Nikon
COOLPIX 4500

REPAIR MANUAL
VAA11901 (J)
VAA11902 (U)
VAA11903 (EP)
VAA11904 (CN)

Nikon

CONTENTS

Specification ····· M1-M2

Disassembling
- Warning/Notes ····· D1
- Front Cover, Rear cover ····· D1
- C/F Card cover, LCD unit ····· D2
- Separation of the camera unit and camera body unit ····· D3
- PCBs and Battery Holder ····· D3
- Lens cover, Discharge the main capacitor ····· D4
- Flash unit, Lens unit ····· D5
- Joint unit ····· D6
- Finder unit ····· D6

Assembling
- Joint unit ····· A1
- Finder unit ····· A1-A2
- Lens unit ····· A2
- Flash unit, CA1, CA2 ····· A3
- Lens cover ····· A4
- CA3, PW1, SY1, TB2, Battery holder ····· A5
- Lens unit and body unit ····· A5
- LCD, C/F Card cover ····· A6
- Front cover, Rear cover ····· A7
- Location of Each Board ····· A8

Adjustment ····· A9-A17

Discription of Circuit ····· E1-E8

Electricity
- Overall Wiring ····· E9
- Overall Block Diagram ····· E10
- CCD Block Diagram ····· E11
- Lens Drive Block Diagram ····· E12
- PW-1 Block Diagram ····· E13
- CA-1 Block Diagram ····· E14
- CA-2 Block Diagram ····· E15
- CA-3 Block Diagram ····· E16
- SY-1 Block Diagram ····· E17

Inspection Standard ····· R1-R5

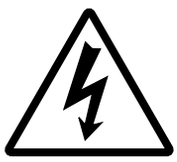
Tool List ····· T1-T2

Specifications

Type	E4500 digital camera
Effective pixels	4.0 million
CCD	$^{1}/_{1.8}$" high-density CCD; total pixels: 4.13 million
Image size (pixels)	•2272 x 1704 •1280 x 960 •2560 x 1520 (3 :2) •1024 x 768 •1600 x 1200 •640 x 480
Lens	4 x Zoom Nikkor
Focal length	F = 7.85 – 32 mm (35-mm [135] camera format equivalent: 38 – 155 mm)
f/-number	f2.6 – f5.1
Construction	Ten elements in eight groups
Digital zoom	4.0 x
Autofocus (AF)	Contrast-detect through-the-lens (TTL) AF
Focus range (measured from lens)	30 cm/1'1" – ∞(50 cm/1'8" at widest zoom position); approximately 2 cm/0.8" (middle zoom position) – ∞ in macro mode
Focus-area selection	Five-area multi AF and spot AF available
Viewfinder	Real-image zoom viewfinder with LED indication
Magnification	0.34 – 1.27 x
Frame coverage	Approximately 80%
Diopter adjustment	–2 – +2m^{-1}
Monitor	1.5", 110,000-dot, low temperature polysilicon TFT LCD with brightness and hue adjustment
Frame coverage	Approximately 97% (through/freeze image)
Storage	
Media	Type I and II CompactFlash™ (CF) cards and Microdrives
File system	Compliant with Design rule for Camera File systems (DCF) and Digital Print Order Format (DPOF)
Compression	JPEG-baseline-compliant
Exposure	
Metering	Four mode through-the-lens (TTL) metering: •256-segment matrix •Spot •Center-weighted •AF spot
Exposure control	Programmed auto with flexible program, shutter-priority auto, aperture-priority auto, manual, exposure compensation (–2.0 – +2.0 EV in steps of $^{1}/_{3}$ EV), autoexposure bracketing
Range (ISO 100 equivalent)	EV – 2.2 – +17.0EV EV – 0.3 – +18.1EV
Shutter	Mechanical and charge-coupled electronic shutter
Speed	1 – $^{1}/_{2300}$ s (programmed auto); 8 – $^{1}/_{2000}$ s (shutter-priority auto); 8 – $^{1}/_{2300}$ s (aperture-priority auto); Bulb (up to 5 min.) and 8 – $^{1}/_{2000}$ s (manual exposure mode)

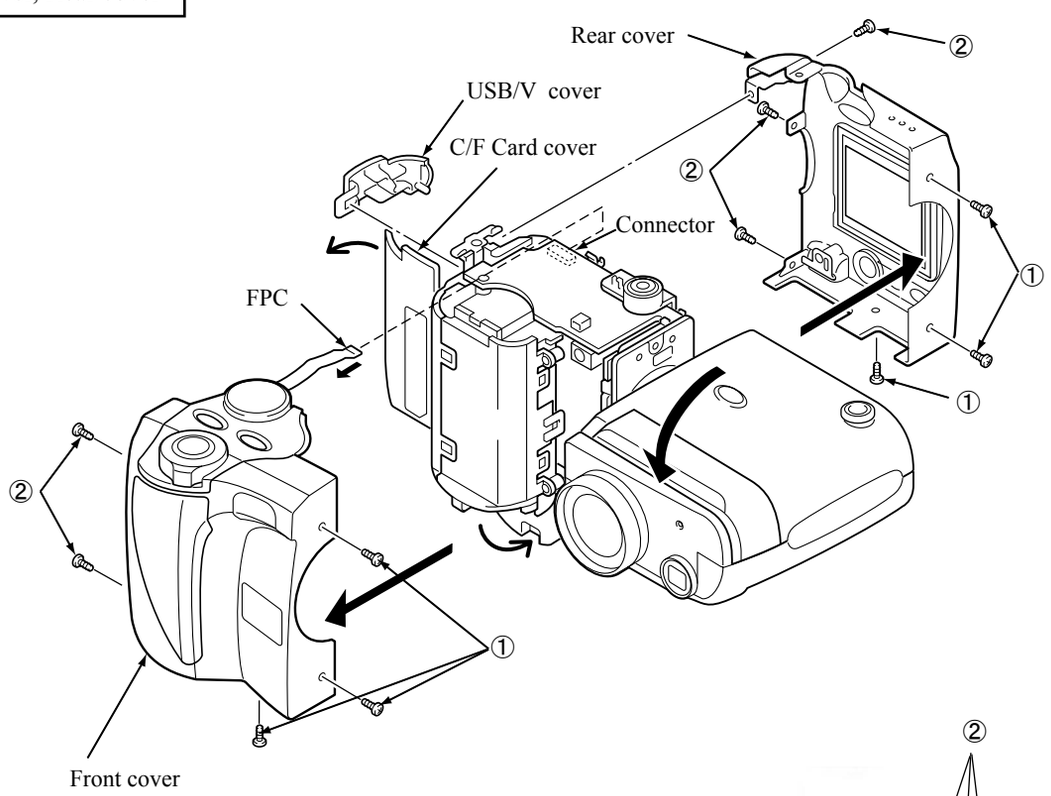
Aperture	Seven-blade iris diaphragm
Range	Ten settings in steps of $^{1}/_{3}$ EV
Sensitivity	ISO equivalent approximately 100, 200, 400, 800, or Auto (auto gain to ISO 800)
Self-timer	Ten- or three-second duration
Built-in Speedlight	Equipped with automatic pop-up
Range	W: 0.7 – 1.6 m (2'4" – 5'3") T: 0.7 – 3 m (2'4" – 9'10")
Sync method	Automatic sync control
Sync terminal	Connects to SK-E900 multi-flash bracket unit (up to five flash units supported with AS-10 and SC-18/19)
Compatible Speedlights	Nikon SB-series 80DX, 50DX, 30, 28DX, 28, 26, 25, 24, 22, and 22s
Interface	USB
Video output	User can choose from NTSC and PAL
I/O terminals	•DC input •Audio/video (A/V) output •Data output (USB)
Power sources	•One rechargeable Nikon EN-EL1 lithium-ion battery (supplied) or six-volt 2CR5 (DL245) lithium battery (available separately) •EH-21 AC adapter/battery charger (available separately) •EH-53 AC adapter (available separately)
Battery life (EN-EL1)	Approximately 100 minutes (as measured at room temperature [20°C/68 °F] under standard Nikon test conditions: monitor on, zoom adjusted with each shot, flash used in approximately one third of photographs, image quality set to NORMAL)
Tripod socket	$^{1}/_{4}$ (ISO 1222)
Dimensions (W x H x D)	130 x 73 x 50 mm (5.1" x 2.9" x 2.0")
Weight	Approximately 360 g (12.8 oz) without battery and memory card
Operating Environment	
Temperature	0 – 40 °C (32 – 104 °F)
Humidity	Less than 85% (no condensation)

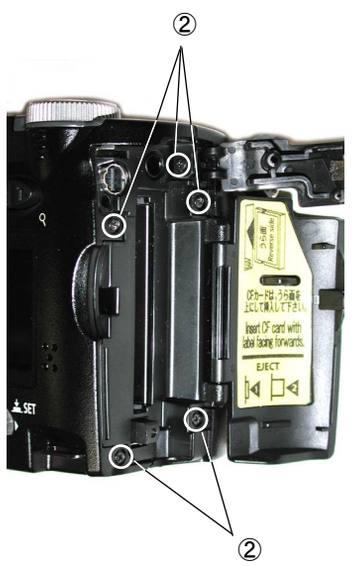
Disassembly

⚠ WARNING	
	● There are high voltege parts inside. Be careful of this electric shock, when you remove the cover. ● You must discharge the main condenser according to the instruction of this repair manual before you remove the cover.

Notes:
(1) Remove the battery prior to disassembly.
(2) During disassembly,make a note of the routing of the wires,which screws are mounted in which parts, etc.
(3) Electrical parts must be grounded since they are easily damaged by static.

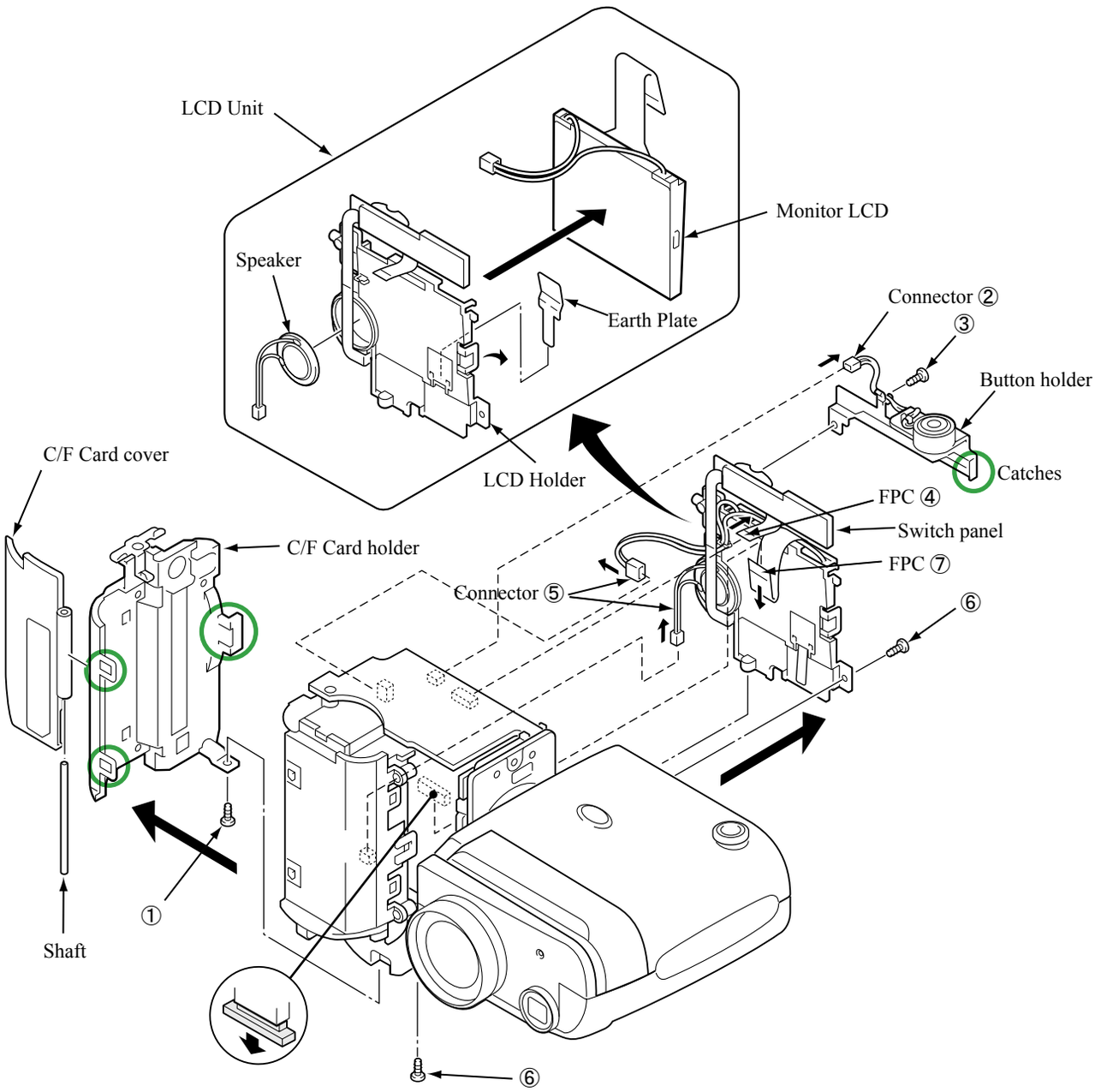
1. Front cover, Rear cover

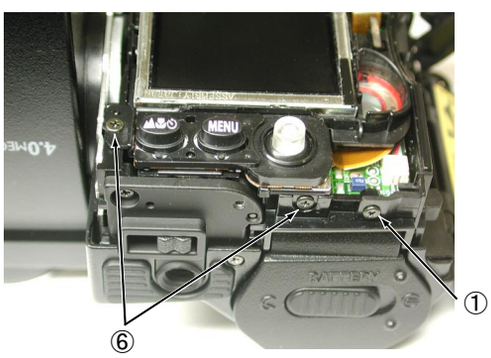




- Rotate the camera unit 90 degrees.
- Remove the 6 screws ① (1.7 x 3.5).
- Open the C/F card cover and the jack cover to remove the 5 screws ② (1.7 x 3.5). [Refer to Picture on the right.]
- Remove the back cabinet.
- Remove the FPC from the connector.
- Open the battery cover to remove the front cabinet.

2. C/F Card cover, LCD Unit

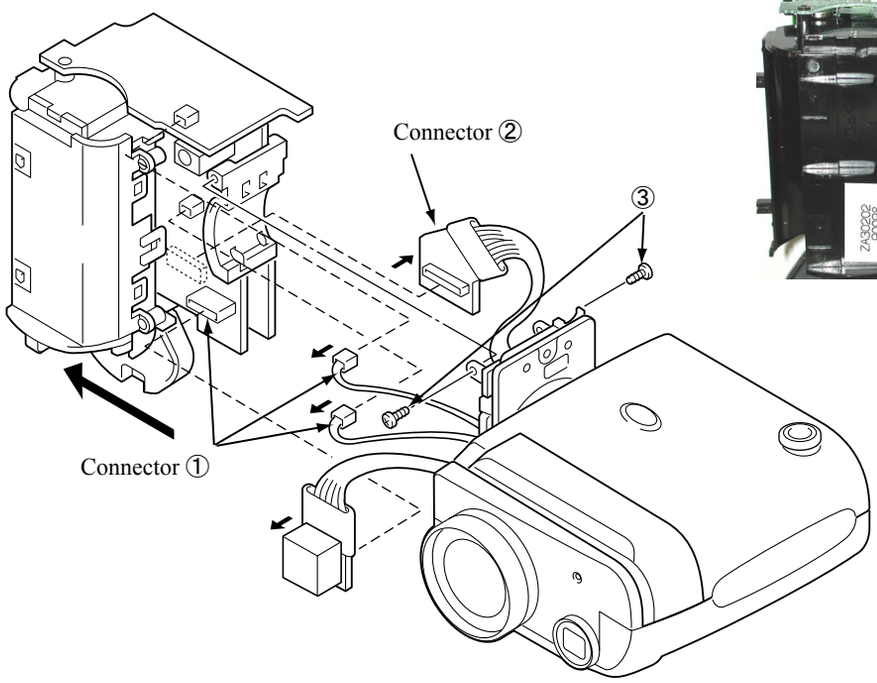


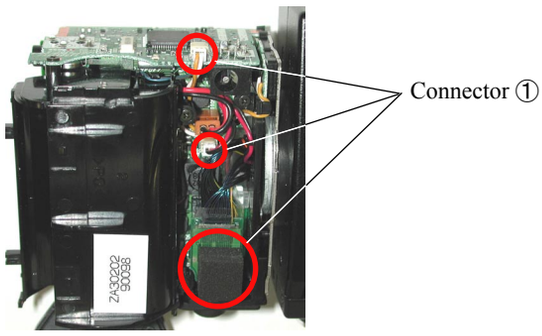


[Screw position]

- Remove the screw ① (1.7 x 3.5).
- Disengage the 3 hooks marked ○. The C/F card holder can be removed in a direction pointed by an arrow, and the shaft and the C/F card cover can be removed at the same time.
- Remove the connector ② , the screw ③ (1.7 x 3.5) and FPC ④. Then lift up the switch panel to remove the button holder. (One side of the button holder has hook, so lift up another side of the holder to remove it.)
- Remove the connector ⑤ (2 pieces) and the 2 screws ⑥ (1.7 x 3.5).
- Lift up the LCD unit, and then remove the FPC ⑦ and LCD unit.

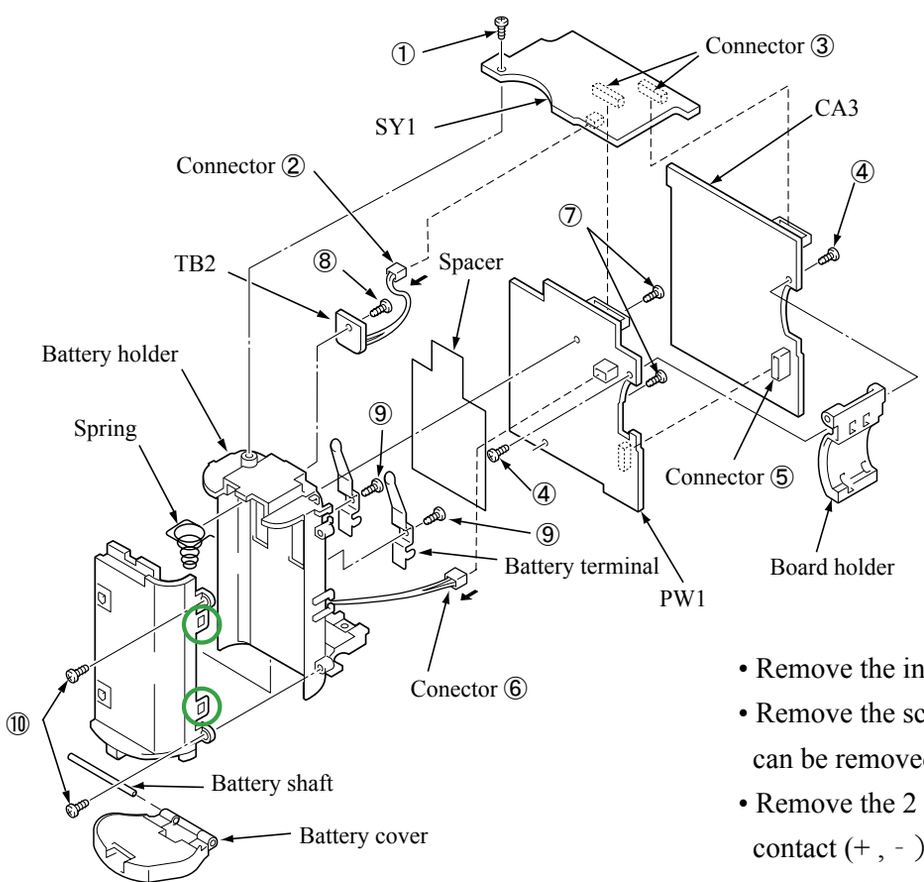
3. Separation of the camera unit and camera body unit





- Remove the connectors ① (3 pieces) and the connector ② .
- Remove the 2 screws ③ (1.7 x 3.5).
- The body unit can be removed from the camera unit.

4. PCBs and Battery Holder



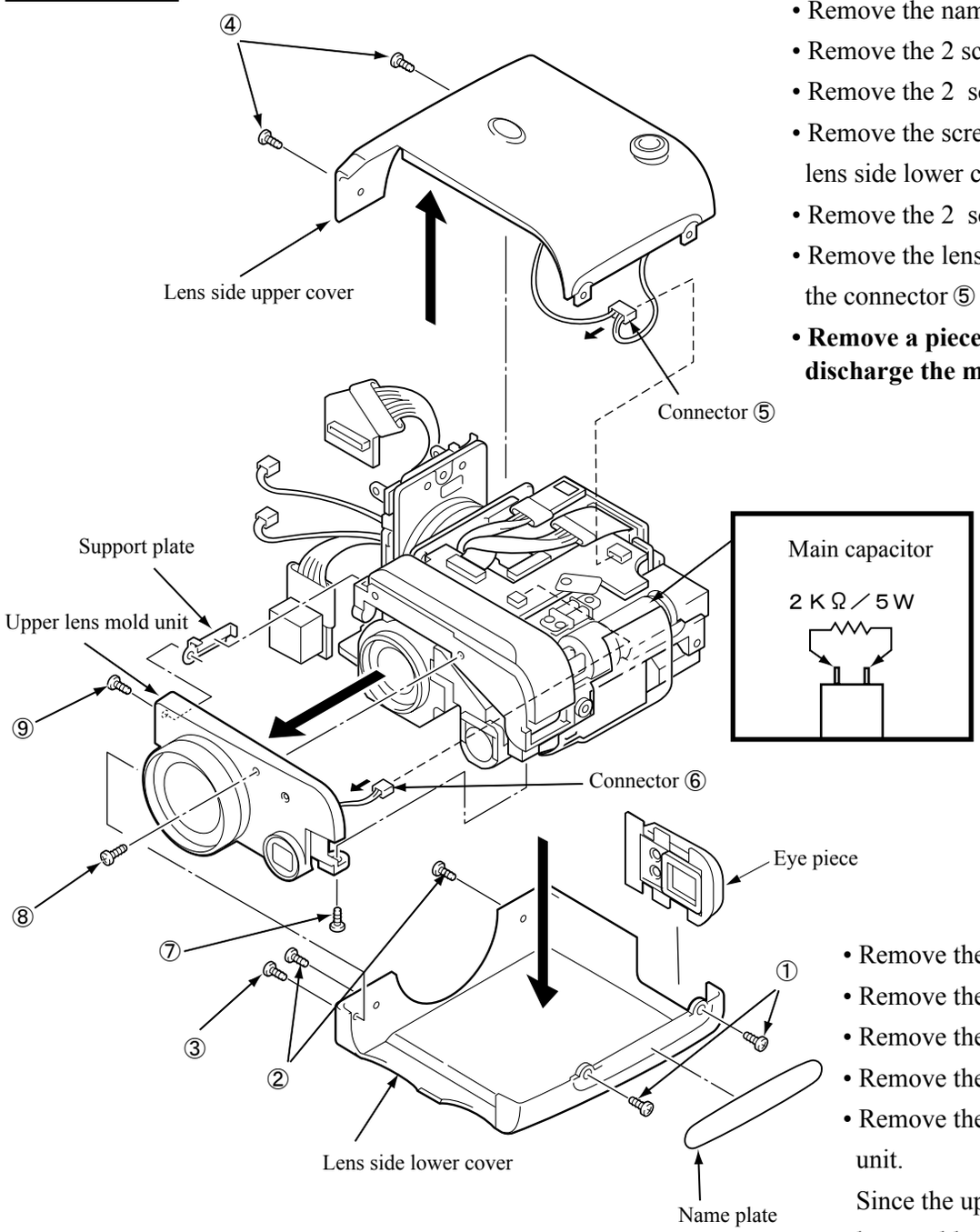
- Remove the connector ② , the screw ① (1.7 x 3.5) and the connector ③ . The SY1 PCB can be removed.
- Remove the 2 screws ④ (1.7 x 3.5) to remove the board holder.
- Remove the connector ⑤ . The CA3 PCB can be removed.
- Remove the connector ⑥ and the 2 screws ⑦ (1.7 x 3.5). The PW1 PCB can be removed.
- Pull out the battery cover shaft to remove the battery cover.

- Remove the insulation sheet.
- Remove the screw ⑧ (1.7 x 3.5). The TB2 PCB can be removed.
- Remove the 2 screws ⑨ (1.7 x 2.5). The battery contact (+ , -) can be removed.
- Remove the 2 screws ⑩ (1.7 x 3.5) and the 2 hooks marked ○ . Then the battery holder can be removed.
- Remove the spring by sliding it.

⚠ WARNING

- There are high voltege parts inside. Be careful of this electric shock, when you remove the cover.
- You must discharge the main condenser according to the instruction of this repair manual before you remove the cover.

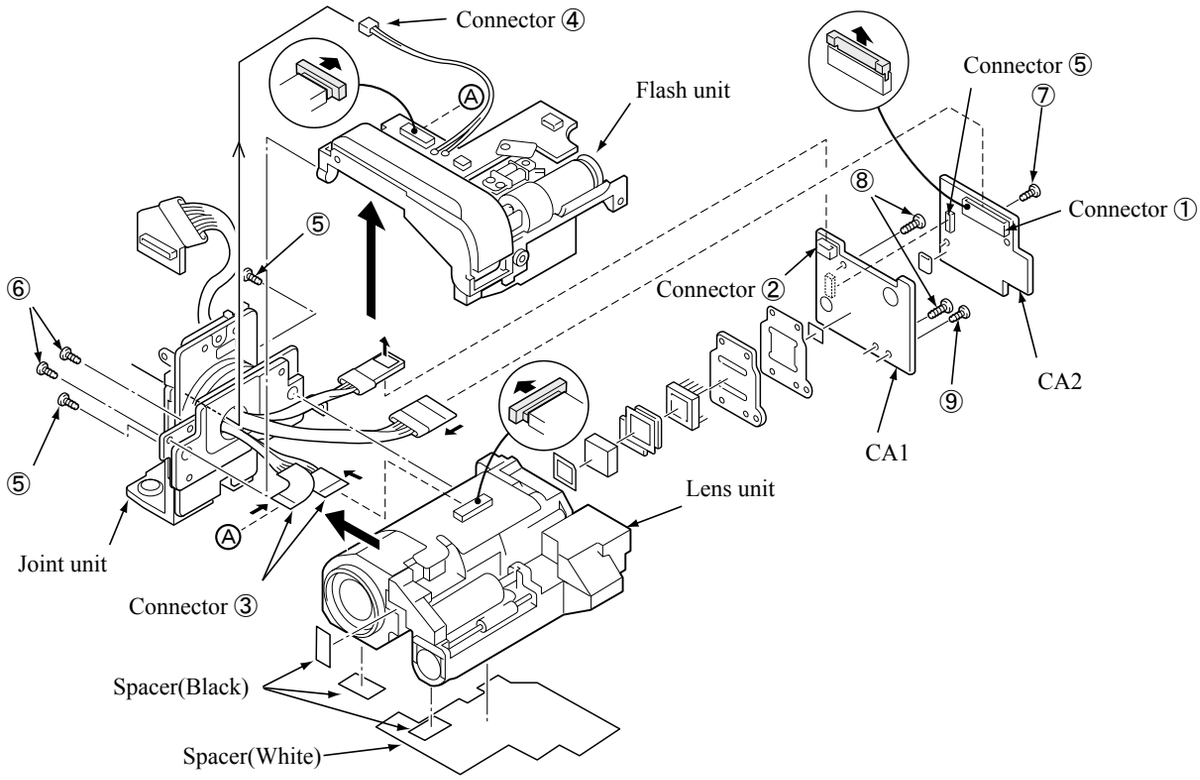
5. Lens cover

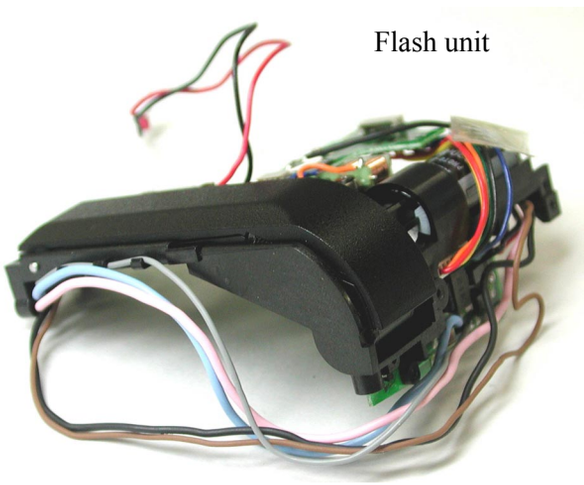


- Remove the name plate.
- Remove the 2 screws ① (1.7 x 3.5).
- Remove the 2 screws ② (1.7 x 3.5).
- Remove the screw ③ (1.7 x 3.5) . The lens side lower cover can be removed.
- Remove the 2 screws ④ (1.7 x 3.5).
- Remove the lens side upper cover and the connector ⑤ .
- **Remove a piece of tape and discharge the main capacitor.**

- Remove the connector ⑥ .
- Remove the screw ⑦ (1.7 x 3.5)
- Remove the screw ⑧ (1.7 x 5)
- Remove the screw ⑨ (1.7 x 3.5)
- Remove the upper lens mold unit.
  Since the upper side of the upper lens mold unit has a hook,remove it from the bottom.
- Remove the support plate.

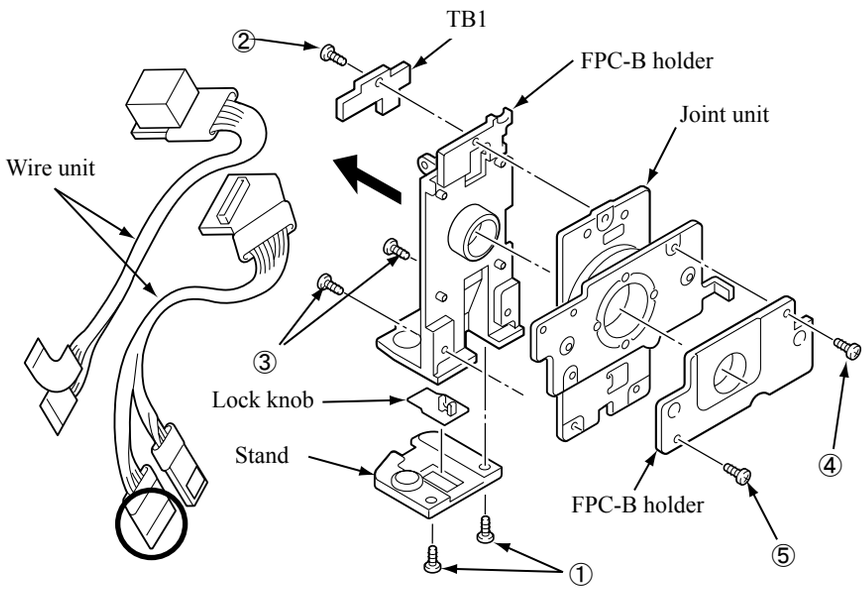
6. Flash unit, Lens unit



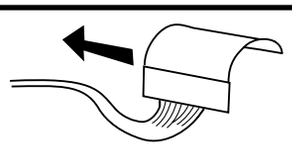


- Remove the connector ① and the connector ② .
- Remove the connector ③ (2 pieces).
- Pull out the connector ④ form the joint part.
- Remove the 2 screws ⑤ (1.7 x 3.5).
- Remove the 2 screws ⑥ (1.7 x 3.5).
- Remove the lens unit from the joint part.
- Remove the 3 pieces of the spacer (black) and a piece of spacer (white). Then remove the speedlight unit.
- Remove the screw ⑦ (1.7 x 3.5).
- Remove the connector ⑤ . The CA2 PCB can be removed.
- Remove the screw ⑨ (1.7 x 3.5)
- Remove the 2 screws ⑧ (1.7 x 6). The CA1 PCB can be removed.

7. Joint unit

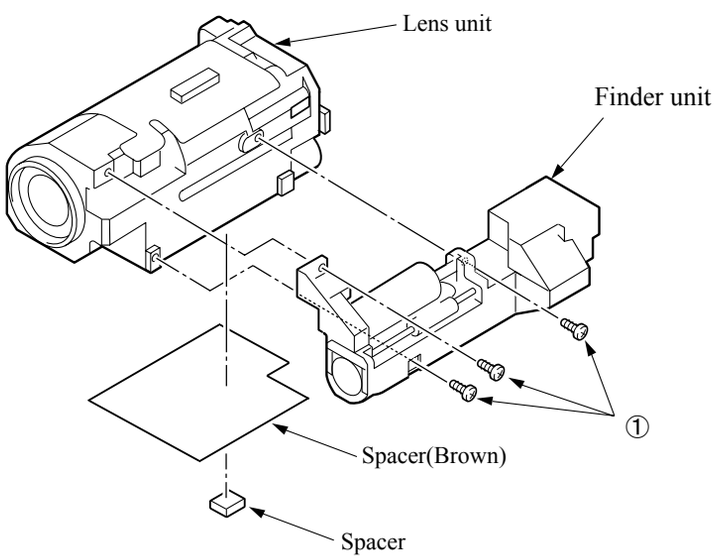


- Remove the shield wire in a direction pointed by an arrow.
- Remove the 2 screws ① (1.7 x 3.5). The tripod socket and the lock knob can be removed.
- Remove the screw ② (1.7 x 3.5). The TB-1 plate can be removed.
- Remove the 2 screws ③ (1.7 x 2.5) . The FPC-A holder can be removed.
- Remove the screw ④ (1.7 x 2.5) and 2 screws ⑤ (1.7 x 1.8). The FPC-B holder can be removed.



Since the connector is wide, bend it as shown in Figure above, and then pull it in a direction pointed by an arrow.

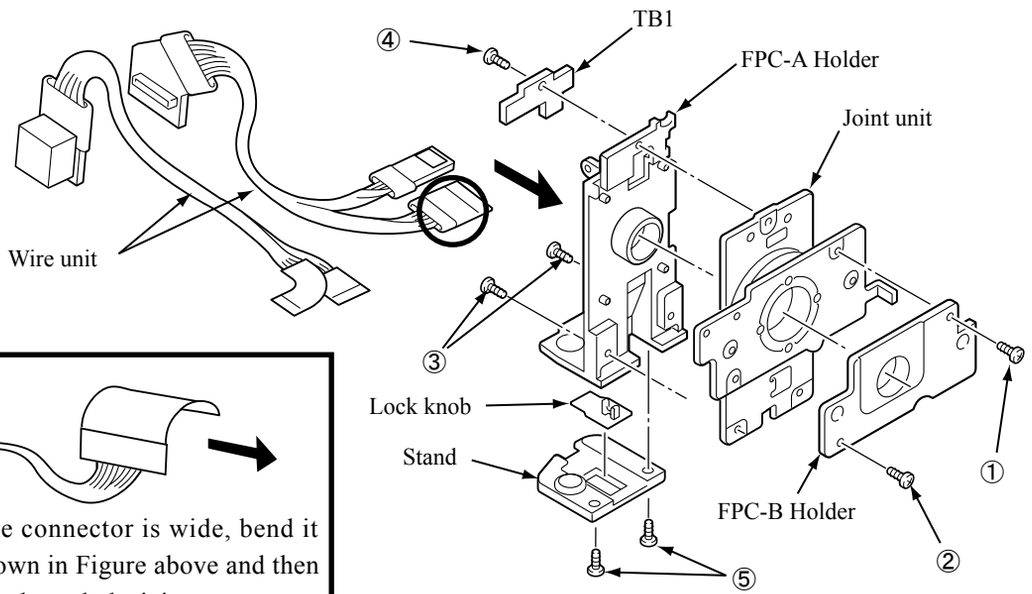
8. Finder unit

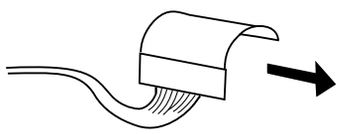


- Remove a piece of spacer (brown).
- Remove the 3 screws ① (1.4 x 3.5).
- The finder unit can be removed.

Assembly

1. Joint unit



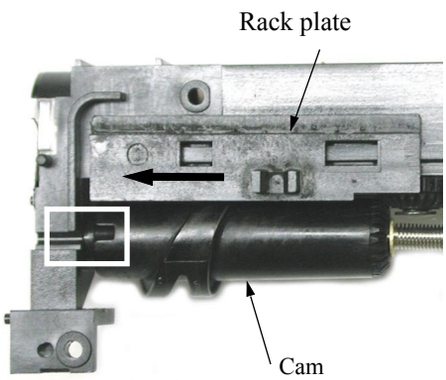


As the connector is wide, bend it as shown in Figure above and then pass it through the joint part.

- Attach the FPC-B holder with the screw ① (1.7 x 3.5) and the screw ② (1.7 x 1.8).
- Attach the FPC-A holder with the 2 screws ③ (1.7 x 2.5).
- Attach the TB1 plate with the screw ④ (1.7 x 3.5).
- Attach the tripod socket and the lock knob with the 2 screws ⑤ (1.7 x 3.5).
- Pass the 2 pieces of the shield wires through the joint part.

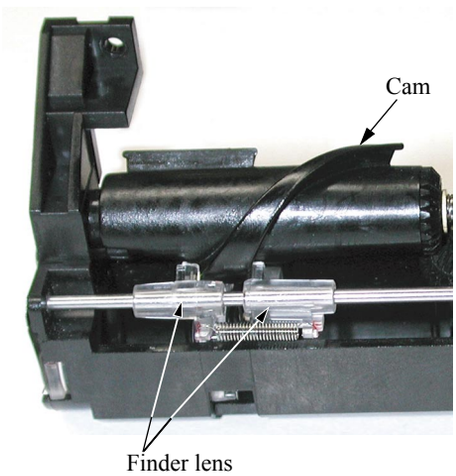
2. Finder uint

Fig. 1



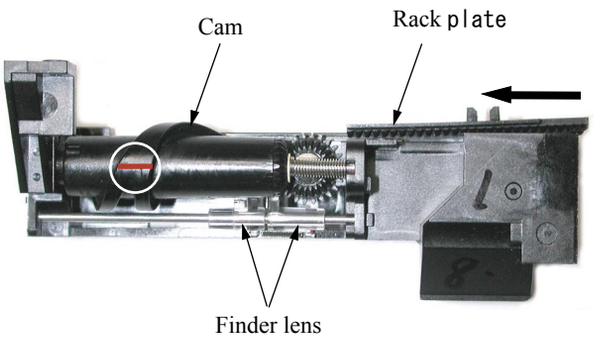
Note) Be sure to check the position of the rack plate and the cam before assembling the finder unit and the lens unit.

Fig. 2



Position check

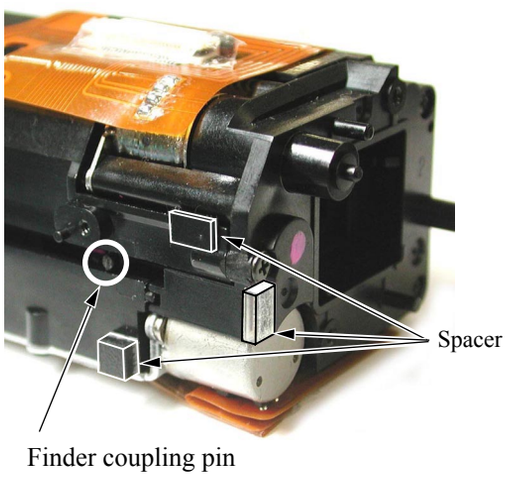
- Move the rack plate to the left.
- The cam groove should be in the position marked white square shown in Figure 1.
- If not, the cam and the fider lens does not engage. Therefore, make the cam engage between the finder lenses as shown in Figure 2 .



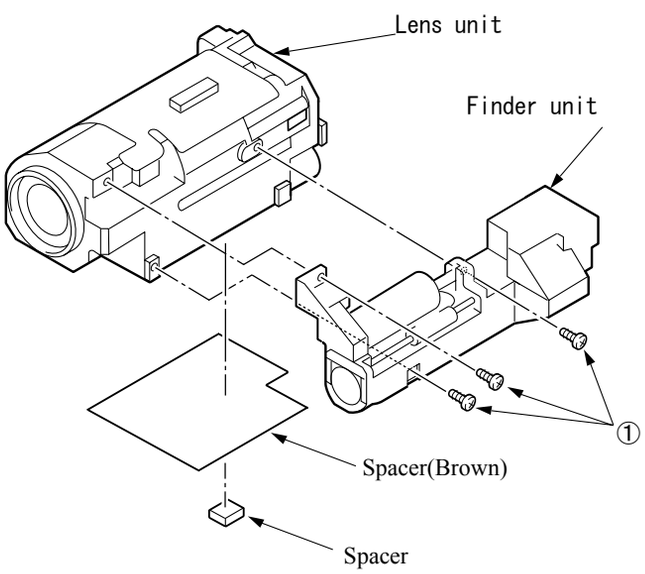
(Note) If the rack plate is removed or the cam is not in the right position, assemble the rack plate by following way.

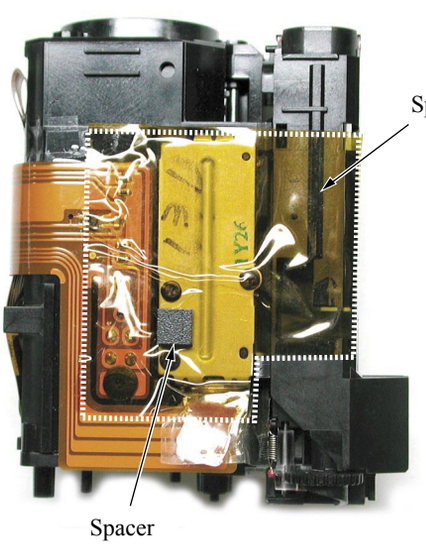
- Move the finder lens to the right end.
- Set the horizontal line on the cam to the center of the cam shaft.
- Assemble the rack plate by sliding it in a direction pointed by an arrow.
- After assembling them, be sure to check the position as mentioned in Page A1.

3. Lens unit



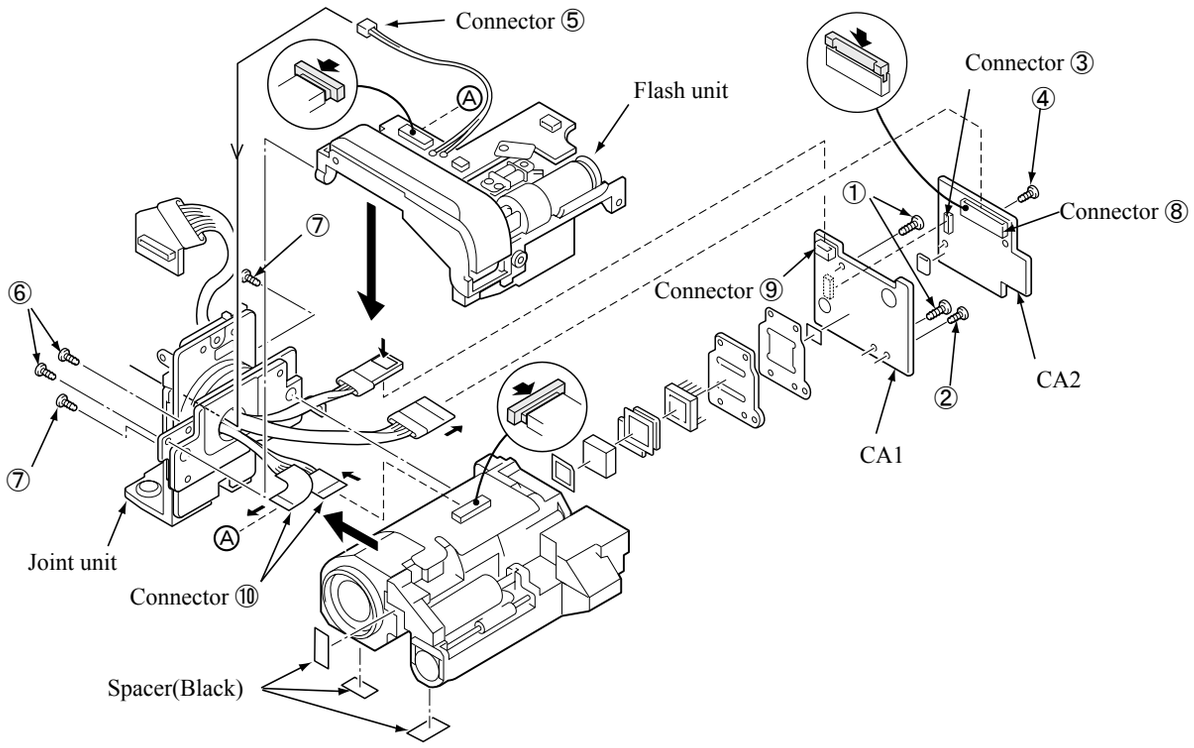
- Attach the 3 pieces of spacers shown in Picture on the left to the lens unit.
- Set the finder coupling pin and the claw of lack plate on the finder unit. Then attach the finder unit with the 3 screws ① (1.4 x 3.5).
- Apply a piece of tape (brown) and spacer to the bottom of the lens unit.

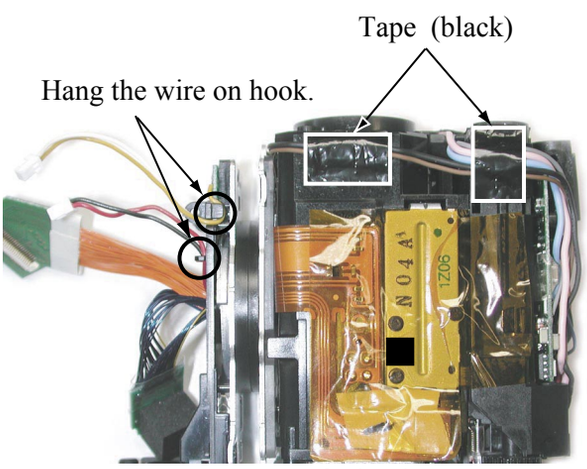




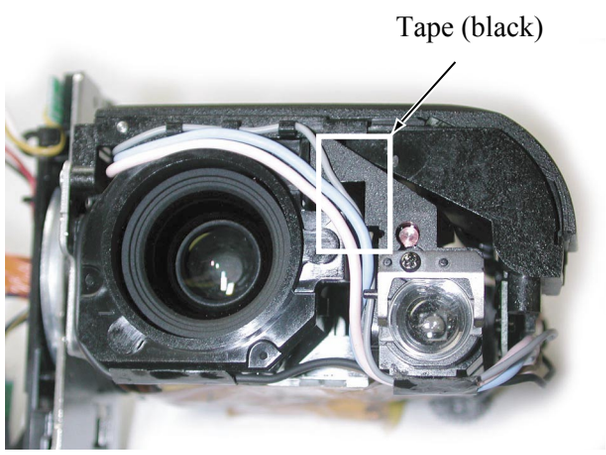
[Position where the tape and spacer should be applied.]

4. Flash unit, CA1, CA2





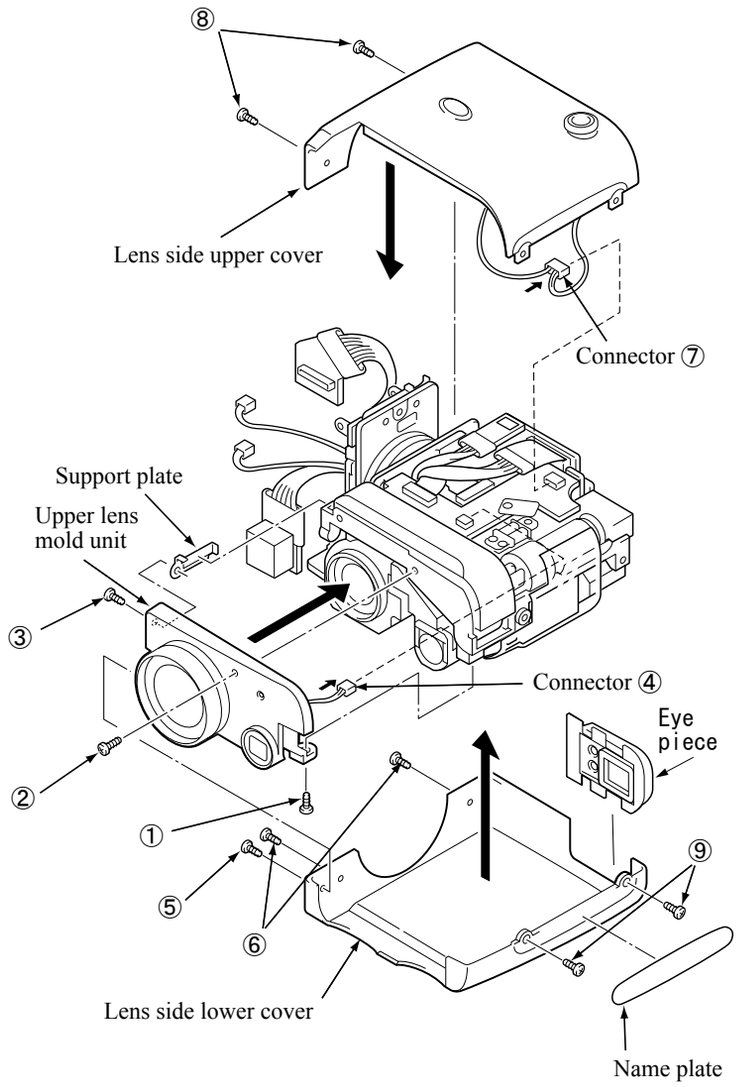
[Arrangement of wires/ Bottom]



[Arrangement of wires /Front]

- Attach the CA1 PCB with the 2 screws ① (1.7 x 6) and the screw ② (1.7 x 2.5).
- Insert the connector ③ and then attach the CA2 PCB with the screw ④ (1.7 x 3.5).
- Put the flash unit on the lens unit and then pass the connector ⑤ through the joint part.
- Attach the joint part with 2 screws ⑥ (1.7 x 3.5).
  Put the 4 connectors on the lens unit.
- Attach the flash unit with the 2 screws ⑦ (1.7 x 3.5).
- Connect the connectors ⑧⑨⑩ (4 pieces).
- Arrange the wires and then apply pieces of tape.
- Hang the wires from the TB1 plate (yellow and white) and the wires from the connector ⑤ (red and black) on the hook on the joint part.

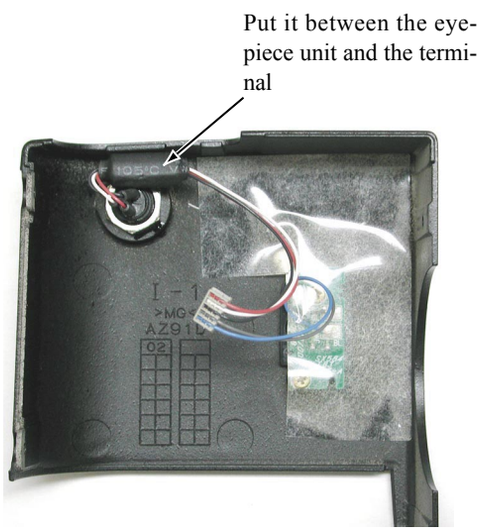
5. Lens cover



• Attach the support plate.
• Set the upper lens mold unit and attach the screw ① (1.7 x 3.5), the screw ② (1.7 x 5) and the screw ③ (1.7 x 3.5).
• Pull out the wire from the connector ④ from the bottom and connect it.

The wires should not be seen when you look at the unit from the side pointed by an arrow in Figure 1.

• Apply a piece of tape (black) and a piece of tape (white). [Refer to Figure 1.]
• Set the eyepiece unit to the lens side lower cover, and then attach the lens side lower cover.
• Attach the screw ⑤ (1.7 x 3.5) and 2 screws ⑥ (1.7 x 3.5).
• Arrange the wires from the terminal unit and then connect the connector ⑦ .
• Attach the lens side upper cover with the 2 screws ⑧ (1.7 x 3.5) and the 2 screws ⑨ (1.7 x 3.5).
• Attach the name plate.



[Arrangement of wires from the terminal unit]

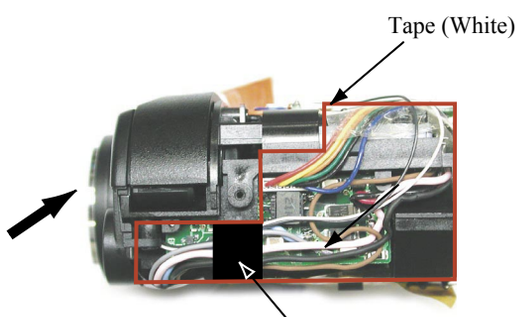
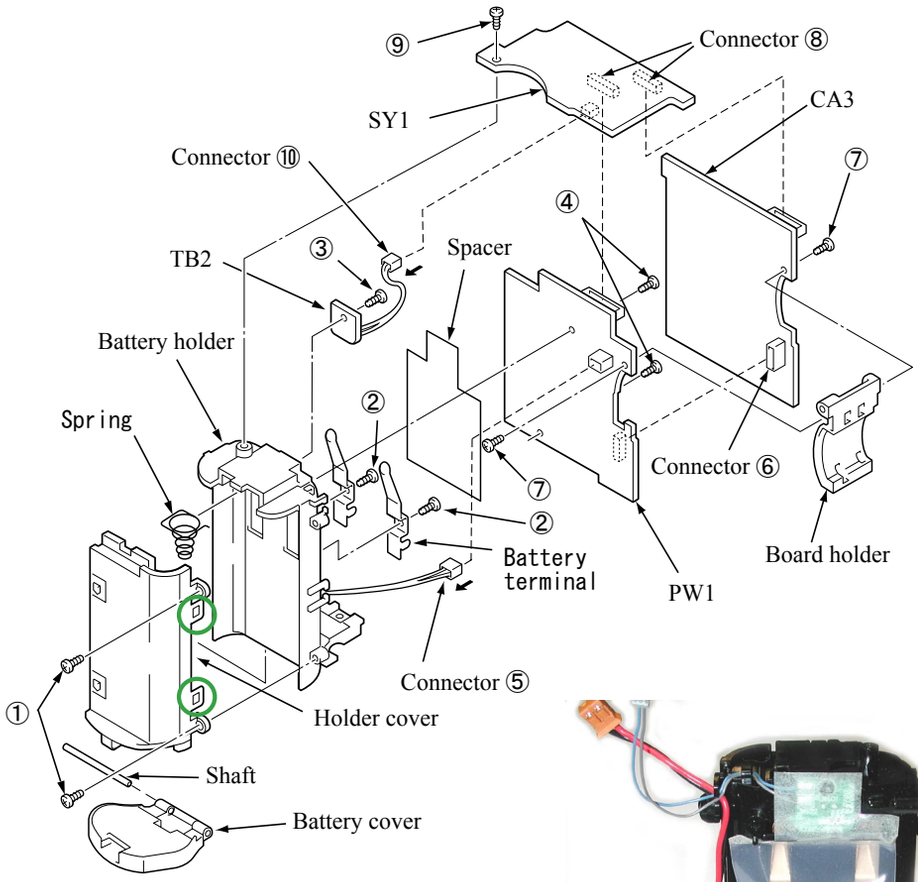


Fig. 1

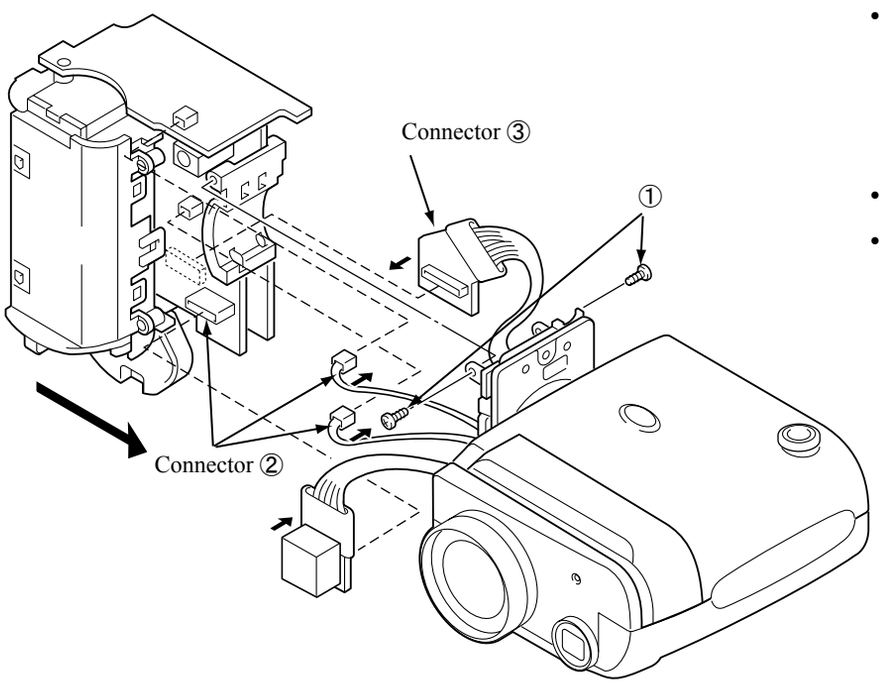
6. CA3, PW1, SY1, TB2, Battery holder



[Arrangement of wires]

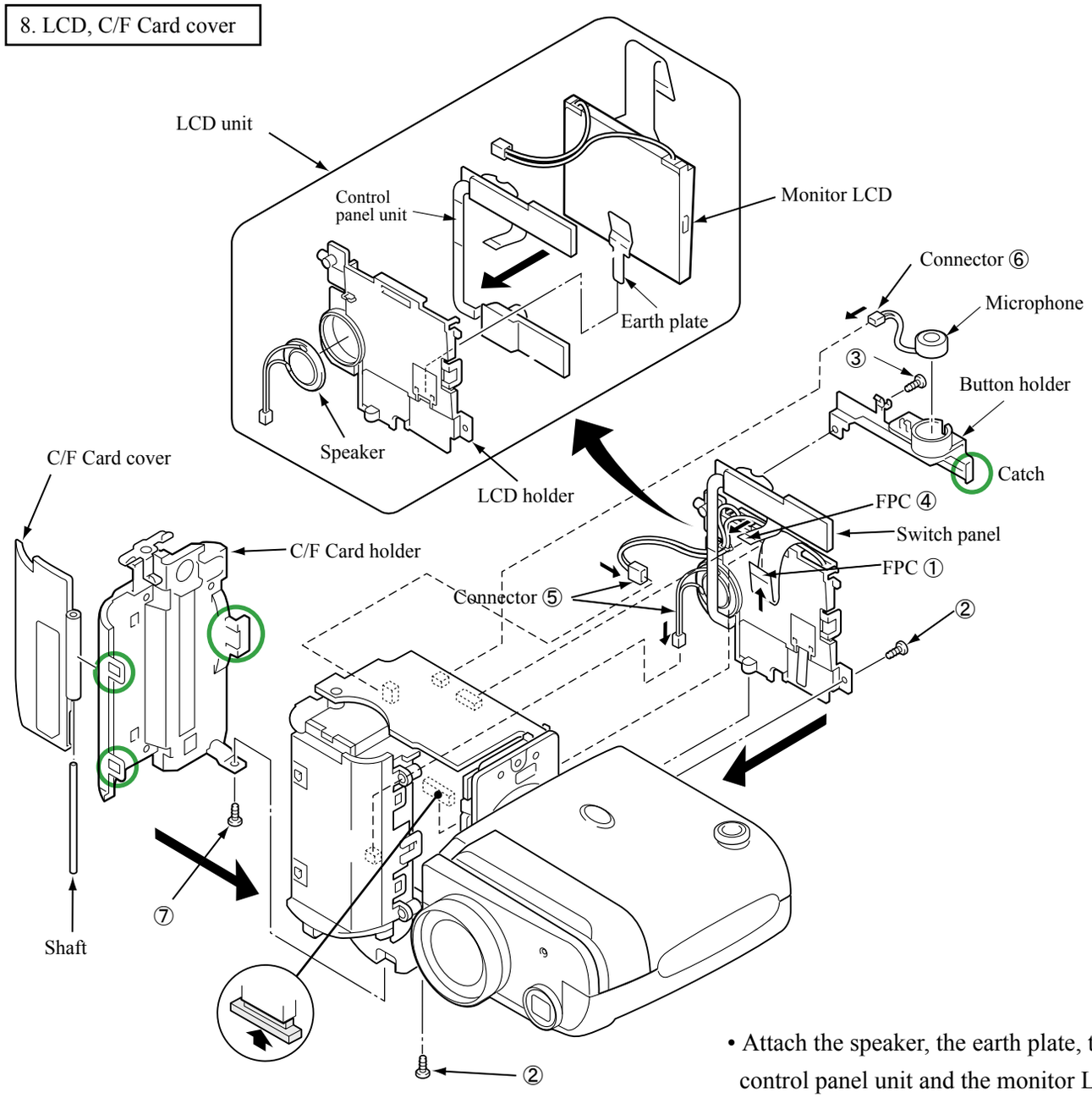
- Set the spring.
- Attach the holder cover with the 2 hooks marked ○ and the 2 screws ① (1.7 x 3.5).
- Attach the battery contact with the 2 screws ② (1.7 x 2.5).
- Attach the TB2 PCB with the screw ③ (1.7 x 3.5).
- Apply a piece of insulation tape and arrange the wires.
- Attach the battery cover with the shaft.
- Attach the PW1 PCB with the screw ④ (1.7 x 3.5) and connect the connector ⑤ .
- Attach the CA3 PCB with the connector ⑥ and attach the board holder with the 2 screws ⑦ (1.7 x 3.5).
- Attach the SY1 PCB with the connector ⑧ and attach the screw ⑨ (1.7 x 3.5).
- Attach the connector ⑩ .

7. Lens unit and body unit

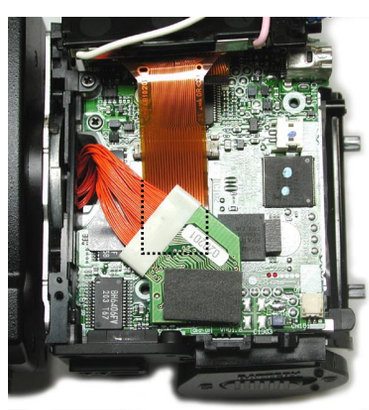


- Set the projection on the bottom of the battery holder and the holes on the tripod socket to attach the body unit to the joint part.
- Attach the 2 screws ① (1.7 x 3.5).
- Connect the connector ② (3pieces) and the connector ③ .

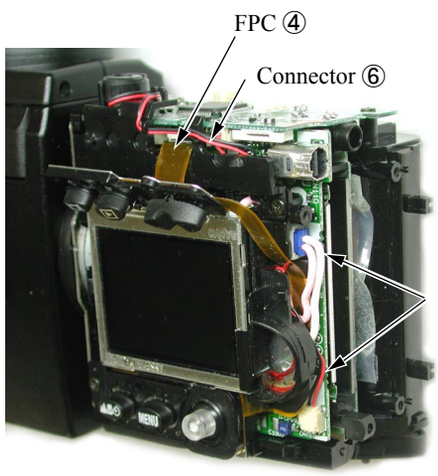
8. LCD, C/F Card cover



[Arrangement of FPC ①]

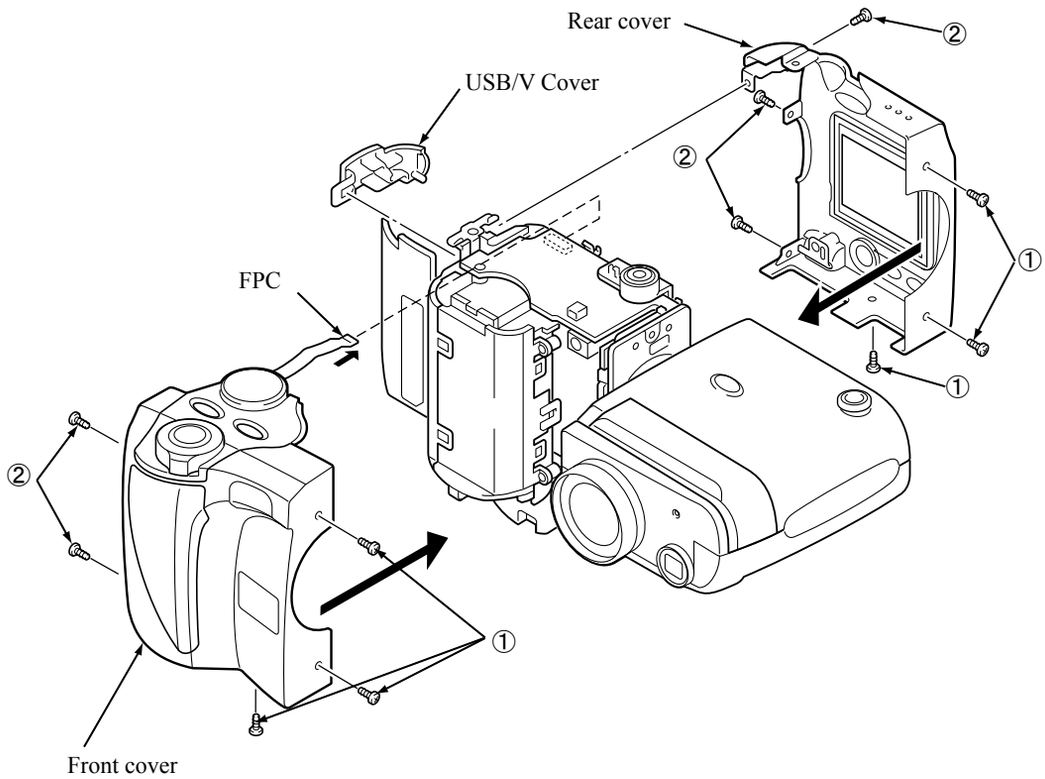


[Arrangement of wires]

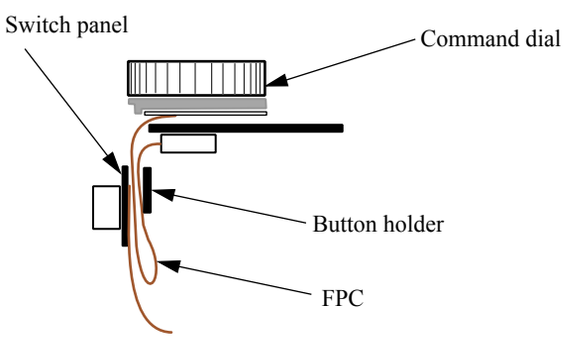


- Attach the speaker, the earth plate, the control panel unit and the monitor LCD to the LCD holder.
- Connect the FPC ① and attach the LCD unit with the 2 screws ② (1.7 x 3.5).
- Attach the microphone to the button holder and then attach the button holder to the LCD unit with the screw ③ (1.7 x 3.5).
  [One side of the button holder is hook.]
- Connect the FPC ④ and then connect the connector ⑤ (2 pieces) and the connector ⑥ .
- Fix the switch panel. (Both-sided adhesive tape).
- Insert the shaft in the C/F card cover and attach the C/F card cover.• Attach the C/F card holder with 3 hooks.

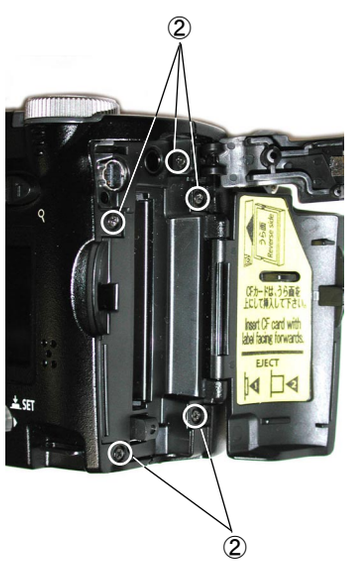
9. Front cover, Rear cover



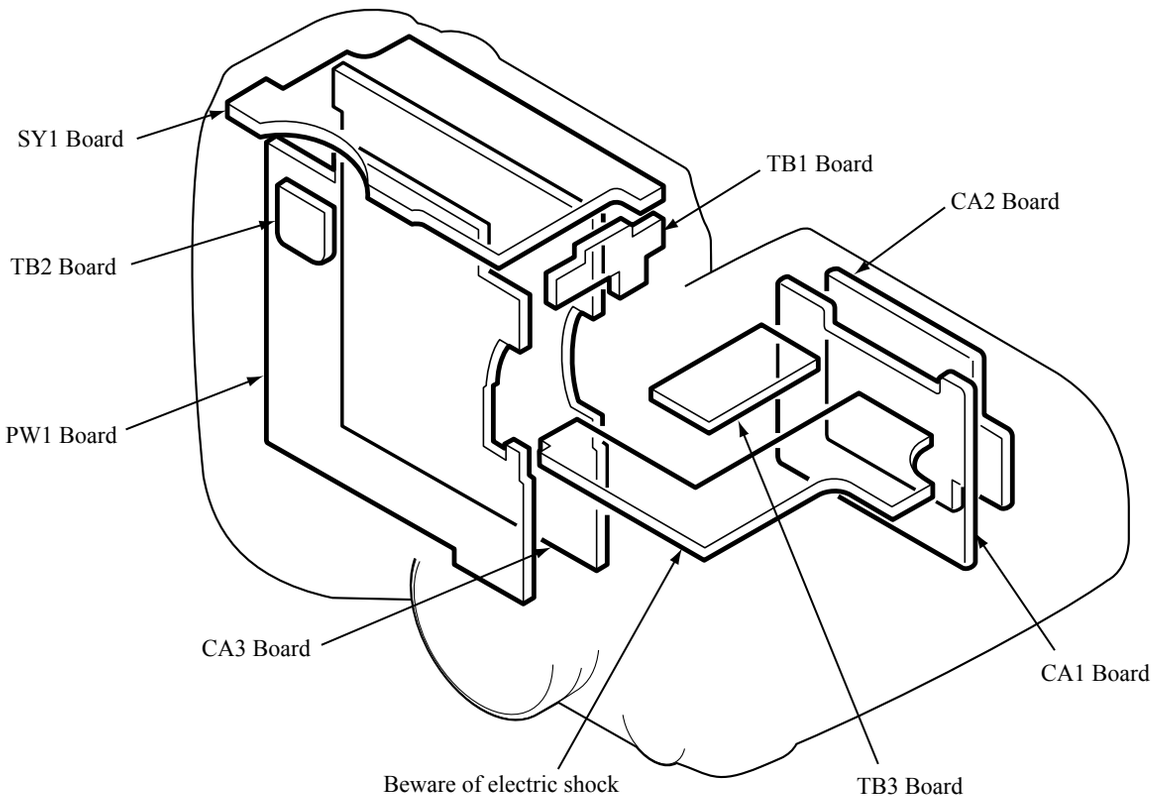
- Connect the FPC to the connector. [Refer to Figure below.]
- Attach the jack cover and the front cabinet with the battery cover open.
- Open the C/F card cover to attach the back cabinet.
- Attach the 6 screws ① (1.7 x 3.5).
- Attach the 5 screws ② (1.7 x 3.5).



[Arrangement of FPC]



10. Location of Each Board



ADJUSTMENT

1. Equipment

IBM compatible PC • AC adapter EH-53 or EH-21 • USB cable • UC-E1 • Oscilloscope

2. Servicing Tools

• Color viewer 5,100 K • Siemens star chart • Calibration software • Chart for color adjustment

3. Adjustment Items and Order

1. Lens Adjustment
2. AWB Adjustment
3. Color Adjustment
4. CCD White Point Defect Detect Adjustment
5. CCD Black Point Defect Detect Adjustment
6. USB Storage information registration
7. LCD Panel Adjustment
   - 7-1. LCD H AFC Adjustment
   - 7-2. LCD RGB Offset Adjustment
   - 7-3. LCD Gain Adjustment
   - 7-4. LCD Blue Brightness Adjustment
   - 7-5. LCD Red Brightness Adjustment
   - 7-6. LCD VcomPP Adjustment

Note) Item 2-4 adjustments should be carried out sequence.
Item 5 adjustments should be carried out after item 2.

4. Setup

1) System requirements

- Windows98® or Me
- IBM-compatible PC with Pentium processor
- CD-ROM drive
- 3.5-inch high-density diskette drive
- USB port
- 40 MB RAM
- Hard disk drive with at least 15 MB available
- VGA or SVGA monitor with at least 256-color display

2) Installing calibration software

- Insert the calibration software installation diskette into your diskette drive.
- Open Explorer.
- Copy the DscCalDI_128 folder on the floppy disk in the FD drive to a folder on the hard disk.

5. Installing USB driver

Install the USB driver with camera or connection kit for PC.

6. Color Viewer

Turn on the switch and wait for 30 minutes for aging to take place before using Color Pure.

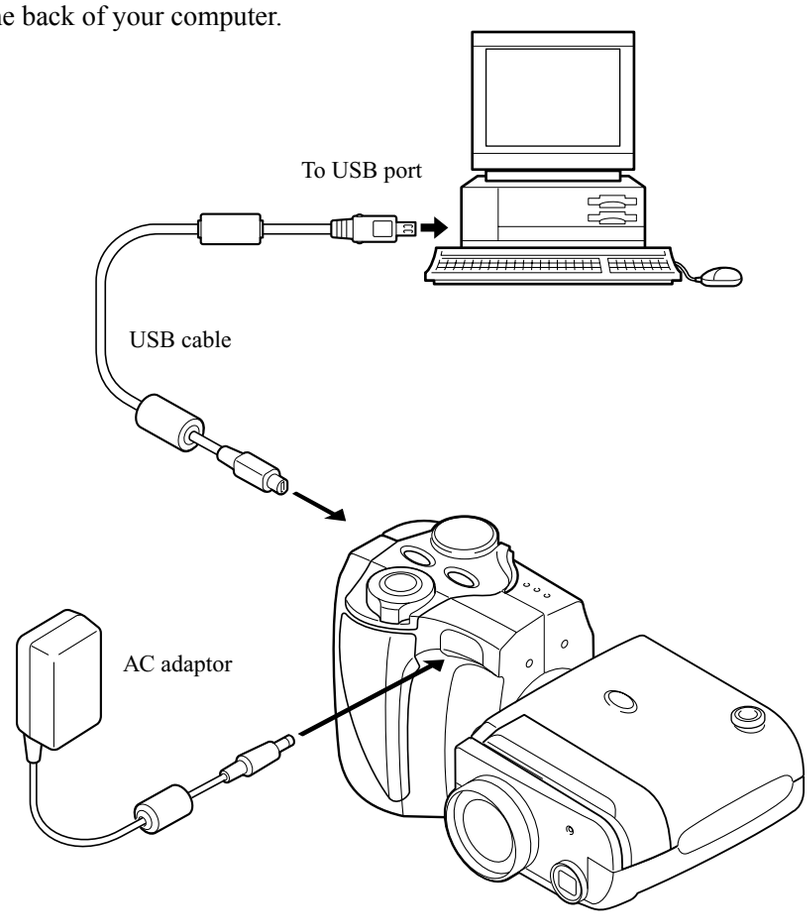
7. Adjustment items required at replacement of parts

	Lens	AWB	Color	CCD Defect	LCD Panel	USB
Lens Unit	○	○	○	○	×	×
CCD	○	○	○	○	×	×
CA-1	○	○	○	○	×	×
CA2	○	○	○	○	×	×
CA3	○	○	○	○	○	○
SY-1	×	×	×	×	×	×
PW-1	×	×	×	×	×	×
TB-1, 2,3	×	×	×	×	×	×

○ Adjustment required, ×Adjustment not required

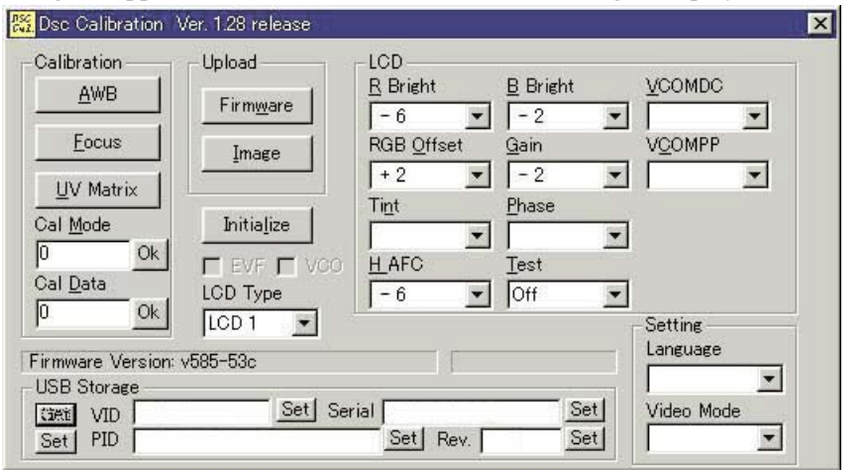
8. Connecting the camera to the computer

1) Line up the arrow on the cable connector with the notch on the camera's USB port. Insert the connector.
2) Locate a USB port on the back of your computer.



9. Calibration software

After starting the applicable calibration software, the following is displayed on the PC monitor.



10. Lens Adjustment

[Preparation]

- Siemens star chart
- POWER switch: ON

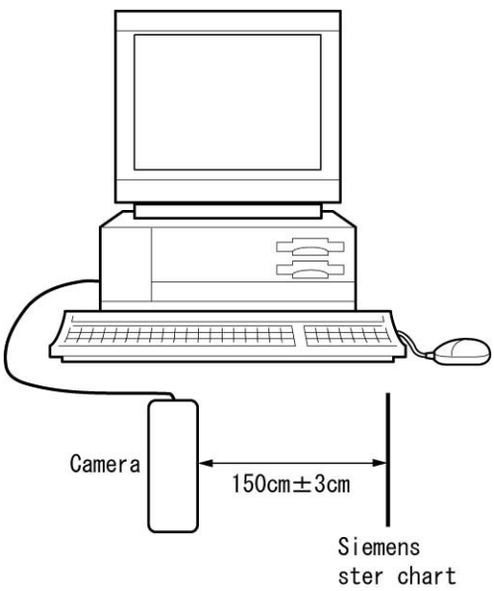
[Adjustment condition]

- Make a copy of A4 size siemens chart in enlarged A3 size or larger.
- Illumination above the subject should be 400 lux ± 10 %.
- Set the siemens star chart 150 cm ± 3 cm (between Siemens star chart and the surface of camera's protection lens)

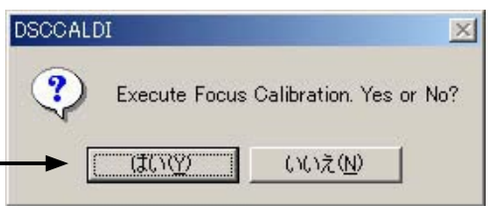
[Adjustment method]

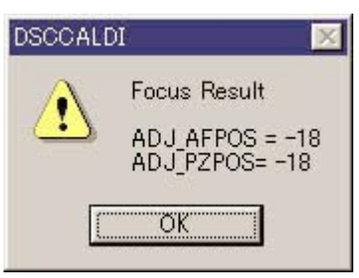
1. Double-click on the DscCalDi128.
2. Set the siemens star chart 150 cm ± 3 cm so that it be-comes center of the screen. LCD (Test → Monitor)
3. Click the Focus, and click the Yes.
4. Lens adjustment value will appear on the screen.

   ADJ_AFPOS = 0 ± 70 ADJ_PZPOS = 0 ± 70
5. Click the OK.



"Yes" →





Adjustment value

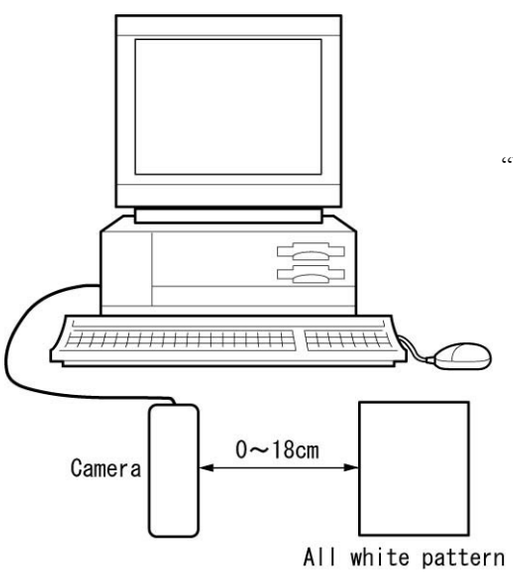
11. AWB Adjustment

[Preparation]

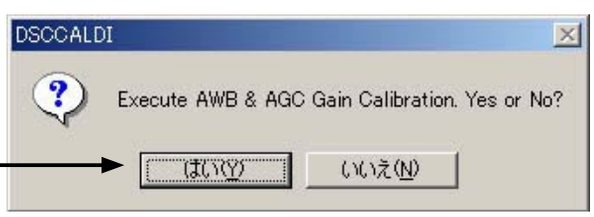
- Color viewer
- POWER switch: ON (set to Any MODE)

[Adjusting method]

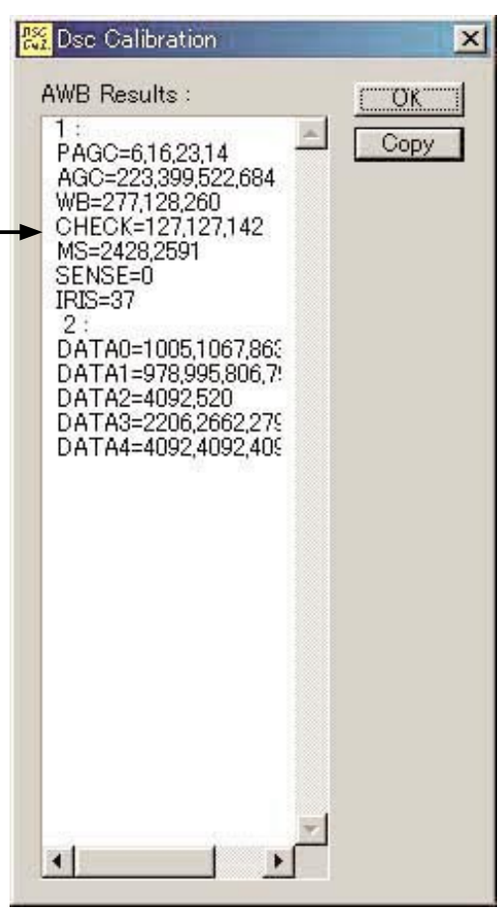
1. Double-click on the DscCalDi128.
2. Click the AWB, and click the Yes.
3. AWB adjustment value will appear on the screen.
   CHECK=128±2, 128±2, 130±30
4. Click the OK.



"Yes"



Adjustment value



12. Color Adjustment

[Note]

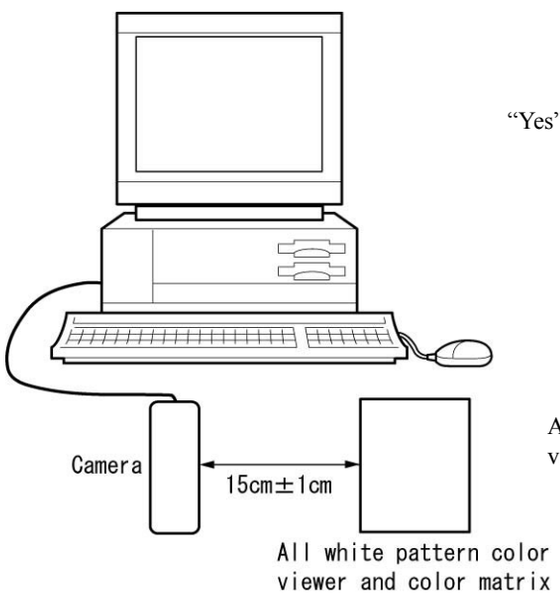
AWB adjustment should always be carried out first.

[Adjustment condition]

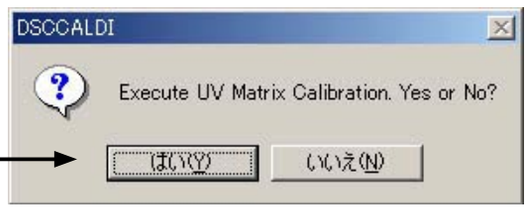
- Set the color adjustment chart to the color viewer.
  (Do not enter any light.)
- Set the color adjustment chart so that it becomes center of the screen.

[Adjustment method]

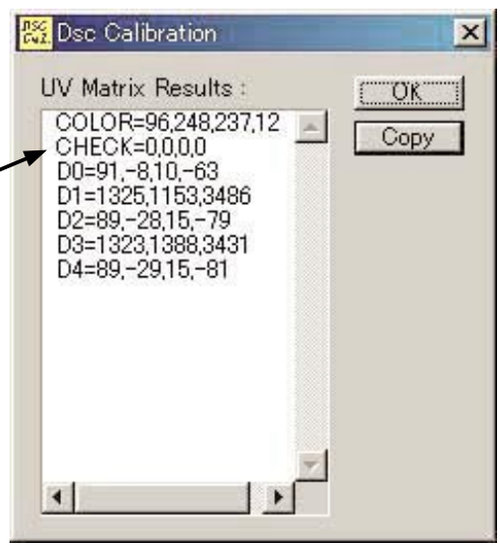
- Double-click on the DscCalDi128.
- Click the UV Matrix, and click the Yes.
- Color adjustment values will appear on the screen.
  CHECK=0±2, 0±2, 0±2, 0±2
- Click the OK.



"Yes"



Adjustment value



13. CCD White point Defect Detect Adjustment

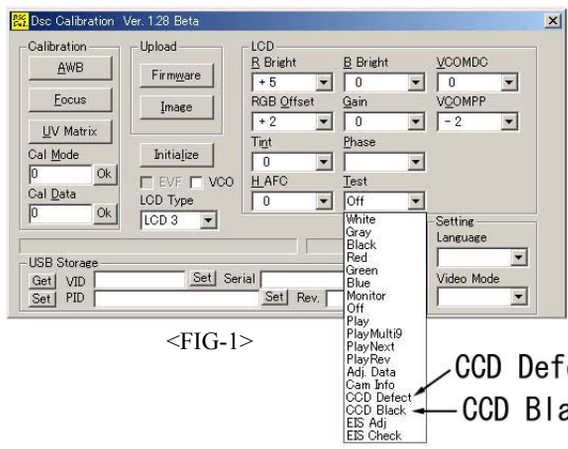
[Adjustment method]

- Double-click on the DscCalDi128.
- Select the CCD Defect from Test menu of Calibration Soft and click the OK. Refer to FIG-1.
- After adjustment, An adjustment value will appear on the screen. Refer to FIG-2.

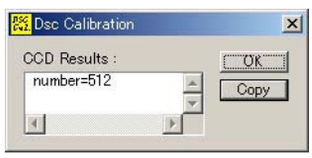
14. CCD Black point Defect Detect Adjustment

[Adjustment method]

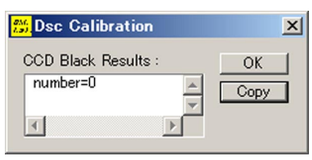
- When setting the camera in place, sei it to an angle so that nothing appears in any part of the color viewer except the white section. (Do not enter any light.)
- Double-click on the DscCalDi128.
- Select CCD Black on the LCD Test, and click the Yes. Refer to FIG-1.
- After the adjustment is completed, the number of defect will appear, Refer to FIG-3.



<FIG-1>



<FIG-2>



<FIG-3>

15. USB STORAGE INFORMATION REGISTRATION

USB storage data is important for when the camera is connected to a computer via a USB connection.

If there are any errors in the USB storage data, or if it has not been saved, the USB specification conditions will not be satisfied, so always check and save the USB storage data.

[Adjustment method]

1. Connect the camera to a computer. (Refer to 8. Connecting the camera to the computer on the page A10.)
2. Double-click on the DscCalDi128.
3. Click on the Get button in the USB storage window and check the USB storage data.

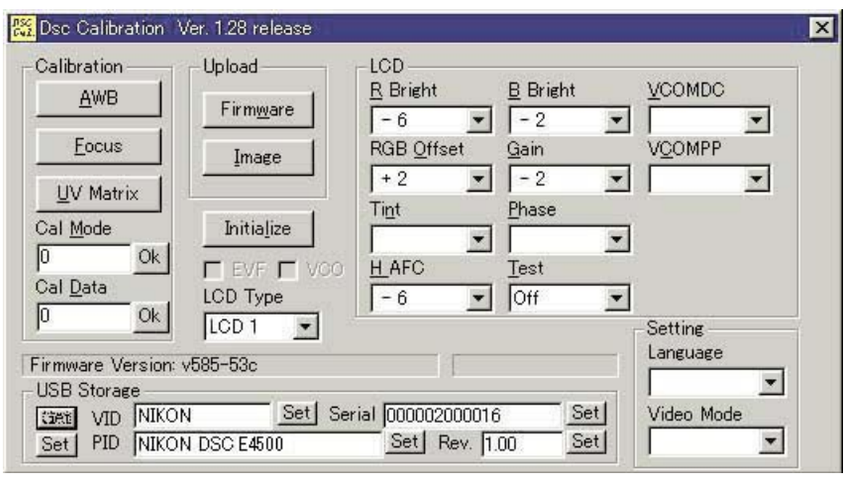
   VID: NIKON

   PID: NIKON DSC E4500

   Serial:

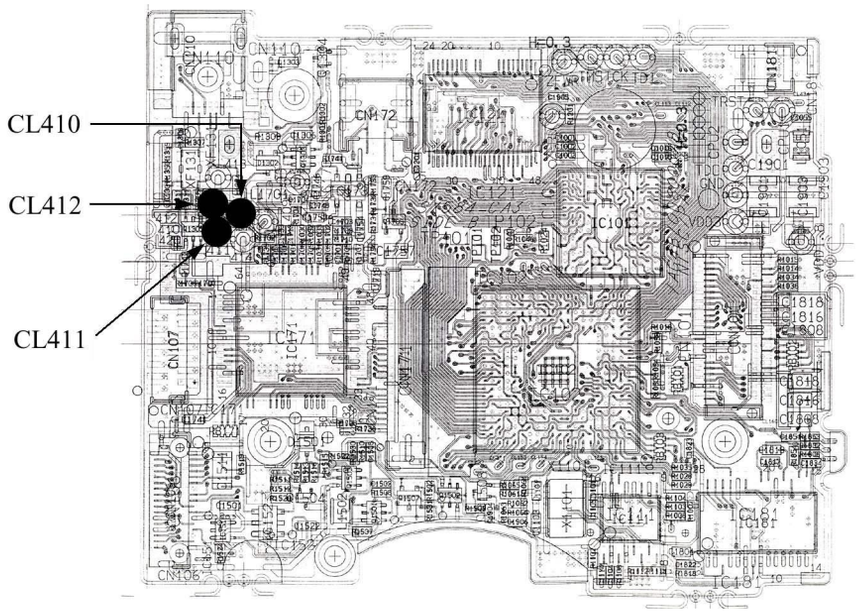
   Rev. : 1.00
4. Check the “Serial” in the above USB storage data. If the displayed value is different from the serial number printed on the base of the camera, enter the number on the base of the camera.

   Then click the Set button.
5. Next, check VID and Rev. entries in the USB storage data. If any of them are different from the values in 3. above, make the changes and then click the corresponding Set button.



16. LCD Panel Adjustment

[CA3 board (Side B)]



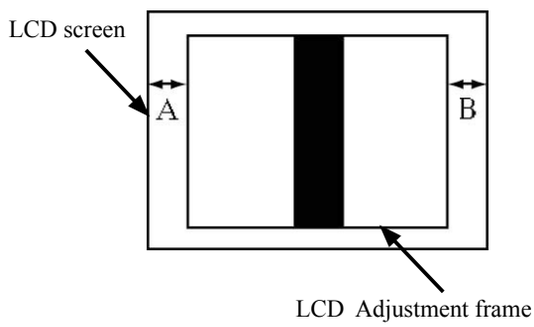
16-1. LCD H AFC Adjustment

[Preparation]

- POWER switch: ON

[Adjusting method]

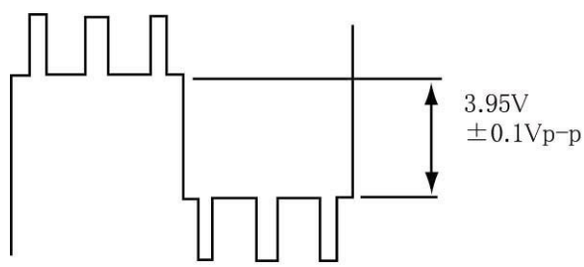
1. Double-click on the DscCalDi128.
2. Select 0 on the LCD H AFC.
3. While watching the LCD monitor, adjust H AFC so that the edge of the LCD adjustment frame are the same distance
   from the left and right edge of the LCD screen. (A = B)



16-2. LCD RGB Offset Adjustment

[Adjusting method]

1. Adjust LCD “RGB Offset” so that the amplitude
   of the CL410 waveform is 3.95 V ±0.1 Vp-p.



CL410 waveform

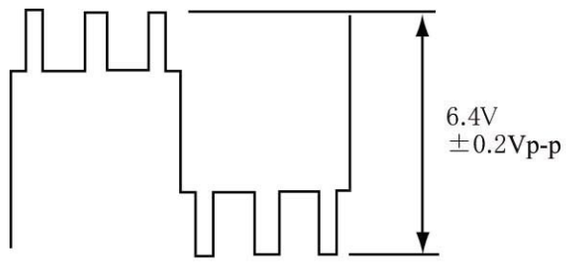
16-3. LCD Gain Adjustment

[Adjusting method]

1. Adjust LCD “Gain” so that the amplitude of the CL410 waveform is 6.4 V ± 0.2 Vp-p.

[Note]

16-2. LCD RGB Offset adjustment should always be carried out first.



CL410 waveform

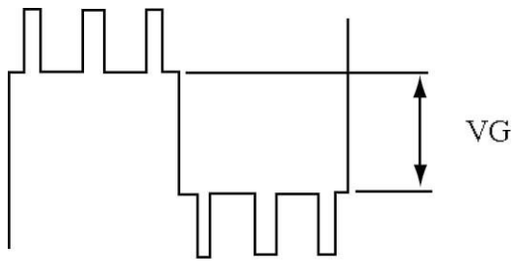
16-4. LCD Blue Brightness Adjustment

[Adjusting method]

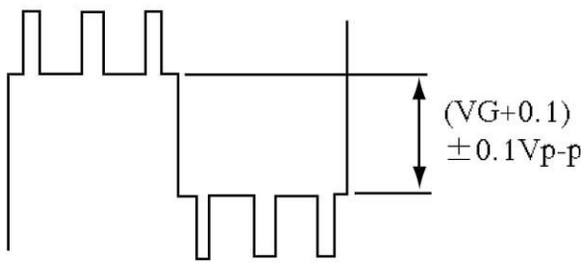
1. Adjust LCD “B Bright” so that the amplitude of the CL412 waveform is (VG+0.1) ±0.1 Vp-p with respect to the CL410 (VG) waveform.

[Note]

16-2. LCD RGB Offset adjustment and 16-3. LCD Gain adjustment should always be carried out first



CL410 waveform



CL412 waveform

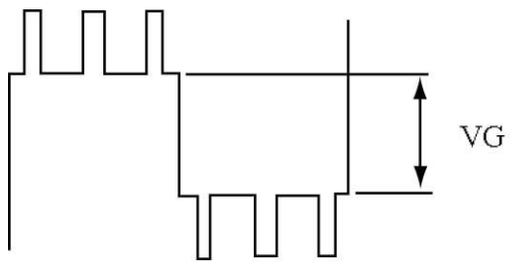
16-5. LCD Red Brightness Adjustment

[Adjusting method]

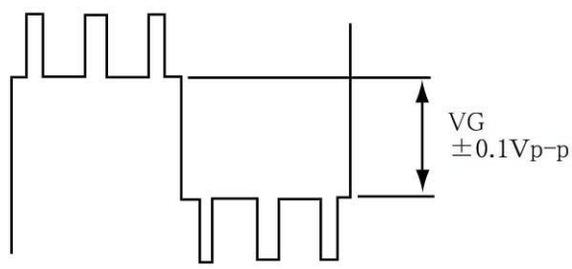
1. Adjust LCD “R Bright” so that the amplitude of the CL411 waveform is (VG+0.1) ±0.1 Vp-p with respect to the CL410 (VG) waveform.

[Note]

16-2. LCD RGB Offset adjustment and
16-3. LCD Gain adjustment have done.



CL410 waveform



CL411 waveform

1. OUTLINE OF CIRCUIT DESCRIPTION

1-1. CA1 CIRCUIT DESCRIPTION

1. IC Configuration

IC903 (ICX411AK-C) CCD imager
IC904 (CXD3400N) V driver
IC905 (AD9849KST) CDS, AGC, A/D converter

2. IC903 (CCD)

[Structure]
Interline type CCD image sensor

Optical size	1/1.8 type
Effective pixels	2312(H) X 1720 (V)
Pixels in total	2384 (H) X 1734 (V)
Optical black	
Horizontal (H) direction:	Front 16 pixels, Rear 56 pixels
Vertical (V) direction:	Front 12 pixels, Rear 2 pixels
Dummy bit number	Horizontal : 28 Vertical :1 (only even number field)

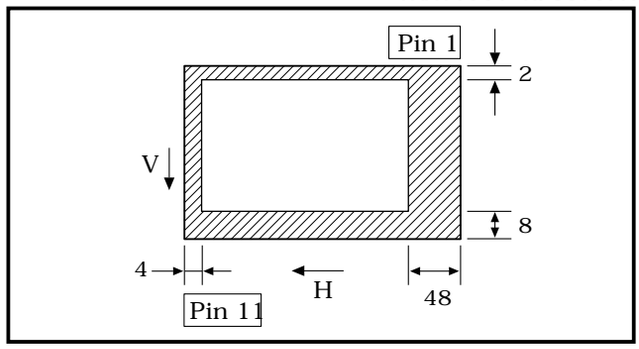


Fig.1-1. Optical Black Location (Top View)

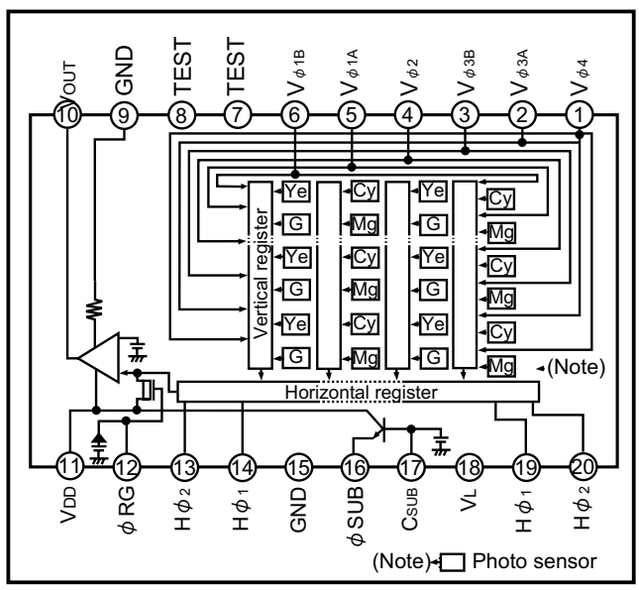


Fig. 1-2. CCD Block Dagram

Pin No.	Symbol	Pin Description	Waveform	Voltage
1	V φ 4	Vertical register transfer clock		-7.5 V, 0 V
2, 3	V φ 3A, V φ 3B	Vertical register transfer clock		-7.5 V, 0 V, 15 V
4	V φ 2	Vertical register transfer clock		-7.5 V, 0 V
5, 6	V φ 1A, V φ 1B	Vertical register transfer clock		-7.5 V, 0 V, 15 V
9, 15	GND	GND	GND	0 V
10	VOUT	Signal output		Aprox. 10 V
11	VDD	Circuit power	DC	15 V
12	φ RG	Reset gate clock		12.5 V, 16 V
13, 20	H φ 2	Horizontal register transfer clock		0 V, 5 V
14, 19	H φ 1	Horizontal register transfer clock		0 V, 5 V
16	φ SUB	Substrate clock	DC	Aprox. 8 V
17	CSUB	Substrate bias	DC	Aprox. 8V (Different from every CCD)
18	VL	Protection transistor bias	DC	

Table 1-1. CCD Pin Description

---- When sensor read-out

3. IC904 (V Driver)

An H driver (IC995) and V driver (IC904) are necessary in order to generate the clocks (vertical transfer clock, horizontal transfer clock and electronic shutter clock) which driver the CCD.

In addition the XV1-XV4 signals which are output from IC102 are the vertical transfer clocks, and the XSG1 and XSG signal which is output from IC102 is superimposed onto XV1 and XV3 at IC904 in order to generate a ternary pulse. In addition, the XSUB signal which is output from IC102 is used as the sweep pulse for the electronic shutter.

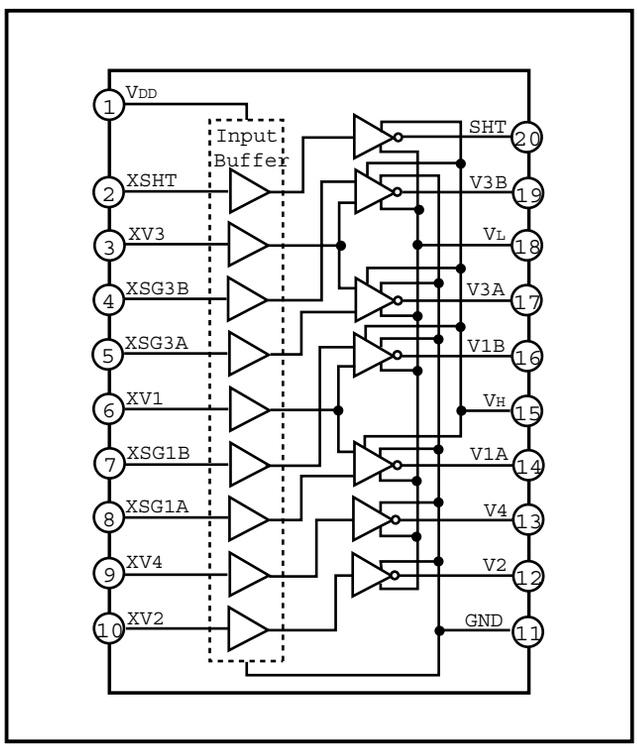


Fig. 1-3. IC904 Block Diagram

4. Lens drive block

4-1. Focus drive

The focus stepping motor drive signals (FM RESETB, FM CW, FM CLK and FM OEB) which are output from 8-bit microprocessor (IC301) are used to drive micro step by the motor driver (IC956). Detection of the standard focusing positions is carried out by means of the photointerruptor (FPI) inside the lens block.

4-2. Zoom drive

The zoom stepping motor drive signals (ZIN1, ZIN2, ZIN3 and ZIN4) which are output from 8-bit microprocessor (IC301) are used to drive by the motor driver (IC953). Detection of the standard zoom positions is carried out by means of photoreflector (ZPI) inside the lens block.

4-3. Iris drive

The iris stepping motor drive signals (IIN1, IIN2, IIN3 and IIN4) which are output from the ASIC expansion port (IC106) are converted into drive by the motor drive (IC953), and are then used to drive the iris steps.

4-4. Shutter drive

The two shutter motor drive signals (SIN1, SIN2) which are output from the ASIC expansion port (IC106) are converted into drive pulses by the motor drive (IC952), and the mecha shutter is opened and closed by regular current drive.

図 1-3.　ICC904 ブロック図

1-2. CA2 CIRCUIT DESCRIPTION

1. IC995 (H driver, CDS, AGC Circuit and A/D Converter)

IC995 contains the functions of H driver, CDS, AGC and A/D converter. H ϕ 1, H ϕ 2, and RG are generated inside as holizontal clock driver for CCD image sensor, and they output to CCD. The video signal which is output from the CCD is input to Pins (29) of IC995. There are sampling hold blocks inside IC905 generated from the SHP and SHD pulses, and it is here that CDS (correlated double sampling) is carried out.

After passing through the CDS circuit, the signal passes through the VGA (Variable Gain Amplifier). It is A/D converted internally into a 12-bit signal, and is then input to ASIC (IC102).

The gain of the VGA is controlled by pin (36)-(38) serial signal which is output from ASIC (IC102).

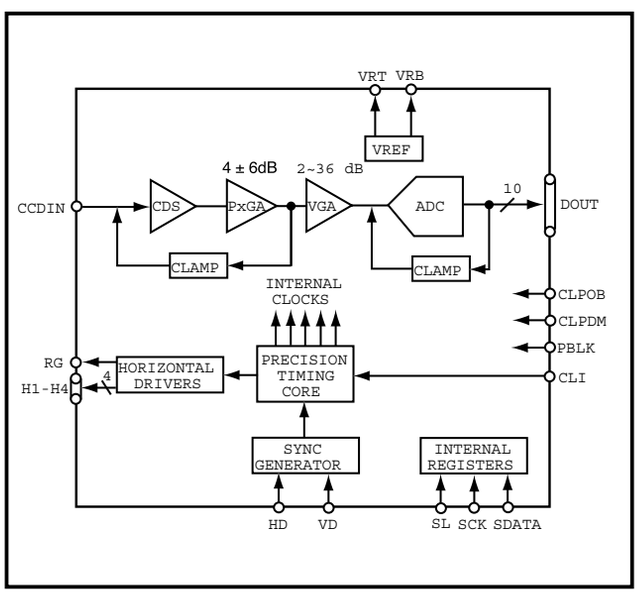


Fig. 2-1. IC995 Block Diagram