



# HITACHI

## SERVICE MANUAL

TK

No. 1782E


# VK-C850E

## *Technical Data*



### SAFETY PRECAUTIONS

The following precautions should be observed when servicing.

1. Since many parts in the unit have special safety-related characteristics, always use genuine Hitachi replacement parts. Especially critical parts in the power circuit block should not be replaced with other makes. Critical parts are marked with  in the schematic diagram, and circuit board diagram.
2. Before returning a repaired unit to the customer, the service technician must thoroughly test the unit to ascertain that it is completely safe to operate without danger of electrical shock.

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

## COLOR VIDEO CAMERA

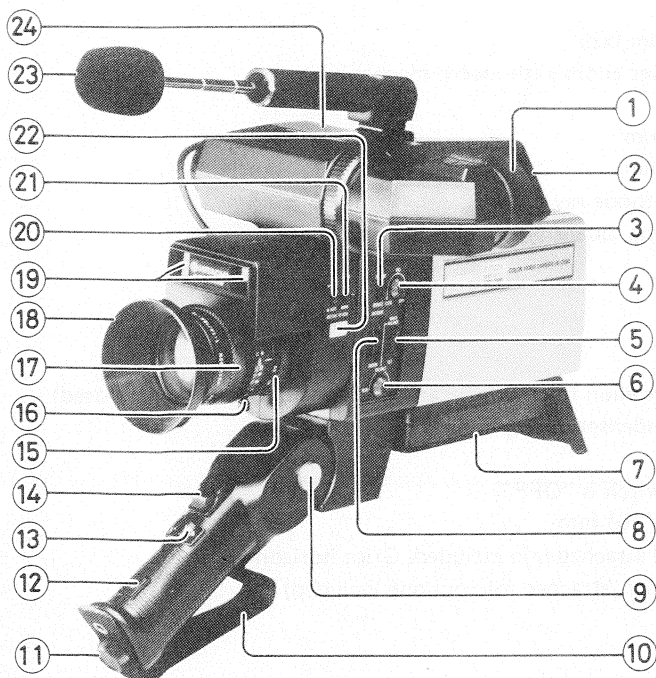
July 1982

TOKAI WORKS

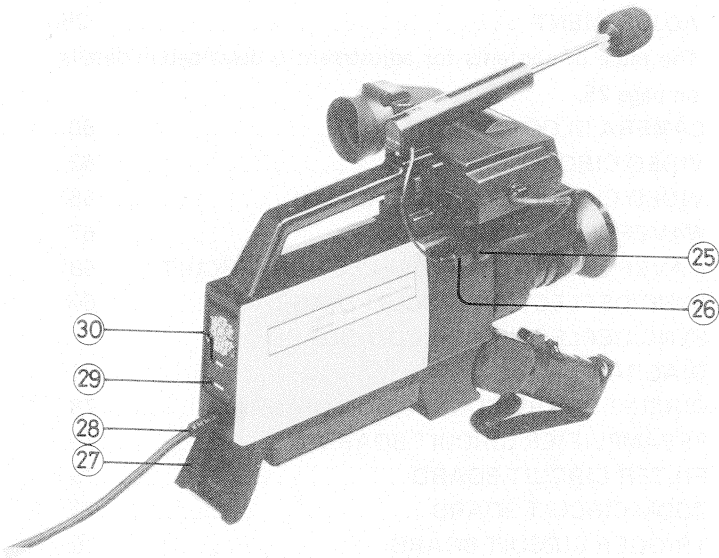
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## KEY TO ILLUSTRATIONS



1. Eye cap
2. Carrying handle
3. Power save switch
4. Iris control knob
5. White balance set switch
6. Color balance control knob
7. Shoulder pad cushion
8. Outdoor/indoor select switch
9. Grip release button
10. Band strap
11. Band strap adjust screw
12. Auto focus switch
13. Power zoom switch
14. Remote control switch
15. Zooming ring
16. Zooming lever
17. Focus adjust ring
18. Zoom lens
19. Rangefinder windows
20. Iris switch for fade in/out
21. Zooming speed select switch
22. Instant review (record check) switch
23. Boom microphone
24. Electronic viewfinder



- 25. Electronic viewfinder connection terminal
- 26. Boom microphone connection terminal
- 27. Shoulder pad
- 28. Camera cable
- 29. External microphone jack
- 30. Earphone jack

## SPECIFICATIONS

System:	Uni-frequency separation system
Signal type:	Based on PAL system
Camera tube:	2/3" SATICON
Synchronization system:	Internal synchronization
Horizontal resolution:	Better than 280 TV line
Number of scanning lines:	625 lines 2:1 interlace
Video output:	1 Vp-p 75Ω (Unbalanced)
Video S/N ratio:	46 dB or more
Standard object luminance:	500 lux
Minimum luminance required:	30 lux
Automatic sensitivity control range:	30 – 100,000 lux
External mic input:	–67 dB, high impedance
Audio line output:	–20 dB, low impedance
Lens (accessory):	F1.4, f = 12.5–75mm zoom (x6) (auto focus, auto iris, power zoom with macro mechanism)
Lens mount:	Special mount
Dia. of filter screw:	52mm, thread pitch 0.75mm
Viewfinder:	Electronic viewfinder system Cathode ray tube: 1.5" cathode ray tube Display function: Recording, quantity of light, battery, white balance
Video input:	1Vp-p, 75Ω (Unbalanced)
Audio input:	0dB, high impedance
Audio output:	5mW
Suitable earphone:	Magnetic earphone (8Ω)
Color temperature control:	From tungsten bulb illumination to cloudy weather (color filter concurrently used)
Build-in microphone:	Uni-directivity electret condenser microphone
Power voltage:	DC12V
Power consumption:	9.8W (When Auto focus switch is "OFF")
Dimensions:	200"(W) x 270"(H) x 425"(D) mm (Electronic viewfinder and attached mic included. Grip: horizontal)
Weight:	3.1 kg (Electronic viewfinder, attached microphone included)
Accessories:	Electronic viewfinder x 1 Boom microphone x 1

## DISASSEMBLY

### Disassembling camera

Remove the camera connector from the power supply and then remove the microphone and viewfinder from the camera before disassembling the camera.

#### 1. Cover (Fig. 1)

Cover (right)

1. Loosen the 2 screws.
2. Remove the screw.
3. Remove the cover in the direction of the arrow.

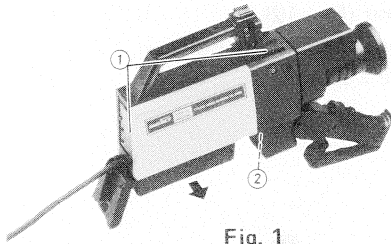


Fig. 1

Remove the cover on the left side in the same manner.

#### 2. Video PC Board (Fig. 2)

1. Remove the cover (left).
2. Remove the 2 screws.

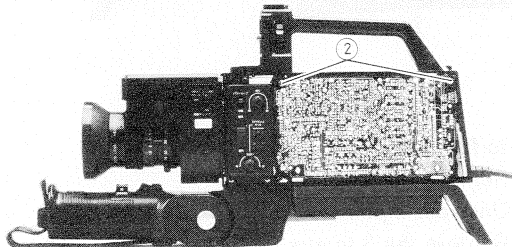


Fig. 2

#### 3. Sync/deflection PC Board (Fig. 3)

1. Remove the cover (right).
2. Remove the 2 screws.

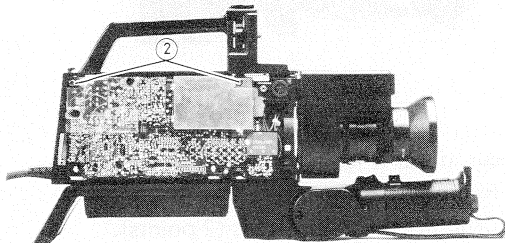


Fig. 3

#### 4. Preamplifier PC Board (Figs. 4, 5)

1. Remove the covers (left and right).
2. Open the video PC Board and sync/deflection PC Board.
3. Remove the connector bracket fixed with screw (Fig. 4).
4. Remove the shield plate of the PC Board (Fig. 4).
5. Unsolder the target lead (Fig. 5).
6. Unsolder the 2 bias light leads (Fig. 5).
7. Remove connector P001 (Fig. 5).
8. Remove the 2 screws (Fig. 5).

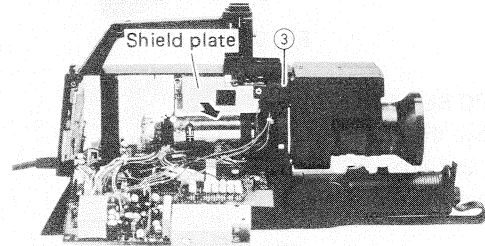


Fig. 4

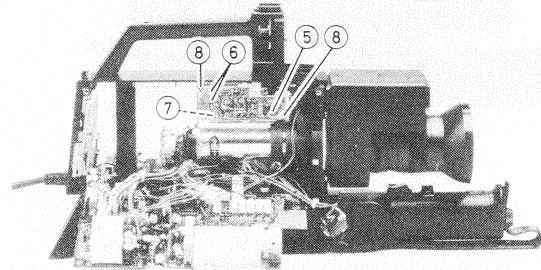


Fig. 5

#### 5. Deflection coil (Fig. 6)

1. Remove the preamplifier PC Board (Fig. 6).
2. Remove black leads soldered to the deflection coil.
3. Remove connector P307 (sync/deflection PC Board).
4. Remove the filter PC Board.
5. Remove the screw.
6. Remove the deflection coil in the direction of the arrow.

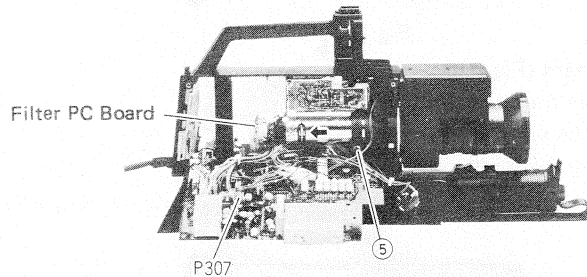


Fig. 6

The camera tube is removed with the deflection coil attached to it.

## 6. Grip (Fig. 7)

1. Remove the 3 screws.
2. Move the grip forward to remove the 2 connectors inside.

Note: Be careful not to catch the leads during assembly.

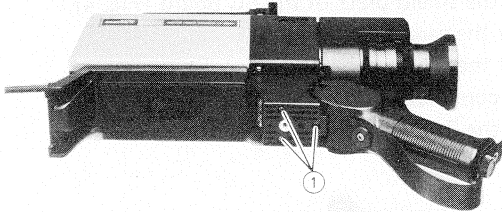


Fig. 7

## 7. Trigger PC Board (Fig. 8)

1. Remove the cover (left).
2. Open the video PC Board.
3. Remove the screw.

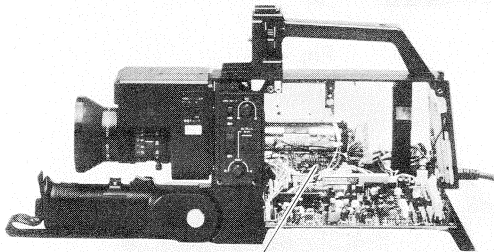


Fig. 8

## 8. Operation switch PC Board (Fig. 9)

1. Remove the cover (left).
2. Set the OUTDOOR/INDOOR select switch to "OUTDOOR".
3. Remove the 3 screws.

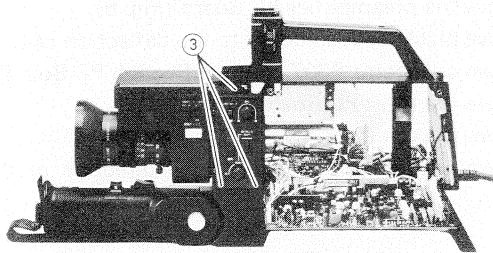


Fig. 9

## 9. RD PC Board (Fig. 10)

1. Remove the cover (left)
2. Open the video PC Board
3. Remove the screw

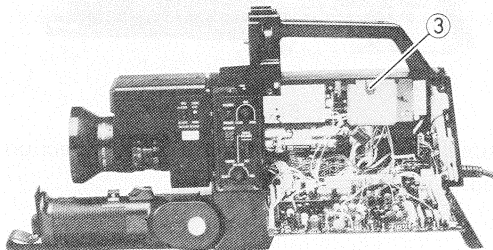


Fig. 10

## Disassembling lens

### 1. Lens cover

Cover, right (Fig. 11)

1. Remove the camera cover (right).
2. Remove the 4 screws.

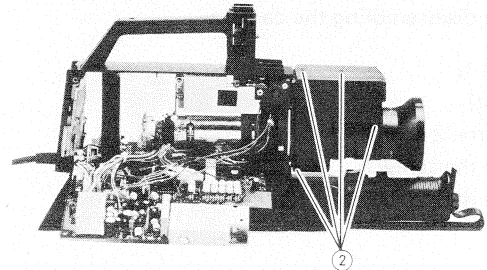


Fig. 11

Cover, left front (Fig. 12)

1. Remove the camera cover (left).
2. Remove the 2 screws.

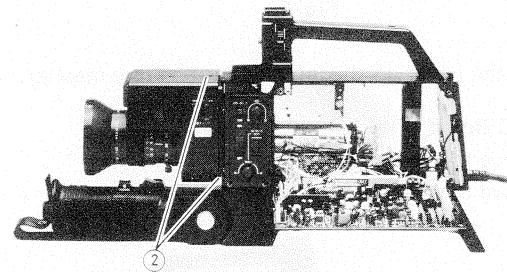


Fig. 12

### 2. Auto-focus block (Fig. 13)

1. Remove the lens cover.
2. Unsolder 2 points.
3. Remove the 3 screws.

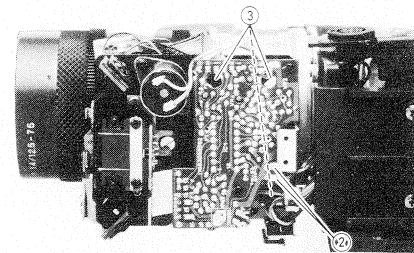


Fig. 13

### 3. Focus motor (Fig. 14)

1. Remove the lens cover.
2. Unsolder the motor leads (2 points).
3. Remove the auto-focus block.
4. Remove the 2 screws.

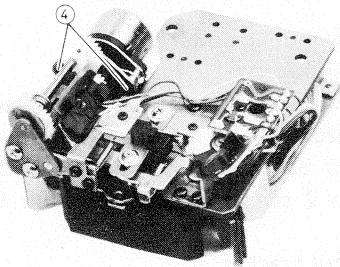


Fig. 14

**4. Scan motor (Fig. 15)**

1. Remove the lens cover.
2. Unsolder 2 points.
3. Remove the 2 screws.

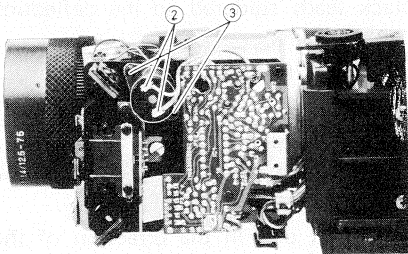


Fig. 15

**5. Zoom motor (Fig. 16)**

1. Remove the lens cover.
2. Unsolder the motor leads (2 points).
3. Remove the 2 screws.

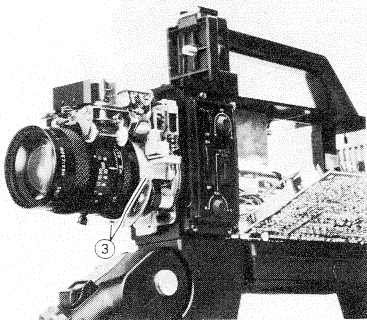


Fig. 16

**6. Lens (Figs. 17, 18, 19)**

1. Remove the covers (left, right).
2. Remove the accessory shoe screw and then remove the shoe spring (Fig. 17).
3. Remove the 3 screws (Fig. 17).
4. Remove the screw to remove the cover (Fig. 17).
5. Remove the grip.
6. Open the video PC Board and sync/deflection PC Board.
7. Remove the preamplifier PC Board.

8. Remove connectors P103 (video PC Board) and P303 (sync/deflection PC Board).
9. Remove the 4 screws to separate the chassis into 2 parts, front and back (Fig. 17).
10. Remove the operation switch PC Board.
11. Remove the 3 screws to remove the filter ass'y (Fig. 18).
12. Remove the 4 screws to remove the lens from the front chassis (Fig. 19).

Note: Assemble them in the reverse procedure. Adjust backfocus after assembling is completed (Refer to "Adjustment").

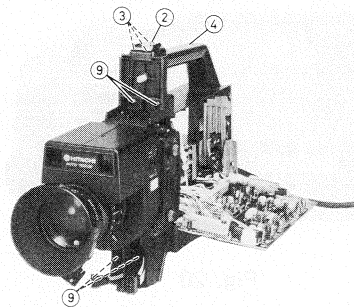


Fig. 17

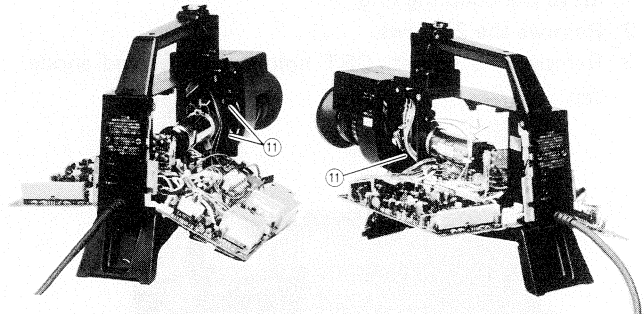


Fig. 18

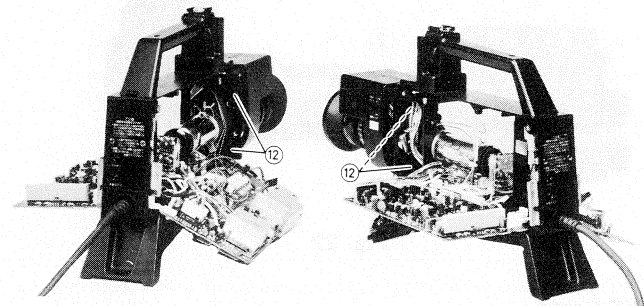


Fig. 19

## Disassembling viewfinder

The viewfinder is the same as in VK-C800E.

### 1. Cabinet B (Fig. 20)

1. Loosen the coupling ring.
2. Remove the 2 screws.

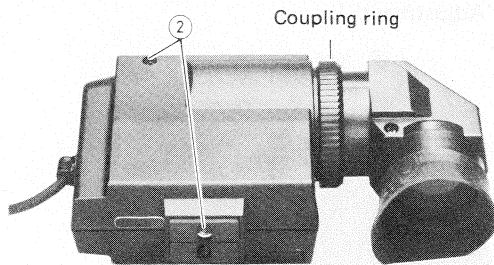


Fig. 20

### 2. CRT (Figs. 21, 22)

1. Move the coupling ring.
2. Remove the 2 screws.
3. Remove the socket, CRT holding rubber and anode cap.

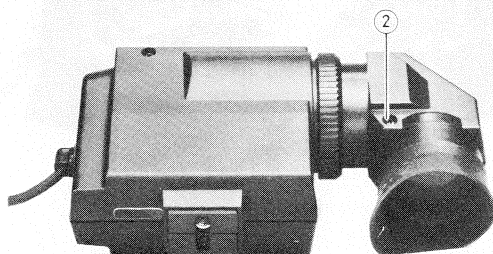


Fig. 21

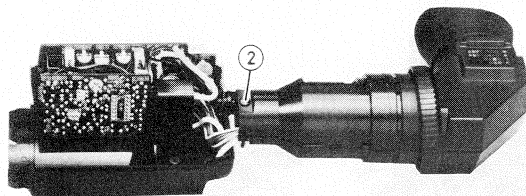


Fig. 22

### 3. PC Board

Not fixed with screws.

## REPLACING CAMERA TUBE COIL ASSEMBLY

Replace the coil ass'y after turning power off.

1. Remove the covers (left/right).  
Loosen the 2 screws on each of both covers, and remove 1 screw of each.
2. Open the video PC Board and sync/deflection PC Board. Remove the 2 screws on each of both PC Boards.
3. Remove the connector bracket.
4. Remove the shield plate of the preamplifier PC Board. It is not fixed with screws.
5. Unsolder the target lead (Fig. 23).
6. Unsolder the bias light leads (Fig. 23).
7. Remove connector P001 (Fig. 24).
8. Remove the preamplifier PC Board (Fig. 23).  
Remove the 2 screws.
9. Remove the black leads soldered to the deflection coil (Fig. 24).
10. Remove connector P307 (sync/deflection PC Board). (Fig. 23)
11. Remove the filter PC Board (Fig. 23).
12. Remove the screw which fixes the deflection coil (Fig. 23).
13. Remove the deflection coil in the direction of the arrow (Fig. 23).
14. Assemble the camera tube coil ass'y according to the procedure in reverse to disassembly.
15. Adjust after replacing the camera tube coil ass'y. (Refer to "Adjustment").

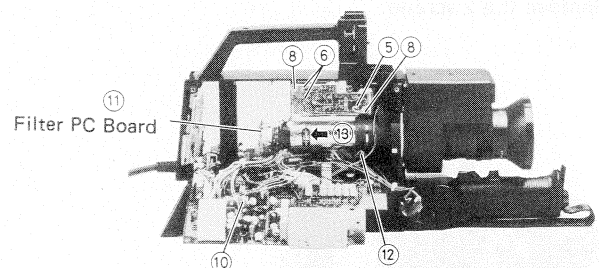


Fig. 23

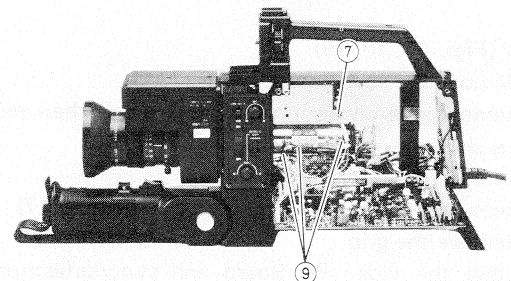


Fig. 24

Note: 1. Use gloves when replacing the ass'y to prevent thumbmarks or dust from adhering to the surface of the camera tube. Thumbmarks or dust will adversely affect picture. When dust adheres, remove it using a soft material such as chamois leather or lens cleaning paper, etc.

2. Azimuth and alignment between the camera tube and deflection coil have been adjusted completely, so do not loosen the camera tube fixing screws, internal camera tube clamp screws or turn the alignment magnet.

## TROUBLESHOOTING

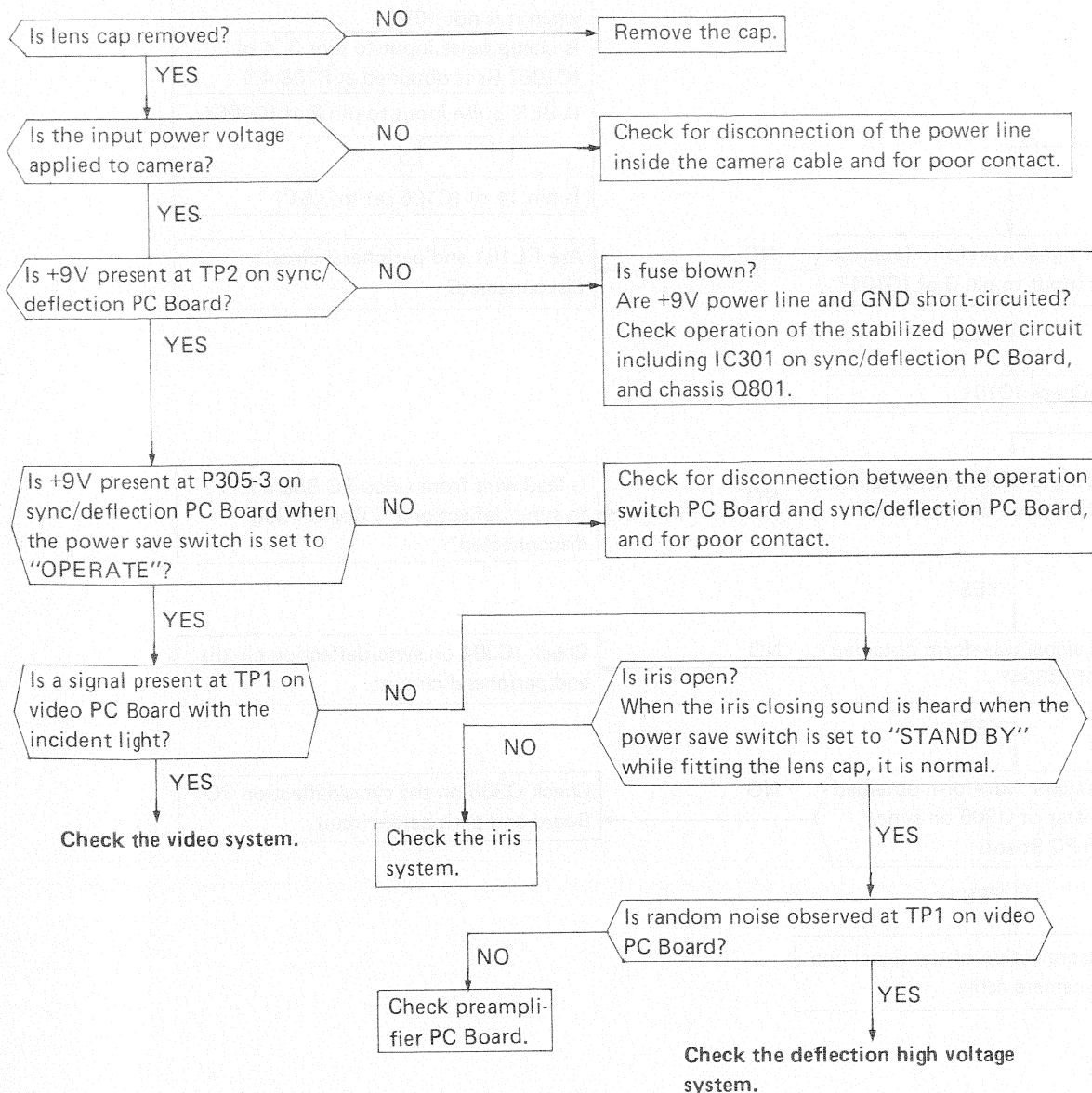
Check the following two items before checking the camera or viewfinder.

1) Check connections between equipment.  
Check carefully the termination condition, cables used and operation switch positions, etc.

2) Check the input power voltage.  
Confirm that correct voltage is supplied to the camera.

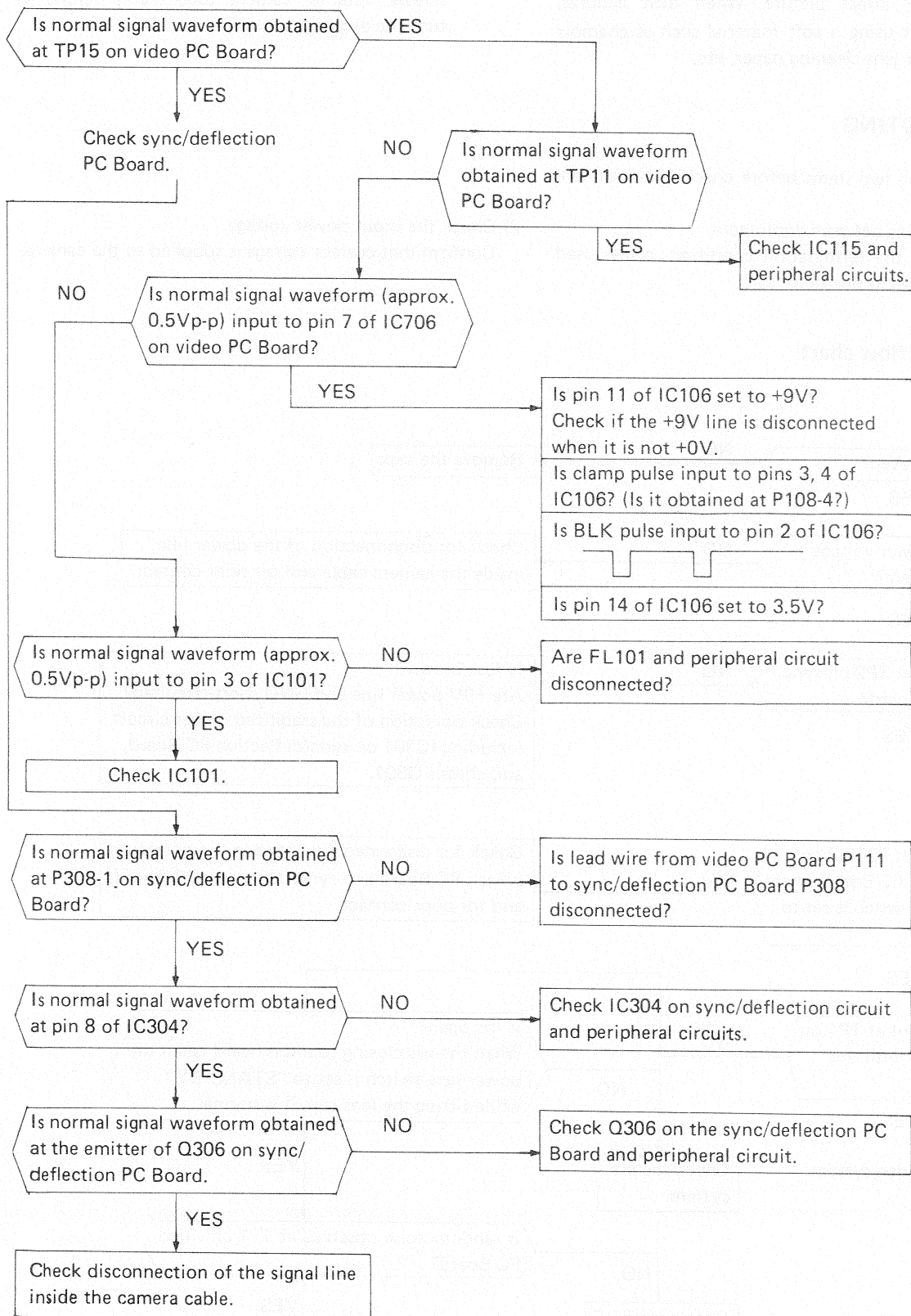
### 1. Camera check flow chart

#### 1) No picture

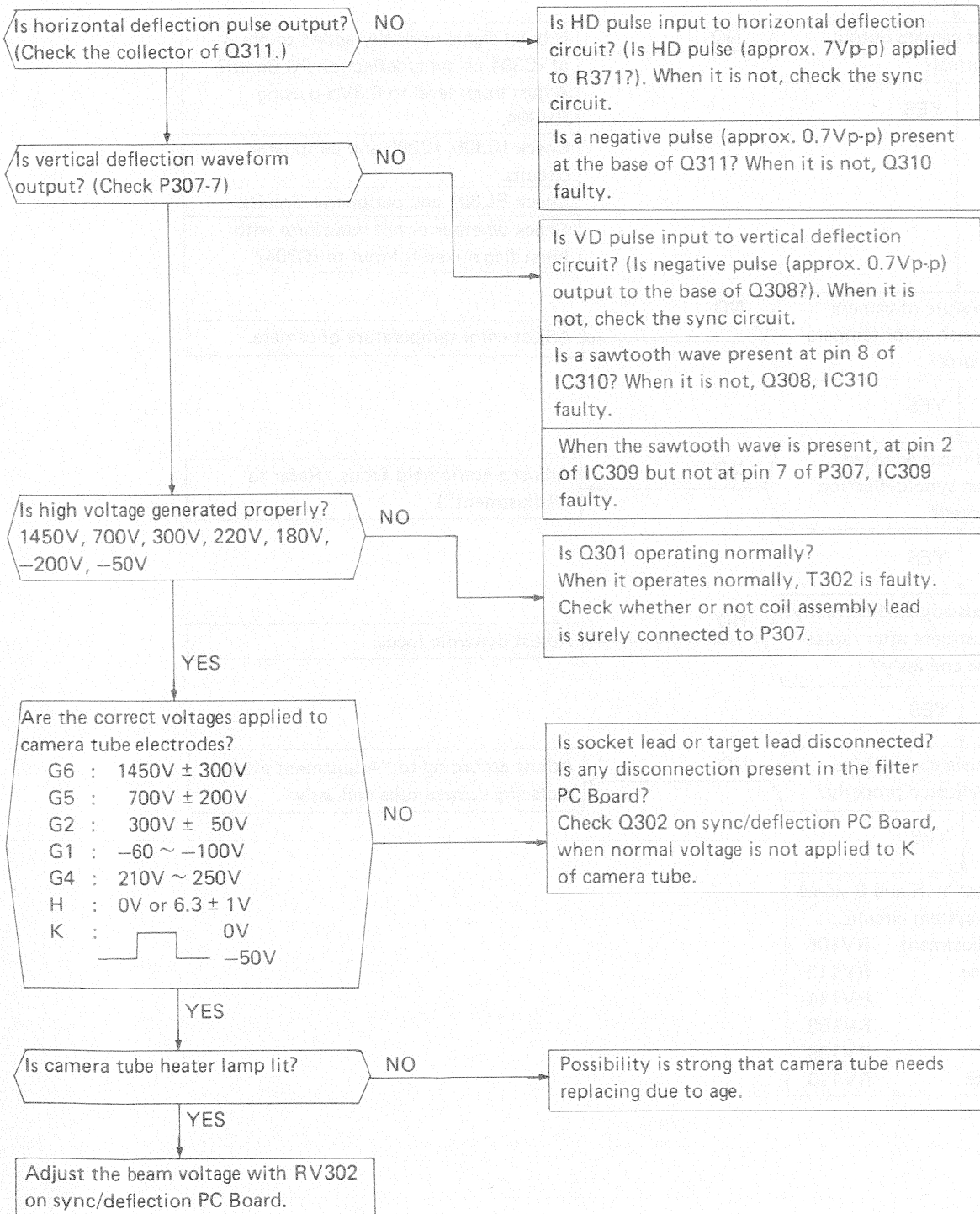


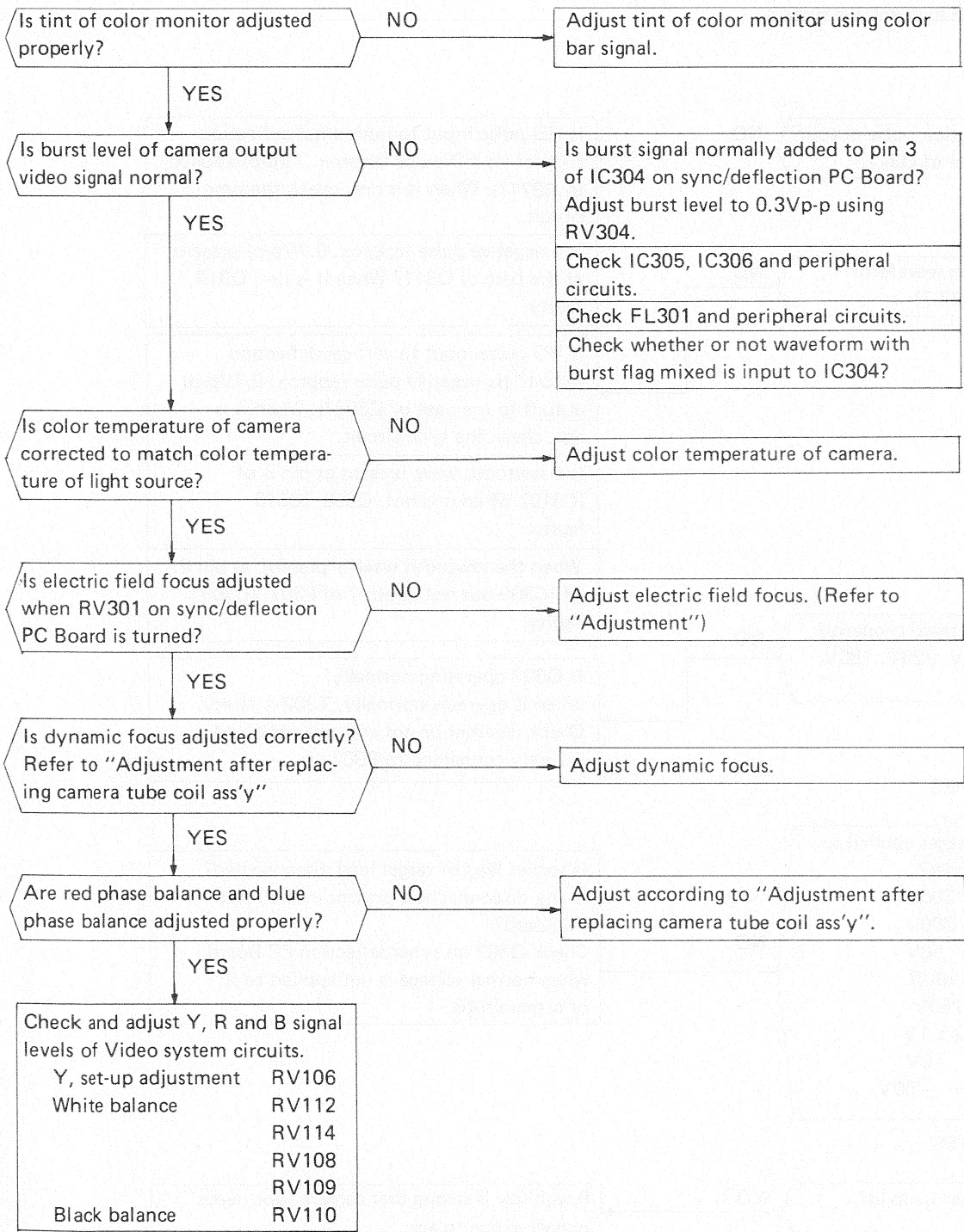


## 2) Checking video system



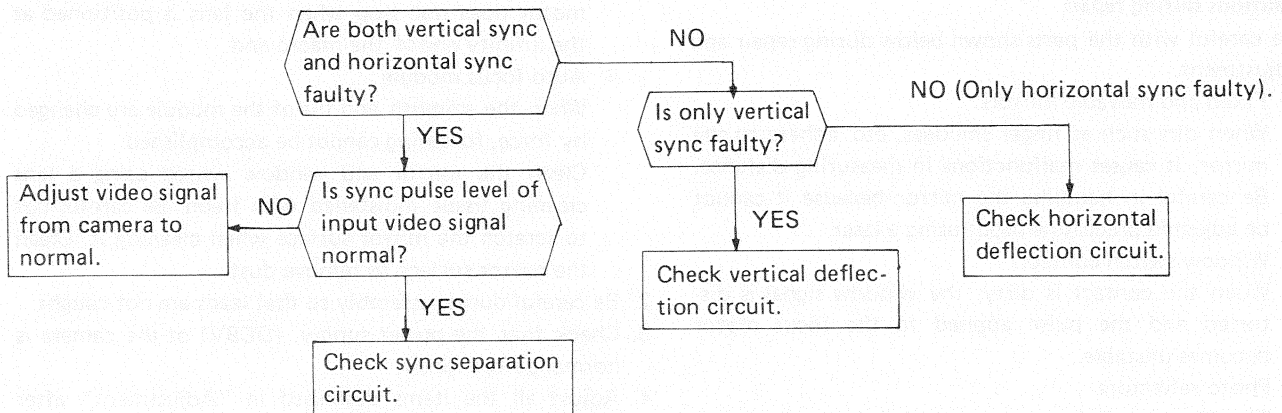
### 3) Checking deflection high voltage system



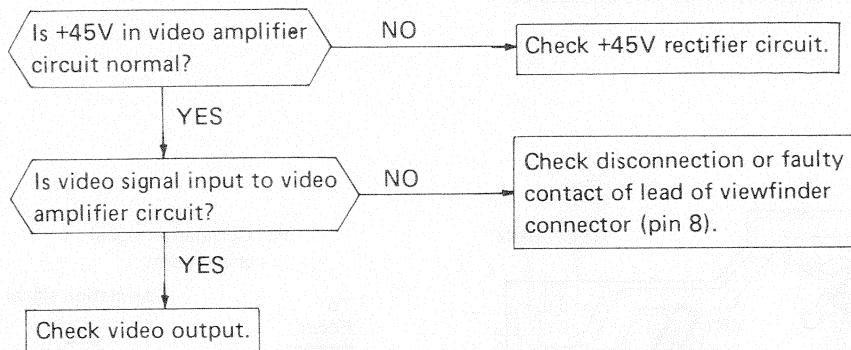


## 2. Viewfinder check flow chart

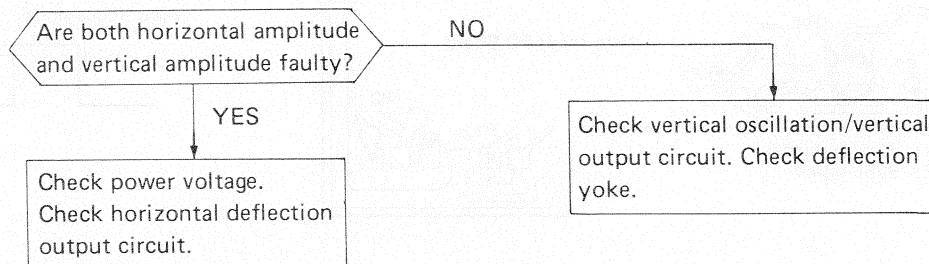
### 1) Synchronization cannot be obtained.



### 2) No picture



### 3) Amplitude faulty



### 3. Auto focus block check flow chart

#### Precautions during repair

1. Be careful with the parts shown below during repair and adjustment.
  - Fixed and movable mirrors.
 

When dirt such as finger smudges, etc. adhere to the mirror, it causes malfunctions in measuring distance. Be careful in handling the mirror because it cannot be adjusted precisely without using a laser.
  - Window switch contact
 

When the contact is dirty, the window signal is distorted and the pulse applied to the focus motor becomes unstable.
  - Photo reflectors
 

The photo reflectors are provided for the syncro-switch and the two limit switches. When the reflector surface of the syncro-switch is dirty, it causes the focus motor to operate unstably or do not operate at

all. When the reflector surface of the limit switches is dirty, the limit switch is not effective and the focus motor does not stop when the lens is positioned at the infinity end or the macro end.

- Auto focus module
 

When the azimuth and tilt of the module are changed by force, focusing cannot be accomplished. Clean the mirror and window switch using a lens cleaning tissue moistened with freon. Be careful not to scratch the mirror surface when cleaning it. Clean the mirror surface to remove dust.
2. Be careful during assembly so that leads are not caught.
  3. Check that the power supply. (DC9V) of the camera is normal before repair.
  4. Adjust all the items described in "Adjustment" after replacing the auto-focus block.

#### ● Check point of signal

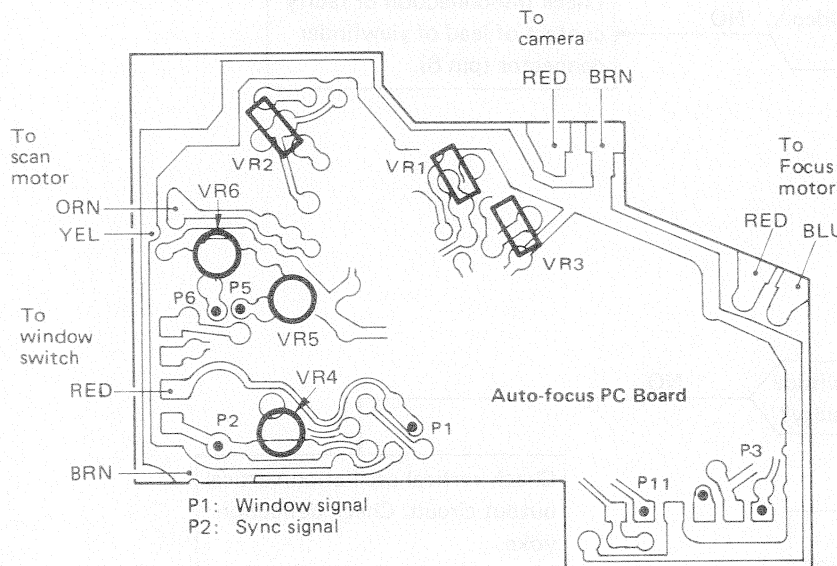


Fig. 25

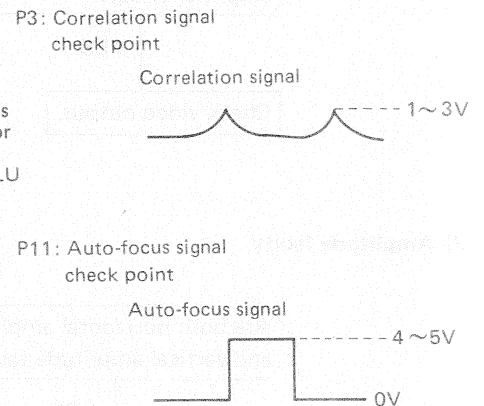
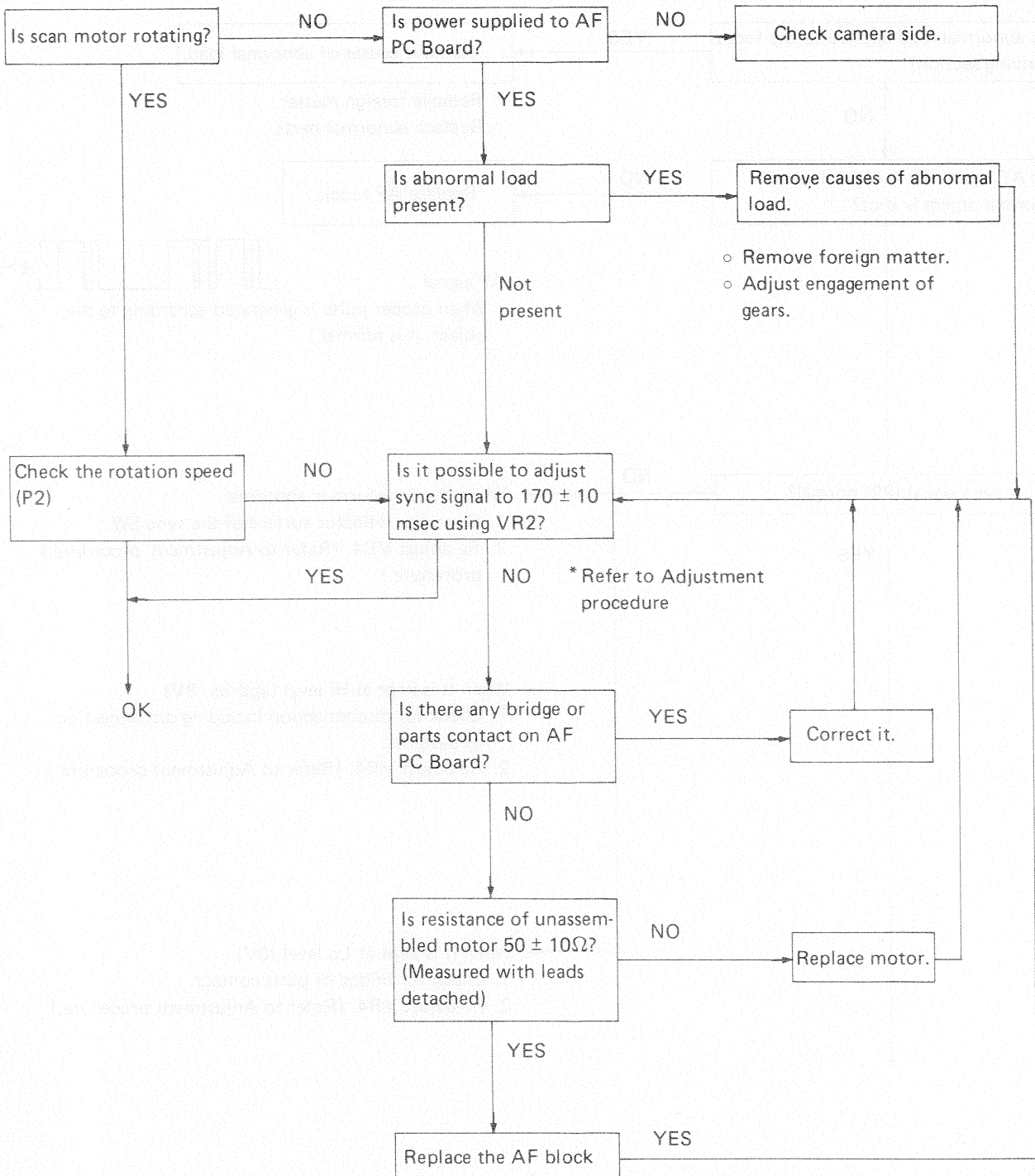


Fig. 26

1) Scan motor speed abnormal



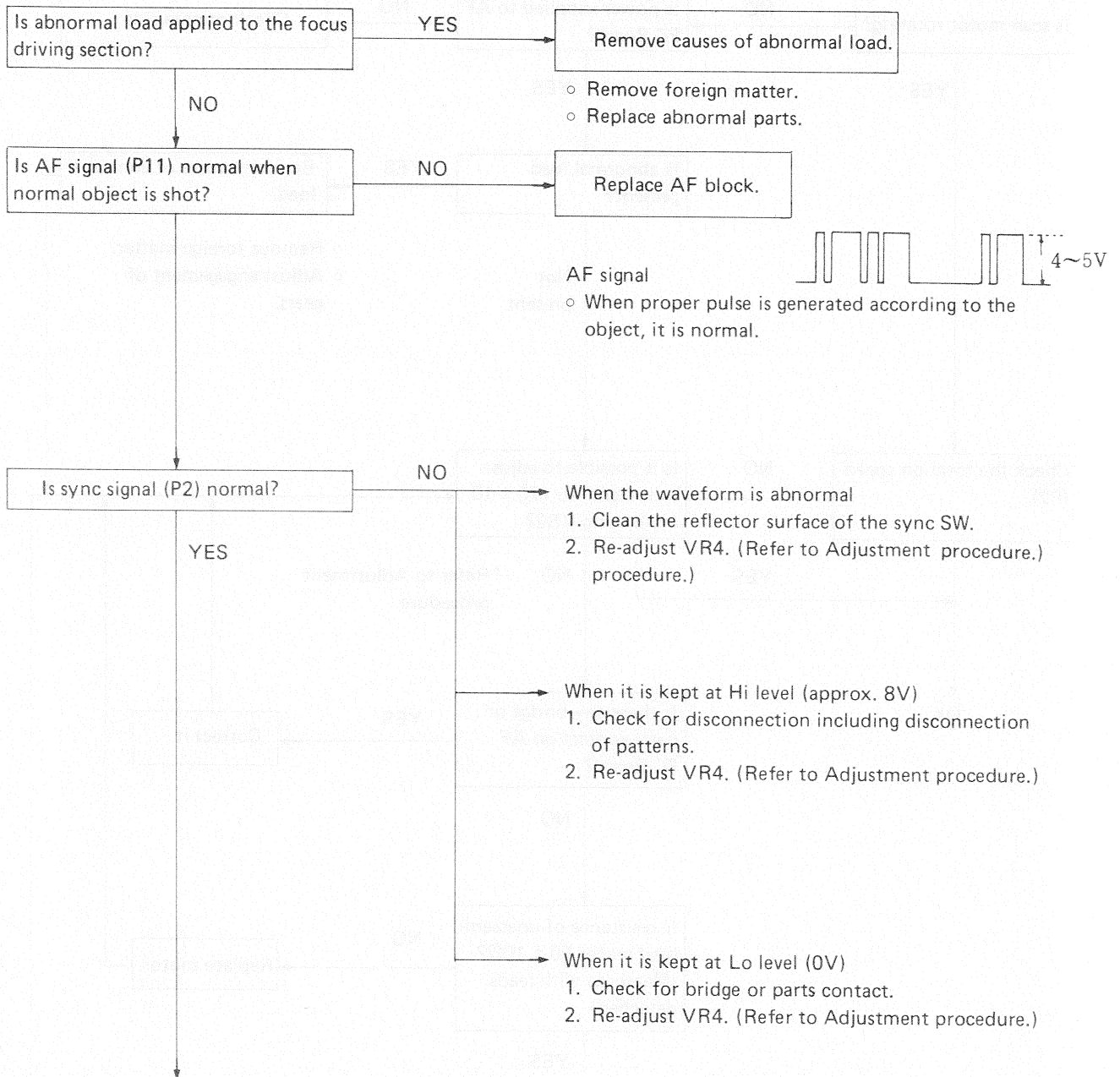
- Remove foreign matter.
- Adjust engagement of gears.

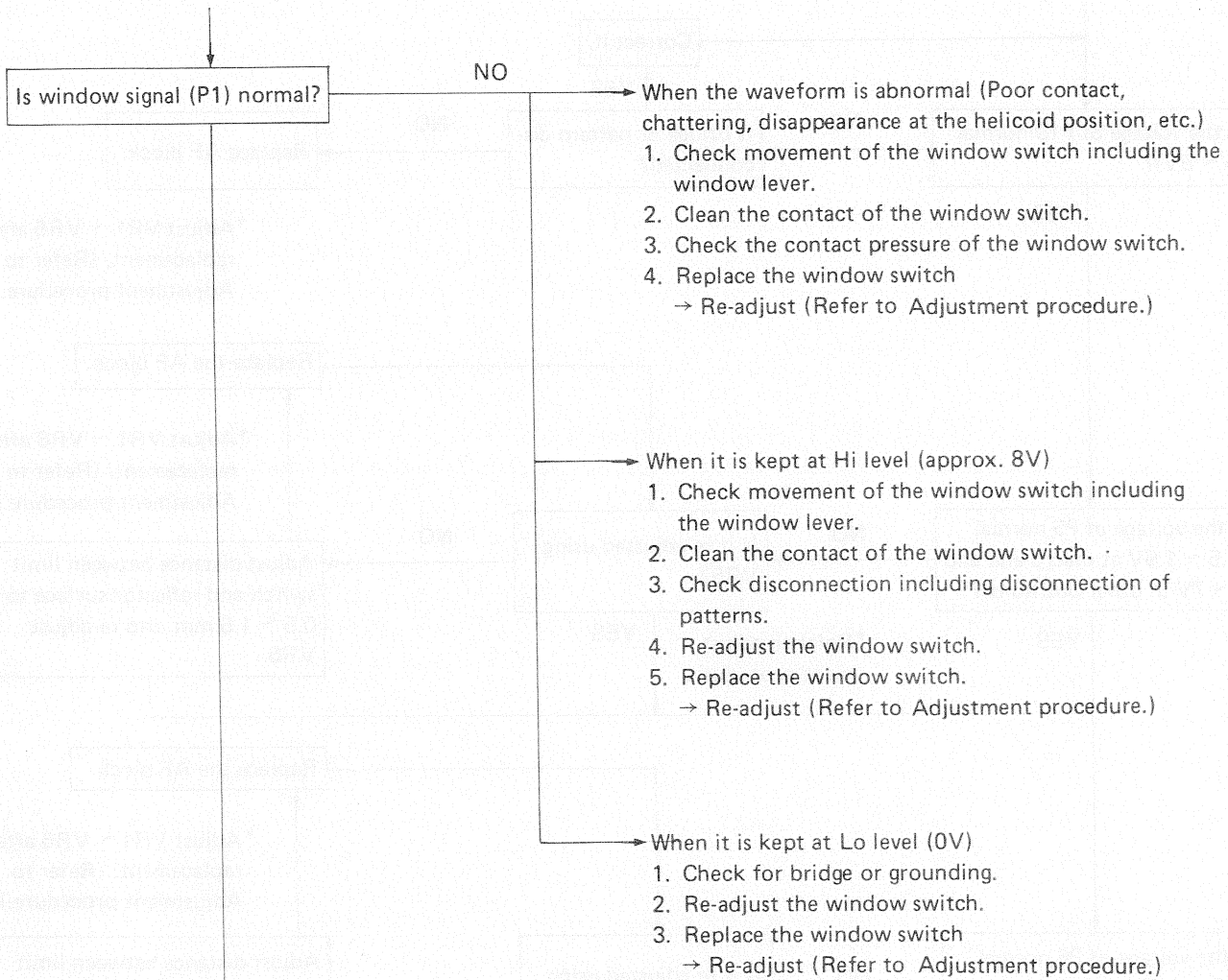
\* Refer to Adjustment procedure

- Adjust VR1 ~ VR6 after replacement (Refer to Adjustment procedure)

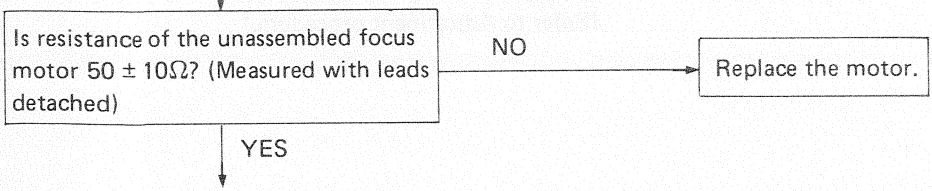
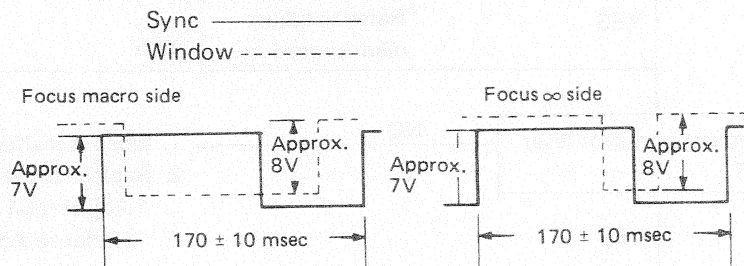
## 2) Focus operation stops or is unstable

(Check that the scan motor rotates normally.)

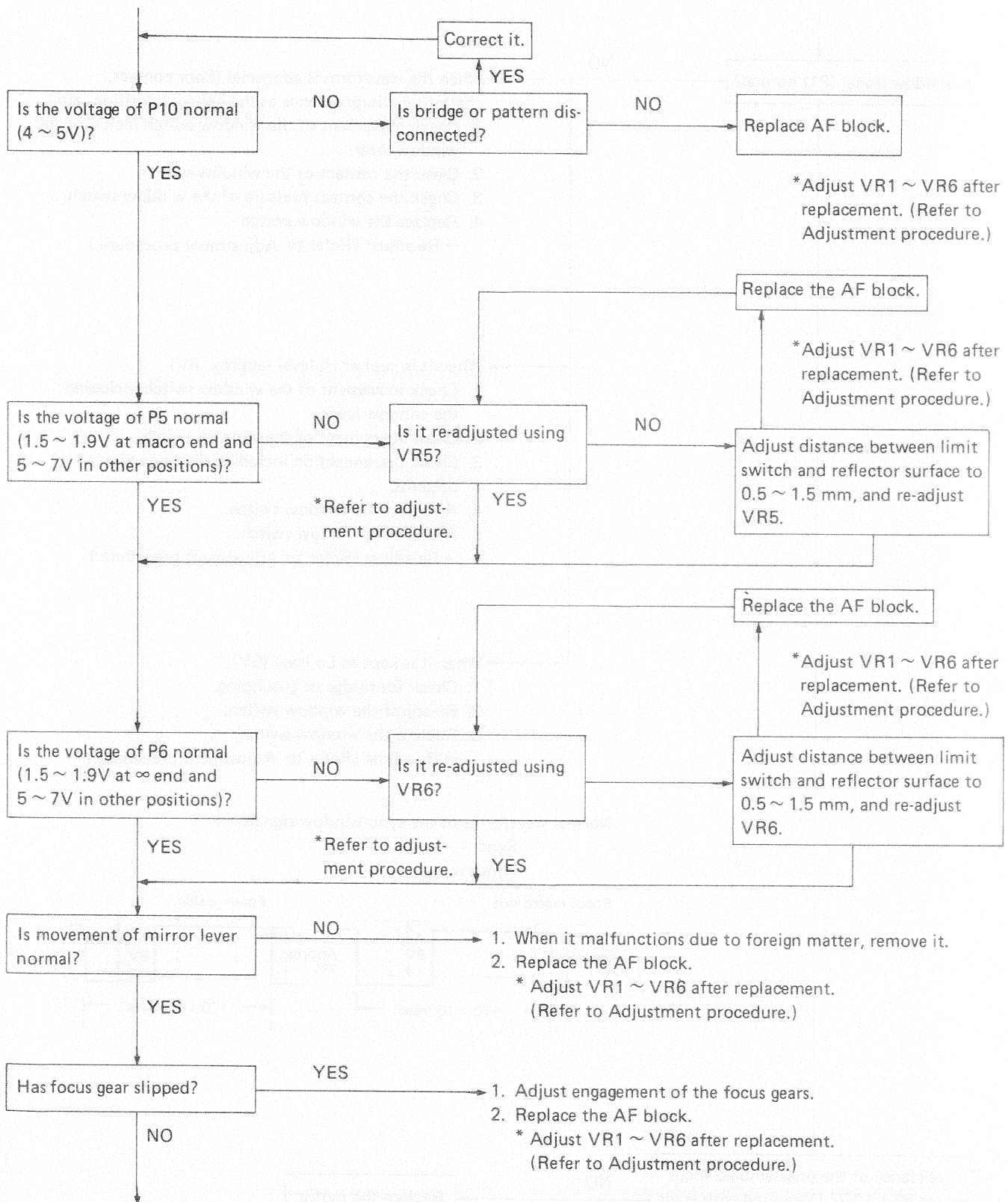


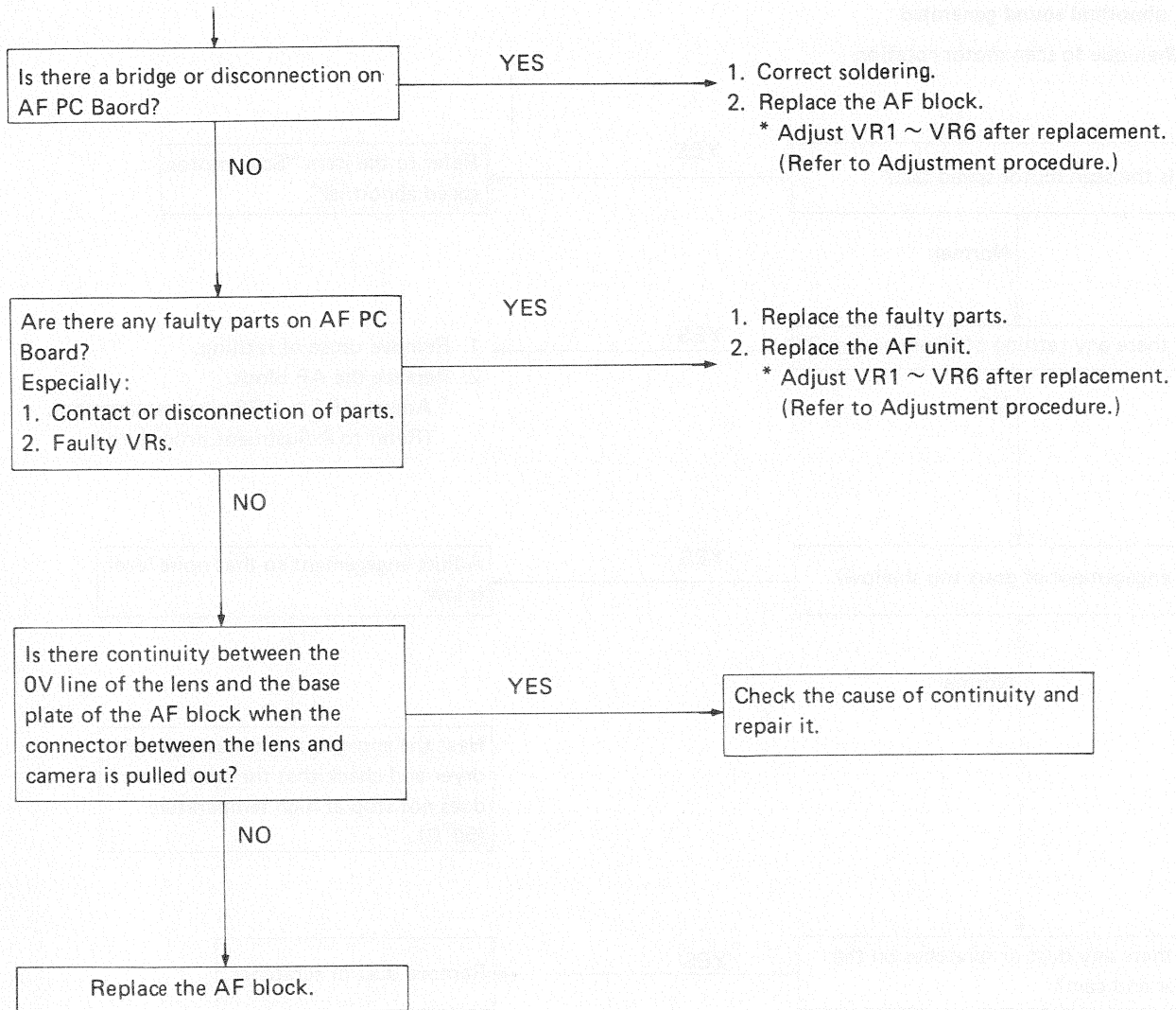


Normal waveforms of the sync/window signals





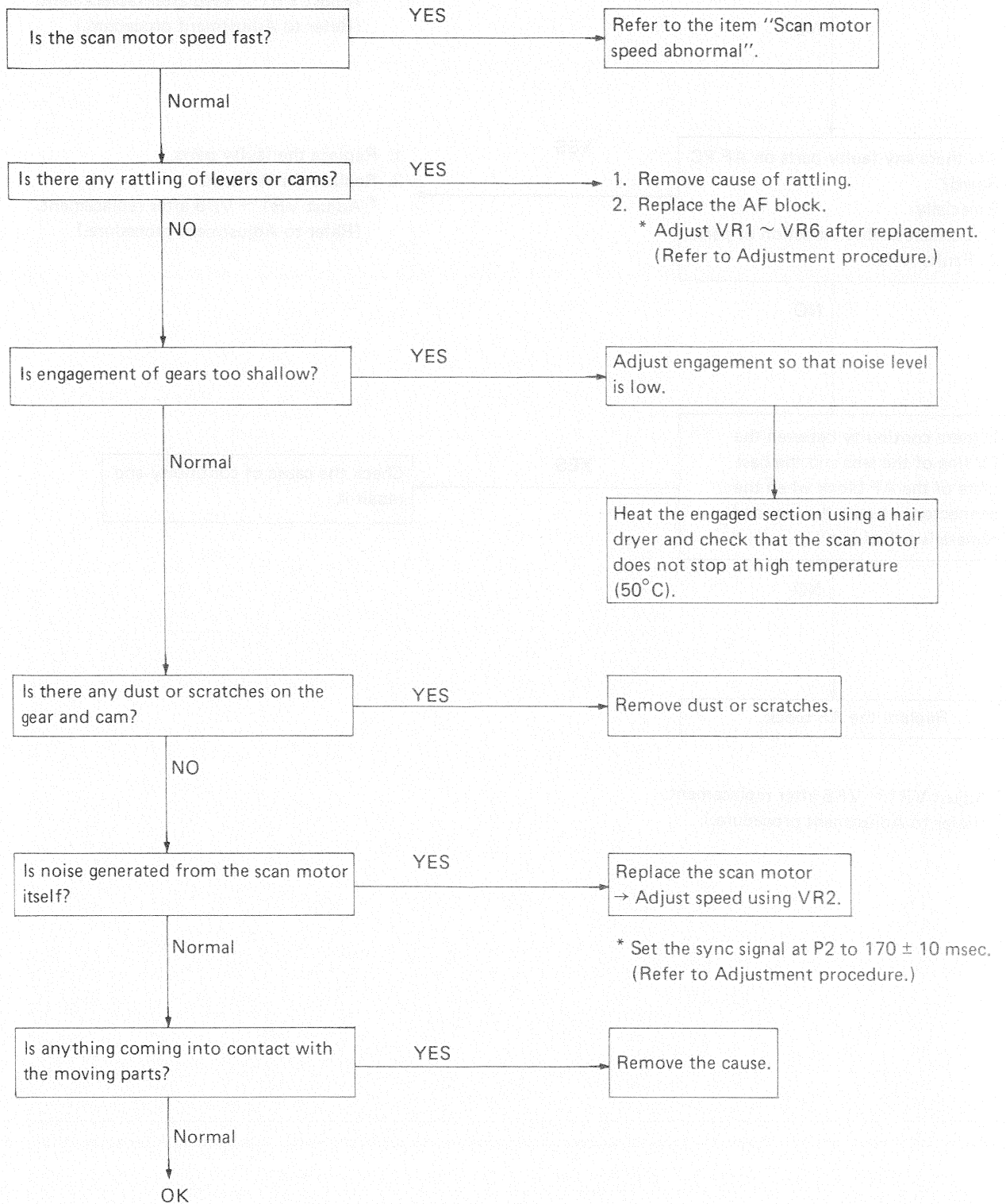




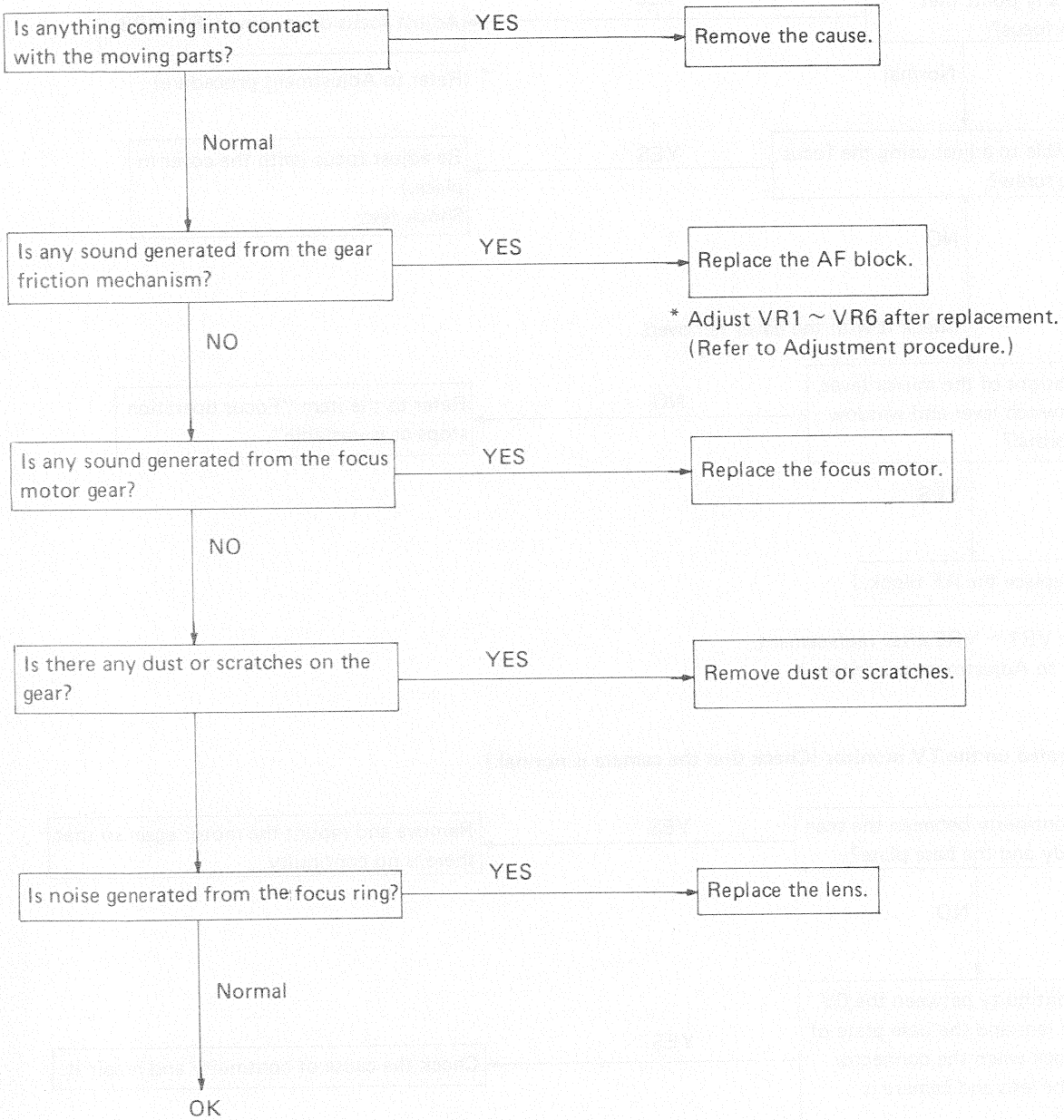
\* Adjust VR1 ~ VR6 after replacement.  
(Refer to Adjustment procedure.)

### 3) Noise, abnormal sound generated

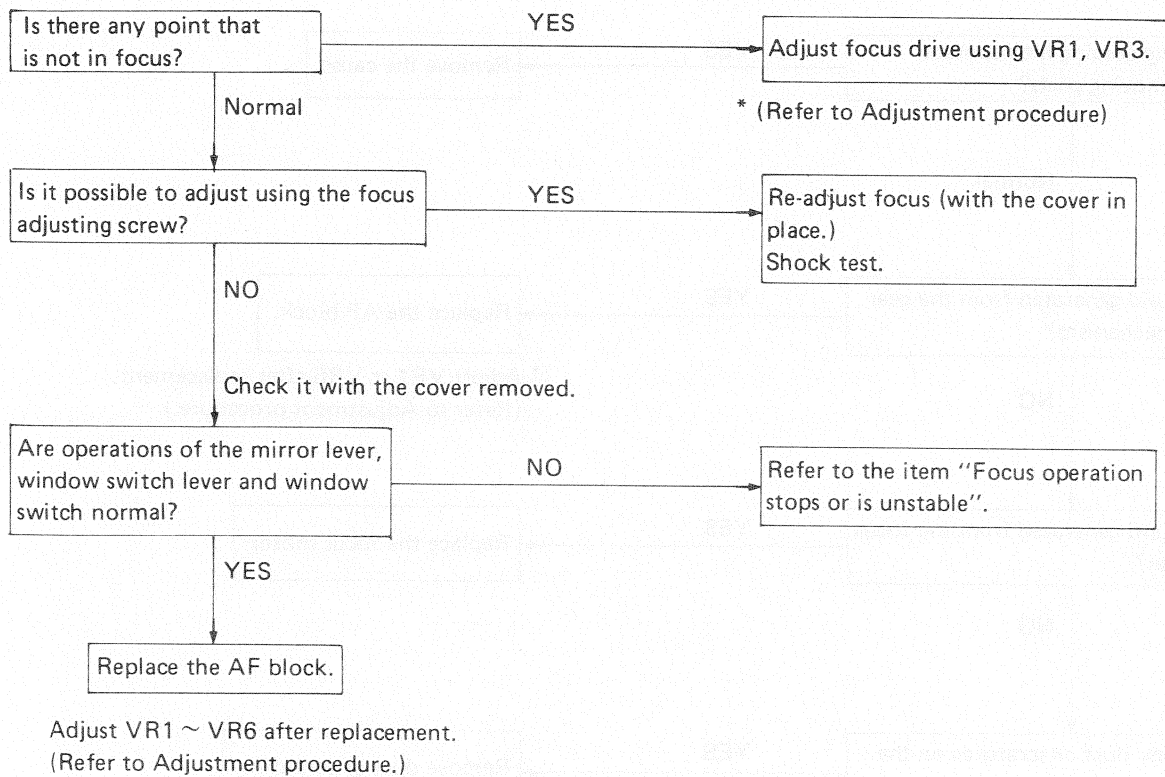
#### (1) When due to scan motor rotation



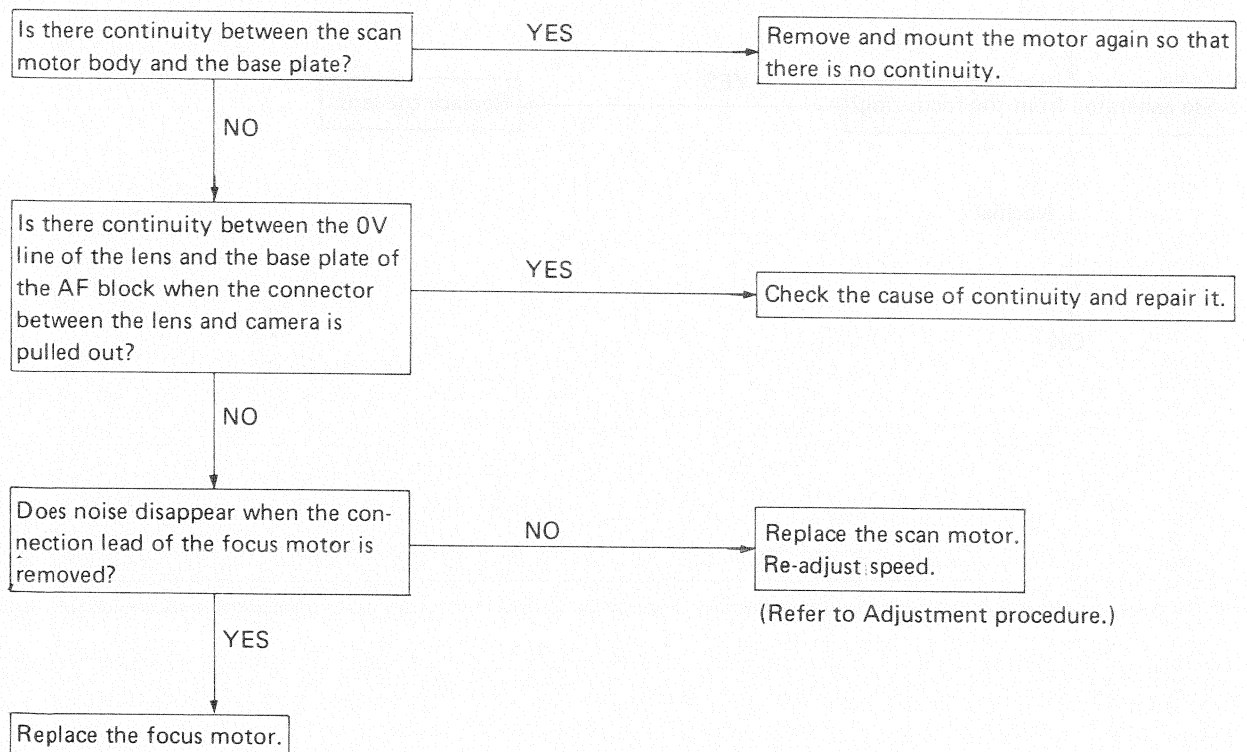
(2) When noise is generated by the focus motor's rotation (Focusing by hand included).



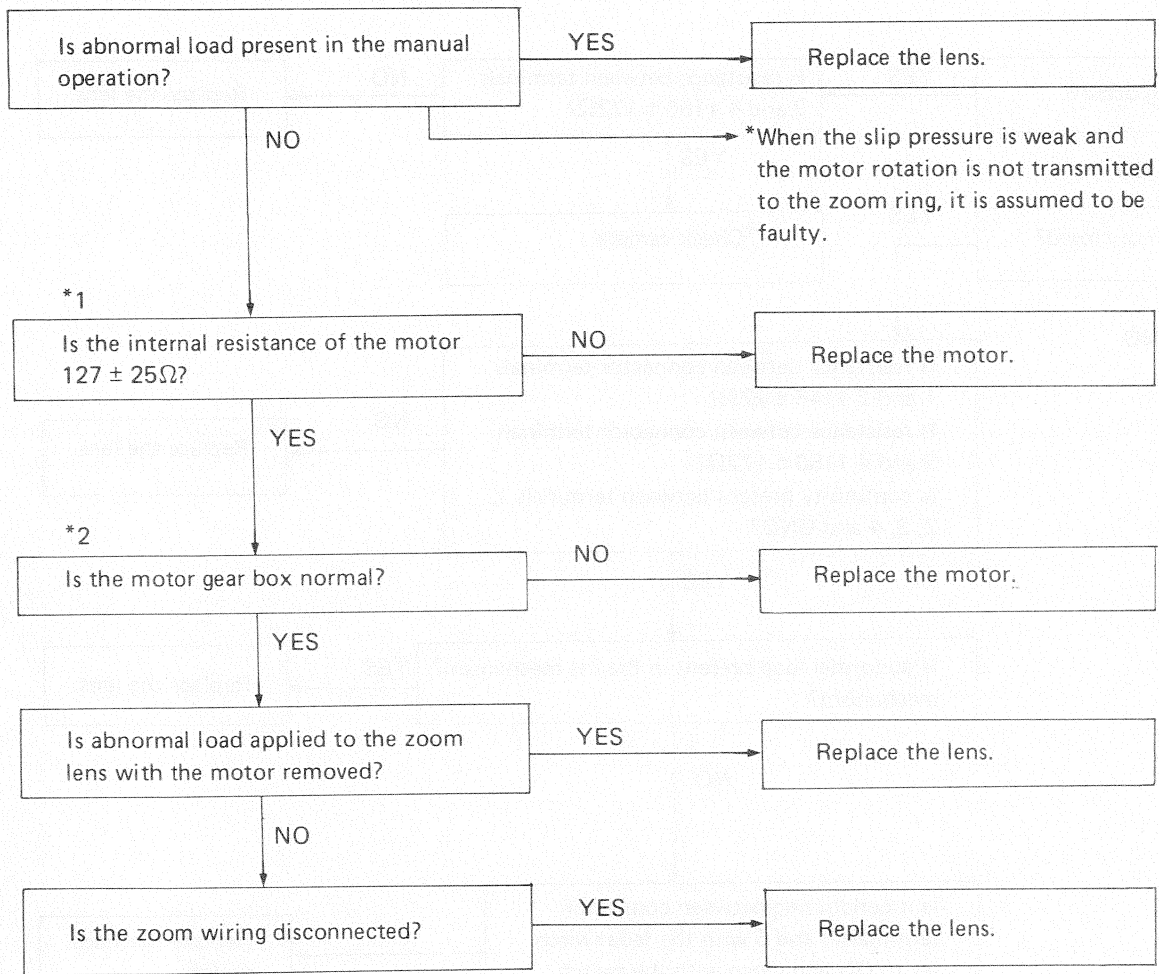
#### 4) AF precision faulty



#### 5) Noise generated on the TV monitor (Check that the camera is normal.)



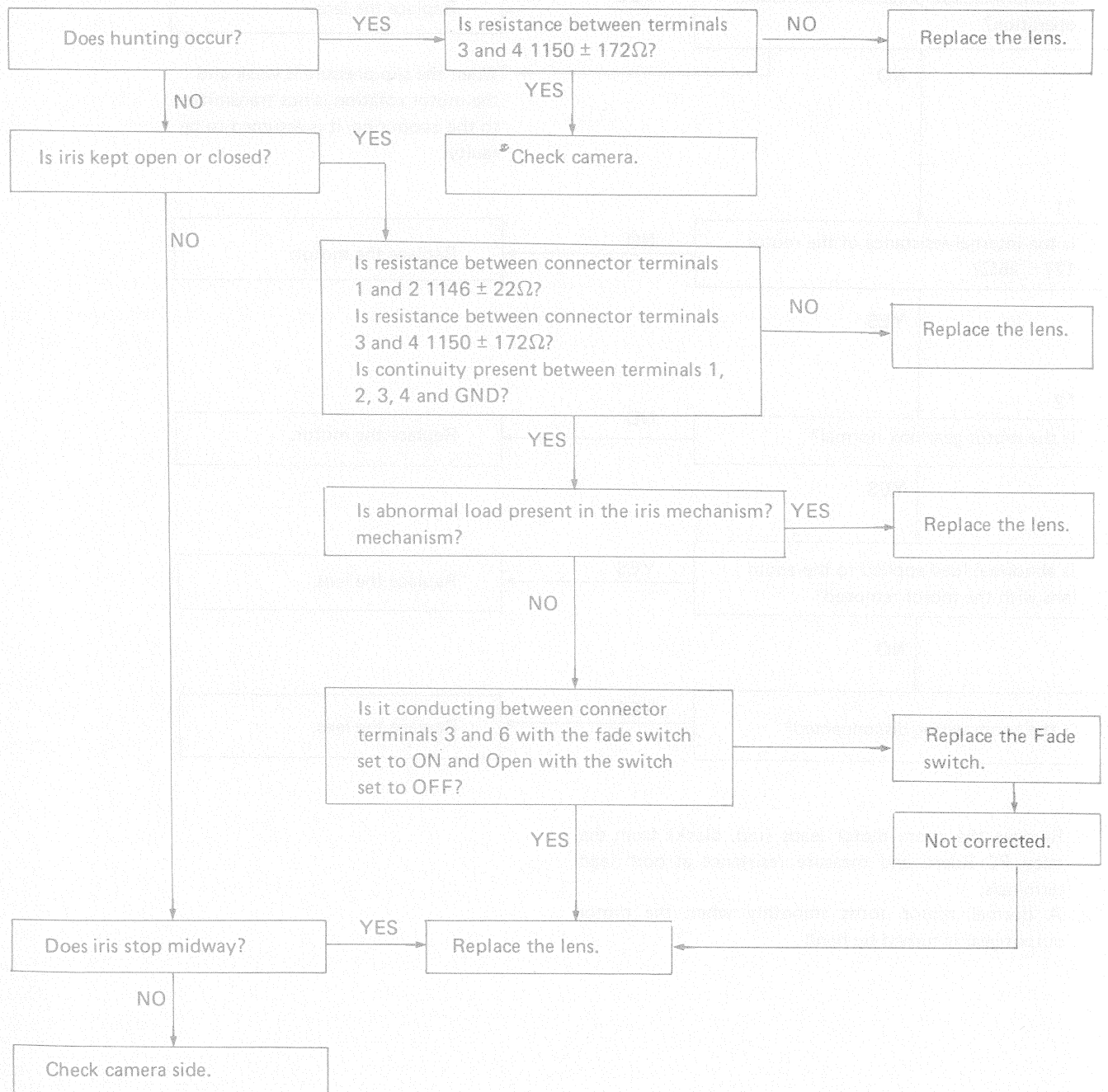
6) Faulty zoom rotation (Motor provided with gear box)



\*1. Remove the zoom motor leads (red, black) from the relay PC Board and measure resistance at both lead terminals.

\*2. A normal motor turns smoothly when the motor output gear is turned by hand.

## 7) Faulty iris



## ADJUSTMENT

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## ABBREVIATION AND NAME OF ADJUSTED PARTS

Part No.	Abbreviation	Name
CV001	SMR	Smear
RV001	BL	Bas light
RV309	H CT	Horizontal, Centering
RV303	REG	Regulator
RV310	WID	Width
RV301	FOC	Focus
RV302	BEAM	Beam
RV311	H. LN	Horizontal, Linearity
RV308	V. CT	Vertical, Centering
RV306	V. LN	Vertical, Linearity
RV307	H. GT	Height
RV305	CKL	Chroma killer level
RV304	CGN	Chroma gain
RV312	B.V.P.	Blue, shading, Vertical, parabola
RV316	R.V.P.	Red, shading, Vertical, parabola
RV320	D.V.P.	Dynamic focus, Vertical, parabola
RV314	B.H.P.	Blue, shading, Horizontal, parabola
RV318	R.H.P.	Red, shading, Horizontal, parabola
RV322	D.H.P.	Dynamic focus, Horizontal, parabola
RV313	B.V.S.	Blue, shading, Vertical, sawtooth
RV317	R.V.S.	Red, shading, Vertical, sawtooth
RV321	D.V.S.	Dynamic focus, Vertical sawtooth
RV315	B.H.S.	Blue, shading, Horizontal, sawtooth
RV319	R.H.S.	R. shading, Horizontal, sawtooth
RV323	D.H.S.	Dynamic focus, Horizontal, sawtooth
CV301	SCF	Subcarrier frequency
RV105	AVL	Auto iris video level
RV118	LIS	Level indicator set
RV119	B.WS	Blue, white balance set
RV120	R. WS	Red, white balance set
RV102	CCL	Chroma carrier level
RV104	B.PS	Blue, phase
RV103	R.PS	Red, phase
RV113	B.BAL	Blue, balance
RV111	R. BAL	Red, balance
RV114	B.GN	Blue, gain
RV112	R.GN	Red. gain
RV117	B-Y	Blue-Y balance
RV116	R-Y	Red-Y balance
RV115	YL GN	YL gain
RV109	B.SET	Blue, setup
RV110	YLBB	YL black balance
RV108	R.SET	Red, setup
RV107	YLSET	YL setup
RV106	Y SET	Y setup

## Before starting adjustment

Check the following before starting adjustment.

### 1. Connection

Connection between camera and power supply, TV set, etc.

### 2. Tools and measuring instruments used for adjustment

- Measuring instruments  
Oscilloscope, frequency counter, DC voltmeter
- Tools, etc.  
(+) screwdrivers (big and medium size), adjusting screwdriver, soldering iron, color viewer (3100°K), test chart A, grey scale chart (11 steps), color bar chart, resistors (3.9kΩ, 12kΩ or 5.6kΩ, 1/8W, 1/4W), scale, TV set.

### 3. Preparation

- Set distance between camera lens and color viewer to 1m.

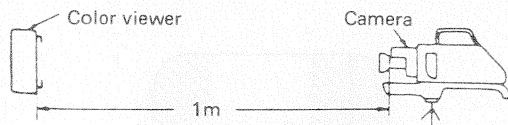


Fig. 27

- Camera operation switch positions  
Zooming speed select switch: NORM (not related to adjustment); Power save switch: STAND BY during preparation, OPERATE during adjustment; Outdoor/indoor select switch: Indoor, Iris control knob, Color balance control knob: mechanical centers.
- Remove the viewfinder and microphone.
- Perform adjustment with the time axis of the oscilloscope set to the H period (horizontal period), when otherwise not specified. Set to the V period when specified, and to H period when specified.
- "Shoot the white chart" in the description means "Shoot the color viewer without inserting a chart".
- Shut off the incident light with the iris set fully to "CLOSED".
- Use P307 when applying the external period.  
V period P307 pin 6 or 7  
H period P307 pin 1 or 2
- Set the probe to 10:1.

Note: Set the power save switch to "NORM" and then set the color viewer switch to ON to start adjustment. Be sure to observe this procedure. When it is done in the wrong order, burning of the SATICON may occur.

## Adjustment after replacing SATICON/coil ass'y

### 1. Adjusting beam voltage

RV302: Sync/Deflection PC Board

- 1) Obtain the light emitting section (3 ~ 5mm) on the right side of the color viewer with a black plate inserted and shoot it.
- 2) Adjust the zoom to max. telephoto.
- 3) Connect the oscilloscope to the TP1 on the Video PC Board.
- 4) Adjust RV302 to set the waveform level temporarily to approx. 1.2V.
- 5) Adjust the iris so that the waveform level is approx. 1.1V.
- 6) Re-adjust RV302 so that the waveform level is  $1V \pm 0.5V_{p-p}$ .

\* This adjustment is not done satisfactorily when the light emitting section is extremely narrow.

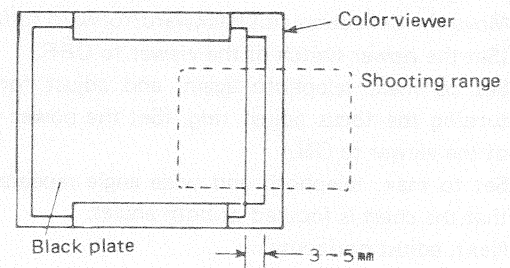


Fig. 28

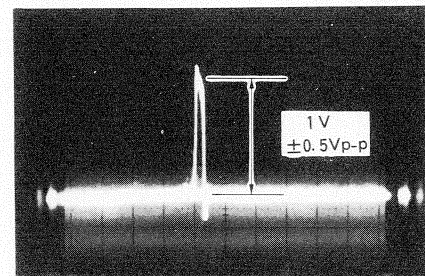


Fig. 29

### 2. Adjusting field focus

RV301: Sync/Deflection PC Board

- 1) Shoot the white chart.
- 2) Adjust the zoom to max. telephoto.
- 3) Connect the oscilloscope to TP16 and TP17 on the Video PC Board.
- 4) Set RV312 and RV323 to their mechanical centers.
- 5) Adjust RV301 so that the waveform is maximum and flat in the direction of the arrow.

\* The waveform is made flat to facilitate shading correction.

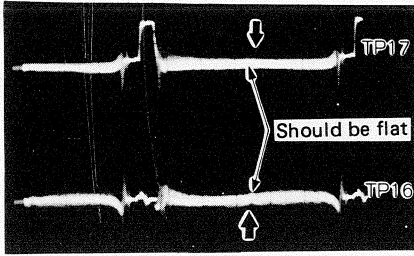


Fig. 30

### 3. Adjusting back-focus and horizontal

#### Back-focus

- 1) Insert the test chart A into the color viewer.
- 2) Adjust the zoom to max. telephoto and adjust focus by turning the focus adjust ring.
- 3) Set to max. wide angle, and loosen the deflection coil fixing screw.
- 4) Move the deflection coil backward/forward to focus. (Set the power switch of the viewer to OFF.)
- 5) Set to max. telephoto again, and adjust focus by turning the focus adjust ring. (Set the power switch of the viewer to ON.)
- 6) Set to max. telephoto and wide angle repeatedly so that the chart is focused at both angles.
- 7) Next, adjust horizontal.

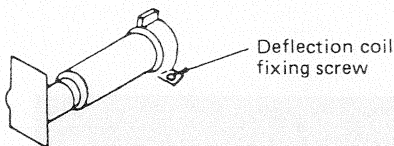


Fig. 31

#### Horizontal

- 1) Check horizontal of the camera and chart. (Check horizontal of the camera placed on the repair bench or the tripod, and the chart placed on the repair bench visually.)
- 2) Turn the deflection coil to adjust so that the chart on the TV screen is horizontal. (It is acceptable to adjust the zoom so that the edges of the chart do not appear on the TV screen and turn the vertical hold control of the TV set so the vertical blanking period appears on the screen, and match the chart and the vertical blanking period so they are parallel. Return the vertical hold control after adjustment.)
- 3) Check the back-focus. Adjust when there is drift. (Check that it is focused at max. telephoto and wide angle. Be sure to check horizontal when back-focus is adjusted.)

- 4) Tighten the deflection coil fixing screw.

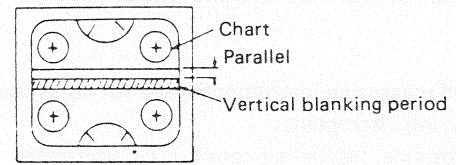


Fig. 32

### 4. Adjusting vertical position

#### RV308: Sync/Deflection PC Board

1. Either use the chart or not.
2. Adjust RV310 to narrow the picture and make the center mark of the black mask appear. \* Adjust RV309 when the center mark does not appear with RV310 turned fully.
3. Adjust RV308 so that the center mark is set to the center of the picture.

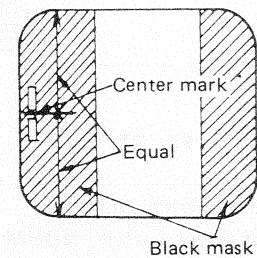


Fig. 33

### 5. Adjusting horizontal size (Adjusting black mask position)

#### RV309, RV310: Sync/Deflection PC Board

1. Shoot the white chart.
2. Adjust the zoom to max. telephoto.
3. Connect the oscilloscope to TP5 on the Sync/Deflection PC Board.
4. Turn RV310 counterclockwise to make the width of the picture a little narrower.
5. Adjust the position using RV309 and the width using RV310 so that the waveform with a little optical black mask remaining at both ends of the video period is obtained.

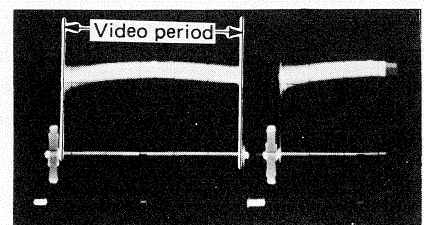


Fig. 34

## 6. Adjusting vertical size

RV306, RV307: Sync/Deflection PC Board

1. Shoot the white chart.
2. Adjust the zoom to max. telephoto.
3. Set the oscilloscope to the V period and connect it to TP2 on the Video PC Board.
4. Adjust RV307 so that crests of beats disappear and then adjust RV306 to make the beats flat.

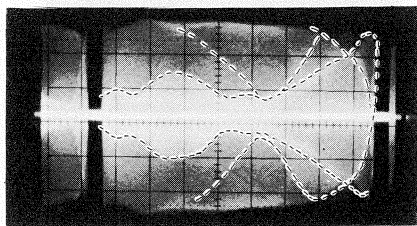


Fig. 35

When the size is drifted, many crests of beats occur.

## 7. Adjusting horizontal linearity

RV311: Sync/Deflection PC Board

1. Insert test chart A into the color viewer to shoot it.
2. Adjust focus and zoom so that the circle pattern is at the center on the screen.
3. Adjust RV311 so that the center of the circle pattern is set to the center of the circle.

## 8. Adjusting red phase, balance

RV103, RV111: Video PC Board

1. Insert the color bar chart into the color viewer and bring it into focus.
2. Adjust the zoom so that the color bar chart fills the TV screen.
3. Connect the oscilloscope to TP4 on the Video PC Board.
4. Repeatedly turn RV103 and RV111 alternately to minimize the blue level of the waveform.

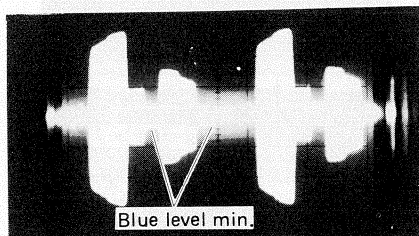


Fig. 36

## 9. Adjusting blue phase, balance

RV104, RV113: Video PC Board

1. Shoot the chart in the same way as in item 8.
2. Connect the oscilloscope to the TP5 on the Video PC Board.
3. Repeatedly turn RV104 and RV113 alternately to minimize the red level of the waveform.

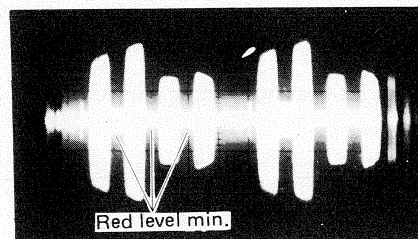


Fig. 37

## 10. Adjusting chroma gain

RV304, RV324: Sync/Deflection PC Board

1. Insert the color bar chart into the color viewer to shoot it.
2. Adjust the zoom so that the color bar chart fills the screen.
3. Connect the oscilloscope to TP5 on the Sync/Deflection PC Board.
4. Adjust RV304 so that the red level of the waveform is  $0.42V_{p-p}$ .
5. Adjust RV324 so that the burst signal with smaller level of the waveform is  $0.3V \pm 0.01V_{p-p}$ .

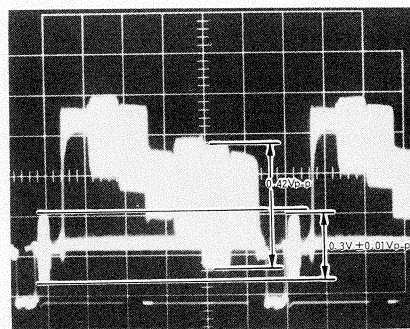


Fig. 38

## 11. Setting iris position

1. Shoot the white chart.
2. Adjust the zoom to max. telephoto.
3. Connect the oscilloscope to TP5 on the Sync/Deflection PC Board.
4. Adjust iris so that the video signal component of the waveform is  $0.4V_{p-p}$ .

## 12. Precise adjustment of field focus

RV301: Sync/Deflection PC Board

1. Shoot the white chart.
2. Adjust the zoom to max. telephoto.
3. Connect the oscilloscope to TP16 and TP17 on the Video PC Board.  
Oscilloscope CH1: TP16  
Oscilloscope CH2: TP17
4. Change over the mode of the oscilloscope to DUAL.
5. Adjust RV301 so that the waveform becomes max. in the direction of the arrow and obtain a waveform facilitating shading correction. (Refer to Fig. 30)

Waveforms facilitating shading correction

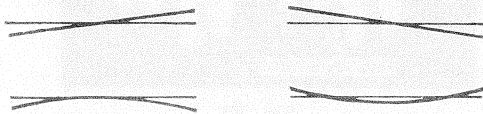


Fig. 39

## 13. Setting iris to click position

Return the iris to its click position.

## 14. Adjusting chroma carrier level

RV102: Video PC Board

1. Insert the grey scale chart into the color viewer to shoot it.
2. Adjust the zoom so that the grey scale fills the screen.
3. Connect the oscilloscope to TP3 on the Video PC Board.
4. Adjust RV1-2 so that the waveform is  $50 \text{ mV} \pm 5 \text{ mVp-p}$ .

## 15. Setting iris position

1. Shoot the white chart.
2. Adjust the zoom to max. telephoto.
3. Connect the oscilloscope to TP5 on the Sync/Deflection PC Board.
4. Adjust iris so that the video signal component of the waveform is  $0.4\text{Vp-p}$ .

## 16. Adjusting dynamic focus

RV320, RV321, RV322, RV323: Sync/Deflection PC Board

1. Shoot the white chart as in item 12.
2. Adjust RV322 and RV323 to obtain a waveform facilitating shading correction.
3. Set the oscilloscope to the V period.
4. Adjust RV320 and RV321 to obtain a waveform facilitating shading correction.

Waveforms facilitating shading correction

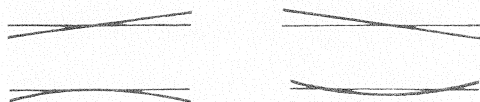


Fig. 40

## 17. Adjusting red/modulation shading

RV316, RV317, RV318, RV319: Sync/Deflection PC Board

1. Shoot the white chart.
2. Adjust the zoom to max. telephoto.
3. Connect the oscilloscope to TP16 on the Video PC Board.
4. Set the oscilloscope to the V period.
5. Adjust RV316 and RV317 so that the waveform is flat and the level minimized.

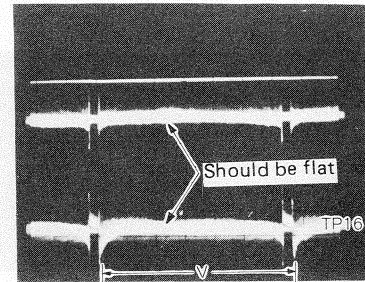


Fig. 41

6. Set the oscilloscope to the H period.
7. Adjust RV318 and RV319 so that the waveform is flat and the level minimized.

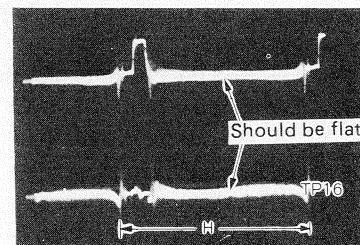


Fig. 42

## 18. Adjusting blue/modulation shading

RV312, RV313, RV314, RV315: Sync/Deflection PC Board

1. Shoot the white chart as in item 17.
2. Connect the oscilloscope to TP17 on the Video PC Board.
3. Set the oscilloscope to the V period.
4. Adjust RV312 and RV313 so that the waveform is flat and the level minimized.

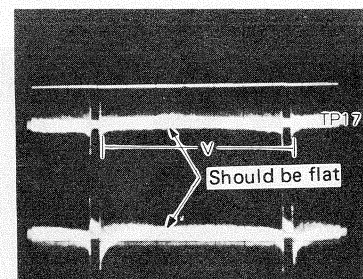


Fig. 43

5. Set the oscilloscope to the H period.
6. Adjust RV314 and RV315 so that the waveform is flat and the level minimized.

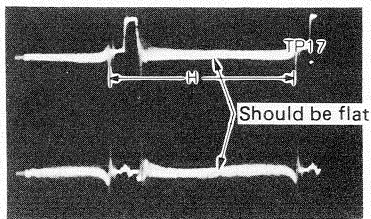


Fig. 44

**19. Setting iris to its click position.**

Return the iris to its click position.

**20. Y set-up**

RV106: Video PC Board

1. Shut off incident light by fitting the lens cap.
2. Connect the oscilloscope to TP5 on the Sync/Deflection PC Board.
3. Adjust RV106 so that the set-up level is  $30\text{ mV} \pm 10\text{ mVp-p}$  (from the center of the carrier).

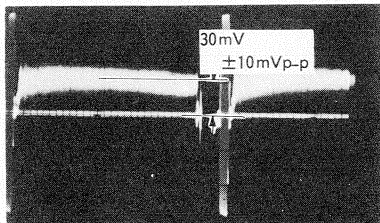


Fig. 45

**21. R set-up**

RV108: Video PC Board

1. Shoot the color viewer with a grey scale chart inserted.
2. Connect the oscilloscope to TP13 on the Video PC Board.
3. Adjust RV108 so that the set-up level is  $120\text{ mV} \pm 20\text{ mVp-p}$ .

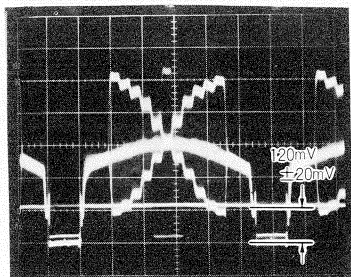


Fig. 46

**22. Adjusting white balance**

RV107, RV109, RV112, RV114: Video PC Board  
 RV305: Sync/Deflection PC Board,  
 RV951, RV952: RD PC Board.

1. Shoot the color viewer with a grey scale chart inserted.
2. Adjust the zoom so that the grey scale fills the TV screen.
3. Connect the oscilloscope to TP5 on the Sync/Deflection PC Board.
4. Repeatedly turn RV107 and RV109 alternately to minimize the carrier in the 2nd ~ 6th steps from the bottom of the waveform. (Refer to Fig. 48).
5. Set RV951 to its mechanical center.
6. Turn RV305 fully counterclockwise.
7. Adjust RV952 to minimize the sub-carrier in the 8th step of the waveform.

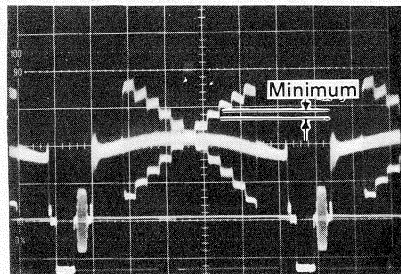


Fig. 47

8. Repeatedly turn RV112 and RV114 alternately to minimize the carrier in the 6th ~ 9th steps from the bottom of the waveform.
9. Repeatedly adjust RV107 and RV109, and RV112 and RV114.

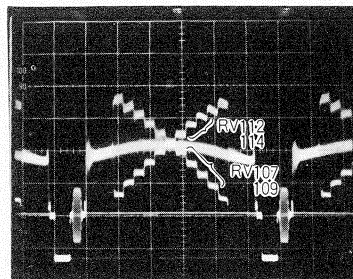


Fig. 48

**23. Adjusting chroma killer level**

RV305: Sync/Deflection PC Board

1. Shoot the color viewer with a grey scale chart inserted.
2. Set the INDOOR/OUTDOOR select switch to OUTDOOR to make the picture reddish.
3. Connect the oscilloscope to TP5 on the Sync/Deflection PC Board.

4. Adjust RV305 so that the sub-carrier at the white peak of the waveform is  $100\text{mV} \pm 10\text{mVp-p}$ .

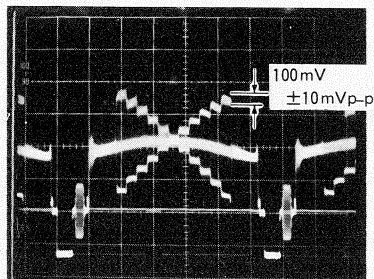


Fig. 49

#### 24. Adjusting black balance

RV110: Video PC Board

1. Shoot the color viewer with a grey scale chart inserted.
2. Adjust the zoom so that grey scale fills the TV screen.
3. Connect the oscilloscope to TP5 on the Sync/Deflection PC Board.
4. Adjust RV110 to minimize the carrier in the lowest step of the waveform.

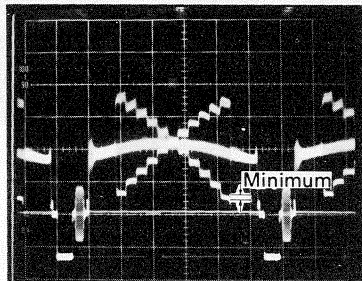
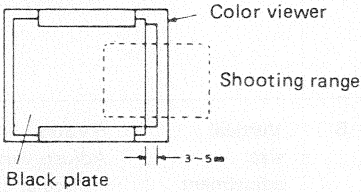
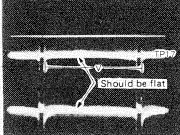


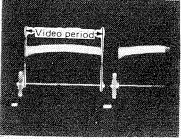
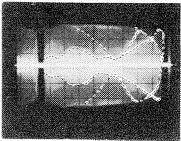
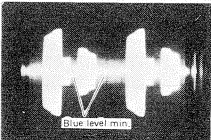
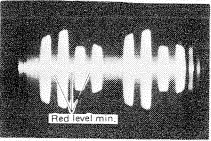
Fig. 50

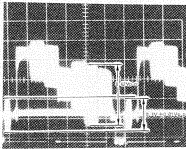
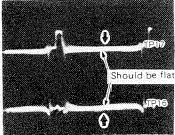
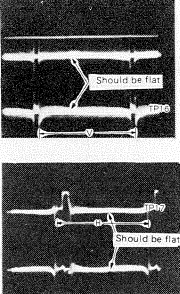
## List of adjustments after replacing SATICON/coil ass'y

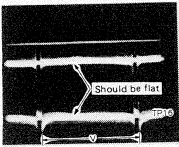
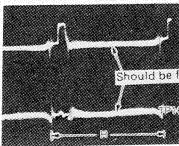
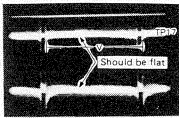
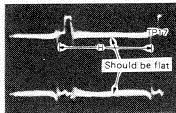
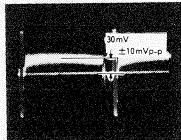
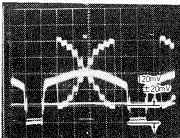
Note: Items concerning the purpose of adjustment and phenomenon of picture in the table are in the order:  
Circuit No., Purpose of adjustment & phenomenon of picture.

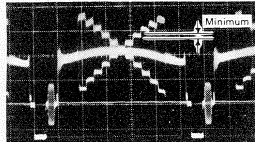
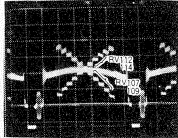
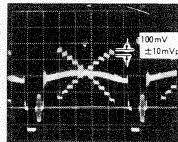
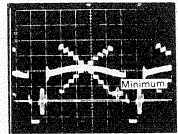
Item No.	Name of adjustment	Purpose of adjustment & phenomenon of picture	Test point	Adjusted part	Adjustment
1	Beam voltage adjustment	RV302 Adjusts the electron beam of SATICON while varying the G1 voltage. <ul style="list-style-type: none"> <li>When voltage is low, steps in the high luminance section (white) of the grey scale cannot be distinguished.</li> <li>When voltage is high, magenta ghost appears to the right of the high luminance section of the grey scale or the section becomes green (horizontally). Shading increases.</li> </ul>	Video PC Board TP1	RV302	Obtain the light emitting section (3 ~ 5 mm) on the color viewer with a black plate inserted and shoot it. Set the waveform to $1V \pm 0.05V_{p-p}$ .  
2	Field focus adjustment	RV301 Sets the focus electrode voltage of SATICON and adjusts so that the electron beam from the cathode focuses on the photoconductive film. <ul style="list-style-type: none"> <li>It is badly focused when the focus ring is turned or the backfocus is adjusted using the coil ass'y.</li> </ul>	Video PC Board TP16, TP17	RV312 ~ RV323: mechanical centers  RV301	Shoot the white chart. Set the zoom to max. telephoto. Set the waveform to max. and flat.  
3	Back-focus, horizontal • Back-focus		TV picture	Deflection coil	Shoot test chart A. <ol style="list-style-type: none"> <li>Set the viewer power supply to ON. Adjust zoom to max. telephoto and focus. Loosen the deflection coil fixing screw.</li> <li>Set the viewer power supply to OFF. Adjust zoom to max. wide and move deflection coil backward and forward. Adjust so that the chart is focused with both max. telephoto and max. wide angle.</li> </ol>
	• Horizontal		TV picture	Deflection coil	Let the vertical blanking period of the TV appear on the screen. Turn the deflection coil so that the chart edge and the blanking are parallel. Check the back-focus after adjustment.
4	Vertical position adjustment	RV308 Vertical deflection position adjustment <ul style="list-style-type: none"> <li>Black mask appears at the top of the picture or the transparent mask appears at the bottom of the picture.</li> </ul>	TV picture	RV310 (RV309) RV308	Adjust RV310 to make the picture narrower, and let the center mark appear on the black mask. <ul style="list-style-type: none"> <li>Adjust RV309 when the center mark does not appear with RV310 fully turned.</li> </ul> Adjust RV308 to set the center mark at the center of the screen.



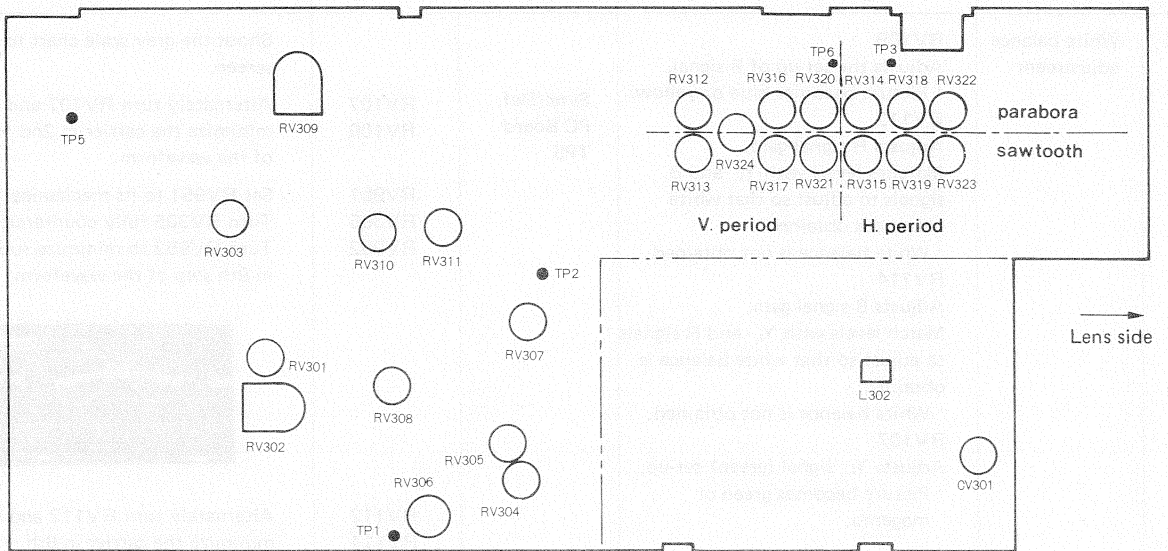
Item No.	Name of adjustment	Purpose of adjustment & phenomenon of picture	Test point	Adjusted part	Adjustment
5	Horizontal size adjustment	RV310 Horizontal deflection size adjustment • The circle chart looks crushed. Color balance is not correct and becomes green. RV309 Horizontal deflection position adjustment • Black mask appears to the left or right of the picture.	TV picture Sync/Def. PC Board TP3	RV310 RV309	Shoot the white chart to fill the screen. Turn RV310 counterclockwise to shorten the waveform width. Turn RV309 and RV310 to set black mask to approx. 1 $\mu$ sec on both left/right sides. 
6	Vertical size adjustment	RV306 Adjusts vertical deflection linearity • Circular chart is distorted. RV307 Adjusts vertical deflection size • Circular chart is distorted.	Video PC Board TP2	V period: RV307 RV306	Shoot the white chart to fill the screen. Adjust RV307 to cancel the crests of beats. Adjust RV306 to make the beats flat. 
7	Horizontal linearity adjustment	RV311 Adjusts horizontal deflection linearity. • The circular chart is distorted. Color unevenness appears on the left and right.	TV picture	RV311	Shoot test chart A to fill the TV screen. Turn RV311 to make the circle in the chart round.
8	Red phase/balance adjustment	RV103 Adjusts the carrier phase shift angle for separating R in the R/B chroma separation circuit. • Color reproduction is not satisfactory and mixed color is seen. RV111 Adjusts the 1H delayed chroma signal carrier level to match it to the chroma signal carrier level of the phase shifter output. • Color saturation and purity are deteriorated and mixed color occurs.	Video PC Board TP4	RV103 RV111	Shoot the color bar chart to fill the screen. Alternately turn RV103 and RV111 to minimize blue level. 
9	Blue phase/balance adjustment	RV104 Adjusts the carrier phase shift angle for separating B in the R/B color separation circuit. • Color reproduction is not satisfactory and mixed color occurs. RV113 Adjust carrier level to match it to the chroma signal carrier level of the phase shifter output. • Color saturation and purity are deteriorated and mixed color occurs.	Video PC Board TP5	RV104 RV113	Shoot the color bar chart to fill the screen. Alternately turn RV104 and RV113 to minimize the red level. 

Item No.	Name of adjustment	Purpose of adjustment & phenomenon of picture	Test point	Adjusted part	Adjustment
10	Chroma gain adjustment	RV304 Controls the chroma signal gain. Color beats and unevenness become conspicuous when color is too dense.	Sync/Def. PC Board TP5	RV304  RV324	Shoot the color bar chart to fill the TV screen. Set the red level of the waveform to 0.42Vp-p. Set the burst signal with smaller level of the waveform to $0.3V \pm 0.01Vp-p$ . 
11	Setting iris position		Sync/Def. PC Board TP5	Iris adjustment	Shoot the white chart. Set the zoom to max. telephoto. Set the video signal component of the waveform to 0.4Vp-p.
12	Precise adjustment of field focus		Video PC Board TP16 TP17	RV301	Shoot the white chart. Set the zoom to max. telephoto. Observe waveforms at TP16, TP17 using a 2-channel oscilloscope. Adjust RV301 so that the waveform at TP16 is fully in the lower direction, at TP17 in the upper direction. Obtain the waveform facilitating shading correction. 
13	Set the iris to its click position				
14	Chroma carrier level adjustment	RV102 Adjusts chroma carrier level • No color, tint abnormal.	Video PC Board TP3	RV102	Shoot the grey scale chart to fill the screen. Adjust RV102 so that the waveform is $50mV \pm 5mVp-p$ .
15	Setting iris position		Sync/Def. PC Board TP5	Iris adjustment	Shoot the white chart. Set the zoom to max. telephoto. Set the video signal component of the waveform to 0.4Vp-p.
16	Dynamic focus adjustment	RV320, RV321, RV322, RV323 Correct peripheral beam focusing of SATICON. Adjust dynamic focus amount. • Black lines appear in the picture. Color unevenness conspicuous.	Video PC Board TP16, TP17	V period: RV320, RV321  H period: RV322, RV323	Shoot the white chart. Set the zoom to max. telephoto. Set the oscilloscope to the DUAL mode. Turn RV320 ~ RV323 to obtain a waveform facilitating shading correction. 

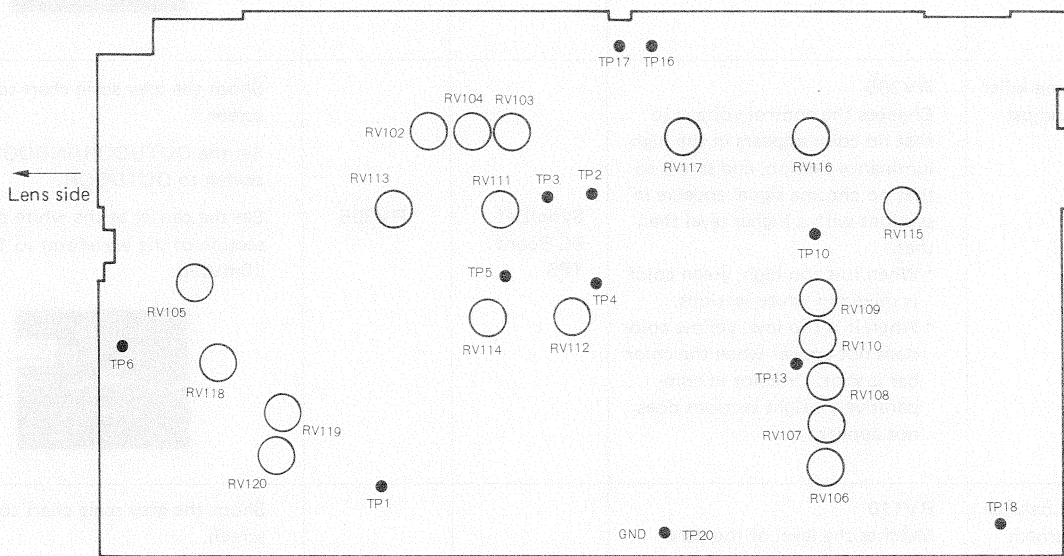
Item No.	Name of adjustment	Purpose of adjustment & phenomenon of picture	Test point	Adjusted part	Adjustment
17	Red/modulation shading adjustment	RV316, RV317, RV318, RV319 Correct color unevenness of R signal. • Color unevenness conspicuous.	Video PC Board TP16	V period: RV316, RV317	Shoot the white chart. Set the zoom to max. telephoto. Turn RV316 and RV317 alternately so that the waveform is flat and the level minimized. 
				H period: RV318, RV319	Turn RV318 and RV319 alternately so that the waveform is flat and the level minimized. 
18	Blue/modulation shading adjustment	RV312, RV313, RV314, RV315 Correct color unevenness of B signal. • Color unevenness conspicuous.	Video PC Board TP17	V period: RV312, RV313	Shoot the white chart. Set the zoom to max. telephoto. Turn RV312 and RV313 alternately so that the waveform is flat and the level minimized. 
				H period: RV314, RV315	Turn RV314 and RV315 alternately so that the waveform is flat and the level minimized. 
19	Set the iris to its click position.				
20	Y set-up	RV106 Adjusts the set-up of the luminance signal. • Picture seems whitish.	Sync/Def. PC Board TP5	RV106	Fit the lens cap to shut off the incident light. Set the waveform to $30\text{mV} \pm 10\text{mVp-p}$ . 
21	R set-up	RV108 Adjusts the set-up of the R signal. • Picture becomes reddish or cyan.	Video PC Board TP13	RV108	Shoot the grey scale chart. Set the waveform to $120\text{mV} \pm 20\text{mVp-p}$ . 

Item No.	Name of adjustment	Purpose of adjustment & phenomenon of picture	Test point	Adjusted part	Adjustment
22	White balance adjustment	<p>RV109 Adjusts the set-up of B signal. • Picture becomes blue or yellow.</p> <p>RV112 Adjusts R signal gain. Matches levels with Y<sub>L</sub> and B signals to adjust so that white balance is obtained. • White balance is not obtained.</p> <p>RV114 Adjusts B signal gain. Match levels with Y<sub>L</sub> and R signals to adjust so that white balance is obtained. • White balance is not obtained.</p> <p>RV107 Adjusts Y<sub>L</sub> signal (green) set-up. • Picture becomes green or magenta.</p>	Sync/Def. PC Board TP5	<p>RV107 RV109</p> <p>RV951 RV305 RV952</p> <p>RV112 RV114</p>	<p>Shoot the grey scale chart to fill the screen.</p> <p>Alternately turn RV107 and RV109 to minimize the carrier in 2nd ~ 6th steps of the waveform.</p> <p>Set RV951 to its mechanical center. Turn RV305 fully counterclockwise. Turn RV952 to minimize sub-carrier in 8th step of the waveform.</p>  <p>Alternately turn RV112 and RV114 to minimize the carrier in 6th ~ 9th steps of the waveform.</p> 
23	Chroma killer level adjustment	<p>RV305 Changes the control voltage so that no color appears in the high luminance section, and sets it so that no chroma signal appears in sections with a higher level than that. • When it is too high, green color is mixed in white sections. • When it is too low, yellow color does not appear when the color bar is shot. Or color in comparatively bright sections does not appear.</p>	Sync/Def. PC Board TP5	RV305	<p>Shoot the grey scale chart to fill the screen.</p> <p>Set the OUTDOOR/INDOOR select switch to OUTDOOR.</p> <p>Set the carrier at the white peak section of the waveform to <math>100\text{mV} \pm 10\text{mVp-p}</math>.</p> 
24	Black balance adjustment	<p>RV110 Matches the level of the dark section of Y<sub>L</sub> (Green) signal to R and B signals. • Picture becomes green or magenta.</p>	Sync/Def. PC Board TP5	RV110	<p>Shoot the grey scale chart to fill the screen.</p> <p>Adjust RV110 to minimize the carrier in the lowest step of the waveform.</p> 

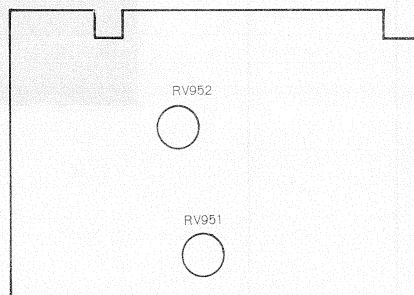
**Circuit adjustment**



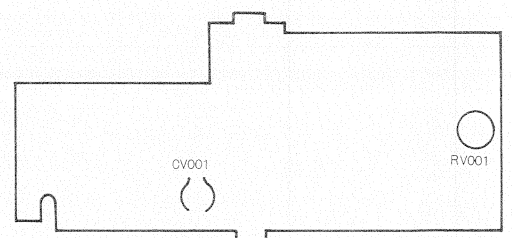
**Fig. 51 Sync/Def. PC Board (Parts side)**



**Fig. 52 Video PC Board (Parts side)**



**Fig. 53 RD PC Board (Parts side)**



**Fig. 54 Pre-amplifier PC Board (Parts side)**

### 1. Adjusting power voltage

RV303: Sync/Deflection PC Board

Either shoot a chart or not.

1. Connect a DC voltmeter to TP2 on the Sync/Deflection PC Board.
2. Adjust RV303 so that the reading of the voltmeter is 9V.

### 2. Adjusting sub-carrier frequency

CV301: Sync/Deflection PC Board

Either shoot a chart or not.

1. Connect the frequency counter to TP6 on the Sync/Deflection PC Board.
2. Adjust CV301 so that the reading of the counter is  $4.4336189 \text{ MHz} \pm 50 \text{ Hz}$ .

### 3. Adjusting PLL

L302: Sync/Deflection PC Board

Perform this adjustment only when parts IC303, X301, C326, C325, L302 are replaced.

It is not required to shoot a chart.

1. Connect the DC voltmeter to TP3 on the Sync/Deflection PC Board.
2. Adjust L302 so that the reading of the voltmeter is 3V.

### 4. Adjusting beam voltage

RV302: Sync/Deflection PC Board

1. Obtain the light emitting section (3 ~ 5mm) on the right side of the color viewer with a black plate inserted and shoot it.

2. Set the zoom to max. telephoto.
3. Connect an oscilloscope to TP1 on the Video PC Board.
4. Adjust RV302 to temporarily set the waveform level to approx. 1.2V.
5. Adjust iris so that the waveform level is approx. 1.1V.
6. Re-adjust RV302 so that the waveform level is  $1V \pm 0.05V_{p-p}$ .

\* When the light emitting section is extremely narrow, this adjustment cannot be done satisfactorily.

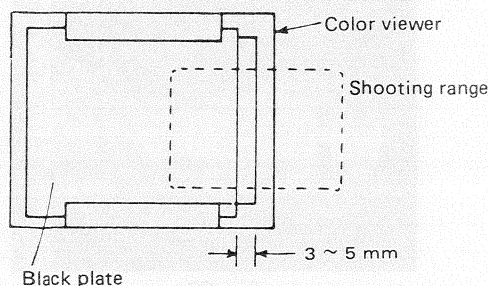


Fig. 55

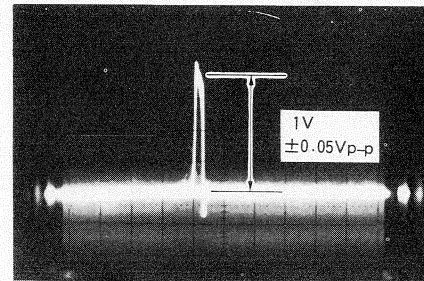


Fig. 56

### 5. Adjusting field focus

RV301: Sync/Deflection PC Board

1. Shoot the white chart.
2. Set the zoom to max. telephoto.
3. Connect the oscilloscope to TP16, TP17 on the Video PC Board.
4. Set RV312 ~ RV323 to their mechanical centers.
5. Adjust RV301 so that the waveform is max. and flat in the direction of the arrow.

\* The waveform is made flat to facilitate shading correction.

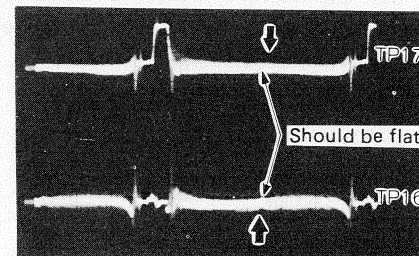


Fig. 57

### 6. Adjusting back-focus and horizontal

• Back-focus

1. Insert the test chart A into the color viewer.
2. Adjust the zoom to max. telephoto and adjust focus by turning the focus adjust ring.
3. Set to max. wide angle, and loosen the deflection coil fixing screw.
4. Move the deflection coil backward/forward to focus. (Set the power switch of the viewer to OFF.)
5. Set to max. telephoto again, and adjust focus by turning the focus adjust ring. (Set the power switch of the viewer to ON.)
6. that the chart is focused at both max. telephoto and wide angle.
7. Next, adjust horizontal.

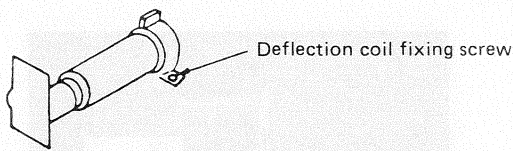


Fig. 58

**Horizontal**

1. Check horizontal of the camera and chart.  
(Check horizontal of the camera placed on the repair bench or the tripod, and the chart placed on the repair bench visually.)
2. Turn the deflection coil to adjust so that the chart in the TV screen is horizontal.  
(It is acceptable to adjust the zoom so that the edges of the chart do not appear on the TV screen, and turn the vertical hold control of the TV set to let the vertical blanking period appear in the screen, and match the chart and the vertical blanking period so they are parallel. Return the vertical hold control after adjustment.)
3. Check the back-focus. Adjust when there is drift.  
(Check that the chart is focused at both max. telephoto and wide angle. Be sure to check horizontal when back-focus is adjusted.)
4. Tighten the deflection coil fixing screw.

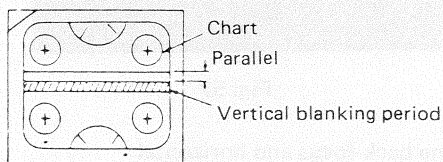


Fig. 59

**7. Adjusting vertical position**

RV308: Sync/Deflection PC Board

1. Either use a chart or not.
2. Adjust RV310 to narrow the picture and to make the center mark of the black mask appear.  
\* Adjust RV309 when the center mark does not appear with RV310 turned fully.
3. Adjust RV308 to set the center mark to the center of the picture.

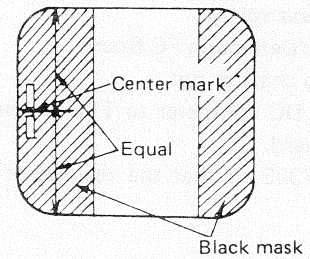


Fig. 60

**8. Adjusting horizontal size**

RV309, RV310: Sync/Deflection PC Board

1. Shoot the white chart.
2. Set the zoom to max. telephoto.
3. Connect the oscilloscope to TP5 on the Sync/Deflection PC Board.
4. Turn RV310 counterclockwise to narrow the picture a little.
5. Adjust the position using RV309, and width using RV310 so that a waveform with a little optical black mask remained at both ends of the video period is obtained.

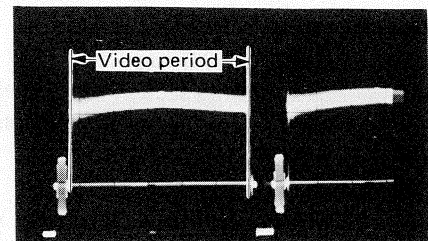


Fig. 61

**9. Adjusting vertical size**

RV306, RV307: Sync/Deflection PC Board

1. Shoot the white chart.
2. Set the zoom to max. telephoto.
3. Set the oscilloscope to the V. period and connect it to TP2 on the Video PC Board.
4. Adjust RV307 to remove the crests of the beats, and adjust RV306 to make the beats flat.

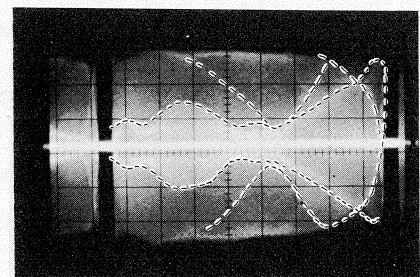


Fig. 62

When the size is drifted, many crests of beats occur.

### 10. Adjusting horizontal linearity

RV311: Sync/Deflection PC Board

1. Insert test chart A into the color viewer and shoot it.
2. Adjust focus and zoom so that the circle pattern is set to the center of the picture.
3. Adjust RV311 so that the center of the circle pattern is set to the center of the circle.

### 11. Setting iris position

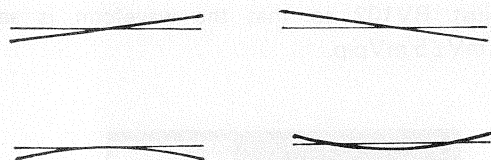
1. Shoot the white chart as in item 5.
2. Set the zoom to max. telephoto.
3. Connect the oscilloscope to TP5 on the Sync/deflection PC Board.
4. Adjust iris so that the video signal component of the waveform is 0.4Vp-p.

### 12. Adjusting dynamic focus

RV320, RV321, RV322, RV323: Sync/Deflection PC Board

1. Shoot the white chart as in item 5.
2. Adjust RV322 and RV323 to obtain the waveform to facilitate shading correction.
3. Set the oscilloscope to the V. period.
4. Adjust RV320 and RV321 to obtain the waveform to facilitate shading correction.

Waveforms facilitating shading correction



☒37

Fig. 63

### 13. Setting iris to its click position.

Return the iris to its click position.

### 14. Checking beam voltage

RV302: Sync/Deflection PC Board

1. Obtain the light emitting section (3 ~ 5mm) on the right side of the color viewer with a black plate inserted and shoot it.
2. Set the zoom to max. telephoto.
3. Connect the oscilloscope to TP1 on the Video PC Board.
4. Adjust RV302 so that the waveform level is  $1V \pm 0.05V_{p-p}$ .

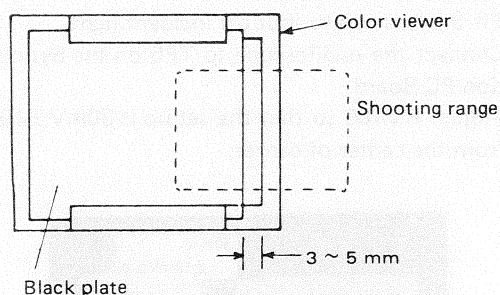


Fig. 64

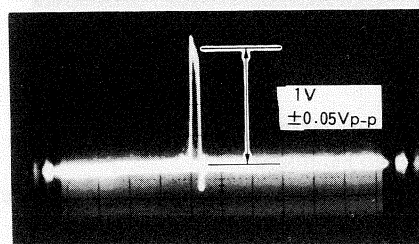


Fig. 65

### 15. Adjusting bias light

RV001: Preamplifier PC Board

1. Fit the lens cap to shut off incident light.
2. Connect the oscilloscope to TP1 on the Video PC Board via resistor.  
\* Connect to TP1 via a resistor ( $5.6k\Omega$ ) when the probe is 1:1, and a resistor ( $12k\Omega$ ) when it is 10:1.
3. Adjust RV001 so that the waveform level is  $10mV_{p-p}$ .

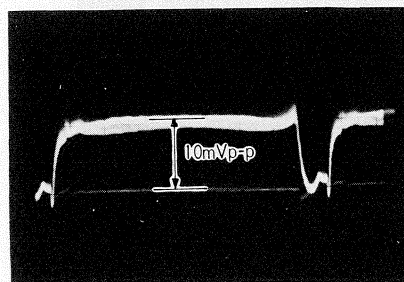


Fig. 66



## 16. Y set-up

RV106: Video PC Board

1. Fit the lens cap to shut off incident light.
2. Connect the oscilloscope to TP5 on the Sync/Deflection PC Board.
3. Adjust RV106 so that the set-up is  $30\text{mV} \pm 10\text{mVp-p}$  from the center of carrier.

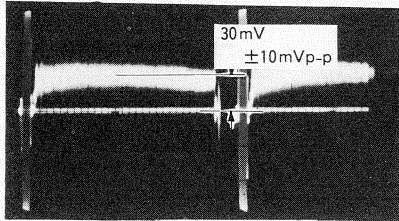


Fig. 67

## 17. Setting level indicator

RV118: Video PC Board

1. Insert a grey scale chart into the color viewer and shoot it.
2. Adjust the zoom so that the grey scale chart fills the TV screen.
3. Connect the oscilloscope to TP5 on the Sync/Deflection PC Board.
4. Adjust RV105 on the Video PC Board so that the video signal component of the waveform is set to  $0.35\text{Vp-p}$ .
5. Adjust RV118 so that the "L" indicator in the viewfinder lights.

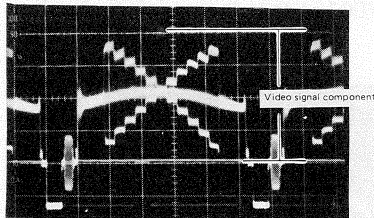


Fig. 68

## 18. Adjusting video level

RV105: Video PC Board

1. Shoot the chart in the same way as in item 17.
2. Adjust RV105 so that the video signal component of the waveform is set to  $0.75\text{V} \pm 0.05\text{Vp-p}$ .

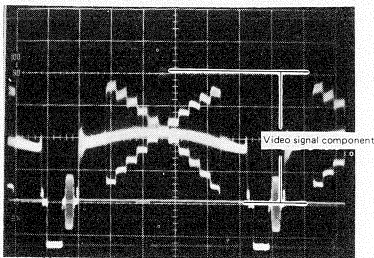


Fig. 69

## 19. Checking field focus

RV301: Sync/Deflection PC Board

1. Shoot the white chart.
2. Set the zoom to max. telephoto.
3. Connect the oscilloscope to TP16 and TP17 on the Video PC Board.
4. Adjust RV301 so that the waveform is max. and flat in the direction of the arrow.

\* The waveform is made flat to facilitate shading correction.

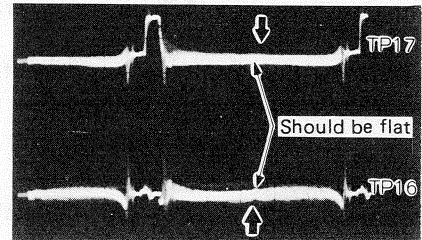


Fig. 70

## 20. Adjusting chroma carrier level

RV102: Video PC Board

1. Insert a grey scale chart into the color viewer and shoot it.
2. Adjust the zoom so that the grey scale chart fills the screen.
3. Connect the oscilloscope to TP3 on the Video PC Board.
4. Adjust RV102 so that the waveform is set to  $50\text{mV} \pm 5\text{mVp-p}$ .

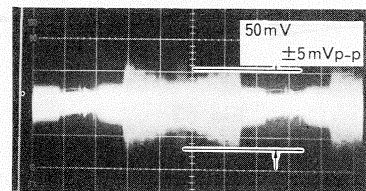


Fig. 71

## 21. Adjusting red phase, balance

RV103, RV111: Video PC Board

1. Insert the color bar chart into the color viewer and bring it into focus.
2. Adjust the zoom so that the color bar chart fills the TV screen.
3. Connect the oscilloscope to TP4 on the Video PC Board.
4. Repeatedly turn RV103 and RV111 alternately to minimize the blue level of the waveform.

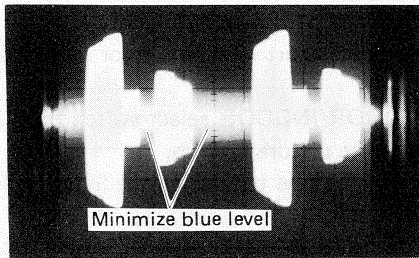


Fig. 72

**22. Adjusting blue phase, balance**

RV104, RV113: Video PC Board

1. Shoot the chart in the same way as in item 8.
2. Connect the oscilloscope to TP5 on the Video PC Board.
3. Repeatedly turn RV104 and RV113 alternately to minimize the red level of the waveform.

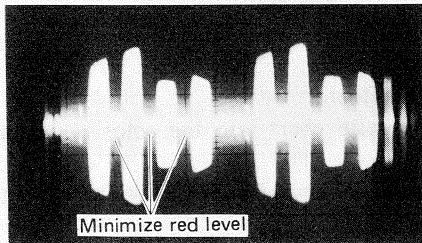


Fig. 73

**23. Adjusting chroma gain**

RV304, RV324: Sync/Deflection PC Board

1. Insert the color bar chart into the color viewer and shoot it.
2. Adjust the zoom so that the color bar chart fills the screen.
3. Connect the oscilloscope to TP5 on the Sync/Deflection PC Board.
4. Adjust RV304 so that the red level of the waveform is set to 0.42Vp-p.
5. Adjust RV324 so that the burst with smaller level signal of the waveform is 0.3V ± 0.01Vp-p.

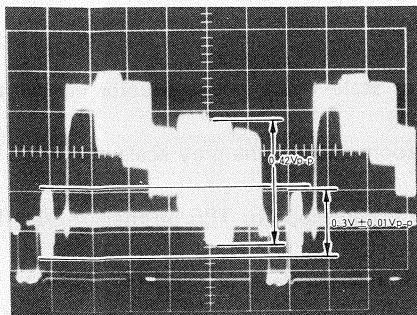


Fig. 74

**24. R set-up**

RV108: Video PC Board

1. Insert the grey scale chart into the color viewer and shoot it.
2. Connect the oscilloscope to TP13 on the Video PC Board.
3. Adjust RV108 so that the set-up level is 120 mV ± 20 mVp-p.

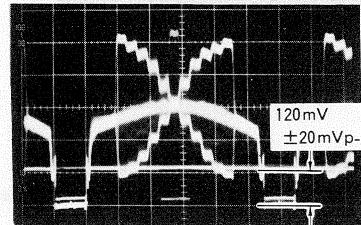


Fig. 75

**25. Adjusting YL gain**

RV115: Video PC Board

1. Insert a grey scale chart into the color viewer and shoot it.
2. Adjust the zoom so that the grey scale fills the screen.
3. Connect the oscilloscope to TP18 on the Video PC Board.
4. Adjust RV115 to minimize the waveform level.

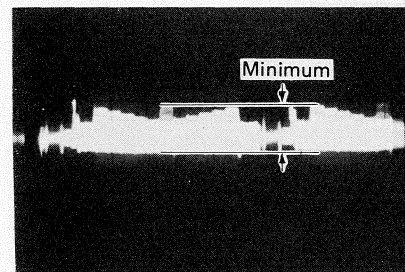


Fig. 76

**26. Adjusting color difference balance**

RV116, RV117: Video PC Board

1. Insert a grey scale chart into the color viewer and shoot it.
2. Adjust the zoom so that the grey scale chart fills the screen.
3. Insert a resistor (3.9kΩ) between TP10 on the video PC Board and GND.
4. Connect the oscilloscope to TP5 on the Sync/Deflection PC Board.
5. Adjust RV116 and RV117 to minimize the carrier at the white clipping of the waveform.

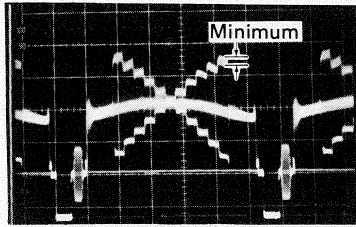


Fig. 77

### 27. Adjusting white balance

RV107, RV109, RV112, RV114: Video PC Board

RV305: Sync/Deflection PC Board

RV951, RV952: RD PC Board

1. Insert a grey scale chart into the color viewer and shoot it.
2. Adjust the zoom so that the grey scale chart fills the screen.
3. Connect the oscilloscope to TP5 on the Sync/Deflection PC Board.
4. Repeatedly turn RV107 and RV109 alternately to minimize the carrier in the 2nd ~ 6th steps from the bottom of the waveform (Refer to Fig. 79).
5. Set R951 to its mechanical center.
6. Turn RV305 fully counterclockwise.
7. Adjust RV952 to minimize the sub-carrier in the 8th step of the waveform.

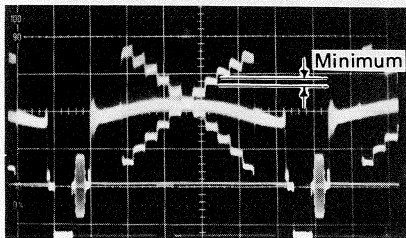


Fig. 78

8. Repeatedly turn RV112 and RV114 alternately to minimize the carrier in the 6 ~ 9 steps from the bottom of the waveform.
9. Repeatedly adjust RV107, RV109 and RV112, RV114.

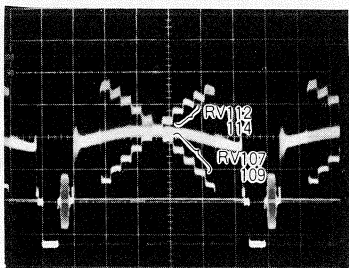


Fig. 79

### 28. Adjusting chroma killer level

RV305: Sync/Deflection PC Board

1. Insert a grey scale chart into the color viewer and shoot it.
2. Set the OUTDOOR/INDOOR select switch to OUTDOOR to make the picture reddish.
3. Connect the oscilloscope to TP5 on the Sync/Deflection PC Board.
4. Adjust RV305 so that the sub-carrier at the white peak section of the waveform is  $100\text{mV} \pm 10\text{mVp-p}$ .

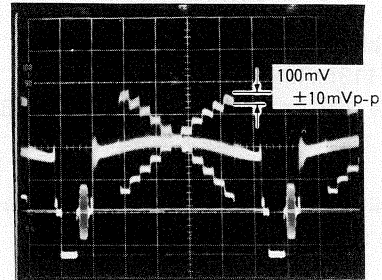


Fig. 80

### 29. Adjusting black balance

RV110: Video PC Board

1. Insert a grey scale chart into the color viewer and shoot it.
2. Adjust the zoom so that the grey scale chart fills the screen.
3. Connect the oscilloscope to TP5 on the Sync/Deflection PC Board.
4. Adjust RV110 to minimize the carrier in the lowest step of the waveform.

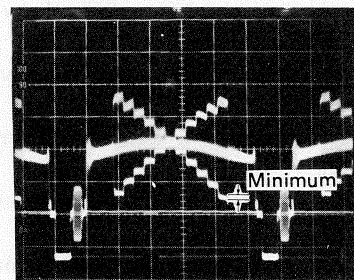


Fig. 81

### 30. Adjusting auto white

RV119, RV120: Video PC Board

1. Insert a grey scale chart into the color viewer and shoot it.
2. Adjust the zoom so that the grey scale chart fills the screen.
3. Connect the oscilloscope to TP5 on the Sync/Deflection PC Board.
4. Connect TP6 on the Video PC Board to GND.
5. Repeatedly turn RV107 and RV109 alternately to minimize the carrier in the 2nd ~ 6th steps from the bottom of the waveform.

6. Repeatedly turn RV112 and RV114 alternately to minimize the carrier in the 6th ~ 9th steps from the bottom of the waveform.
7. Repeatedly adjust RV107, RV109 and RV112, RV114.
8. Repeatedly turn RV119 and RV120 to minimize the sub-carrier at the center of the waveform.

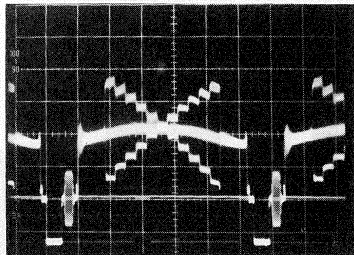


Fig. 82

### 31. Adjusting smear

CV001: Pre-amplifier PC Board

Perform this adjustment only when the color smear occurs. Re-adjust white balance and black balance after adjusting smear.

1. Insert a grey scale chart into the color viewer and shoot it.
2. Adjust the zoom that the grey scale chart fills the screen.
3. Adjust CV001 so that color smears do not occur at the right side of the white section of the grey scale.

### 32. Re-adjusting white balance, chroma killer level and black balance

- Adjusting white balance

RV107, RV109, RV112, RV114: Video PC Board

1. Insert a grey scale chart into the color viewer to shoot it.
2. Adjust the zoom so that the grey scale chart fills screen.
3. Connect the oscilloscope to TP5 on the Sync/Deflection PC Board.
4. Repeatedly turn RV107 and RV109 alternately to minimize the carrier in the 2nd ~ 6th steps from the bottom of the waveform (Refer to Fig. 84)
5. Set RV951 to its mechanical center.
6. Turn RV305 fully counterclockwise.
7. Adjust RV952 to minimize the sub-carrier in the 8th step of the waveform.

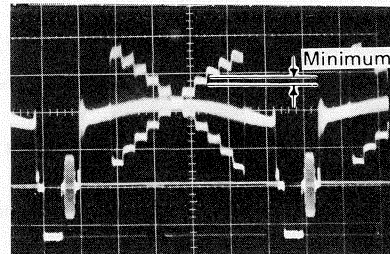


Fig. 83

8. Repeatedly turn RV112 and RV114 alternately to minimize the carrier in the 6th ~ 9th steps from the bottom of the waveform.
9. Repeatedly adjust RV107, RV109 and RV112, RV114.

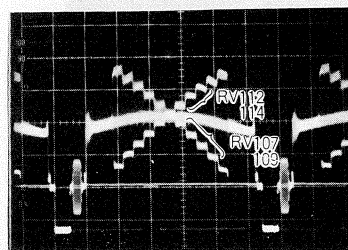


Fig. 84

- Adjusting chroma killer level

RV305: Sync/Deflection PC Board

1. Insert a grey scale chart into the color viewer and shoot it.
2. Set the OUTDOOR/INDOOR select switch to OUTDOOR to make the picture reddish.
3. Connect the oscilloscope to TP5 on the Sync/Deflection PC Board.
4. Adjust RV305 so that the sub-carrier at the white peak of the waveform is  $100\text{mV} \pm 10\text{mV}_{\text{p-p}}$ .

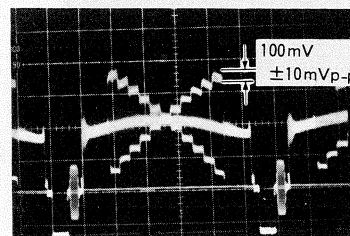


Fig. 85

• Adjusting black balance

RV110: Video PC Board

1. Insert a grey scale chart into the color viewer and shoot it.
2. Adjust the zoom so that the grey scale chart fills the screen.
3. Connect the oscilloscope to TP5 on the Sync/Deflection PC Board.
4. Adjust RV110 to minimize the carrier at the lowest step of the waveform.

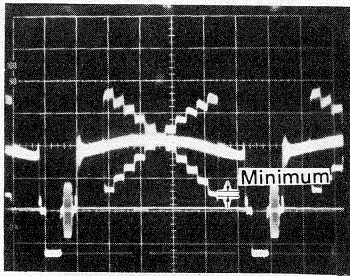


Fig. 86

34. Setting iris position

1. Shoot the white chart.
2. Set the zoom to max. telephoto.
3. Connect the oscilloscope to TP5 on the Sync/Deflection PC Board.
4. Adjust the iris so that the video signal component of the waveform is 0.4Vp-p.

35. Adjusting red/modulation shading

RV316, RV317, RV318, RV319: Sync/Deflection PC Board

1. Shoot the white chart.
2. Set the zoom to max. telephoto.
3. Connect the oscilloscope to TP16 on the Video PC Board.
4. Set the oscilloscope to the V. period.
5. Adjust RV316 and RV317 so that the waveform is flat and the level minimized.

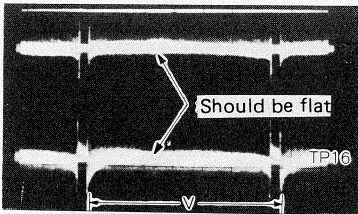


Fig. 87

6. Set the oscilloscope to the H. period.
7. Adjust RV318 and RV319 so that the waveform is flat and the level minimized.

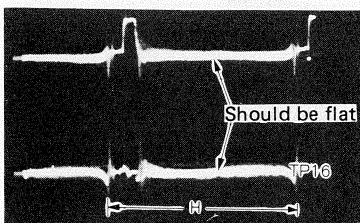


Fig. 88

36. Adjusting blue/modulation shading

RV312, RV313, RV314, RV315: Sync/Deflection PC Board

1. Shoot the white chart.
2. Connect the oscilloscope to TP17 on the Video PC Board.
3. Set the oscilloscope to the V. period.
4. Adjust RV312 and RV313 so that the waveform is flat and the level minimized.

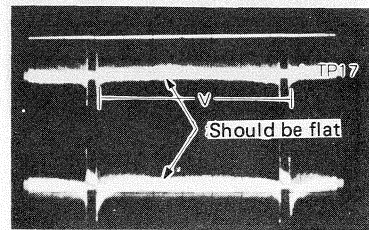


Fig. 89

5. Set the oscilloscope to the H. period.
6. Adjust RV314 and RV315 so that the waveform is flat and the level minimized.

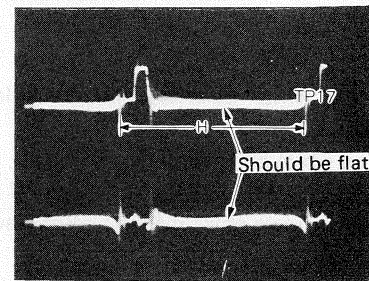


Fig. 90

37. Setting iris to its click position

Return the iris to its click position.

38. Re-adjusting white balance

RV107, RV109, RV112, RV114: Video PC Board

1. Insert a grey scale chart into the color viewer and shoot it.
2. Adjust the zoom so that the grey scale chart fills the screen.
3. Connect the oscilloscope to TP5 on the Sync/Deflection PC Board.
4. Repeatedly turn RV107 and RV109 alternately to minimize the carrier in the 2nd ~ 6th steps from the bottom of the waveform (Refer to Fig. 92).
5. Set RV951 to its mechanical center.

6. Turn RV305 fully counterclockwise.
7. Adjust RV952 to minimize the sub-carrier in the 8th step of the waveform.

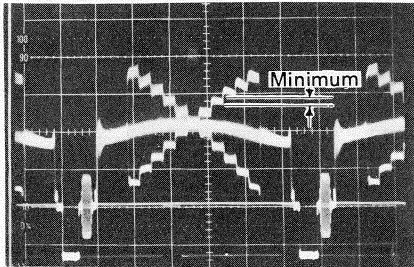


Fig. 91

8. Repeatedly turn RV112 and RV114 alternately to minimize the carrier in the 6th ~ 9th steps from the bottom of the waveform.
9. Repeatedly adjust RV107, RV109 and RV112, RV114.

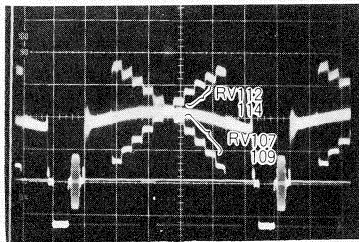


Fig. 92

### 39. Adjusting chroma killer level

RV305: Sync/Deflection PC Board

1. Insert a grey scale chart into the color viewer and shoot it.
2. Set the OUTDOOR/INDOOR select switch to OUTDOOR to make the picture reddish.
3. Connect the oscilloscope to TP5 on the Sync/Deflection PC Board.
4. Adjust RV305 so that the sub-carrier at the peak section of the waveform is  $100\text{mV} \pm 10\text{mVp-p}$ .

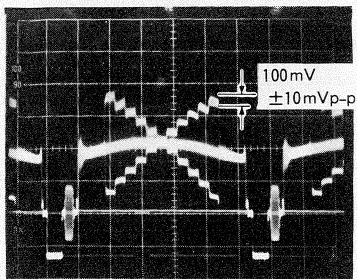
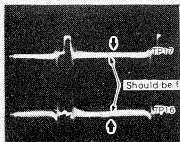
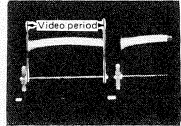
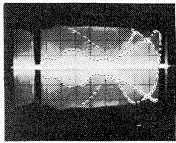


Fig. 93

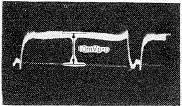
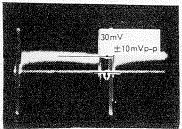
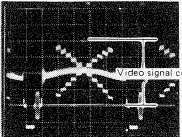
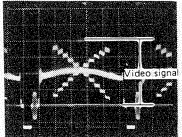
## Circuit adjustment list

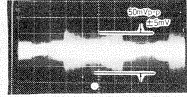
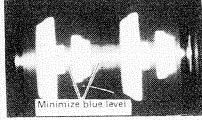
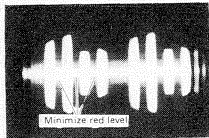
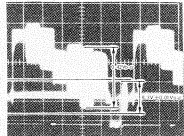
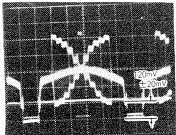
Note: Items concerning the purpose of adjustment and phenomenon of picture in the table are shown in the order:  
Circuit No., Purpose of adjustment & phenomenon of picture.


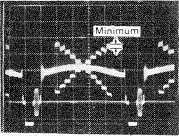
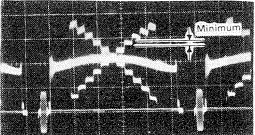
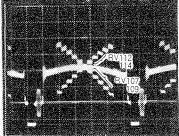
Item No.	Name of adjustment	Purpose of adjustment & phenomenon of picture	Test point	Adjusted part	Adjustment
1	Power voltage adjustment	RV303 Setting camera circuit power voltage	Sync/Def. PC Board TP2	RV303	Reading of voltmeter: 9V
2	Sub-carrier frequency adjustment	CV301 Adjusts oscillation frequency of the sync signal generator. • Color flickers, no color or color is incorrect.	Sync/Def. PC Board TP6	CV301	Reading of counter: 4.4336189 MHz $\pm$ 50 Hz
3	PLL adjustment Adjust when IC305, X301, C326, C325, L302 are replaced.	L302 Adjusts to provide inter-leaving of the horizontal sync signal and the sub-carrier frequency. • Picture unstable, sync incorrect or no color.	Sync/Def. PC Board TP3	L302	Reading of voltmeter: 3V
4	Beam voltage adjustment	FV302 Adjusts the electron beam of SATICON while varying the G1 voltage. • When voltage is low, steps in the high luminance section (white) of the grey scale cannot be distinguished. • When voltage is high, magenta ghost appears to the right of the high luminance section of the grey scale. Or, the section becomes green (horizontally). Shading increases.	Video PC Board TP1	RV302	Obtain the light emitting section (3 ~ 5 mm) on the right side of the color viewer with a black plate inserted and shoot it.  Set the waveform to $1V \pm 0.05V_{p-p}$ .
5	Field focus adjustment	RV301 Sets the focus electrode voltage of SATICON and adjusts so that the electron beam from the cathode focuses on the photo-conductive film. • It is badly focused when the focus ring is turned or the backfocus is adjusted using the coil ass'y.	Video PC Board TP16 TP17	RV312 ~ RV323: Mechanical centers. RV301	Shoot the white chart. Set the zoom to max. telephoto. Set the waveform max. and flat.  
6	Back-focus, horizontal adjustment • Back-focus		TV picture	Deflection coil	Shoot test chart A.  1. Set the viewer power supply to ON. Set zoom to max. telephoto and adjust the focus ring.  Loosen the deflection coil fixing screw.  2. Set the viewer power supply to OFF. Adjust zoom to max. wide and move deflection coil back and forth to adjust.  Adjust so that the chart is focused with both max. telephoto and max. wide.

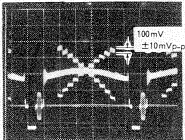
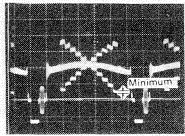
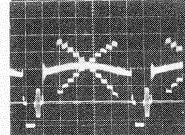
Item No.	Name of adjustment	Purpose of adjustment & phenomenon of picture	Test point	Adjusted part	Adjustment
	• Horizontal		TV picture	Deflection coil	Let the vertical blanking period of the TV appear on the screen. Turn the deflection coil so that the chart edge and the blanking are parallel. Check the back-focus after adjustment.
7	Vertical position adjustment	RV308 Vertical deflection position adjustment • Black mask appears at the top of the picture or, the transparent mask appears at the bottom of the picture.	TV picture	RV310 (RV309) RV308	Adjust RV310 to narrow the picture and let the center mark appear on the black mask. * Adjust RV310 when the center mark does not appear with RV310 fully turned. Adjust RV308 to set the center mark to the center of the screen.
8	Horizontal size adjustment	RV310 Horizontal deflection size adjustment • The circle chart looks crushed. Color balance is not correct and becomes green. RV309 Horizontal deflection position adjustment • Black mask appears to the left or right of the picture.	TV picture Sync/Def. PC Board TP5	RV310  RV309	Shoot the white chart to fill the screen. Turn RV310 counterclockwise to shorten the waveform width. Turn RV309 and RV310 to set black mask to approx. 1μsec on both left/right sides. 
9	Vertical size adjustment	RV306 Adjusts vertical deflection linearity • Circular chart is distorted. RV307 Adjusts vertical deflection size • Circular chart is distorted.	Video PC Board TP2	V period: RV306 RV307	Shoot the white chart to fill the screen. Adjust RV307 to cancel the crests of beats. Adjust RV306 to make the beats flat. 
10	Horizontal linearity adjustment	RV311 Adjusts horizontal deflection linearity • Circular chart is distorted. Color unevenness appears on the left and right.	TV picture	RV311	Shoot test chart A to fill the screen. Turn RV311 to make the circle in the chart round.
11	Setting iris position		Sync/Def. PC Board TP5	Iris adjustment	Shoot the white chart. Set the zoom to max. telephoto. Set the video signal component of the waveform to 0.4Vp-p.
12	Dynamic focus adjustment	RV320, RV321, RV322, RV323 Correct peripheral beam focusing	Video PC Board	V period: RV320, RV321 H period: RV322, RV323	Shoot the white chart. Set the zoom to max. telephoto. Set the oscilloscope to the DUAL mode. Turn RV320 ~ RV323 to obtain a waveform to facilitate shading correction.

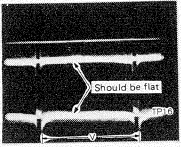
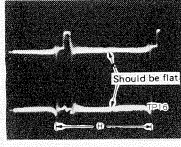
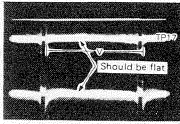
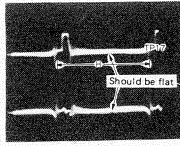
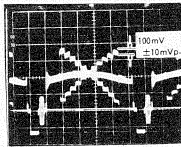


Item No.	Name of adjustment	Purpose of adjustment & phenomenon of picture	Test point	Adjusted part	Adjustment
13	Set the iris to its click position.				
14	Beam voltage check				
15	Bias light adjustment	RV001 Adjusts potential of bias light. When potential is too low: • Picture becomes greenish.	Video PC Board TP1	RV001	Shut off incident light. Connect the probe to TP1 via a resistor. Set the waveform to 10mVp-p. 
16	Y set-up	RV106 Adjusts set-up of luminance signal.	Sync/Def. PC Board TP5	RV106	Shut off incident light. Set the waveform to 30mV ±10mVp-p. 
17	Level indicator set	RV118 Adjusts the point where the "L" indicator which shows the under-exposure lights. • "L" indicator does not light or always keeps lit when the picture level lowered.	Sync/Def. PC Board TP5	RV105  RV118	Shoot the grey scale chart to fill the screen. Set the video signal component of the waveform to 0.35Vp-p. 
18	Video level adjustment	RV105 Sets the balance of the auto iris mechanism to keep the video output level constant. • Picture is dark when illumination is sufficient. Picture is too bright and bright sections are saturated.	Sync/Def. PC Board TP5	RV105	Shoot the grey scale chart to fill the screen. Adjust RV105 and set the video signal component level to 0.75V ±0.05Vp-p. 
19	Field focus check				

Item No.	Name of adjustment	Purpose of adjustment & phenomenon of picture	Test point	Adjusted part	Adjustment
20	Chroma carrier level adjustment	RV102 Adjusts chroma signal carrier level. • No color, tint abnormal	Video PC Board TP3	RV102	Shoot the grey scale chart to fill the screen. Adjust the waveform level and set it to $50\text{mV} \pm 5\text{mVp-p}$ . 
21	Red phase/balance adjustment	RV103 Adjusts the carrier phase shift angle for separating R in the R/B chroma separation circuit. • Color reproduction is not satisfactory and mixed color is seen. RV111 Adjusts the 1H delayed chroma signal carrier level to match it to the chroma signal carrier level of the phase shifter output. • Color saturation and purity are deteriorated and mixed color occurs.	Video PC Board TP4	RV103 RV111	Shoot the color bar chart to fill the screen. Alternately turn RV103 and RV111 to minimize blue level. 
22	Blue phase/balance adjustment	RV104 Adjusts the carrier phase shift angle for separating B in the R/B color separation circuit. • Color reproduction is not satisfactory and mixed color is seen. RV113 Adjusts the 1H delayed chroma signal carrier level to match it to the signal carrier level of the phase shifter output. • Color saturation and purity are deteriorated and mixed color occurs.	Video PC Board TP5	RV104 RV113	Shoot the color bar chart to fill the screen. Alternately turn RV104 and RV113 to minimize the red level. 
23	Chroma gain adjustment	RV304 Controls the chroma signal gain. • Color beats and unevenness become conspicuous when color is too dense.	Sync/Def. PC Board TP5	RV304 RV324	Shoot the color bar chart to fill the screen. Set the red level of the waveform to $0.42\text{Vp-p}$ . Set the burst signal with smaller level of the waveform to $0.3\text{V} \pm 0.01\text{Vp-p}$ . 
24	R set-up	RV108 Adjusts the set-up of the R signal. • Picture becomes reddish or cyan.	Video PC Board TP13	RV108	Shoot the grey scale chart. Set the waveform to $120\text{mV} \pm 20\text{mVp-p}$ . 

Item No.	Name of adjustment	Purpose of adjustment & phenomenon of picture	Test point	Adjusted part	Adjustment
25	Y <sub>L</sub> gain adjustment	RV115 Y <sub>L</sub> signal (green) gain adjustment. Changes the level of the 1H delayed Y <sub>L</sub> signal to watch it with the level of the non-delayed Y <sub>L</sub> signal. • White balance is not obtained. Step becomes unnatural.	Video PC Board TP18	RV115	Shoot the grey scale chart to fill the screen. Adjust RV115 to minimize the waveform level. 
26	Color difference balance adjustment	RV116 Adjusts balance of color difference signal R - Y. • Color reproduction poor. RV117 Adjusts balance of color difference signal B - Y. • Color reproduction poor.	Sync/Def. PC Board TP5	RV116  RV117	Shoot the grey scale chart to fill the screen. Insert the resistor (3.9kΩ) between TP10 on the Video PC Board and GND. Turn RV116 and RV117 to adjust the carrier at clipped section of the waveform. Set it to minimum. 
27	White balance adjustment	RV109 Adjusts the set-up of B signal. • Picture becomes blue or yellow. RV112 Adjusts R signal gain. Match levels with Y <sub>L</sub> and B signals and adjust so that the white balance is obtained. • White balance cannot be obtained. RV114 Adjusts B signal gain. Match levels with Y <sub>L</sub> and R signals and adjust so that the white balance is obtained. • White balance cannot be obtained. RV107 Adjusts set-up of Y <sub>L</sub> (green) signal. • Picture becomes green or magenta.	Sync/Def. PC Board TP5	RV107 RV109  RV951 RV305 RV952  RV112 RV114	Shoot the grey scale chart to fill the screen. Alternately turn RV107 and RV109 to minimize the carrier in the 2nd ~ 6th steps of the waveform. Set RV951 to its mechanical center. Turn RV305 fully counterclockwise. Turn RV952 to minimize the sub-carrier in the 8th step of the waveform.  Alternately turn RV112 and RV114 to minimize the carrier in the 6th ~ 9th steps of the waveform. 

Item No.	Name of adjustment	Purpose of adjustment & phenomenon of picture	Test point	Adjusted part	Adjustment
28	Chroma killer level adjustment	RV305 Changes the control voltage so that no color appears in the high luminance section, and sets it so that no chroma signal appears in sections with a higher level than that. • When it is too high, green color is mixed in white sections. • When it is too low, yellow color does not appear when the color bar is shot. Or color in comparatively bright sections does not appear.	Sync/Def. PC Board TP5	RV305	Shoot the grey scale chart to fill the screen. Set the OUTDOOR/INDOOR select switch to OUTDOOR. Set the carrier at the white peak section of the waveform to $100\text{mV} \pm 10\text{mVp-p}$ . 
29	Black balance adjustment	RV110 Matches the level of the dark section of YL (green) signal to R and B signals. • Picture becomes green or magenta.	Sync/Def. PC Board TP5	RV110	Shoot the grey scale chart to fill the screen. Adjust RV110 to minimize the carrier in the lowest step of the waveform. 
30	Auto white adjustment	RV119, RV120 Sets auto white operation level. • Auto white is not obtained.	Sync/Def. PC Board TP5	RV119 RV120	Shoot the grey scale chart to fill the screen. Connect TP6 on the Video PC Board and GND. Adjust white balance. Alternately turn RV119 and RV120 to minimize the carrier at the center of the waveform. 
31	Smear adjustment	CV001 Corrects frequency response of the preamplifier. • Smears occur to the outline of the picture causing oscillations.	TV picture	CV001	Shoot the grey scale chart to fill the screen. Adjust smear on the right of the white section of the grey scale chart to remove it.
32	Re-adjusting white balance, chroma killer level, black balance				
34	Setting iris position		Sync/Def. PC Board TP5	Iris adjustment	Shoot the white chart. Set the zoom to max. telephoto. Set the video signal component of the waveform to $0.4\text{Vp-p}$ .

Item No.	Name of adjustment	Purpose of adjustment & phenomenon of picture	Test point	Adjusted part	Adjustment
35	Red/modulation shading adjustment	RV316, RV317, RV318, RV319 Correct color unevenness of R signal • Color unevenness conspicuous.	Video PC Board TP16	V period: RV316, RV317	Shoot the color viewer to fill the screen. Turn RV313 and RV317 alternately so that the waveform is flat and the level minimized. 
				H period: RV318, RV319	Turn RV318 and RV319 alternately so that the waveform is flat and the level minimized. 
36	Blue/modulation shading adjustment	RV312, RV313, RV314, RV315 Correct color unevenness of B signal. • Color unevenness conspicuous.	Video PC Board TP17	V period: RV312, RV313	Shoot the white chart. Turn RV312 and RV313 alternately so that the waveform is flat and the level minimized. 
				H period: RV314, RV315	Turn RV314 and RV315 alternately so that the waveform is flat and the level minimized. 
37	Setting iris control to its click position.				
38	Re-adjusting white balance				
39	Chroma killer level adjustment	RV305 Changes the control voltage so that no color appears in the high luminance section, and sets it so that no chroma signal appears in sections with a higher level than that. • When it is too high, green color is mixed in white sections. • When it is too low, yellow color does not appear when the color bar is shot. Or color in comparatively bright sections does not appear.	Sync/Def. PC Board TP5	RV305	Shoot the grey scale chart to fill the screen. Set the OUTDOOR/INDOOR select switch to OUTDOOR. Set the carrier at the white peak section of the waveform to $100\text{mV} \pm 10\text{mVp-p}$ . 

## Viewfinder adjustment

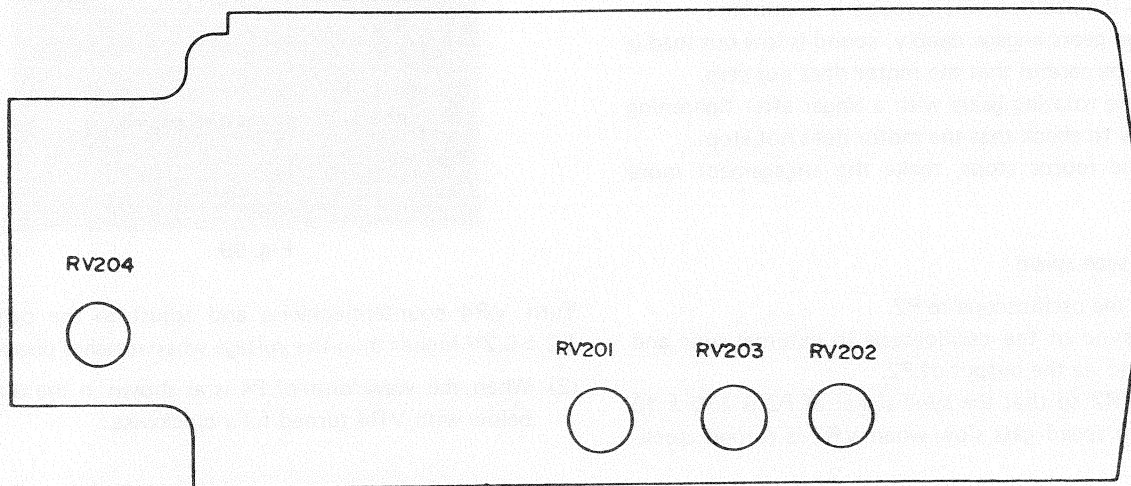


Fig. 94 Viewfinder PC Board (Parts side)

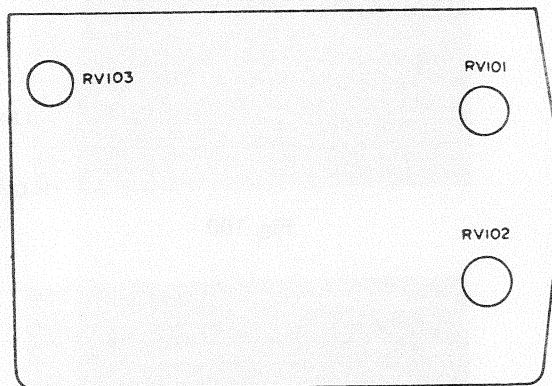


Fig. 95 Viewfinder PC Board (Pattern side)

Perform adjustment while looking through the viewfinder.

1. Adjusting contrast

RV101: Adjust the contrast of picture so that the picture is easy to see.

2. Adjusting brightness

RV102: Adjusts brightness of the picture so that the picture is easy to see.

3. Adjusting vertical hold

RV201: Adjusts vertical hold.

4. Adjusting vertical height

RV202: Adjusts vertical height

5. Adjusting vertical linearity

RV203: Adjusts vertical linearity.

6. Adjusting horizontal hold

RV103: Adjusts horizontal hold

7. Adjusting focus

RV204: Adjusts so that focus of the picture is best.

8. Adjusting centering

Matches the raster position using the centering magnets attached to the deflection yoke.

## Auto focus adjustment

### 1. Scan motor installation position adjustment

- (1) Adjust the ratio (whether or not engagement is deep or shallow) of the length of action of gears which are installed with the motor shaft and tighten the fixing screw to the position where sound is minimum.  
When the gears engage deeply, sound is low but load is large, so be careful that the motor does not step.
- (2) Touch the rotating gears with a finger after tightening the screw to check that the motor does not stop.  
When the motor stops, make the engagement more shallow.

### 2. Adjusting scan speed

- (1) Connect the oscilloscope to P2.
- (2) Set the sync of the oscilloscope to external sync and apply sync via the output of P2.
- (3) Adjust VR2 so that the sync signal of P2 is  $170 \pm 10$  ms. (Scan speed gets slow when VR2 is turned clockwise.)

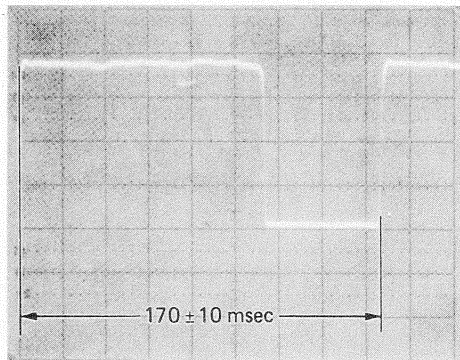


Fig. 96

### 3. Adjusting margin of sync signal

Adjust VR4 after adjusting the scan speed so that the P4 output is as shown in the diagram below.

- (1) When the waveform of P4 is as shown in the diagram below with VR4 turned fully clockwise.

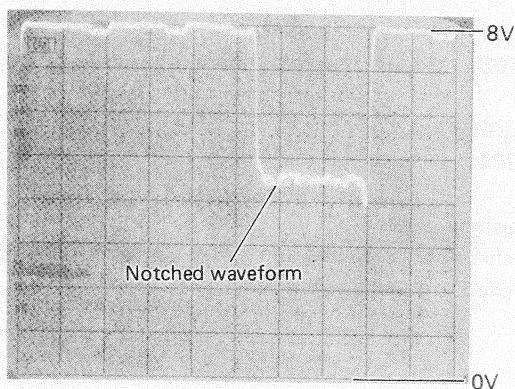


Fig. 97

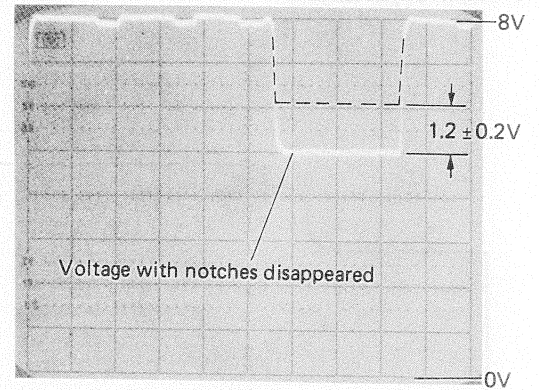


Fig. 99

Turn VR4 counterclockwise and adjust to the position  $1.2 \pm 0.2V$  higher than the voltage when notches disappear.

- (2) When the waveform of P4 is as shown in the diagram below with VR4 turned fully clockwise.

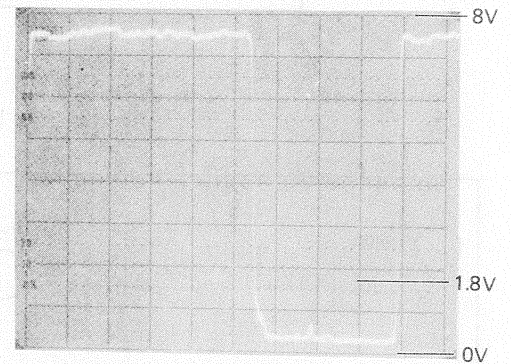


Fig. 100

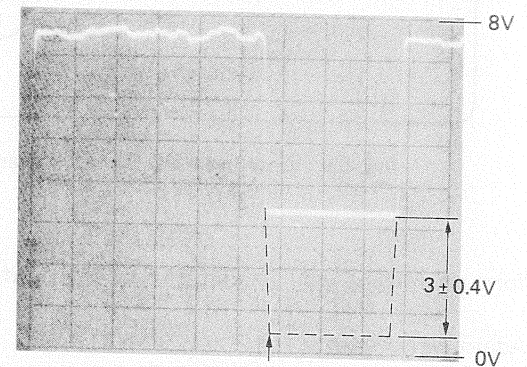


Fig. 101

Turn VR4 counterclockwise to adjust to the position  $3 \pm 0.4V$  higher than the voltage when VR4 is turned fully clockwise.

Note 1. The reflection plate is assumed to be abnormal when the waveforms shown on the left occur.



Fig. 102

#### 4. Adjusting window signal

\*Perform this adjustment after the adjustment of the scan speed and the sync signal margin are complete.

- (1) Remove the lens hood.
- (2) Shoot the auto-focus check chart (around black circle). Set luminance of the chart to approx. 300 Lux at that time.
- (3) Connect P2 and P1 to CH1 and CH2 of the oscilloscope. Apply sync to the external trigger via the output of P2.
- (4) Adjust the window signal (P1) as shown in the diagram below using the window signal adjusting screw.

A. When the focus ring is set to the macro end.

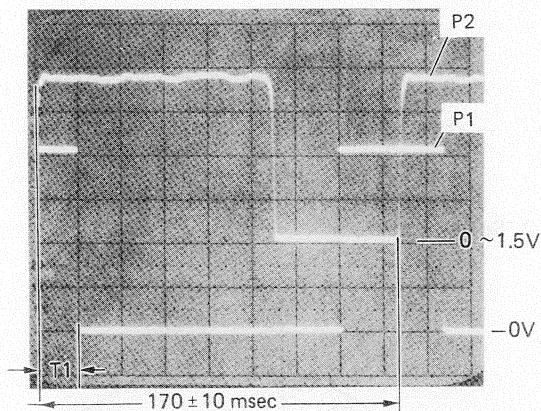


Fig. 103

B. When the focus ring is set to the  $\infty$  end.

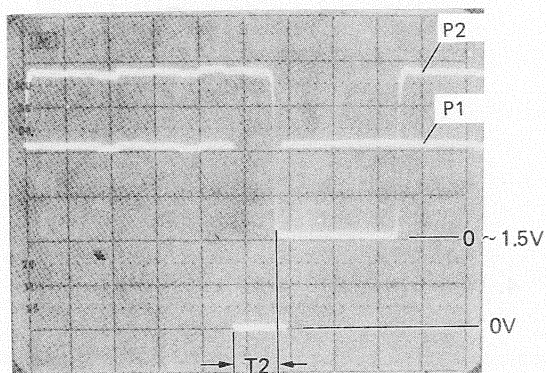


Fig. 104

Adjust so that  $T1 \pm 4\text{msec} = T2$

Note: Observe the waveforms at P1 and P2 using the 2-picture oscilloscope. It is easy to see when synchronizing by P2.

#### 5. Adjusting limit switches (Use a digital voltmeter or oscilloscope, not a tester.)

##### Macro side limit switch

- 1) Adjust VR5 so that the voltage of P5 is  $1.7 \pm 0.2\text{V}$  when the lens is moved to the macro end.
- 2) Check that P5 is 5V or more when the lens is positioned at other positions than the macro end.
- 3) When P5 is 5V or less, adjust the distance between the photo-reflector on the macro side and the reflection surface of the reflection pin to 0.5 ~ 1.5 mm, and re-adjust VR5.

##### $\infty$ (infinity) side limit switch

- 1) Adjust VR6 so that the voltage of P6 is  $1.7 \pm 0.2\text{V}$  when the lens is brought to the  $\infty$  end.
- 2) Check that the voltage of P6 is 5V or more at the other position than the  $\infty$  end.
- 3) When P6 is 5V or less, adjust the distance between the photo-reflector on the  $\infty$  side and the reflection surface of the reflection pin to 0.5 ~ 1.5 mm, and then re-adjust VR6.

#### 6. Adjusting focus drive

Adjust focus drive in the procedure shown below using VR1 (focus speed control VR) and VR3 (sensitivity control VR).

Note: Set VR1 and VR3 to the positions shown below before adjustment.

VR1 ..... Clockwise end  
VR3 ..... Clockwise end

- (1) Set the distance to the object to 1.5 m and adjust the focus adjusting screw so that the focus scale indicates approx. 1.5m. (When the focus is greatly out of focus.) Note: Use an object with clear contrast such as a auto-focus check chart, etc.
- (2) Hunting occurs in this condition, so turn VR3 counterclockwise to adjust to the position where no hunting occurs. (The position where the focus gear stops.)
- (3) Gradually turn VR1 to adjust to the limit position where no over-shooting occurs when the lens is operated from the macro side and  $\infty$  side.

#### 7. Adjusting focus

- (1) Apply the cover to the lens and remove the rubber cap on the side of the cover.
- (2) Shoot the auto-focus check chart from 2 m.
- (3) Focus distance of zoom: 75mm.
- (4) Adjust to the best focus using the focus adjusting screw while watching the monitor. (When the focus adjusting screw is turned clockwise, focus moves toward the  $\infty$  side.)



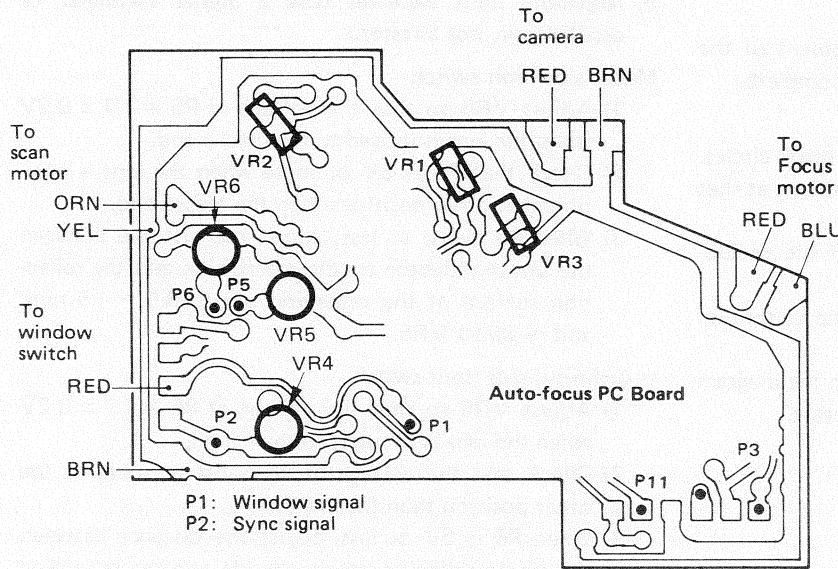


Fig. 105

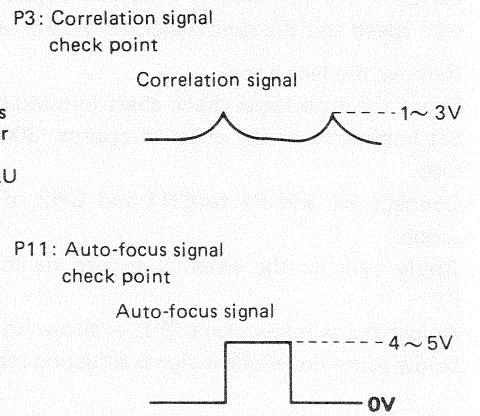


Fig. 106

• How to check the Auto-focus signal

Shoot the corner of the auto-focus chart to check.

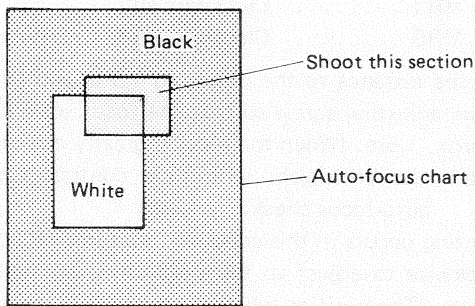


Fig. 107

2. Scan motor

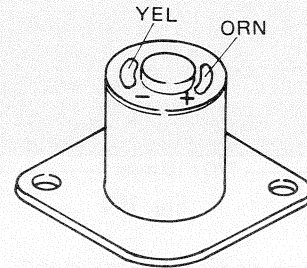


Fig. 109

3. Focus motor

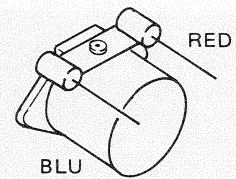


Fig. 110

• Wiring

1. Zoom motor

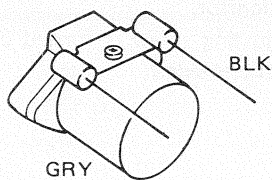


Fig. 108

4. Window switch

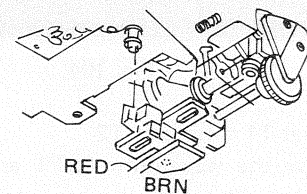


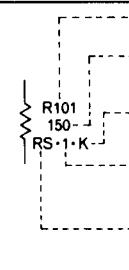
Fig. 111






# SCHEMATIC DIAGRAMS & CIRCUIT BOARD DIAGRAMS

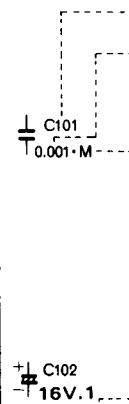
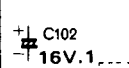
## Note

1. Voltage measured at base of chassis with minimum volume control and no signal.
2. Nomenclature of Resistors and Capacitors.

Circuit No.	
Value	No indicated $\Omega$ (Ohm) M : 1000 K $\Omega$
Tolerance	No indicated $\pm 5\%$ K : $\pm 10\%$ M : $\pm 20\%$
Wattage	No indicated $\frac{1}{4}W$
Sort	No indicated Carbon film RC : Composition RW : Wire wound RS : Oxide metal film RN : Fixed metal film



Circuit No.	
Value	No indicated $\mu F$ P : PF
Tolerance	No indicated $\pm 10\%$ J : $\pm 5\%$ M : $\pm 20\%$ Z : $+80\%$ , $-20\%$ D : $\pm 0.5pF$ C : $\pm 0.25pF$
Sort	 Ceramic
	 Electrolytic
	 Mylar
	 Polyester
	 Styrol
Voltage	No indicated 50WV

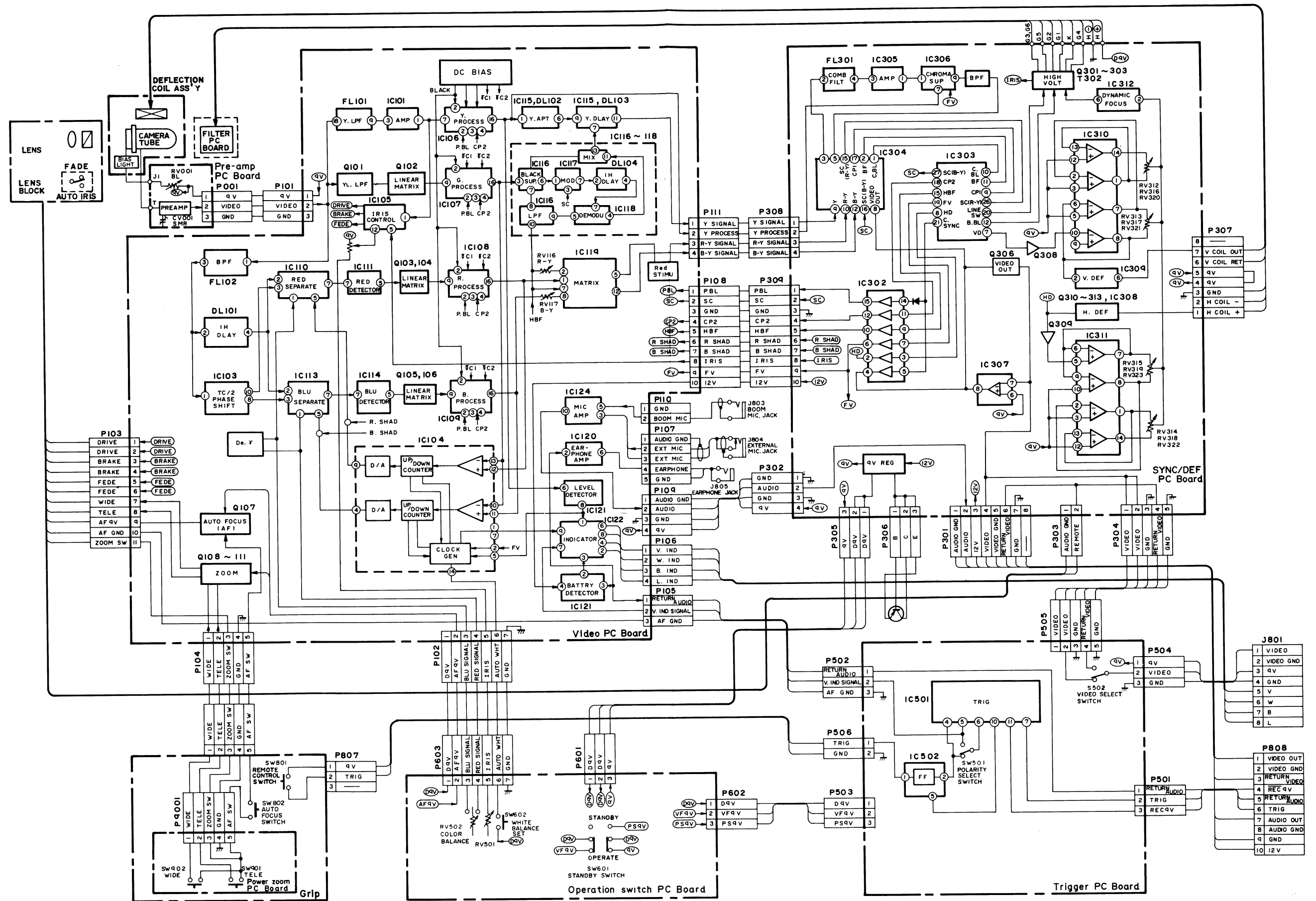



3. Be sure to make your orders of resistors and capacitors with value, voltage, tolerance and sort.

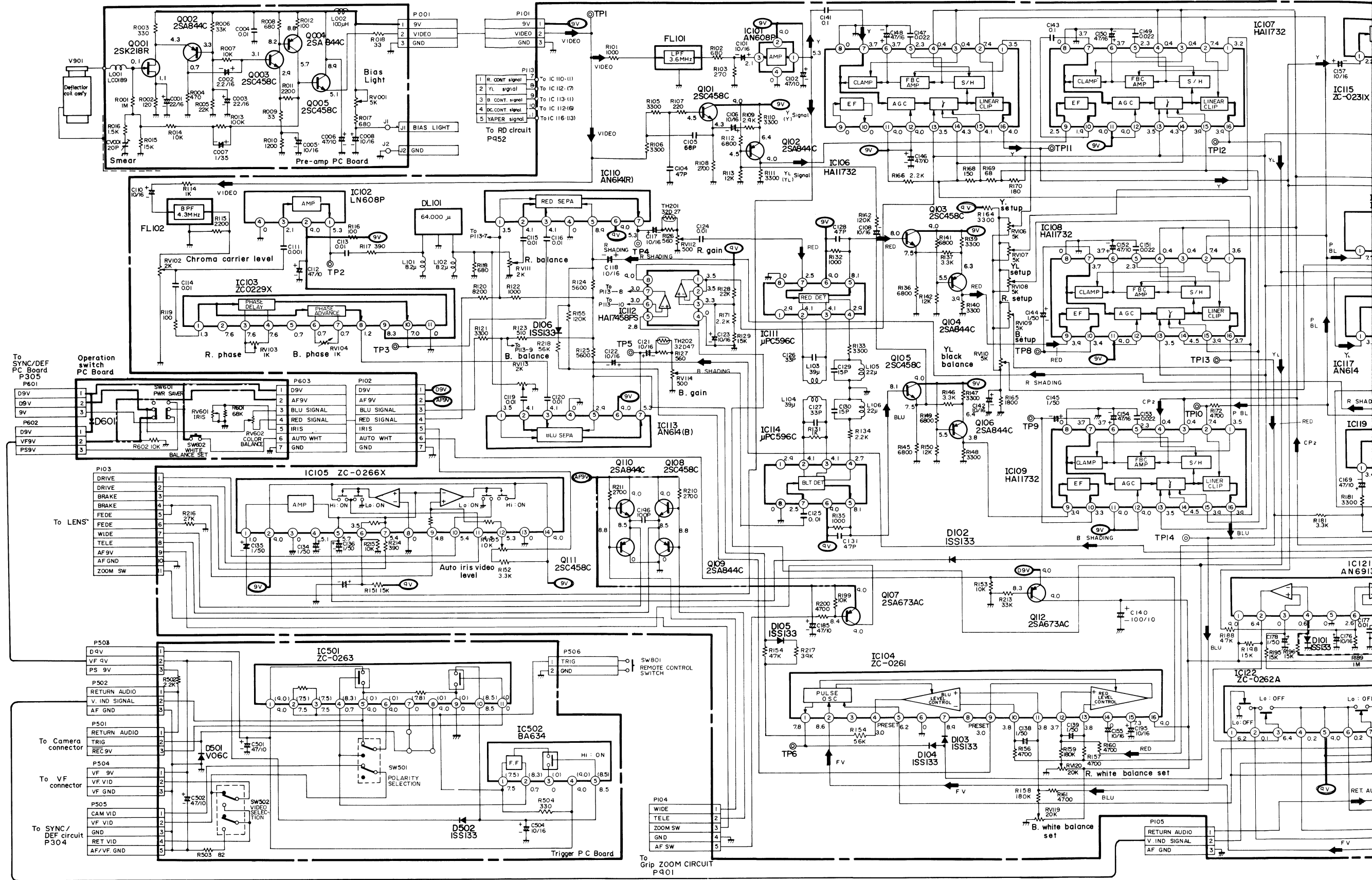
## Cautions on use of MOS IC

1. The MOS IC is inserted in black foam for shipment. This foam is a conductor which short-circuits between the leads to prevent damage. Do not remove ICs from this foam during their storage. Avoid removing ICs from this foam, placing them on plastic which is likely to be charged with static electricity or inserting them into styrol foam.
2. High voltages may be applied during soldering caused by leakages from the soldering iron, so be sure to ground the tip of the soldering iron or use a low voltage soldering iron.
3. The human body, clothes made of synthetic fibres or nylon gloves may be charged with several thousands volts of static electricity because of friction, so a workers should be grounded.
4. Be sure to ground measuring instruments such as oscilloscopes, VTVMs, etc. used for repairs.

# CAMERA BLOCK DIAGRAM



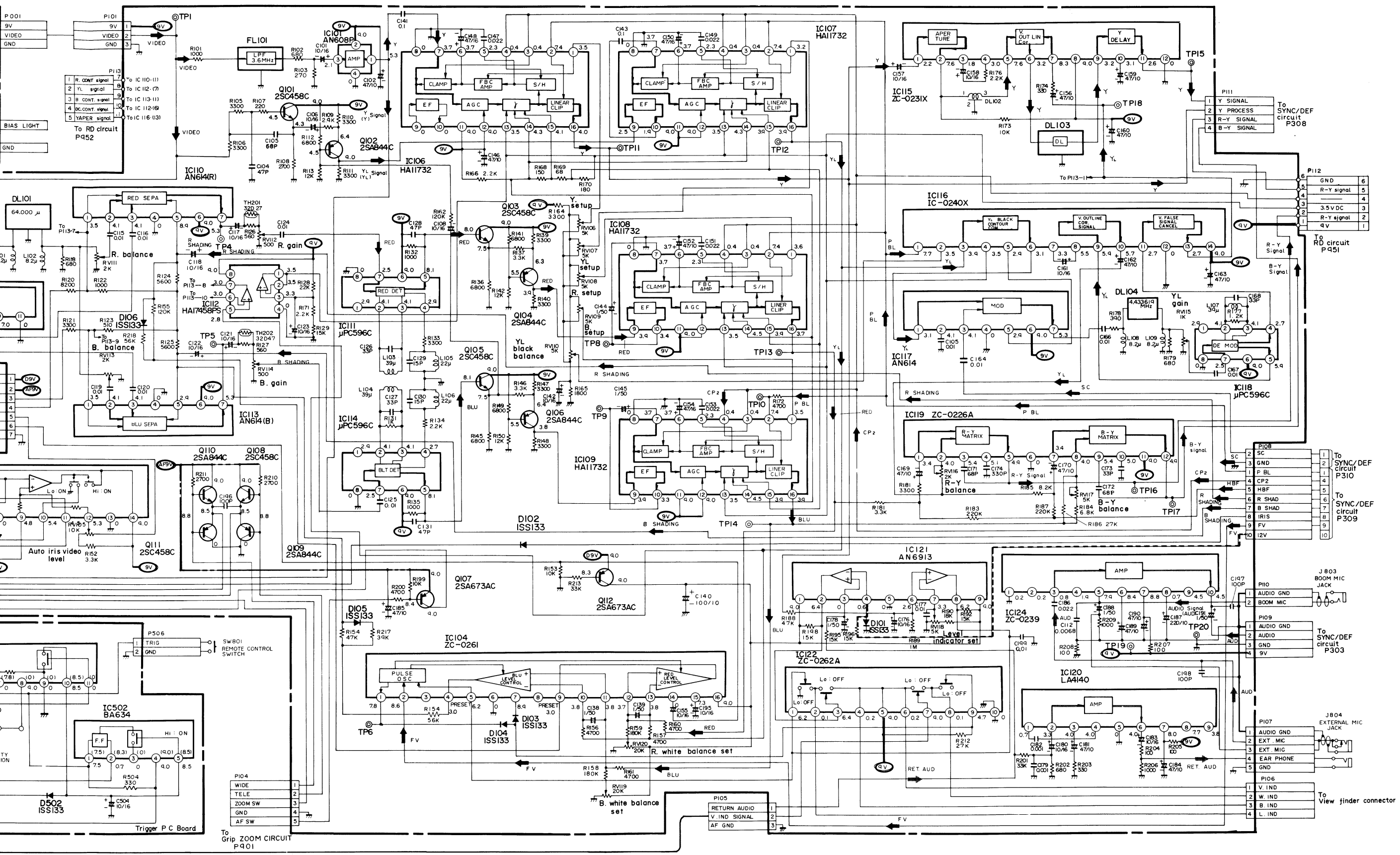
# VIDEO CIRCUIT DIAGRAM



Voltages show those during operation. Values inside ( ) for IC501, IC502 are those during recording

- D9V : Power supply which cannot be set to ON/OFF by SW601
- 9V : Power supply which can be set to ON/OFF by SW601
- AF9V : Power supply for Auto focus block
- VF9V : Power supply for View finder
- 12V : Power supply supplied from VTR

- ← Shows the flow of the video signal. VIDEO, Y signal(Y), K signal(K), CHROMA signal(C), RED signal (RED), BLU signal (BLU), R, Y signal, R, Y signal
- ← Shows the flow of the pulse signal. PBL, SC, CP, HBF, R SHADING, B SHADING, FV.
- ← Shows the flow of the audio signal. AUDIO signal(AUD), RETURN, RETURN AUDIO signal (R AUD)



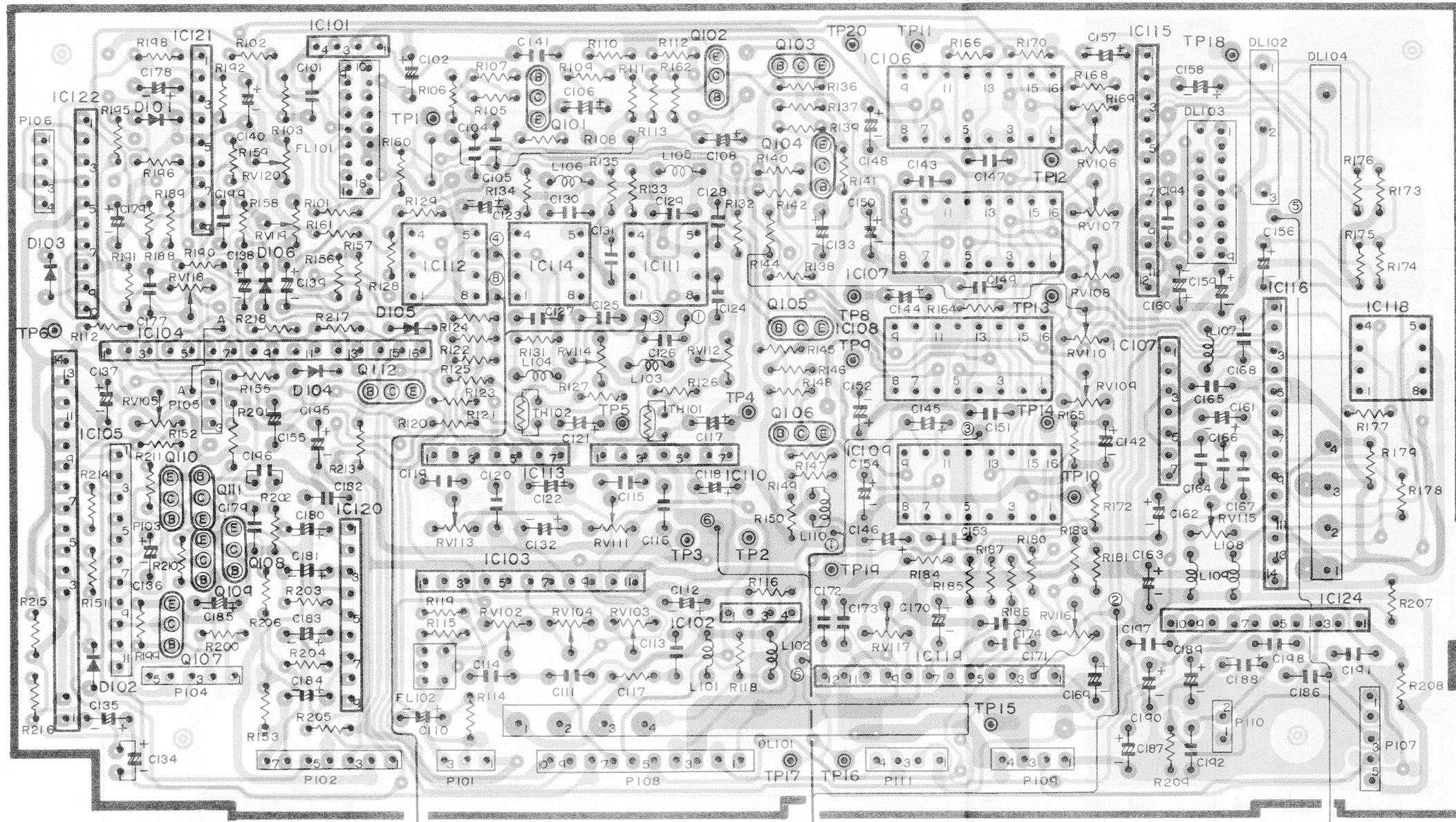
voltages show those during operation. Values inside ( ) for IC501, IC502 are those during recording

- D9V : Power supply which cannot be set to ON/OFF by SW601
- 9V : Power supply which can be set to ON/OFF by SW601
- AF9V : Power supply for Auto focus block
- VF9V : Power supply for View Finder
- I2V : Power supply supplied from VTR

- ← Shows the flow of the video signal VIDEO, Y signal(Y), L signal(L), CHROMA signal(C), RED signal (RED), BLU signal (BLU), R-Y signal R-Y signal
- ← Shows the flow of the pulse signal PBL, SC, CP, HFB, R SHADING, S SHADING, FV.
- ← Shows the flow of the audio signal AUDIO signal(AUD), RETURN, RETURN AUDIO signal(R AUD)

# VIDEO CIRCUIT BOARD DIAGRAM

The circuit No. in this manual is obtained by adding "100" to the circuit No. stamped on the circuit board. Example: In this manual R124 (R212) → R24 (R112) on board.



**IC108**

9	10	11	12	13	14	15	16
39V	34V	9V	9V	35V	45V	39V	37V
8	7	6	5	4	3	2	1
0V	37V	37V	23V	04V	04V	74V	36V

**IC109**

9	10	11	12	13	14	15	16
39V	33V	9V	9V	35V	45V	39V	39V
8	7	6	5	4	3	2	1
0V	37V	37V	23V	04V	04V	74V	35V

**IC105**

14	9V
13	0V
12	53V
11	4.5V
10	54V
9	4.8V
8	0V
7	54V
6	3.5V
5	5.7V
4	5.1V
3	0V
2	9V
1	1V

**IC120**

1	0.7V
2	3.3V
3	4V
4	4V
5	0V
6	4V
7	8V
8	7.7V
9	3.8V

**IC118**

4	2.7V	5	5.9V
3	4.1V	6	9V
2	4.1V	7	2.5V
1	2.9V	8	0V

**IC115**

1	2.2V
2	7.6V
3	1.8V
4	3V
5	7.6V
6	3.2V
7	8.3V
8	9V
9	3.2V
10	3.1V
11	2.6V
12	0V

**IC116**

1	7.7V
2	3.5V
3	3.9V
4	3.5V
5	2.9V
6	3.1V
7	3.3V
8	5.5V
9	5.9V
10	5.7V
11	2.7V
12	0V
13	2.7V
14	9V

**Q111**

E	8.5V
C	9V
B	8.8V

**Q110**

E	8.5V
C	0V
B	8.8V

**Q105**

B	C	E
8.1V	9V	7.5V

**Q106**

B	C	E
5.5V	3.8V	6.4V

**IC117**

1	3.1V
2	4.1V
3	4.1V
4	0V
5	2.9V
6	9V
7	5.3V

**IC113-110**

1	2	3	4	5	6	7
35V	4.1V	4.1V	0V	2.9V	9V	5.3V

**IC119**

12	11	10	9	8	7	6	5	4	3	2	1
4.9V	9V	5V	5.4V	4V	3.4V	0V	4.9V	5.1V	5.4V	4V	3.4V

**IC103**

1	2	3	4	5	6	7	8	9	10	11
1.3V	7.6V	7.6V	7.6V	0.7V	0.7V	0.7V	1.2V	8.3V	7V	0V

**Q109**

E	8.5V
C	0V
B	8.8V

**Q108**

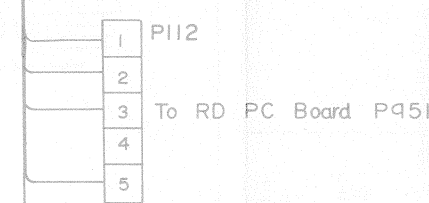
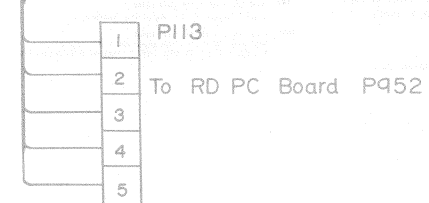
E	8.5V
C	9V
B	8.8V

**Q107**

E	9V
C	0V
B	8.4V

**Q112**

B	C	E
8.3V	9V	9V



**IC122**

1	6.2V
2	0.1V
3	6.4V
4	0.2V
5	9V
6	0.2V
7	9V
8	0.1V
9	4.7V
10	0V

**IC121**

1	9V
2	6.4V
3	0V
4	0.6V
5	0V
6	2.6V
7	3.3V
8	6.2V
9	9V

**IC101**

4	3	2	1
0V	2.1V	9V	5.3V

**Q101**

B	4.5V
C	9V
E	4.3V

**Q102**

E	6.4V
C	9V
B	4.5V

**Q103**

B	C	E
8V	9V	7.5V

**IC106**

9	10	11	12	13	14	15	16
0V	0V	9V	9V	3.5V	4.3V	4.1V	4V
8	7	6	5	4	3	2	1
0V	2.8V	3.7V	2.3V	0.4V	0.4V	7.4V	3.5V

**IC107**

9	10	11	12	13	14	15	16
2.5	1.9V	9V	9V	3.5V	4.3V	3.9V	3.9V
8	7	6	5	4	3	2	1
0V	3.7V	3.7V	2.3V	0.4V	0.4V	7.4V	3.2V

**IC102**

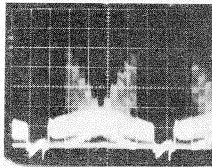
1	2	3	4
4.9V	8.3V	2V	0V

**IC124**

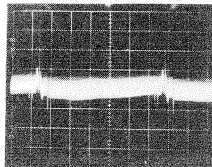
10	9	8	7	6	5	4	3	2	1
4.5V	4.5V	0.7V	8.8V	8.4V	7.9V	1.9V	0.8V	0.2V	0.2V

**IC104**

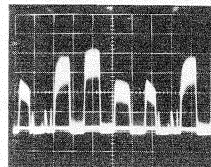
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
7.8V	8.6V	—	3V (PRESET)	6.2V	0V	8.9V	—	3V (PRESET)	3.8V	3.8V	3.7V	3.8V	0V	7.3V	9V



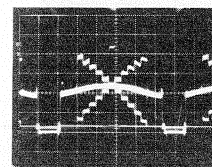
TP-1  
0.1V/div · 10 $\mu$ S/div



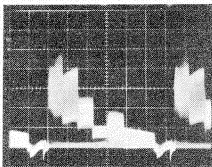
IC110 5pin  
0.1V/div · 10 $\mu$ S/div



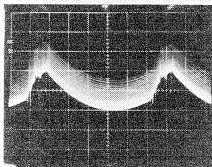
IC114 5pin  
0.1V/div · 10 $\mu$ S/div



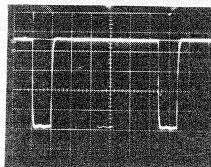
TP-15  
0.5V/div · 10 $\mu$ S/div



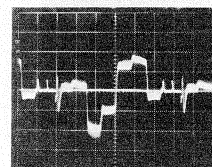
TP-1  
0.1V/div · 10 $\mu$ S/div



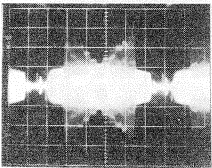
IC113 5pin  
0.1V/div · 10 $\mu$ S/div



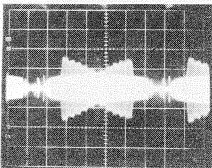
TP-10  
2V/div · 10 $\mu$ S/div



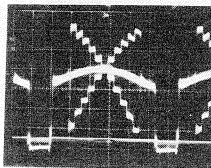
TP-16  
0.2V/div · 10 $\mu$ S/div



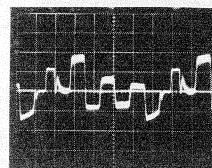
TP-2  
0.1V/div · 10 $\mu$ S/div



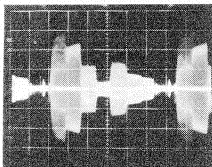
TP-5  
0.2V/div · 10 $\mu$ S/div



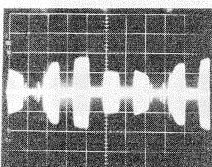
TP-11  
0.2V/div · 10 $\mu$ S/div



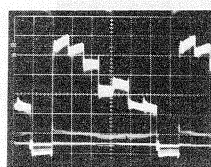
TP-17  
0.2V/div · 10 $\mu$ S/div



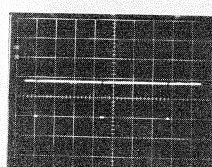
TP-2  
0.1V/div · 10 $\mu$ S/div



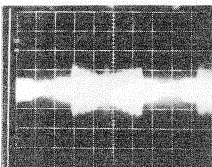
TP-5  
0.2V/div · 10 $\mu$ S/div



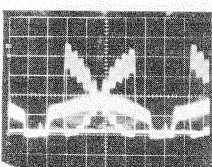
TP-11  
0.2V/div · 10 $\mu$ s/div



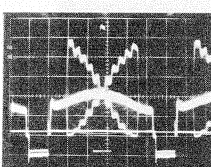
IC104 2pin  
5V/div · 5ms/div



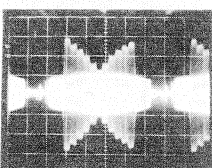
TP-3  
0.02V/div · 10 $\mu$ S/div



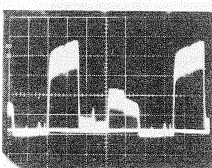
IC111 5pin  
0.1V/div · 10 $\mu$ S/div



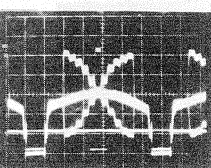
TP-12  
0.2V/div · 10 $\mu$ S/div



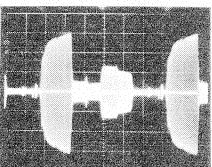
TP-4  
0.2V/div · 10 $\mu$ S/div



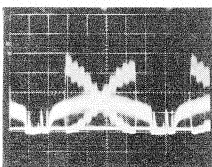
IC111 5pin  
0.1V/div · 10 $\mu$ S/div



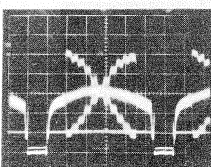
TP-13  
0.2V/div · 10 $\mu$ S/div



TP-4  
0.2V/div · 10 $\mu$ S/div

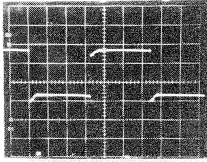


IC114 5pin  
0.1V/div · 10 $\mu$ S/div

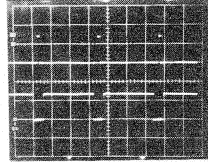


TP-14  
0.2V/div · 10 $\mu$ S/div

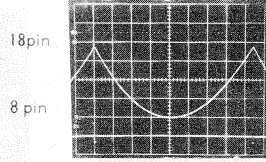
# WAVEFORMS IN SYNC/DEFLECTION CIRCUIT



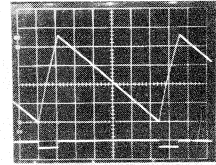
Q301 COLLECTOR  
1 V/div · 20 $\mu$ S/div



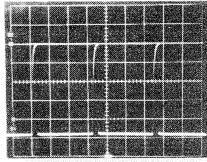
5 V/div · 5 mS/div



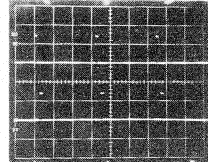
IC310 14pin  
0.5V/div · 2 mS/div



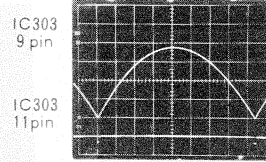
IC311 7pin  
0.5V/div · 10 $\mu$ S/div



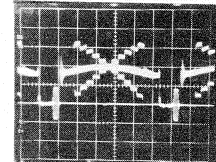
Q303 BASE · G4  
10V/div · 20 $\mu$ S/div



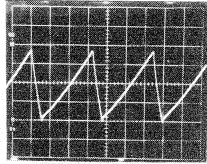
5 V/div · 5 mS/div



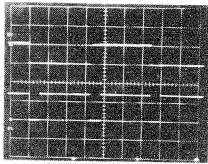
IC303 9pin  
IC303 11pin  
IC310 1pin  
0.5V/div · 2 mS/div



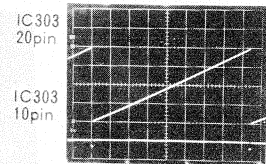
IC304 8pin  
0.5V/div · 10 $\mu$ S/div



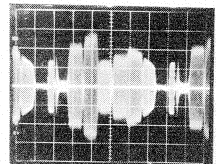
P307 2pin  
0.5V/div · 20 $\mu$ S/div



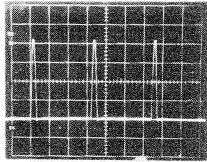
5 V/div · 5 mS/div



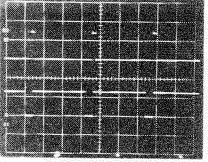
IC303 20pin  
IC303 10pin  
IC310 7pin  
0.5V/div · 2 mS/div



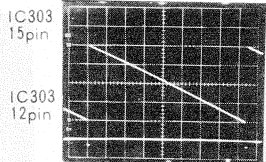
IC304 5pin  
0.5V/div · 10 $\mu$ S/div



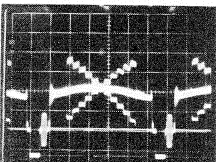
Q311 COLLECTOR  
20V/div · 20 $\mu$ S/div



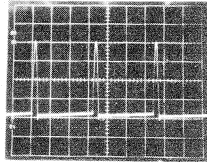
50V/div · 5 mS/div



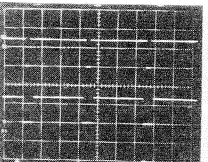
IC303 15pin  
IC303 12pin  
IC310 8pin  
0.5V/div · 2 mS/div



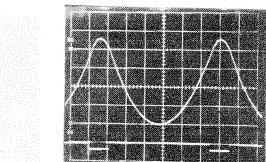
OUTPUT TP-5  
0.2V/div · 10 $\mu$ s/div



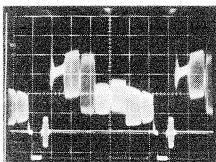
P307 1pin  
10V/div · 20 $\mu$ S/div



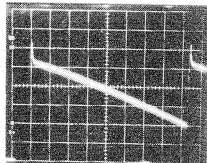
5 V/div · 5 mS/div



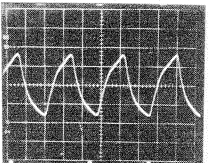
IC311 14pin  
0.5V/div · 10 $\mu$ S/div



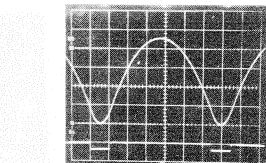
OUTPUT TP-5  
0.2V/div · 10 $\mu$ s/div



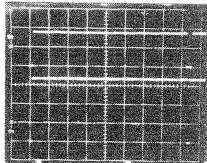
P307 7pin  
1 V/div · 2 mS/div



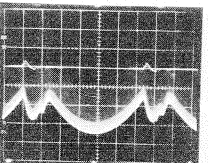
IC303 26pin  
2 V/div · 0.1 $\mu$ S/div



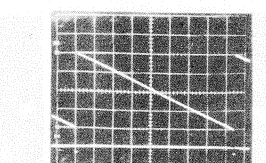
IC311 1pin  
0.5V/div · 10 $\mu$ S/div



2 V/div · 2 mS/div



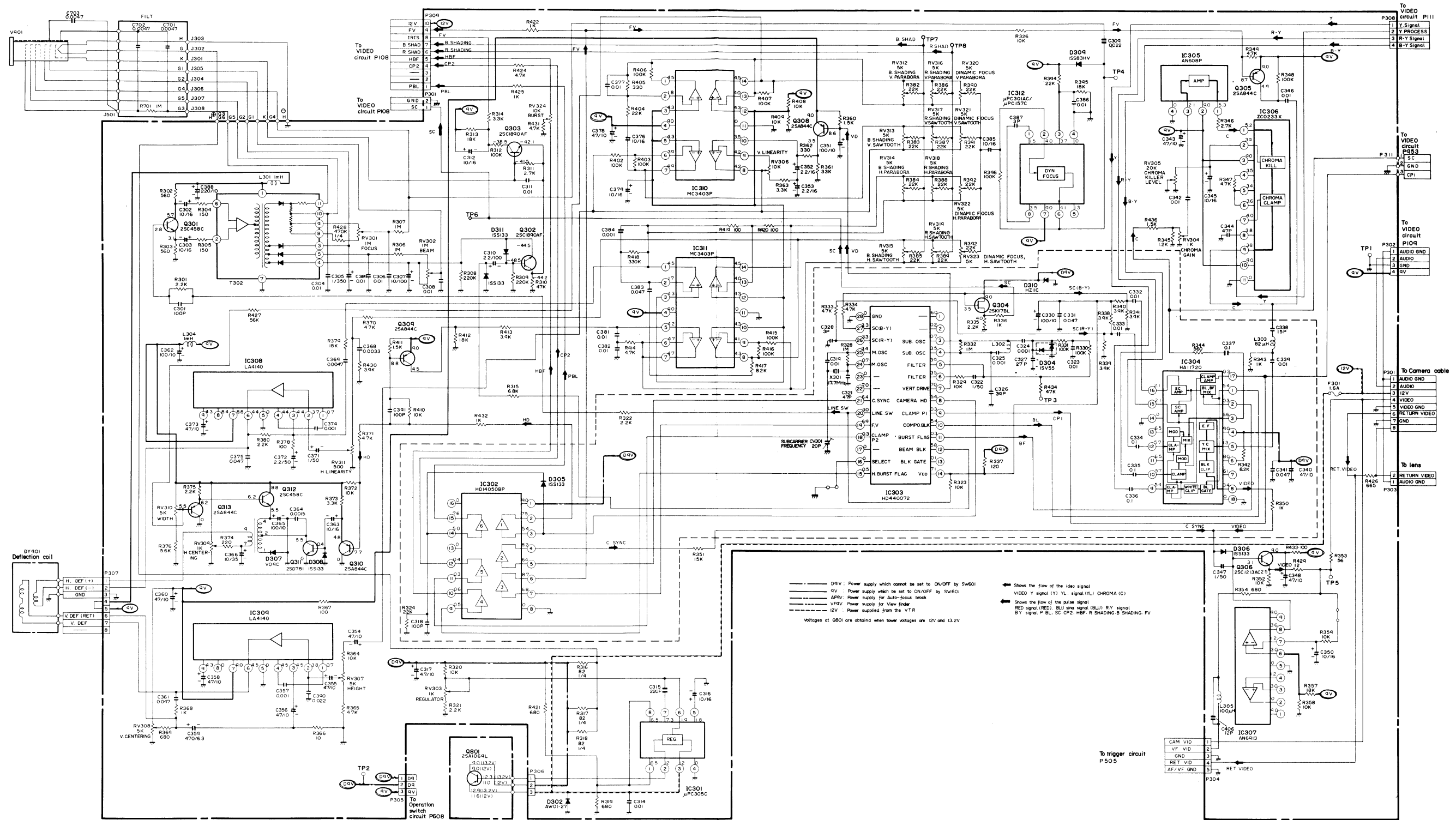
TP-4  
2 V/div · 10 $\mu$ S/div



IC311 8pin  
0.5V/div · 10 $\mu$ S/div

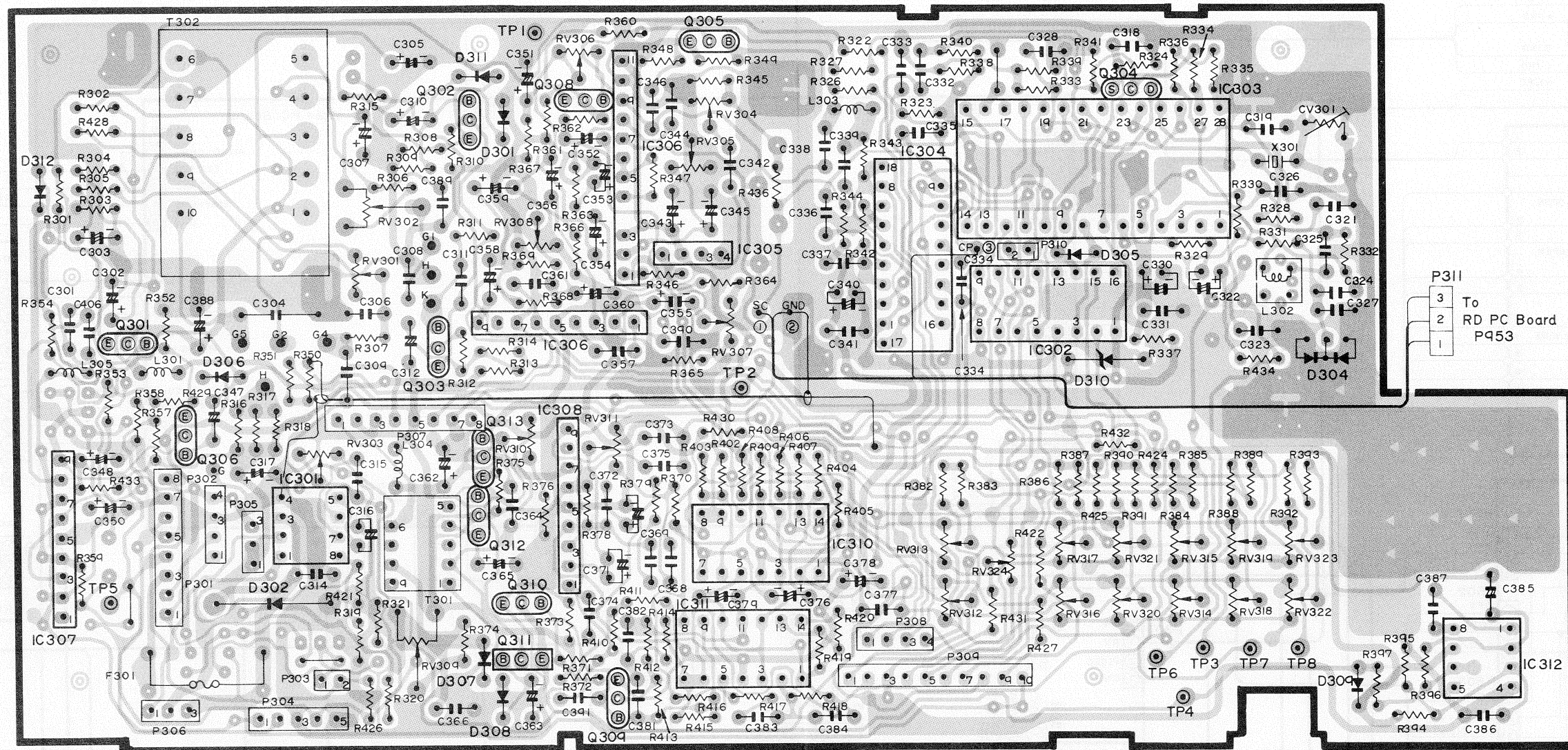


# SYNC/DEFLECTION CIRCUIT DIAGRAM



# SYNC/DEFLECTION CIRCUIT BOARD DIAGRAM

The circuit No. in this manual is obtained by adding "300" to the circuit No. stamped on the circuit board. Example: In this manual R357 (R426) → R57 (R126) on board.



Q301		
E	C	B
3.1V	5.7V	2.8V

Q303		
B	-41.5V	
C	-38.5V	
E	-42.1V	

Q302		
B	-48.5V	
C	-44.2V	
E	-44.5V	

Q308		
E	C	B
9 V	3.5V	8.6V

IC306	
11	0V
10	9V
9	3.8V
8	3.8V
7	4V
6	3.6V
5	3.4V
4	3.5V
3	9V
2	3.9V
1	5.2V

Q305		
E	C	B
9 V	4.9V	8.7V

IC305			
1	2	3	4
5.3V	9V	2.1V	0V

IC304	
18	0V
8	3.4V
7	6.1V
6	8V
5	1.3V
4	9V
3	6.6V
2	0.3V
1	5.4V
17	0.3V

Q304		
S	G	D
4V	3.5V	9V

IC307	
9	9V
8	3.6V
7	1.2V
6	3V
5	0V
4	1.2V
3	3V
2	0V
1	9V

Q306	
E	2.5V
C	9V
B	3.1V

IC301			
4	0V	5	1.8V
3	12V	6	1.9V
2	12V	7	7.3V
1	6.5V	8	6.5V

Q313	
B	5.5V
C	0V
E	6.2V

Q312	
B	6.2V
C	8.8V
E	5.5V

IC309								
9	8	7	6	5	4	3	2	1
4.3V	0V	9V	4.5V	0V	4.5V	4.5V	3.8V	0.7V

Q311		
E	C	B
0V	5.5V	0.4V

Q309	
E	9V
C	4.5V
B	8.8V

IC310						
8	9	10	11	12	13	14
4.2V	4.2V	3.5V	0V	4.3V	4V	4.5V
7	6	5	4	3	2	1
4.9V	3.9V	4.3V	9V	4.3V	1.8V	4.5V

Q310		
B	C	E
4.8V	0V	7.7V

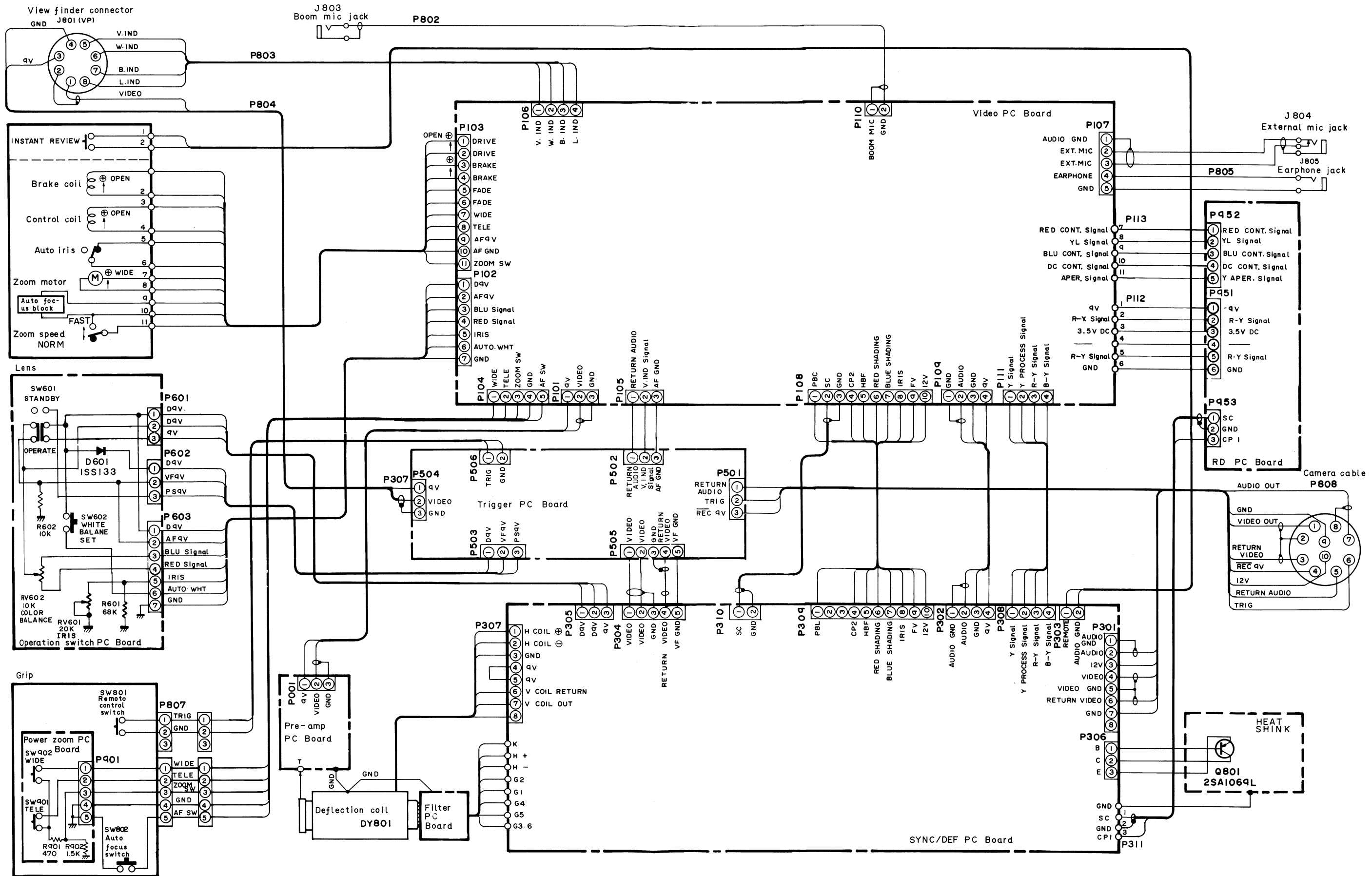
IC308	
9	4.3V
8	8.4V
7	8.8V
6	4.4V
5	0V
4	4.4V
3	4.4V
2	3.7V
1	0.7V

IC303													
15	16	17	18	19	20	21	22	23	24	25	26	27	28
0.5V	7V	0V	0.3V	6.9V	3V	6.4V	7V	0V	0.7V	3.4V	3.3V	3.3V	0V
14	13	12	11	10	9	8	7	6	5	4	3	2	1
7.1V	0.1V	5.8V	0.3V	5.4V	0.3V	5.4V	7V	3.5V	3.9V	3.5V	0.7V	0.2V	6V

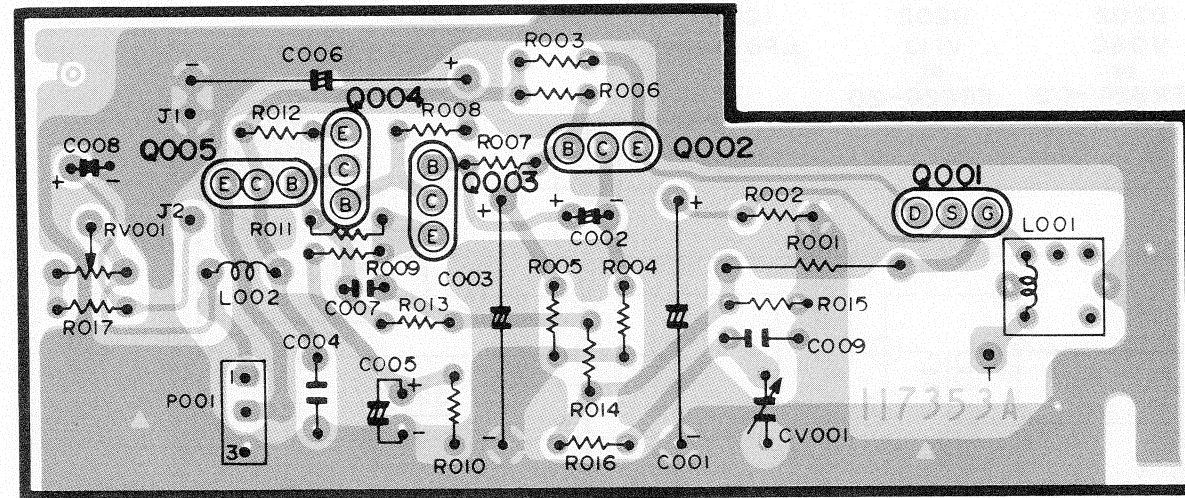
IC302						
9	10	11	12	13	14	16
0.5V	0.6V	0.3V	0.4V	0V	5V	7.6V
8	7	6	5	4	3	1
0V	6.8V	8.7V	6.4V	8.2V	5.4V	7.5V
9V						

IC312			
8	3.5V	1	1.5V
7	9V	2	4V
6	4.1V	3	3.7V
5	1.3V	4	0V

# CIRCUIT BOARD CONNECTION DIAGRAM



### PREAMPLIFIER CIRCUIT BOARD



**P001**

1	9V
2	VIDEO
3	GND

To video P101

**Q005**

E	C	B
5.1V	8.9V	5.7V

**Q004**

E	8.8V
C	5.7V
B	8.2V

**Q003**

B	3.1V
C	8.2V
E	2.9V

**Q002**

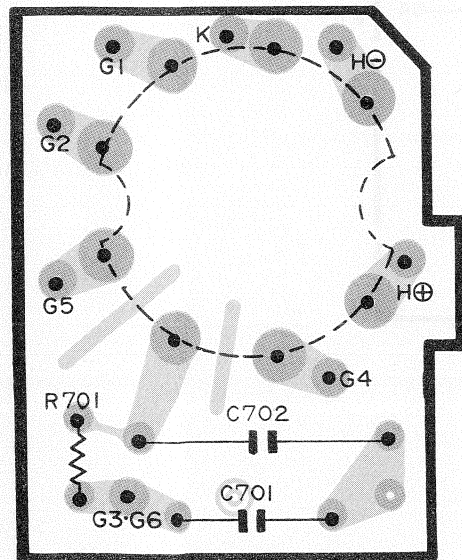
B	C	E
3.3V	0.7V	4.3V

**Q001**

D	S	G
4.3V	1.1V	0.1V

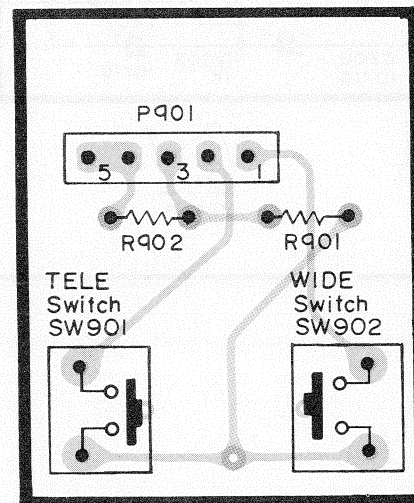
### FILTER CIRCUIT BOARD

Circuit No.: 7 x x



### ZOOM CIRCUIT BOARD

Circuit No.: 9 x x



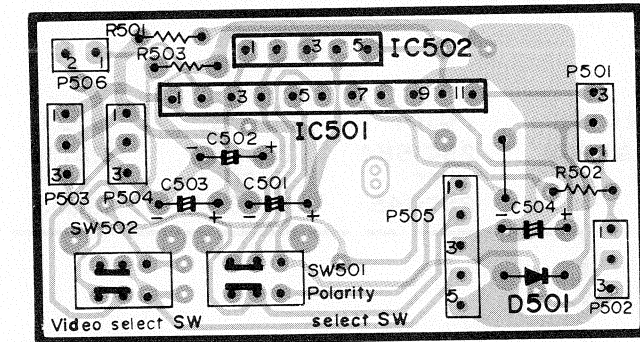
**P901**

5	AF SW
4	GND
3	ZOOM SW
2	TELE
1	WIDE

To video P104

### TRIGGER CIRCUIT BOARD

Circuit No.: 5 x x



**P506**

1	TRIG	To Grip P807
2	GND	

**P505**

1	VIDEO	To sync/def P304
2	VIDEO	
3	GND	
4	RETURN VIDEO	
5	GND	

**P501**

1	RETURN AUDIO	To camera cable P808
2	TRIG	
3	REC 9V	

**P503**

1	D9V	Operation switch P602
2	VF9V	
3	PS9V	

**P502**

1	RETURN AUDIO	To video P105
2	V. IND SIGNAL	
3	AF GND	

**P504**

1	9V	To VF connector J801
2	VIDEO	
3	GND	

**IC502**

	1	2	3	4	5
REC	7.5V	0.7V	0V	9V	8.5V
(REC)	(7.5V)	(8.3V)	(0V)	(9V)	(8.5V)

**IC501**

	1	2	3	4	5	6	7	8	9	10	11
REC	9V	7.5V	7.5V	0.7V	9V	9V	0V	9V	0V	8.5V	0V
(REC)	(9V)	(7.5V)	(7.5V)	(8.3V)	(0V)	(0V)	(7.8V)	(0V)	(0V)	(8.5V)	(0V)

### OPERATION SWITCH CIRCUIT BOARD

Circuit No.: 6 x x

**P601**

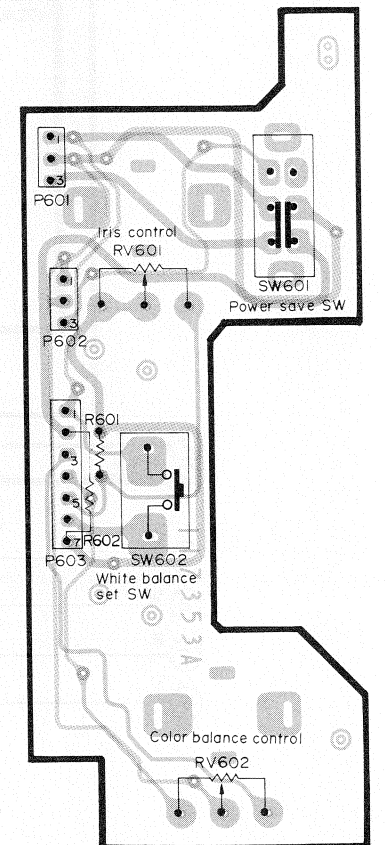
1	D9V	To sync/def. P305
2	D9V	
3	9V	

**P602**

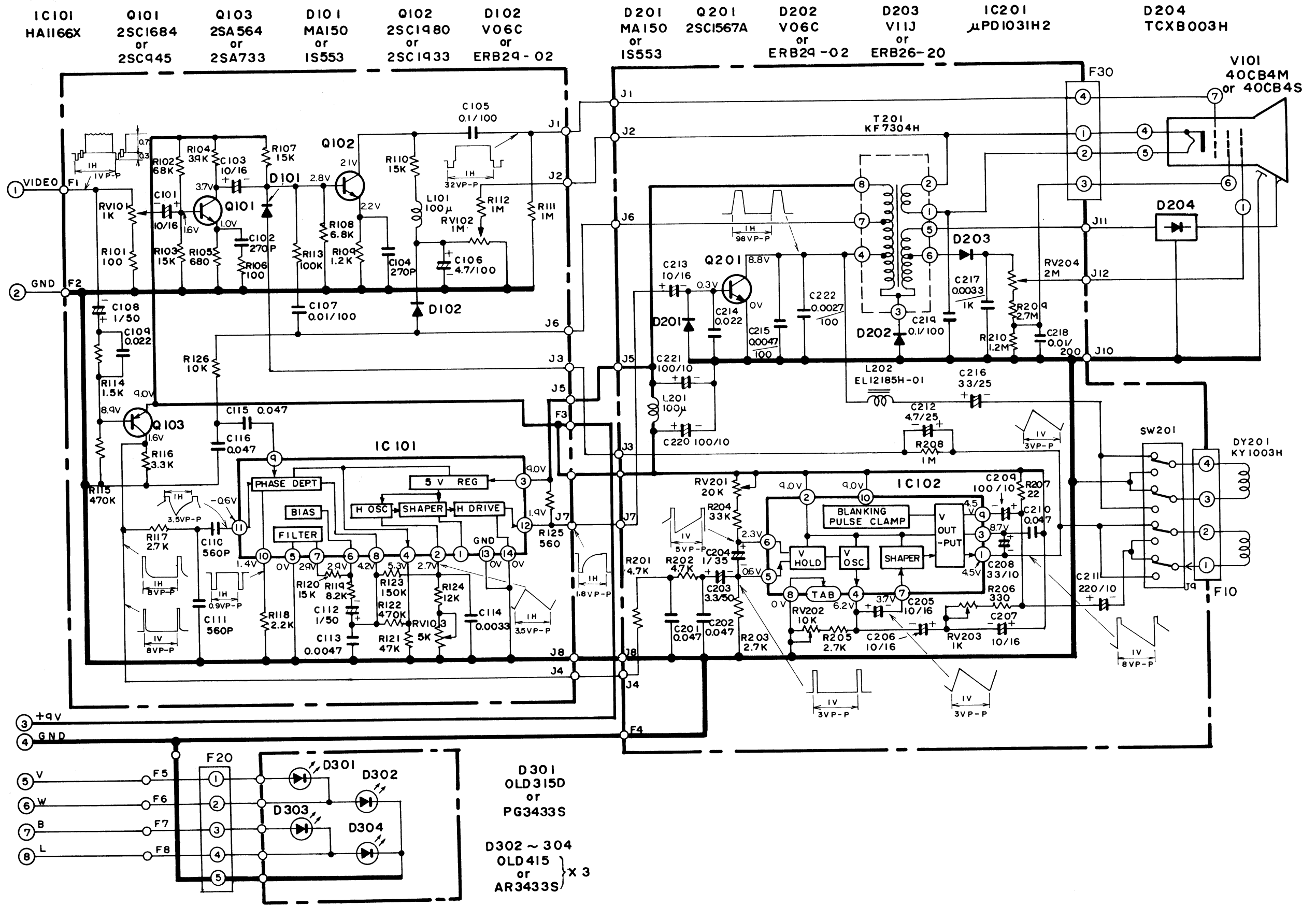
1	D9V	To trigger P503
2	VF9V	
3	PS9V	

**P603**

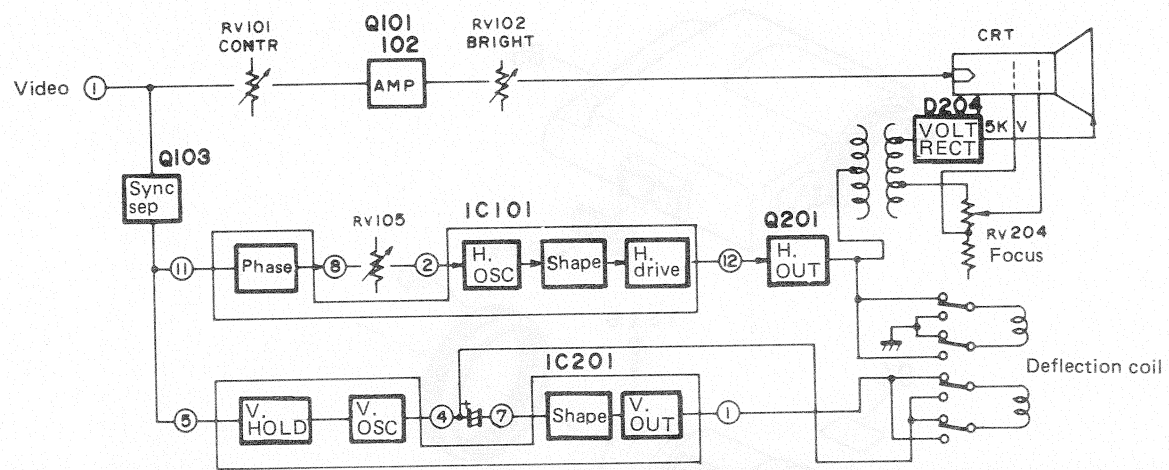
1	D9V	To video P102
2	AF9V	
3	BLU SIGNAL	
4	RED SIGNAL	
5	IRIS	
6	AUTO WHO	
7	GND	



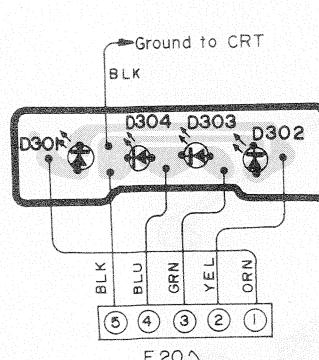
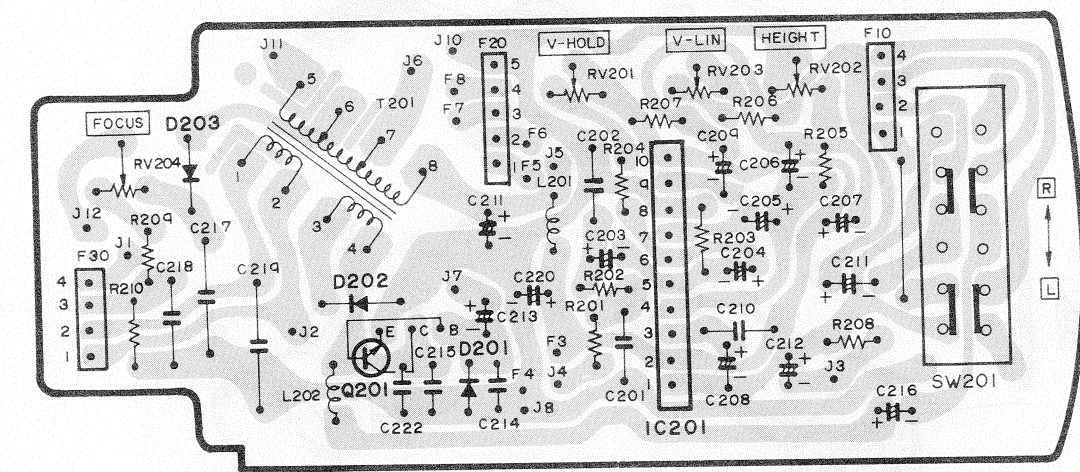
VIEWFINDER CIRCUIT DIAGRAM



### VIEWFINDER BLOCK DIAGRAM



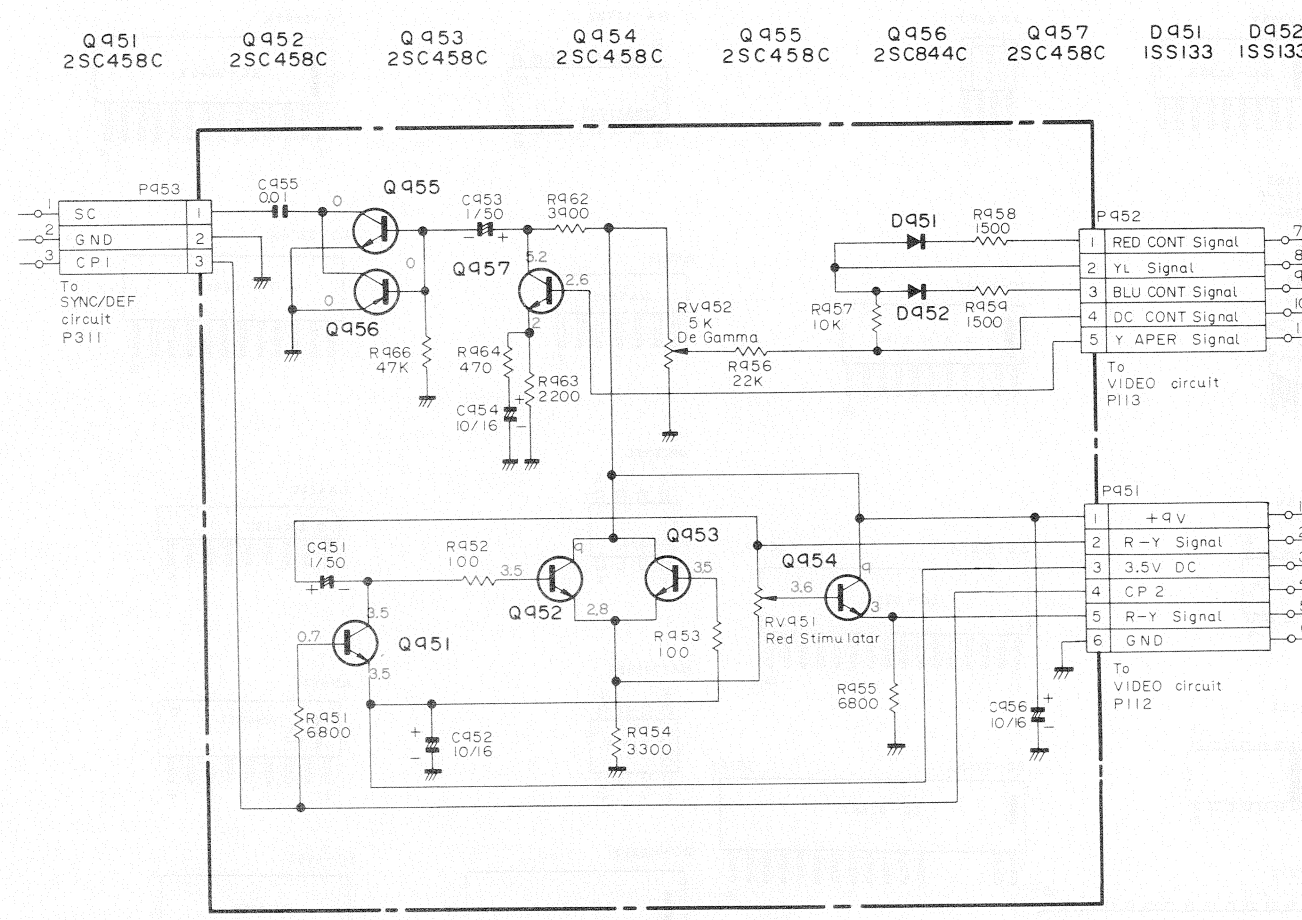
### VIEWFINDER CIRCUIT BOARD DIAGRAM



IC101				IC102			
1	-	14	0V	1	4.5V		
2	2.7V	13	0V	2	9V		
3	9V	12	1.9V	3	8.7V		
4	5.3V	11	-0.6V	4	6.2V		
5	0V	10	1.4V	5	0.6V		
6	2.9V	9	-	6	2.3V		
7	2.9V	8	4.2V	7	3.7V		
				8	0V		
				9	4.5V		
				10	9V		

Q101		Q102		Q103		Q201	
B	1.6V	B	2.8V	B	8.9V	B	0.3V
C	3.7V	C	2.1V	C	1.6V	L	8.8V
E	1V	E	2.2V	E	9V	F	0V

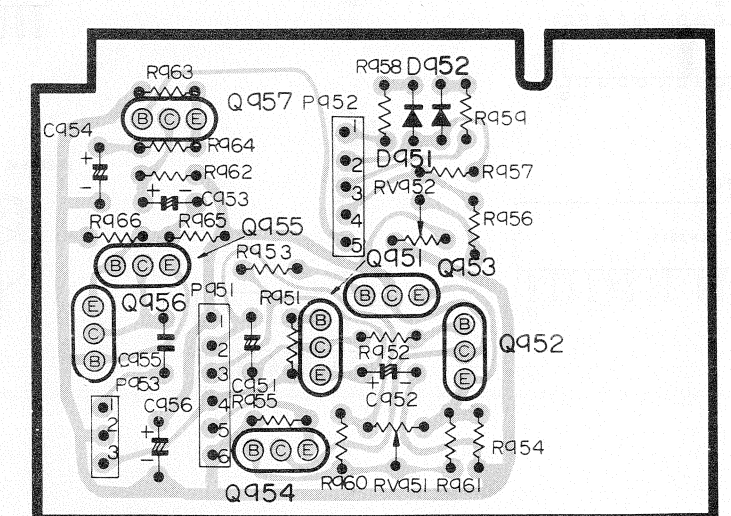
### RD CIRCUIT DIAGRAM



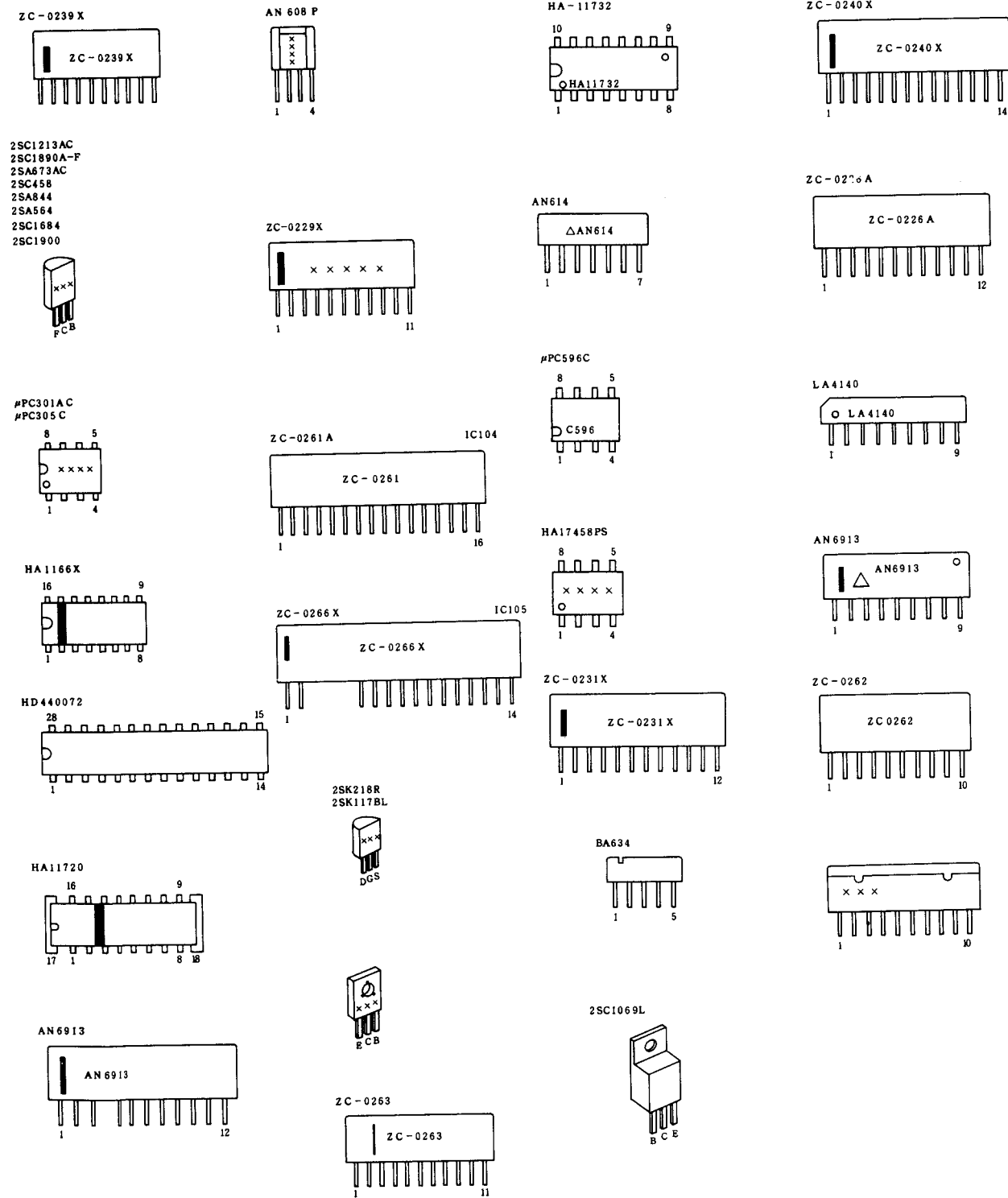
Q951		Q952		Q953		Q954	
E	3.5V	E	2.8V	E	2.8V	E	3V
C	3.5V	C	9V	C	9V	C	9V
B	0.2V	B	3.5V	B	3.5V	B	3.6V

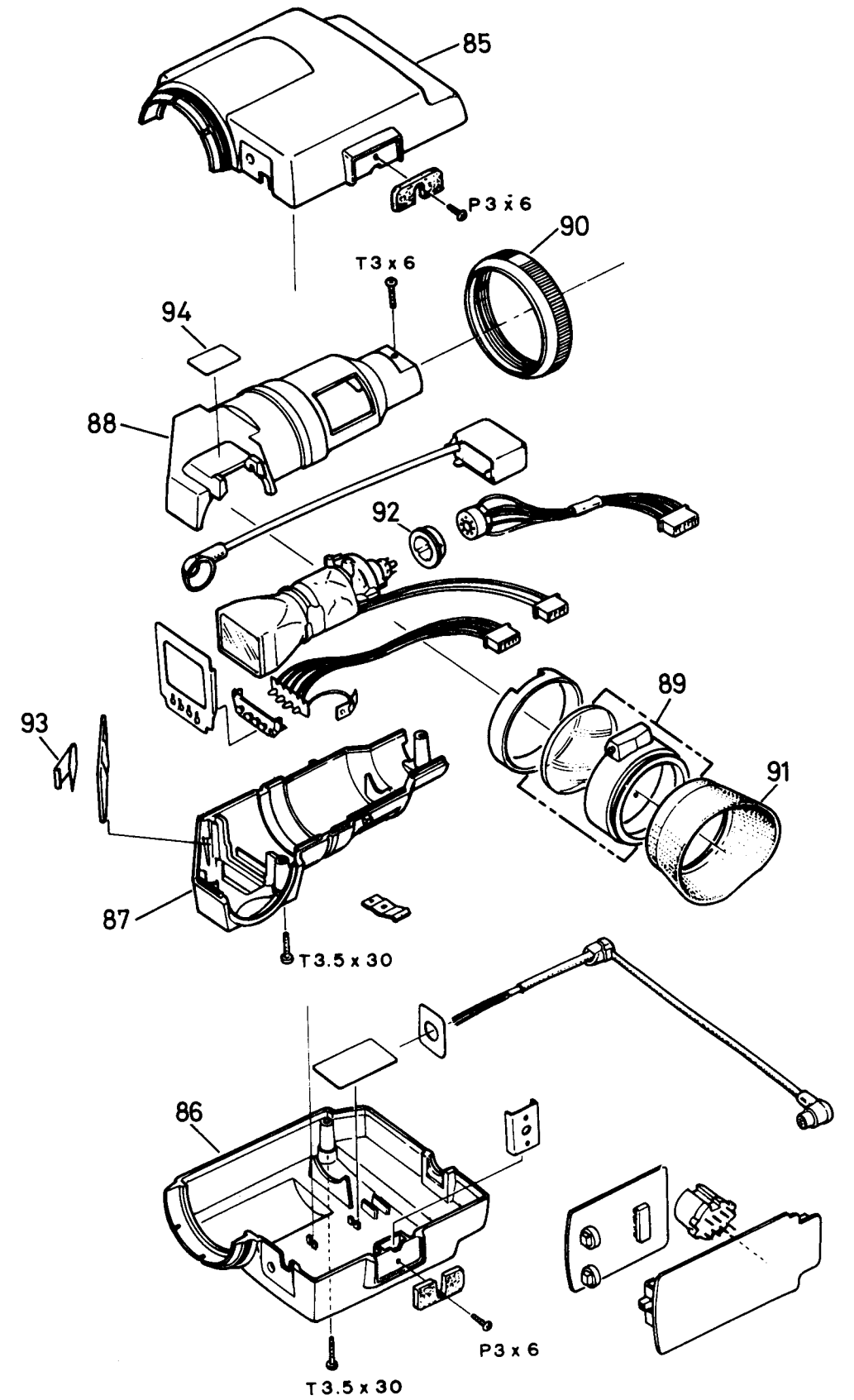
Q955		Q956		Q957	
E	0V	E	0V	E	3.2V
C	0V	C	0V	C	5.2V
B	0V	B	0V	B	2.6V



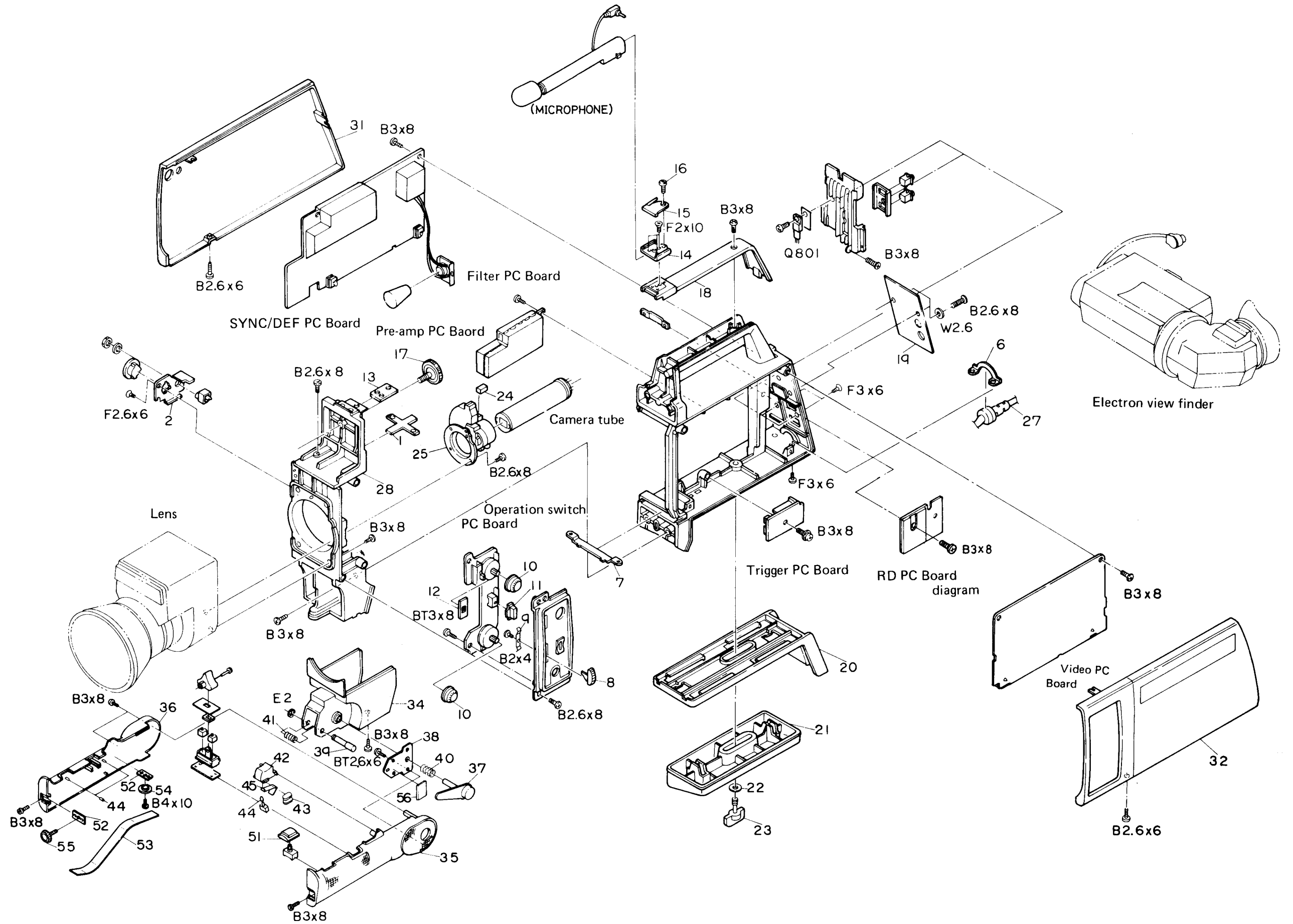
SHAPE AND PIN NO. OF SEMICONDUCTOR



EXPLODED VIEW (View finder)

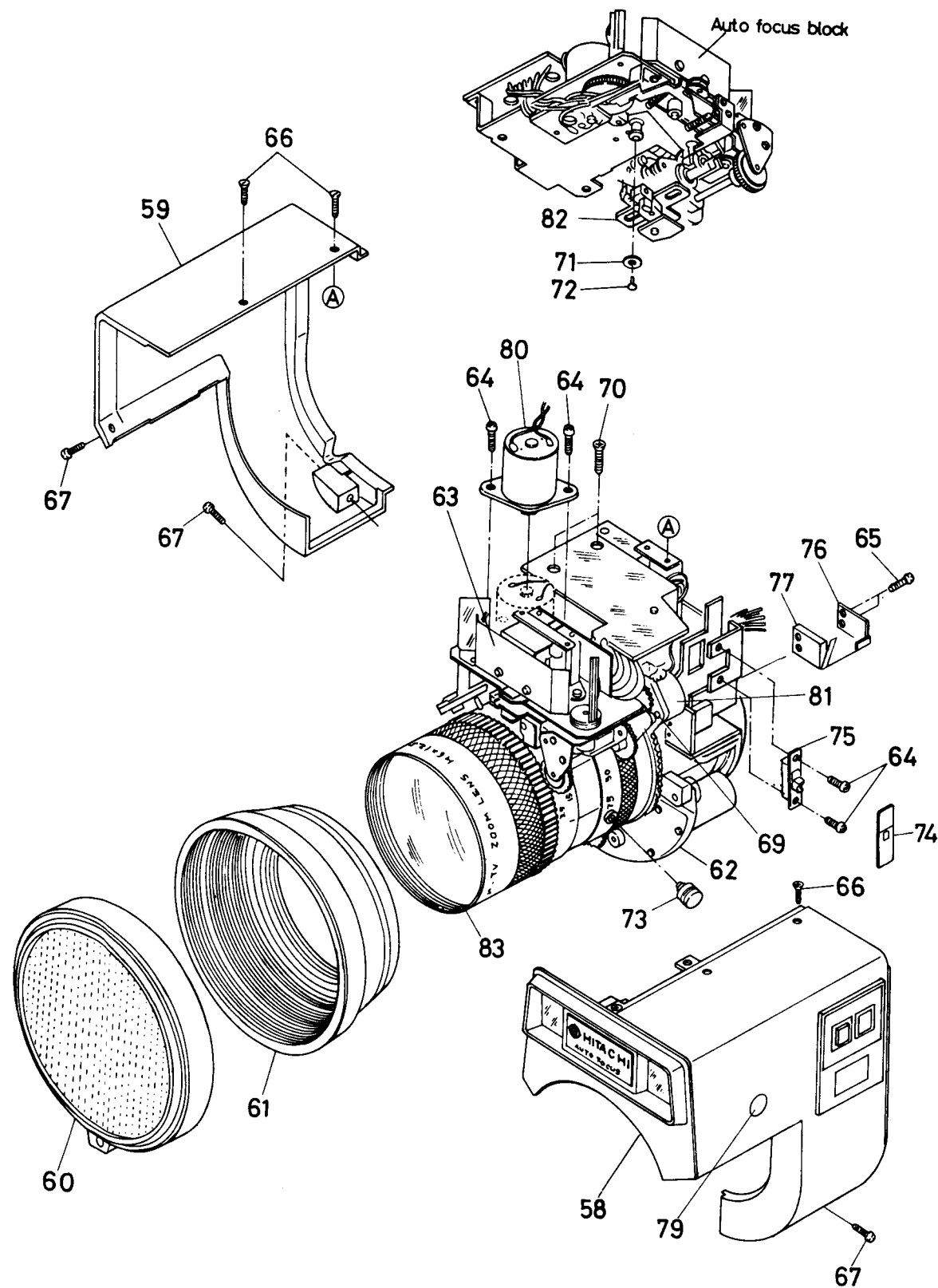


EXPLODED VIEW (Camera)





EXPLODED VIEW (Auto focus/Lens block)



REPLACEMENT PARTS LIST (Camera, Auto focus/Lens block)

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
FOR FINAL ASSEMBLY					
1	7377351	BRACKET	59	6109862	COVER (R)
2	7377371	BRACKET	60	6570431	LENS CAP
6	7377381	CABLE HOLDER	61	6868681	LENS HOOD
7	7377361	BRACKET	62	5577411	MOTOR (ZOOM)
8	6293131	KNOB	63	5490031	A.F UNIT
9	6535981	SPRING	64	7782083	SCREW 2X2
10	6293141	KNOB	65	7782081	SCREW 1.4X5
11	6057271	BUTTON	66	7782086	SCREW 2X3
12	6690831	SWITCH COVER	67	7782084	SCREW 2X6
13	7373051	NUT	69	7782085	SCREW 1.4X3.5
14	7373061	SHOE-ACCESSORY	70	7782071	SCREW
15	6534321	SPRING	71	7787851	WASHER
16	7551391	SCREW	72	7782082	SCREW 1.7x3
17	6290871	KNOB	73	7552281	ZOOM LEVER
18	6862301	COVER	74	6634691	PLATE
19	6636242	REAR PLATE	75	5623981	SWITCH
20	6862221	HOLDER	76	7373331	PLATE
21	6867541	PAD	77	5601231	SWITCH
22	7787841	WASHER	79	6589741	CAP
23	6290861	SCREW	80	5490012	MOTOR (SCAN)
24	7671681	PUSH	81	5490021	MOTOR (FOCUS)
25	6959621	FILTER	82	5603501	SWITCH
27	5897658	CABLE	83	5490093	LENS
28	6977672	LENS CHASSIS	CAPACITORS		
31	6867622	COVER (R)	CV001	5058292	TRIMMER
32	6867632	COVER (L)	CV301	5058292	TRIMMER
34	6867991	GRIP BASE	RESISTORS		
35	6867971	GRIP (A)	RV001	5007404	SEMI VARIABLE
36	6867981	GRIP (B)	RV102	5007403	SEMI VARIABLE 1KOHM
37	6053921	BUTTON	RV103-104	5007402	SEMI VARIABLE 2KOHM
38	7377481	PLATE	RV105	5007405	SEMI VARIABLE 10KOHM
39	7551381	PIN	RV106	5007404	SEMI VARIABLE
40	6520161	SPRING	RV107	5007404	SEMI VARIABLE
41	6520151	SPRING	RV108	5007404	SEMI VARIABLE
42	6060301	BUTTON	RV109	5007404	SEMI VARIABLE
43	6590561	CUSHION	RV110	5007404	SEMI VARIABLE
44	6590571	CUSHION	RV111	5007403	SEMI VARIABLE 1KOHM
45	6535061	SPRING	RV112	5007401	SEMI VARIABLE 500OHM
51	6057281	BUTTON	RV113	5007403	SEMI VARIABLE 1KOHM
52	7790331	NUT	RV114	5007401	SEMI VARIABLE 500OHM
53	7753531	BELT	RV115	5007402	SEMI VARIABLE 2KOHM
54	6862311	SPACER	RV116	5007403	SEMI VARIABLE 1KOHM
55	6862291	SCREW	RV117-118	5007404	SEMI VARIABLE
56	7678531	METAL PLATE	RV119-120	5007406	SEMI VARIABLE 20KOHM
58	6109852	COVER (L)	RV301	5007409	SEMI VARIABLE RESISTOR
			RV302	5008439	VARIABLE RESISTOR 1M OHM

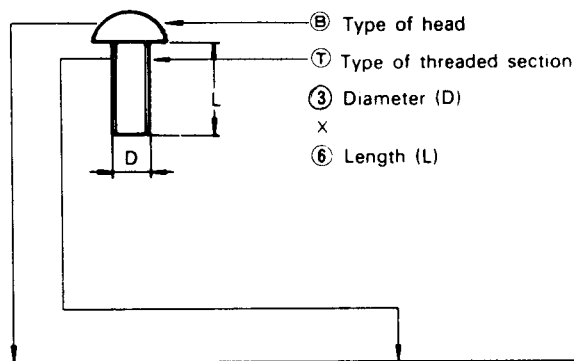
SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
RESISTORS			Q111	5320023	TRANSISTOR 2SC458LGC
RV303-304	5007402	SEMI VARIABLE 2KOHM	Q112	5320593	TRANSISTOR 2SA673C
RV305	5007406	SEMI VARIABLE 20KOHM	Q301	5320023	TRANSISTOR 2SC458LGC
RV306	5007405	SEMI VARIABLE 10KOHM	Q302-303	5322234	TRANSISTOR 2SC1890A-F
RV307-308	5007404	SEMI VARIABLE	Q304	5322235	TRANSISTOR 2SK117BL
RV309	5007408	SEMI VARIABLE 1KOHM	Q305	5321251	TRANSISTOR 2SA844C
RV310	5007404	SEMI VARIABLE	Q306	5320623	TRANSISTOR SILICON 2SC1213A-C 80MHZ 400M
RV311	5007401	SEMI VARIABLE 500OHM	Q308	5321251	TRANSISTOR 2SA844C
RV312-323	5007404	SEMI VARIABLE	Q309	5321251	TRANSISTOR 2SA844C
RV324	5007405	SEMI VARIABLE 10KOHM	Q310	5321251	TRANSISTOR 2SA844C
RV601	5000883	VARIABLE 5KOHM	Q311	5322238	TRANSISTOR 2SD781
RV602	5000882	VARIABLE 20KOHM	Q312	5320023	TRANSISTOR 2SC458LGC
RV951-952	5007404	SEMI VARIABLE	Q313	5321251	TRANSISTOR 2SA844C
SEMI-CONDUCTORS			Q801	5331732	TRANSISTOR 2SA1069L
D101	5331592	DIODE 1SS133	Q951-955	5320023	TRANSISTOR 2SC458LGC
D102	5331592	DIODE 1SS133	Q956	5321251	TRANSISTOR 2SA844C
D103	5331592	DIODE 1SS133	Q957	5320023	TRANSISTOR 2SC458LGC
D104	5331592	DIODE 1SS133	IC101-102	5351821	IC AN608P
D301	5331592	DIODE 1SS133	IC103	5351847	IC ZC-0229X
D302	2327079	DIODE AW01	IC104	5351833	IC ZC-0261A
D304	5330771	DIODE 1SV55	IC105	5351837	IC ZC-0266X
D305-306	5331592	DIODE 1SS133	IC106-109	5351824	IC HA11732
D307	5330421	DIODE SILICON V09C 15K	IC110	5351822	IC AN614
D308	5331592	DIODE 1SS133	IC111	5351823	IC MPC596C
D309	5351571	IC UPC1026C	IC112	5351683	IC TL082CP
D310	5330553	DIODE HZ11C	IC113	5351822	IC AN614
D311	5331592	DIODE 1SS133	IC114	5351823	IC MPC596C
D501	5330101	RECTIFIER SILICON V06C 15K	IC115	5351849	IC ZC-0231X
D502	5331592	DIODE 1SS133	IC116	5351851	IC ZC-0240X
D601	5331592	DIODE 1SS133	IC117	5351822	IC AN614
D951-952	5331592	DIODE 1SS133	IC118	5351823	IC MPC596C
Q001	5322761	TRANSISTOR 2SK218Q	IC119	5351682	IC ZC0226
Q002	5321251	TRANSISTOR 2SA844C	IC120	5351689	IC LA4140
Q003	5320023	TRANSISTOR 2SC458LGC	IC121	5352556	IC AN6913
Q004	5321251	TRANSISTOR 2SA844C	IC122	5351835	IC ZC-0262
Q005	5320023	TRANSISTOR 2SC458LGC	IC124	5331854	IC ZC-0239X
Q101	5320023	TRANSISTOR 2SC458LGC	IC301	5352553	IC MPC305C
Q102	5321251	TRANSISTOR 2SA844C	IC302	5365616	IC HD14050B
Q103	5320023	TRANSISTOR 2SC458LGC	IC303	5365613	IC HD440072
Q104	5321251	TRANSISTOR 2SA844C	IC304	5351688	IC HA11720
Q105	5320023	TRANSISTOR 2SC458LGC	IC305	5351821	IC AN608P
Q106	5321251	TRANSISTOR 2SA844C	IC306	5351857	IC ZC-0233X
Q107	5320593	TRANSISTOR 2SA673C	IC307	5352556	IC AN6913
Q108	5320023	TRANSISTOR 2SC458LGC	IC308-309	5351689	IC LA4140
Q109-110	5321251	TRANSISTOR 2SA844C	IC310-311	5352557	IC MC3403P

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
SEMI-CONDUCTORS			FL1U1	5162064	FILTER
IC312	5352552	IC MPC301AC	FL1U2	5162065	FILTER
IC5U1	5351836	IC ZC-0263	FL3U1	5162063	FILTER
IC5U2	5351834	IC BA634	F301	5721451	FUSE 1.6A
TH2U1-202	5340213	THERMISTOR 32027	J7U1	5659276	SOCKET
COILS			SW5U1	5622015	SWITCH
L002	5152354	COIL	SW5U2	5622015	SWITCH
L101-102	5152359	CHOKE COIL	SW6U2	5653761	SWITCH
L103-104	5152358	CHOKE COIL	SW8U1-8U2	5633761	SWITCH
L105-106	5152352	COIL	SW9U1	5622014	SWITCH
L107	5152358	CHOKE COIL	SW9U3	5622014	SWITCH
L108-109	5152359	CHOKE COIL	J8U5	5672121	JACK
L301	5150616	COIL	J8U4-8U5	5672061	MIC JACK
L302	5150618	COIL	TRANSFORMERS		
L303	5152386	CHOKE COIL	T3U1	5270255	TRANSFORMER
L304	5150616	COIL	T3U2	5270256	TRANSFORMER
L305	5150526	COIL	CRYSTAL		
MISCELLANEOUS			X3U1	5760479	CRYSTAL
DL1U1	5785236	DELAE LINE	MISCELLANEOUS		
DL1U2	5785231	DELAY LINE	5421771	MICROPHONE	
DL1U3	5785235	DELAE LINE	5310762	SACHICON	
DL1U4	5785237	DELAE LINE			

(Electronic viewfinder)

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
FOR FINAL ASSEMBLY			D203	5330492	DIODE V11L
85	6105261	CABINET (A)	D204	5331631	DIODE TCXB003H
86	6105271	CABINET (B)	D301	5380762	DIODE PG3433S
87	6105251	COVER-CRT	D302-304	5380761	DIODE AR3433S
88	6862282	COVER	IC101	5352551	IC HA1166X
89	6959531	LENS	IC201	5352555	IC MPC1031H2
90	6862271	LING	Q101	5322791	TRANSISTOR 2SC1684R
91	6589671	RUBBER	Q102	5322642	TRANSISTOR 2SC1980
92	6587181	RUBBER	Q103	5321731	TRANSISTOR 2SA5640
93	6534311	SPRING	Q201	5322643	TRANSISTOR 2SC1567A
94	4605712	LABEL-VF	TRANSFORMERS		
RESISTORS			T201	5271041	FLYBACK TRANSFORMER
RV103	5007427	SEMI VARIABLE 5KOHM	COILS		
RV201	5007405	SEMI VARIABLE 10KOHM	L101	5152355	COIL
RV202	5007403	SEMI VARIABLE 1KOHM	L201	5152355	COIL
RV101	5007424	SEMI VARIABLE 1KOHM	L202	5152356	COIL
RV102	5007425	SEMI VARIABLE 1MOHM	MISCELLANEOUS		
RV203	5007421	SEMI VARIABLE 1KOHM		5659451	SOCKET-CRT
RV204	5007426	SEMI VARIABLE 2MOHM		7373071	CABLE-VF
SEMI-CONDUCTORS			DY201	5272051	COIL ASSEMBLY
D101	5331193	DIODE MA150	SW201	5622011	SWITCH
D102	5330101	RECTIFIER SILICON V06C 15K	V101	5310511	CRT
D201	5331193	DIODE MA150			
D202	5330101	RECTIFIER SILICON V06C 15K			

Example : BT3×6



Washers and Nuts

Abbreviation	Name	Shape	Abbreviation	Name	Shape	Abbreviation	Name	Shape
No symbol	Brazier head		No symbol	Machine (clamps without tapping)		W	Washer	
P	Pan head		t	Tapping (clamps with tapping) Type 1		SW	Spring washer	
B	Binding head		T	Tapping (clamps with tapping) Type 2		LW	Locking washer	
O	Oval countersunk head		f	Forming tight (for metal)		E	E-ring	
F	Flat countersunk head		Note Since the forming tight screw tightens while self-tapping, machine screws can be replaced by tapping screws			N	Nut	
						Note Internal dia. is indicated for nuts and washers		

— MEMO —