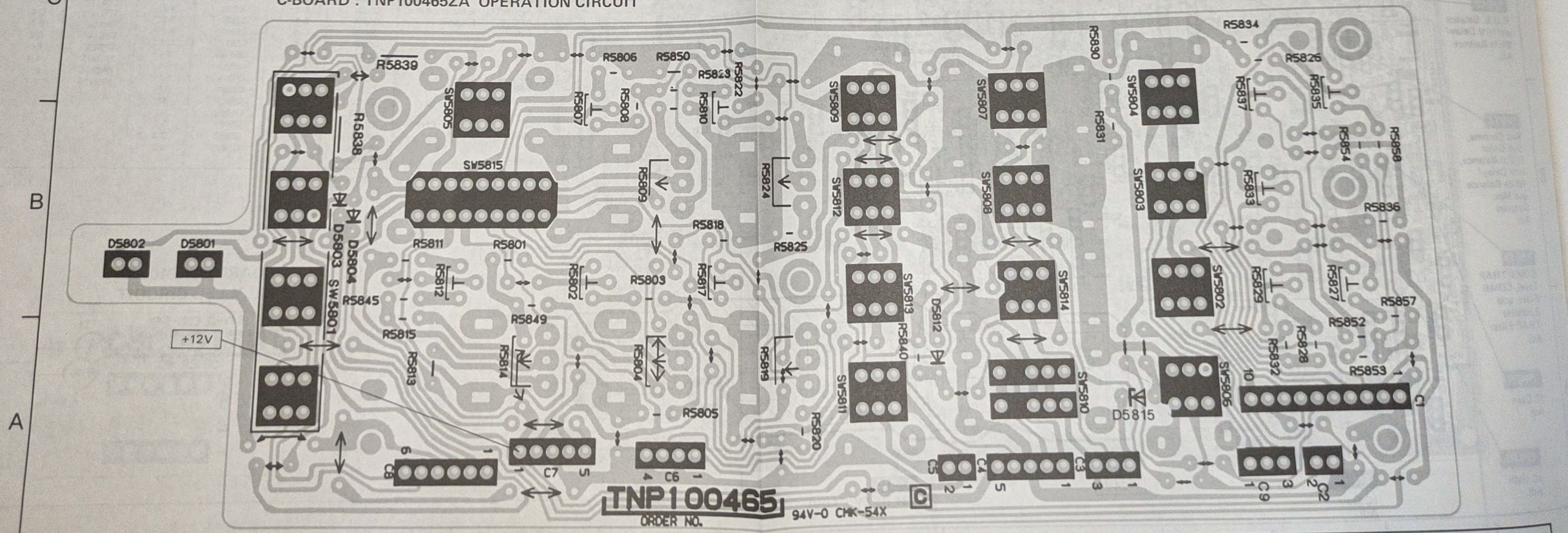
Q-BOARD	
Integrated Circuit	
IC5201	D-2
Transistor	
Q5201 Q5202 Q5203	D-3 E-3 D-2
VR	
R5216	E-2

ADDRESS INFORMATION

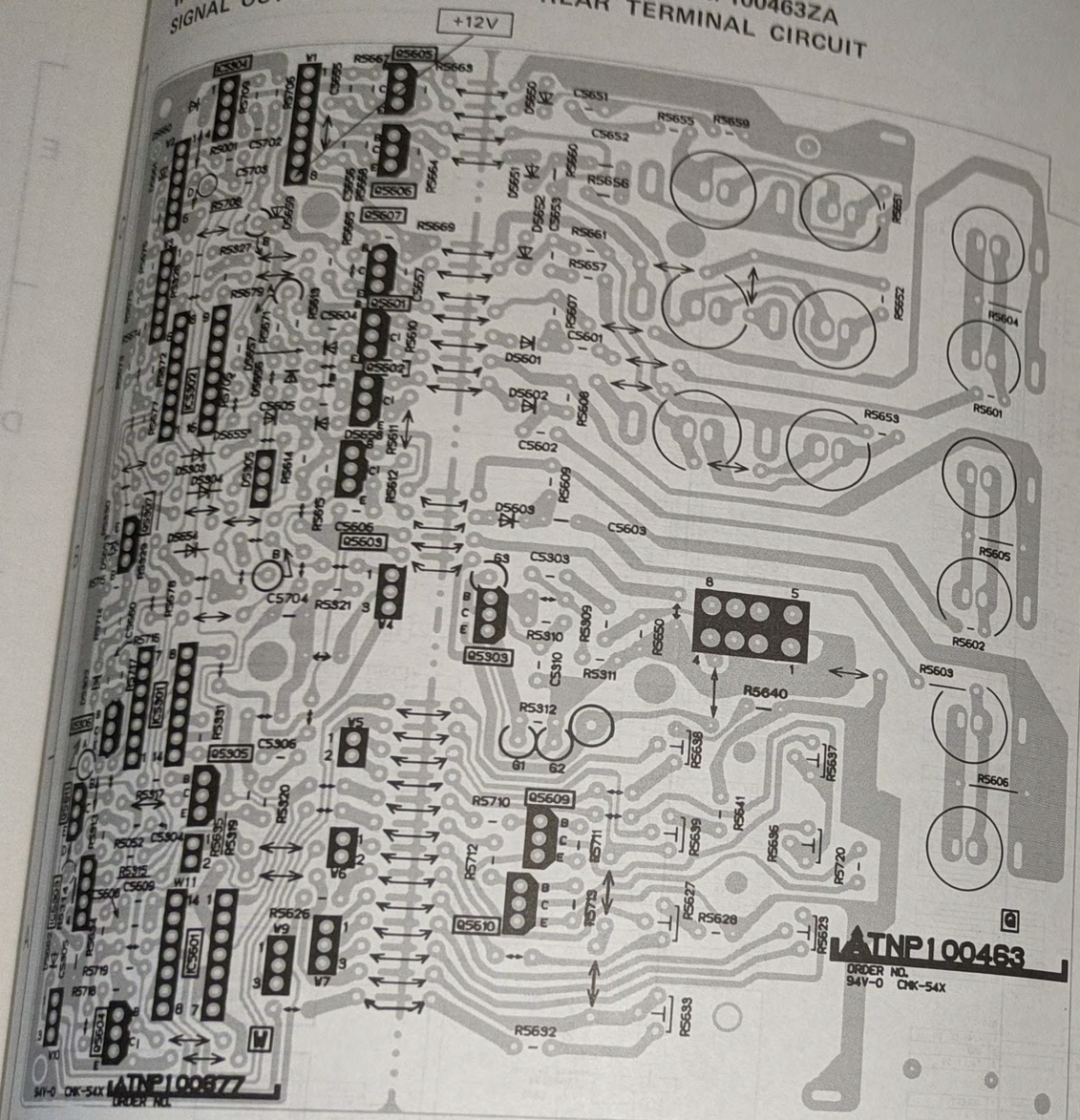


P-BOARD : TNP800260
S-VIDEO TERMINAL CIRCUIT

C-BOARD : TNP100465ZA OPERATION CIRCUIT



W-BOARD : TNP100677ZA
SIGNAL OUT CIRCUIT



W-BOARD	
Integrated Circuit	
IC5301	B-1
IC5302	C-1
IC5303	A-1
IC5304	C-1
IC5601	A-1
Transistor	
Q5305	A-1
Q5306	B-1
Q5307	B-1
Q5601	C-2
Q5602	B-2
Q5603	B-2
Q5604	A-1
Q5605	C-2
Q5606	C-2
Q5607	C-2
Q5611	A-1

ADDRESS INFORMATION

G-BOARD : TNP100463ZA
REAR TERMINAL CIRCUIT

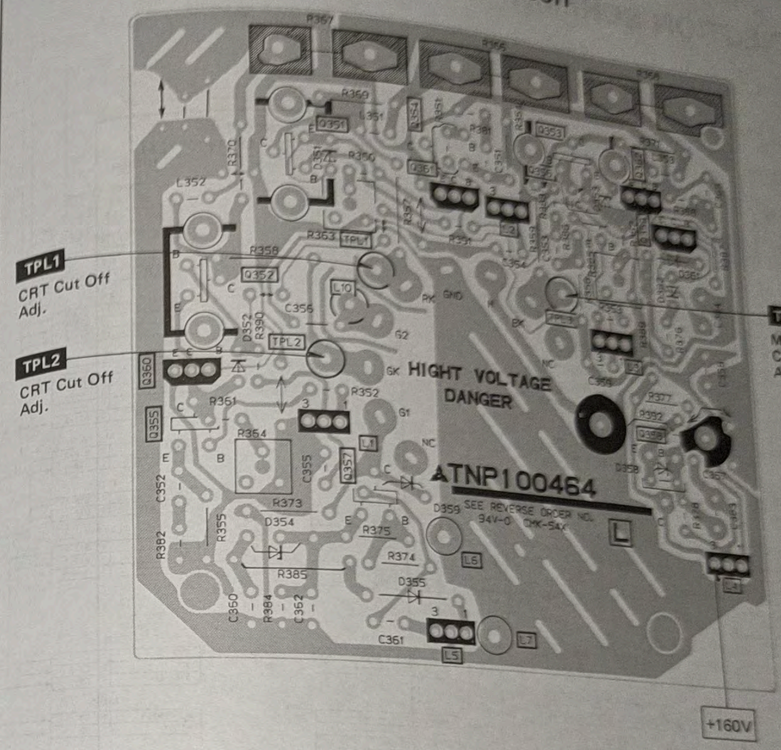
G-BOARD	
Transistor	
Q5303	B-2
Q5609	A-2
Q5610	A-2
VR	
R5623	A-3
R5627	A-3
R5633	A-3
R5636	A-3
R5637	B-3
R5638	B-3
R5639	A-3

ADDRESS INFORMATION

D-BOARD	
Integrated Circuit	
IC761	A-3
Transistor	
Q580	B-1
Q581	B-2
Q751	B-2
Q755	A-3
Q756	B-3
Q757	B-3
Q758	A-3
VR	
R768	B-2
TP	
TPM1	B-2
TPM2	A-3

ADDRESS INFORMATION

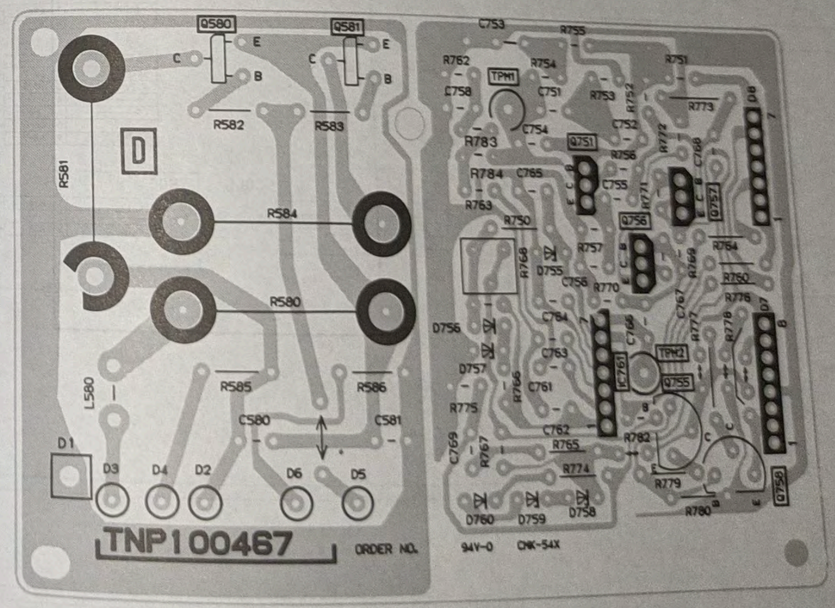
L-BOARD : TNP100464ZA CRT DRIVE CIRCUIT



L-BOARD	
Transistor	
Q351	E-2
Q352	D-1
Q353	E-2
Q354	E-2
Q355	D-1
Q356	E-2
Q357	D-2
Q358	D-3
Q359	E-3
Q360	D-1
Q361	D-2
Q362	E-3
TP	
TPL1	D-2
TPL2	C-1
TPL3	D-2

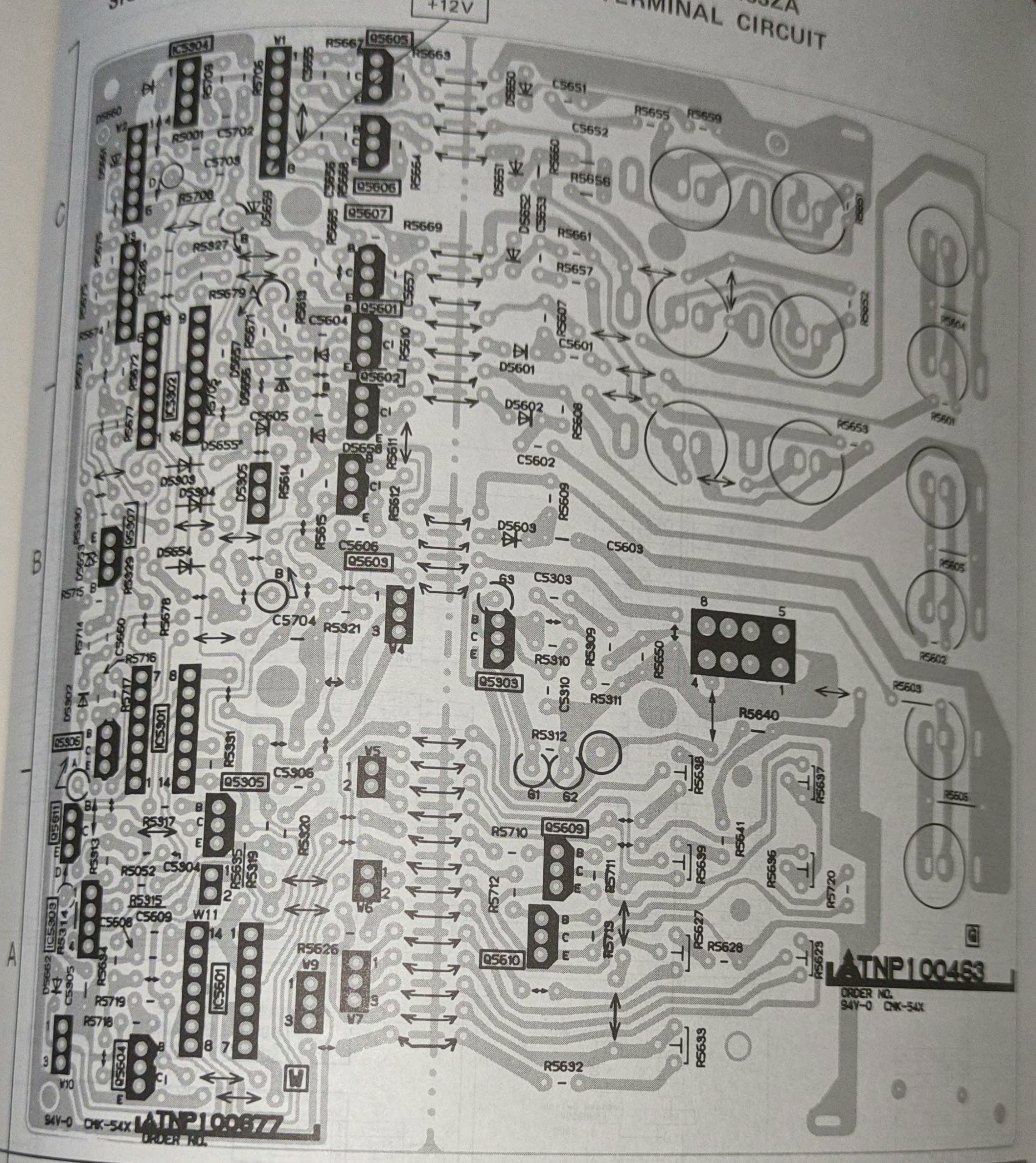
ADDRESS INFORMATION

D-BOARD : TNP100467ZA
PINCUSHION CORRECTOR CIRCUIT



W-BOARD : TNP100677ZA SIGNAL OUT CIRCUIT

G-BOARD : TNP100463ZA REAR TERMINAL CIRCUIT



W-BOARD	
Integrated Circuit	
IC5301	B-1
IC5302	C-1
IC5303	A-1
IC5304	C-1
IC5601	A-1
Transistor	
Q5305	A-1
Q5306	B-1
Q5307	B-1
Q5601	C-2
Q5602	B-2
Q5603	B-2
Q5604	A-1
Q5605	C-2
Q5606	C-2
Q5607	C-2
Q5611	A-1

ADDRESS INFORMATION

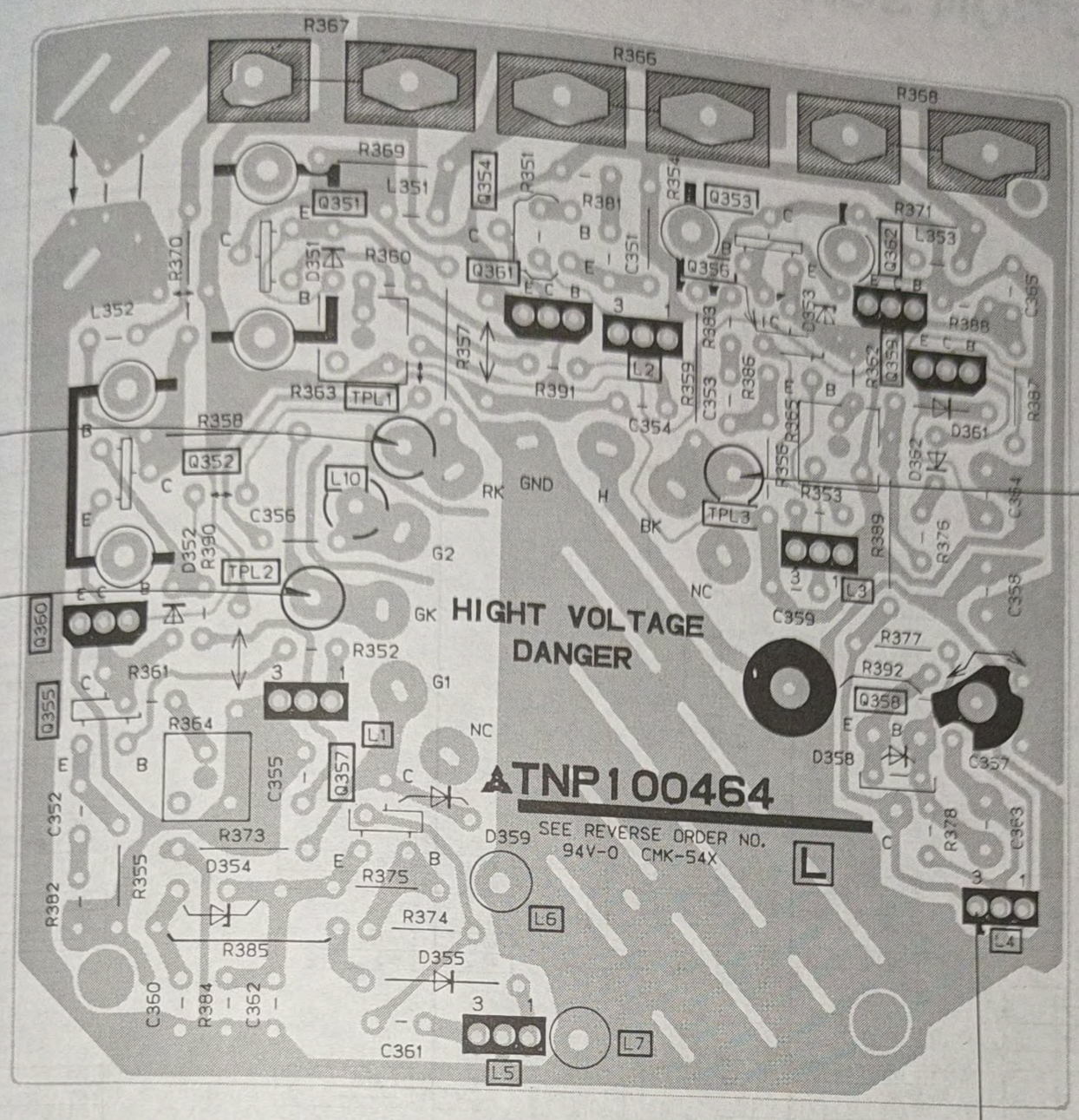
G-BOARD	
Transistor	
Q5303	B-2
Q5609	A-2
Q5610	A-2
VR	
R5623	A-3
R5627	A-3
R5633	A-3
R5636	A-3
R5637	B-3
R5638	B-3
R5639	A-3

ADDRESS INFORMATION

D-BOARD	
Integrated Circuit	
IC761	A-3
Transistor	
Q580	B-1
Q581	B-2
Q751	B-2
Q755	A-3
Q756	B-3
Q757	B-3
Q758	A-3
VR	
R768	B-2
TP	
TPM1	B-2
TPM2	A-3

ADDRESS INFORMATION

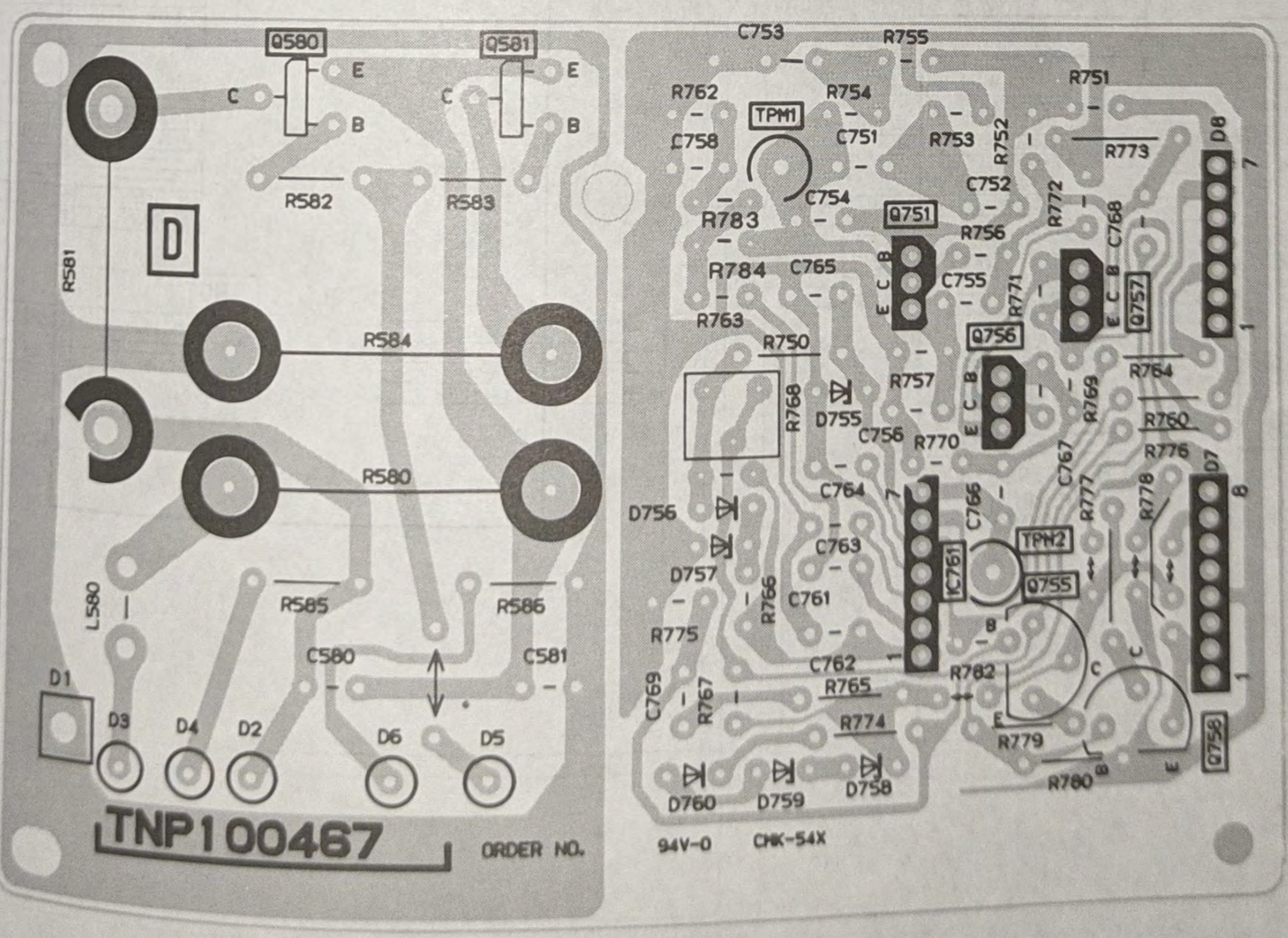
L-BOARD : TNP100464ZA CRT DRIVE CIRCUIT



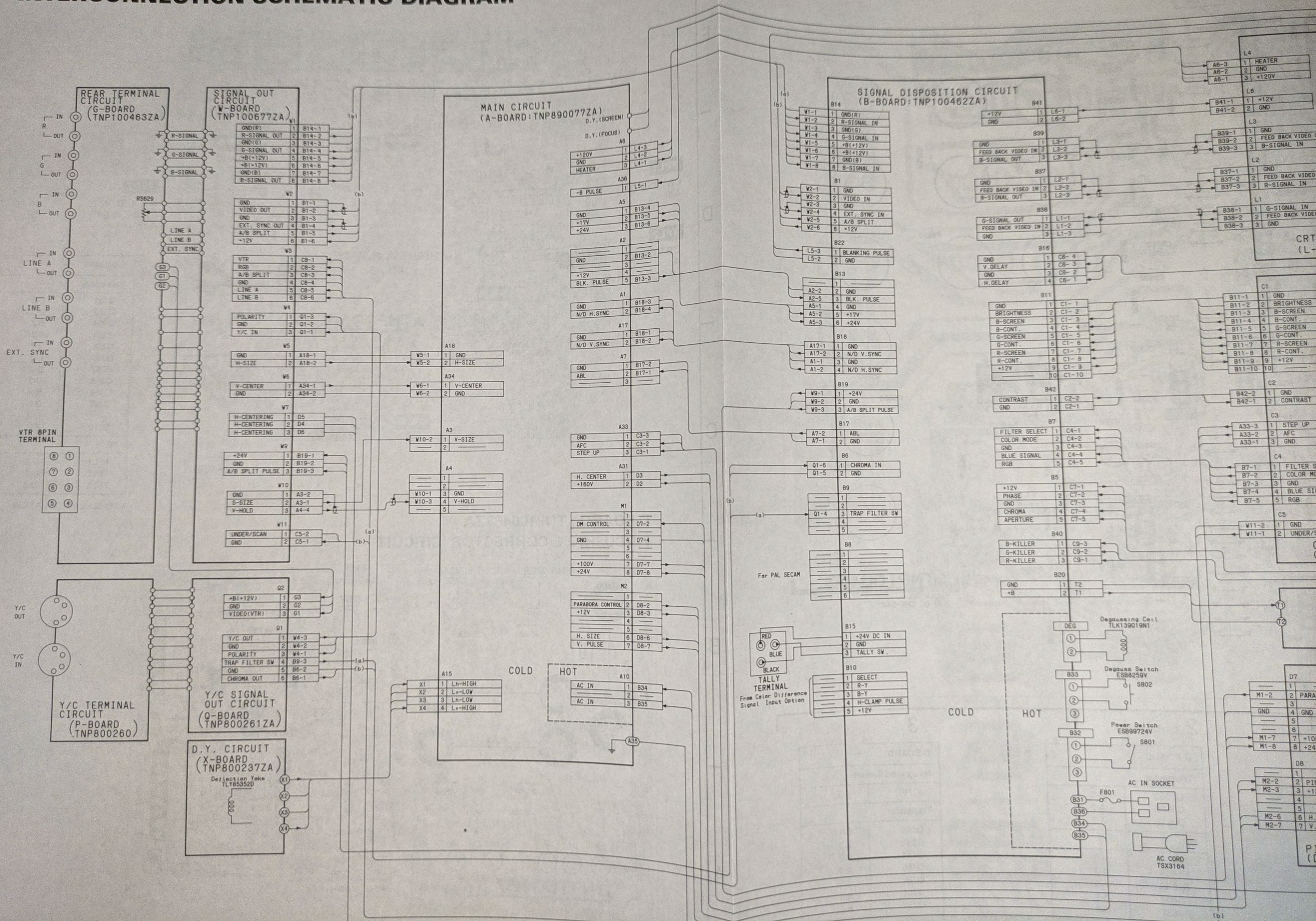
L-BOARD	
Transistor	
Q351	E-2
Q352	D-1
Q353	E-2
Q354	E-2
Q355	D-1
Q356	E-2
Q357	D-2
Q358	D-3
Q359	E-3
Q360	D-1
Q361	D-2
Q362	E-3
TP	
TPL1	D-2
TPL2	C-1
TPL3	D-2

ADDRESS INFORMATION

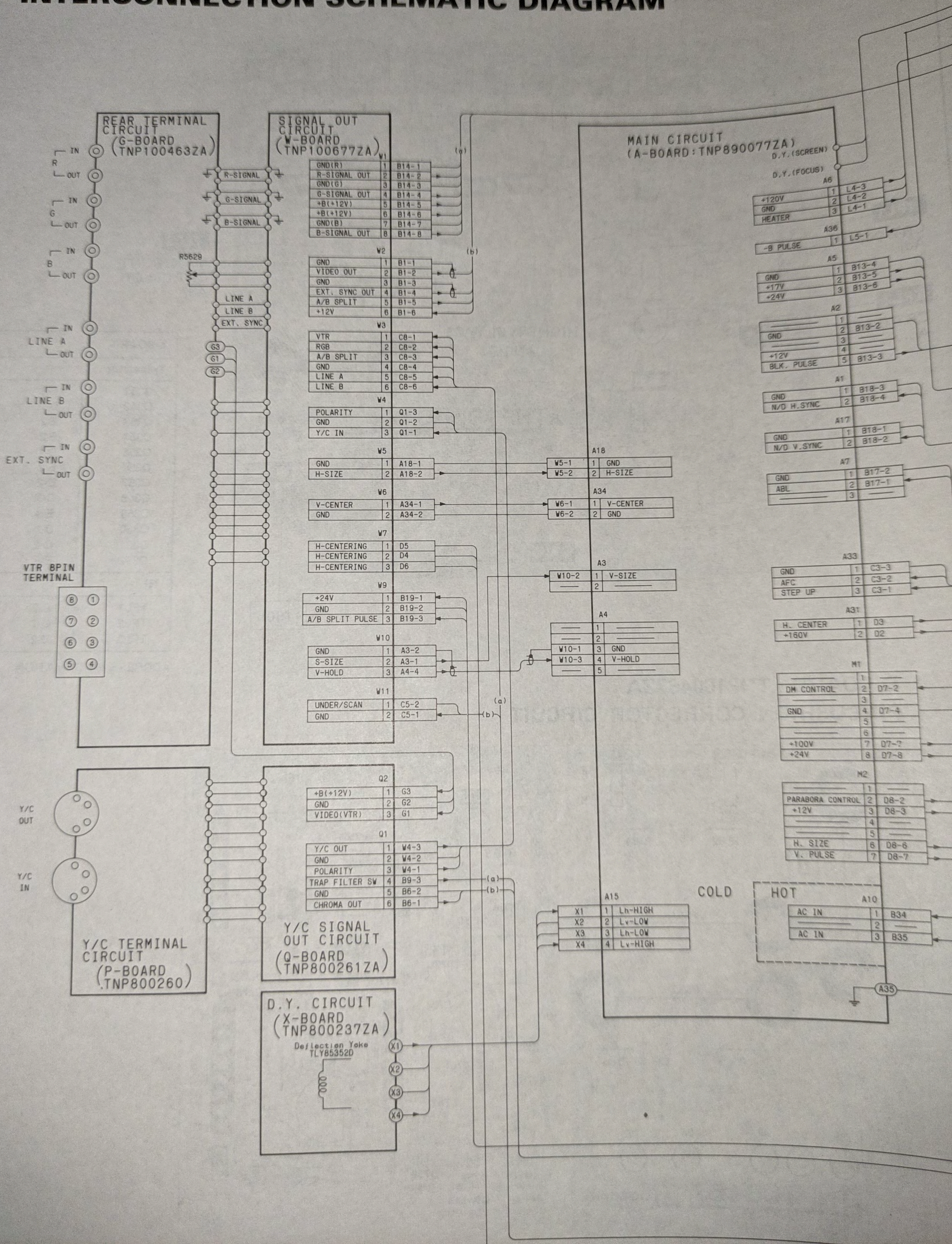
D-BOARD : TNP100467ZA
PINCUSHION CORRECTOR CIRCUIT



INTERCONNECTION SCHEMATIC DIAGRAM



INTERCONNECTION SCHEMATIC DIAGRAM



SIGNAL DISPOSITION CIRCUIT
(B-BOARD:TNP100462ZA)

(a)
(b)

B14

W1-1	1	GND(R)
W1-2	2	R-SIGNAL IN
W1-3	3	GND(G)
W1-4	4	G-SIGNAL IN
W1-5	5	+B(+12V)
W1-6	6	+B(+12V)
W1-7	7	GND(B)
W1-8	8	B-SIGNAL IN

B1

W2-1	1	GND
W2-2	2	VIDEO IN
W2-3	3	GND
W2-4	4	EXT. SYNC IN
W2-5	5	A/B SPLIT
W2-6	6	+12V

B22

L5-3	1	BLANKING PULSE
L5-2	2	GND

B13

———	1	———
A2-2	2	GND
A2-5	3	BLK. PULSE
A5-1	4	GND
A5-2	5	+17V
A5-3	6	+24V

B18

A17-1	1	GND
A17-2	2	N/D V.SYNC
A1-1	3	GND
A1-2	4	N/D H.SYNC

B19

W9-1	1	+24V
W9-2	2	GND
W9-3	3	A/B SPLIT PULSE

B17

A7-2	1	ABL
A7-1	2	GND

B6

Q1-6	1	CHROMA IN
Q1-5	2	GND

B9

———	1	———
———	2	———
Q1-4	3	TRAP FILTER SW
———	4	———
———	5	———

B8

———	1	———
———	2	———
———	3	———
———	4	———
———	5	———
———	6	———

For PAL SECAM

B15

1		+24V DC IN
2		GND
3		TALLY SW.

B10

———	1	SELECT
———	2	R-Y
———	3	B-Y
———	4	H-CLAMP PULSE
———	5	+12V

RED
BLUE
BLACK
TALLY TERMINAL
From Color Difference Signal Input Option

COLD

B41

+12V	1	L6-1
GND	2	L6-2

B39

GND	1	L3-1
FEED BACK VIDEO IN	2	L3-2
B-SIGNAL OUT	3	L3-3

B37

GND	1	L2-1
FEED BACK VIDEO IN	2	L2-2
R-SIGNAL OUT	3	L2-3

B38

G-SIGNAL OUT	1	L1-1
FEED BACK VIDEO IN	2	L1-2
GND	3	L1-3

B16

GND	1	C6- 4
V.DELAY	2	C6- 3
GND	3	C6- 2
H.DELAY	4	C6- 1

B11

GND	1	C1- 1
BRIGHTNESS	2	C1- 2
B-SCREEN	3	C1- 3
B-CONT.	4	C1- 4
G-SCREEN	5	C1- 5
G-CONT.	6	C1- 6
R-SCREEN	7	C1- 7
R-CONT.	8	C1- 8
+12V	9	C1- 9
———	10	C1-10

B42

CONTRAST	1	C2-2
GND	2	C2-1

B7

FILTER SELECT	1	C4-1
COLOR MODE	2	C4-2
GND	3	C4-3
BLUE SIGNAL	4	C4-4
RGB	5	C4-5

B5

+12V	1	C7-1
PHASE	2	C7-2
GND	3	C7-3
CHROMA	4	C7-4
APERTURE	5	C7-5

B40

B-KILLER	1	C9-3
G-KILLER	2	C9-2
R-KILLER	3	C9-1

B20

GND	1	T2
+B	2	T1

HOT

DEG — Degaussing Coil TLK139019N1

B33 — Degauss Switch ESB8259V — S802

B32 — Power Switch ESB99724V — S801

F801

B31 **B36** **B34** **B35** — AC IN SOCKET

AC CORD TSX3164

(CRT SOCKET

L4

A6-3	1	HEATER
A6-2	2	GND
A6-1	3	+120V

L6

B41-1	1	+12V
B41-2	2	GND

L3

B39-1	1	GND
B39-2	2	FEED BACK VIDEO OUT
B39-3	3	B-SIGNAL IN

L2

B37-1	1	GND
B37-2	2	FEED BACK VIDEO OUT
B37-3	3	R-SIGNAL IN

L1

B38-1	1	G-SIGNAL IN
B38-2	2	FEED BACK VIDEO OUT
B38-3	3	GND

CRT DRIVE CIRCUI
(L-BOARD:TNP1004

C1

B11-1	1	GND
B11-2	2	BRIGHTNESS
B11-3	3	B-SCREEN
B11-4	4	B-CONT.
B11-5	5	G-SCREEN
B11-6	6	G-CONT.
B11-7	7	R-SCREEN
B11-8	8	R-CONT.
B11-9	9	+12V
B11-10	10	———

C2

B42-2	1	GND
B42-1	2	CONTRAST

C3

A33-3	1	STEP UP
A33-2	2	AFC
A33-1	3	GND

C4

B7-1	1	FILTER SELECT
B7-2	2	COLOR MODE
B7-3	3	GND
B7-4	4	BLUE SIGNAL
B7-5	5	RGB

C5

W11-2	1	GND
W11-1	2	UNDER/SCAN

OPERATION CIRCU
(C-BOARD:TNP100

T1
T2

TALLY LED CIRC
(T-BOARD:TNP1

D7

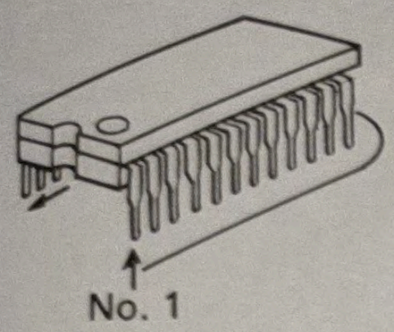
———	1	———
M1-2	2	PARABOLA OUT
———	3	———
GND	4	GND
———	5	———
———	6	———
M1-7	7	+100V
M1-8	8	+24V

D8

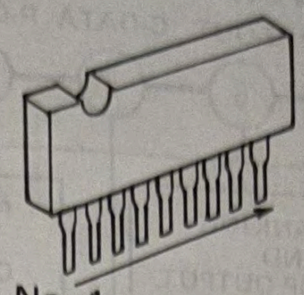
———	1	———
M2-2	2	PIN CONTROL
M2-3	3	+12V
———	4	———
———	5	———
M2-6	6	H.SIZE
M2-7	7	V.PULSE

PINCUSHION CORRE
(D-BOARD:TNP1004

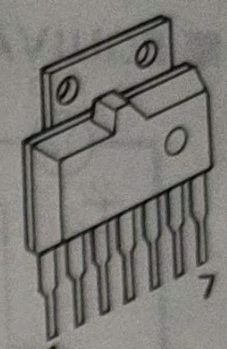
TERMINAL GUIDE OF IC'S, TRANSISTORS, DIODES



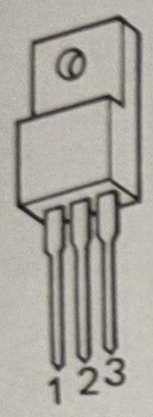
TA7676AP	24 Pin
AN5625N	22 Pin
AN5435	18 Pin
TC4053BP	16 pin
TC4066BP	14 Pin
AN5860	14 Pin
M51392P	14 Pin



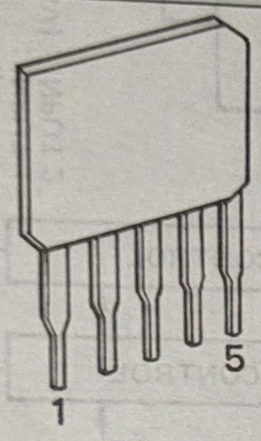
AN5790N	12 Pin
TVSBA236B	9 Pin
AN614	7 Pin
AN608P	4 Pin



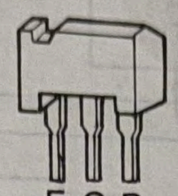
AN5521



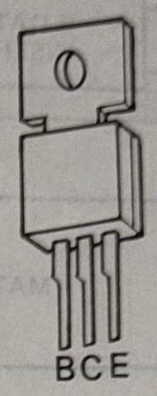
M5F7812



TNH11303



2SD636R
2SD637R
2SB641R
2SB642Q
UN1212



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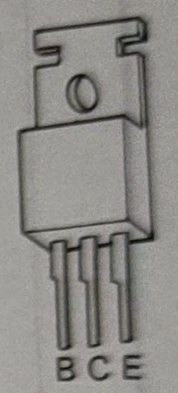
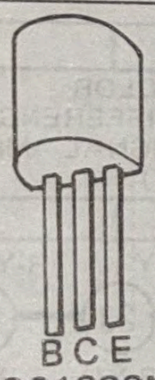


2SC1683Q, 2SB750

2SC7846Q
2SA900R
2SC3503LB



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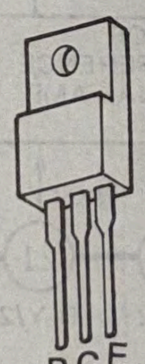
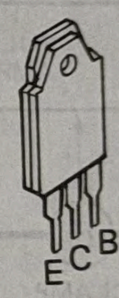
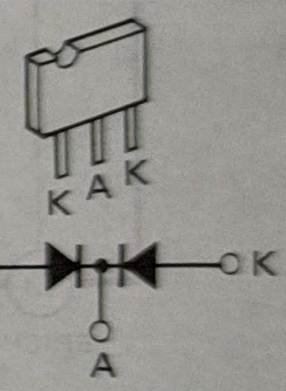
2SC1573ANC
2SC1215S



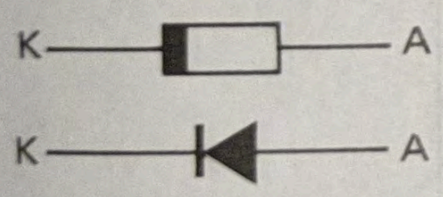
2SC3944LB
2SC2834AM
2SD1264Q
2SD1264AQLB
2SD1264PLB
2SB940Q



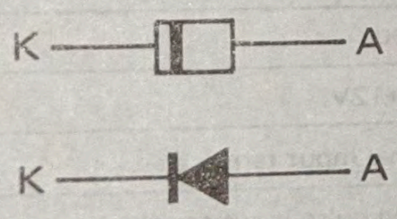
2SD1732RL



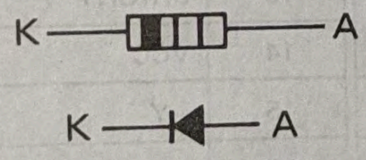
MA154WA



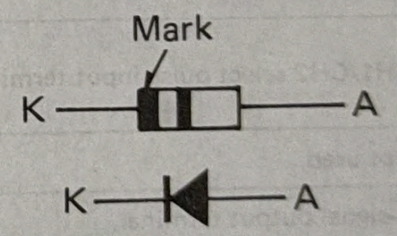
TVS11DQ03C



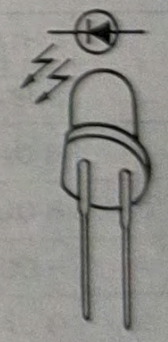
TVSRU1, RH4F
TVSRU2AM, TVSEM1Z
TVSEU1A, TVSES1Z
TVSES1, TVSEH1Z
RF1A, TVSRD20FB1



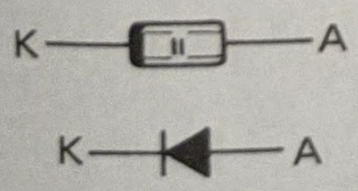
MA4030M
MA4030



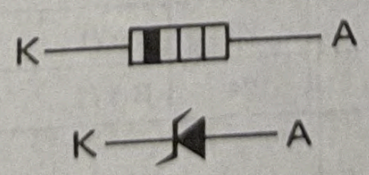
MA4120H



LN31CPHLUGS



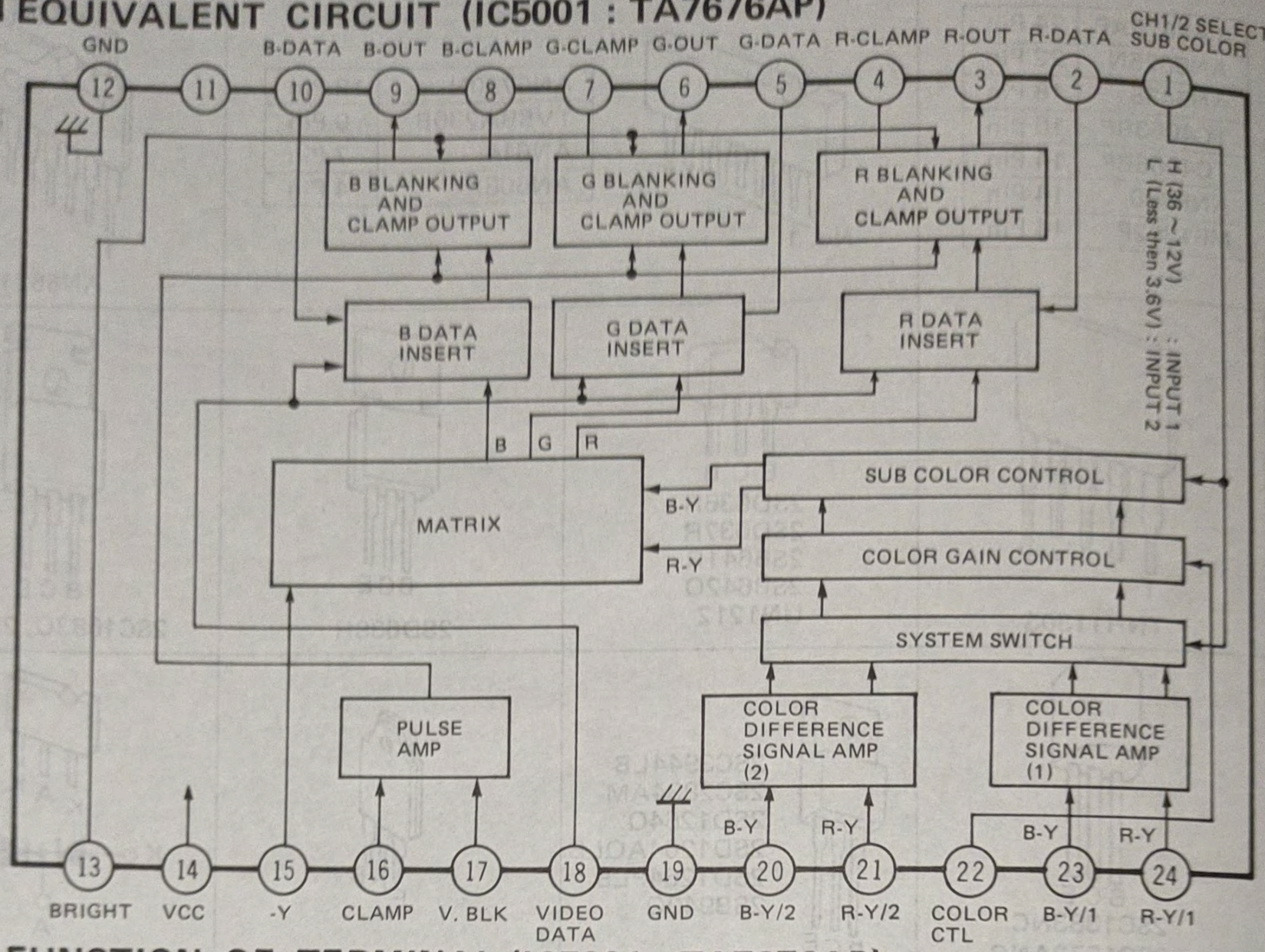
MA165, MA27WB
MA166, MA150
MA161, MA162
MA27, OA90G
OA90AM, OA90AG
MA182, MA150
MA170, MA154WA



MA4180
MA4200
MA4091M
MA4043M
MA4068M
MA4082M

EQUIVALENT CIRCUIT AND FUNCTION OF TERMINAL

■ EQUIVALENT CIRCUIT (IC5001 : TA7676AP)

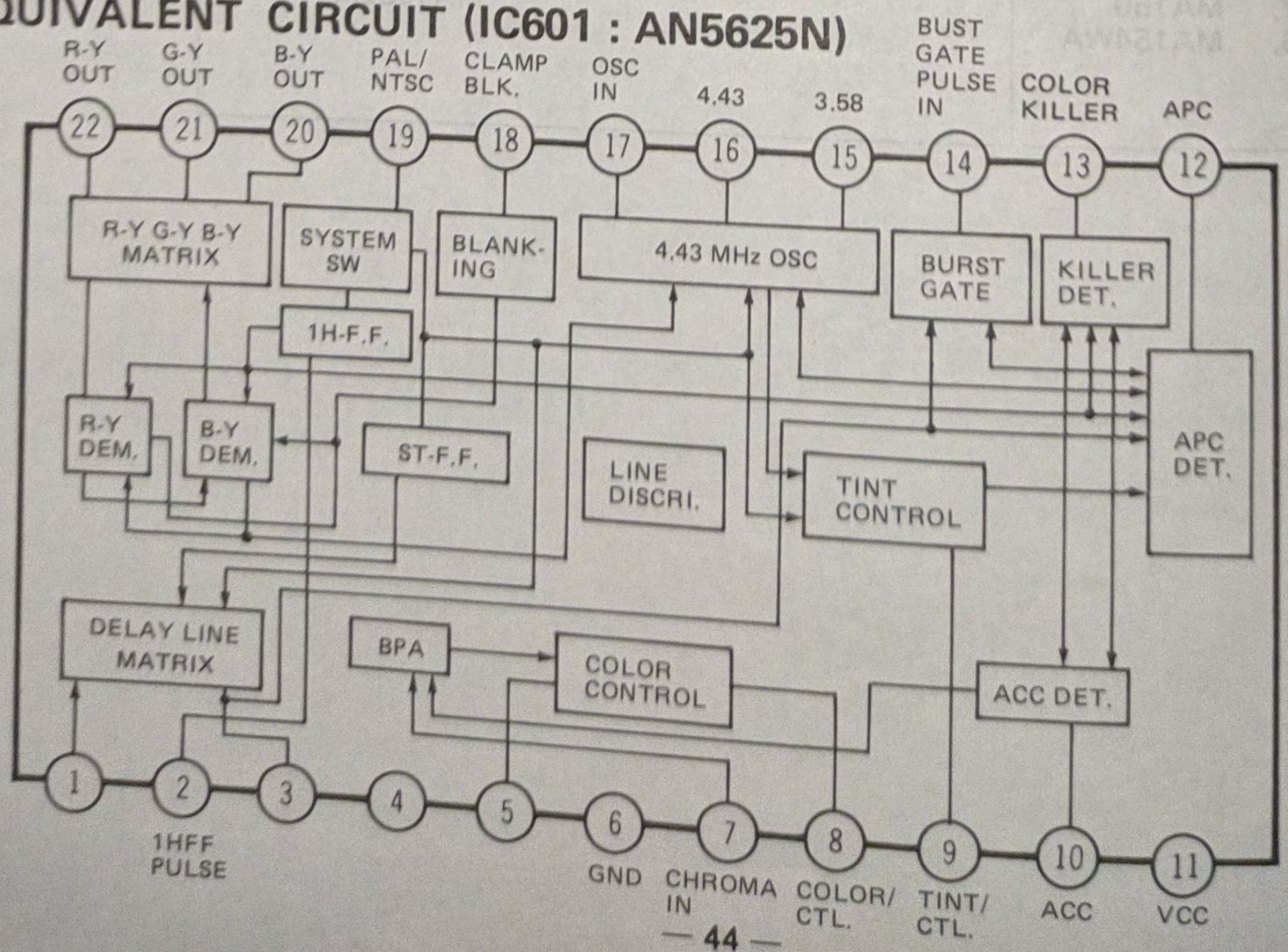


■ FUNCTION OF TERMINAL (IC5001 : TA7676AP)

Pin No.	Mark	Function
1	CH1/CH2 SELECT SUB COLOR	CH1/CH2 select pulse input terminal.
2	R-DATA	Not used.
3	R-OUT	R-signal output terminal.
4	R-CLAMP	R-signal clamping terminal.
5	G-DATA	Not used.
6	G-OUT	G-signal output terminal.
7	G-CLAMP	G-signal clamping terminal.
8	B-CLAMP	B-signal clamping terminal.
9	B-OUT	B-signal output terminal.
10	B-DATA	Not used.
11	NC	Not used.
12	GND	GND terminal.

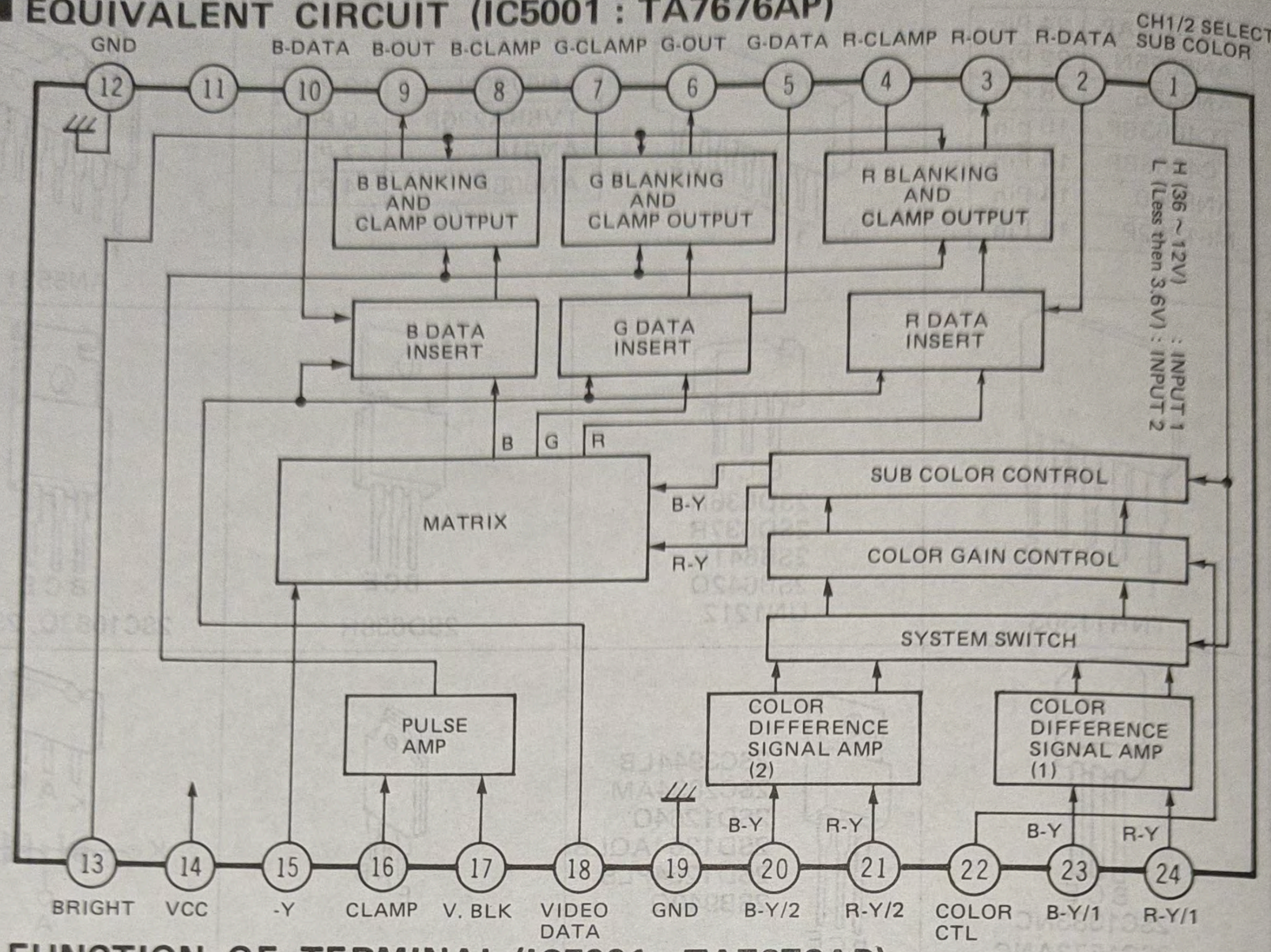
Pin No.	Mark	Function
13	BRIGHT	Not used.
14	VCC	Apply +12V.
15	–Y	–Y signal input terminal.
16	CLAMP	Blanking pulse input terminal.
17	V. BLK	Not used.
18	VIDEO/DATA	GND terminal.
19	GND	GND terminal.
20	B-Y/2	Difference signal (B-Y/2) input terminal.
21	R-Y/2	Difference signal (R-Y/2) input terminal.
22	COLOR/CTL	Color control voltage input terminal.
23	B-Y/1	Difference signal (B-Y/1) input terminal.
24	R-Y/1	Difference signal (R-Y/1) input terminal.

■ EQUIVALENT CIRCUIT (IC601 : AN5625N)



EQUIVALENT CIRCUIT AND FUNCTION OF TERMINAL

■ EQUIVALENT CIRCUIT (IC5001 : TA7676AP)

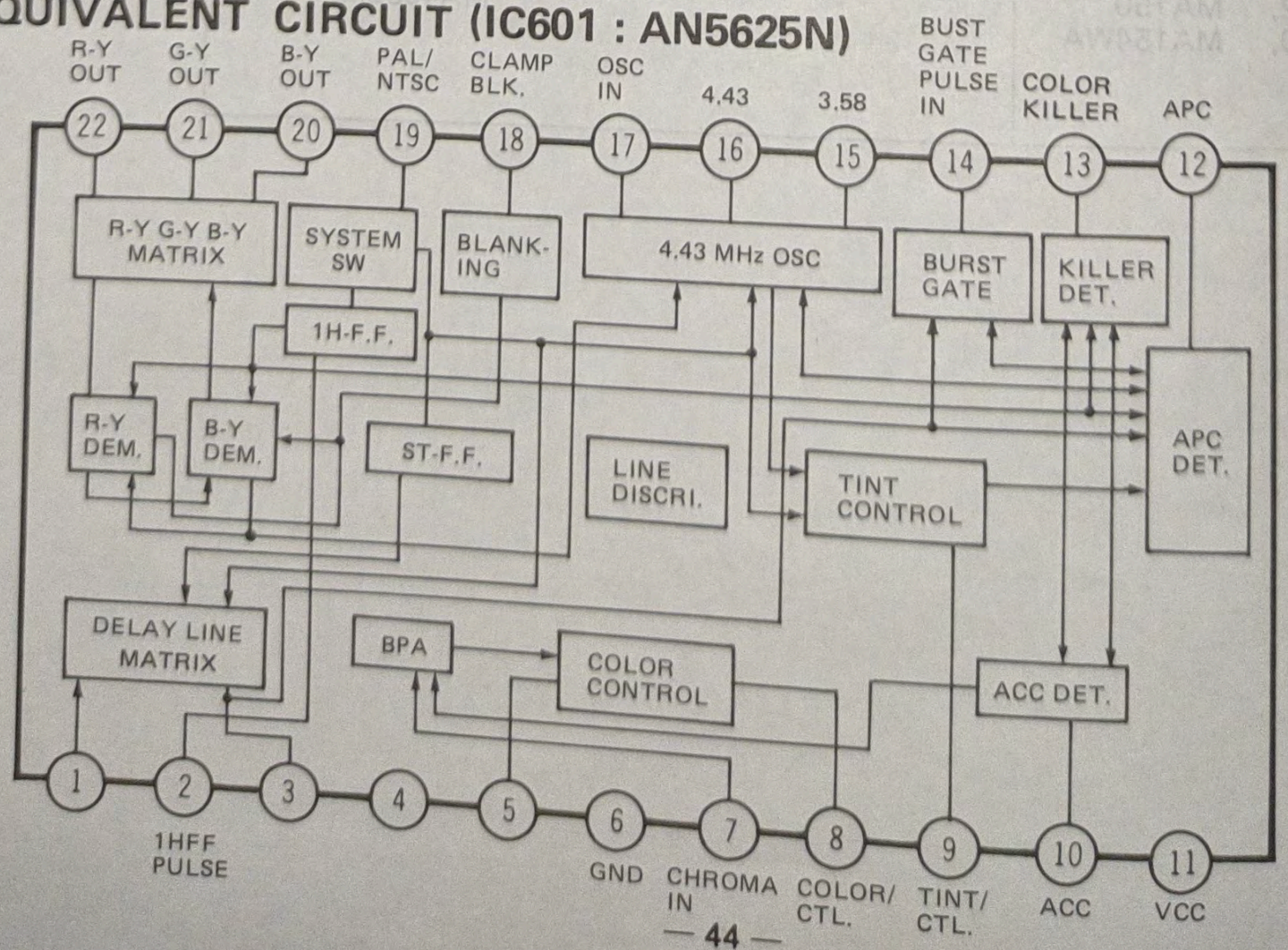


■ FUNCTION OF TERMINAL (IC5001 : TA7676AP)

Pin No.	Mark	Function
1	CH1/CH2 SELECT SUB COLOR	CH1/CH2 select pulse input terminal.
2	R-DATA	Not used.
3	R-OUT	R-signal output terminal.
4	R-CLAMP	R-signal clamping terminal.
5	G-DATA	Not used.
6	G-OUT	G-signal output terminal.
7	G-CLAMP	G-signal clamping terminal.
8	B-CLAMP	B-signal clamping terminal.
9	B-OUT	B-signal output terminal.
10	B-DATA	Not used.
11	NC	Not used.
12	GND	GND terminal.

Pin No.	Mark	Function
13	BRIGHT	Not used.
14	VCC	Apply +12V.
15	–Y	–Y signal input terminal.
16	CLAMP	Blanking pulse input terminal.
17	V. BLK	Not used.
18	VIDEO/DATA	GND terminal.
19	GND	GND terminal.
20	B-Y/2	Difference signal (B-Y/2) input terminal.
21	R-Y/2	Difference signal (R-Y/2) input terminal.
22	COLOR/CTL	Color control voltage input terminal.
23	B-Y/1	Difference signal (B-Y/1) input terminal.
24	R-Y/1	Difference signal (R-Y/1) input terminal.

■ EQUIVALENT CIRCUIT (IC601 : AN5625N)



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