

# MITSUBISHI

## Models CP-1423B, CP-1427BM, CP-1623B, CP-1627BM

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**General Description:** A series of colour television receivers incorporating various user functions but incorporating a similar basic chassis. Most signal processing is by integrated circuit and a 40-pin device incorporates decoder and timebase functions. The circuit and adjustments for Model CP-1423B are given here as a general guide to all models in this range. Further guidance may be found in the section on Model CT2023 elsewhere in this volume.

**Mains Supply:** 240 volts, 50Hz.

**Cathode Ray Tubes:** A34JBQOOX (14-in.); 420FWB22P (16-in.).

**Adjustments:** (See Fig. T138) Models CP1427BM, CP1627BM).

**R.F. A.G.C. (VR101):** Set channel selector to a channel where cross-modulation or overload exists.

Turn R.F. A.G.C. control VR101 on P.C.B.-C.T.V. anti-clockwise until the noise disappears.

Check all channels available and make sure no noise or cross-modulation is observed.

**Sub.-Cont. (VR201):** Tune receiver into a standard colour bar signal of 65~90 dB/ $\mu$ V.

Set the Black Level control VR273, and Sharpness control VR272 at the click-stop position.

Switch set Off then On again at the mains switch to normalise settings.

Set Service Switch S201 to the 'C' position.

Connect a D.C. ammeter with 1mA full scale between the testpoint PT2(+) and PT1(-) on P.C.B.-C.T.V..

Adjust Sub-Cont. VR201 on P.C.B.-C.T.V. for beam current of  $470 \pm 20 \mu$ A (1427BM),  $500 \pm 20 \mu$ A (1627BM) on the meter.

Return Service Switch S201 to the 'N' position

**S.I.F. (L301):** Tune receiver into a programme.

Set Volume to normal listening level.

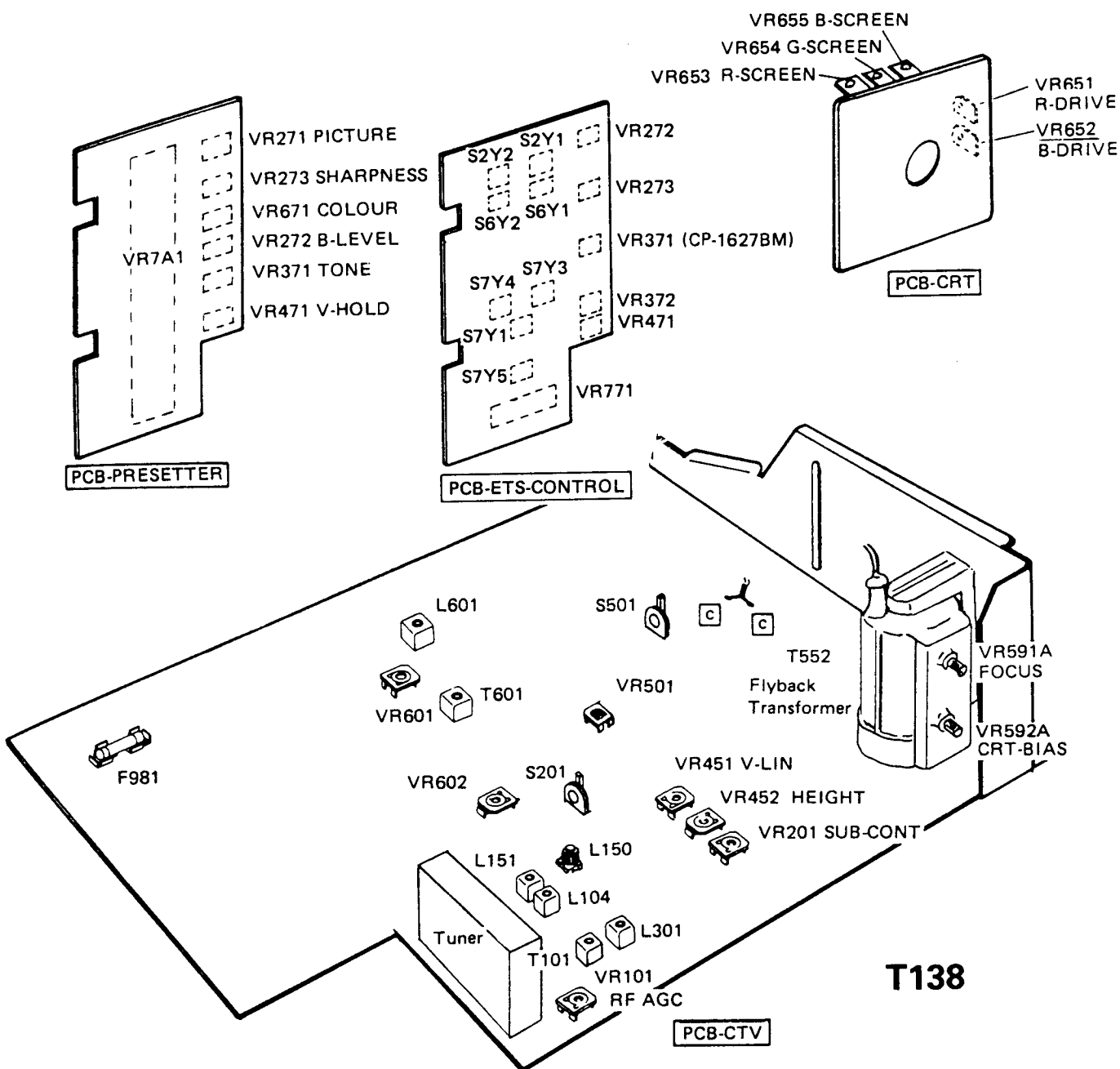
Adjust L301 on P.C.B.-C.T.V. for maximum volume with minimum buzz.

**Height and Linearity (VR452, VR451):** Make sure the A.C. power supply voltage is at the specified value (240V).

Set V. Hold control VR471 on P.C.B.-Control to the centre of vertically synchronising range.

Adjust Height control VR452 on P.C.B.-C.T.V. for approx. 90% vertical size of raster.

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(T138) LOCATION OF ADJUSTMENTS—MODELS CP-1423 ETC.

Adjust V. Lin. control VR451 on P.C.B.-C.T.V. for symmetry of vertical linearity.

Set Picture control (S2Y1, S2Y2) to obtain a normal condition, Sharpness control VR272, and Black Level control VR273 at the click-stop position.

Adjust Height control VR452 for normal vertical size.

Repeat steps above, if necessary.

**Horizontal Freq. Control (VR501):** If there is difficulty in maintaining horizontal sync., adjust VR501.

Short circuit the test points TP8A and TP8B. Apply a D.C. bias of around 2-4V to TP8C.

Adjust VR501 for near synchronisation.  
Remove the lead from TP8A and TP8B.

**Horizontal Centring (S501):** Adjust H. Freq. control VR501 as described above.

Adjust H. Phase S501 on P.C.B.-C.T.V. to centre the picture.

**Horizontal Width (Jumper  $\square$  –  $\square$ ):** Tune receiver to a programme.  
Set Picture control (S2Y1, S2Y2) to obtain a normal condition, Sharpness control VR272, and Black Level control VR273 at the click-stop position.

Make sure the mains voltage is 240V.

If horizontal size of the raster is small, clip off the jumper ( $\square$  –  $\square$ ) on the P.C.B.-C.T.V.

**Focus (VR591A):** Tune receiver into a monochrome signal.

Set Picture control (S2Y1, S2Y2) to obtain a normal condition, Sharpness control VR272, and Black Level control VR273 at the click-stop position.

Adjust Focus control VR591A for best overall focus.

**Sub-Colour (VR602):** Tune receiver into a colour bar signal.

Switch set Off then On again at the mains switch to normalise settings.

Set Picture control (S2Y1, S2Y2) to obtain a normal condition, Sharpness control VR272, and Black Level control VR273 at the click-stop position.

Adjust Sub-Colour control VR602 on P.C.B.-C.T.V. for optimum colour saturation.

## Adjustments

Models CP-1423B, CP-1623B.

**Sub-Cont. (VR201):** Tune receiver into a standard colour-bar signal of 65~90dB  $\mu$ V.

Set Picture control VR271, Sharpness control VR273 and Black Level control VR272 at the click-stop position.

Set Service Switch S201 to the 'C' position.

Connect a D.C. ammeter with 1mA full scale between the testpoint PT2(+) and PT1(-) on P.C.B.-C.T.V.

Adjust Sub-Cont. VR201 on P.C.B.-C.T.V. for beam current of  $430\mu\text{A} \pm 20\mu\text{A}$  on the meter. (500 $\mu\text{A}$ -CP-1623B).

Return Service Switch S201 to the 'N' position.

**S.I.F. (L301):** Tune receiver into a programme.

Set Volume control VR391 at a position where correct volume is obtained.

Adjust L301 on P.C.B.-C.T.V. for maximum volume with minimum buzz.

**Height and Linearity (VR442, VR443):** Make sure the A.C. power supply voltage is at the specified value (240V).

Set VR401 on P.C.B.-C.T.V. to the centre of vertically synchronising range.

Adjust Height control VR442 on P.C.B.-C.T.V. for approx. 90% vertical size of raster.

Adjust V. Lin. control VR443 on P.C.B.-C.T.V. for symmetry of vertical linearity.

Set Picture control VR271, Sharpness control VR273, and Black Level control VR272 at the click-stop position.

Adjust Height control VR401 for normal vertical size.

Repeat steps above, if necessary.

**Horizontal Freq. Control (VR501):** If there is difficulty in maintaining horizontal sync., adjust VR501.

Connect a 100  $\Omega$  resistor between TP8A and TP8B on P.C.B.-C.T.V.

Adjust VR501 for near synchronisation.

Remove the resistor from TP8A and TP8B.

**Horizontal Centring (S501):** Adjust H. Freq. control VR501 as described above.

Adjust H. Phase S601 on P.C.B.-C.T.V. to centre the picture.

**Horizontal Width (Jumper  $\square$  –  $\square$ ):** Tune receiver to a programme.

Set Picture control VR271, Sharpness control VR273, and Black Level control VR272 at the click-stop position.

Make sure the mains voltage is 240V.

If horizontal size of the raster is small, clip off the jumper ( $\square$  –  $\square$ ) on P.C.B.-C.T.V.

**Focus (VR591A):** Tune receiver into a monochrome signal. Set Picture control VR271, Sharpness control VR273, and Black Level control VR272 at the click-stop position.

Adjust Focus control VR591A for best overall focus.

**Sub-Colour (VR602):** Tune receiver into a colour-bar signal.

Set Colour control VR671 at the mid position.

Set Picture control VR271, Sharpness control VR273, and Black Level control VR272 at the click-stop position.

Adjust Sub-Colour control VR602 on P.C.B.-C.T.V. for optimum colour saturation.

## Purity and Convergence

**Procedure:** Remove the deflection yoke and the rubber wedges from the picture tube cone taking care not to strike or scratch the cone.

Clean the cement remaining on the deflection yoke and the surface of the tube cone by means of appropriate solvent.

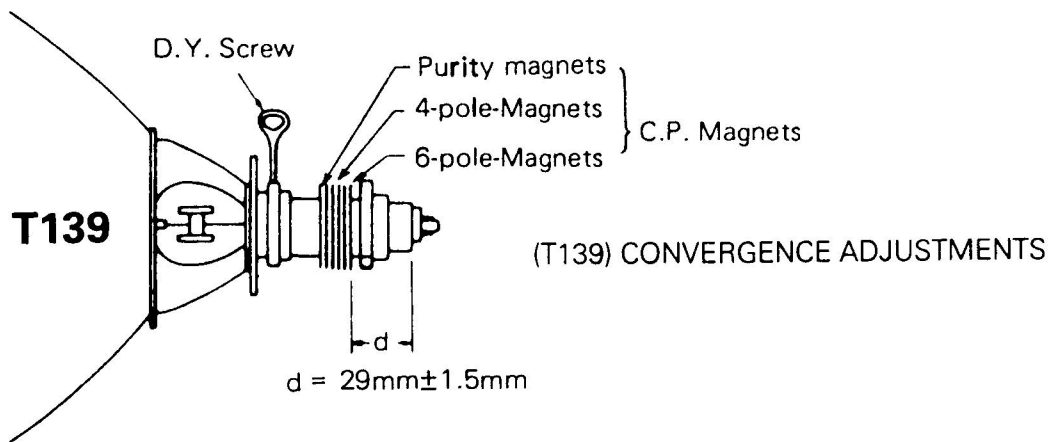
Tune receiver into a cross-hatch signal.

Fit the deflection yoke on the neck of tube and push forward.

Fit C.P. (Magnet) Assembly to the neck of the picture tube and fasten the screw at the position with a distance between 6-pole magnet end and the base of picture tube of 29 mm.

Demagnetise at the front and sides of the tube with a degaussing coil.

**Purity:** Short circuit the base and emitter of B-Out transistor Q653 on P.C.B.-C.R.T. to produce yellow raster.



With the deflection yoke positioned fully forward, adjust purity magnet so that the yellow vertical bar is at the centre of the screen.

Slide the deflection yoke slowly backwards to produce a uniform yellow raster.

Short circuit the base and emitter of corresponding two transistors on P.C.B.-C.R.T. to produce green, red, and blue rasters and to verify their purity, and fasten the screw of the deflection yoke.

Remove the shorting leads from respective transistors.

**Static Convergence:** Tune receiver into a crosshatch signal.

Set Picture control (S2Y1, S2Y2) (VR271-CP1423 /1623) to obtain a normal condition, Sharpness control VR272 (VR273-CP1423 /1623) and Black Level control VR273 (VR272-CP1423 /1623) at the click-stop position.

Adjust 4-pole magnets to converge red and blue vertical and horizontal lines at the centre of the screen.

Adjust 6-pole magnets to place the red and blue lines converged on the green lines.

If necessary, repeat steps as above.

After the position of the wedges have been decided, gently turn up the end of the wedge and strip the tape from the rear of the end to expose the adhesive material, then adhere to the picture tube cone.

**Periphery of Convergence:** Observe the horizontal lines at the centre of screen. If the red and blue horizontal lines are shifted crossing with green horizontal lines as shown converge them by swinging yoke vertically.

Then confirm that vertical lines at the screen centre are also converged.

Observe the vertical lines at left and right centres of the screen. If red or blue vertical line is shifted against green vertical line, converge them by swinging yoke horizontally. Then confirm that the horizontal lines both at top and bottom centres of the screen are also converged.

**Note:** Never perform focus adjustment after convergence adjustments. If focus is adjusted after convergence adjustment, check convergence again.

Push three rubber wedges between the picture tube cone and the deflection yoke 120°.

Observe the entire screen and make sure convergence adjustment is complete. If necessary, change the positions of the wedges and repeat the procedure.

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If necessary, repeat steps above.  
 Tighten the deflection yoke locking screw.  
 When adjusting the deflection yoke position, do not touch the purity ring magnets except where necessary.

**Grey Scale:** Entire grey scale adjustment procedure may be necessary when replacing picture tube or P.C.B.-C.R.T.

Tune receiver into a monochrome programme. (In case a colour programme, set Service Switch S201 at the 'C' position.)

Set Picture, Sharpness, and Black Level controls, at the click-stop position and Colour control at the mechanical centre.

Turn Screen controls VR653, VR654, VR655 at about 90° anti-clockwise position from the centre and Drive controls VR651, VR652 to mechanical centre.

Turn Sub-Cont. control VR201 to mechanical centre.

Set Service Switch S201 at the 'S' position on P.C.B.-C.T.V. to obtain a horizontal line of low brightness across the screen.

Advance C.R.T.-Bias control VR592A until either the red, blue or green horizontal line appears on the screen.

Adjust the rest of the Screen controls to produce a white horizontal line.

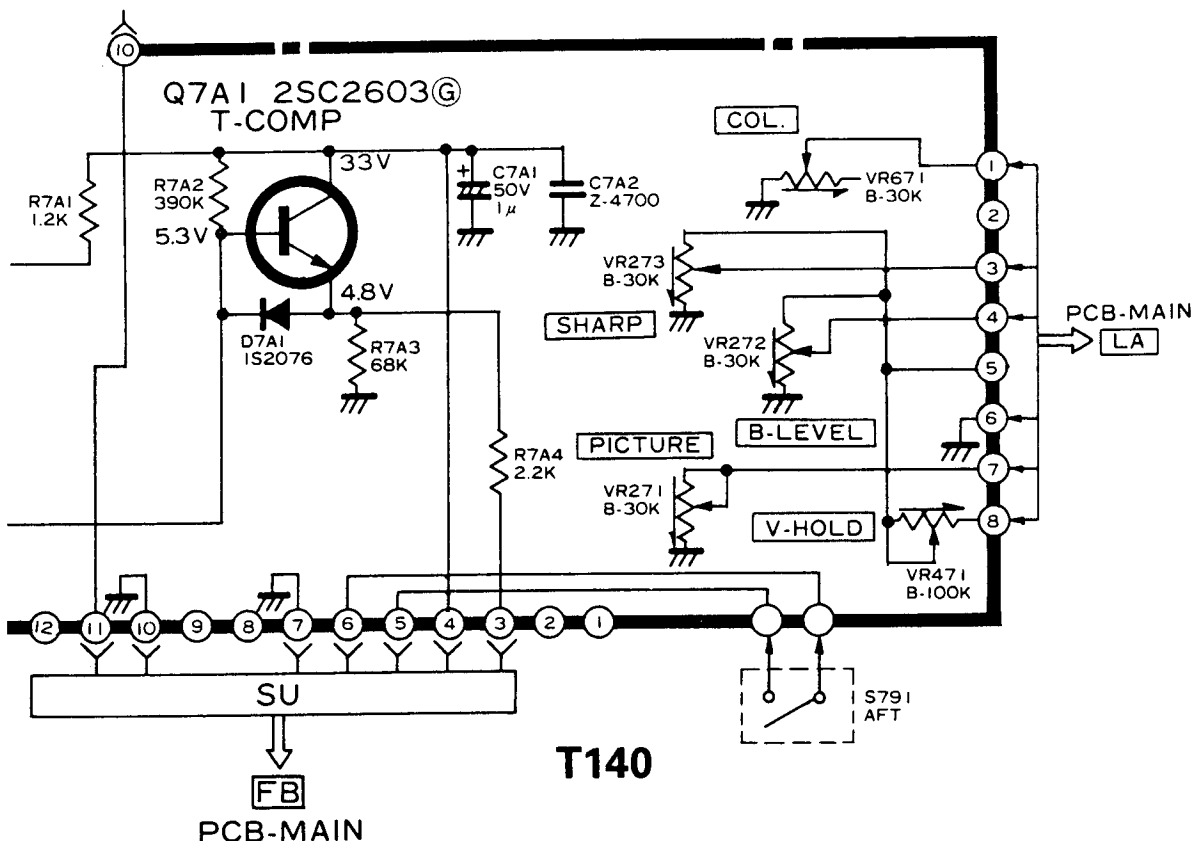
Set Service Switch S201 at the 'C' position on P.C.B.-C.T.V.

Adjust red and blue Drive controls VR651 and VR652 to obtain a pure peak white raster.

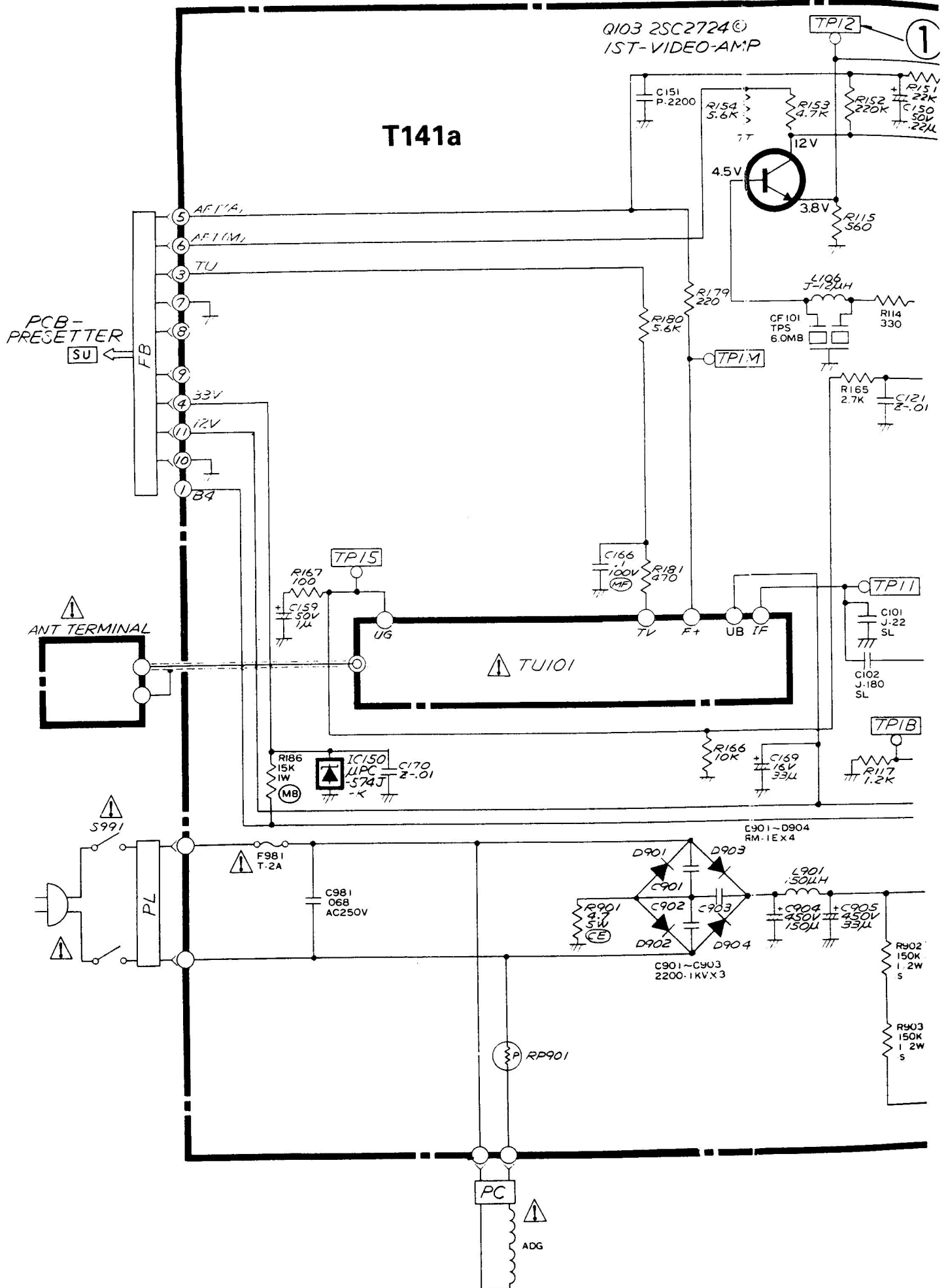
Check overall black and white tracking throughout the normal brightness and contrast range.

If necessary, repeat the procedure.

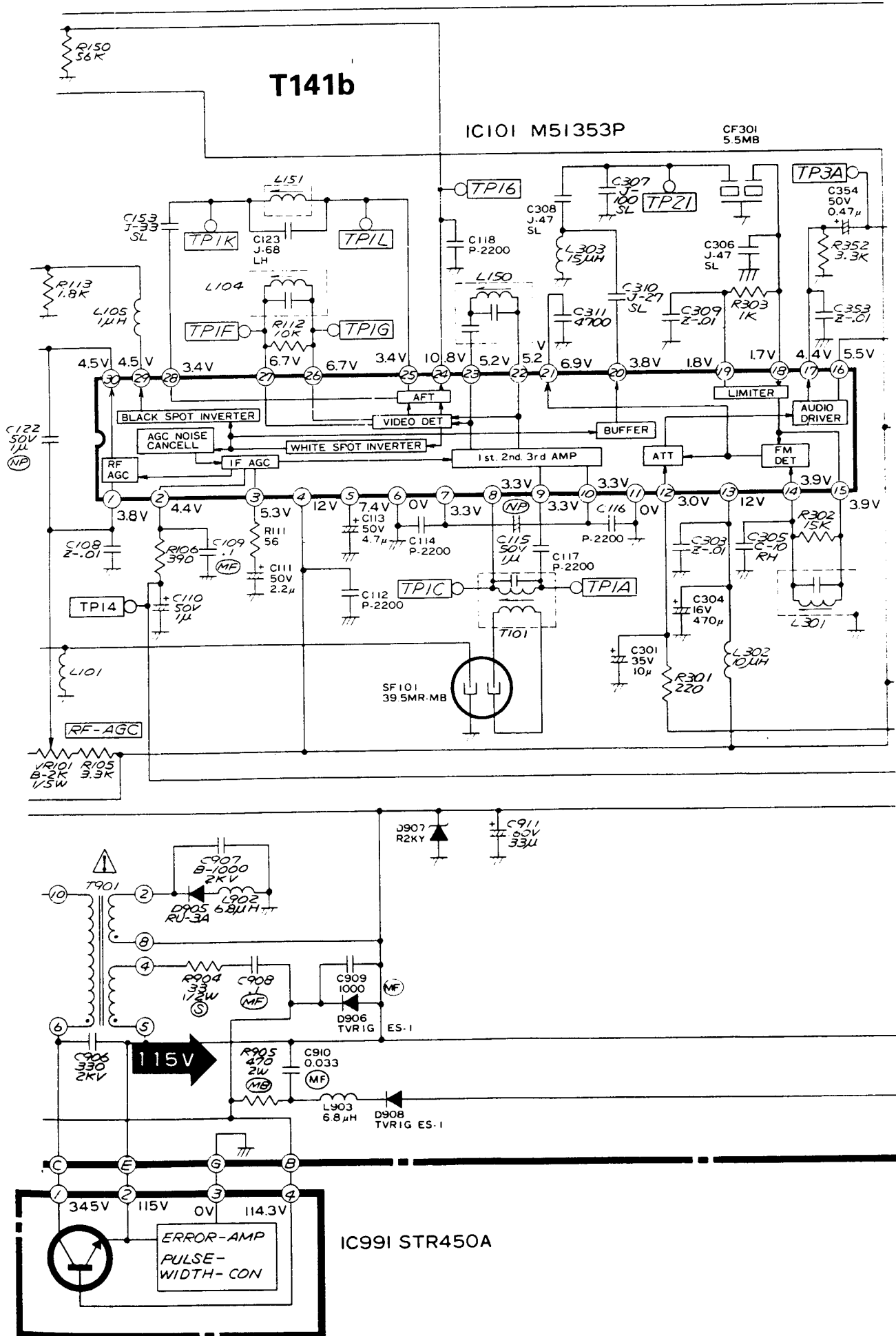
Return Service Switch S201 at the 'N' position.



(T140) CIRCUIT DIAGRAM (P.C.B.-PRESETTER)—MODEL CP-1423

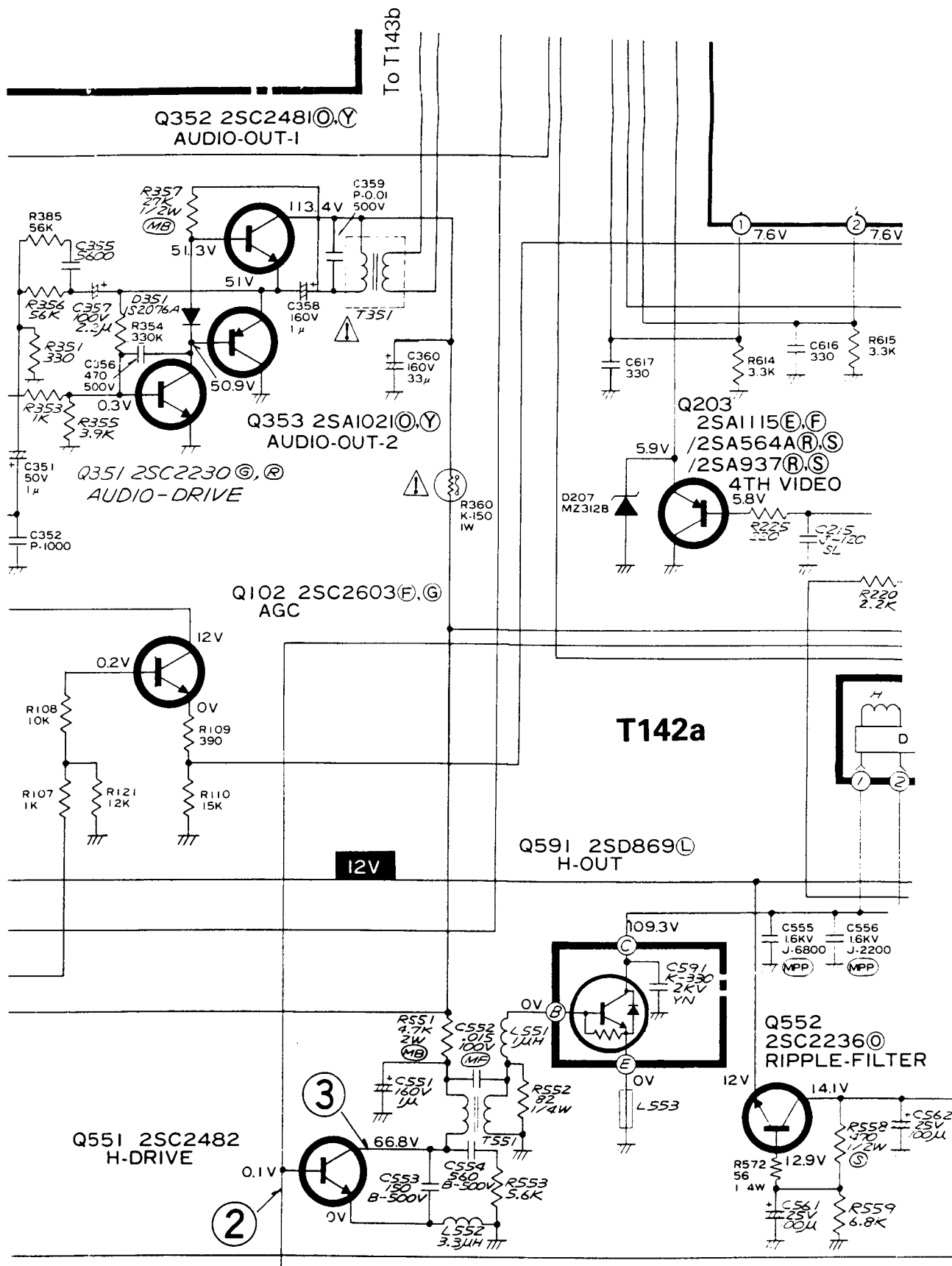


(T141a) CIRCUIT DIAGRAM (I.F. SECTION)—MODEL CP-1423 (PART)



(T141b) CIRCUIT DIAGRAM (I.F. SECTION)—MODEL CP-1423 (CONTINUED)

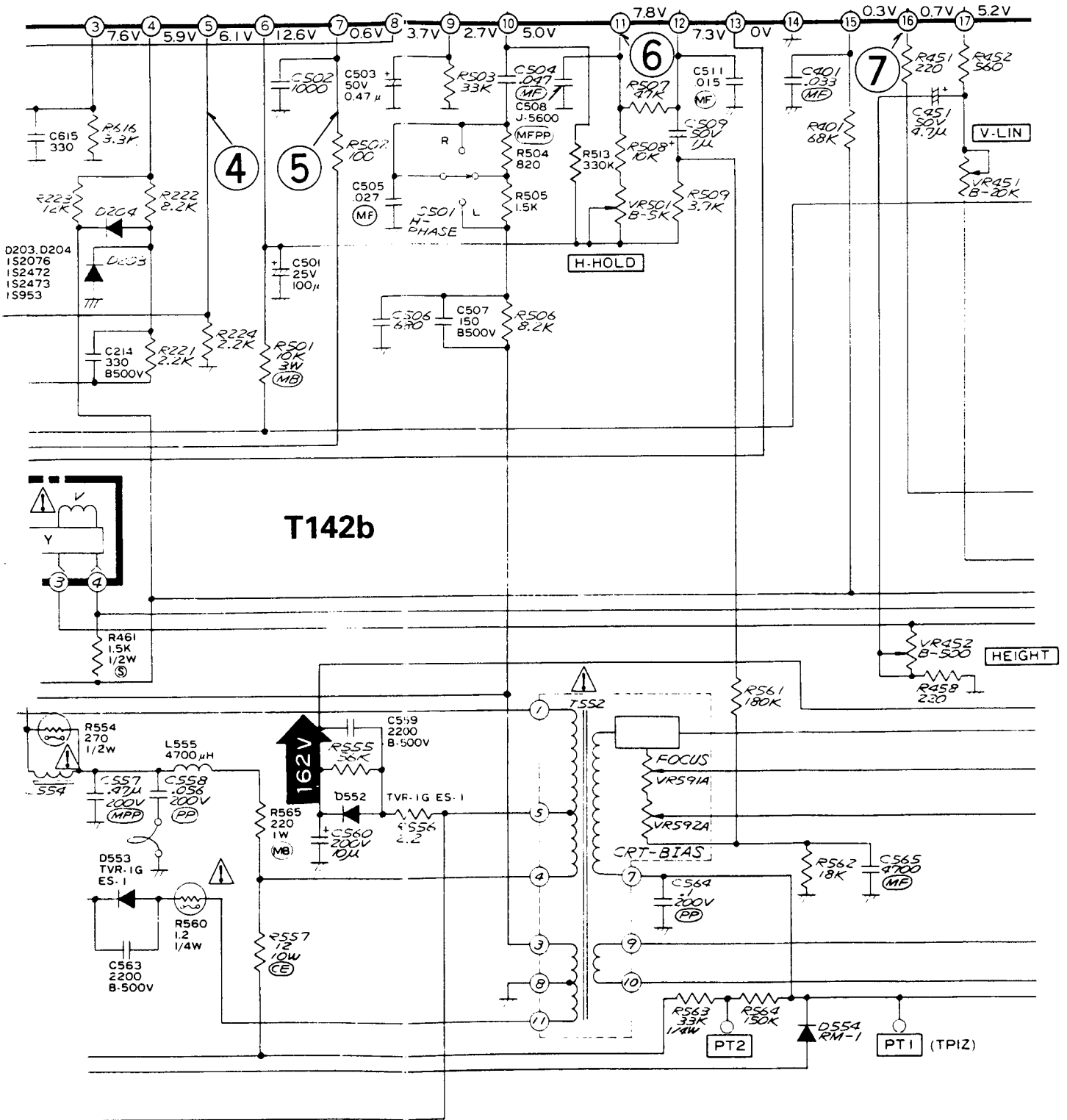




(T142a) CIRCUIT DIAGRAM (OUTPUT STAGES)—MODEL CP-1423 (PART)

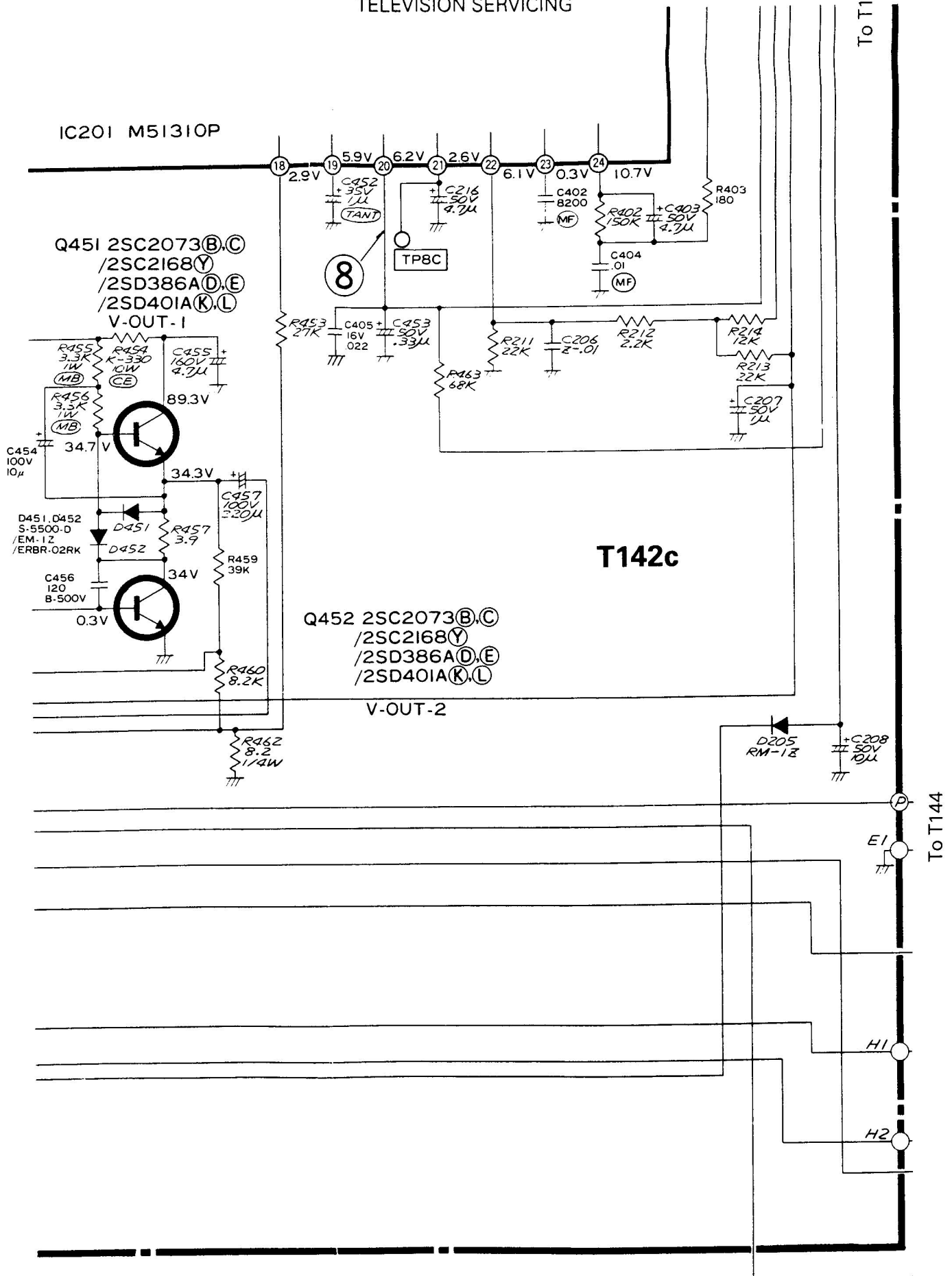
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# IC 201



(T142b) CIRCUIT DIAGRAM (OUTPUT STAGES)—MODEL CP-1423 (PART)

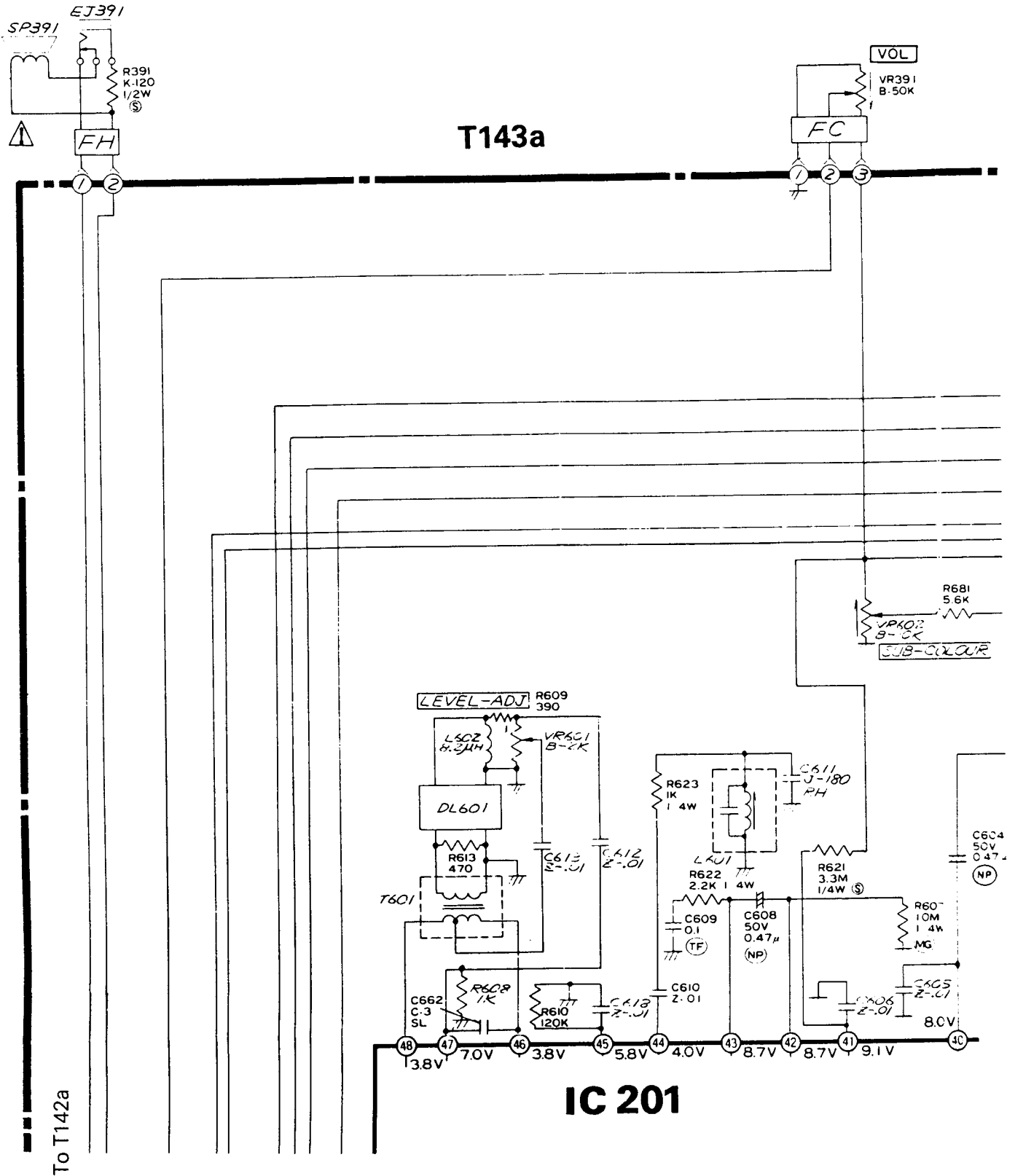
TELEVISION SERVICING



(T142c) CIRCUIT DIAGRAM (OUTPUT STAGES)—MODEL CP-1423 (CONTINUED)

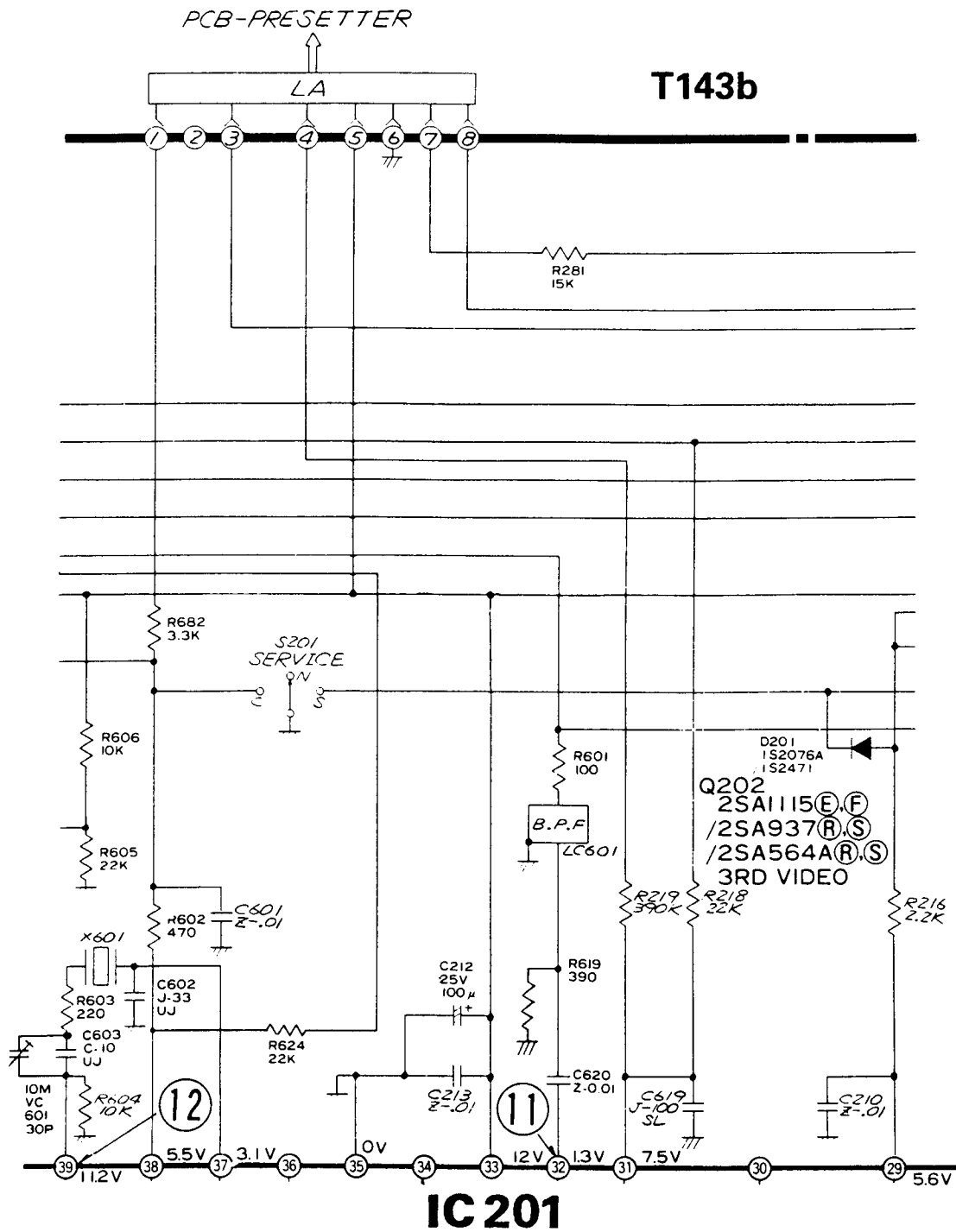
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T143a



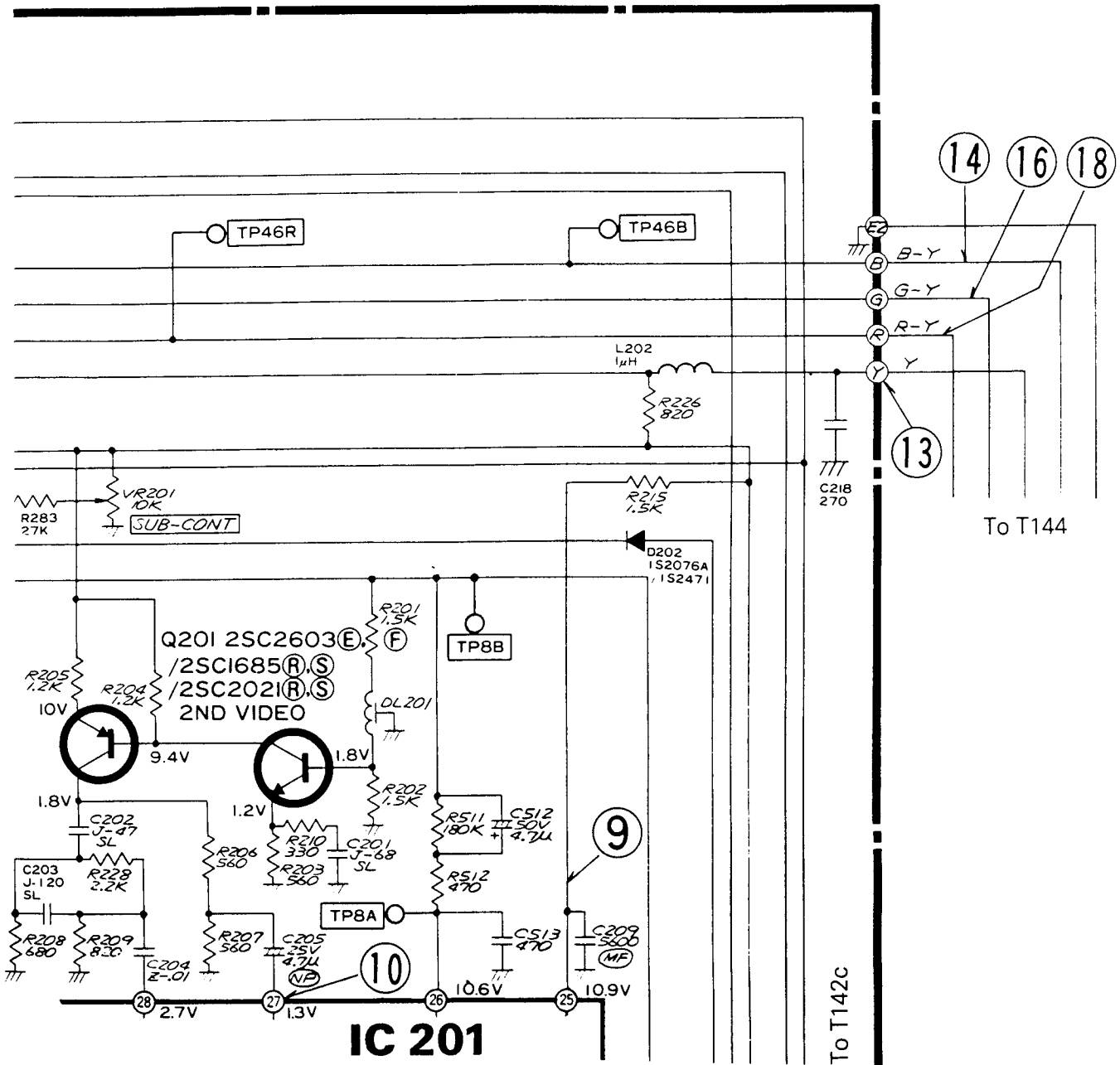
(T143a) CIRCUIT DIAGRAM (CHROMA/VIDEO STAGES)—MODEL CP-1423 (PART)

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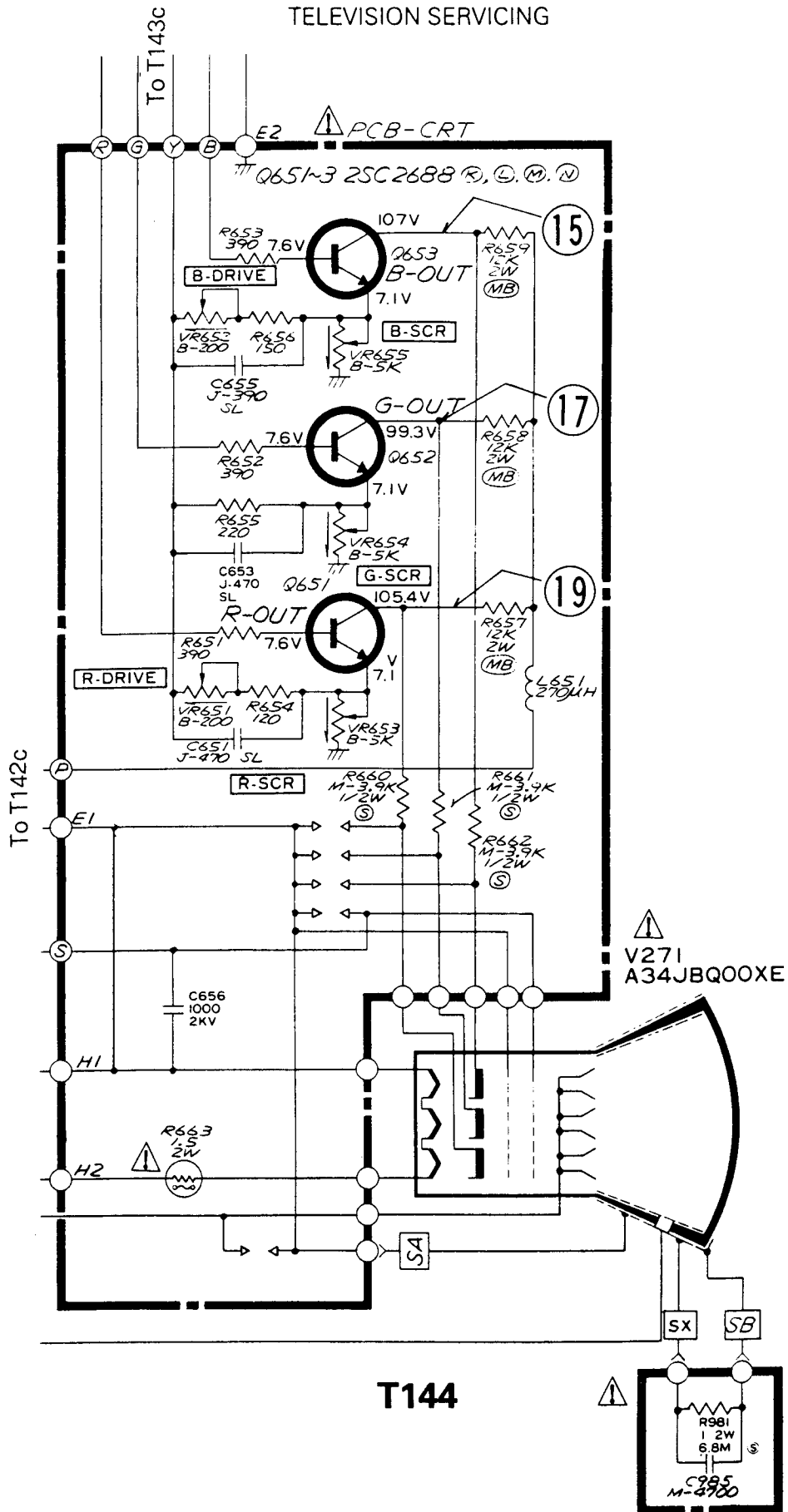
(T143b) CIRCUIT DIAGRAM (CHROMA/VIDEO STAGES)—MODEL CP-1423 (PART)

T143c



(T143c) CIRCUIT DIAGRAM (CHROMA/VIDEO STAGES)—MODEL CP-1423 (CONTINUED)

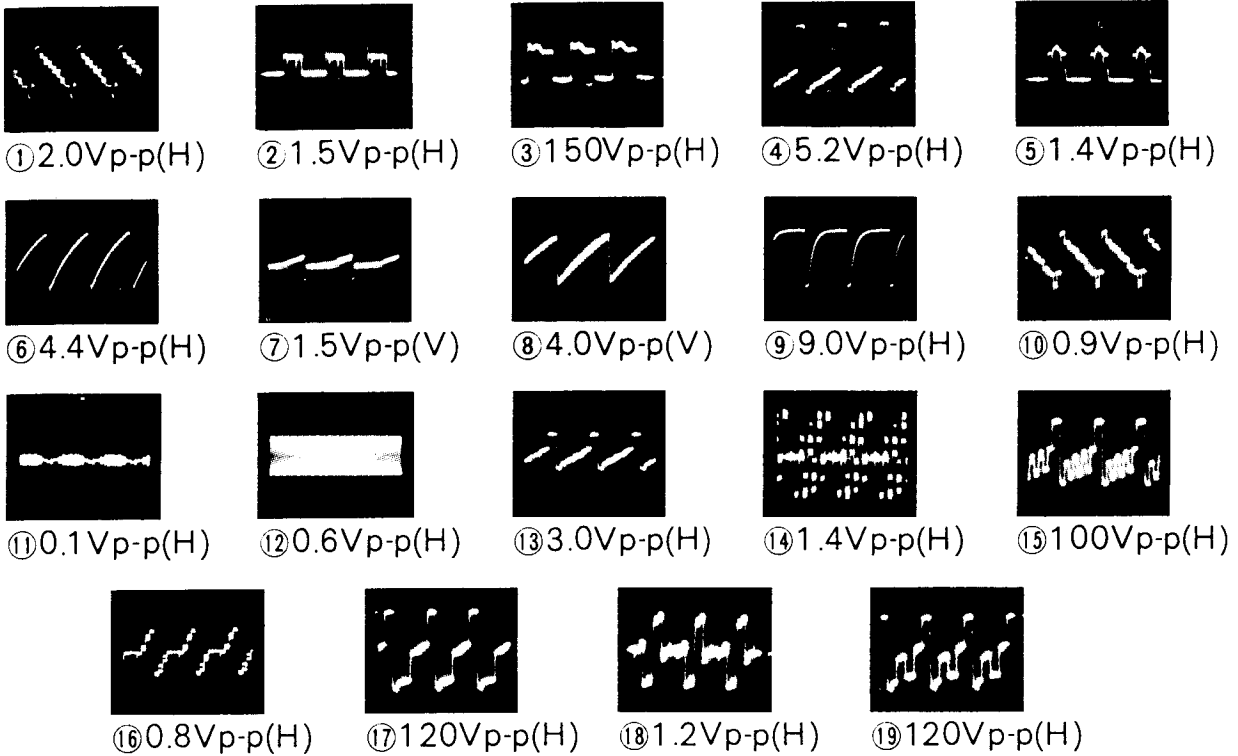
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(T144) CIRCUIT DIAGRAM (C.R.T. PANEL)—MODEL CP-1423

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**T145**



(T145) CIRCUIT WAVEFORMS—MODELS CP-1423 ETC.

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**MITSUBISHI Models CT2023, CT2027  
CT2223, CT2227, CT2229,  
CT2627/B, BM, TX Versions**

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**General Description:** A series of mains-operated colour television receivers with options for manual, or remote control and Teletext. The same basic main chassis is used in all models with alternative c.r.t. base panels. The circuit for Model CT2627BM is given here as a general guide together with differences in adjustments due to component renumbering and other changes. (See also Models CP-1423B etc.).

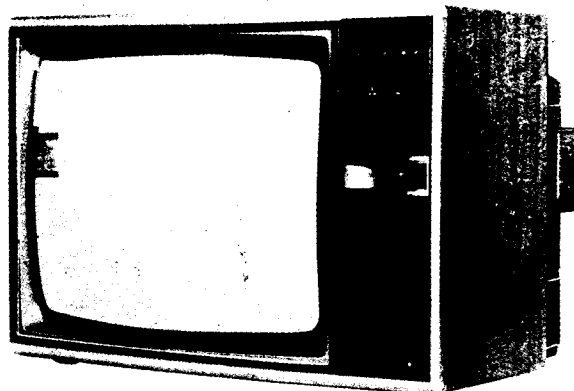
**Mains Supply:** 240 volts, 50Hz.

**Cathode Ray Tubes:** 510ABCB22P (20-in.); 560GEB22Q (22-in.); 670EMB22Q (26-in.).



# Mitsubishi CTV Service Manual

## Model CT-2027BM



### SPECIFICATIONS

<b>Reception System</b>	CCIR-I PAL	<b>Semiconductors</b>	
<b>Channels</b>	UHF ch 21 ~ 68 16 Channel preset	Integrated Circuit	12
<b>Mains Input</b>	AC 240V 50Hz	Transistors	28
<b>Power Consumption</b>	95W	Diodes	60
<b>Aerial Input</b>	75 ohm	Posistor	1
<b>Convergence</b>	Dynamic convergenceless	<b>Cabinet Dimensions</b>	23-7/8"(W)x15-3/4"(H)x18-1/8"(D) 606mm      400mm      460mm
<b>Intermediate Frequency</b>	Video            39.5MHz Sound            33.5MHz Colour sub-carrier 35.07MHz	<b>Weight</b>	25.0 kg (55.1 lbs)
<b>Intercarrier Frequency</b>	6.0MHz	<b>Special Features</b>	<ul style="list-style-type: none"> <li>• 90° In-line, High-fidelity, High-contrast picture tube (Blue Diamond Tube)</li> <li>• Voltage Synthesizer tuning system.</li> <li>• 24 Function direct access remote control system.</li> <li>• 1-chip Video/Chroma IC; VIF circuit with SAW (Surface Acoustic Wave) Filter; Hybrid IC power regulator; IC sound output</li> <li>• New jungle IC deflection circuit</li> <li>• [Optional] Video IN/OUT and Audio IN/OUT facility (For VCR)</li> <li>• Two way speakers</li> </ul>
<b>Audio Output</b>	2.5W		
<b>Speaker</b>	4"(10cm) round type, 8Ω 1-5/8" (4cm) Round type, [Tweeter]		
<b>Picture Tube</b>	510ACB22P 20" 90° Deflection Pin cushion distortion free Quick heating T-Banded type		

**
 MITSUBISHI ELECTRIC (U.K) LTD.  
 OTTERSPOOL WAY, WATFORD, HERTS. WD2 8LD**

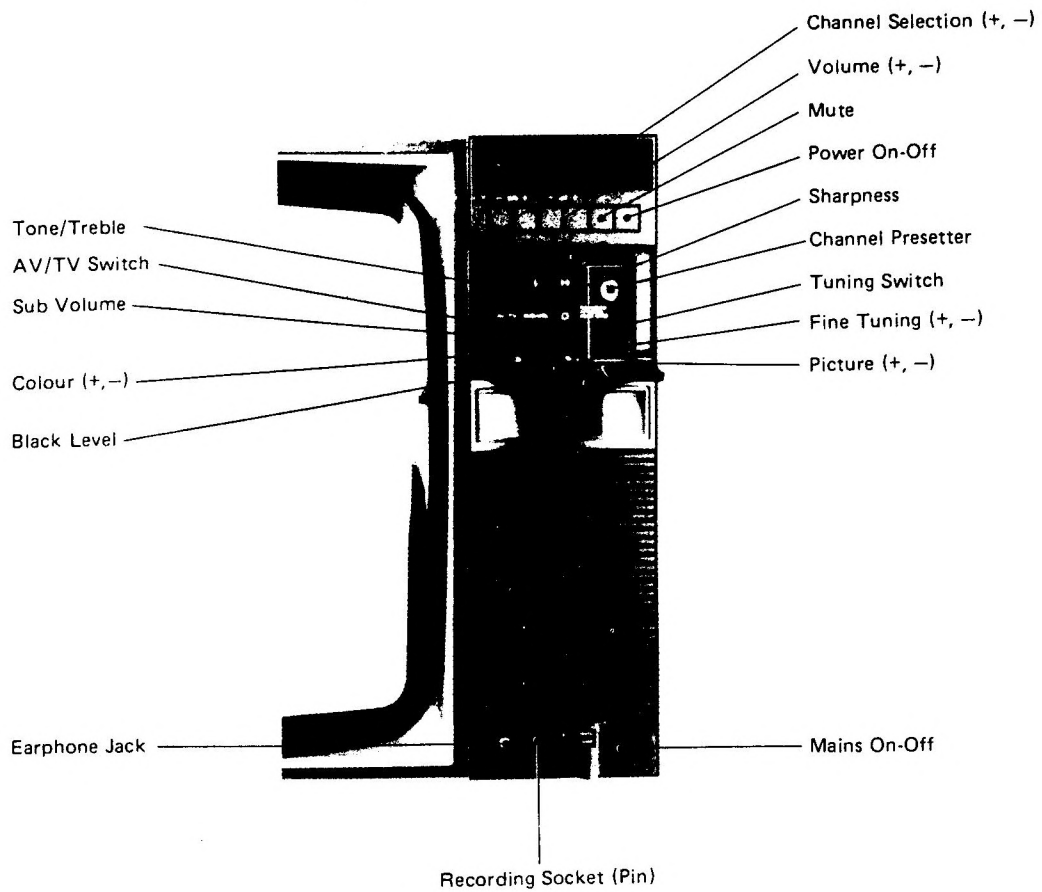


Fig. 1 Controls

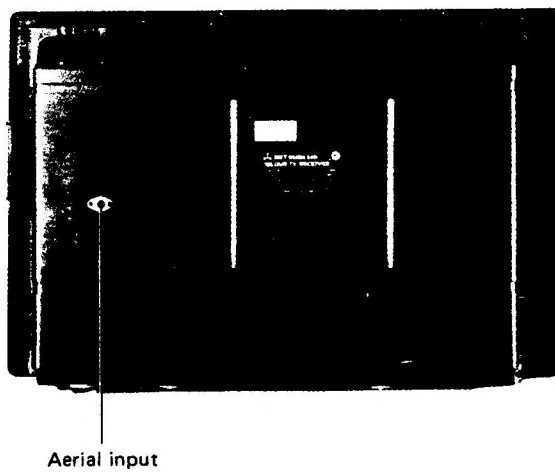
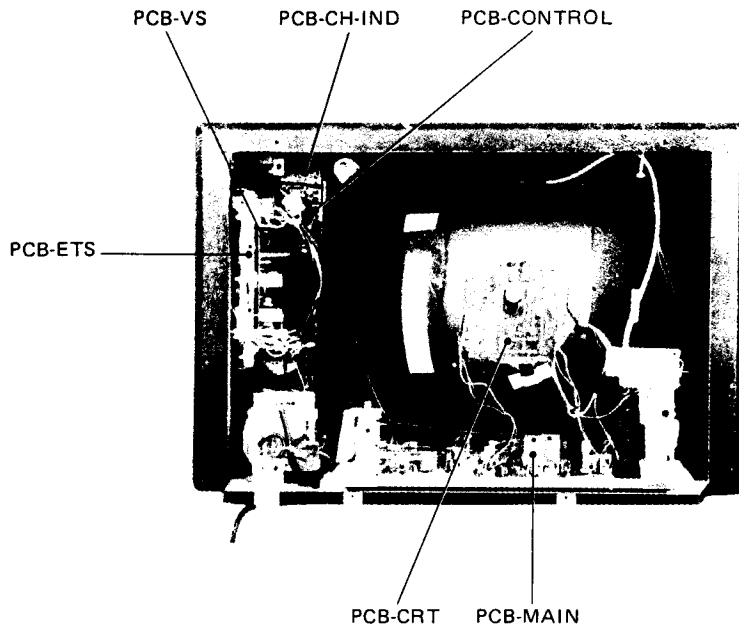
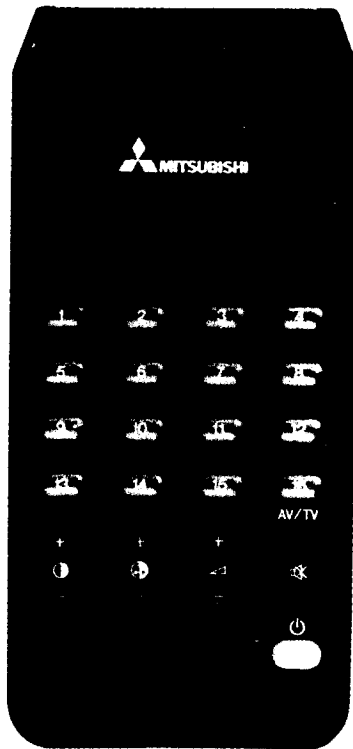


Fig. 2 Rear View



**Fig. 3 Location of PCBs**



**Fig. 4 Remote Control Transmitter**

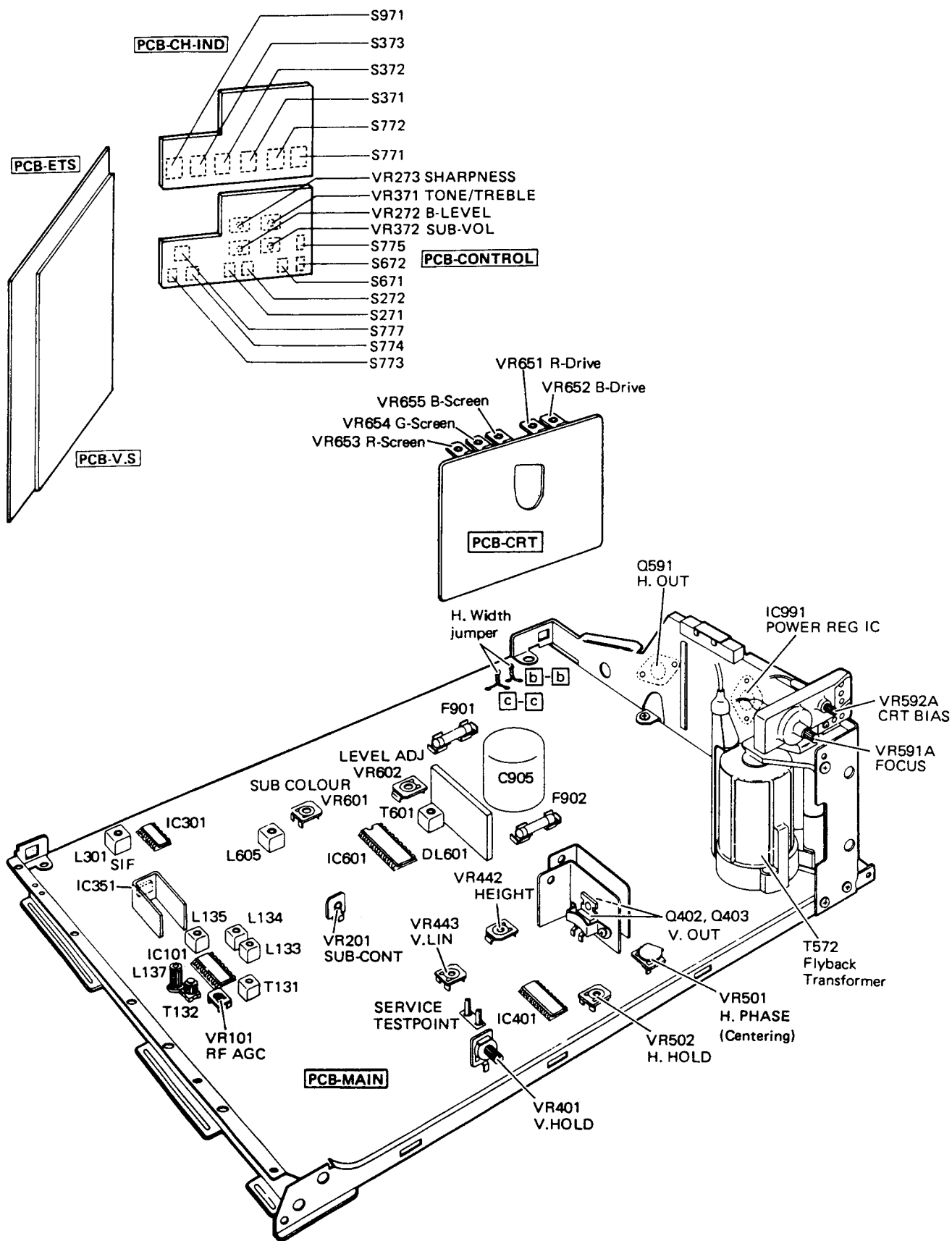


Fig. 5 Location of Controls

## SERVICE ADJUSTMENTS

### RF AGC (VR101)

- (1) Set channel selector to a channel where cross-modulation or overload exists.
- (2) Turn RF AGC control VR101 on PCB-MAIN slowly anticlockwise until the noise disappears.
- (3) Receive all the channels available and make sure no noise or cross-modulation is observed.

### SUB CONT (VR201)

- (1) Tune receiver into a standard colour bar signal of 65 ~ 90dB/ $\mu$ V.
- (2) Set PICTURE control (S271, S272) to obtain a normal condition, SHARPNESS control VR273 and BLACK LEVEL control VR272 at the click-stop position.
- (3) Set COLOUR control (S671, S672) to minimum.
- (4) Connect a DC ammeter with 1mA full scale between the testpoints TP91(+) and TP1Z(-) on PCB-MAIN.
- (5) Adjust SUB CONT VR201 on PCB-MAIN for beam current of  $750 \pm 20\mu$ A.

### SIF (L301)

- (1) Tune receiver into a programme.
- (2) Set volume control (S371, S372) at position where correct volume is obtained.
- (3) Adjust L301 on PCB-MAIN for maximum volume.

### HEIGHT AND LINEARITY (VR442, VR443)

Make sure the AC power supply voltage is at the specified value (240V).

- (1) Set VR401 V. HOLD control on PCB-MAIN at the centre of synchronizing range.
- (2) Adjust HEIGHT control VR442 on PCB-MAIN for approx. 90% vertical size of raster.
- (3) Adjust V. LIN control VR443 on PCB-MAIN for symmetry of vertical linearity.
- (4) Set PICTURE control (S271, S272) to obtain a normal condition, SHARPNESS control VR273, and BLACK LEVEL control VR272 at the click-stop position.
- (5) Adjust HEIGHT control VR442 for normal vertical size.
- (6) Repeat steps above, if necessary.

### HORIZONTAL FREQ CONTROL (VR502)

If there is difficulty in maintaining horizontal sync, adjust VR502.

- (1) Connect a 100 $\Omega$  resistor between TP8A and TP8B on PCB-MAIN.
- (2) Adjust VR502 for almost in sync condition.
- (3) Remove the resistor from TP8A and TP8B.

### HORIZONTAL CENTERING (VR501)

- (1) Make sure H. HOLD control VR502 has been adjusted.
- (2) Adjust H-PHASE VR501 on PCB-MAIN to centre the raster.

### HORIZONTAL WIDTH (Jumper $\boxed{b}$ - $\boxed{b}$ or $\boxed{c}$ - $\boxed{c}$ )

- (1) Tune receiver to a programme.
- (2) Set PICTURE control (S271, S272) to obtain a normal condition, SHARPNESS control VR273, and BLACK LEVEL control VR272 at the click-stop position.
- (3) Make sure the Mains voltage is 240V.
- (4) If horizontal size of the raster is too small, clip off the jumper  $\boxed{b}$  -  $\boxed{b}$  (and  $\boxed{c}$  -  $\boxed{c}$  if necessary) on PCB-MAIN.

### FOCUS (VR591A)

- (1) Tune receiver into a monochrome signal.
- (2) Set PICTURE control (S271, S272) to obtain a normal condition, SHARPNESS control VR273, and BLACK LEVEL control VR272 at the click-stop position.
- (3) Adjust FOCUS control VR591A on the rear right of PCB-MAIN for best overall definition and focus.

## CHROMA CIRCUITS

### VECTOR ADJUSTMENT

Connect a 10pF capacitor across the pins 4 and 5 of the delay line DL601 on PCB-MAIN.

- (1) Tune receiver in PAL colour bar signal.
- (2) Switch set OFF then ON again at the mains switch to normalize settings.
- (3) Set SUB-COLOUR control VR601 on PCB-MAIN at the midposition and LEVEL ADJ VR602 on PCB-MAIN at about 30° clockwise position from centre.

Set the oscilloscope brightness to a level at which bright points for six colours are visible both at outer and inner sides of the vector.

If the picture has no colour then, adjust L605 for normal colour.

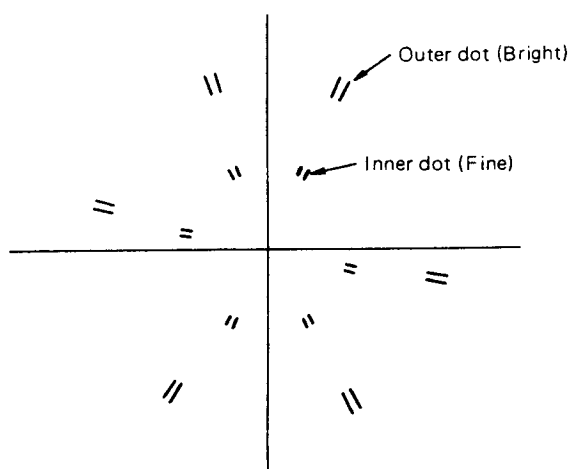


Fig. 6 Vector Pattern of Colour Bar Signal

- (4) Set the oscilloscope to the X-Y mode and connect the pin terminal L2 (B-Y OUT) and pin terminal L3 (R-Y OUT) on PCB-MAIN to the horizontal and vertical inputs of the oscilloscope respectively to display a vector pattern on the screen. (Fig. 6)
- (5) Observing the outermost dots which correspond to normal colour bar, adjust the LEVEL ADJ VR602 and TRANS-OUT T601 on PCB-MAIN alternately to almost coincide the double dot patterns equally for all colours on the scope.

- (6) Observing the inner dots, adjust the coil L605 and LEVEL ADJ VR602 on PCB-MAIN alternately so that the double dots are converged. The converged points are located in about half way on the lines connecting the centre of the vector and each outer dots. (Fig. 7)
- (7) Repeat steps (6) and (7) above so that the outer and inner dots are converged almost uniformly. Remove the 10pF capacitor from across pins 4 and 5 of DL601 on PCB-MAIN.

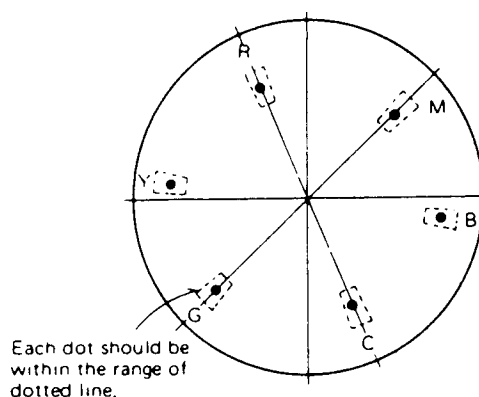


Fig. 7 Vector Pattern of Colour Bar Signal

### SUB-COLOUR (VR601)

- (1) Tune receiver into a colour bar signal.
- (2) Switch set OFF then ON again at the mains switch to normalize settings.
- (3) Set PICTURE control (S671, S672) to obtain a normal condition, SHARPNESS control VR273, and BLACK LEVEL control VR272 at the click-stop position.
- (4) Adjust SUB-COLOUR control VR601 on PCB-MAIN for optimum colour saturation.

### PURITY AND CONVERGENCE

#### Procedure

- (1) Remove the deflection yoke and the rubber wedges from the picture tube cone with care not to strike or scratch the cone.
- (2) Clean the cement remaining on the deflection yoke or the surface of the picture tube cone by means of appropriate solvent.
- (3) Tune receiver to a cross-hatch signal.
- (4) Fit the deflection yoke on the neck of picture tube and push toward the cone.

- (5) Fit C.P. (Magnet) Assembly to the neck of the picture tube and fasten the screw at the position with a distance between 6-pole magnet end and the base of picture tube as shown in Fig. 8.
- (6) Demagnetise at the front and sides of the picture tube with a degaussing coil.

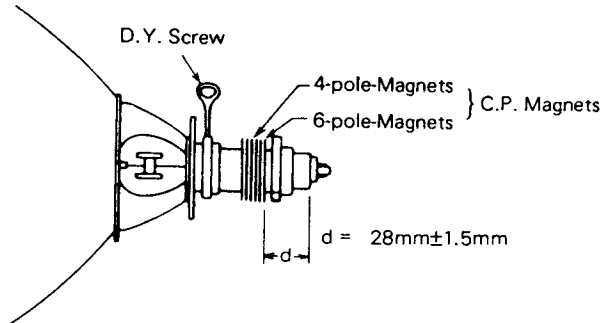


Fig. 8

### Preliminary Adjustment

#### 1. Purity

- (1) Short-circuit the base and emitter of B-OUT transistor Q653 on PCB-CRT to produce yellow raster.
- (2) With the deflection yoke positioned fully forward, adjust purity magnet so that the yellow bar is at the centre of the screen with normal vertical centering. (Fig. 9)
- (3) Slide the deflection yoke slowly backwards to produce a uniform yellow raster.
- (4) Short-circuit the base and emitter of corresponding two transistors on PCB-CRT as indicated in Table 1 to produce green, red, and blue rasters and to verify their purity, and fasten the screw of the deflection yoke temporarily.
- (5) Remove the shorting leads from respective transistors.

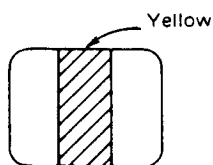


Fig. 9 Screen

Table 1 Transistors to be Shorted to Produce Primary Colour

Transistor Raster	R-OUT Q651	G-OUT Q652	B-OUT Q653
Red	Open	Short	Short
Green	Short	Open	Short
Blue	Short	Short	Open

#### 2. Static Convergence

- (1) Set PICTURE control (S271, S272) to obtain a normal condition, SHARPNESS control VR273, and BLACK LEVEL control VR272 at the click-stop position.
- (2) Adjust two 4-pole magnets to converge red and blue vertical and horizontal lines at the centre of the screen.
- (3) Adjust two 6-pole magnets to converge the red and blue lines on green lines.

#### Note:

1. Adjustment of 4-pole magnets affects red and blue beams to move them in the reverse directions with similar movement; relative angle of two tabs for amount of shift while rotating the two 4-pole magnets together for rotating shift of beams.
2. Adjustment of 6-pole magnets affects red and blue beams to move them in the same direction with similar movement; relative angle of two tabs for amount of shift while rotating two 6-pole magnets placed together for rotating shift of beams. (Fig. 10)

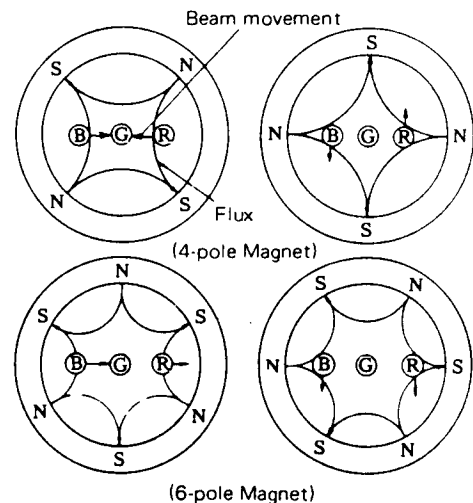


Fig. 10

### 3. Focus

If necessary, adjust focus. Ascertain focus is optimum throughout the entire screen. Do not adjust focus after the following adjustment.

#### Regular Adjustment

##### 1. Purity

- (1) Short-circuit the base and emitter of B-OUT transistor Q653 on PCB-CRT to produce yellow raster.
- (2) Loosen the deflection yoke locking screw and move it forwards and be certain the yellow bar is at the horizontal centre.  
If necessary, adjust purity magnets to centre it.
- (3) Slide the yoke backwards to produce a uniform yellow raster.
- (4) Short-circuit the base and emitter of corresponding two transistors on PCB-CRT as indicated in Table 1 to produce green, red, and blue rasters and verify their purity, then fasten the screw of the deflection yoke temporarily.
- (5) If necessary, repeat steps above.
- (6) Tighten the yoke in position.

Note: When adjusting the deflection yoke position never touch the portions other than the screw. Do not touch the purity ring magnets except where necessary.

##### 2. Static Convergence

- (1) Tune receiver into a cross-hatch signal.
- (2) Set PICTURE control (S271, S272) to obtain a normal condition, SHARPNESS control VR273, and BLACK LEVEL control VR272 at the click-stop position.
- (3) Adjust 4-pole magnets to converge red and blue vertical and horizontal lines at the centre of the screen.
- (4) Adjust 6-pole magnets to place the red and blue lines converged on the green lines.
- (5) If necessary, repeat steps (3) and (4) above.

##### 3. Periphery of Convergence

- (1) Observe the horizontal lines at the centre of screen. If the red and blue horizontal lines are shifted crossing with green horizontal lines as shown in Fig. 11(A), converge them by swinging yoke vertically. Then confirm that vertical lines at the screen centre are also converged.
- (2) Observe the vertical lines at left and right centres of the screen as shown in Fig. 11(B). If red or blue vertical line is shifted against green vertical

line, converge them by swinging yoke horizontally. Then confirm that the horizontal lines both at top and bottom centres of the screen are also converged.

- (3) The shift of beams as shown in Fig. 11(C) can be converged by rotating the entire deflection yoke. The rotation of the yoke should be made in consideration of a point where raster rotation and convergence compromise.

Note: Never perform focus adjustment after convergence adjustments. If focus is adjusted after convergence adjustment, check convergence again.

- (4) Insert three rubber wedges between the picture tube cone and the deflection yoke at the portions indicated in Fig. 12 without allowing any clearance to remain.
- (5) Observe the entire screen and make sure convergence adjustment is complete. If necessary, change the positions of the wedges and repeat steps (1) and (2) above.
- (6) After the portions to fix the wedges have been decided, gently turn up the end of the wedge and strip the tape from the rear of the end to expose the adhesive material, then return it to adhere to the picture tube cone. (Fig. 13)

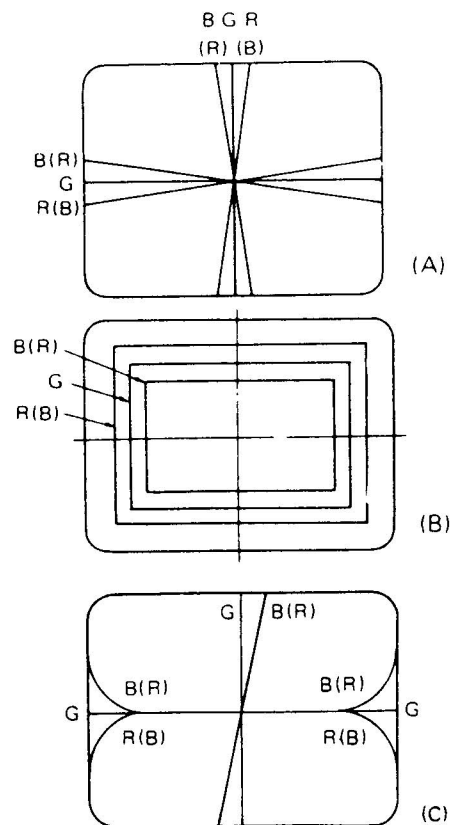


Fig. 11



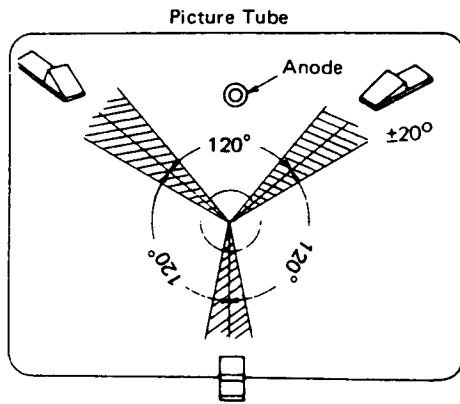


Fig. 12

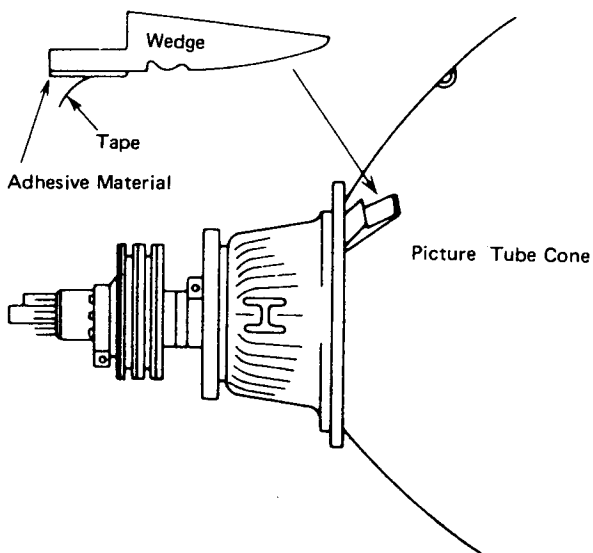


Fig. 13

## GREY SCALE

Entire grey scale adjustment procedure described below may be necessary when replacing picture tube or PCB-CRT.

- (1) Tune receiver in a B/W programme. (In case a colour programme, ground pin ② of IC601.)
- (2) Set PICTURE control (S271,S272) to obtain a normal condition, SHARPNESS, and BLACK LEVEL controls (VR271, VR272) at the click-stop position. Set the CRT BIAS VR592A at the fully anticlockwise.
- (3) Turn SCREEN controls VR653, VR654, VR655 and DRIVE controls VR651, VR652 on PCB-CRT to mechanical centre.
- (4) Short-circuit two pins of the Service Connector on PCB-MAIN to obtain a horizontal line of low brightness at the centre of the screen.
- (5) Advance CRT BLAS VR592A on HV-Block until either the red,blue or green horizontal line appears on the screen.
- (6) Adjust the rest of the SCREEN controls to produce a white horizontal line.
- (7) Open the Service Connector to produce raster.
- (8) Adjust red, and blue DRIVE controls VR651 and VR652 to make raster white over the entire screen.
- (9) Check overall black and white tracking throughout the normal brightness and contrast range. If necessary, repeat steps (4) thru. (9). Accuracy of screen adjustment is important.
- (10) Remove the shorting lead from pin ② of IC601.

## PARTS LIST (CT-2027BM)

In order to expedite delivery of replacement part orders,

- Specify: 1. Model number  
2. Part number and Description  
3. Quantity

Unless full information is supplied, delay in execution of orders will result.

RESISTOR		CAPACITOR			
MARK	TOLERANCE	MARK	TOLERANCE	MARK	TOLERANCE
J	± 5%	J	± 5%	Z	+80% -20%
K	±10%	K	±10%	C	±0.25pF
M	±20%	M	±20%	D	±0.5pF
		P	+100% - 0%	F	±1pF

SYMBOL NO.	PARTS NO.	DESCRIPTION	SYMBOL NO.	PARTS NO.	DESCRIPTION
<b>TUNER AND TUBES</b>			IC7U0	266 P99101	AN5020
TU-U	295 P69001	Tuner UF2-B31	IC991	267 P90203	STR-371
V271	251 P19803	Picture tube 510ABC22P	<b>DIODES &amp; OTHERS</b>		
<b>TRANSISTORS</b>			D101	264 P04504	1S2471
Q101	260 P32101	2SC1687	D102	264 P04501	1S2076
Q105	260 P33806	2SC2603-F, G	D105	264 P04501	1S2076
Q103	260 P41902	2SC2724-C	D132	264 P10503	EQB01-12
Q104	260 P36004	2SA628A-F	D133	264 P04502	1S2076A
Q1F1	260 P33805	2SC2603-G	D201	264 P29102	MZ306A2
Q201	260 P25603	2SA1115-E	D202	264 P04501	1S2076
Q401	260 P33804	2SC2603-E, F	D203	264 P19306	MZ312B
Q402	260 P42002	2SC2073-B, C	D205	264 P10103	RA-1/RM-1
Q403	"	"	D206	264 P04501	1S2076
Q571	260 P42201	2SC2482	D207	"	"
Q591	260 P43201	2SD869-L	D208	"	"
Q651	260 P42501	2SC2688	D209	"	"
Q652	"	"	D210	264 P22102	MZ308B
Q653	"	"	D211	264 P04504	1S2471
Q7A0	260 P10707	2SC620-D, E	D212	264 P19306	MZ312B
Q7A1	260 P33806	2SC2603-F, G	D214	264 P04504	1S2471
Q7A2	260 P33805	2SC2603-G	D371	264 P10102	RA-1Z/RM-1Z
Q7A3	"	"	D372	"	"
Q7A6	260 P33804	2SC2603-E, F	D373	"	"
Q7A7	260 P41603	2SC2274-F	D374	"	"
Q7A8	"	"	D401	264 P04501	1S2076
Q7A9	260 P33806	2SC2603-F, G	D402	"	"
Q7B0	260 P25601	2SA1115-E, F	D403	"	"
Q7B1	"	"	D404	264 P10102	RM-1Z(V)
Q7B2	"	"	D405	264 P04501	1S2076
Q7B9	260 P33806	2SC2603-F, G	D501	264 P04504	1S2471
Q7U0	260 P33802	2SC2603-E	D5A1	264 P13002	RH-1
Q7U1	"	"	D571	"	"
<b>INTEGRATED CIRCUITS</b>			D572	264 P10103	RA-1/RM-1
IC101	266 P10601	M5186P	D574	264 P10201	RU-3A
IC1A1	266 P01002	μPC574J	D7A0	264 P10102	RM-1Z
IC301	266 P32301	M5144P	D7A1	264 P10102	RM-1Z
IC351	266 P36201	μPC2002	D7A2	"	"
IC3101	266 P32301	M5144P	D7A3	"	"
IC401	266 P50201	LA7800	D7A4	264 P10404	HZ30-2
IC601	266 P62702	M51393AP	D7A5	264 P14406	MZ412B2/HZ12BP01
IC7A0	266 P19301	M50124P	D7A6	264 P29109	MZ305A/HZ5B08
IC7A1	266 P19101	M58653P	D7A7	264 P10102	RM-1Z
IC7A2	266 P92201	μPC78M05H	D7A8	264 P04504	1S2471
			D7A9	"	"
			D7B0	"	"
			D7B2	"	"
			D7B3	"	"
			D7U0	264 P18401	BP104
			D7U1	264 P04504	1S2471

SYMBOL NO.	PARTS NO.	DESCRIPTION	SYMBOL NO.	PARTS NO.	DESCRIPTION
<b>DIODES &amp; OTHERS</b>			<b>CAPACITORS &amp; RESISTORS</b>		
D7U4	264 P18901	LED TLR124	L7U0	409 P14801	Trans-Remocon
D7Z0	264 P04504	1S2471	L901	321 C03104	RF 10 $\mu$ HK
D7Z1	264 P30201	TLR324	L991	409 B02802	Degalissing
D7Z2	264 P31303	LED SLR-34UR	DL201	337 P02604	Delay line 1.5K 0.35 $\mu$
D7Z4	264 P04504	1S2471	DL601	337 P02701	Delay line DL-700
D7Z5	"	"	<b>CAPACITORS &amp; RESISTORS</b>		
D7Z6	"	"	C7F0	185 D05307	C-Electrolytic H50V 2200 $\mu$ F-M
D7Z7	"	"	C905	185 D05202	C-Electrolytic H180V 470 $\mu$ F-Q
D7Z8	"	"	CR7A0	149 D81101	CR-Multiple B50V 1000pF-Mx4
D7Z9	"	"	R355	109 P05204	R-Fusible 1/4W 1.2 $\Omega$ -J
D901	264 P10105	RA-1B/RM-1B	R371	109 P01301	R-Fusible 1/2W 2.2 $\Omega$ -K
D902	"	"	R415	109 D0510	R-Cement-wire 10W 330 $\Omega$ -K
D903	"	"	R5A1	109 P01301	R-Fusible 1/2W 2.2 $\Omega$ -K
D904	"	"	R5A5	103 P37706	R-Fuse 1/4W 0.47 $\Omega$ -K
D7151	264 P04504	1S2471	R581	102 P08309	R-Cement-wire 10W 12 $\Omega$ -K
RP901	265 P04702	Posistor	R669	109 P02901	R-Fusible 2W 1.5 $\Omega$ -J
X601	285 P01101	Quartz crystal unit 4.43MHz	R7A0	103 P39801	R-Fuse 1/2W 1.2 $\Omega$ -J
CF131	296 P02404	Ceramic trap TPS 6.0MHz	R901	102 P03302	R-Wire-P 2W 2.2 $\Omega$ -J
CF301	296 P01403	Ceramic filter SFE-6.0MHz	R904	109 P05202	R-Fusible 1/4W 470 $\Omega$ -J
CF7A0	299 P04601	Ceramic oscillator 4MHz	R991	109 D03404	R-Cement-wire 10W 220 $\Omega$ -K
SF131	296 P03406	SAW filter KAF-39.5MHz	<b>VARIABLE RESISTORS</b>		
<b>TRANSFORMERS</b>			VR101	127 C02005	Semifixed 1/5W B-2K $\Omega$ ±25%
T131	323 P16401	VIF (38MHz)	VR201	127 C03008	" 1/5W B-10K $\Omega$ ±25%
T132	323 P16501	VIF (38MHz)	VR272	120 C23106	PCB 0.15W B-30K $\Omega$ -30S CS
T571	336 P00504	Horizontal drive	VR273	"	" "
T572	334 B06903	Flyback	VR371	120 C23205	PCB 0.1W A-50K $\Omega$ -30S
T601	349 P15501	DL-OUT	VR372	120 C23305	PCB 0.1W C-5K $\Omega$ -30S
T991	350 P18405	Power	VR401	129 C03103	Semifixed 0.3W B-20K $\Omega$ ±25%
<b>COILS</b>			VR442	127 C02003	" 1/5W B-500 $\Omega$ ±25%
L101	325 C08306	Peaking 820 $\mu$ HK	VR443	127 C02008	" 1/5W B-10K $\Omega$ ±25%
L102	321 C03001	RF 1 $\mu$ HK	VR501	129 C04408	" 0.3W B-3K $\Omega$ ±25%
L131	321 C04105	RF	VR502	127 C02007	" 1/5W B-5K $\Omega$ ±25%
L132	321 C04603	Choke	129 P00907	VR-FOCUS	
L133	323 P15401	VIF	VR601	127 C02008	Semifixed 1/5W B-10K $\Omega$ ±25%
L134	323 P15801	VIF	VR602	127 C02005	" 1/5W B-2K $\Omega$ ±25%
L135	327 P05201	SIF 6MHz	VR651	127 C03001	" 1/5W B-200 $\Omega$ ±25%
L136	325 C08601	Peaking 6.8 $\mu$ HJ	VR652	"	" "
L137	320 P03604	Trap 6RM-33.4MHz	VR653	127 C03007	" 1/5W B-5K $\Omega$ ±25%
L201	321 C03001	RF 1 $\mu$ HK	VR654	"	" "
L202	325 C08802	Peaking 390 $\mu$ HJ.	VR655	"	" "
L301	327 P05201	SIF 6MHz	VR771	129 P01504	Channel-Presetter B-100K $\Omega$
L302	321 C03104	RF 10 $\mu$ HK	<b>PRINTED CIRCUITS</b>		
L491	330 P08001	Deflection yoke	920 A15003	PCB-MAIN	
L501	321 C03104	RF 10 $\mu$ HK	920 B45307	PCB-V.S	
L571	321 C03007	" 3.3 $\mu$ HK	920 B63006	PCB-CRT	
L573	411 P00104	Lead ferrite	920 B72004	PCB-E.T.S	
L574	333 P00105	Horizontal linearity	920 C73003	PCB-CH-IND	
L5A2	321 C03104	RF 10 $\mu$ HK	920 C73102	PCB-CONTROL	
L5A3	321 C01102	RF 4700 $\mu$ HJ	920 C72904	PCB-E.T.S-CONTROL	
L601	325 C08601	Peaking 6.8 $\mu$ HJ	920 C72506	PCB-PREAMP	
L602	"	"	<b>MISCELLANEOUS</b>		
L603	"	"	AG651	224 D01901	Air gap
L604	325 C08200	Peaking 39 $\mu$ HK	AG652	"	"
L605	349 P15001	Demodulation			
L606	321 C03005	RF 2.2 $\mu$ HK			
L608	321 C03104	RF 10 $\mu$ HK			
L651	325 C08300	Peaking 270 $\mu$ HK			

SYMBOL NO.	PARTS NO.	DESCRIPTION
<b>MISCELLANEOUS</b>		
AG653	224 D01901	Air gap
AG654	"	"
AG655	"	"
AG656	299 D07001	Focus gap
F902	283 D02109	Fuse 0.63 A-F
F901	283 D02405	Fuse 2A-T
F911	"	"
F912	"	"
K7A0	287 P02206	Relay Power JC AR322
S371	338 P01601	Convergence purity ring assembly
S372	432 P05101	Switch-Key Board
S373	"	"
S771	"	"
S772	"	"
S777	432 P03601	Switch-Push
S971	432 P05101	Switch-Key Board
S991	432 P01901	Switch-Push (Mains)
S271	432 P03801	Switch-Key Board
S272	"	"
S671	"	"
S672	"	"
S773	"	"
S774	"	"
SP391	449 C04101	Socket-CRT
SP392	480 P39001	Speaker
J371	480 P02801	Speaker Tweeter
J372	451 C05601	Jack
	449 C05501	Socket-DIN (Recording)
	641 D36501	Wedge
	669 D01301	Tap Screw 3 x 12
	674 D01602	Wing nut
	802 C44505	Packing case
	803 B34201	Cushion
	829 D05506	Packing sheet
	829 D10701	Sheet-S2
	829 D11101	Sheet-S1
	829 C05304	Sheet
	831 B02009	Packing bag
	871 C12004	IB-COLOUR
	939 P05501	Transmitter-REMOCON
<b>CABINET PARTS</b>		
	702 C44408	Assy-Door control
	702 C44406	Assy-Panel control
	702 C40509	Door-Jack
	704 C25301	Knob-Push-P (Mains On/Off)
	704 D78701	Knob-Push (Picture, Colour, AV/TV SW)
	704 D83601	" (Tuning Switch)
	761 B07701	Case-Remocon
	771 D04701	PAD
	960 A19504	Assy-Cabinet
	960 B28004	Assy-Back cover
	702 C44202	Grille-SP
	702 C44407	Panel-SP

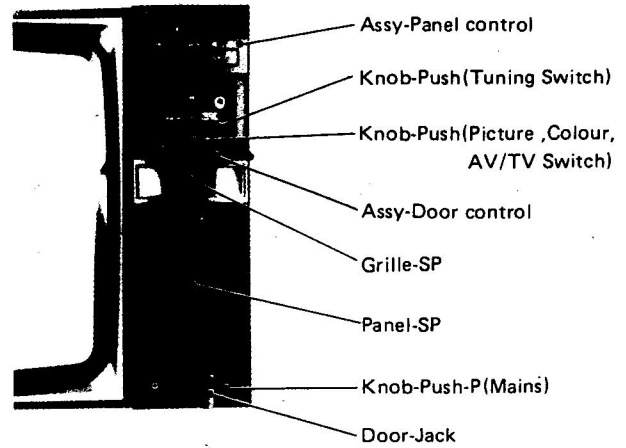


Fig. A Cabinet Parts (I)

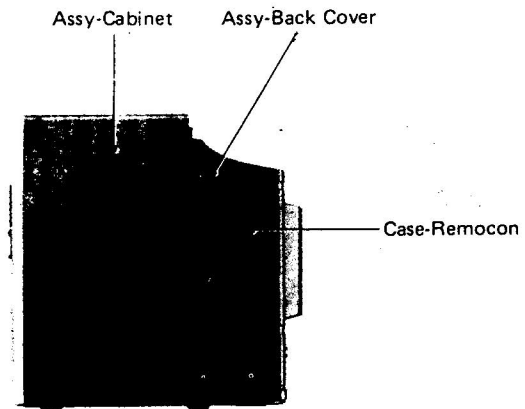


Fig. B Cabinet Parts (II)