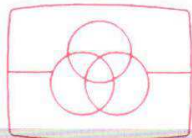


Service Manual

PAL Colour Video Camera WV-F70E Series



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Panasonic

Matsushita Electric Industrial Co., Ltd.

Central P.O. Box 288, Osaka 530-91, Japan

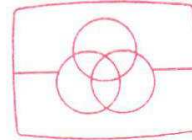
Service Manual

PAL Colour Video Camera

WV-F70E Series

Vol. 1

Circuit Description



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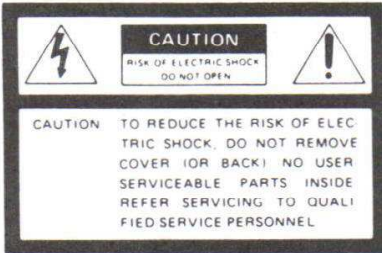


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Preliminary

 <p>CAUTION TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK) NO USER SERVICEABLE PARTS INSIDE REFER SERVICING TO QUALIFIED SERVICE PERSONNEL</p>		<p>This symbol warns the user that uninsulated voltage within the unit may have sufficient magnitude to cause electric shock. Therefore, it is dangerous to make any kind of contact with any inside part of this unit.</p>
		<p>This symbol alerts the user that important literature concerning the operation and maintenance of this unit has been included. Therefore, it should be read carefully in order to avoid any problems.</p>

IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are important for safety. These parts are indicated by the " ⚠ " mark on the schematic diagram and the replacement parts list. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent shock, fire, or other hazards.

Do not modify the original design without permission of manufacturer.

SPECIFICATIONS**ENG Colour Camera WV-F70E**

Pick-up System:	Middle index prism system (F1.4)
Image Sensor:	Two 1/2" interline transfer CCDs Pixels: 681 (Horizontal) X 582 (Vertical)
Scanning Standard:	625 lines, 50 fields, 25 frames
Synchronizing System:	Internal or external (gen-lock), automatically switchable Internal: PAL standard External (gen-lock) Input: PAL composite (VBS) signal or black burst signal Freely adjustable over 360°
Subcarrier Phase for Gen-lock:	Adjustable from -0.1 µsec to +3.5 µsec.
Horizontal Phase for Gen-lock:	Adjustable from -0.1 µsec to +3.5 µsec.
Video Output	Four outputs 1.0 Vp-p PAL composite/75 ohms X 2 (BNC connector) 1.0 Vp-p PAL composite/75 ohms X 1 (32-pin VTR/RCU connector) (PAL composite, Y/C component switchable) PAL: 1.0 Vp-p PAL composite/75 ohms X 1 (32-pin VTR/RCU connector) Y/C: 1.0 Vp-p luminance (Y) composite/75 ohms X 2 (S-Video connector and 32-pin VTR/RCU connector) 0.3 Vp-p burst level chrominance/75 ohms X 2 (S-Video connector and 32-pin VTR/RCU connector) (PAL/(Y/C) switchable) 1.0 Vp-p composite/75 ohms through 32-pin VTR/RCU connector MIC: -70 dBm X 1 (7-pin connector)
Auxiliary Input:	
Audio Input:	
Audio Output:	-20 dBm or -60 dBm/unbalanced, switchable (32-pin VTR/RCU connector)
Illumination Required:	2000 lux at F5.0, 3200°K
Minimum Illumination:	30 lux at F1.6 with +18 dB gain, more than 70% output level
Signal-to-noise Ratio:	55 dB (at -6 dB, luminance) without gamma and aperture correction
Horizontal Resolution (at center):	500 lines, Y signal
Registration:	0.05% (entire picture area, excluding lens)
Detail/Aperture:	Horizontal and vertical (2-line type)
White Balance:	Automatic white balance setting (AWC with two memories) and Manual
Black Balance:	Automatic
Encoder:	Y,U,V
Colour Bar:	Built-in EBU colour bar generator
Colour Conversion Filters:	3200°K, 5600°K with 12.5% ND, 5600°K, Close
Maximum Cable Length:	VTR Cable: 30 m (no power supply via cable) 10 m (power supply through cable) 32-pin Studio Cable: Max. 300 m with cable compensator
Switches:	Camera Power, Colour Bar/Camera Selection, High Gain Selection, White Balance Selection, Auto White/Auto Black Set, Level Indicator ON/OFF, VTR Start/Stop, Check, Lens Iris Selection, Detail ON/OFF, Subcarrier Phase Coarse, Recording Time Reset
	Camera Adaptor: VTR Compatibility, Audio Level Selection, Audio Monitor Selection, VTR Video Output Selection, Power Select, RCU/VTR Signal Selection
	Viewfinder Peaking ON/OFF, Tally ON/OFF
	Zoom Lens Servo/Manual Zoom Selection, Servo Zoom Control, Iris Control Selection, Auto Iris, Return Video/REC check, Macro, VTR Start/Stop
Controls:	Camera Total Pedestal, Red Gain, Blue Gain, Subcarrier Phase Fine, Horizontal Phase, Lens Iris
	Camera Adaptor Audio Monitor/Intercom Level
	Viewfinder Brightness, Contrast

Standard Lens (WV-LZ70/12):	12:1 auto iris servo control zoom lens, 8 – 96 mm with macro mode, F1.6	
Lens Iris:	Automatic or manual	
Lens Mount:	Special screw mount for 1/2" pickup device	
Lens Filter Size:	62 mm P=0.75	
Viewfinder:	1.5" (1-3/8" actual image size) electronic viewfinder with character display and zebra level indicator	
Power Source:	12 V DC, 5 sources as follows: (1) Battery Pack (2) AC Adaptor (3) External DC source through 4-pin DC connector (4) VTR (external AC adaptor) (5) Remote Control Unit through VTR/RCU connector	
Battery Pack Operating Time:	Approximately 1 hour with WV-PS60 Approximately 2 hours with WV-PS33	
Power Consumption:	Camera Head	10.8 watts (12V DC, 0.9A)
	ENG Configuration	13.2 watts (12V DC, 1.1A)
	Studio Configuration	22.8 watts (12V DC, 1.9A)
Ambient Operating Temperature:	-5°C — +45°C	
Ambient Operating Humidity:	30 % — 90 %	
Dimensions:	Camera Head Only (WV-F70E)	119(W) x 211(H) x 155(D) mm
	ENG Configuration (with WV-PS60)	240(W) x 298(H) x 447(D) mm
	Studio Configuration	183(W) x 475(H) x 550(D) mm
Weight:	Camera Head only	1.6 kg (3.5 lbs)
	ENG Configuration	4.8 kg (10.6 lbs)
	Studio Configuration	7.9 kg (17.4 lbs)

Dimensions and weights indicated are approximate.
Specifications are subject to change without notice.

SYSTEM ACCESSORIES

■ COLOUR CAMERA WV-F70HE

- Camera Head 1 set
- Camera Adaptor 1 set
- Shoulder Pad 1 set
- M6 Plug for Intercom 1 pc

■ COLOUR CAMERA WV-F70E

- Camera Head 1 set
- Camera Adaptor 1 set
- 1.5" Electronic Viewfinder WV-VF38AE 1 set
- 12X Servo Control Zoom Lens
WV-LZ70/12E 1 set
- Microphone WV-MC70 1 set
- Shoulder Pad 1 set
- M6 Plug for Intercom 1 pc

■ DOCKABLE KIT WV-DKT70E

- Battery Mount Adaptor
- Camera Handle
- Shoulder Strap WV-QB70

■ MAIN OPTIONAL ACCESSORIES

- 1.5" Electronic Viewfinder WV-VF38AE
- 5" Electronic Viewfinder WV-VF65BE
- Remote Control Unit (RCU) WV-RC36
- Stereo Electret Condenser Microphone WV-MC70
- 12X Servo Control Zoom Lens WV-LZ70/12
- Tripod Mounting Adaptor WV-QT70
- 1/2" Bayonet Mount Adaptor WV-LC70

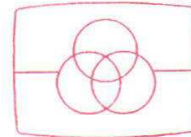
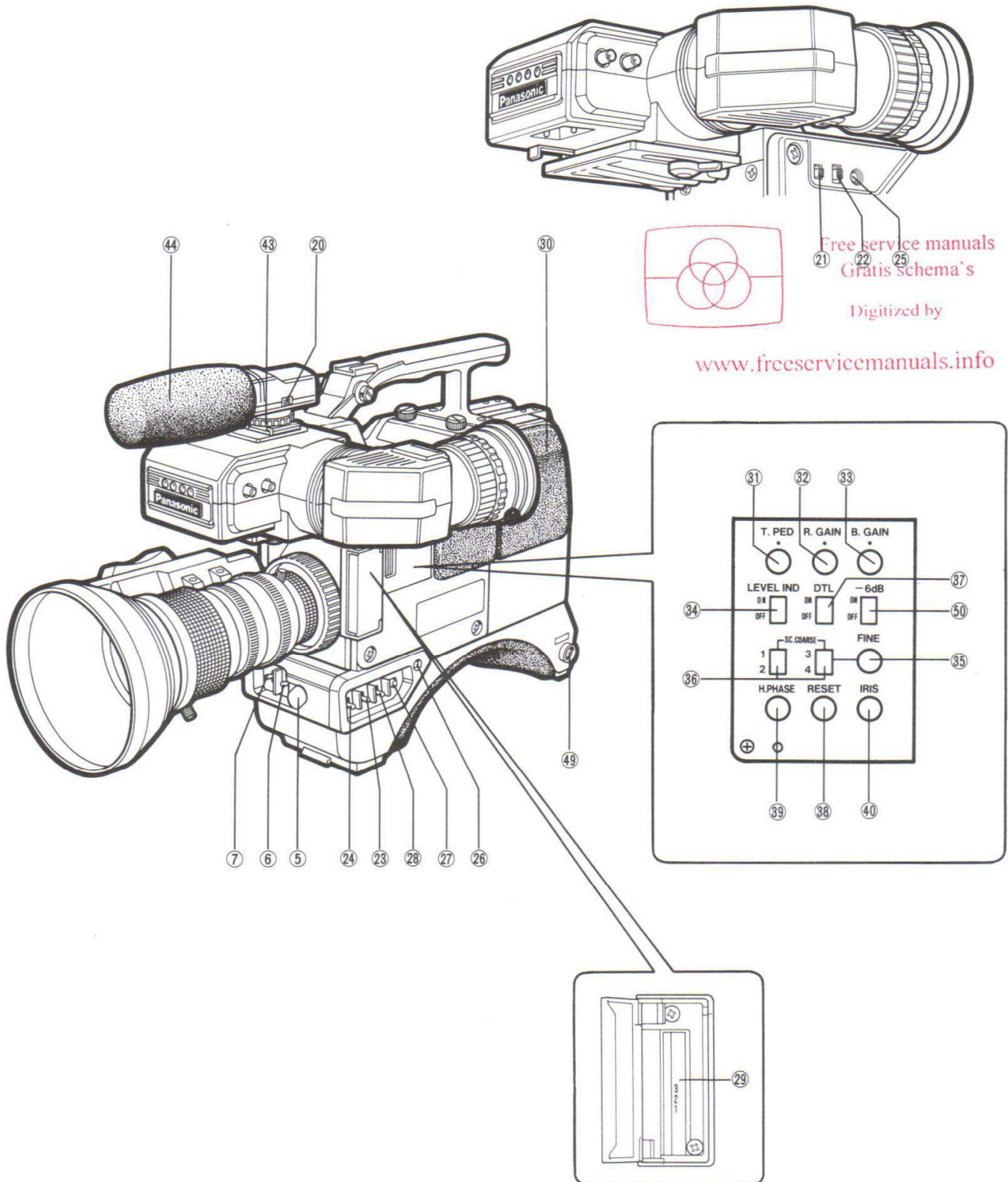
- Shoulder Strap WV-QB70
- Mic Holder for optional microphone WV-MH70
- Carrying Case WV-CC71
- AC Adaptor/Charger WV-PS31
- Battery Pack (1.65 Ah) WV-PS60E
- Battery Pack (3.5 Ah) WV-PS33E
- Battery Charger DE-1232 (for WV-PS60E)
- Battery Charger WV-BC30 (for WV-PS33E)
- Battery Adaptor WV-AD19

■ OTHER OPTIONAL ACCESSORIES

- VTR Cable: WV-CA32/10 (32P-10P) 3 m (10 ft)
- WV-CA32A/14 (32P-14P) 3 m (10 ft)
- 10-pin VTR Extension Cable:
10H-30AS 10 m (30 ft)
- 10H-50AS 17 m (50 ft)
- 14-pin VTR Extension Cable:
WV-CA14X30 10 m (30 ft)
- Studio Cable: 32A-25 8 m (25 ft)
- 32A-50 17 m (50 ft)
- 32A-100 30 m (100 ft)
- S-VHS Cable: WV-CA38
- Lens Connector Conversion Cable WV-LC10

MAJOR OPERATING CONTROLS AND THEIR FUNCTIONS

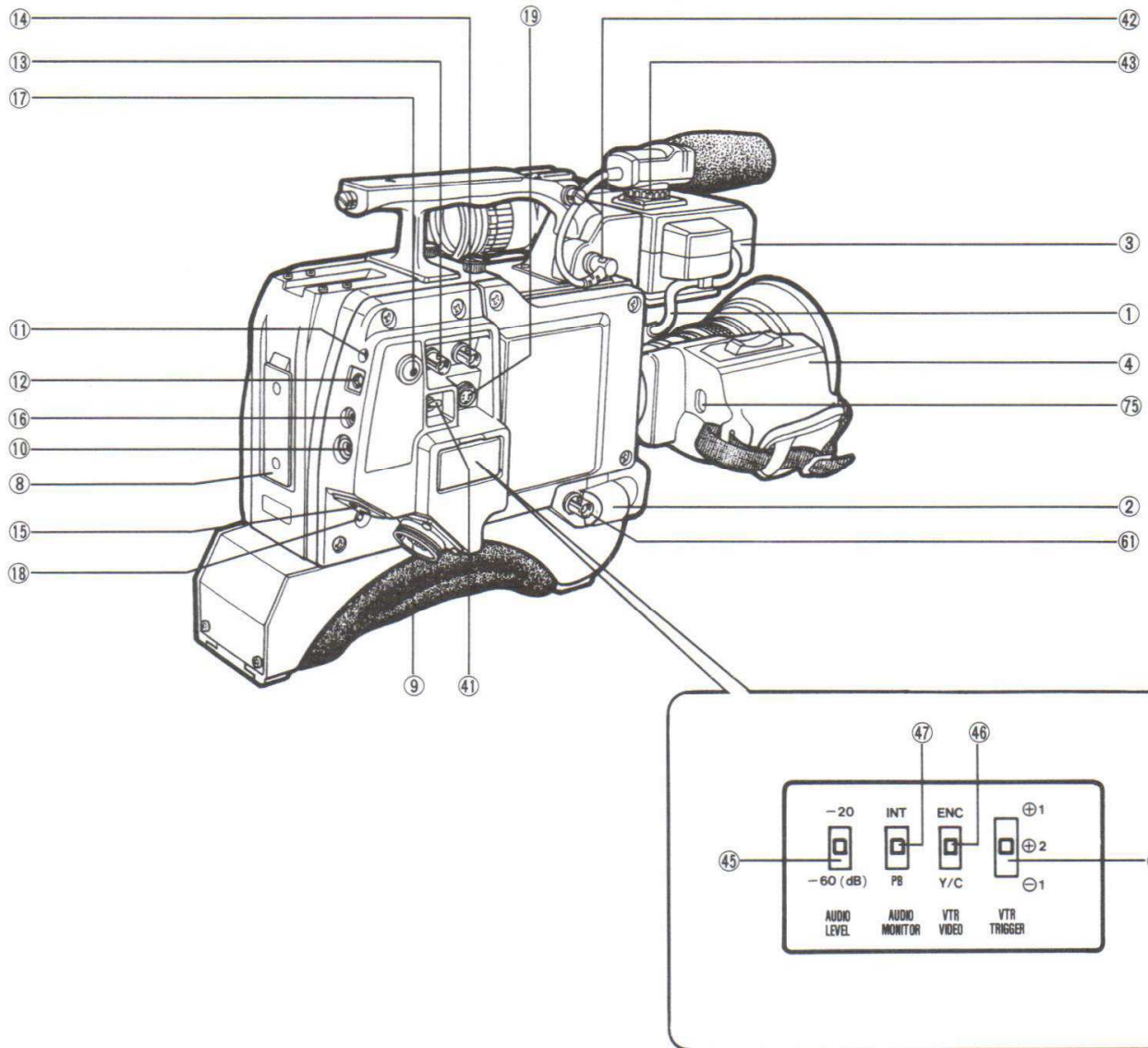
ENG Colour Camera System, WV-F70E Series



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1. Viewfinder Connector (12-pin) (VIEWFINDER)

Connect the viewfinder cable from the 1.5" or 5" Electronic Viewfinder to this connector.

Note: When connecting the 5" Electronic Viewfinder WV-VF65B) to this connector, use the Viewfinder Conversion Cable supplied with the WV-VF65B.

2. Lens Connector (12-pin) (LENS)

Connect the lens cable to this connector.

Note: If the Auto Iris Servo Control Zoom Lens with an 8-pin connector is to be used, the optional Lens Connector Conversion Cable WV-LC10 is required. This will allow proper matching of the 8-pin connector of the lens with the 12-pin connector of the camera.


3. 1.5" Electronic Viewfinder

This small 1.5" (1-3/8" actual image size) monitor shows exactly the image picked up by the lens. The viewfinder can be tilted 90° from horizontal and slid laterally by up to 1-3/4" (45 mm) and 13/16" (20 mm) back and forth.

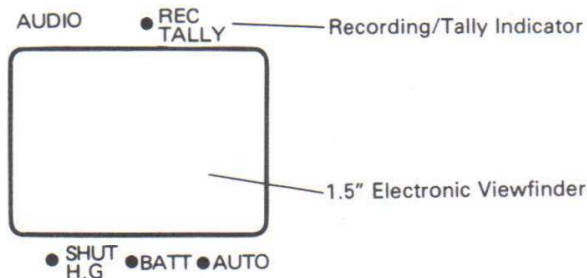
4. Auto Iris Servo Control Zoom Lens

This is a high-quality 8 – 96 mm lens offering automatic as well as manual iris control and servo control zoom. The lens features a special screw mount and F1.6 maximum aperture. Picture size may be magnified by up to 12 times through use of the zoom feature. Simply rotate the macro ring for close-up or wide angle recording. Macro shooting is possible of objects up to 1.4cm (1/2") from the lens surface.

5. VTR Start/Stop Button (VTR) (parallel operation)

This button is used to change the recorder mode from pause (Recording Pause) to recording and functions in the same way as the VTR Start/Stop Button  on the lens. Press once to start recording.

While recording, the Recording/Tally indicator in the viewfinder lights and the Tally Light on the viewfinder also lights.




When the button is pressed once more, the recorder is set to the Pause mode (Recording Pause), and the Recording/Tally indicator and Tally Light will go off.

Note: If the attached zoom lens features a lock-release type VTR start/stop button, this VTR Start/Stop button functions only when the corresponding button on the lens is released.

6. Auto White/Auto Black Set Switch (AUTO W/B BAL AWC/HOLD/ABC)

This switch sets the white balance and black balance automatically as follows:

AWC: This position is used for setting the white balance when the White Balance Selection Switch  is set to the AWC A or AWC B position. White balance adjustment is required when "AWC A NG" or "AWC B NG" starts blinking in the viewfinder or when the Auto Warning Indicator in the viewfinder lights.

Two white balance settings for two light sources, such as indoor and outdoor, can be retained in the memory. In this case both the AWC A and AWC B positions are used.

HOLD: In this position, the white and black balances set at the AWC or ABC position can be held fixed if so desired until next setting.

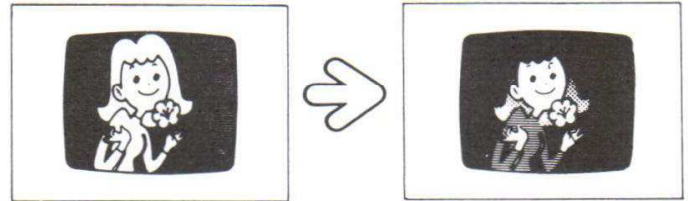
ABC: This position is used for setting the black balance. Black balance adjustment is required when "ABC NG" starts blinking in the viewfinder or when the Auto Warning Indicator in the viewfinder lights.

Note: Since the black balance adjustment always is performed automatically first at 0 dB gain and then at +18 dB gain, the picture will flash in the viewfinder while the black balance is being set. This flashing will help informing you of present adjustment.

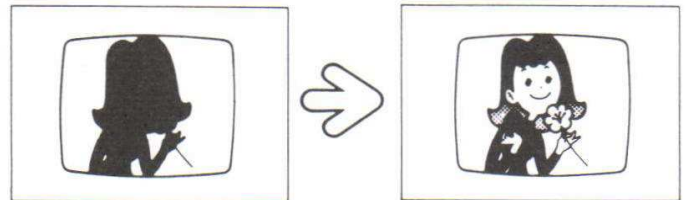
7. Lens Iris Selection Switch

(LENS IRIS 1/2 OPEN, NOR, 1/2 CLOSE)

This switch can be used to set the lens iris opening to compensate for unusual lighting conditions. If the object is brightly lit against a dark background, set this switch to the 1/2 CLOSE position. This will close the lens iris by a 1/2 F-stop.



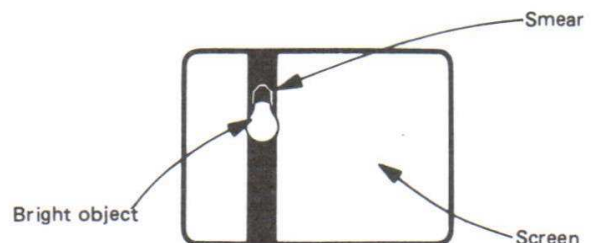
If the object is relatively dark and the background is bright, set the switch to the 1/2 OPEN position. This will open the lens iris by a 1/2 F-stop.



At the normal (NOR) position, the lens is operating with normal lens iris openings.

Note:

- 1) If this switch is used, be sure to return it to the detent NOR position after use.
- 2) If the camera is aimed at an extremely bright object, such as the sun or a lamp, vertical bars (i.e. smear) may appear in the picture. This is a peculiar phenomenon of the CCD and is quite normal. Try as much as possible to avoid shooting scenes with extremely bright light, as this could also be harmful to the camera.



- 3) Set this switch to the NOR position when the camera is used together with the Remote Control Unit (RCU).
- 4) If a zoom lens with an 8-pin connector is used, the Lens Connector Conversion Cable WV-LC10 must also be used.

8. Battery Pack Mounting Angle

Mount the Battery Pack WV-PS60/WV-PS33 or the AC Adaptor/Charger WV-PS31 on the camera by sliding it down along this mounting angle.

9. VTR/RCU Connector (32-pin) (VTR/RCU)

When using the camera together with a Panasonic portable colour VTR, the supplied VTR cable should be connected between the camera and VTR. This connector is also used for connection of the 32-pin studio cable from the Remote Control Unit (RCU) for comprehensive system operation. When connecting the 32-pin studio cable to this connector, the camera is automatically set to the RCU operation mode.

1/2" VHS and 3/4" U-vision portable VTR
(10-pin)

WV-CA32/10 (32P-10P cable)

1/2" S-VHS and 3/4" U-vision portable VTR
(14-pin)

WV-CA32A/14 (32P-14P cable)

10. Intercom Jack (M6) (INTERCOM)

This jack is used for communication between the camera operator and operators of the RCU and Special Effect Generator in the system.

11. Recording/Tally Indicator (red) (REC TALLY)

This indicator lights when the camera is set to the recording mode (through the VTR Start/Stop button), and informs the person concerned of scenes being recorded.

The Tally indicator also lights when the camera is in full system operation together with the Remote Control Unit and Special Effects Generator.

In case a tape is not loaded or the tape end is reached, or if the servo mechanism is working improperly, this indicator will start blinking to warn the operator of such faults.

12. Battery Connector (BATTERY)

Connect the cord from the Battery Pack to this connector.

13. Gen-lock Input Connector (BNC) (GEN-LOCK)

The colour video signal of the camera is automatically synchronized to the gen-lock signal (composite or black burst) which is supplied to this connector. The gen-lock signal is used for system reference, such as when using the Special Effects Generator.

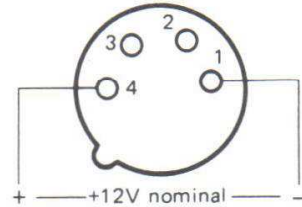
Caution: If the gen-lock signal is jittery (such as when obtained from VTR playback), the camera may not be able to synchronize properly.

14. Video Output Connector (BNC) (VIDEO OUT)

A composite video signal is provided at this connector.

15. External DC Input Connector (XLR, 4-pin) (EXT DC)

This connector accepts the power cable from an external DC source supplying nominal power of 12 V, 1.5 A (a belt type battery or car battery for example). This connector also accepts the power cable from an AC adaptor. For driving the studio configuration, a 12 V DC, 2.5 A power source is required.

**16. Audio Monitor Jack (M3) (AUDIO MONITOR)**

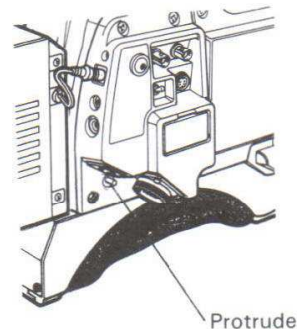
When an earphone is connected, the sound picked up through the microphone ④ or played back audio on the 1/2" S-VHS or 3/4" U-vision recorder connected to the camera through the 14-pin camera connector can be monitored. Selection of the audio source is enabled by the Audio Monitor Selection switch ④.

17. Audio Monitor/Intercom Level Control (LEVEL)

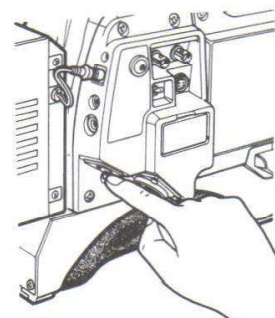
Use this control to freely adjust the volume level in the earphone connected to the Audio Monitor Jack ⑥ or the headset connected to the Intercom Jack ⑩.

18. Circuit Protector (BREAKER)

When an excessive current flows into the camera by accident or some other reason, the red button of this circuit protector protrudes to cut off the circuit.



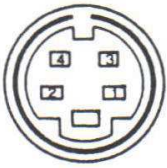
After solving the problem, press the red button again to recover the circuit.

**CAUTION:**

Refer servicing to qualified service personnel to solve the problem.

19. S-VHS Video Output Connector (S-VIDEO OUT)

The luminance (Y) and chroma (C) signals for S-VHS VTR or monitor are provided at this connector.



S-VIDEO OUT (female)

No.	CONTENTS
1	Y Ground
2	C Ground
3	Y Signal Output
4	C Signal Output

20. Low Cut Filter Switch (LOW CUT FILTER, ON/OFF)

Normally, set this switch to OFF position. When the noise of strong wind is picked up, set this switch to ON position.

21. Shutter ON/OFF Switch (SHUTTER, ON/OFF)

Fast-moving objects shot as slow shutter speeds, such as is only possible on normal cameras, will appear blurred. This camera, however, features an electronic shutter which can be switched ON and OFF by this switch, and which enables blur-free recording of high-speed action, such as car racing, golf swings, gymnastics, birds in flight, and much more.

OFF: Normal recording with standard shutter speeds.

ON: The electronic shutter mode is engaged for blur-free recording of high-speed action. The electronic shutter speed can be set by the Shutter Speed Selection switch 22.

22. Shutter Speed Selection Switch (1/250, 1/500, 1/1000)

This switch selects the shutter speed of the electronic shutter. The switch can only be operated when the Electronic Shutter ON/OFF switch 21 is set to ON.

23. White Balance Selection Switch (WHITE BAL; AWC A/B/MANUAL)

This switch is used to select the white balance mode as follows:

AWC A: The white balance can be set automatically by pressing the Auto White/Auto Black Set Switch 6 upwards. The setting is stored in memory A.

AWC B: Similar to AWC A, but the setting is stored in memory B.

MANUAL:

Proper white balance is achieved for 3200°K colour temperature with the Filter Wheel 29 set to position 1 and setting the Red Gain Control 32 and Blue Gain Control 33 to their mechanical center position.

Note:

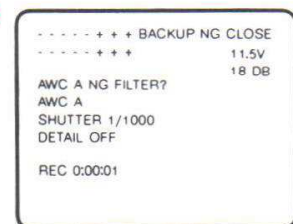
- 1) Two white balance settings, one each for different lighting conditions such as indoor and outdoor, may be stored in the two memories AWC A and AWC B.
- 2) This switch should be set to the AWC A or AWC B position when the RCU is used.

24. High Gain Selection Switch (GAIN 0/+9 dB/+18 dB)

Normally set this switch to the 0 dB position. Positions +9 dB and +18dB increase the video output amplitude for low light scenes and are equivalent to opening the lens iris 1.5 or 3 F-stops, respectively.

25. Check Button (CHECK)

The operating conditions of the camera can be displayed on the viewfinder by keeping this button pressed.

**26. Power Indicator (POWER)**

This indicator lights red when the camera is operating. When the camera is in the standby mode, the indicator lights green.

27. Power Switch (DC POWER; OFF/SAVE/ON)

This switch selects the operating mode of the camera as follows:

OFF: Power to the camera is turned off.

SAVE: The main camera circuit is turned off. The heater of the CRT on viewfinder is on, however. The Power Indicator 26 lights green at this position.

ON: The unit is in the operating condition after necessary adjustments have been made. The Power Indicator lights red.

Note: This switch should be set to the ON position when the camera is used with the Remote Control Unit (RCU).

28. Colour Bar/Camera Selection Switch (BAR/CAMERA)

This switch selects the video output signal as follows:

BAR: An EBU colour bar is provided from the Video Output connector 14, 61 and the VTR/RCU connector 9.

CAMERA: The actual picture as picked up through the lens is displayed.

Note: This switch is inoperative when the RCU is used.

29. Filter Wheel

To set the filter wheel, flip open the cover.

The filter wheel is a four-position wheel which controls two built-in colour temperature conversion filters and one ND filter.

- (1) 3200°K — indoor light
(tungsten, halogen, quartz lamps)
- (2) 5600°K
+12.5% ND — daylight (sunny)
- (3) 5600°K — daylight (cloudy/rainy)
- (4) Closed

Select the position according to the light source. The position of the filter wheel is displayed in the viewfinder when the CHECK button 25 is pressed.

30. Camera Adaptor

The camera adaptor is pre-installed on the camera at the factory. The adaptor is required for ENG, EFP and studio applications. It should be removed if the camera is to be used with S-VHS dockable VTRs.

31. Total Pedestal Level Control (T.PED)

This control can adjust the pedestal level of the video signal (luminance) for matching the pedestal level of more than two cameras in the system. Use a waveform monitor or oscilloscope for precise adjustment.

32. Red Gain Control (R.GAIN)

This control only works when the White Balance Selection switch 23 is set to the MANUAL position. The control is used to match the red gain with the colour signals of other cameras in the system. The red gain should be set to its mechanical center position for proper white balance for 3200°K colour temperature with the Filter wheel 29 set to position 1.

33. Blue Gain Control (B.GAIN)

This control only works when the White Balance Selection switch 23 is set to the MANUAL position. The control is used to match the blue gain with the colour signals of other cameras in a system. The blue gain should be set to its mechanical center position for proper white balance for 3200°K colour temperature with the Filter wheel 29 set to position 1.

Note: The Red and Blue Gain controls 32 and 33 cannot be operated when the White Balance Selection switch 23 is set to AWC A or AWC B.

34. Level Indicator ON/OFF Switch (LEVEL IND ON/OFF)

When this switch is set to ON, picture images exceeding the specified level (0.7 Vp-p) will produce a zebra pattern in the viewfinder.

If the background is bright and the object appears too dark in the automatic iris control mode, the lens iris should be adjusted manually until the zebra pattern barely appears. If the zebra pattern is visible, overexposure of the background will take place.

When in the automatic iris control mode, set this switch to OFF.


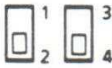
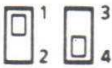

35. Subcarrier Phase Fine Control (SC PHASE)

This control allows fine adjustment of the subcarrier phase set by the Subcarrier Phase Coarse Switches 36. The control allows continuous control of up to +90° subcarrier phase to match the phase of the subcarrier signal obtained at the Gen-Lock Input connector 13.

This control should be adjusted together with the Subcarrier Phase Coarse switches 36 when the camera is used in a system configuration including the Special Effects Generator.

36. Subcarrier Phase Coarse Switches (SC PHASE COARSE)

The subcarrier phase of the camera signal can be adjusted from 0° to 360° in 90° steps with these switches, as shown below, for matching the phase of the subcarrier signal at the Gen-Lock Input connector 13. These switches should be set when the camera is used in a system configuration with the Special Effects Generator.

Subcarrier Phase	0°	90°	180°	270°
Position of Switches				

37. Detail ON/OFF Switch (DTL ON/OFF)

The detail/aperture enhancement can be switched by this switch while observing the sharpness of the picture.

38. Recording Time Reset Button (REC TIME)

The accumulated recording time is displayed in the viewfinder under REC TIME while the CHECK button 25 is pressed. The time can be reset to "0:00:00" by pressing this button. Thus, total recording time can easily be checked by pressing this button at the outset of a new recording.

Note: For studio application, the time the Tally light lights is accumulated in the viewfinder REC TIME display.

39. Horizontal Phase Control (H.PHASE)

The horizontal phase of the camera signal can be adjusted to match the horizontal phase of the signal at the Gen-Lock Input connector 13.

This control should be adjusted when the camera is used in a system configuration with the Special Effects Generator.

40. Lens Iris Control (IRIS)

The auto iris level of the lens which requires DC control signal for auto iris control can be adjusted by this control. When the lens which requires a video signal for auto iris control such as WV-LZ70/12 is used, this control will have no effect and please use the lens iris control on the lens.

Note: If a zoom lens with an 8-pin connector is used, the Lens Connector Conversion Cable WV-LC10 must also be used. In this case the lens iris control will have no effect. If such adjustment should be necessary, please use the lens iris control on the lens.

41. Power Selection Switch (POWER SELECT BATT/EXT DC-VTR/RCU)

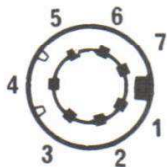
Using this switch, the desired power source connected to the camera may be freely selected.

BATT/EXT DC: This position is used for power supply from the battery pack, an external DC source or through an AC adaptor.

VTR/RCU: This position is used when power is to be supplied through the 32-pin connector from the VTR or the Remote Control Unit (RCU).

42. Microphone Connector (7-pin) (MICROPHONE)

Connect the cord from the optional microphone WV-MC70 to this connector.



- 1 : Ground
- 2 : N/C
- 3 : Right out
- 4 : N/C
- 5 : Left out
- 6 : N/C
- 7 : +B in

43. Microphone Holding Ring

To secure the microphone, turn this ring clockwise.

44. Microphone

This is an unidirectional stereo electret condenser microphone. The output level of the microphone is approximately -70 dB.

45. Audio Level Selection Switch (AUDIO LEVEL -20/-60 dB)

Two audio output levels to the VTR can be selected: -20 dB or -60 dB. The camera has been preset to -20 dB at the factory.

46. VTR Video Output Selection Switch (VTR VIDEO ENC-Y/C)

This switch selects the video output signal obtained at the VTR/RCU connector ⑨.

ENC: A composite video signal is supplied for 1/2" VHS and 3/4" U-vision portable VTRs.

Y/C: A component signal (luminance (Y) and chrominance (C) signals) are supplied for S-VHS VTRs.

Note:

- 1) If this switch is set to the Y/C position, when a recorder other than an S-VHS recorder is used, colour recording cannot be made.
- 2) The camera has been preset to the ENC position at the factory.

47. Audio Monitor Selection Switch (INT/PB)

This switch selects the audio signal from the Audio Monitor jack ⑩ to be monitored.

INT: The sound picked up by the microphone can be monitored.

PB: The played back audio portion from the 1/2" S-VHS or 3/4" U-vision recorder, obtained through the 68-pin connector or the 14-pin camera connector, can be monitored.

Note: The camera has been preset to the INT position at the factory.

48. VTR Compatibility Switch (⊕1/⊕2/⊖1)

Set this switch according to the VTR which is connected to the camera.

⊕1: For 1/2" VHS VTRs.

⊕2: For 3/4" U-vision VTRs, connected to the camera using a 14-pin connector and S-VHS VTRs.

⊖1: If a VTR of other manufacture is used, and if this VTR pauses when the tape should be running and vice versa, this switch should be set to this position.

Note:

- 1) The switch has been preset to the ⊕1 position at the factory.
- 2) Some VTRs may not operate properly when connected to this camera, even though the setting of this switch is changed. Please consult your dealer for further information.

49. Fuse

A 5A 250V fuse is installed in the fuse holder. For continued protection of the equipment, do not install a fuse of a higher current rating.

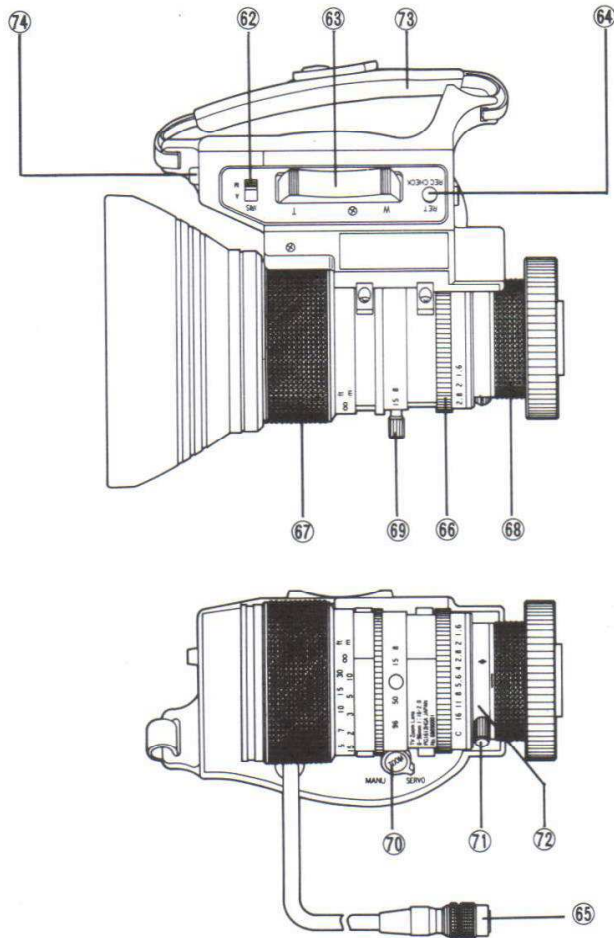
50. -6 dB ON/OFF Switch

Normally set this switch to OFF position. In combination with the High Gain Selection Switch ⑭, the overall gain of the camera can be set to -6 dB, 0 dB, +3 dB, +9 dB, +12 dB or +18 dB. Refer to page 52 for setting and character display on viewfinder.

61. Monitor Output Connector (BNC) (MONITOR OUT)

A composite video signal for monitoring is provided at this connector.

12X Servo Control Zoom Lens WV-LZ70/12

**62. Iris Control Selection Switch (A/M)**

This switch selects the operational condition of the lens iris.

A (Auto): The lens iris is automatically controlled. When the camera is used in studio applications together with the Remote Control Unit (RCU), the switch should be set to M (Manual) position. In this case, the lens iris can not be remotely controlled from the RCU.

M (Manual): The lens iris can be manually controlled by rotating the Iris ring 66.

63. Servo Zoom Control (Wide/Tele)

The zoom function of this high quality 12:1 zoom lens can be controlled by pressing this control. Zooming to tele as well as wide angle is possible. Furthermore, the zooming speed can be controlled by changing the pressure applied on this control.

64. Return Video/Recording Check Button (RET/REC CHECK)

When an auxiliary signal such as a lineview signal from a Special Effects Generator is supplied to the auxiliary connector of the Remote Control Unit (RCU) while the camera is set up for system operation, the signal can be previewed on the electronic viewfinder as long as this button is kept pressed.

When the 3/4" U-vision portable recorder, connected through the 14-pin camera input connector, or an S-VHS VTR recorder is set to the playback mode, the played back picture can be viewed as long as this button is kept pressed.

65. Lens Cable with 12-pin Connector

This cable supplies power to the servo control zoom motor and the automatic iris control device.

The cable should be connected to the Lens Connector 2 on the camera.

66. Iris Ring

When the Iris Control Selection switch 62 is set to the M (manual) position, the lens iris can be manually adjusted by rotating this ring.

67. Focus Ring

Rotating this ring will change the lens focus. By observing the picture in the viewfinder, correct focus can easily be set.

68. Macro Ring

For close-up shooting, rotate this ring to the macro area. After setting the Servo/Manual Zoom Selection switch ⑩ to the MANU (manual) position, close-up shooting up to approximately 14 mm (1/2") from the lens surface is possible by rotating the Macro Ring/Lever.

69. Zoom Ring/Lever

By setting the Servo/Manual Zoom Selection switch ⑩ to the MANU (manual) position, zooming can be manually performed through use of this ring/lever. 12 times magnification is possible from wide angle to telephoto. When the Servo/Manual Zoom Selection switch ⑩ is set to the SERVO position, zooming is performed with the Servo Zoom control ⑬.

70. Servo/Manual Zoom Selection Switch (SERVO/MANU)

This switch is used to select between zooming by servo control and manually.

SERVO: Zoom operation is performed by pressing either side of the Servo Zoom control ⑬.

MANU: Zoom operation is performed manually by rotating the Zoom Ring/Lever ⑨.

71. Flange-back Lock Knob

The Flange-back Adjustment Ring ⑭ can be locked by turning this knob.

72. Flange-back Adjustment Ring

The flange-back of the lens can be adjusted by rotating this ring. The Flange-back Lock knob ⑰ should be released prior to adjustment.

73. Hand Strap

The hand strap helps the camera operator in getting a firm grip on the camera. The hand strap length can be freely adjusted.

74. Auto Iris Fine Control (FINE, L/H)

The auto iris level can be adjusted by this control. Normally, set this control to the center (detent) position. When the lens iris should be slightly opened, turn this control to the H (High) direction and slightly closed, turn this to the L (Low) direction.

75. VTR Start/Stop Button (VTR)

This switch is used to start and pause the connected recorder. The function of the button is identical to the VTR Start/Stop Button ⑤ on the camera.

After having set the recorder to the recording standby mode, press this button to start and pause recording. While recording is in progress, the Recording/Tally indicator in the viewfinder and the Tally light ⑤ on front of the viewfinder lights.

Note: If a zoom lens with an 8-pin connector is used, the lens connector conversion cable WV-LC10 must also be used. In this case, if recording is started by pressing the VTR Start/Stop button on the lens, the recording cannot be paused by pressing the VTR Start/Stop button ⑤ in the camera. To pause recording, the VTR Start/Stop button on the lens must be pressed again.

1. Outline

Incoming light which contains luminance (Y) and chrominance (C) enters a prism through a zoom lens and separated into the Y and C signal component respectively. The separated Y and C signal component go to the respective frame interline transfer (FIT) CCD image sensor and converted into the modulated signal whose peak-to-peak level corresponds to the incoming light intensity. The CCD drive pulse generator generates a horizontal (H) and a vertical (V) transfer pulse which are synchronized with the horizontal and vertical drive (HD & VD) pulses and sends them to the CCD image sensors for driving the sensors. The modulated signals from the CCD image sensors are then sent to the preamplifier circuit. In the preamplifier circuit, these signals are detected by the correlative double-sampling and the video signals are obtained.

The R, G and B signal thus made are respectively fed to the signal processing circuit where their gain is controlled by setting the High Gain Selection Switch. In the signal processing circuit, the black level of these signals between the 0dB and +18dB position of the High Gain Selection Switch are automatically aligned and the gain of the R and B signals are automatically adjusted to match them with that of G signal for the white balance setting by the DC voltages supplied from the Power/Auto board. The black level variation of R, G and B signals due to the lens flare is also compensated in this circuit.

The R, G and B signals are then fed to the pedestal control circuit inside IC, where the black level of the R and B signals are automatically adjusted to align them with that of G signal for the black balance setting by the DC voltages supplied from the Power/Auto board.

The R, G and B signals whose pedestal levels are set are applied to the gamma correction circuit in IC to correct the non-linear photoelectric conversion characteristic of cathode ray tube and to produce a linear picture of high fidelity. The signals from the gamma correction circuits are non-additively mixed each other and the highest signal is detected. The highest signal is supplied to the lens iris control circuit and used to control the lens iris corresponding to the incoming light intensity.

The Y signal from the Preamp/Drive board is supplied to the detail generator circuit and mixed with 1H detail signal to enhance the horizontal and vertical sharpness.

The R, G and B signals are then supplied to the camera/bar select circuit in the Sync/Encoder board. The R, G and B bar signals are also sent to the select circuit from the color bar generator circuit. These signals are selected by setting the Color Bar/Camera Selection Switch and sent to the V, U and luminance (Y) matrix circuit respectively. The V and U signal are fed to the chroma processing circuit where these signals modulate the subcarrier (SC) signal from the sync pulse generator IC and the chrominance signal is made. The

chrominance signal is sent to the video output circuit where it is mixed with the Y signal to make a video signal. The video signal is sent to other system products through the video output connector or the camera adaptor. The Y signal (component output) are fed to the MII format VTR for recording. The Y signal is also fed through the viewfinder signal processing circuit to the viewfinder together with the character signal and the zebra pattern signal.

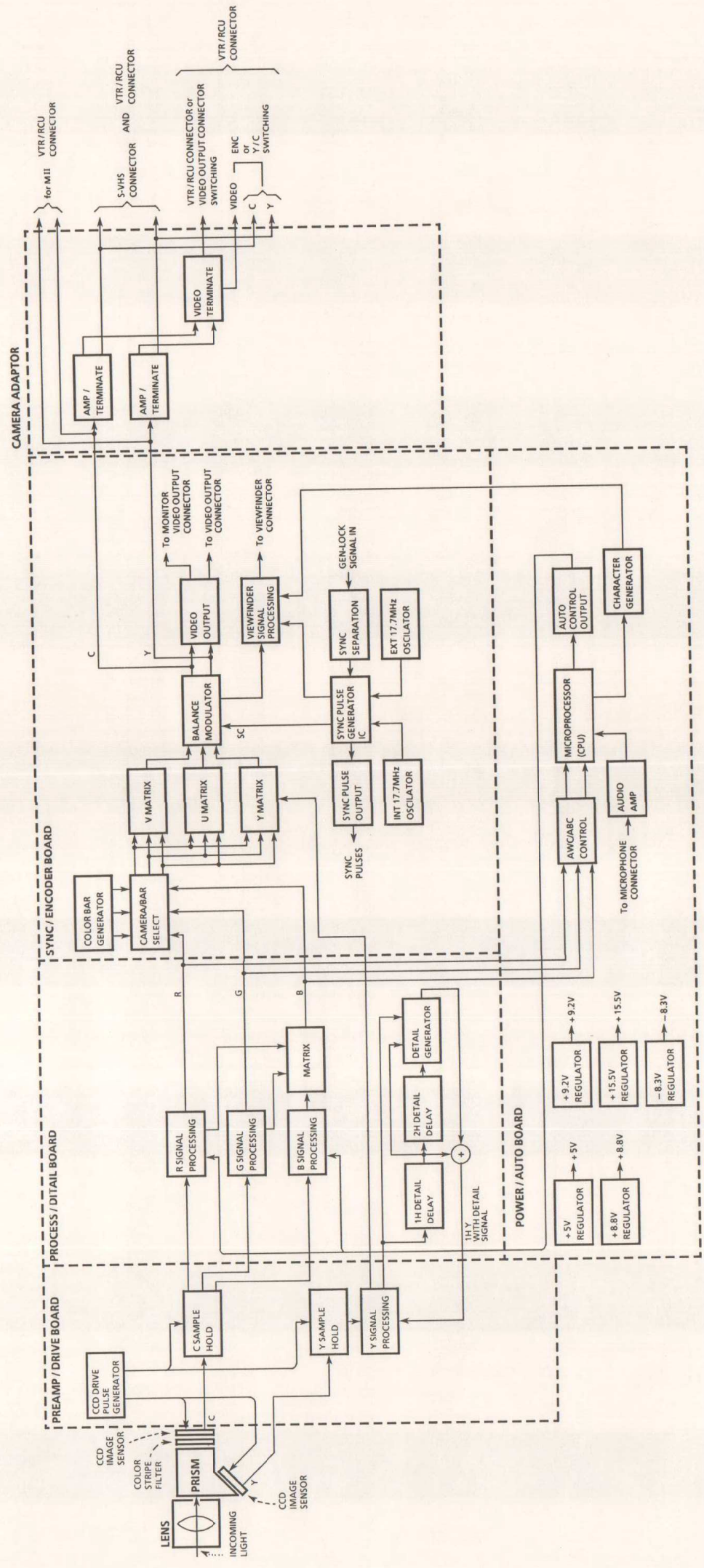
The 17MHz frequency oscillated in the internal 17MHz oscillator in the Sync/Encoder board is fed to the sync generator. The subcarrier signal and the pulses necessary for making a video signal are sent to other circuit through the pulse generator circuit. The sync separation circuit receives the black burst signal or composite video signal supplied to the gen-lock input connector. In the gen-lock circuit, the subcarrier (SC) signal and the horizontal drive (HD) pulse generated in the sync generator circuit are compared in phased with those separated from the gen-lock signal and the error in comparison controls the 17MHz voltage controlled oscillator. The 17MHz signal is fed to the sync generator circuit to generate the subcarrier signal and the horizontal drive pulse. As a result, the phase lock loop (PLL) is formed and the sync generator circuit generates the subcarrier signal and pulses which are synchronized with the gen-lock signal.

The R, G and B signals are sent to the auto-white control circuit and the auto-black control circuit. In the auto-white control circuit, the R and B signal levels are compared with the reference G signal and the error level in comparison is sent to the microprocessor. The microprocessor sends the DC voltages through the auto control output circuit to the R and B signal processing circuits to control the gain of the R and B signal and to match them with the G signal level. In this way, the R, G and B signal levels become same and the white balance is automatically set.

Similarly, the dark level of the R and B signals are compared with that of G signal in the auto-black control circuit and the resultant in comparison is fed to the microprocessor. The microprocessor sends the DC voltages via the auto control output circuit to the R and B pedestal control circuit in order to control the black level of the R and B signal and to match them with that of G signal automatically. During the black balance setting, the black level of the R, G and B signals at the +18dB position of the High Gain Selection Switch are respectively compared with those at the 0dB position using the auto-black balance setting circuitry. The output in comparison is fed to the microprocessor and the microprocessor supplies the DC voltage through the auto control output circuit to the R, G and B signal processing circuit in the ProcessDetail board to control the black levels in the +18dB position for matching with those in the 0dB position automatically.

When the automatic white or black balance setting fails, the microprocessor sends the signal to the character generator to generate the warning character. The warning character is

displayed in the viewfinder through the viewfinder signal processing circuit in the Sync/Encoder board.
 The power circuit generates from +12V DC the DC voltages used in the camera and sends them to other boards.



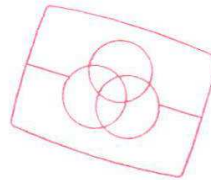
Service Manual

PAL Colour Video Camera

WV-F70E Series

Vol. 2

Adjustment Procedures



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Vol. 2

Adjustment Procedure

1. TEST EQUIPMENT REQUIRED

Following equipments are required for adjustment of WV-F70.

- Test signal generator (Black burst) or special effects generator (Black burst output)
- Waveform monitor
- Vectorscope
- Oscilloscope (Dual trace, More than 100MHz bandwidth, Delayed sweep)
- Digital voltmeter
- Frequency counter (More than 50MHz measurable frequency range)
- Monochrome underscanned video monitor (more than 800 lines resolution)
- Color video monitor
- Logarithmic gray scale chart (YV2310RB99)
- Color chart (YV2100RB98)
- In-mega cycle chart (YFINMEGA-K)
- Registration/White set chart (YFV8RA0011A3)
- AC adaptor (WV-PS31) or DC power supply (DC 12V, 3A or more)
- Lighting (300 footcandles (3000 lux), 3200°K)
- Lux meter
- Tripod
- Tripod mounting adaptor (WV-QT70)
- 12X power zoom lens (WV-LZ70/12)
- Camera adaptor
- Extension board (YVVOEA0071AN)
- Extension cables (YVVOEA0070AN)

2. DISASSEMBLING PROCEDURE FOR ADJUSTMENT

2-1 Camera

2-1-1 Side Cover

- Loosen four screws which hold the side cover and remove the side cover.

(A) For left side cover (viewed from the front)



Fig. 2-1-1

(B) For right side cover (viewed from the front)

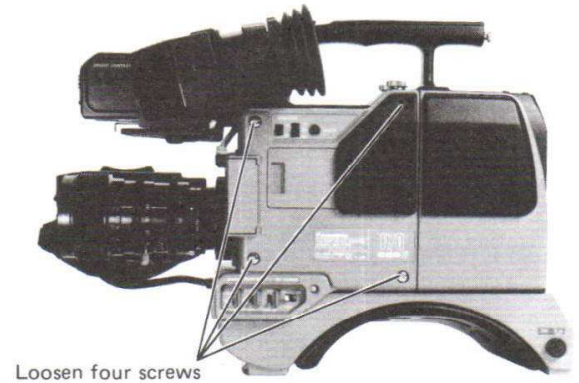
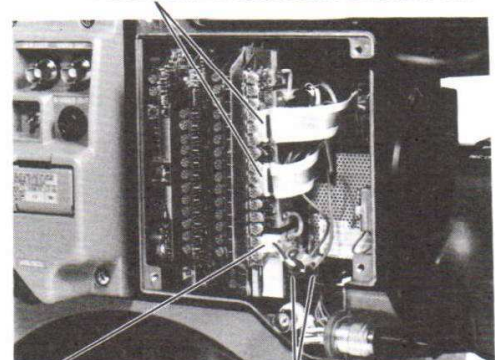


Fig. 2-1-2

2-1-2 Preamp/Drive Board

- Loosen four screws holding the left side cover and remove the left side cover as shown in Fig.2-1-1.
- Disconnect flexible cables connecting to CN2 and CN4 on the Preamp/Drive board by pulling the latch forward. (Fig.2-1-3)
- Remove felight beads from shield case on the Preamp/Drive board and disconnect CN6 on the Preamp/Drive board. (Fig.2-1-3)

Disconnect flexible cables CN2 and CN4



Disconnect CN6

Remove felight beads

Fig. 2-1-3

- Remove the Preamp/Drive board from Mother board by pulling it forward. (Fig.2-1-4)

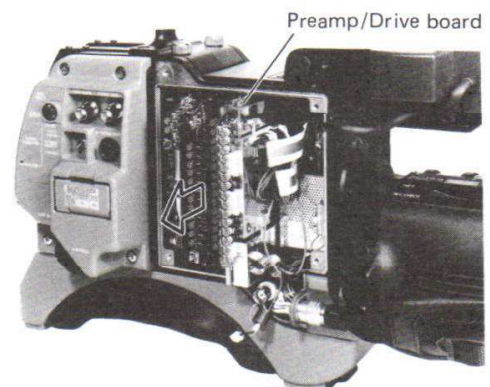


Fig. 2-1-4

- Remove two felight beads from the shield case on the Preamp/Drive board and disconnect CN3, CN5 and CN7 on the Preamp/Drive board. (Fig.2-1-5)

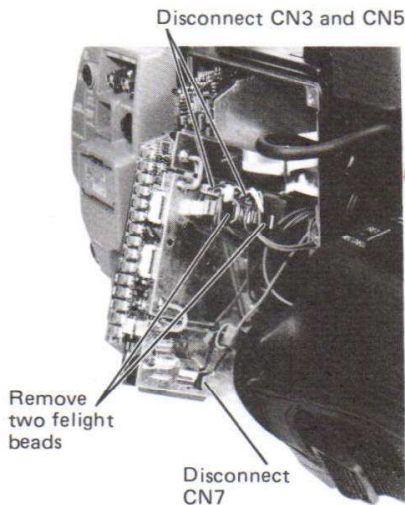
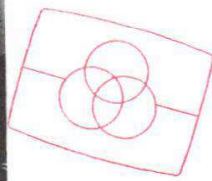


Fig. 2-1-5



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Fig. 2-2-3

- Pull the operation cover with the Main board backward. (Fig.2-2-4)

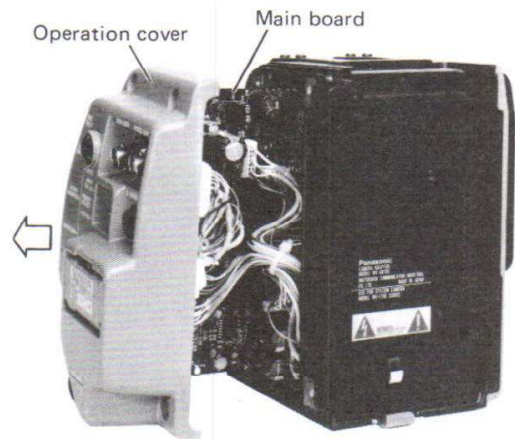


Fig. 2-2-4

2-2 Camera Adapter

- Loosen two screws and remove two screws holding the hand grip (M91) and remove the hand grip. (Fig.2-2-1)

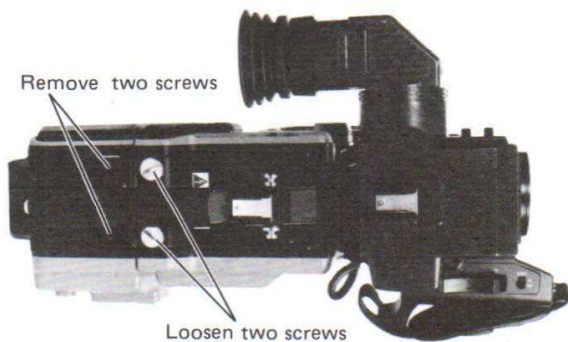


Fig. 2-2-1

- While pushing release button remove the camera adaptor by pulling it backward. (Fig.2-2-2)

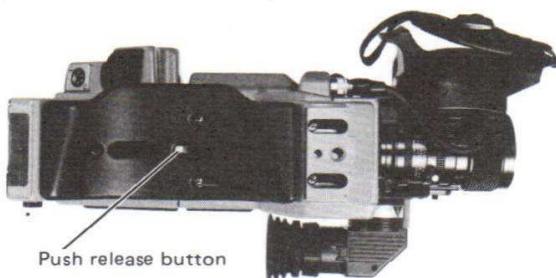


Fig. 2-2-2

- Remove three screws holding the rear cover (M62) and four screws holding the operation cover. (Fig.2-2-3)

2-3 12X Servo Control Zoom Lens WV-LZ70/12

- Disconnect the lens cable to the 12-pin lens connector on the camera.
- Turn the lens holding ring counter-clockwise and remove the lens.

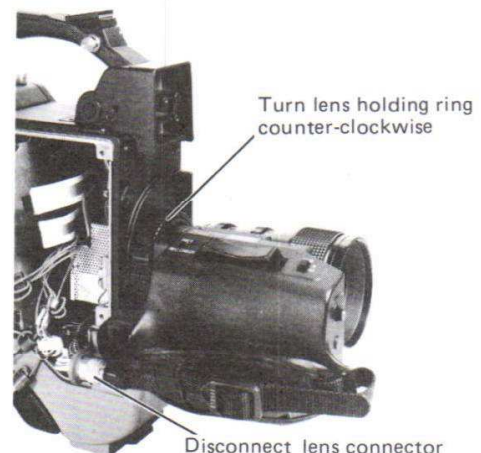


Fig. 2-3-1

- Remove ten screws holding main cover and remove main cover.

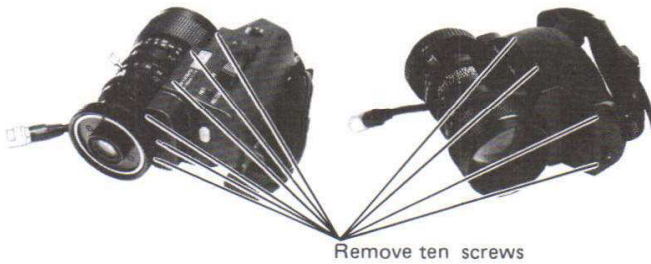


Fig. 2-3-2

3. Prism and CCD Assembly Replacement

- Remove the Preamp/Drive board while referring to 2-1-2 Preamp/Drive board.
- Remove the viewfinder from the camera by releasing the locks. (Fig.3-1)



Fig. 3-1

- Remove three screws holding the EVF mounting angle and remove the EVF mounting angle. (Fig.3-2)



Fig. 3-2

- Remove four screws holding the bottom cover (M105) and remove the bottom cover. (Fig.3-3)

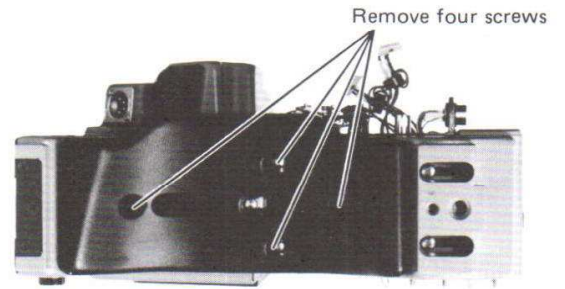
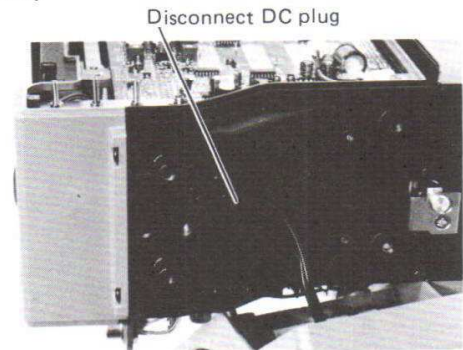


Fig. 3-3

- Disconnect DC plug from the camera by pulling it forward. (Fig.3-4)



- Remove four screws holding the front cover (M1) and remove the front cover. (Fig.3-5)

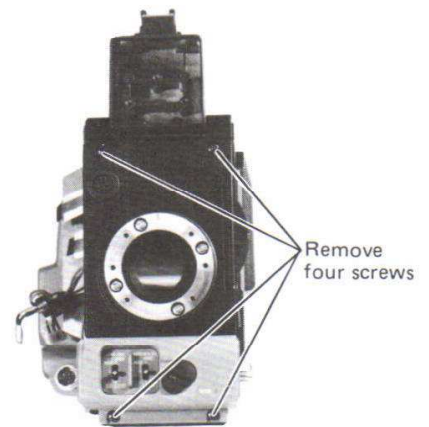


Fig. 3-5

- Disconnect CN6, CN7, CN10 and CN11 on the Mother board. (Fig.3-6)

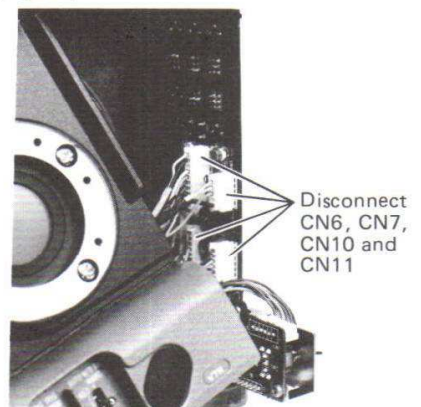


Fig. 3-6

- Remove two screws holding the shield plate (M10) and remove the shield plate. (Fig.3-7)

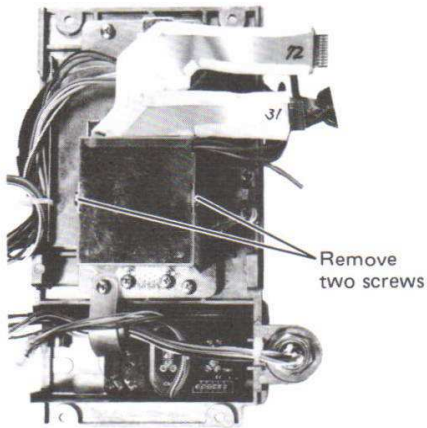


Fig. 3-7

- Remove three screws holding the shield case (M7) and remove the shield case. (Fig.3-8)

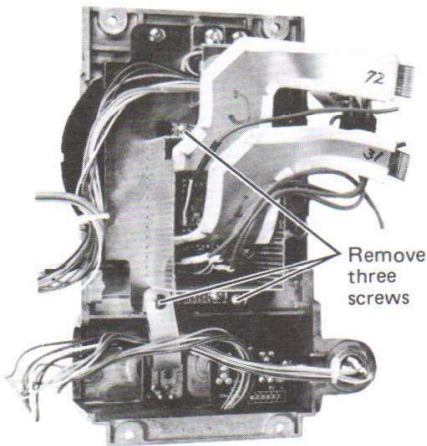


Fig. 3-8

- Remove two screws holding the Prism and CCD assembly (M6) and remove the Prism and CCD assembly. (Fig.3-9)

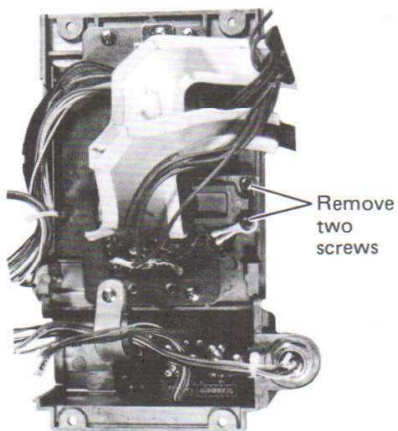


Fig. 3-9

- After replacing the Prism and CCD assembly, assemble the camera in the reverse order of disassembly.

4. ADJUSTMENT PROCEDURE-1

4-1 Connection and Setting Up for Adjustment

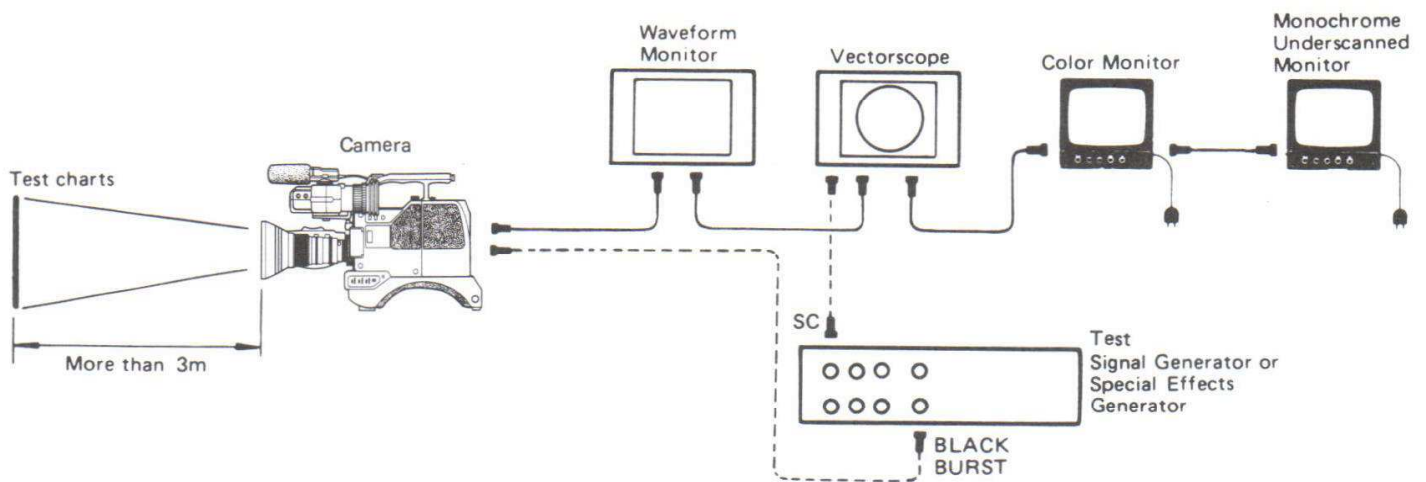


Fig. 4-1-1

Connection

- Connect the coaxial cable between the VIDEO OUTPUT connector on the right side (viewed from rear) of camera adaptor and the VIDEO INPUT connector of the waveform monitor.
- Connect the coaxial cable between the VIDEO OUTPUT connector of the waveform monitor and the VIDEO INPUT connector of the vectorscope.
- Connect the coaxial cable between the VIDEO OUTPUT connector of the vectorscope and the VIDEO INPUT connector of the color monitor.
- Connect the coaxial cable between the VIDEO OUTPUT connector of the color monitor and the VIDEO INPUT connector of the monochrome underscanned monitor.
- Terminate the VIDEO INPUT connector of the monochrome underscanned monitor with 75 ohms.

Setup

- Turn on the camera for warming up at least 30 minutes prior to adjustment.
- Distance between the camera and test chart should be 3m.
- Lighting: 300 footcandles (3000 lux), incident, 3200°K.

Position of Controls and Switches on the Camera

(Left Side) Viewed from rear

- Filter Wheel 1
- High Gain Selection Switch 0 dB
- Color Bar/Camera Selection Switch BAR
- White Balance Selection Switch MANUAL
- Power Switch ON

(Mother board)

- T PED Center
- R GAIN Center
- B GAIN Center
- Shutter ON/OFF Switch OFF
- Detail ON/OFF Switch ON
- H PHASE Center
- SC PHASE Center
- SC PHASE COARSE SWITCH 2, 4
- Lens Iris Control Center
- Level Indicator ON/OFF Switch ON
- -6dB ON/OFF Switch OFF

(Front)

- Auto White/Auto Black Set Switch HOLD
- Lens Iris Selection Switch NOR

(Right Side) Viewed from rear

- Power Selection Switch BATT/EXT DC
- VTR Compatibility Switch ⊕1
- Audio Monitor/Intercom Level Control ... Center
- Audio Level Selection Switch -20
- VTR Video Output Selection Switch ENC
- Audio Monitor Selection Switch INT

(Lens)

- Iris Control Selection Switch M (Manual)
- Servo/Manual Zoom Selection Switch MANU

4-2 Adjustment

- Refer to the LOCATION OF TEST POINTS AND ADJUSTING CONTROLS.
- Aim the camera at the test chart so that the arrow heads on the test chart just touch to the four edges of the raster on the underscanned video monitor.

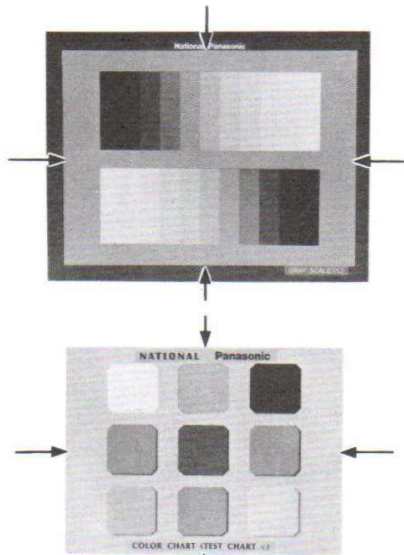


Fig. 4-2-1

■ Extension Board

- When adjusting the Preamp/Drive, Process/Detail, Sync/Encoder, and Power/Auto board, use the following extension board.

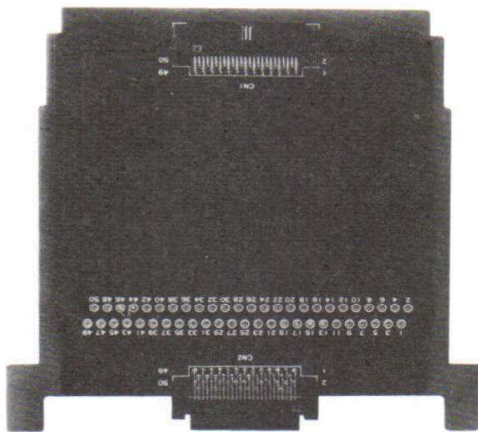


Fig. 4-2-2

■ Extension Cables

- When adjusting the Preamp/Drive board, use the following extension cables in addition to the extension board.

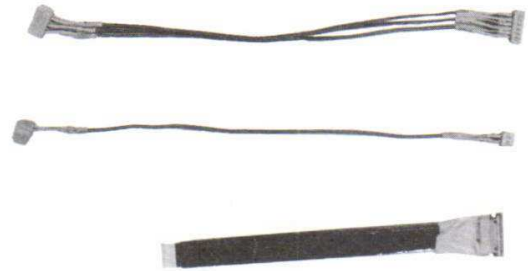
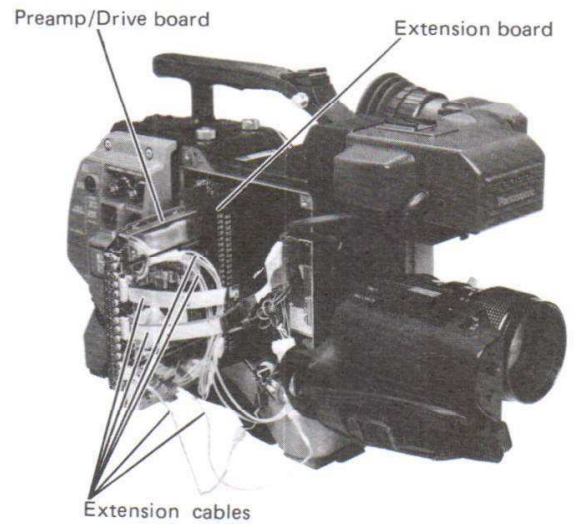


Fig. 4-2-3

- These extension cables can extend the cables from CN2 - CN7.



■ Power/Auto Board Adjustment

(1) +8.8V adjustment

Test Points : Pin 1 or 2 of Extension board

Adjusts : VR3 (+8.8V ADJ) Power/Auto board

- Connect the digital voltmeter to pin 1 or 2 of Extension board.
- Adjust VR3 for $8.8V \pm 0.1V$.

(2) Switching frequency adjustment

Test points : Drain of Q37 Power/Auto board

Pin 46(CP) of Extension board

Adjust : VR4 (SW FREQ ADJ) Power/Auto board

- Connect 2 probes of the oscilloscope to Drain of Q37 and pin 46 (CP) of Extension board.
- Trigger the oscilloscope at H rate with using TP1 (HD) on the Mother board.
- Adjust VR4 so that four pulses at Drain of Q37 are put between clamp pulses as shown in Fig. 4-2-4

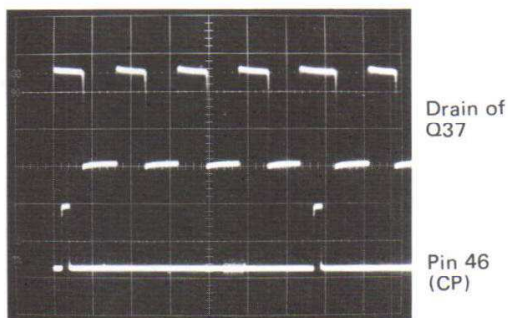


Fig. 4-2-4

■ Sync/Encoder Board Adjustment

(3) Internal subcarrier adjustment

Test point: TP7 (SC) Sync/Encoder board

Adjust: CT3 (SC FREQ ADJ) Sync/Encoder board

- Connect the frequency counter to TP7.
- Adjust CT3 for $4.43361875MHz \pm 5Hz$ (PAL) or $3.579545MHz \pm 5Hz$ (NTSC).

(4) Interleaving adjustment (PAL only)

Test point : TP4 (INTER LEAVING) Sync/Encoder board

Adjust : CT1 (INTERLEAVING) Sync/Encoder board

- Connect the oscilloscope to TP4.
- Set the oscilloscope to DC mode.
- Adjust CT1 so that the DC voltage becomes $2.5V \pm 0.1V$.

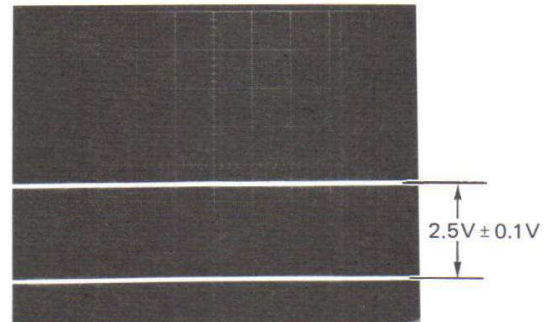


Fig. 4-2-5

- Reset the oscilloscope to AC mode.

(5) Vertical drive width adjustment (PAL only)

Test points : Pin 42 (VD OUT) of Extension board

Pin 34 (C SYNC OUT) of Extension board

Adjust : VR23 (VD WIDTH) Sync/Encoder board

- Connect 2 probes of the oscilloscope to pins 42 (VD OUT) and 34 (C SYNC OUT) of Extension board.
- Trigger the oscilloscope at V rate with using TP2 (VS) on the Mother board.
- Adjust VR23 so that \textcircled{A} becomes 2.5H as shown in Fig.4-2-6.

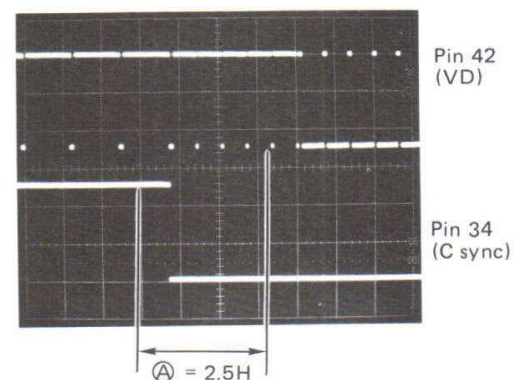


Fig. 4-2-6

(6) H. phase adjustment

Test points : Pin28 (G/L VIDEO) of Extension board
VIDEO OUTPUT Connector

Adjusts : VR5 (H PHASE) Mother board
VR7 (H PHASE LIMIT)

- Supply the black burst signal or color bar signal to the GEN-LOCK INPUT connector on the camera adaptor from the Test Signal Generator or S.E.G.
- Connect the 2 probes of the oscilloscope to pin28 (G/L VIDEO) of Extension board and VIDEO OUTPUT Connector.
- Trigger the oscilloscope at H rate with using TP1 (HD) on Mother board.
- Set the oscilloscope to H rate and dual display.
- Expand the H sync period on the oscilloscope.

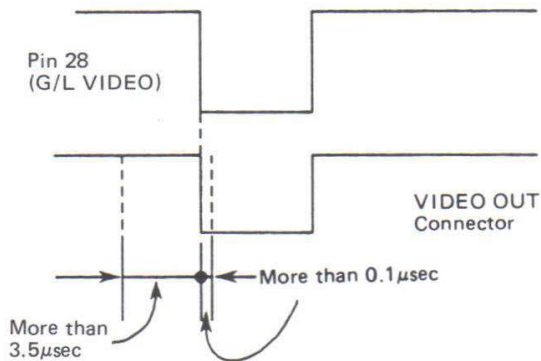


Fig. 4-2-7

- Confirm that the sync of gen-lock signal at pin28 (G/L VIDEO) of Extension board lags more than 3.5 µsec sync signal at VIDEO OUTPUT connector when turning VR5 fully counter clockwise.
- Reset VR5 fully clockwise.
- Adjust VR7 so that the sync of gen-lock signal at pin28 (G/L VIDEO) of Extension board leads by 0.1 µsec.

(7) Subcarrier phase adjustment

Adjusts :	VR4 (SC PHASE)	Mother board
	VR8 (SC PHASE LIMIT)	Mother board
	SW7	Mother board
	(SC PHASE COARSE-1 SWITCH)	
	SW8	Mother board
	(SC PHASE COARSE-2 SWITCH)	
Observe :	Vectorscope	

- Supply the black burst signal or color bar signal to the GEN-LOCK INPUT connector on the camera adaptor from the Test Signal Generator or S.E.G.
- Supply an external subcarrier signal to the external subcarrier reference (EXT CW ØREF) connector of the vectorscope from the Test Signal Generator or S.E.G.
- Set the burst mode (ØREF) of the vectorscope to EXT position.
- Set SW7 and SW8 to the position where variable range of phase becomes minimum.
- Turn VR4 fully counter clockwise.
- Adjust phase control of vectorscope so that burst phase positions 0° (U axis).

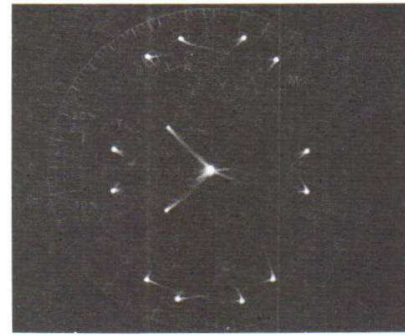


Fig. 4-2-8

- Turn VR4 fully clockwise.
- Adjust VR8 so that burst phase delays 93° as shown in Fig.4-2-9.

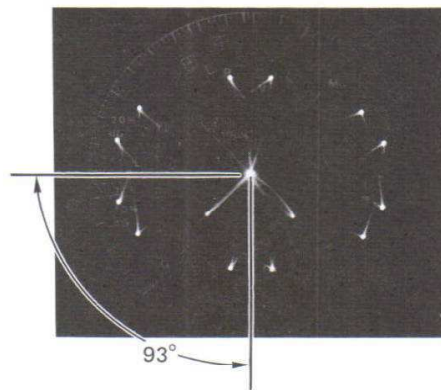


Fig. 4-2-9

- Set SW7 and SW8 to 0° position.
- Confirm that the burst phase changes more than 90°, 180° and 270° when SW7 and SW8 are set to 90°, 180° and 270° position.
- Confirm that the burst phase changes 90° when VR4 is turned back.
(The burst phase changes more than 360° by setting SW7, SW8 and VR4.)
- Reset SW7 and SW8 to 0° position and return VR4 to its mechanical center.
- Disconnect the black burst signal or color bar signal from the GEN-LOCK INPUT connector, and the external subcarrier signal from the vectorscope.

(8) Color bar adjustment

Test point : Pin20 (Y OUT) of Extension board
Adjusts : VR7 (BAR WIDTH) Sync/Encoder board
Observe : Oscilloscope

- Confirm that the Color Bar/Camera Selection Switch is set to BAR position.
- Connect the oscilloscope to pin 20 of Extension board.
- Trigger the oscilloscope at H rate with using TP1 (HD) on the Mother board.
- Adjust VR7 so that the width of black bar portion becomes $5.5 \mu\text{sec}$.

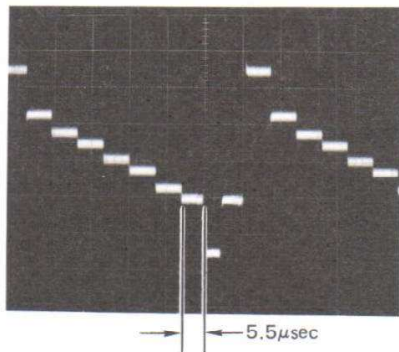


Fig. 4-2-10

(9) U/V (B-Y/R-Y) black balance/white balance adjustment

Test point : VIDEO OUTPUT connector
Adjusts : VR14
(PAL...U CARRIER BAL) Sync/Encoder board
(NTSC..B-Y CARRIER BAL) Sync/Encoder board
VR15
(PAL...V CARRIER BAL) Sync/Encoder board
(NTSC..R-Y CARRIER BAL) Sync/Encoder board
VR9
(PAL...U WHITE BAL) Sync/Encoder board
(NTSC..B-Y WHITE BAL) Sync/Encoder board
VR11
(PAL...V WHITE BAL) Sync/Encoder board
(NTSC..R-Y WHITE BAL) Sync/Encoder board

- Connect the oscilloscope terminated with 75ohms to VIDEO OUTPUT connector.
- Trigger the oscilloscope at H rate with using TP1 (HD) on the Mother board.
- Confirm that the Color Bar/Camera Selection Switch is set to BAR position.
- Adjust VR14 and VR15 alternately so that the carrier on the black level becomes minimum.
- Adjust VR9 and VR11 alternately so that the carrier on the white level becomes minimum.

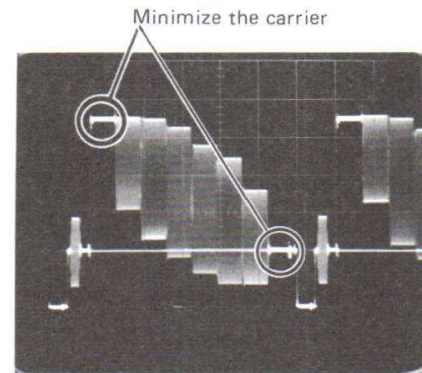


Fig. 4-2-11

(10) Bar pedestal , Sync level and Y gain adjustment

Test point : VIDEO OUTPUT connector
Adjusts : VR13 (BAR SETUP) Sync/Encoder board
VR18 (TOTAL Y GAIN) Sync/Encoder board
VR8 (Y GAIN) Sync/Encoder board

- Connect the oscilloscope terminated with 75ohms to VIDEO OUTPUT connector.
- Trigger the oscilloscope at H rate with using TP1 (HD) on the Mother Board.
- Adjust VR18 so that the sync level becomes $0.3 \pm 7\text{mV}$ (PAL) or $40 \text{ IRE} \pm 1 \text{ IRE}$ (NTSC).
- Adjust VR13 so that the setup level (black level) becomes 0V (PAL) or $7.5 \text{ IRE} \pm 1 \text{ IRE}$ (NTSC).
- Adjust VR8 so that the white bar signal level becomes $0.7 \pm 7\text{mV}$ (PAL) or $77 \text{ IRE} \pm 1 \text{ IRE}$ (NTSC).

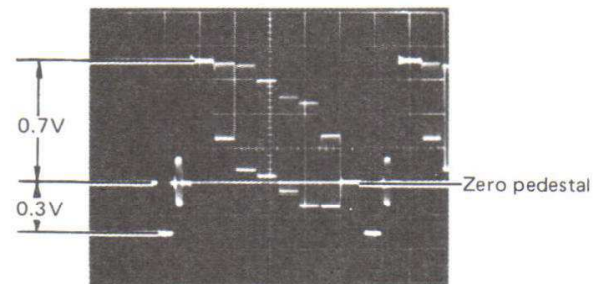


Fig. 4-2-12

(11) Chroma adjustment (PAL model)

Test point : VIDEO OUTPUT connector

Adjusts : VR16 (U BURST GAIN) Sync/Encoder board
 VR17 (V BURST GAIN) Sync/Encoder board
 VR10 (U GAIN) Sync/Encoder board
 VR12 (V GAIN) Sync/Encoder board
 VR1 (BAR PHASE-1) Sync/Encoder board
 VR5 (BAR PHASE-2) Sync/Encoder board

Observe : Vectorscope

- Adjust VR16 so that the phase difference between the burst vectors for odd and even line becomes 90° on the vectorscope.
- Adjust VR17 so that the burst vector becomes 75% position on the 135° and 225° axis.
- Adjust VR10, VR12, VR1 and VR5 so that all vectors fall into their respective boxes.

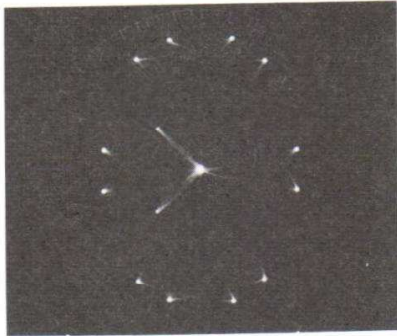


Fig. 4-2-13

- Repeat above steps so that all vectors fall into their respective boxes.

(12) Chroma adjustment (NTSC model)

Test point : VIDEO OUTPUT connector

Adjusts : VR16 (BURST PHASE) Sync/Encoder board
 VR17 (BURST GAIN) Sync/Encoder board
 VR10 (B-Y GAIN) Sync/Encoder board
 VR12 (R-Y GAIN) Sync/Encoder board
 VR1 (BAR PHASE-1) Sync/Encoder board
 VR3 (BAR PHASE-2) Sync/Encoder board

- Adjust VR17 so that the burst vector becomes 75% position on the 180° axis.
- Adjust VR10, VR12, VR1 and VR3 so that all vectors fall into their respective boxes.
- Adjust VR16 so that the burst vector places on the 180° axis.

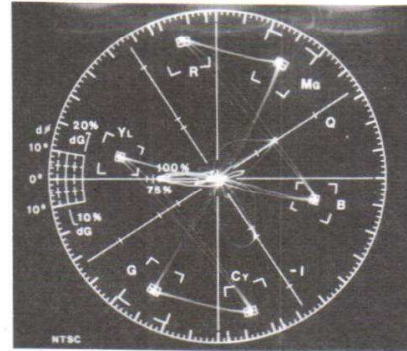


Fig. 4-2-14

- Repeat above steps so that all vectors fall into their respective boxes.

(13) Camera chroma gain adjustment

Test point : VIDEO OUTPUT connector

Adjust : VR22 Sync/Encoder board
 (PAL ... U SUB GAIN)
 (NTSC . B-Y SUB GAIN)

- Set the BAR/CAMERA MOD switch SW2 on the Sync/Encoder board to CAM position.
- Adjust gain control of vectorscope so that red and magenta vectors fall into their respective boxes.
- Adjust VR22 so that yellow and blue vectors fall into their respective boxes.

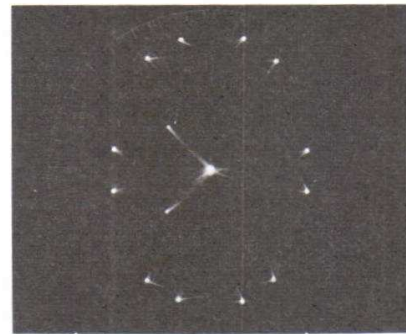


Fig. 4-2-15

- Reset the BAR/CAMERA MOD switch SW2 on the Sync/Encoder board to BAR position.

(14) Horizontal lock adjustment

Test point : TP3 (H LOCK) Sync/Encoder board
 Adjust : L9 (H LOCK) Sync/Encoder board

- Supply the black burst signal or color bar signal to GEN-LOCK INPUT connector on the camera adaptor from Test signal generator or S.E.G.
- Connect the oscilloscope to TP3.
- Trigger the oscilloscope at H rate with using TP1 (HD) on the Mother board.
- Adjust L9 so that the DC voltage becomes $2.5V \pm 0.1V$.

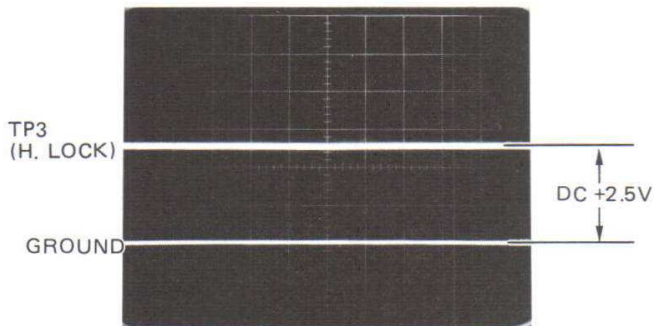


Fig. 4-2-16

(15) Color lock adjustment

Test point : TP5 (SC LOCK) Sync/Encoder board
 Adjust : CT2 (SC LOCK) Sync/Encoder board

- Supply the black burst signal or color bar signal to GEN-LOCK input connector on the camera adaptor from Test signal generator or S.E.G.
- Connect the oscilloscope to TP5.
- Adjust CT2 so that the DC voltage becomes $2.5V \pm 0.1V$.
- If DC voltage does not become $2.5V$, turn L8 on Sync/Encoder board a little so that it becomes $2.5V$.

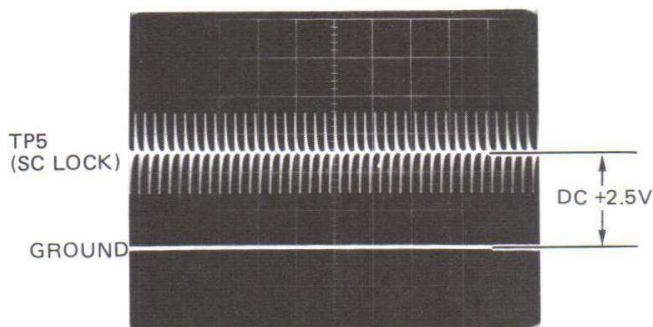


Fig. 4-2-17

(16) Flange-back adjustment (Lens)

Adjust : Flange-back adjustment ring
 Observe : Monochrome underscanned video monitor

- Set the wheel to 1 (3200°K) position.
- Loosening the flange-back lock knob.
- Set the lens iris to fully open in order to have minimum depth of focus. If the picture on the monochrome underscanned video monitor is saturated. Set the filter wheel to 2 (5600°K + 12.5% ND) position.
- Aim the camera at the resolution chart further than 10 feet (3m) from the camera.
- Zoom in (close up) and adjust lens focus while observing the monochrome underscanned video monitor.
- Zoom out (wide angle) and adjust the focus by turning the flange-back adjustment ring.
- Zoom in again and adjust the lens focus by turning the focus ring.
- Zoom out again and if necessary adjust the focus with the flange-back adjustment ring.
- Repeat this procedure until correct focus is maintained throughout the entire zoom range. When the adjustment has been completed, tighten the flange-back lock knob.

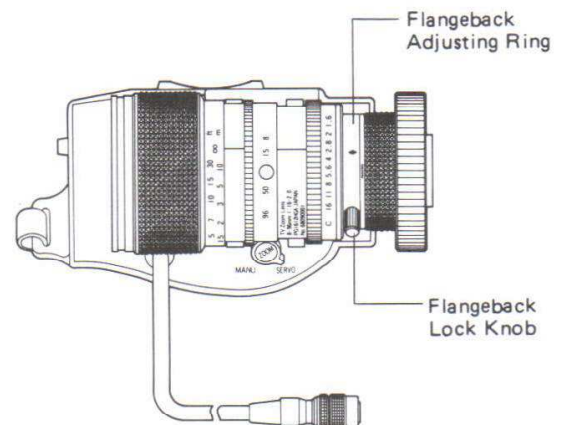


Fig. 4-2-18

■ Preamp/Drive Board Adjustment**(17) PLL (Phase Lock Loop) adjustment**

Test point : TP105 (PLL) Preamp/Drive board
 Adjust : L113 (PLL LOCK) Preamp/Drive board

- For this adjustment, refer to 2-1-2 Preamp/Drive board as shown on page 2-1 for disassembling.
- Set the RGB/YC selection switch SW1 on the Sync/Encoder board to RGB position.
- Set the color Bar/Camera selection switch on the left side of the camera to CAM position.
- Connect the oscilloscope to TP105.
- Adjust L113 so that the DC voltage becomes $2.5V \pm 0.1V$.

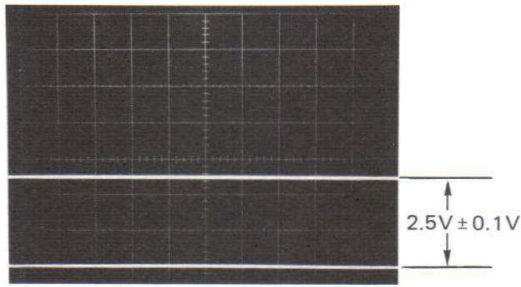


Fig. 4-2-19

- After finishing this adjustment, turn off the power and remove Extension board and Extension cables.
- Return the Preamp/Drive board into the camera.
- Turn on the Power.
- Turn VR6 (Y BLACK CLIP) and VR8 (Y WHITE CLIP) on the Preamp/Drive board fully counter clockwise.

(18) C Sub adjustment

Observe : Video monitor
 Adjust : VR103 (C SUB) Preamp/Drive board

- Set the Iris Control Selection Switch to A (Auto) position .
- Aim the camera at the 60-watt lamp placed in front of the dark background.

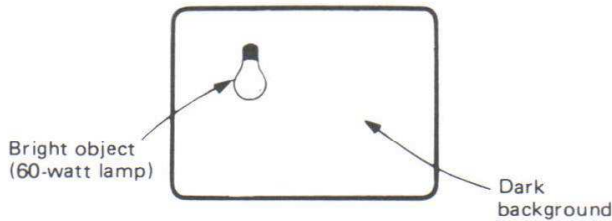
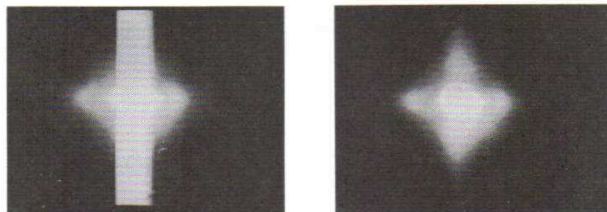


Fig. 4-2-20

- Adjust VR103 so that the smear on the monitor just disappear.



NO GOOD

GOOD

Fig.4-2-21

(19) C output gate adjustment

Test point : TP102 (C OG) Preamp/Drive board
 Adjust : VR104 (C OG) Preamp/Drive board

- Set the filter wheel to 4 (CLOSE) position.
- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to TP102 and set to DC mode.
- Adjust VR104 for 8.5V.

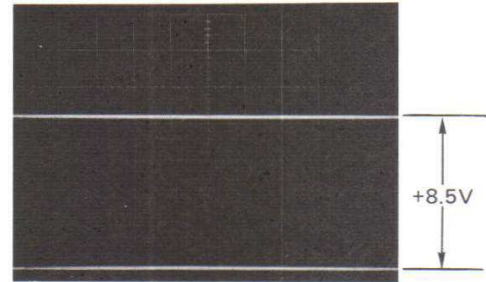


Fig. 4-2-22

(20) Y Sub adjustment

Observe : Video monitor
 Adjust : VR101 (Y SUB) Preamp/Drive board

- Set the RGB/YC selection switch SW1 on the Sync/Encoder board to YC position.
- Set the Iris Control Selection Switch to A(Auto) position.
- Aim the camera at the 60-watt lamp placed in front of the dark background.

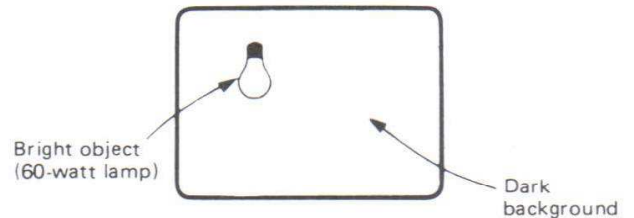


Fig. 4-2-23

- Adjust VR101 so that the smear on the monitor just disappear.

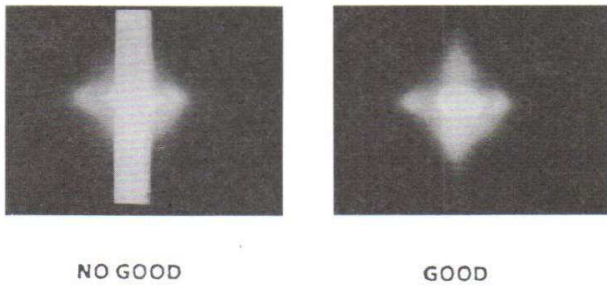


Fig. 4-2-24

(21) Y output gate adjustment

Test point : TP101 (Y OG) Preamp/Drive board
Adjust : VR102 (Y OG) Preamp/Drive board

- Set the filter wheel to 4 (CLOSE) position.
- Connect the oscilloscope to TP101 and set to DC mode.
- Trigger the oscilloscope at H rate with using TP1 (HD) on the Mother board.
- Adjust VR102 for 8.5V.

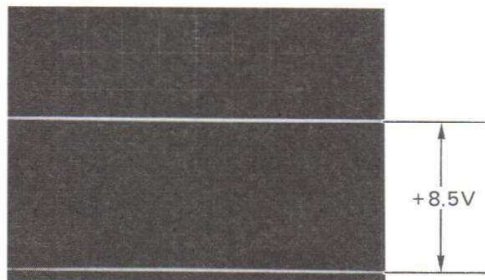


Fig. 4-2-25

■ Process/Detail Board Adjustment

IMPORTANT NOTICE

Preset the memory in the POWER/AUTO board, short TP1 (P ROM RESET 1) and TP2 (P ROM RESET 2), also short TP3 (AUTO RESET 1) and TP4 (AUTO RESET 2) on the POWER/AUTO board for the following adjustment and do not set the Auto White and Black Balance setting switch (AWC, ABC) on the front panel throughout the adjustment.

(22) R/G/B Pulse cancel and pedestal adjustment

Test points :	TP12 (G OUT)	Process/Detail board
	TP11 (R OUT)	Process/Detail board
	TP20 (B OUT)	Process/Detail board
Adjusts :	VR3 (G PUL CAN)	Process/Detail board
	VR16 (G PED)	Process/Detail board
	VR1 (R PUL CAN)	Process/Detail board
	VR15 (R PED)	Process/Detail board
	VR5 (B PUL CAN)	Process/Detail board
	VR17 (B PED)	Process/Detail board

- Set the RGB/YC selection switch SW1 on the Sync/Encoder board to RGB position.
- Set the filter wheel to 4 (CLOSE) position.
- Confirm that the T PED control VR1 on the Mother board is set to its mechanical center.

■ G pulse cancel and pedestal adjustment

- Connect the oscilloscope to TP12.
- Trigger the oscilloscope at H rate using TP1 (HD) on Mother board.
- Set the High Gain Selection Switch to 0dB.
- Preset VR16 so that the pedestal level of G signal becomes 40mV (PAL) or 20mV (NTSC).
- Adjust VR3 so that the pedestal level of G signal is not varied (stayed in the same level) while changing the High Gain Selection Switch between 0dB and +18dB position.
- Set the High Gain Selection Switch to 0dB position.
- Adjust VR16 so that the pedestal level of G signal becomes 40mV (PAL) or 20mV (NTSC).

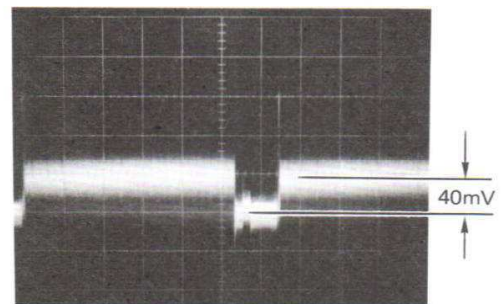


Fig. 4-2-26

■ R pulse cancel and pedestal adjustment

- Connect the oscilloscope to TP11.
- Preset VR15 so that the pedestal level of R signal becomes 40mV (PAL) or 20mV (NTSC).
- Adjust VR1 so that the pedestal level of R signal is not varied (stayed in the same level) while changing the High Gain Selection Switch between 0dB and +18dB position.
- Set the High Gain Selection Switch to 0dB position.
- Adjust VR15 so that the pedestal level of R signal becomes 40mV (PAL) or 20mV (NTSC).

■ B pulse cancel and pedestal adjustment

- Connect the oscilloscope to TP20.
- Preset VR17 so that the pedestal level of B signal becomes 40mV (PAL) or 20mV (NTSC).
- Adjust VR5 so that the pedestal level of B signal is not varied (stayed in the same level) while changing the High Gain Selection Switch between 0dB and +18dB position.
- Set the High Gain Selection Switch to 0dB position.
- Adjust VR17 so that the pedestal level of B signal becomes 40mV (PAL) or 20mV (NTSC).
- Set the filter wheel to 1 (3200°K) position.
- Turn VR7 (R PRE-KNEE), VR8 (G PRE-KNEE), VR9 (B PRE-KNEE), VR26 (HIGH GAIN LEVEL DEPENDENT) and VR30 (DTL GAIN) on the Process/Detail board fully clockwise.
- Turn VR11 (R/G/B WHITE CLIP), VR25 (LEVEL DEPENDENT) and VR29 (NOISE SUPPRESS) on the Process/Detail board fully counter clockwise.

(23) R/G/B Input gain adjustment

test points :	Pin 1 (Y) of CN 6	Preamp/Drive board
	TP12 (G OUT)	Process/Detail board
	TP11 (R OUT)	Process/Detail board
	TP20 (B OUT)	Process/Detail board
Adjusts :	VR4 (G INPUT GAIN)	Process/Detail board
	VR2 (R INPUT GAIN)	Process/Detail board
	VR6 (B INPUT GAIN)	Process/Detail board

- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to Pin1 (Y) of CN6 on the Preamp/Drive board.
- Trigger the oscilloscope at H rate using TP1 (HD) on Mother board.
- Adjust the lens iris so that the Y signal level becomes 100mVp-p and keep this condition until the adjustment is completed.

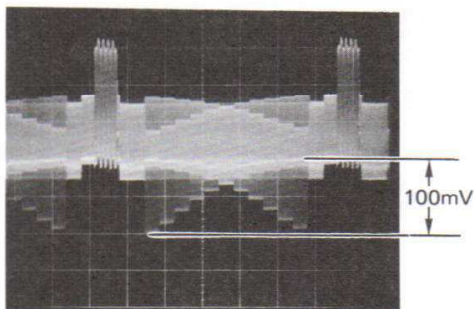


Fig. 4-2-27

- Connect the oscilloscope to TP12.
- Adjust VR4 so that the G signal at TP12 becomes 0.7Vp-p.

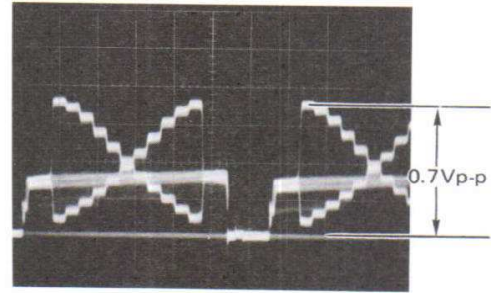


Fig. 4-2-28

- Connect the oscilloscope to TP11.
- Adjust VR2 so that the R signal becomes 0.7Vp-p.
- Connect the oscilloscope to TP20.
- Adjust VR6 so that the B signal becomes 0.7Vp-p.

(24) R/G/B Gamma adjustment

Test point : VIDEO OUTPUT connector

Adjusts : VR10 (R/G/B GAMMA) Process/Detail board

- Set the High Gain Selection Switch to 0 dB position.
- Aim the camera at the logarithmic gray scale chart.
- Confirm that the composite video signal level is 0.7V (PAL) or 100 IRE (NTSC). If not, readjust lens iris.
- While observing the oscilloscope, adjust VR10 so that the crosspoint level of the gray scale of the composite video signal becomes 350mV +0V, -14mV (PAL) or 50IRE ± IRE (NTSC).

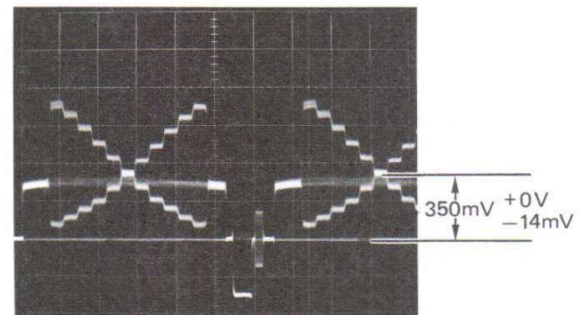


Fig. 4-2-29

- Confirm R/G/B pulse cancel, pedestal and input gain while referring to adjustment procedure items (22), (23).

(25) Matrix adjustment

Test point : VIDEO OUTPUT connector

Adjusts : VR18 (MATRIX LEVEL) Process/Detail board
VR31 (MATRIX GAIN) Process/Detail board

Observe : Vectorscope

- Connect the oscilloscope terminated with 75 ohms to VIDEO OUTPUT connector.
- Trigger the oscilloscope at H rate with using TP1(HD) on the Mother board.
- Aim the camera at color chart.
- Set Matrix ON/OFF switch SW1 on the Process/Detail board to ON position.
- Adjust lens iris so that white chip level of color chart on the oscilloscope becomes 700mV (PAL) or 714mV (NTSC).

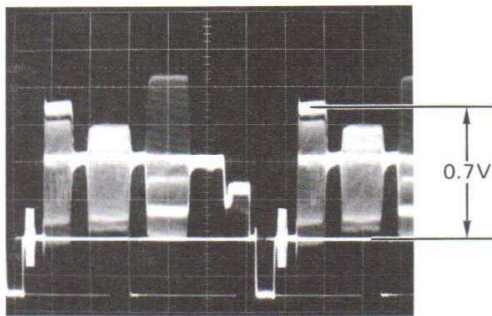


Fig. 4-2-30

- Adjust VR18 so that Red vector becomes $103^\circ \pm 1^\circ$ on the vectorscope.

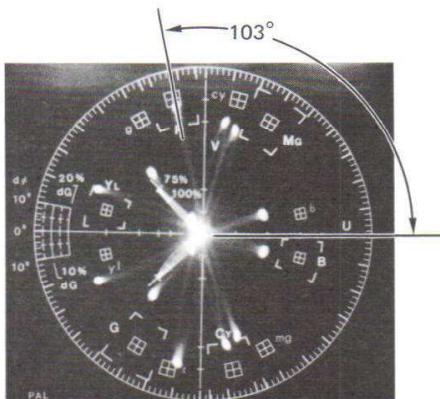


Fig. 4-2-31

- Aim the camera at logarithmic gray scale chart.
- Adjust VR31 so that carrier of composite video signal on the oscilloscope becomes minimum.

Minimize carrier

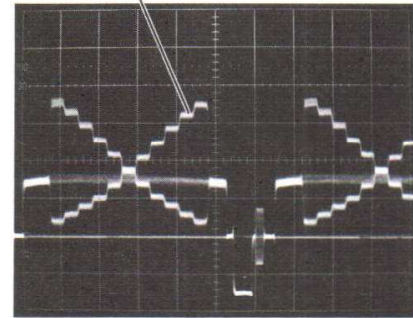


Fig. 4-2-32

(26) R/G/B Knee and white clip adjustment

Test point : VIDEO OUTPUT connector

Adjusts : VR8 (G PRE-KNEE) Process/Detail board
VR7 (R PRE-KNEE) Process/Detail board
VR9 (B PRE-KNEE) Process/Detail board
VR11 (R/G/B WHITE CLIP) Process/Detail board

Observe : Vectorscope

- Connect the oscilloscope terminated with 75 ohms to VIDEO OUTPUT connector.
- Trigger the oscilloscope at H rate with using TP1(HD) on the Mother board.
- Adjust lens iris so that composite video signal on the oscilloscope becomes 700mV (PAL) or 714mV (NTSC) and note the F stop of lens iris as (A).
- Open the lens iris 1F stop from (A).
- Adjust VR8, VR7 and VR9 so that knee effects between 665mV and 840mV (PAL) or 678mV and 857mV (NTSC) and minimize the carrier of portion where knee effects.

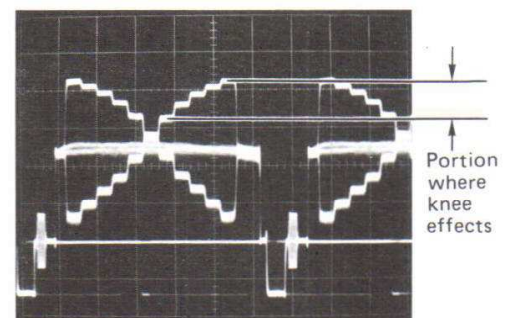


Fig. 4-2-33

- Open the lens iris.
- Adjust VR11 so that clip level of signal becomes 840mV (PAL) or 857mV (NTSC).

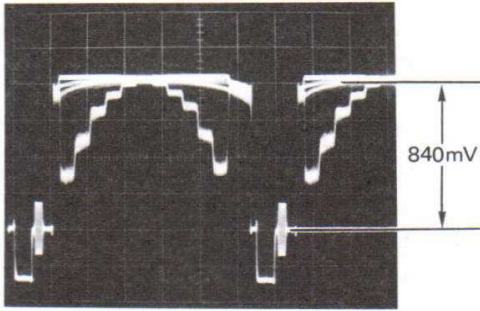


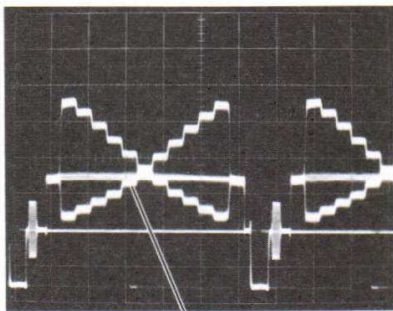
Fig. 4-2-34

(27) R/G/B white balance fine adjustment

Test point : VIDEO OUTPUT connector

Adjusts :	VR15 (R PED)	Process/Detail board
	VR17 (B PED)	Process/Detail board
	VR2 (R INPUT GAIN)	Process/Detail board
	VR6 (B INPUT GAIN)	Process/Detail board

- Connect the oscilloscope terminated with 75 ohms to VIDEO OUTPUT connector.
- Trigger the oscilloscope at H rate with using TP1(HD) on the Mother board.
- Fine-adjust VR15, VR17, VR2 and VR6 so that the carrier on the video signal becomes minimum.



Minimize the carrier

Fig. 4-2-35

(28) Y DC/Y input gain adjustment (Preamp/Drive board)

Test points :	TP7 (Y DC)	Mother board
	TP1 (Y)	Preamp/Drive board
Adjusts :	VR301 (Y DC)	Preamp/Drive board
	VR2 (Y INPUT GAIN)	Preamp/Drive board

- Set the RGB/YC Selection Switch SW1 on the Sync/Encoder board to YC position.
- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to Pin1 (Y) of CN6 on the Preamp/Drive board.
- Trigger the oscilloscope at H rate using TP1 (HD) on Mother board.

- Adjust the lens iris so that the Y signal level becomes 100mVp-p and keep this condition until the adjustment is completed.

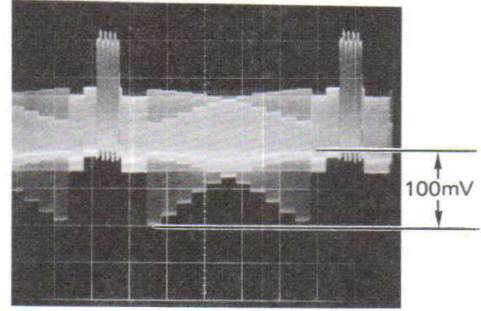


Fig. 4-2-36

- Connect the oscilloscope to TP7.
- Set the oscilloscope to DC mode.
- Adjust VR301 so that DC voltage becomes 0.5V.

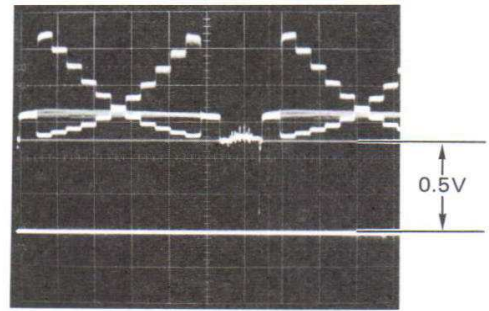


Fig. 4-2-37

- Connect the oscilloscope to TP1.
- Set the oscilloscope to AC mode.
- Adjust VR2 so that the Y signal becomes 0.4V.

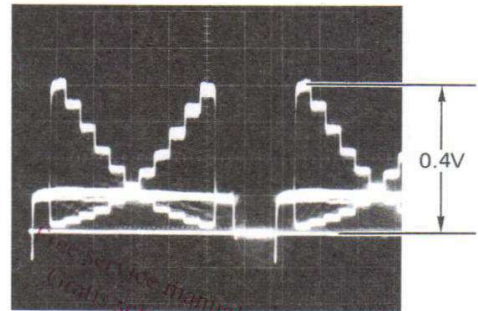
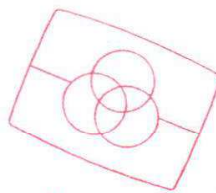


Fig. 4-2-38



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(29) Y pulse cancel and pedestal adjustment**(Preamp/Drive board)**

Test point :	Pin1 (Y) of CN6	Preamp/Drive board
Adjusts :	VR1 (Y PUL CAN)	Preamp/Drive board
	VR9 (Y PED)	Preamp/Drive board
	VR10 (-6dB PUL CAN)	Preamp/Drive board

- Connect the oscilloscope terminated with 75 ohms to VIDEO OUTPUT connector.
- Trigger the oscilloscope at H rate with using TP1(HD) on the Mother board.
- Set the filter wheel to 4 (CLOSE) position.
- Preset VR9 so that the pedestal level of video signal becomes $35\text{mV} \pm 7\text{mV}$ (PAL) or $54\text{mV} \pm 7\text{mV}$ (NTSC).
- Adjust VR1 so that the pedestal level of video signal is not varied (stayed in the same level) while changing the High Gain Selection Switch between 0dB and + 18dB position.
- Set the -6dB ON/OFF Switch on the Mother board to ON position.
- Adjust VR10 so that the pedestal level of video signal is not varied (stayed in the same level) while changing the High Gain Selection Switch between 0dB and + 12dB position.
- Set the High Gain Selection Switch to 0dB position.
- Set the -6dB ON/OFF Switch on the Mother board to OFF position.
- Adjust VR9 so that the pedestal level becomes $35\text{mV} \pm 7\text{mV}$ (PAL) or $54\text{mV} \pm 7\text{mV}$ (NTSC).

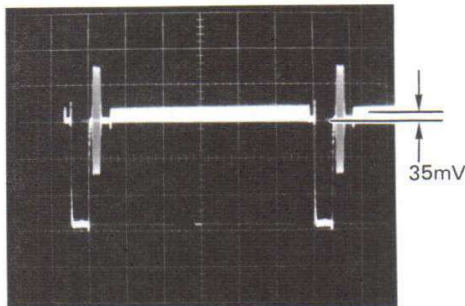


Fig. 4-2-39

(30) Y gamma and gain adjustment (Preamp/Drive board)

Test points :	Pin1 (Y) of CN6	Preamp/Drive board
	VIDEO OUTPUT connector	
Adjusts :	VR4 (Y GAIN-1)	Preamp/Drive board
	VR7 (Y GAMMA)	Preamp/Drive board

- Set the filter wheel to 1(3200°K) position.
- Connect the oscilloscope to pin1 (Y) of CN6 on the Preamp/Drive board.
- Trigger the oscilloscope at H rate using TP1 (HD) on the Mother board.

- Adjust the lens iris so that the Y signal level becomes 100mV and keep this condition until the adjustment is completed (refer to Fig. 4-2-36 on page 2-16).
- Connect the oscilloscope terminated with 75 ohms to VIDEO OUTPUT connector.
- Adjust VR4 and VR7 so that gain level becomes $700\text{mV} \pm 7\text{mV}$ or $714\text{mV} \pm 7\text{mV}$ (NTSC) and gamma level becomes $350\text{mV} + 0\text{V}$, -14mV (PAL) or $357\text{mV} \pm 7\text{mV}$ (NTSC) on the oscilloscope.

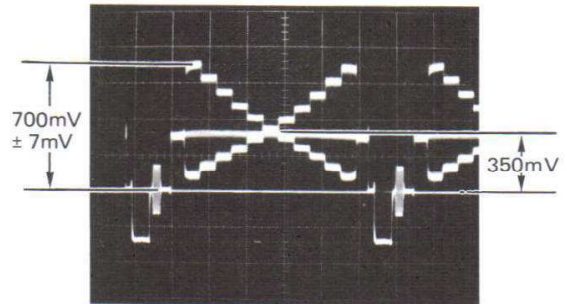


Fig. 4-2-40

(31) High Gain adjustment (Preamp/Drive board)

Test point :	VIDEO OUTPUT connector	
Adjust :	VR5 (Y GAIN-2)	Preamp/Drive board

- Connect the oscilloscope terminated with 75 ohms to VIDEO OUTPUT connector.
- Trigger the oscilloscope at H rate with using TP1 (HD) on the Mother board.
- Adjust lens iris so that video signal becomes 700mV (PAL) or 714mV (NTSC).
- Set the High Gain Selection Switch to + 18dB position.
- Place the 1/8 ND filter in front of the lens.
- Adjust VR5 so that video signal becomes $700\text{mV} \pm 7\text{mV}$ (PAL) or $714\text{mV} \pm 7\text{mV}$ (NTSC).

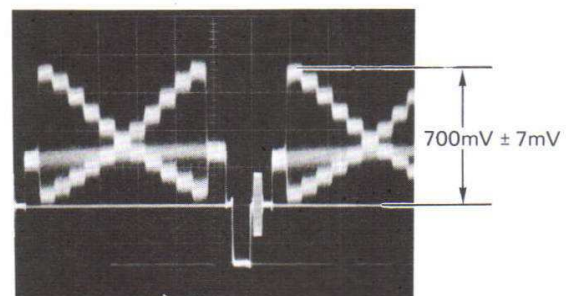


Fig. 4-2-41

- Set the High Gain Selection Switch to 0dB position and remove 1/8 ND filter.

(32) Y white clip adjustment (Preamp/Drive board)

Test point : VIDEO OUTPUT connector

Adjusts : VR8 (Y WHITE CLIP) Preamp/Drive board
VR3 (Y PRE WHITE CLIP) Preamp/Drive board

- Connect the oscilloscope terminated with 75 ohms to VIDEO OUTPUT connector.
- Trigger the oscilloscope at H rate with using TP1 (HD) on the Mother board.
- Aim the camera at logarithmic gray scale chart.
- Open the lens iris.
- Set the High Gain Selection Switch to 0dB position.
- Adjust VR8 so that clip level of signal becomes 770mV (PAL) or 785mV (NTSC).

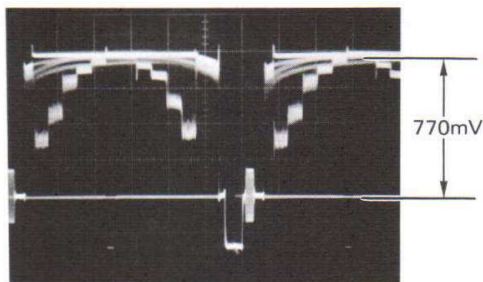


Fig. 4-2-42

- Set the High Gain Selection Switch to +18dB position.
- Adjust VR3 so that clip level of signal becomes 840mV (PAL) or 857mV (NTSC).

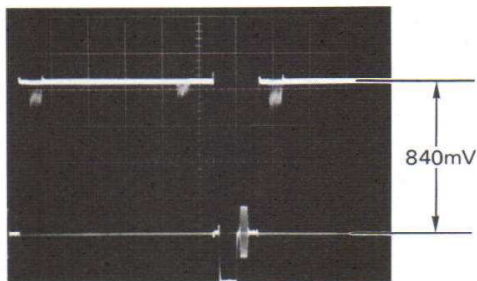


Fig. 4-2-43

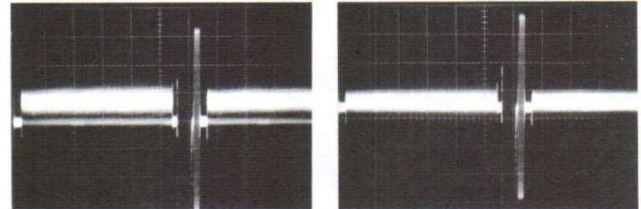
- Repeat above adjustment clip level at 0dB is maintained between 770mV and 800mV (PAL) or 785mV and 821mV (NTSC), and clip level at +18dB is maintained between 800mV and 840mV (PAL) or 821mV and 857mV (NTSC).

(33) Black clip adjustment (Preamp/Drive board)

Test point : VIDEO OUTPUT connector

Adjust : VR6 (Y BLACK CLIP) Preamp/Drive board

- Set the filter wheel to 4 (CLOSE) position.
- Adjust VR6 so that video signal is just clipped.



GOOD

NO GOOD

Fig. 4-2-44

(34) 1H CCD bias level adjustment

Test points : TP14 (0H Y) Process/Detail board
TP19 (1H BIAS) Process/Detail board
Adjusts : VR19 (1H CCD BIAS) Process/Detail board
VR20 (1H CCD GAIN) Process/Detail board

- Set the filter wheel to 1(3200°K) position.
- Aim the camera at in-mega cycle chart.
- Connect the oscilloscope to TP14.
- Trigger the oscilloscope at H rate with using TP1 (HD) on the Mother board.
- Adjust lens iris so that signal becomes 0.2V, and keep this condition until the adjustment (34), (35) are completed.

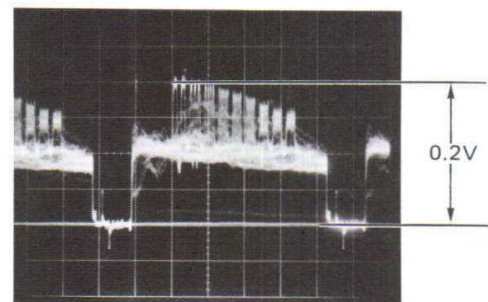


Fig. 4-2-45

(38) Total aperture level adjustment

Test point : VIDEO OUTPUT connector
Adjust : VR30 (DTL GAIN) Process/Detail board

- Set the filter wheel to 1 (3200°K) position.
- Connect the oscilloscope terminated with 75 ohms to VIDEO OUTPUT connector.
- Trigger the oscilloscope at V rate with using TP2 (VS) on the Mother board.
- Set the High Gain Selection Switch to 0dB position.
- Turn VR27 (GAIN-1 NOISE SUPPRESS) and VR28 (GAIN-2 NOISE SUPPRESS) fully counter clockwise.
- Aim the camera at the window chart and adjust lens iris so that the white level becomes 490mV (PAL) or 500mV (NTSC)
- Confirm that the Detail ON/OFF Switch SW5 on the Mother board is set to ON position.
- Adjust VR30 so that the average of left and right vertical aperture signal levels becomes $115\% \pm 5\%$ of the white level.

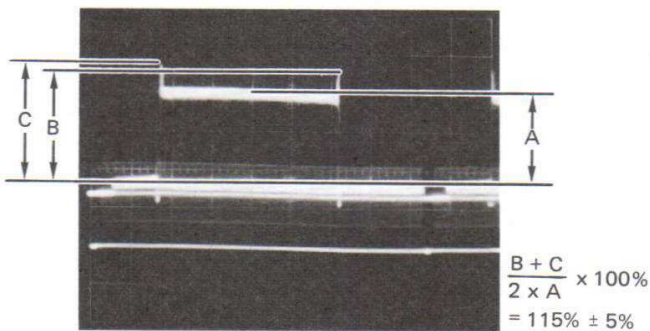


Fig. 4-2-50

(39) Level dependent adjustment

Test point : VIDEO OUTPUT connector
Adjust : VR25 (LEVEL DEPENDENT) Process/Detail board

- Connect the oscilloscope terminated with 75 ohms to VIDEO OUTPUT connector.
- Trigger the oscilloscope at H rate with using TP1 (HD) on the Mother board.
- Set the filter wheel to 1 (3200°K) position.
- Set the High Gain Selection Switch to 0dB position.
- Aim the camera at the logarithmic gray scale chart and adjust lens iris so that the white level becomes 700mV (PAL) or 714mV (NTSC)
- Adjust VR25 so that the aperture signal on the lowest step of gray scale signal only is suppressed.

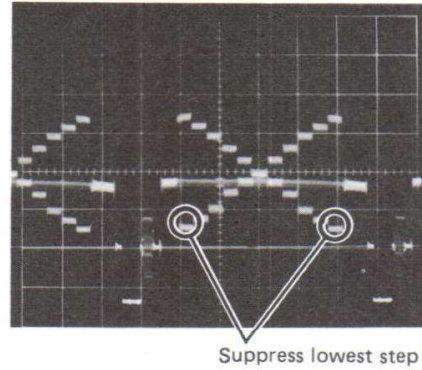


Fig. 4-2-51

(40) Auto white control and auto black control adjustment (Power/Auto board)

Test point : VIDEO OUTPUT connector
Adjusts : VR1 (AWC/ABC ADJ1) Power/Auto board
 VR2 (AWC/ABC ADJ2) Power/Auto board

- Connect the oscilloscope terminated with 75 ohms to VIDEO OUTPUT connector.
- Set the filter wheel to 1 (3200°K) position.
- Aim the camera at the logarithmic gray scale chart.
- Set the White Balance Selection Switch to A or B of AWC position.
- Adjust lens iris to that video signal becomes 700mV (PAL) or 714mV (NTSC).
- Connect the vectorscope to VIDEO OUTPUT connector.
- Set the gain of vectorscope to maximum.
- Press up the Auto White/Auto Black Set Switch on the front of camera to AWC position.
- Press up again the Auto White/Auto Black Set Switch on the front of camera to AWC position and press MOD Switch SW1 on the Power/Auto board at same time.
- Adjust VR1 and VR2 so that the vector positions at the center of the vectorscope.

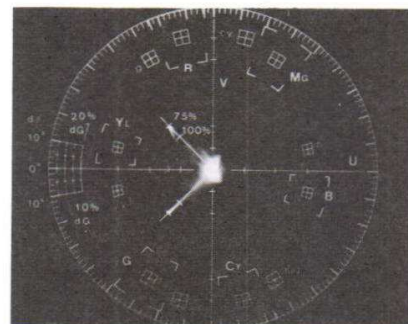


Fig.4-2-52

- Press the MOD Switch SW1 on the Power/Auto board again.
- Set the filter wheel to 4 (CLOSE) position.
- Press down the Auto White/Auto Black Set Switch on the front of camera to ABC position.
- Press down again the Auto White/Auto Black Set Switch on the front of camera to ABC position and press MOD Switch SW1 on the Power/Auto board at same time.
- Adjust VR1 and VR2 so that the vector positions at the center of the vector scope.
- Press MOD Switch SW1 on the Power/Auto board again.
- Repeat above procedure until the vector is maintained at the center of the vectorscope when setting the Auto white/Auto Black Set Switch to both AWC and ABC positions.

(41) Level indicator adjustment (Sync/Encoder board)

Test point : VIDEO OUTPUT connector

Adjust : VR19 (ZEBRA LEVEL) Sync/Encoder board

Observe : Viewfinder

- Connect the oscilloscope terminated with 75 ohms to VIDEO OUTPUT connector.
- Set the filter wheel to 1 (3200°K) position.
- Set the High Gain Selection Switch to 0dB position.
- Aim the camera at the logarithmic gray scale chart.
- Confirm that Level Indicator ON/OFF Switch on the Mother board is set to ON position.
- Set the lens iris so that the white level becomes 700mV (PAL) or 714mV (NTSC)
- Adjust VR19 so that the white chip (top step) of the logarithmic gray scale turns into ZEBRA pattern on the view finder.
- Set the lens iris so that white level becomes 665mV (PAL) or 678mV (NTSC).
- Confirm that the white chip (top step) of the logarithmic gray scale does not turn into ZEBRA pattern on the viewfinder.
- If the ZEBRA pattern appears, re-adjust VR19 until the white chip (top step) of the logarithmic gray scale turns into ZEBRA pattern at 700mV (PAL) or 714mV (NTSC) and does not turn into ZEBRA pattern at 665mV(PAL) or 678mV (NTSC).

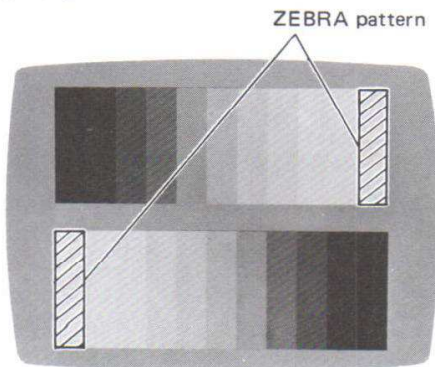


Fig. 4-2-53

(42) Character size adjustment (Power/Auto board)

Adjust: CT1 (CHARACTER POSITION)

Power/Auto board

Observe : 1.5" viewfinder

- Set the filter wheel to 4 (CLOSE) position.
- Observe 1.5" viewfinder screen.
- Adjust CT1 for making space corresponding to one character at right side of character "DB" while pressing the Check button on the left side of camera.

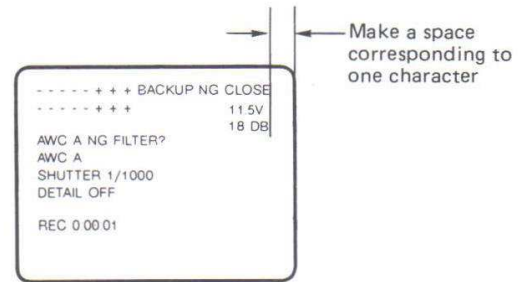


Fig. 4-2-54

4-3 Camera Adaptor Adjustment

- The camera must be completely aligned before Camera Adaptor adjustment is made.
- Disassemble the Camera Adaptor while referring to 2-2 Camera Adaptor on page 2-2.
- Refer to the separate booklet for the Test Points and Adjusting Controls.
- Connect the Camera Adaptor to the camera head.
- Connect the camera and the remote control unit (RCU) using 32 pin camera cable 32A-25.

Position of Controls and Switches on the Camera

<Left Side> Viewed from rear

- Filter Wheel 1
- High Gain Selection Switch 0 dB
- Color Bar/Camera Selection Switch BAR
- White Balance Selection Switch MANUAL
- Power Switch ON

<Mother board >

- T PED Center
- R GAIN Center
- B GAIN Center
- Detail Level Selection Switch ON
- Shutter ON/OFF Switch OFF
- H PHASE Center
- SC PHASE Center
- Lens Iris Control Center

- Level Indicator ON/OFF Switch ON
- -6dB ON/OFF Switch OFF

<Front>

- Auto White/Auto Black Set Switch HOLD
- Lens Iris Selection Switch NOR

<Right Side> Viewed from rear

- Power Selector Switch VCR/RCU
- VTR Compatibility Switch ⊕1
- Audio Monitor/Intercom Level Control ... Center
- Audio Level Selection Switch -20
- VTR video Output Selection Switch ENC
- Audio Monitor Selection Switch INT

<Lens>

- Iris Control Selection Switch A (Auto)
- Servo/Manual Zoom Selection Switch MANUAL

Position of Controls and Switches on the RCU

- Power Switch ON
- High Gain Selection Switch 0 dB
- Auto White/Auto Black Set Switch HOLD
- White/Black Balance Selection Switch ... MANUAL
- R GAIN Center
- B GAIN Center
- Detail ON/OFF Switch OFF
- Cable Length Compensation Switch 50m (150ft)
- Intercom Level Control Center
- Color Bar/Camera Selection Switch BAR
- H PHASE Center
- SC PHASE FINE Center
- SC Phase Coarse Switch 0°
- TOTAL PEDESTAL Center
- R PEDESTAL Center
- B PEDESTAL Center
- Y ADJUST Center
- CHROMA ADJUST Center
- Lens Iris Control AUTO

(1) +9V adjustment

Test point : TP1 (+9V)
Adjust : VR1 (+9V ADJ)

- Connect the digital voltmeter to TP1.
- Adjust VR1 for 9V ± 0.05V.

4-4 Lens Adjustment

- The camera must be completely aligned before 12X Servo Control Zoom Lens WV-LZ70/12 adjustment is made.
- Disassemble the WV-LZ70/12 while referring to 2-3 12X Servo Control Zoom Lens WV-LZ70/12 on page 2-2.
- Refer to Location of Test points and Adjusting Controls on page 2-25.
- Mount the WV-LZ70/12 to the camera.
- For Flange-back adjustment, refer to 4-2 Adjustment / item NO. (16) Flange-back adjustment on page 2-11.

(1) +2V adjustment

Test point : TP8 (+2V) Main board
Adjust : VR5 (+2V ADJ) Main board

- Connect the digital voltmeter to TP8.
- Adjust VR5 for +2V ± 0.03V.

(2) Zoom balance adjustment

Adjust : VR3 (ZOOM BALANCE) Main board

- Set the lens to fully Wide position by pressing the Servo Zoom Control.
- Measure the time from Wide to Tele position and note the time as (A).
- Set the lens to fully Tele position by pressing the Servo Zoom Control.
- Measure the time from Tele position to Wide position and note the time as (B).
- Adjust VR3 so that (A) = (B).

(3) Zoom speed adjustment

Adjust : VR4 (ZOOM SPEED) Main board

- Adjust VR4 so that zooming speed from tele to wide and wide to tele positions are put between 2.5 μsec and 3.5 μsec.

5. ADJUSTMENT PROCEDURE-2

When individual printed circuit board is replaced, following adjustments shows "○" mark items are required checking or readjusting.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
POWER / AUTO	○	○																			
SYNC / ENCODER			○	○	○			○	○	○	○		○	○	○						
PREAMP / DRIVE																	○	○	○	○	○
PROCESS / DETAIL																					

	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)
POWER / AUTO																			○		○
SYNC / ENCODER																			○	○	
PREAMP / DRIVE						○	○	○	○	○	○	○							○		
PROCESS / DETAIL	○	○	○	○	○	○							○	○	○	○	○	○	○		