ORDER NO. VKD81090572C1

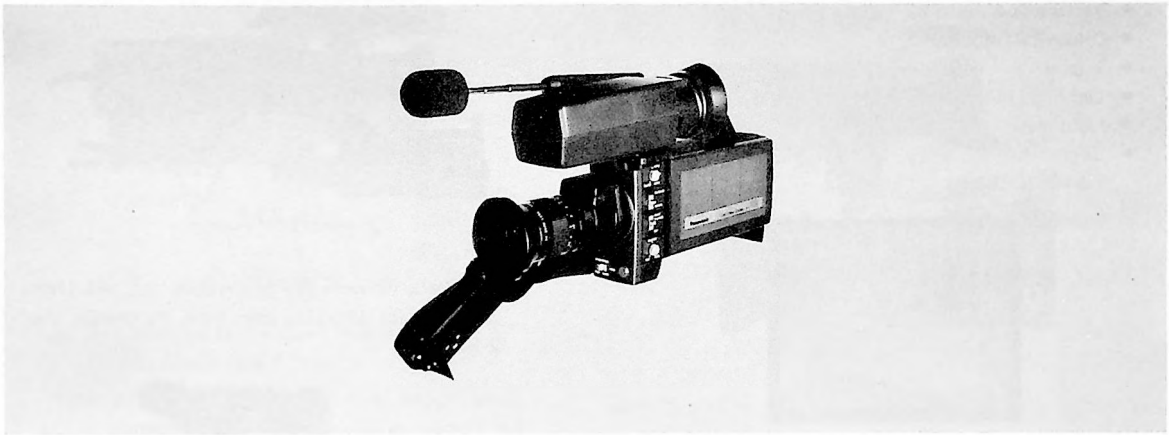
Service Manual

Vol. 2

Adjustment Procedures

Color Video Camera

WV-3110



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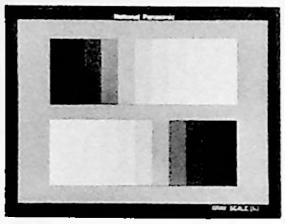
1. TEST EQUIPMENT REQUIRED

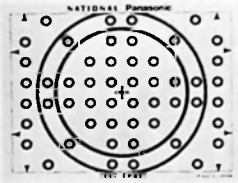
The following equipment is required for adjustment of WV-3110 color camera.

- Oscilloscope
  (dual trace, delayed, 25MHz bandwidth, with three proves, one must be 1:1)
- Digital voltmeter (DVM)
- Frequency counter
- Vectorscope
- Color video monitor
- Tripod
- Lighting [140 footcandles (1400 lux), 3200°K]
- Light meter
- Logarithmic gray scale chart (Parts No. YWV2310RB99)



- Color chart (Parts No. YWV2100RB98)

- Ball chart (Parts No. YWV2100RB03)



FRONT

REAR

2. DISASSEMBLY PROCEDURE FOR ADJUSTMENT

2-1. Camera Unit

- Turn the power off.
- Remove the two screws on the bottom of each side cover holding the both side covers. (Fig. 2-1-1)

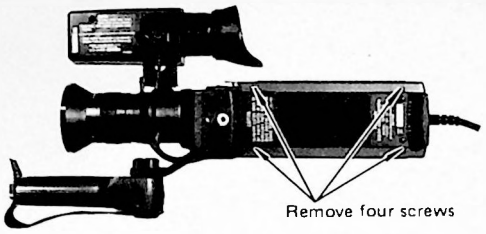


Fig. 2-1-1

- Slide back the both side covers about 1/2 inch (1cm) with care for unlocking them from the chassis. (Fig. 2-1-2)

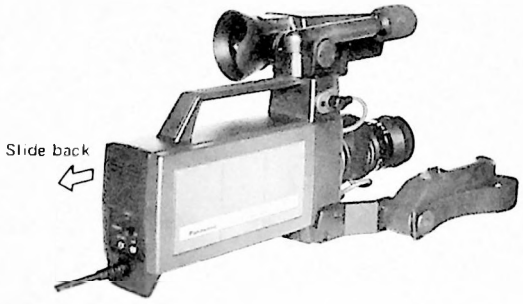


Fig. 2-1-2

- Both side covers may be removed by pulling them outward.

  Note: When reinstalling the left side cover (viewed from the front), place the bottom-right corner of the cover underneath the mounting portion of the adjustable handle grip. (Fig. 2-1-3)

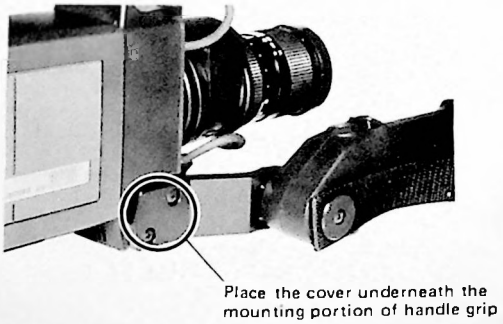


Fig. 2-1-3

- Remove three screws which hold the printed circuit board (PCB) in order to gain access to the desired circuitry.

  (A) For left side PCB (viewed from the front)
  Deflection Circuit Board (YWV3110PZK1)

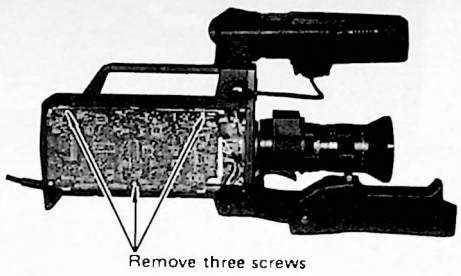


Fig. 2-1-4

(B) For right side PCB (viewed from the front)
Process Circuit Board (YWV3110PZK2)

Note: When reinstalling the process circuit board, make sure that the insulating washers are attached at the PCB.

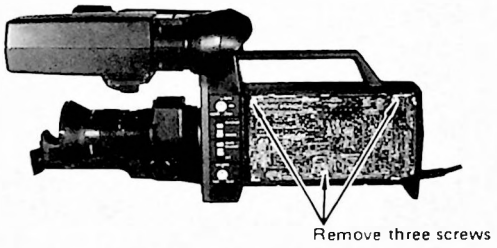


Fig. 2-1-5

- Hook both PCBs onto the PCB holding edges of the chassis to fix both PCBs firmly. (Fig. 2-1-6)

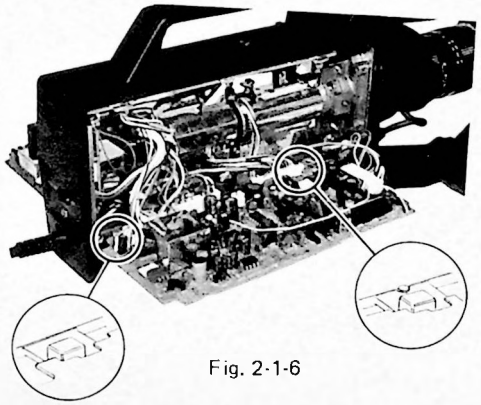


Fig. 2-1-6

2-2. Viewfinder Unit

- Disconnect the viewfinder connector from the camera.
- Remove viewfinder cable from the cable clamp, loosen the EVF fixing knob and remove the viewfinder from the mounting bracket. (Fig. 2-2-1)

  Note: The viewfinder can be disassembled without removing it from the camera.

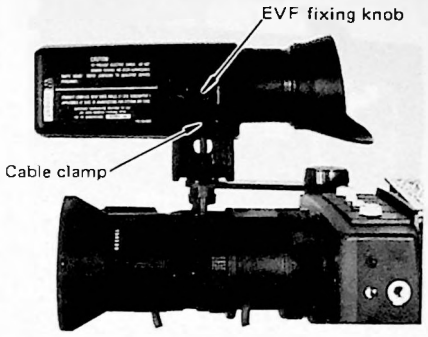


Fig. 2-2-1

- Remove the three screws on the bottom and remove the top cover.

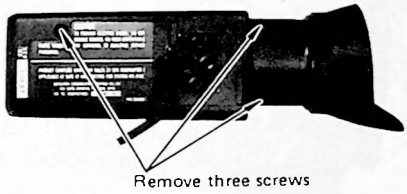


Fig. 2-2-2

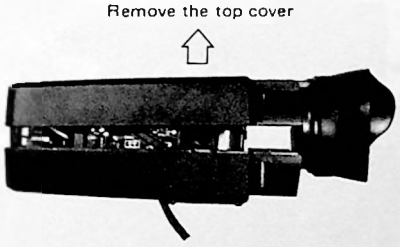


Fig. 2-2-3

3. VIDICON REPLACEMENT

- Dissassemble the camera as described in Section 2 "DISASSEMBLY PROCEDURE FOR ADJUSTMENT" on page 1.
- Remove the two screws holding the vidicon socket shield case B and remove the shield case B after pulling it back a little. (Fig. 3-1)

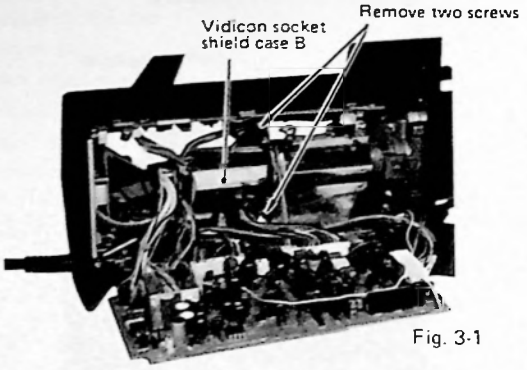


Fig. 3-1

- Disconnect the vidicon socket from the vidicon. (Fig. 3-2)
- Remove the two screws on the coil holder A, and remove the holder A and the backfocus adjusting pin. Fig. 3-2)

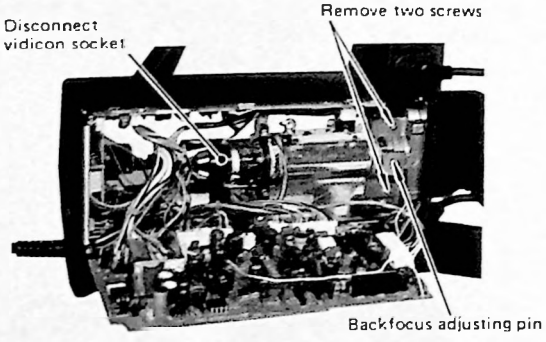


Fig. 3-2

- Remove the four screws which hold the shield plate for preamplifier circuit board and remove the shield plate. (Fig. 3-3)

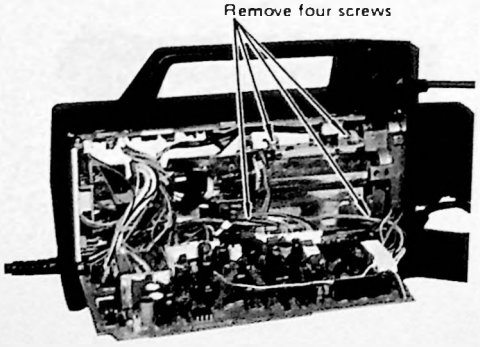


Fig. 3-3

- Disconnect the deflection coil connector CN111 from the deflection circuit board and unsolder the target lead from the preamplifier circuit board. (Fig. 3-4)

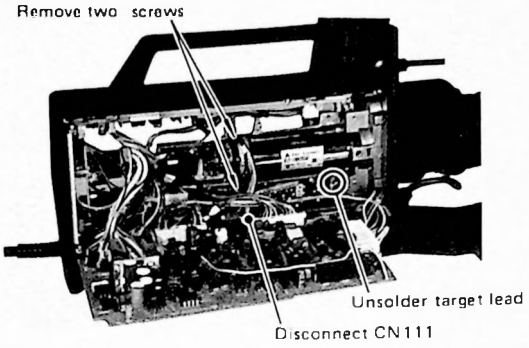


Fig. 3-4

- Remove the two screws (Fig. 3-4) on the coil holder B and remove the deflection coil together with the coil holder B from the chassis by pulling it backward. (Fig. 3-5)

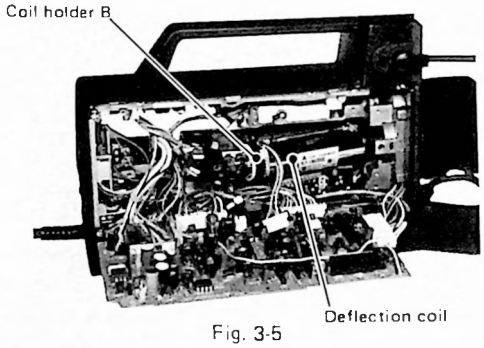


Fig. 3-5

- Loosen the vidicon holding screw and push the vidicon out (in the direction of the lens). (Fig. 3-6)

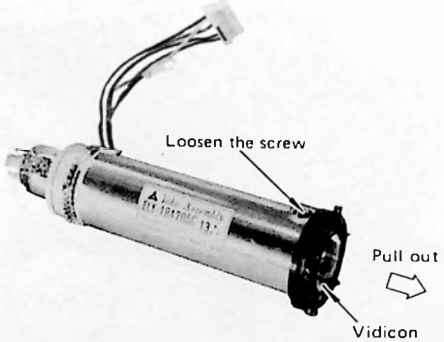


Fig. 3-6

- Insert the new vidicon (parts No. S4094) into the deflection coil and push it completely until it stops.

  Note: 1. When inserting the vidicon in place, be careful not to expose the target directly to bright light.
  2. Make sure that the vidicon is positioned correctly, i.e., the optical black on the vidicon is on the right and in parallel with the vertical line between the centers of the protruding part of the deflection coil when the target lead is positioned at the bottom side as shown in Fig. 3-7.

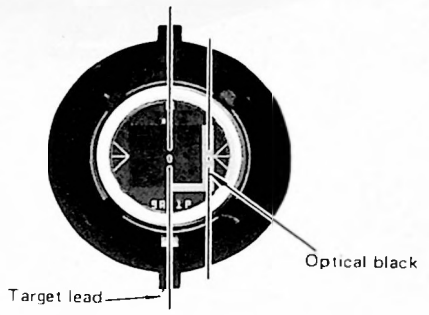


Fig. 3-7

- Tighten the vidicon holding screw (Fig. 3-6) to secure the vidicon in place.
- Clean the vidicon faceplate with the lens cleaning tissue or cloth.
- Install the deflection coil into the chassis.

  Note: 1. The target lead has to be positioned downward.
  2. Make sure that the protruding part of the deflection coil engages the recessed part of the chassis. (Fig. 3-8)

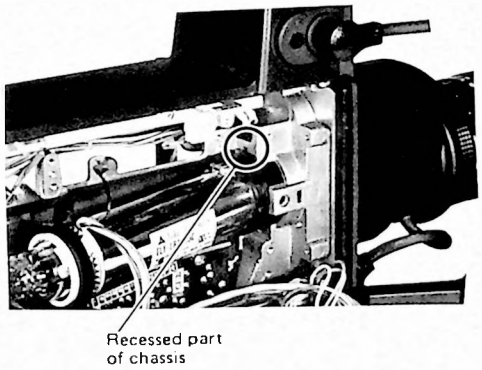


Fig. 3-8

- Attach the coil holder B to the deflection coil (Fig. 3-9) and hold it with two screws.

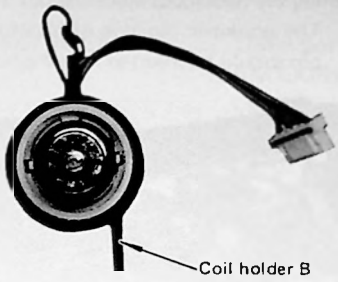


Fig. 3-9

- Solder the target lead.
- Attach the shield plate for preamplifier with the four screws. (Fig. 3-10)

  Note: When attaching the shield plate, also fix the ground leads for the deflection coil and the preamplifier circuit board. (Fig. 3-10)

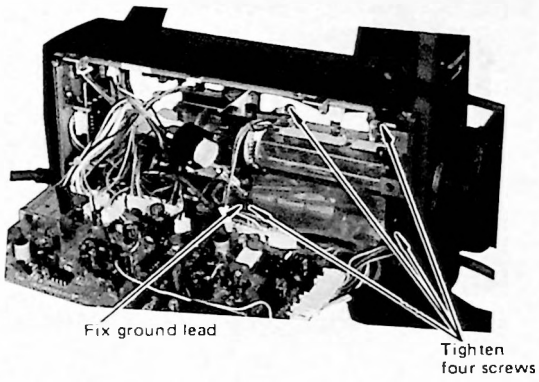


Fig. 3-10

- Align the ditch on the front portion of the deflection coil with the hole for the back focus adjusting pin by moving the deflection coil. (Fig. 3-11)

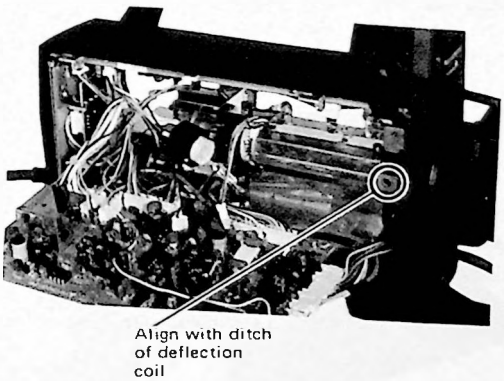


Fig. 3-11

- Insert the backfocus adjusting pin into the hole and confirm that the deflection coil moves back and forth by turning the backfocus adjusting pin. (Fig. 3-12)

  Note: The eccentric pin side of backfocus adjusting pin should be inserted into the hole.

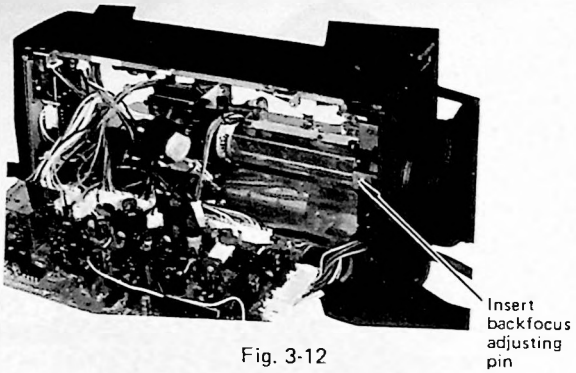


Fig. 3-12

- Install the coil holder A to the chassis with the two screws. (Fig. 3-13)

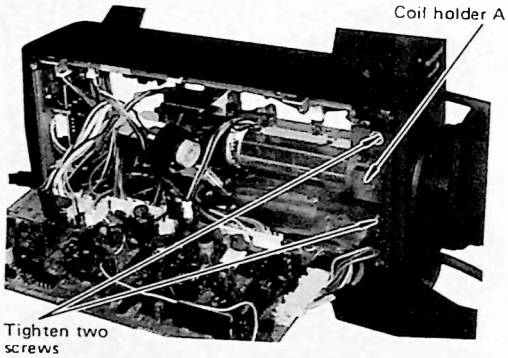


Fig. 3-13

- Connect the vidicon socket to the vidicon and the deflection coil connector CN111 to the Deflection circuit board.
- Install the ground lead for the vidicon socket. (Fig. 3-14)

  Note: The vidicon socket shield case B will be installed after the vidicon rotation adjustment.

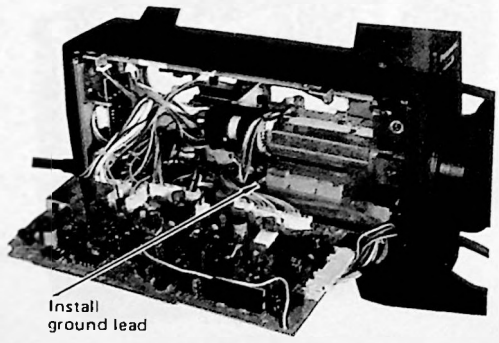


Fig. 3-14

- Hook both PCBs onto the PCB holding edges of the chassis to hold both PCBs firmly. (Fig. 3-15)

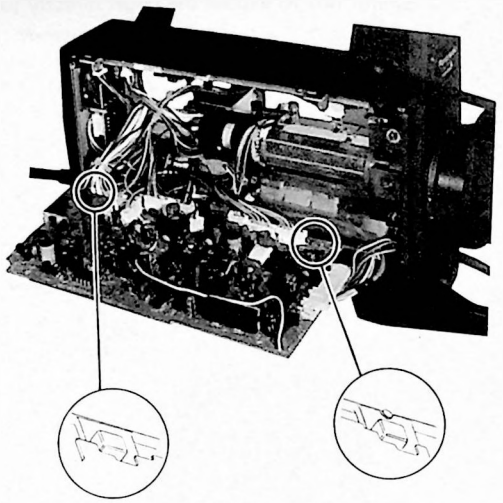


Fig. 3-15

- After replacing the vidicon, adjust the camera according to Section 4 "ADJUSTMENT PROCEDURE" on page 6.

Steps denoted by shaded outlines do not have to be performed if only vidicon is replaced.

4. ADJUSTMENT PROCEDURE

4-1. Connection and Setting Up for Adjustment

■ Connection

- Connect the camera cable from the camera to the power supply.
- Connect the video cable from the power supply to the color monitor.
- Terminate the color monitor video input in 75 ohms.

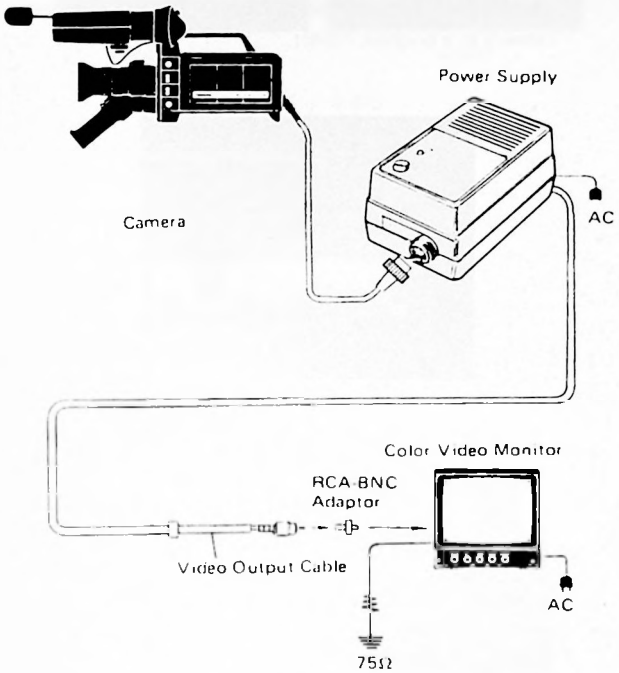


Fig. 4-1-1

■ Disassembling

- Disassemble the camera while referring to Section 2. "DISASSEMBLY PROCEDURE FOR ADJUSTMENT" on page 1.

■ Setting up

- Light: Incident light intensity on chart: 140 foot-candles (1400 lux) Color temperature: 3200°K
- Test Charts: Logarithmic gray scale chart (YWV2310RB99)
  Color chart (YWV2100RB98)
  Flat white chart
  Ball chart (YWV2100RB03)

■ Position of controls and switches on the camera

- Set the controls and switches on the camera as follows;

Indoor/Outdoor switch	Lower position (INDOOR)
White balance switch	Upper position (WHITE BALANCE)
Iris close/auto/open control	Center position (AUTO)
Color adjustment control	Center position (BALANCE)
Standby power switch	Right position (ON)

Caution: Do not set the white balance during the adjustment.

Note: TP in this manual refers to a test point on the printed circuit board.

4-2. Power Supply Adjustment

Note: If a complete alignment is to be performed, proceed with the power supply adjustment first. If only a portion of the procedure is to be done, check the power supply voltage, but do not adjust unless it is in gross error (±0.1V).

- Refer to page 23 for the test points and adjusting controls.

(a) +9V adjustment

Test point:	TP104 (+9V)	Deflection Board
Adjust:	VR104 (+9V ADJ)	" "

- Connect the DVM probe to TP104.
- Adjust +9V ADJ VR104 for 9V ± 0.02V.

(b) Battery warning level adjustment

Observe: Viewfinder
Adjust: VR120 (BATTERY WARNING LEVEL)
Deflection Board

- Disconnect the camera cable from the power supply.
- Connect the DC power supply (10 ~ 12VDC variable, 1.0A) to pin 4 of CN106 or pin 4 of CN107 on the Deflection circuit board.
- Set the DC power supply voltage for 10.8V±0.02V.
- Turn VR120 fully counterclockwise, then turn it back slowly and stop it when the battery warning indicator [REC] in the viewfinder just start flashing.
- Disconnect the DC power supply and connect the camera cable to the power supply.

4-3. Sync Adjustment

- Refer to page 23 for the test points and adjusting controls.

(a) 3.58MHz adjustment

Test point:	TP201 (SC)	Process Board
Adjust:	VC202 (3.58MHz ADJ)	" "

- Connect the frequency counter to TP201.
- Adjust 3.58MHz ADJ VC202 for 3.579545MHz ± 10Hz.

4-4. Camera Unit Adjustment

- Refer to page 23 for the test points and adjusting control.

(a) Lens iris setting for adjustment

Adjust:	Iris setting screw	Zoom Lens Unit

- Set the standby power switch on the rear of camera to the STANDBY position.

Note: Before setting the lens iris opening, the standby power switch on the camera should be STAND-BY position or the power switch on the power supply must be turned OFF.

- Remove the cap for the iris setting screw from the zoom lens unit. (Fig. 4-4-1)
- While pushing the iris setting screw (in the zoom lens unit) with the screw driver, turn the screw clockwise about 90 degrees until it locks. When the iris setting screw is locked, the screw will not come back unless it is turned counterclockwise.
- Set the standby power switch to the ON position. In this state, the automatic iris control function goes off and the lens iris is set to the specific iris opening.

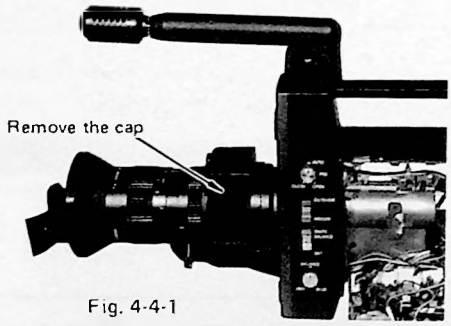


Fig. 4-4-1

(b) Beam current adjustment

Test point:	TP204 (PRE VIDEO)	Process Board
Adjust:	VR114 (BEAM)	Deflection Board
	VR224 (AIC SET)	Process Board

- Set the zoom lens to the automatic iris control (AIC) mode by turning the iris setting screw in the zoom lens counterclockwise to unlock it after setting the standby power switch to the STANDBY position.
- Set the standby power switch to the ON position.

Steps denoted by shaded outlines do not have to be performed if only vidicon is replaced.

- Turn AIC SET VR224 fully counterclockwise.
- Connect the oscilloscope to TP204.
- Trigger the oscilloscope at H.rate. (Use TP105 on deflection board)
- If a horizontal magenta bar is observed on the monitor, turn H.CENTERING VR107 clockwise until the bar disappears.
- Aim the camera at the scene which contains a high intensity object.
- Adjust BEAM VR114 until the waveform is clipped at 2.4Vp-p. (Fig. 4-4-2)
  If the signal does not increase up to 2.4Vp-p, aim the camera at a brighter object.

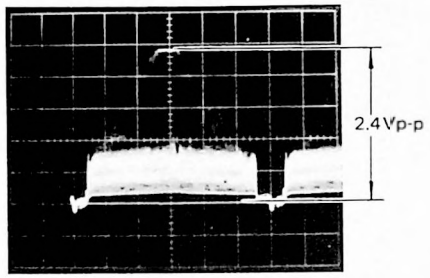


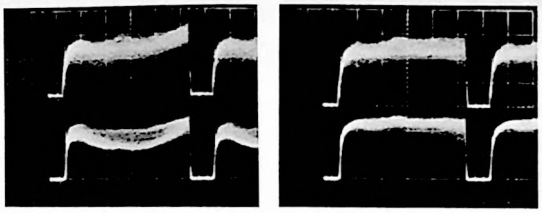
Fig. 4-4-2

(c) Beam alignment adjustment

Test points:	TP213 (R)	Process Board
	TP212 (B)	" "
	TP207 (+3.3V)	" "
Adjust:	VR116 (FOCUS)	Deflection Board
	Alignment magnets	Coil Assembly
Observe:	Color monitor	

- Set the lens iris referring to (a) Lens iris setting for adjustment on page 7.
- Disconnect the connector CN208 for the automatic gain control (AGC) from the Process circuit board and connect a jumper wire between pin 2 of CN208 and TP207 (+3.3V).
- Aim the camera at the white chart.
- Connect the oscilloscope to TP213 (R) and TP212 (B).
- Trigger the oscilloscope at H.rate. (Use TP105 on deflection board)
- Turn DYNAMIC FOCUS VR131, VR132, VR133 and VR134 to their mechanical center.
- Also turn SIGNAL SHADING VR208 to VR215 to their mechanical center.

- While observing the color monitor, adjust FOCUS VR116 for minimum green tint in the center. At this time, the center portion of R and B signal waveforms at TP213 and TP212 become maximum. (Fig. 4-4-3)



NO GOOD GOOD

Fig. 4-4-3

- Then while observing the color monitor, rotate the alignment magnets (see Fig. 4-4-4) for minimum green tint in the center and maximum magenta (red) throughout the picture area.
  At this time, the waveform peaks of R and B signals are same in phase and maximum in amplitude. (Fig. 4-4-5)

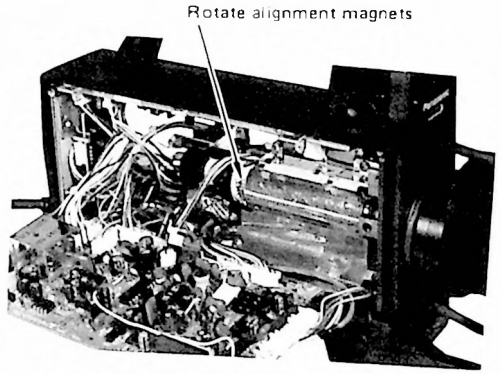
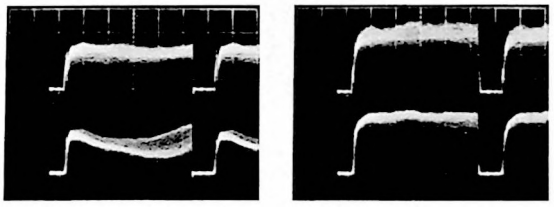


Fig. 4-4-4



NO GOOD GOOD

Fig. 4-4-5

- Overall focus is affected by the beam alignment adjustment so readjust FOCUS VR116 occasionally while performing beam alignment adjustment.
- If a bright green area appears at the corner of the monitor, readjust the beam alignment with the alignment magnets.
- If green tinted areas still remain after repeating the beam alignment, they will be minimized by the dynamic focus and signal shading adjustments which follow.

(d) Focus coarse adjustment

Adjust:	VR116 (FOCUS)	Deflection Board
Observe:	Color monitor	

- Keep the lens iris set as in the preceding step.
- Keep connecting the jumper wire as in the preceding step.
- Aim the camera at the white chart.
- While observing the color monitor, adjust FOCUS VR116 for minimum green tint and maximum magenta (red) throughout picture area.
- If bright green area appears at the corner of the monitor, readjust the beam alignment while referring to " (c) Beam alignment adjustment" on page 7.
- If green tinted areas still remain after repeating the beam alignment, they will be minimized by the dynamic focus and signal shading adjustment which follow.

(e) Vidicon rotation

Test point:	Pin 3 of IC204 (Rc/Bc)	Process Board
Adjust:	Vidicon	

- Keep setting the lens iris and connecting the jumper wire as in the preceding step.
- Remove the two screws which hold the vidicon socket shield case B, and remove the shield case. (Fig. 4-4-6)

Note: The ground lead for the vidicon socket must be installed on the chassis. (Fig. 4-4-6)

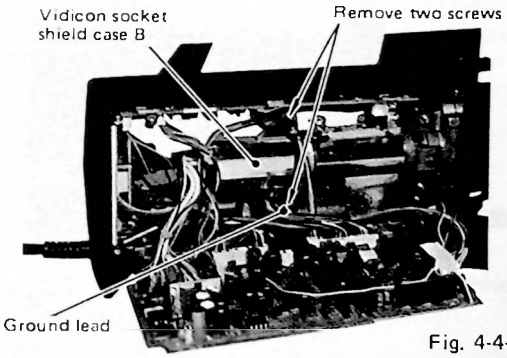


Fig. 4-4-6

- Loosen the vidicon holding screw. (Fig. 4-4-7)

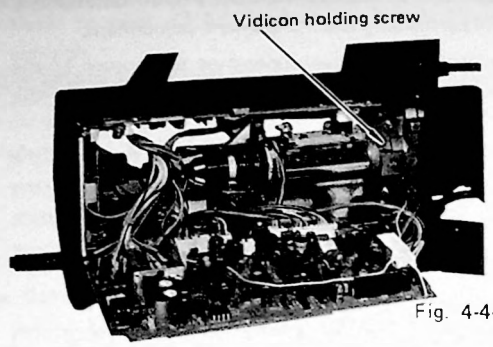


Fig. 4-4-7

- Aim the camera at the white chart.
- Connect the oscilloscope to pin 3 of IC204 on the process circuit board.
- Trigger the oscilloscope at V rate. (Use TP106 on deflection board)
- Use the delayed sweep mode of oscilloscope to line-select 2H periods from the center of the waveform. (Fig. 4-4-8)

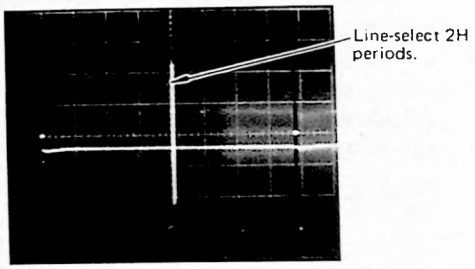


Fig. 4-4-8

- Rotate the vidicon by means of the vidicon socket (Fig. 4-4-9) (CAUTION, 1600V DC) and stop at the point where the waveform becomes as flat as possible. (Fig. 4-4-10)

  Ideally, the waveform should show one flat envelope of lesser amplitude and one of greater amplitude, each with a period of 1H.

  Note: Do not push the vidicon forward while rotating it.

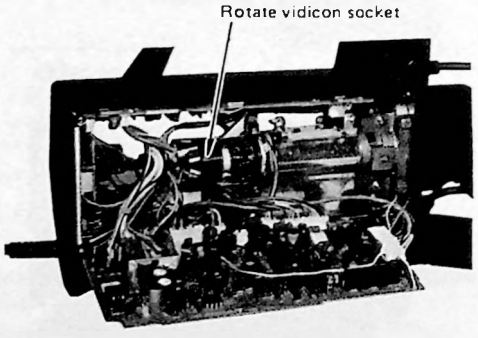
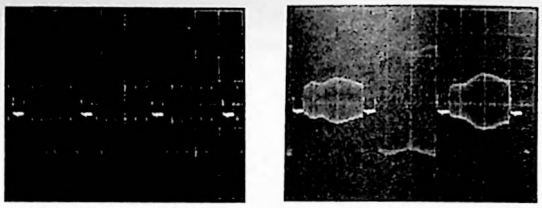


Fig. 4-4-9



NO GOOD GOOD

Fig. 4-4-10

- Carefully tighten the vidicon holding screw and make sure that the waveform remains properly adjusted.
- Install the vidicon socket shield case B with the two screws.

(f) Backfocus adjustment

Adjust:	Backfocus adjusting screw
Observe:	Color monitor

- Set the zoom lens to the automatic iris control (AIC) mode by turning the iris setting screw in the zoom lens counterclockwise to unlock it after setting the standby power switch to the STANDBY position.
- Set the standby power switch to the ON position, lower the lighting level so that the lens iris opens fully in order to have minimum depth of focus.
- Aim the camera at an object further than 6 feet (2m) from the camera.
- Loosen the two backfocus fixing screws slightly. (Fig. 4-4-11)
- Zoom in (close up/telephoto) and adjust the lens focus.
- Zoom out (wide angle) and adjust the focus by turning the backfocus adjusting screw. (Fig. 4-4-11)

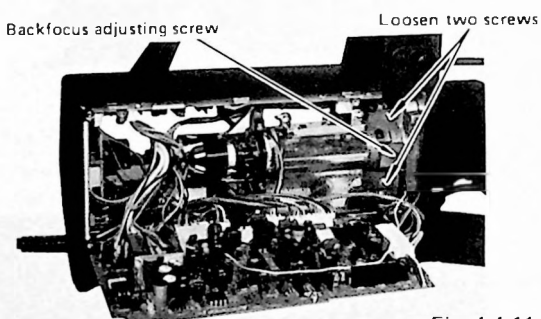


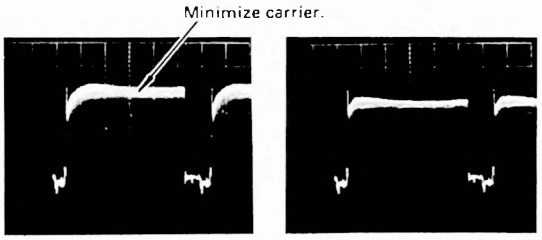
Fig. 4-4-11

- Zoom in again and adjust the focus by turning the lens focus.
- Zoom out again and adjust the focus by turning the backfocus adjusting screw.
- Repeat this procedure until the focus tracks throughout the zoom range.

(g) Horizontal size, horizontal linearity and vertical size adjustment

Test points:	TP203 (Y)	Process Board
	Pin 3 of IC204 (Rc/Bc)	" "
Adjust:	VR105 (H.SIZE)	Deflection Board
	VR112 (H.LIN-1)	" "
	VR106 (H.LIN-2)	" "
	VR108 (V.SIZE)	" "

- Set the lens iris referring to (a) Lens iris setting for adjustment on page 7.
- Aim the camera at the white chart.
- Connect the oscilloscope to TP203.
- Trigger the oscilloscope at H rate. (Use TP105 on deflection board)
- Adjust H.SIZE VR105 so that the carrier (3.58MHz) on the center portion of the Y signal at TP203 is minimum. (Fig. 4-4-12)
- Adjust H.LIN-1 VR112 so that the carrier (3.58MHz) on the Y signal is minimum. (Fig. 4-4-12)



NO GOOD GOOD

Fig. 4-4-12

- Adjust H.LIN-2 VR106 so that the carrier (3.58MHz) on the starting portion of Y signal at TP203 is minimum (Fig. 4-4-13), and the starting portion of Y signal becomes as flat as possible.
  At this time, the picture will have minimum disturbance (color shading) on the left side of the color monitor.

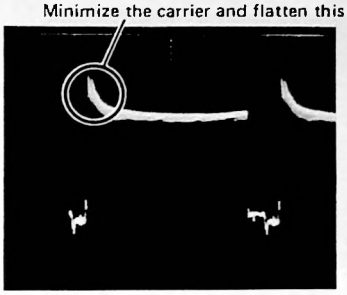
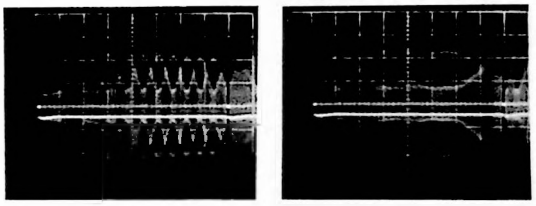


Fig. 4-4-13

- Repeat adjusting H.SIZE VR105, H.LIN-1 VR112 and H.LIN-2 VR106 until the carrier on the Y signal is minimum, the starting portion of Y signal is flat and the picture has minimum disturbance on the left side.
- Connect the oscilloscope to pin 3 of IC204 on the Process circuit board.
- Trigger the oscilloscope at V rate. (Use TP106 on deflection board)
- Adjust V.SIZE VR108 for minimum beat during the vertical period. (Fig. 4-4-14)



NO GOOD GOOD

Fig. 4-4-14

(h) Vertical centering adjustment

Test point:	TP204 (PRE VIDEO)	Process Board
Adjust:	VR107 (H. CENTERING)	Deflection Board
	VR109 (V. CENTERING)	" "

- Keep setting the lens iris and connecting the jumper wire as in the preceding step.
- Aim the camera at the white chart.
- Connect the oscilloscope to TP204
- Trigger the oscilloscope at V.rate. (Use TP106 on deflection board)

- Turn H. CENTERING VR107 fully counterclockwise.
  Note: The optical black clamp may disturb the picture.
- While observing the waveform, adjust V. CENTERING VR109 so that the marker which shows the vertical center of vidicon positions at the center of video signal waveform in vertical rate. (Fig. 4-4-15)

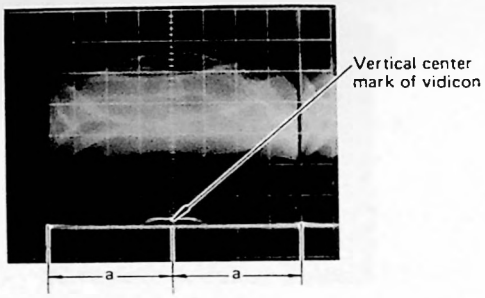


Fig. 4-4-15

- Turn H. CENTERING VR107 back until the magenta tint disappears.

(i) Horizontal centering adjustment

Test points:	TP105 (Hs)	Deflection Board
	TP204 (PRE VIDEO)	Process Board
Adjust:	VR107 (H. CENTERING)	Deflection Board

- Keep setting the lens iris and connecting the jumper wire as in the preceding step.
- Aim the camera at the white chart.
- Connect the oscilloscope to TP204 and TP105.
- Trigger the oscilloscope at H.rate. (Use TP105 on deflection board)
- Expand the horizontal blanking period on the oscilloscope.
- Adjust H. CENTERING VR107 until the optical black width is 3.5μsec. (Fig. 4-4-16)
  If the falling edge of the waveform corresponding to the picture area is noisy, adjust for the middle.

Fig. 4-4-16

(j) Dark current and dark shading adjustment

Test point:	TP204 (PRE VIDEO)	Process Board
Adjusts:	VR101 (H. PARABOLA)	Deflection Board
	VR102 (H. SAWTOOTH)	" "
	VR110 (TARGET)	" "

- Keep setting the lens iris and connecting the jumper wire as in the preceding step.
- Cap on the lens after aiming the camera at the white chart for a while (about 30 seconds) until the burning image on the vidicon disappears.
- Connect a 1:1 probe of the oscilloscope to TP204.
- Trigger the oscilloscope at V.rate. (Use TP106 on deflection board)
- Adjust TARGET VR110 so that the dark current is 50mV. (Fig. 4-4-17)
  Note: If there is dark shading, adjust the level at the center of the waveform.

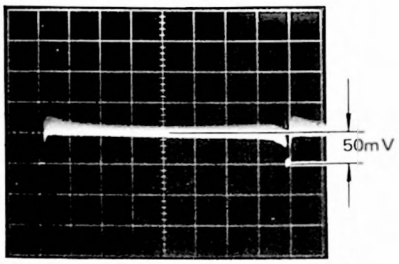
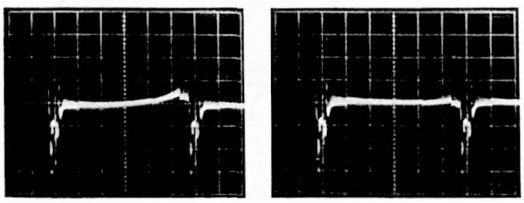


Fig. 4-4-17

- Trigger the oscilloscope at H.rate. (Use TP105 on deflection board)
- While watching the waveform, adjust DARK SHADING, H. PARABOLA VR101 and H. SAWTOOTH VR102 to make the dark current waveform as flat as possible. (Fig. 4-4-18)



NO GOOD GOOD

Fig. 4-4-18

- After the above adjustment, trigger the oscilloscope at V. rate again. (Use TP106 on deflection board)
- Confirm that the dark current in the middle of waveform is 50mV. If not, readjust TARGET VR110 for 50mV.

(k) Beam current readjustment

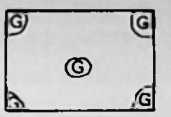
- Adjust the beam current while referring to (b) Beam current adjustment on page 7.

(l) Dynamic focus adjustment

Adjusts:	VR116 (FOCUS)	Deflection Board	
	VR132 (H. SAWTOOTH)	"	"
	VR131 (H. PARABOLA)	"	"
	VR133 (V. PARABOLA)	"	"
	VR134 (V. SAWTOOTH)	"	"
Observe:	Color monitor		

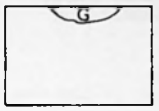
- Keep setting the lens iris and connecting the jumper wire as in the preceding step.
- Aim the camera at the white chart.
- Observe the color monitor, and adjust FOCUS VR116 for minimum green in the center and maximum magenta (red) throughout the picture area.
- Observe the color monitor and adjust for the best white balance at the center of the screen using the color adjustment (RED/BLUE) control on the side of the camera.
- Increase the color monitor's chroma gain for better viewing.
  Make sure that the color monitor is converged properly.
- Adjust DYNAMIC FOCUS, H. SAWTOOTH VR132, H. PARABOLA VR131, V. PARABOLA VR133 and V. SAWTOOTH VR134 to minimize the green tint in the corners and edge of picture.

  Note: 1. Overall focus is affected by the dynamic focus adjustment so readjust FOCUS VR116 occasionally while performing the dynamic focus adjustment.
  2. The object of this adjustment is to optimize overall focus, especially at the picture edges and corners.



H. PARABOLA VR118
V. PARABOLA VR120

H. SAWTOOTH VR119
H. PARABOLA VR118



V. SAWTOOTH VR121

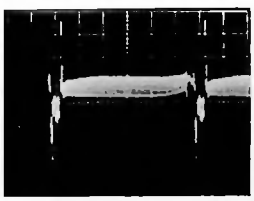
H. SAWTOOTH VR119
V. SAWTOOTH VR121

Fig. 4-4-19

(m) Optical black (OB) correction and OB offset adjustment

Test point:	TP203 (Y)	Process Board	
Adjusts:	VR226 (OB CORRECTION-PARA)	"	"
	VR225 (OB CORRECTION-SAW)	"	"
	VR227 (OB OFFSET)	"	"

- Keep the lens iris set as in the preceding step.
- Disconnect the jumper wire between pin 2 of CN208 and TP207 on the Process circuit board.
- Cap on the lens after aiming the camera at the white chart for a while (about 30 seconds) until burning image on the vidicon disappears.
- Connect the oscilloscope to TP203.
- Trigger the oscilloscope at H.rate. (Use TP105 on deflection board)
- Adjust OB CORRECTION-PARA VR226 and OB CORRECTION-SAW VR225 so that the top portion of dark signal waveform becomes as narrow as possible. (Fig. 4-4-20)



NO GOOD GOOD

Fig. 4-4-20

- Adjust OB OFFSET VR227 so that the center portion of dark current level matches the optical black (OB) level. (Fig. 4-4-21)

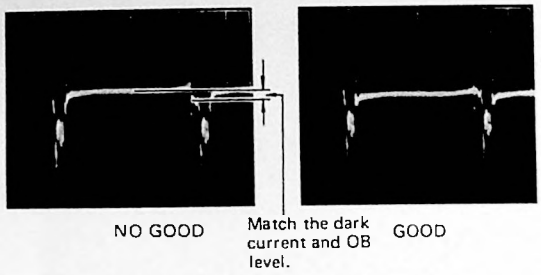


Fig. 4-4-21

(n) Input level adjustment

Test point:	TP203 (Y)	Process Board
Adjusts:	VR220 (INPUT GAIN)	" "
	VR224 (AIC SET)	" "

- Keep the lens iris set as in the preceding step.
- Connect the jumper wire between pin 2 of CN208 and TP207.
- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to TP203.
- Trigger the oscilloscope at H.rate. (Use TP105 on deflection board)
- Adjust INPUT GAIN VR220 so that the voltage between the OB level and the fourth step (one step below the crossing step) of the gray scale waveform is 0.2V. (Fig. 4-4-22)

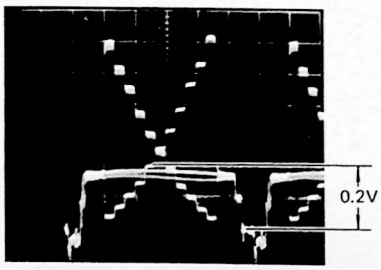


Fig. 4-4-22

- Set the zoom lens to the automatic iris control (AIC) mode by turning the iris setting screw in the zoom lens counterclockwise to unlock it after setting the standby power switch to the STANDBY position.
- Set the standby power switch to the ON position.

Steps denoted by shaded outlines do not have to be performed if only vidicon is replaced.

- Adjust AIC SET VR224 so that the voltage between the OB level and the fourth step (one step below the crossing step) of the gray scale waveform is about 0.4V. (Fig. 4-4-23)

  Note: This is the presetting-up for R and B signal tracking-3 adjustment.

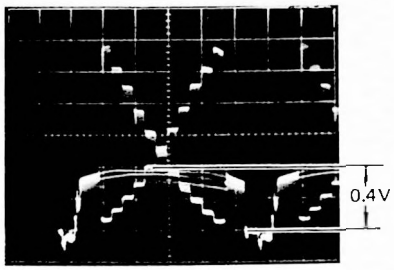


Fig. 4-4-23

(o) Vertical edge balance adjustment

Test point:	TP205 (V. EDGE)	Process Board
Adjust:	VR201 (V. EDGE BALANCE)	" "

- Set the lens iris referring to (a) Lens iris setting for adjustment on page 7.
- Keep connecting the jumper wire as in the preceding step.
- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to TP205.
- Trigger the oscilloscope at H.rate. (Use TP105 on deflection board)
- Adjust V. EDGE BALANCE VR201 to cancel the video signal. (Fig. 4-4-24)

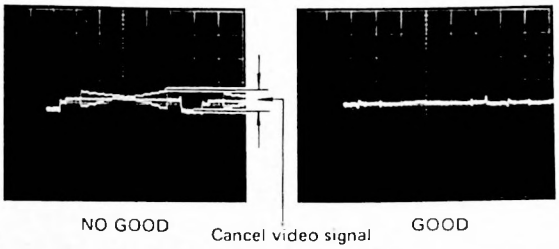


Fig. 4-4-24

(p) Y gain adjustment

Test point:	TP208 (NTSC)	Process Board
Adjusts:	VR217 (Y. GAIN)	" "
	VR229 (Y. PED)	" "

- Keep setting the lens iris and connecting the jumper wire as in the preceding step.
- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to TP208.
- Trigger the oscilloscope at H.rate. (Use TP105 on deflection board)

- Adjust Y. GAIN VR217 for 0.71V from the blanking level to the top step of the gray scale waveform. (Fig. 4-4-25)

  Note: If it is difficult to read the signal level due to the carrier signal, turn TRACKING-3 SET VR219 fully counterclockwise to minimize the carrier signal. After adjusting Y. GAIN VR217, turn VR219 fully clockwise.

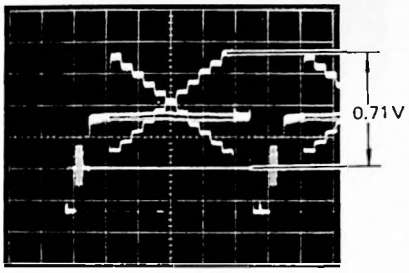


Fig. 4-4-25

- Cap on the lens.
- Adjust Y. PED VR229 so that the dark (Pedestal) level is 50mV. (Fig. 4-4-26)

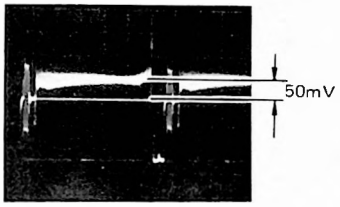


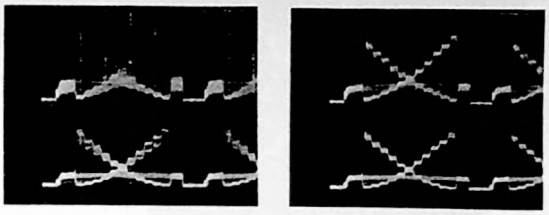
Fig. 4-4-26

Repeat adjusting Y.GAIN VR217 and Y.PED VR229 until the dark (Pedestal) level is 50mV and the Y signal is 0.71V.

(q) R and B signal separation adjustment

Test point:	TP213 (R)	Process Board
	TP212 (B)	" "
Adjusts:	VC201 (Rc/Bc SEPARATION-1)	" "
	VR223 (Rc/Bc SEPARATION-2)	" "

- Keep setting the lens iris and connecting the jumper wire as in the preceding step.
- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to TP213 (R) and TP212 (B).
- Trigger the oscilloscope at H.rate. (Use TP105 on deflection board)
- Adjust Rc/Bc SEPARATION-1 VC201 for minimum waveform flicker (especially B signal at TP212). (Fig. 4-4-27)
- Adjust Rc/Bc SEPARATION-2 VR223 for the same condition.
- Repeat adjusting VC201 and VR223 until the flicker in both waveform is minimum.



NO GOOD GOOD

Fig. 4-4-27

(r) B gain and Y_L pedestal preset adjustment

Test points:	TP212 (B)	Process Board
	TP214 (Y_L)	" "
Adjusts:	VR216 (Rc/Bc GAIN)	" "
	VR218 (Y_L PED)	" "

- Keep setting the lens iris and connecting the jumper wire as in the preceding step.
- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to TP212 (B) and TP214 (Y_L).
- Trigger the oscilloscope at H.rate. (Use TP105 on deflection board)
- Set the color adjustment (RED/BLUE) control on the side of the camera to the center (BALANCE) position.
- Turn B. TRACKING-1 VR206, B. TRACKING-2 VR204, R. TRACKING-1 VR207 and R. TRACKING-2 VR205 to their mechanical center.
- Turn B. TRACKING-3 VR202, R. TRACKING-3 VR203 and TRACKING-3 SET VR219 fully clockwise.
- Overlay the B signal and Y_L signal on the oscilloscope, and adjust Rc/Bc GAIN VR216 so that the signal level between the black chip (zero step) and fifth step (crossing step) of the gray scale waveform match. (Fig. 4-4-28)

  Note: Before adjusting VR216, if the gray scale's black chip of Y_L signal is suppressed, turn Y_L PED VR218 until the black chip of Y_L signal can be observed.

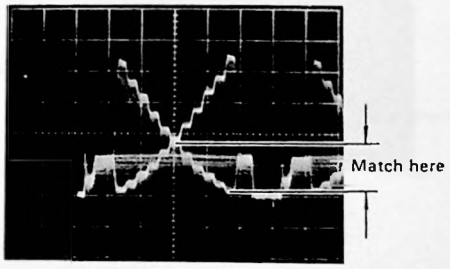


Fig. 4-4-28

- Next, adjust Y_L PED VR218 so that the pedestal level of Y_L signal matches that of B signal. (Fig. 4-4-29)

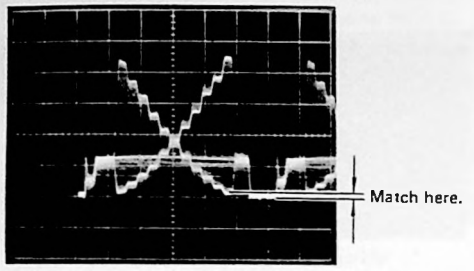


Fig. 4-4-29

- Repeat adjusting VR216 and VR218 until the signal level between the black chip (zero step) and fifth step (crossing step), and pedestal level of gray scale waveforms match.

(s) R gain and R pedestal preset adjustment

Test points:	TP213 (R)	Process Board	
	TP214 (Y_L)	"	"
Adjusts:	VR228 (R. GAIN)	"	"
	VR222 (R. PED)	"	"

- Keep setting the lens iris and connecting the jumper wire as in the preceding step.
- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to TP213 (R) and TP214 (Y_L).
- Trigger the oscilloscope at H.rate. (Use TP105 on deflection board)
- Overlay the R signal and Y_L signal on the oscilloscope, and adjust R.GAIN VR228 so that the signal level between the black chip (zero step) and fifth step (crossing step) of the gray scale waveform match. (Fig. 4-4-30)

  Note: Before adjusting VR228, if the gray scale's black chip of R signal is suppressed, turn R.PED VR222 until the black chip of R signal can be observed.

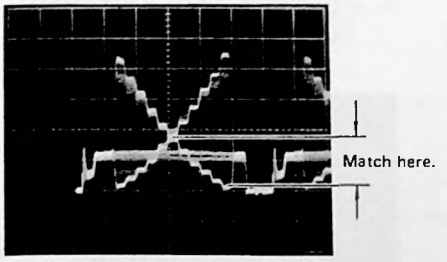


Fig. 4-4-30

- Next, adjust R. PED VR222 so that the pedestal level of R signal matches that of Y_L signal. (Fig. 4-4-31)

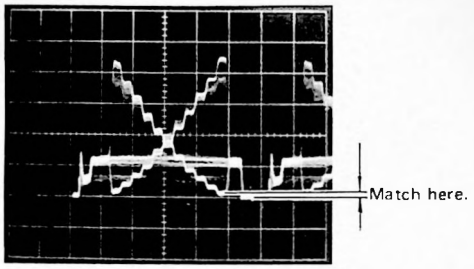


Fig. 4-4-31

- Repeat adjusting VR228 and VR222 until the signal level between the black chip (zero step) and fifth step (crossing step), and pedestal level of gray scale waveforms match.

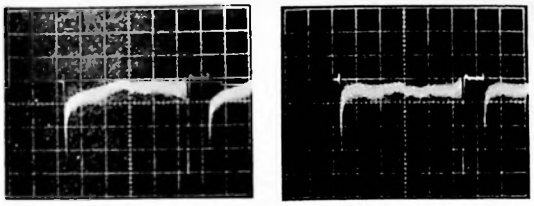
(t) Signal shading adjustment

Test points:	TP213 (R)	Process Board	
	TP212 (B)	"	"
	TP214 (Y_L)	"	"
Adjusts:	VR209 (R-V. SAWTOOTH)	"	"
	VR211 (R-V. PARABOLA)	"	"
	VR213 (R-H. SAWTOOTH)	"	"
	VR215 (R-H. PARABOLA)	"	"
	VR208 (B-V. SAWTOOTH)	"	"
	VR210 (B-V. PARABOLA)	"	"
	VR212 (B-H. SAWTOOTH)	"	"
	VR214 (B-H. PARABOLA)	"	"

- Keep setting the lens iris and connecting the jumper wire as in the preceding step.
- Aim the camera at the white chart.

■ R signal shading adjustment

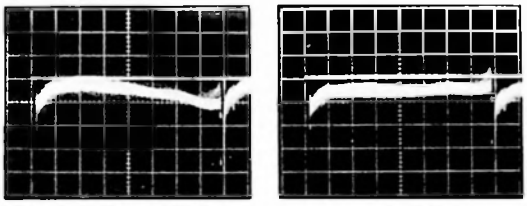
- Connect the oscilloscope to TP214 (Y_L) (ch1) and TP213 (R) (ch2).
- Trigger the oscilloscope at H.rate. (Use TP105 on deflection board)
- Invert ch2 (R, TP213) on the oscilloscope.
- Set the oscilloscope to ADD mode and observe the Y_L-R signal thus produced.
- Adjust R-H. SAWTOOTH VR213 and R-H. PARABOLA VR215 to make the waveform as flat as possible. (Fig. 4-4-32)



NO GOOD GOOD

Fig. 4-4-32

- Trigger the oscilloscope at V.rate. (Use TP106 on deflection board)
- Adjust R-V. SAWTOOTH VR209 and R-V. PARABOLA VR211 to make the waveform as flat as possible. (Fig. 4-4-33)



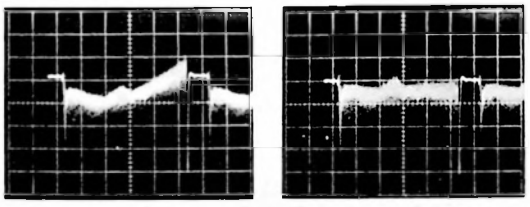
NO GOOD GOOD

Fig. 4-4-33

- Reset the Invert/Normal ch2 switch on the oscilloscope to Normal, and set to the Alternate mode.

B signal shading adjustment

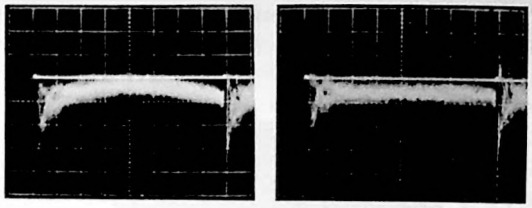
- Connect the oscilloscope to TP214 (Y_L) (ch1) and TP212 (B) (ch2).
- Trigger the oscilloscope at H.rate. (Use TP105 on deflection board)
- Invert ch2 (B, TP212) on the oscilloscope.
- Set the oscilloscope to ADD mode and observe the Y_L-B signal thus produced.
- Adjust B-H. SAWTOOTH VR212 and B-H. PARABOLA VR214 to make the waveform as flat as possible. (Fig. 4-4-34)



NO GOOD GOOD

Fig. 4-4-34

- Trigger the oscilloscope at V.rate. (Use TP106 on deflection board)
- Adjust B-V. SAWTOOTH VR208 and B-V. PARABOLA VR210 to make the waveform as flat as possible. (Fig. 4-4-35)



NO GOOD GOOD

Fig. 4-4-35

- Reset the Invert/Normal ch2 switch on the oscilloscope to Normal, and set the oscilloscope to the Alternate mode.

(u) Y_L and B signal tracking adjustment

		Process	Board
Test points:	TP212 (B)		
	TP214 (Y_L)	"	"
Adjusts:	VR216 (Rc/Bc GAIN)	"	"
	VR218 (Y_L PED)	"	"
	VR206 (B. TRACKING-1)	"	"
	VR204 (B. TRACKING-2)	"	"

- Keep setting the lens iris and connecting the jumper wire as in the preceding step.
- Confirm that B. TRACKING-3 VR202, R. TRACKING-3 VR203 and TRACKING-3 SET VR219 are turned fully clockwise, and B. TRACKING-1 VR206 and B. TRACKING-2 VR204 are set to their mechanical center.
- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to TP212 (B) and TP214 (Y_L).
- Trigger the oscilloscope at H.rate. (Use TP105 on deflection board)
- Overlay the B signal and the Y_L signal on the oscilloscope, and confirm that the signal level between the black chip (zero step) and fifth step (crossing step) of the gray scale waveforms match. If not, adjust Rc/Bc GAIN VR216 to match them. (Fig. 4-4-36)

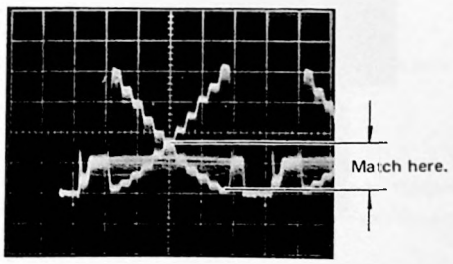


Fig. 4-4-36

- Adjust B. TRACKING-1 VR206 so that the B signal matches the Y_L signal in the lower half of the gray scale waveform. (Fig. 4-4-37)

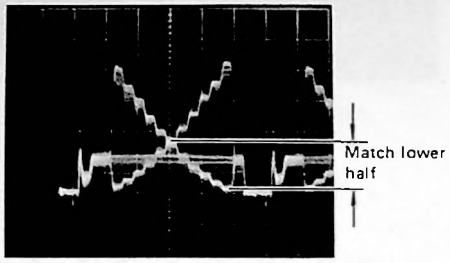


Fig. 4-4-37

- Adjust Y_L PED VR218 so that the pedestal level of Y_L signal matches that of B signal. (Fig. 4-4-38)

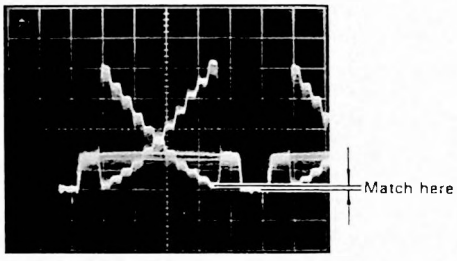


Fig. 4-4-38

- Adjust B. TRACKING-2 VR204 so that the B signal matches the Y_L signal in the 8th ~ 9th step of gray scale waveform. (Fig. 4-4-39)

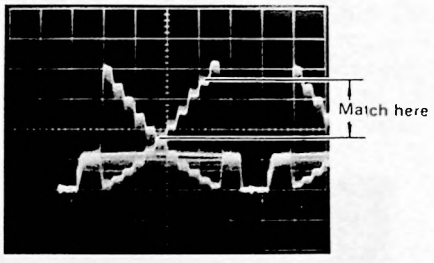


Fig. 4-4-39

- Repeat the above steps until the Y_L and B signal waveforms match.

(v) Y_L and R signal tracking adjustment

Test points:	TP213 (R)	Process Board	
	TP214 (Y_L)	"	"
Adjusts:	VR228 (R. GAIN)	"	"
	VR222 (R. PED)	"	"
	VR207 (R. TRACKING-1)	"	"
	VR205 (R. TRACKING-2)	"	"

- Keep setting the lens iris and connecting the jumper wire as in the preceding step.
- Confirm that R. TRACKING-1 VR207 and R. TRACKING-2 VR205 are set to their mechanical center.
- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to TP213 (R) and TP214 (Y_L).
- Trigger the oscilloscope at H rate. (Use TP105 on deflection board)
- Overlay the R. signal and the Y_L signal on the oscilloscope and confirm that the signal level between the black chip (zero step) and fifth step (crossing step) of the gray scale waveforms match. If not, adjust R. GAIN VR228 to match them. (Fig. 4-4-40)

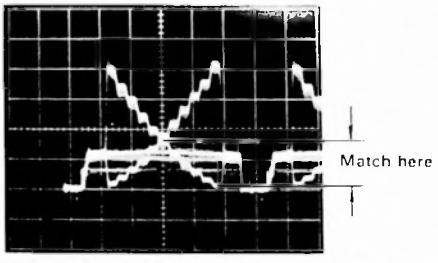


Fig. 4-4-40

- Adjust R. TRACKING-1 VR207 so that the R signal matches the Y_L signal in the lower half of the gray scale waveform. (Fig. 4-4-41)

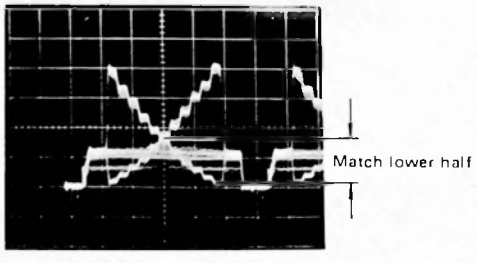


Fig. 4-4-41

- Adjust R. PED VR222 so that the pedestal level of R signal matches that of Y_L signal. (Fig. 4-4-42)

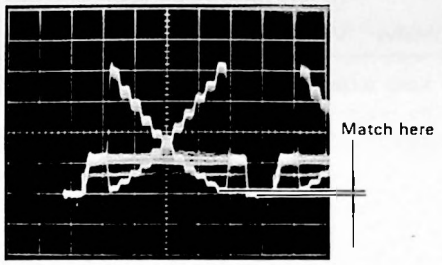


Fig. 4-4-42

- Adjust R. TRACKING-2 VR205 so that the R signal matches the Y_L signal in the 8th ~ 9th step of gray scale waveform. (Fig. 4-4-43)

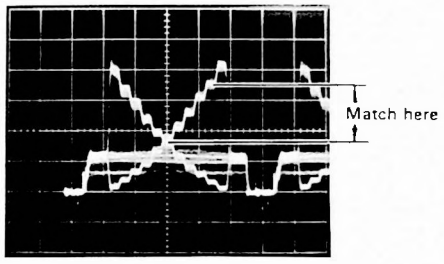


Fig. 4-4-43

- Repeat the above step until the Y_L and R signal waveforms match.

(w) R and B signal tracking-3 adjustment

Test points:	TP213 (R)	Process Board	
	TP212 (B)	"	"
	TP214 (Y_L)	"	"
Adjusts:	VR203 (R. TRACKING-3)	"	"
	VR202 (B. TRACKING-3)	"	"
	VR219 (TRACKING-3 SET)	"	"

- Set the zoom lens to the automatic iris control (ACI) mode by turning the iris setting screw in the zoom lens counterclockwise to unlock it after setting the standby power switch on the rear of camera to the STANDBY position.
- Set the standby power switch to the ON position.
- Confirm that B. TRACKING-3 VR202, R. TRACKING-3 VR203 and TRACKING-3 SET VR219 are turned fully clockwise.
- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to TP212 (B) and TP214 (Y_L).
- Trigger the oscilloscope at H.rate. (Use TP105 on deflection board)
- Compare the B signal and Y_L signal on the oscilloscope, and note the step at which the B signal no longer tracks with the Y_L signal. (Fig. 4-4-44)
  In the example shown in Fig. 4-4-44, 6th step is the point of divergence.

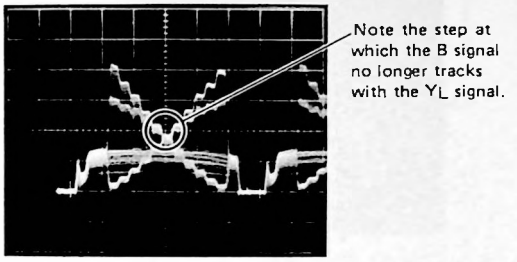


Fig. 4-4-44

- Turn back TRACKING-3 SET VR219 slowly and stop it at the point where the noted step of B signal just starts to be extended. (Fig. 4-4-45)

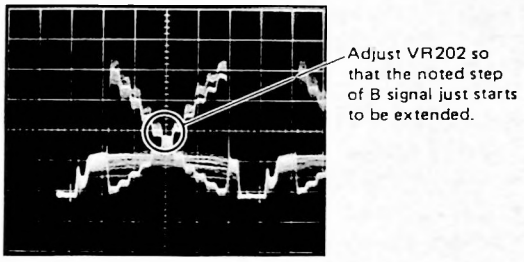


Fig. 4-4-45

- Adjust B. TRACKING-3 VR202 so that the B signal matches the Y_L signal in the 8th ~ 9th step of gray scale waveform. (Fig. 4-4-46)

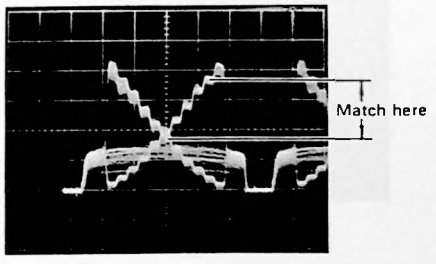


Fig. 4-4-46

- Repeat the above steps until the B signal and Y_L signal match.

- Connect the oscilloscope to TP213 (R) and TP214 (Y_L).
- Overlay the R signal and the Y_L signal on the oscilloscope, and adjust R. TRACKING-3 VR203 so that the R signal matches the Y_L signal in the 8th ~ 9th step of gray scale waveform. (Fig. 4-4-47)

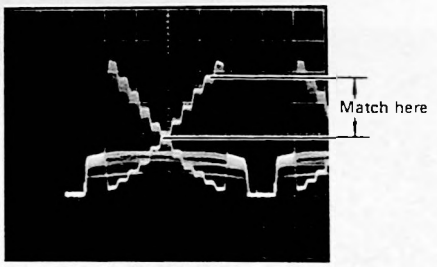


Fig. 4-4-47

(x) AIC level adjustment

Test point:	TP208 (NTSC)	Process Board
Adjust:	VR224 (AIC SET)	" "

- Keep setting the lens iris to the automatic iris control (AIC) mode as in the preceding step.
- Disconnect the jumper wire between pin 2 of CN208 and TP207, and connect CN208.
- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to TP208.
- Trigger the oscilloscope at H.rate. (Use TP105 on deflection board)
- Adjust AIC SET VR224 for 0.71V from the blanking level to the top step of the gray scale waveform. (Fig. 4-4-48)

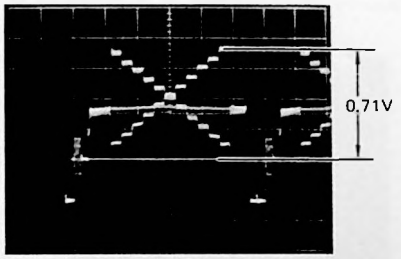


Fig. 4-4-48

(y) Chroma gain and burst phase adjustment

Adjusts:	VR211 (CHROMA GAIN)	Process Board
	VC203 (BURST PHASE)	" "
Observe:	Vectorscope	

- Keep setting the lens iris and connecting CN208 as in the preceding step.
- Aim the camera at the color chart (YWV2100RB98).
- Connect the NTSC output to a terminated vectorscope.
- Adjust CHROMA GAIN VR211 so that the RED vector on the vectorscope is equal to 180% as compares to the burst signal. (Fig. 4-4-49)
- Adjust BURST PHASE VC203 so that the RED vector is 12° away from the R-Y axis. (Fig. 4-4-49)

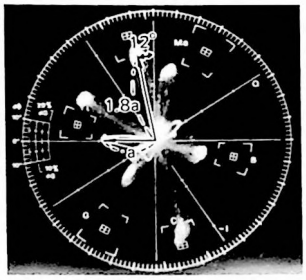


Fig. 4-4-49

(z) Iris indicator level adjustment

Adjust:	VR121 (IRIS INDICATOR Deflection Board LEVEL)
Observe:	Viewfinder

- Keep setting the lens iris and connecting CN208 as in the preceding step.
- Aim the camera at the logarithmic gray scale chart.
- While observing the viewfinder, adjust IRIS INDICATOR LEVEL VR121 so that the iris indicator line located on the left side of the viewfinder is positions at the center. (Fig. 4-4-50)

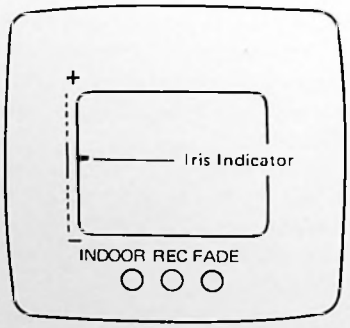


Fig. 4-4-50

Steps denoted by shaded outlines do not have to be performed if only vidicon is replaced.

4-5. Viewfinder Adjustment

- The camera must be completely aligned before viewfinder adjustment is made.
- The conditions and connections for viewfinder adjustment are the same as shown in Fig. 4-1-1 on page 6.
- Refer to page 21 for the adjusting controls.

(a) Horizontal hold adjustment

Adjust:	VR802 (H. HOLD)
Observe:	Viewfinder

- Aim the camera at the ball chart (YWV2100RB03).
- Adjust H. HOLD VR802 to a mid-point of horizontal hold lock range.

(b) Reduce picture size using H. SIZE L805 and V. SIZE VR805.

(c) Picture tilt adjustment

Adjust:	Deflection coil
Observe:	Viewfinder

- Make sure the camera is level with the chart.
- Loosen the deflection coil holding screw. (Fig. 4-5-1)

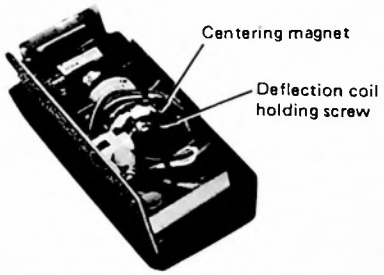


Fig. 4-5-1

- Observe the viewfinder, and turn the deflection coil until the image is straight.
- Tighten the deflection coil holding screw.

(d) Centering magnets adjustment

Adjust:	Centering Magnets
Observe:	Viewfinder

- Adjust the centering magnets (see Fig. 4-5-1) until the center of picture (raster) comes to the center of the viewfinder screen. (Fig. 4-5-2)

Viewfinder

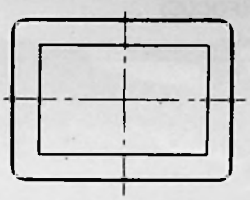


Fig. 4-5-2

(e) Horizontal and vertical size adjustment

Adjusts:	L805 (H. SIZE)
	VR805 (V. SIZE)
Observe:	Viewfinder

- Aim the camera at the ball chart, and line up the reference arrow head with edge of the raster (blanking) on the viewfinder. (Fig. 4-5-3)
- Adjust H.SIZE L805 to a point where the ball chart's edges just disappear on the viewfinder. (Fig. 4-5-3)
  Confirm that the picture increase by same amount on both sides.
- Then adjust V. SIZE VR805 so that the circle in the chart is nearly a true circle.
  Confirm that the picture increases by same amount on top and bottom.

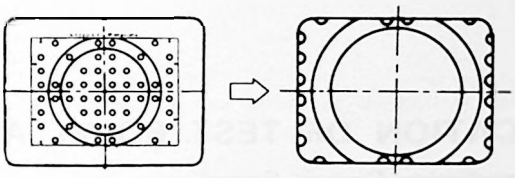


Fig. 4-5-3

Steps denoted by shaded outlines do not have to be performed if only vidicon is replaced.

(f) Focus adjustment

Adjust:	VR804 (FOCUS)
Observe:	Viewfinder

- Aim the camera at the resolution chart.
- Adjust FOCUS VR804 for best resolution in the viewfinder.

(g) Contrast and brightness adjustment

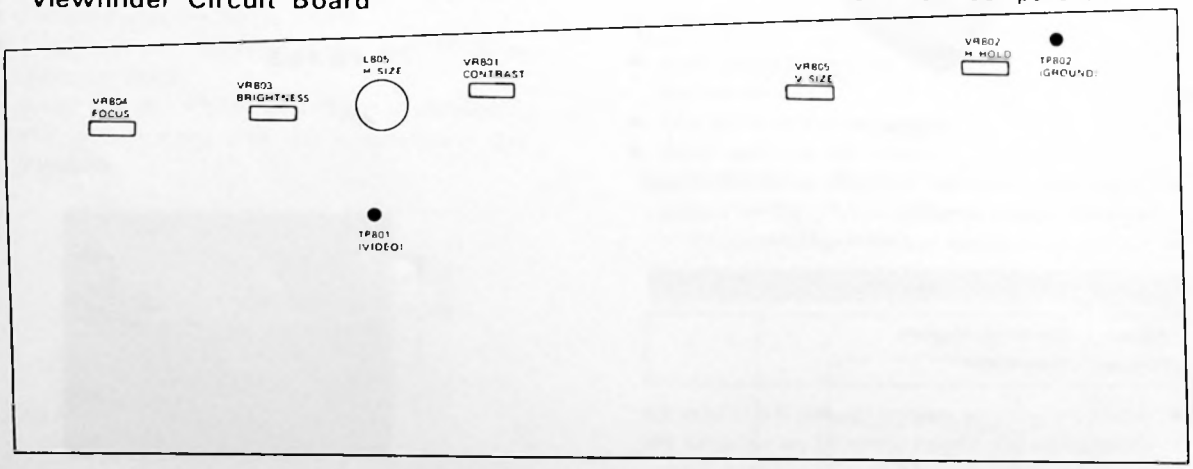
Adjusts:	VR801 (CONTRAST)
	VR803 (BRIGHTNESS)
Observe:	Viewfinder

- Aim the camera at the logarithmic gray scale chart.
- Adjust CONTRAST VR801 and BRIGHTNESS VR803 so that the black-and-white chip gradations will be the same on the viewfinder screen as that in the monitor.

LOCATION OF TEST POINT AND ADJUSTING CONTROLS

Viewfinder Circuit Board

— View From Component Side —



5. POWER CIRCUIT BOARD REMOVAL

- Disassemble the camera as described in Section 2. "DISASSEMBLY PROCEDURE FOR ADJUSTMENT" on page 1.
- Remove the four screws holding the rear cover and remove the panel. (Fig. 5-1 and 2)

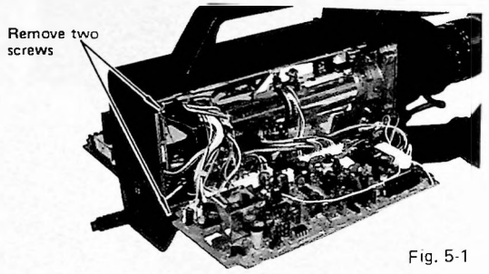


Fig. 5-1

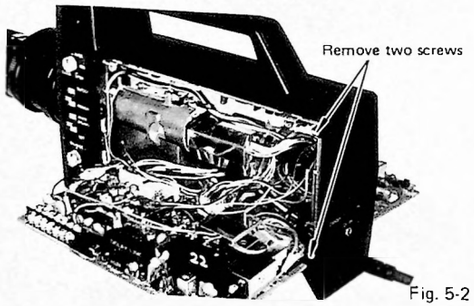


Fig. 5-2

- Remove the indicating plate from the standby power switch.

  Note: When reinstalling the indicating plate, place it on the standby power switch so that its red portion is at the left side. (Fig. 5-3)

Fig. 5-3

- Remove the four screws holding the power circuit board (Fig. 5-4) and remove the circuit board.

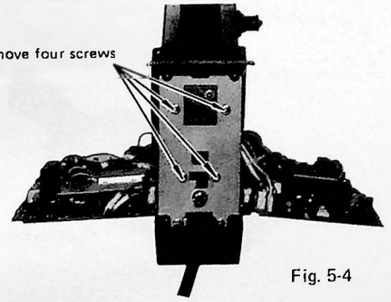


Fig. 5-4

6. WHITE SET CIRCUIT BOARD REMOVAL

- Disassemble the camera as described in Section 2. "DISASSEMBLY PROCEDURE FOR ADJUSTMENT" on page 1.
- Remove the four screws fixing the white set circuit board. (Fig. 6-1)

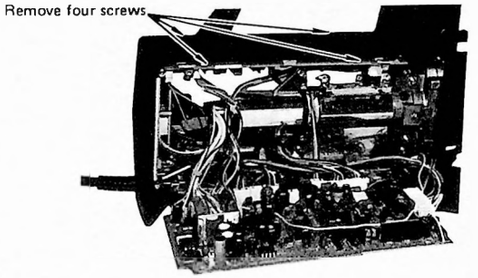


Fig. 6-1

- Take out the white set circuit board. (Fig. 6-2)

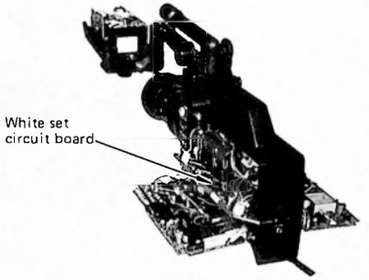
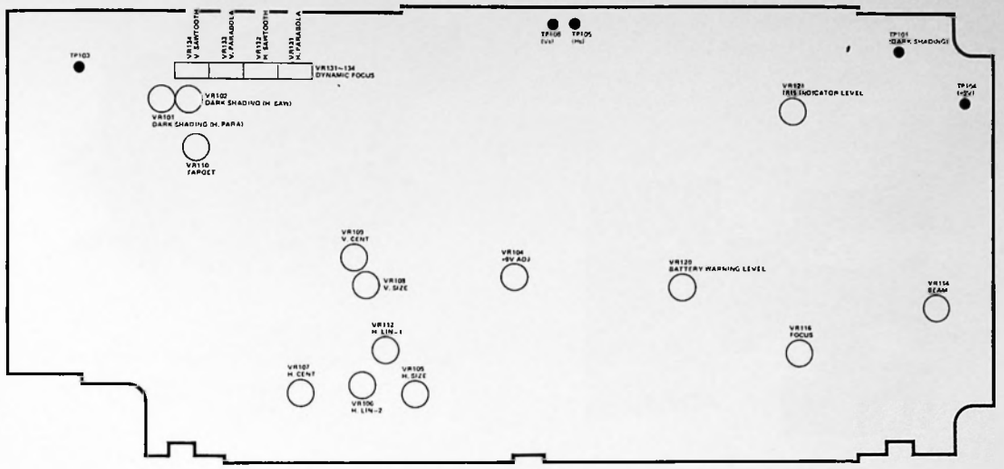


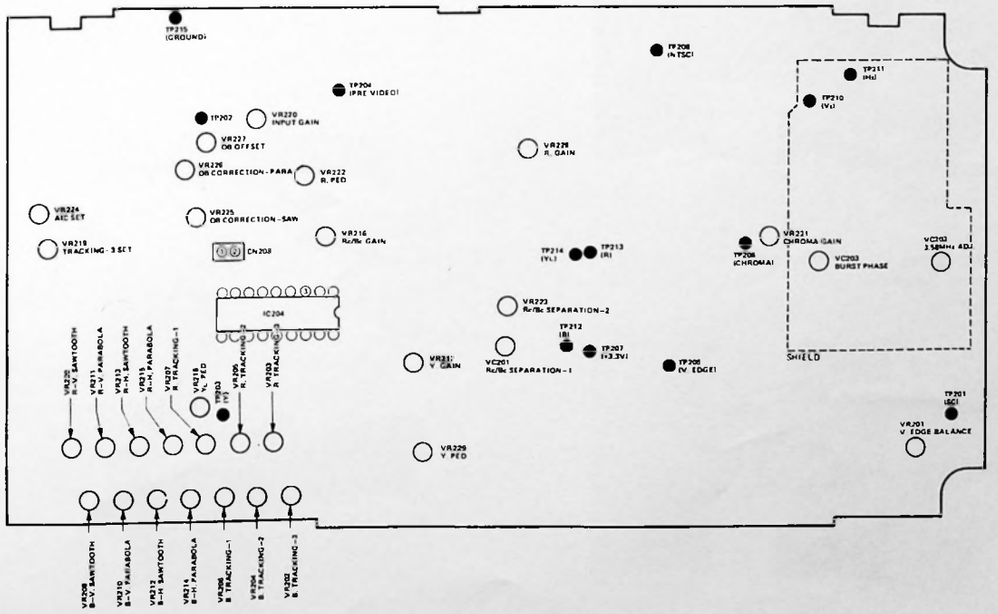
Fig. 6-2

LOCATION OF TEST POINTS AND ADJUSTING CONTROLS

DEFLECTION CIRCUIT BOARD



PROCESS CIRCUIT BOARD



7. CONTROL PANEL REMOVAL

- Disassemble the camera and the viewfinder as described in Section 2. "DISASSEMBLY PROCEDURE FOR ADJUSTMENT" on page 1.
- Disconnect the connector CN103 for the microphone from the deflection circuit board, and remove the microphone unit by removing the one fixing screw. (Fig. 7-1)

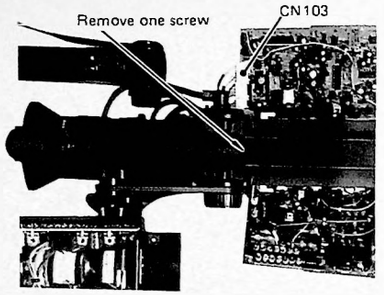


Fig. 7-1

- Remove the MIC holder by removing the two fixing screws. (Fig. 7-2)

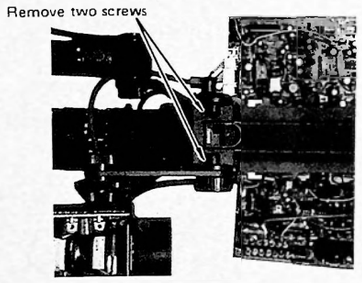


Fig. 7-2

- Remove the EVF mounting base by removing the one fixing screw. (Fig. 7-3)

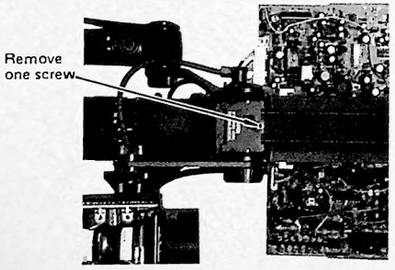


Fig. 7-3

- Remove the rear cover by removing the four fixing screws. (Fig. 7-4)

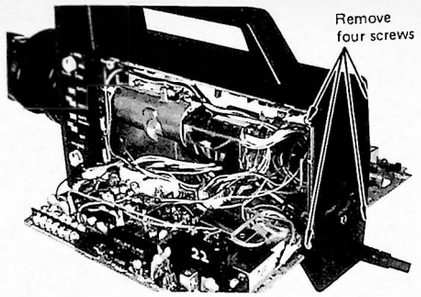


Fig. 7-4

Note: When reinstalling the indicating plate, place it on the standby power switch that its red portion is at the left side. (Fig. 7-5)

Fig. 7-5

- Remove the four screws on the bottom cover and remove the cover. (Fig. 7-6)

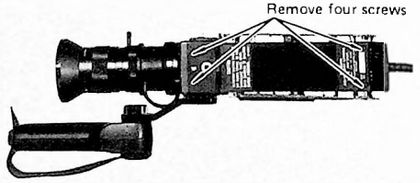


Fig. 7-6

- Remove the one screw on the handle cover B and remove the handle cover B. (Fig. 7-7)

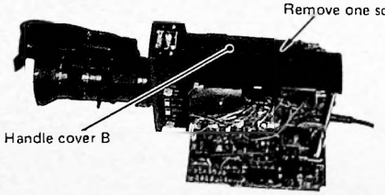


Fig. 7-7

- Remove the one screw on the handle cover A and remove the handle cover A. (Fig. 7-8)

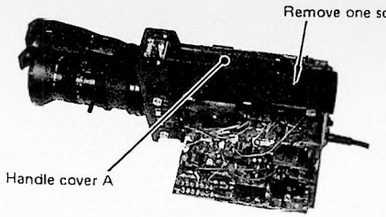


Fig. 7-8

- Remove the one screw by the EVF connector and move the upper cover as shown below.
So that the control panel fixing screws can be observed. (Fig. 7-9, 7-10)

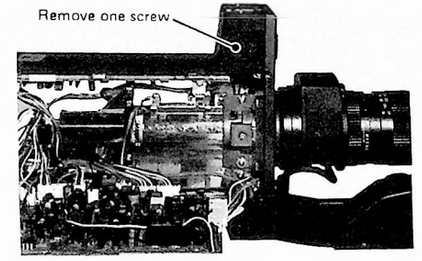


Fig. 7-9

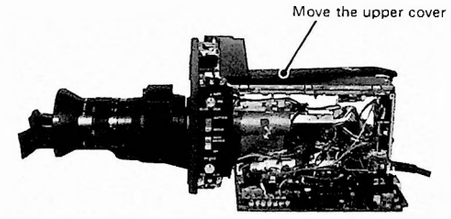


Fig. 7-10

- Remove the two screws on the control panel and remove the control panel from the chassis. (Fig. 7-11)

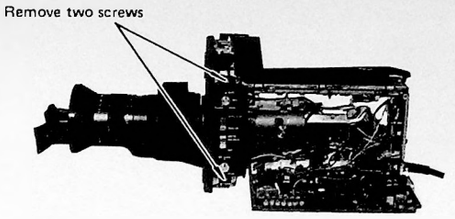


Fig. 7-11

- Remove the two control knobs, and the two screws on the control panel base for removing the control panel from the base. (Fig. 7-12)

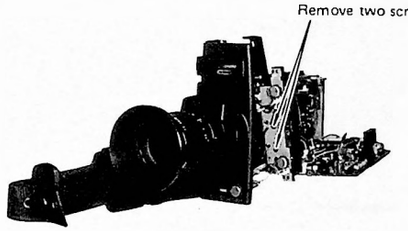


Fig. 7-12

Note:
- When installing the control panel to the control panel base, set the indoor/outdoor switch and the white balance switch on the control panel to the upper position for proper engagement.
- When installing the control panel with the control panel base to the chassis, set the indoor/outdoor switch to the upper (OUTDOOR) position and the white balance switch to the lower (SET) position for proper engagement.

8. HANDLE GRIP DISASSEMBLY

- Disassemble the camera as described in Section 2. "DISASSEMBLY PROCEDURE FOR ADJUSTMENT" on page 1.
- Disconnect the connector CN208 from the Process circuit board. (Fig. 8-1).

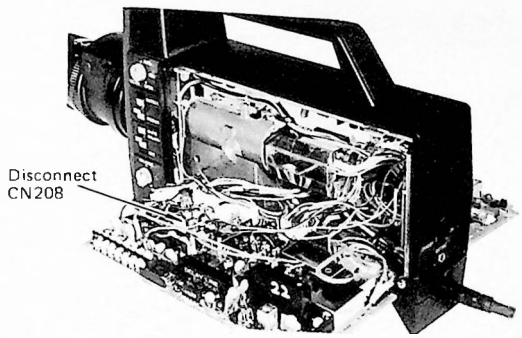


Fig. 8-1

- Disconnect the connector CN101 for the handle grip from the Deflection circuit board. (Fig. 8-2)
- Remove the two screws which hold the adjustable handle grip to the chassis (Fig. 8-2) and remove the handle grip

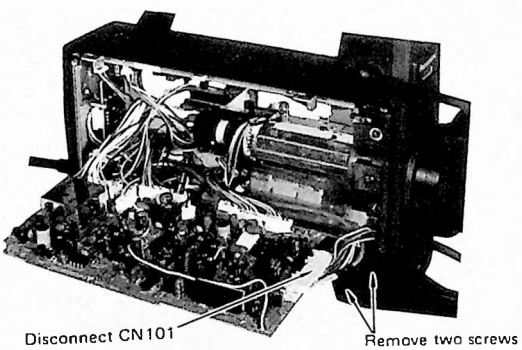


Fig. 8-2

- Remove the two screws which hold the handle strap. (Fig. 8-3)

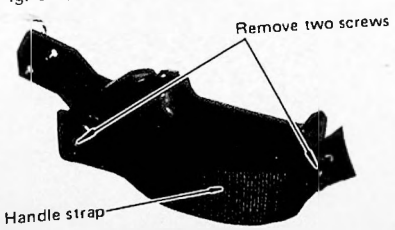


Fig. 8-3

- Remove the two screws which hold the handle grip left cover and remove the left cover. (Fig. 8-4 and 5)

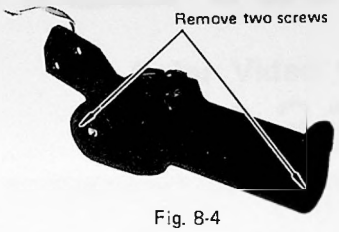


Fig. 8-4

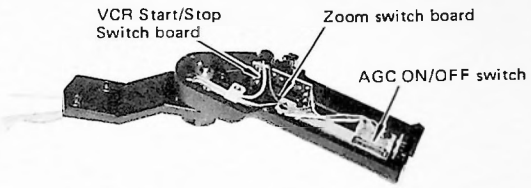


Fig. 8-5