VAA12901-R.3594.A

作成承認印	配布許可印
ニコン 映像カンパニー CS推進部 GM	サービス 計画課 M

Nikon

COOLPIX 4300

J:VAA12901 SV / BG
VAA12911 BK / BG
U:VAA12902 SV / GR
EP:VAA12903 SV / BG
VAA12913 BK / BG
EN:VAA12904 SV / BG

Body color/Grip color
SV(Silver),BK(Black)/BG(Bule-Gray),GR(Green)

REPAIR MANUAL

Nikon | NIKON CORPORATION
Tokyo, Japan

Printed in Japan February 2003

Specifications

Type	E4300 digital camera
Effective pixels	4.0 million
CCD	1/1.8-inch high-density CCD; total pixels: 4.13 million
Image size (pixels)	• 2272 x 1704 • 1280 x 960 • 2048 x 1536 • 1024 x 768 • 1600 x 1200 • 640 x 480 Four Small Picture sizes selectable (640 x 480, 320 x 240, 160 x 120 or 96 x 72 pixels)
Lens Focal length f/-number Construction	• 3x Zoom Nikkor • F = 8-24 mm (35 mm [135] camera format equivalent: 38-114 mm) • f/2.8-f/4.9 • Nine elements in eight groups
Digital zoom	4.0x
Autofocus (AF) Focus range measured from lens) Focus-area selection	Contrast-detect through-the-lens (TTL) AF • 30 cm (1 ft.)-∞ at widest angle (W), 60 cm (2 ft.)-∞ at telephoto (T) • Macro mode (Autofocus): 4 cm (1.6 in.)-∞ at widest angle (W), 30 cm (1 ft.)-∞ at telephoto (T) Five-area multi AF and spot AF available
Viewfinder Frame coverage	Real-image zoom optical viewfinder with LED indication Approximately 80%
Monitor Frame coverage	1.5-inch 110,000-dot, low-temperature polysilicon TFT LCD with brightness adjustment Approximately 97% vertical and 97% horizontal
Storage Media File system File format	Type I CompactFlash™ (CF) cards Compliant with Design rule for Camera File systems (DCF), Exif 2.2, Digital Print-Order Format (DPOF) Compressed: JPEG-baseline-compliant; (FINE-, NORMAL-, and BASIC-quality images) Uncompresses: TIFF-RGB (HI-quality images) Movies: QuickTime
Exposure Metering Exposure control Range (ISO equivalent)	Four-mode through-the-lens (TTL) metering • 256-segment Matrix • Center-Weighted • Spot • AF Spot Programmed auto, manual, exposure compensation (–2.0 - +2.0 EV in steps of 1/3 EV), autoexposure bracketing, AE lock • W: EV –3 to +15 • T: EV –1.4 to +16.6
Shutter Speed	Mechanical and charge-coupled electronic shutter 8-1/1000 sec.; Bulb (up to 60 sec. in M mode)

Aperture Range	Electronically controlled preset aperture Two steps (f/2.8 and f/7.6 [W])
Sensitivity	ISO equivalent approximately 100, 200, 400 or Auto
Self-timer	Ten- or three-second duration
Built-in Speedlight Range Sync method	Equipped with automatic pop-up W: 0.4 to 3.7 m (1.3 to 12.1 ft.) T: 0.4 to 2.3 m (1.3 to 7.5 ft.) Automatic sync control
Interface	USB
Video output	User can choose from NTSC and PAL
I/O terminals	• DC input • Data output (USB)
Power sources	• 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 90 minutes (as measured at room temperature [20°C/68°F] under standard Nikon test conditions: zoom adjusted with each shot, flash used in approximately one third of photographs, image quality set to NORMAL, image size 2272 x 1704)
Tripod socket	1/4 (ISO1222)
Dimensions (W x H x D)	95 x 69 x 52 mm (3.7 x 2.7 x 2.0 in.)
Weight	Approximately 225 g (7.9 oz.) without battery and memory card
Operating environment Temperature Humidity	 0 - 40°C (32 – 104°F) Under 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:

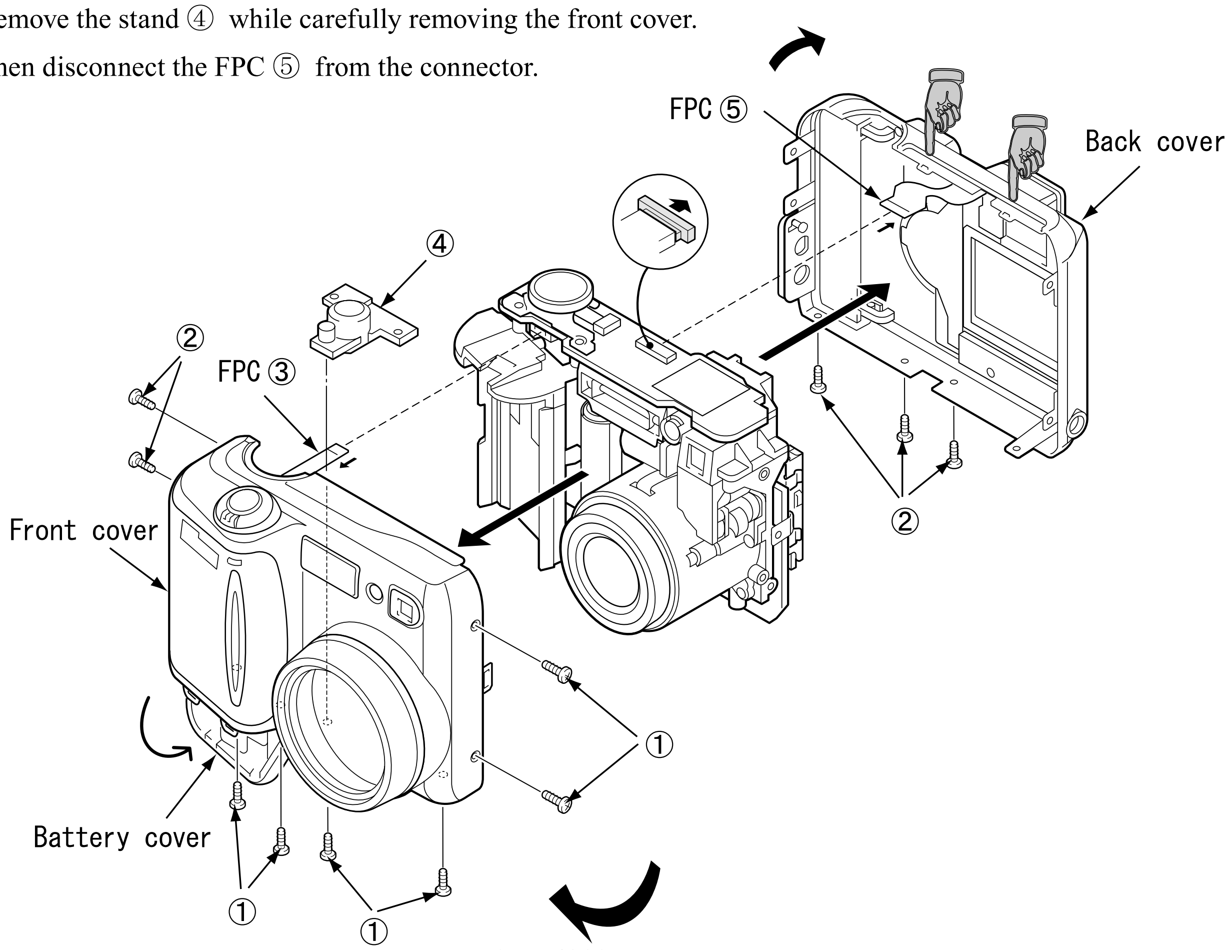
① Remove the battery prior to disassembly.

② During disassembly, make a note of the routing of the cords, which screws are mounted in which parts, etc.

③ Electrical parts must be grounded since they are easily damaged by static.

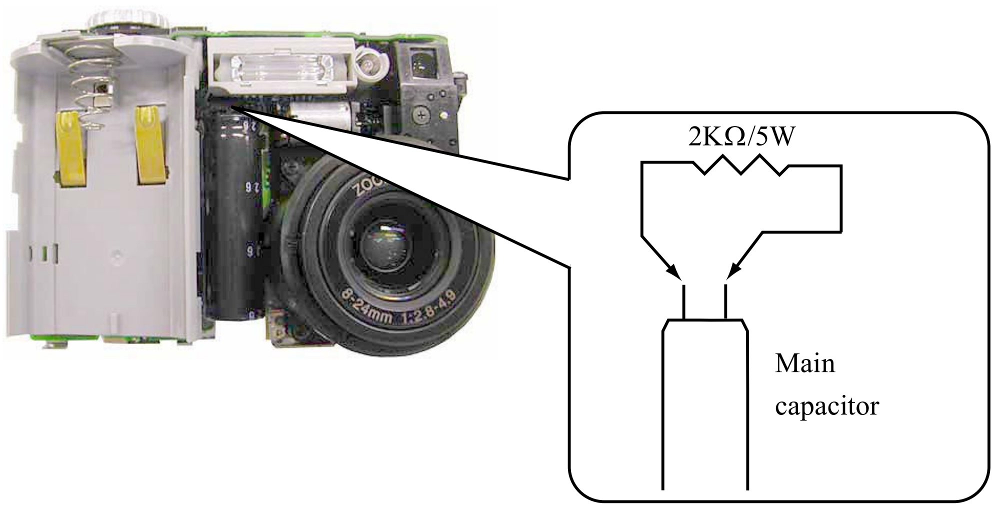
REAR COVER, FRONT COVER

- Open the battery cover.
- Remove the 6 pieces of the screws ① (M1.7×4).
- Remove the 5 pieces of the screws ② (M1.7×4.5).
- Lift up the front cover by setting up from the bottom side.
- Remove the hook as pushing the section shown in the diagram with your finger, and then remove the back cover.
- Disconnect the FPC ③ connector.
- Remove the stand ④ while carefully removing the front cover.
  Then disconnect the FPC ⑤ from the connector.



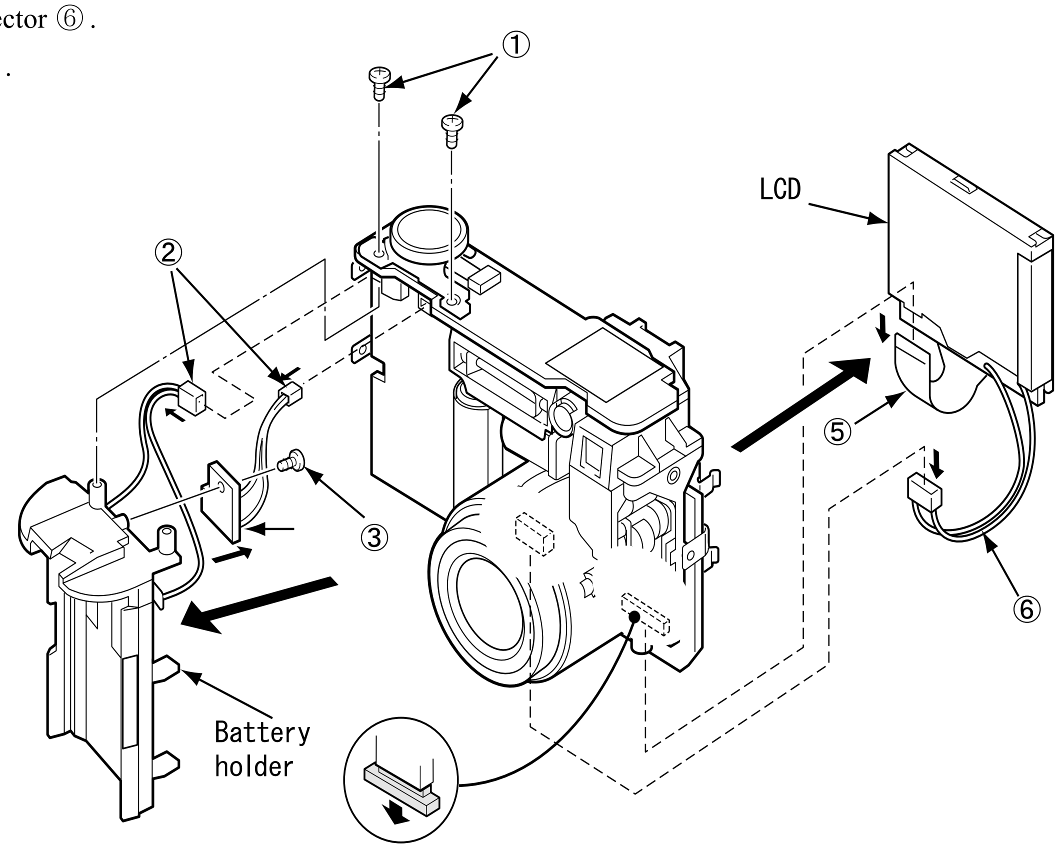
DISCHARGE ELECTRICITY FROM THE MAIN CAPACITOR

⚠ 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.

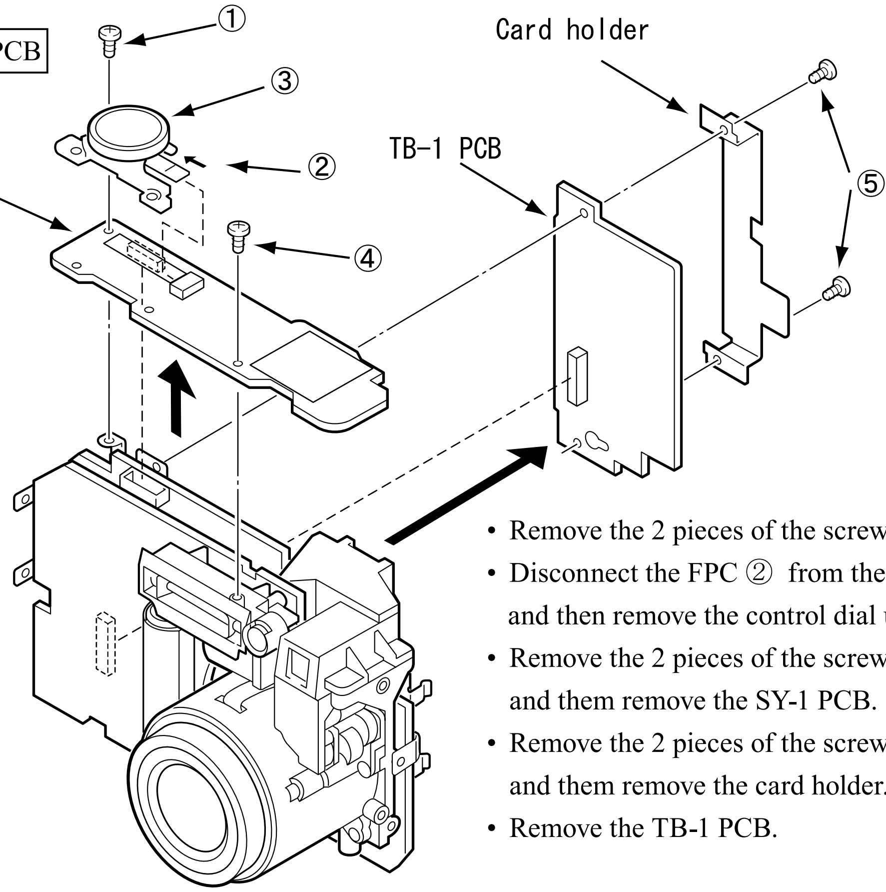


BATTERY HOLDER , LCD

- Remove the 2 pieces of screws ① (M1.7×4).
- Remove the 2 pieces of connectors ② , and then remove the battery holder.
- Remove the screw ③ (M1.7×4), and then remove the TB-1 board ④ .
- Disconnect the FPC ⑤ form the connector.
- Remove the connector ⑥ .
- Remove the LCD .



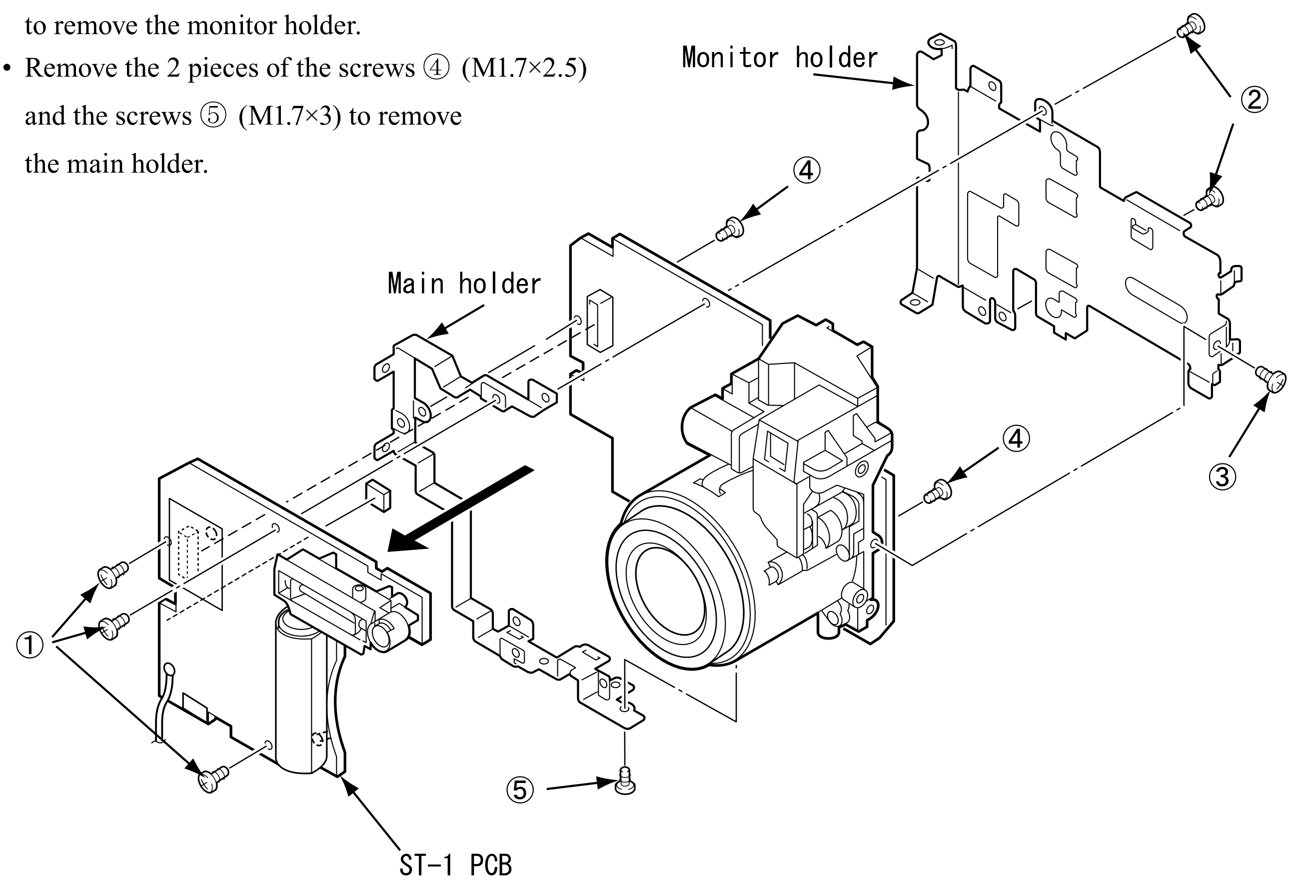
SY-1 PCB / TB-1 PCB



- Remove the 2 pieces of the screws ① (M1.7×2.5)
- Disconnect the FPC ② from the SY-1 PCB, and then remove the control dial unit ③ .
- Remove the 2 pieces of the screws ④ (M1.7×4), and them remove the SY-1 PCB.
- Remove the 2 pieces of the screws ⑤ (M1.7×3), and them remove the card holder.
- Remove the TB-1 PCB.

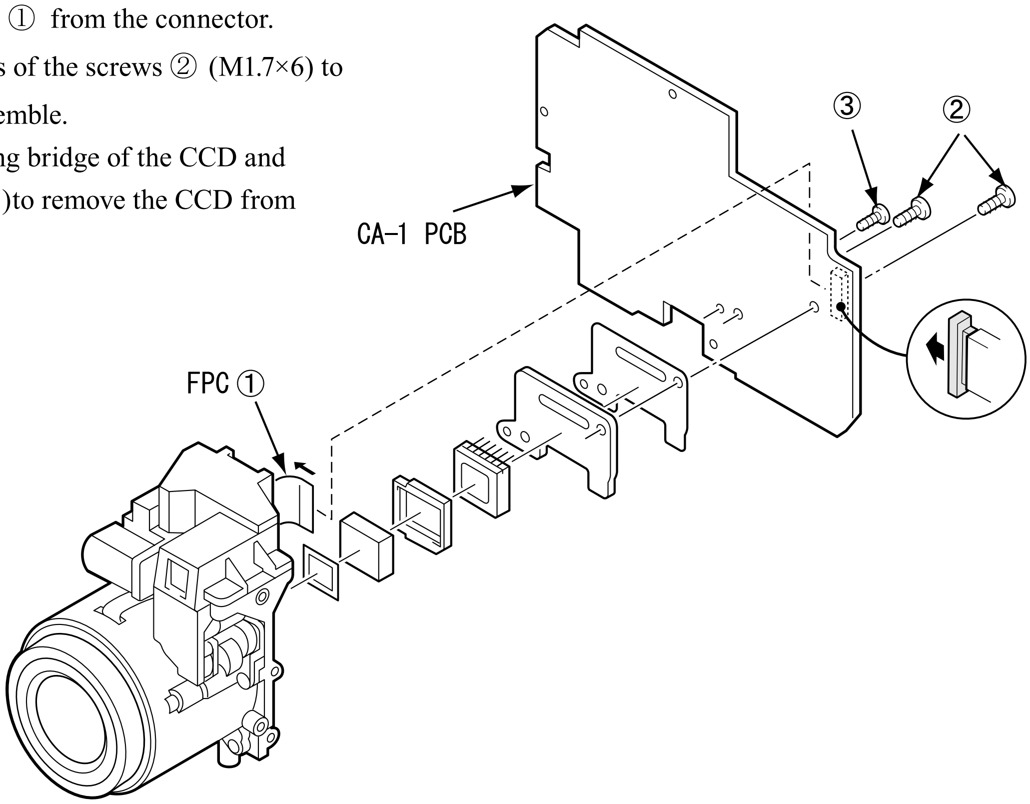
ST-1 PCB / MONITOR HOLDER

- Remove the 3 pieces of the screws ① (M1.7×2.5), and then remove the ST-1 PCB.
- Remove the 2 pieces of the screws ② (M1.7×2.5) and the screws ③ (M1.7×3) to remove the monitor holder.
- Remove the 2 pieces of the screws ④ (M1.7×2.5) and the screws ⑤ (M1.7×3) to remove the main holder.



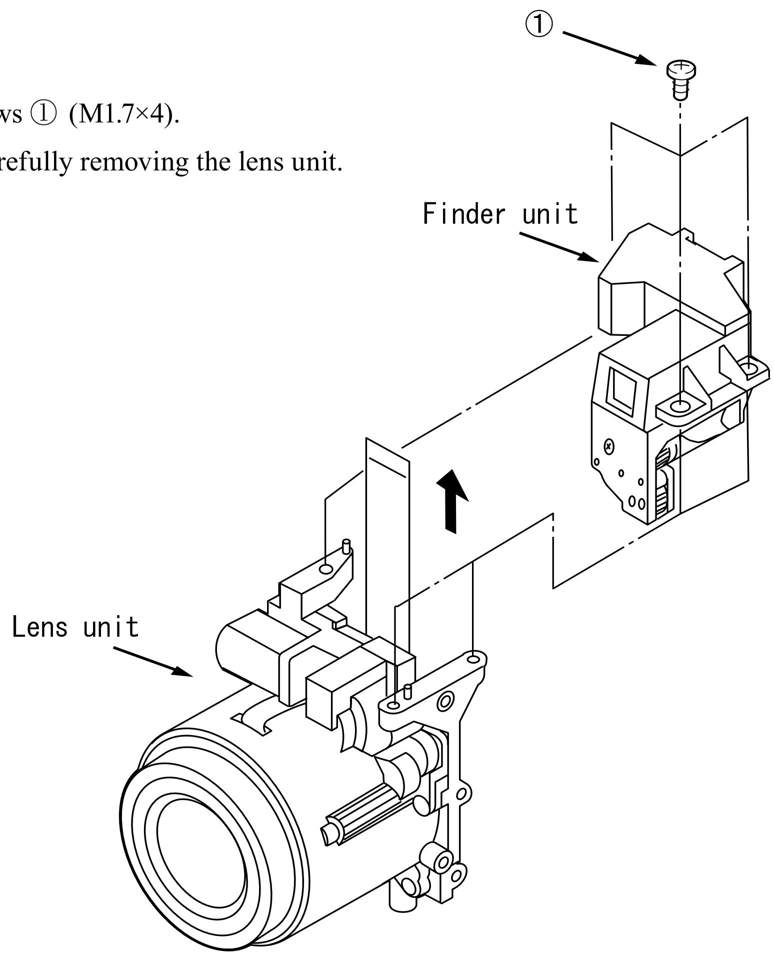
LENS UNIT

- Disconnect the FPC ① from the connector.
- Remove the 2 pieces of the screws ② (M1.7×6) to remove the lens assemble.
- Remove the soldering bridge of the CCD and screw ③ (M1.7×2.5)to remove the CCD from the CA-1 PCB.



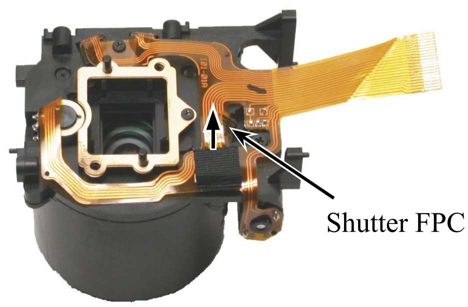
FINDER UNIT

- Remove the 3 pieces of the screws ① (M1.7×4).
- Remove the finder unit while carefully removing the lens unit.

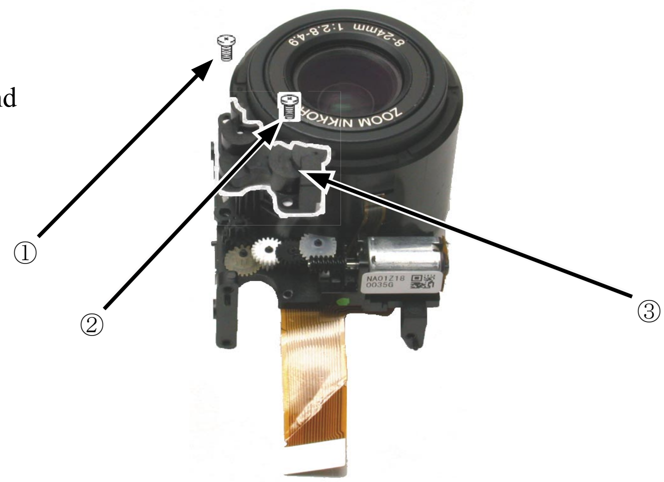


LENS - BARREL

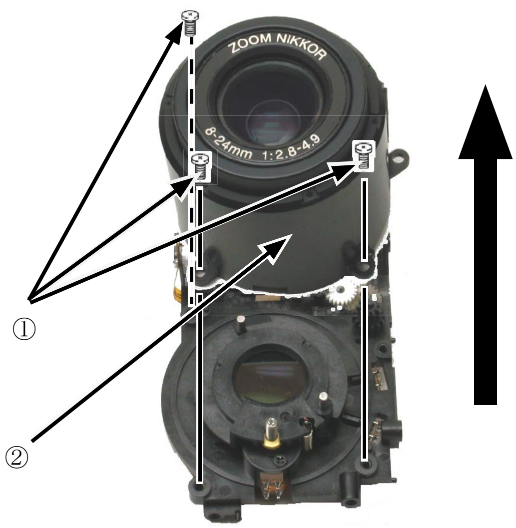
・ Remove the shutter FPC from the connector.



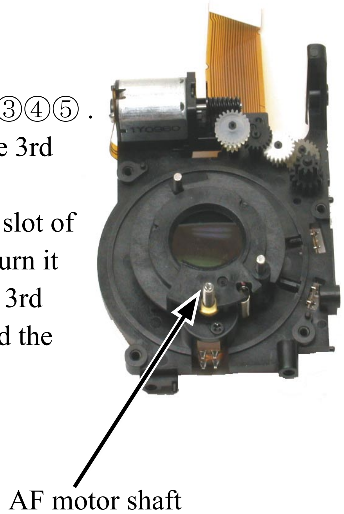
・ Remove the screw ①（M 1.7×4） and the screw ②（M 1.7×3).
・ Uncover the zoom gear cover ③ .

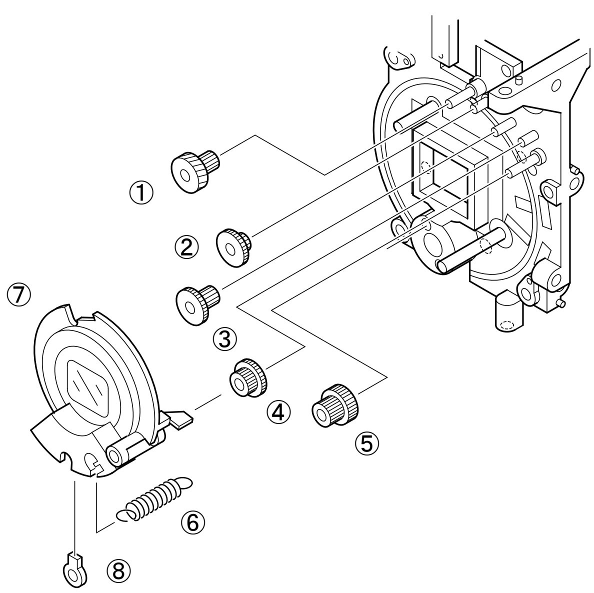


・Remove the 3 screws ①（M 1.7×4） .
・Lift up slowly the 1 and 2 lens group unit ② to detach.



・Remove the gears ①②③④⑤ .
・Remove the spring of the 3rd lens group frame ⑥ .
・Insert the driver into the slot of the AF motor shaft and turn it clockwise to remove the 3rd lens group frame ⑦ and the AF nut ⑧ .

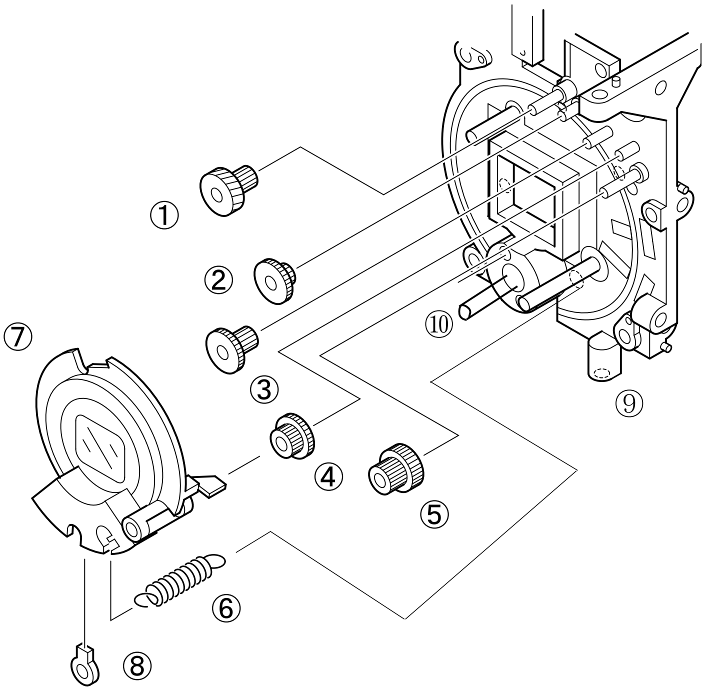




ASSEMBLY

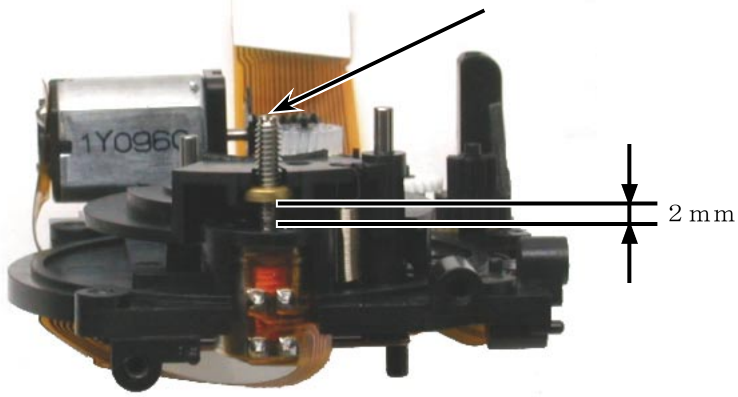
LENS - BARREL

- Re-assemble the gears in the order of ④ , ③ , ② , ① and ⑤ .
- Attach the AF nut ⑧ to the 3rd lens frame ⑦ . Then insert the driver into the slot of the AF motor shaft ⑩ and turn counterclockwise and re-assemble the 3rd lens frame ⑦ to the master frame ⑨ .
- Hook the spring ⑥ on the 3rd lens group frame ⑦ and the master frame ⑨ .
  To prevent the spring from coming off, apply a little of the Screw Lock to the hook (on both sides).

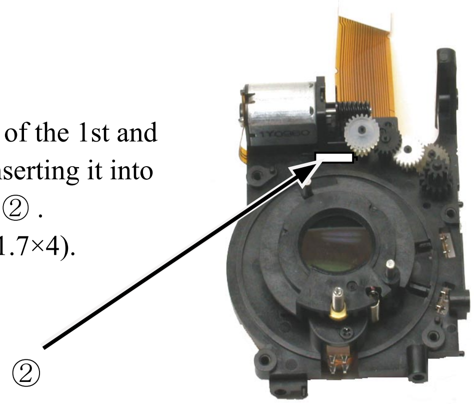


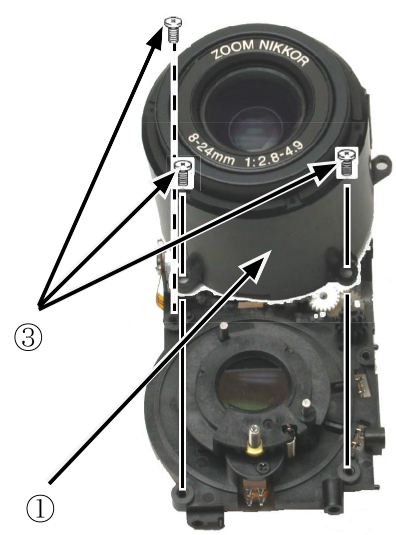
- Set the 3rd lens group frame ⑦ in position as shown in the right.

Insert the driver into the slot of the AF motor shaft and turn it.

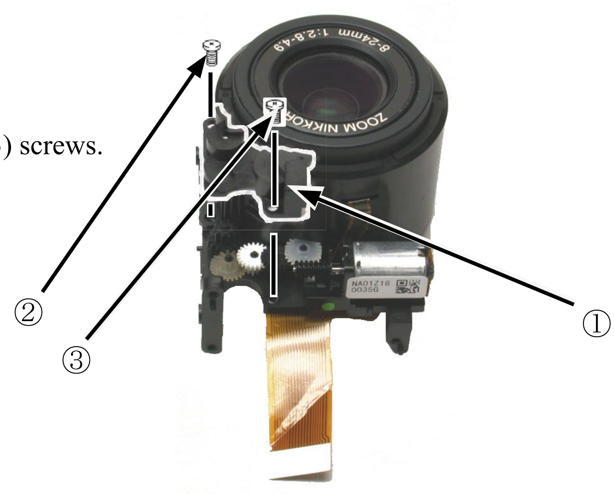


- Re-assemble the shutter FPC of the 1st and 2nd lens group unit ① by inserting it into the hole of the master frame ② .
- Tighten the 3 screws ③ (M1.7×4).

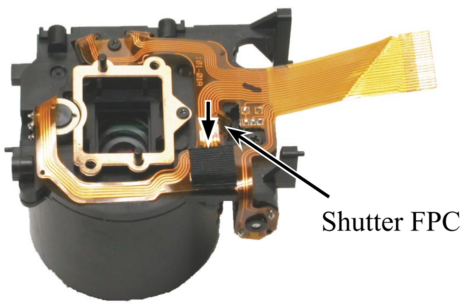




・Cover the zoom gear cover ① .
・Screw the ② (M1.7×4) and ③ (M1.7×3) screws.



・Insert the shutter FPC into the connector.



CHECK WHEN DISSEMBLE AND REPAIR THE LENS-BARREL

When the lens-barrel is dissembled and repaired, the following should be checked after re-assembling the front and back cover.
Refer to Page A7 for the method to inspect.

(1) Check the zoom driving and release performance
(2) Check the resolution by photographing the chart

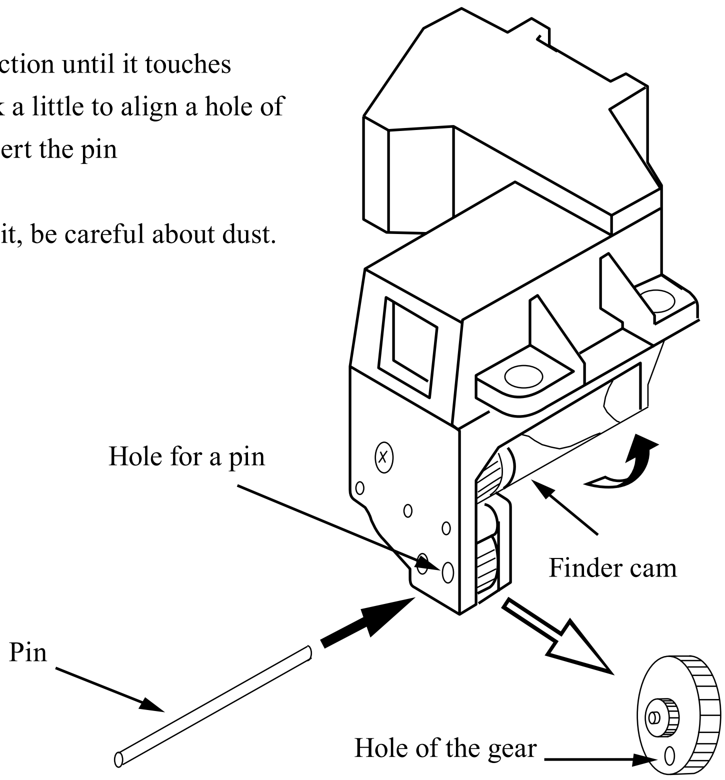
In case either (1) or (2) of the above fails, it is necessary to replace the lens-barrel group unit with the new one.

ASSEMBLY

FINDER UNIT

- Rotate the finder cam in an arrow direction until it touches the limit (Wide end), and rotate it back a little to align a hole of the gear and a hole for a pin. Then insert the pin (approx. ϕ0.5) into the holes.

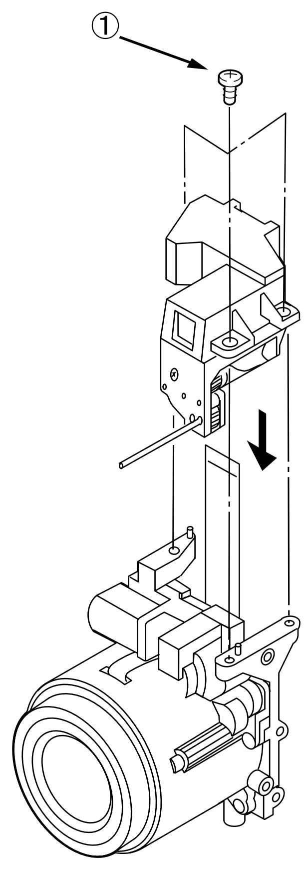
Note: When mounting the finder lens unit, be careful about dust.



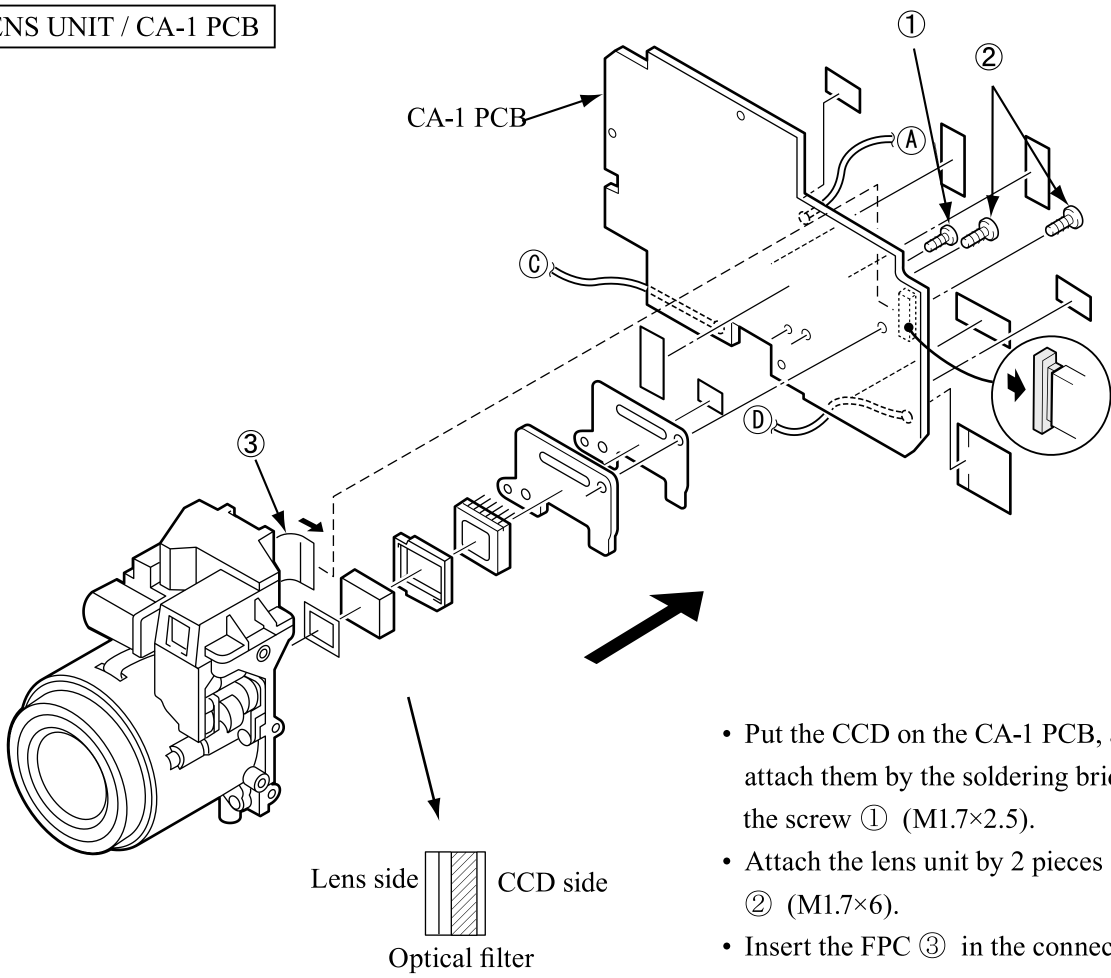
LENS UNIT

- Set the lens unit to the reset position.
- Put the finder unit on the lens unit.
- Fix the finder unit by 3 pieces of the screws ① (M1.7×4).
- Remove the pin from the finder unit.

Note: When mounting the finder lens unit, be careful about dust.



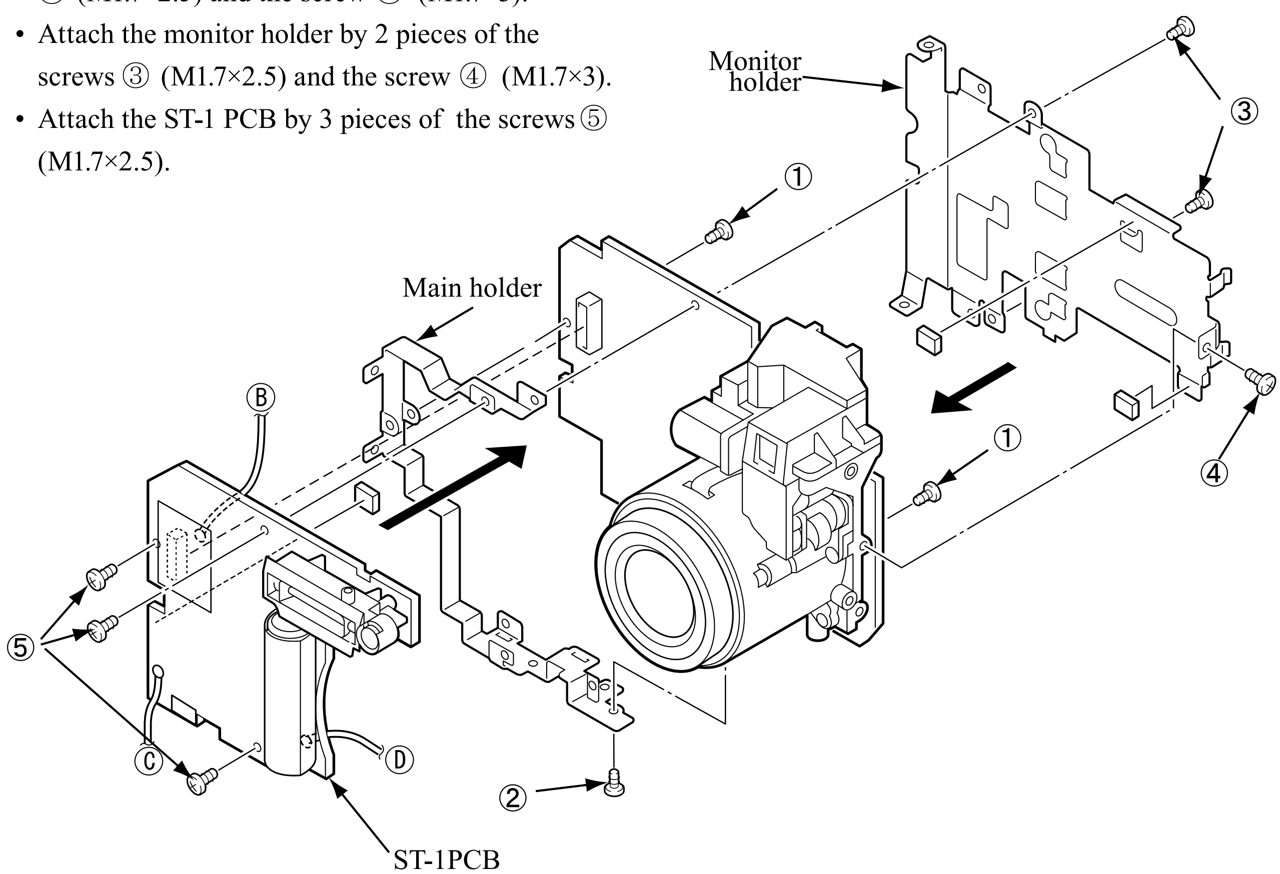
LENS UNIT / CA-1 PCB



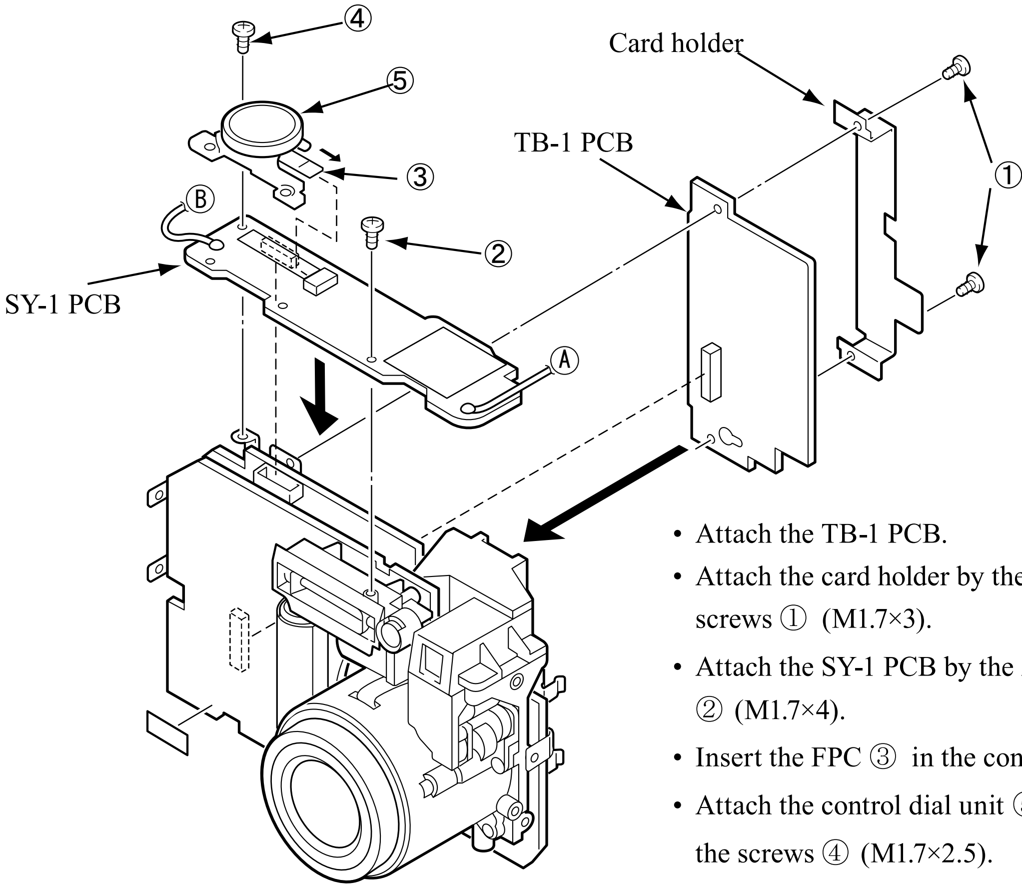
- Put the CCD on the CA-1 PCB, and then attach them by the soldering bridge and the screw ① (M1.7×2.5).
- Attach the lens unit by 2 pieces of the screws ② (M1.7×6).
- Insert the FPC ③ in the connector.

ST-1 PCB / MONITOR HOLDER

- Attach the main holder by 2 pieces of the screws ① (M1.7×2.5) and the screw ② (M1.7×3).
- Attach the monitor holder by 2 pieces of the screws ③ (M1.7×2.5) and the screw ④ (M1.7×3).
- Attach the ST-1 PCB by 3 pieces of the screws ⑤ (M1.7×2.5).



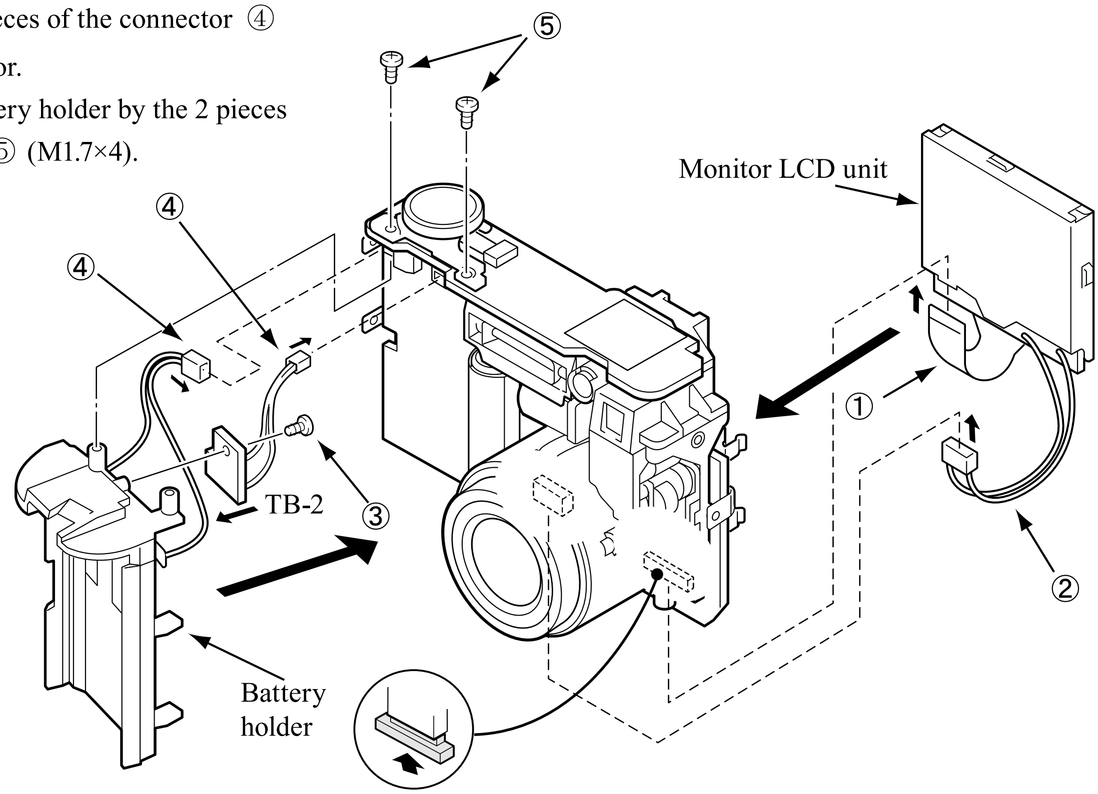
SY-1 PCB / TB-1 PCB



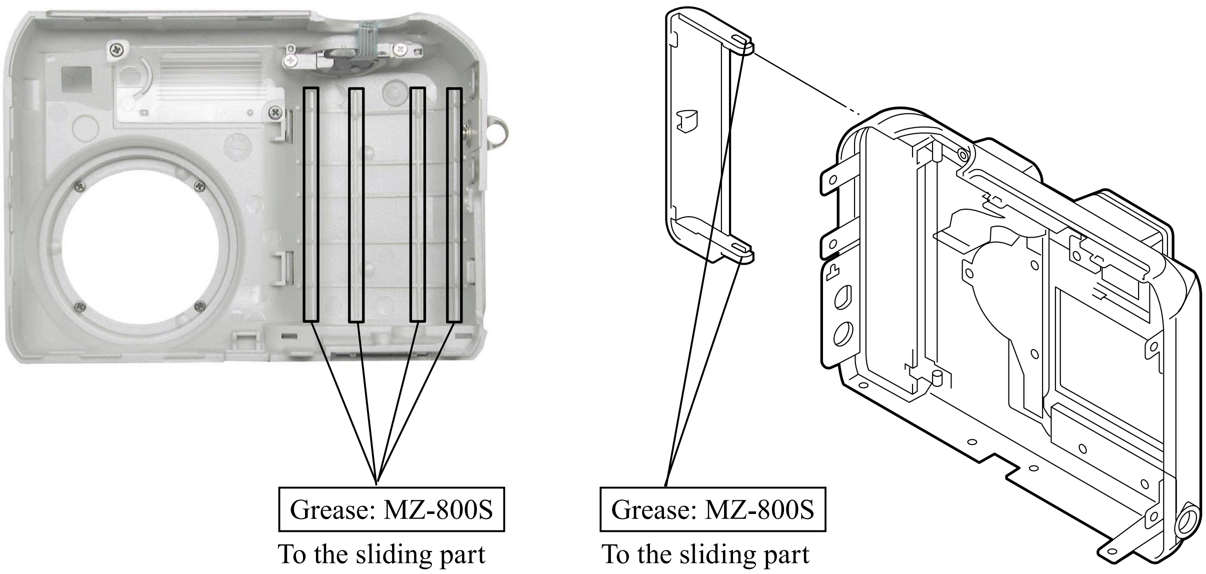
- Attach the TB-1 PCB.
- Attach the card holder by the 2 pieces of the screws ① (M1.7×3).
- Attach the SY-1 PCB by the 2 pieces of the screws ② (M1.7×4).
- Insert the FPC ③ in the connector.
- Attach the control dial unit ⑤ by the 2 pieces of the screws ④ (M1.7×2.5).

BATTERY HOLDER , LCD

- Attach the monitor LCD unit.
- Insert the FPC ① in the connector.
- Insert the connector ② in the connector.
- Attach the TB-2 PCB by the screws ③ (M1.7×4) .
- Insert the 2 pieces of the connector ④ in the connector.
- Attach thebattery holder by the 2 pieces of the screws ⑤ (M1.7×4).



LOCATION WHERE THE GREASE SHOULD BE APPLIED OF THE CARD COVER AND FRONT COVER

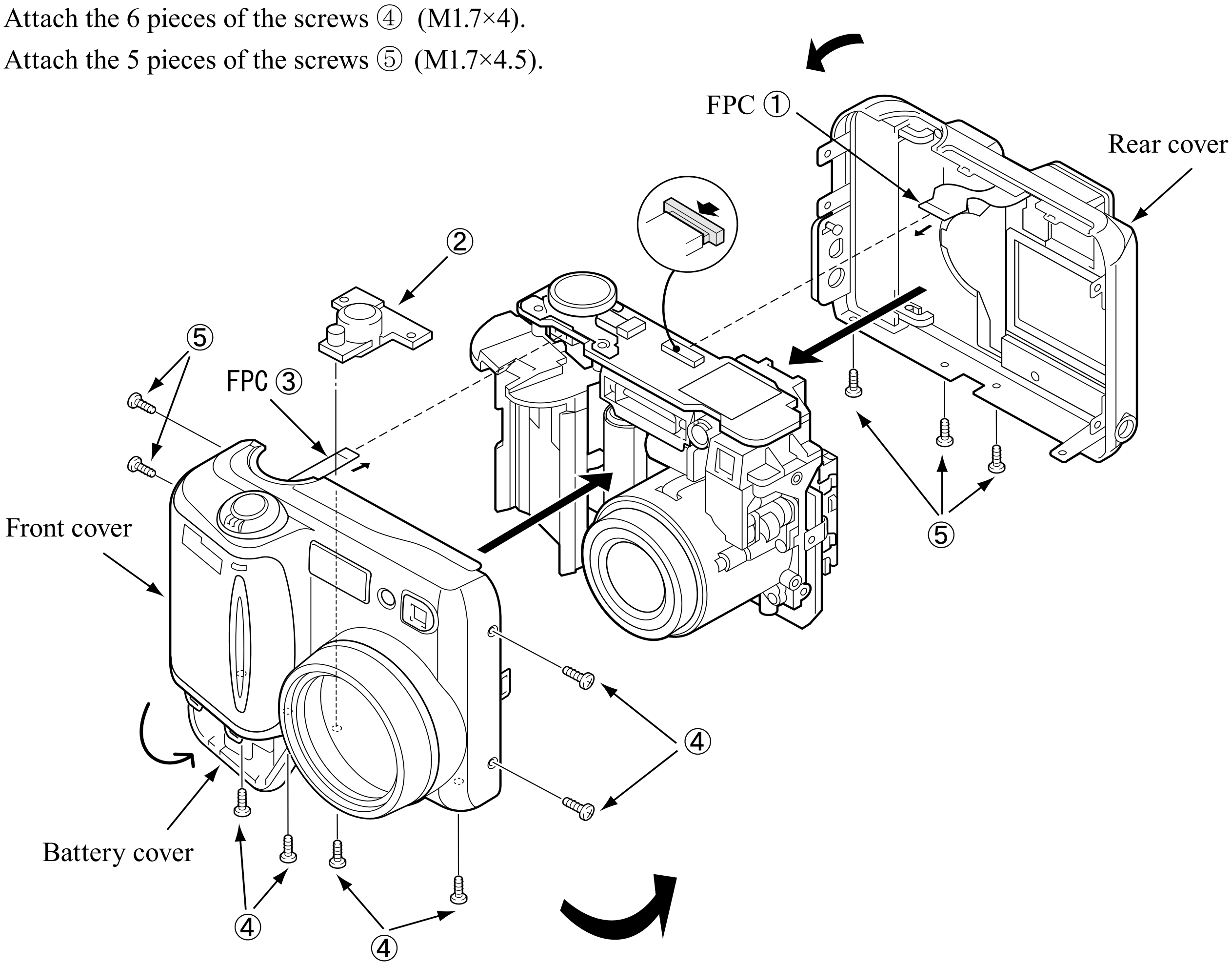


Grease: MZ-800S
To the sliding part
with the battery
(Rib x 4 places)

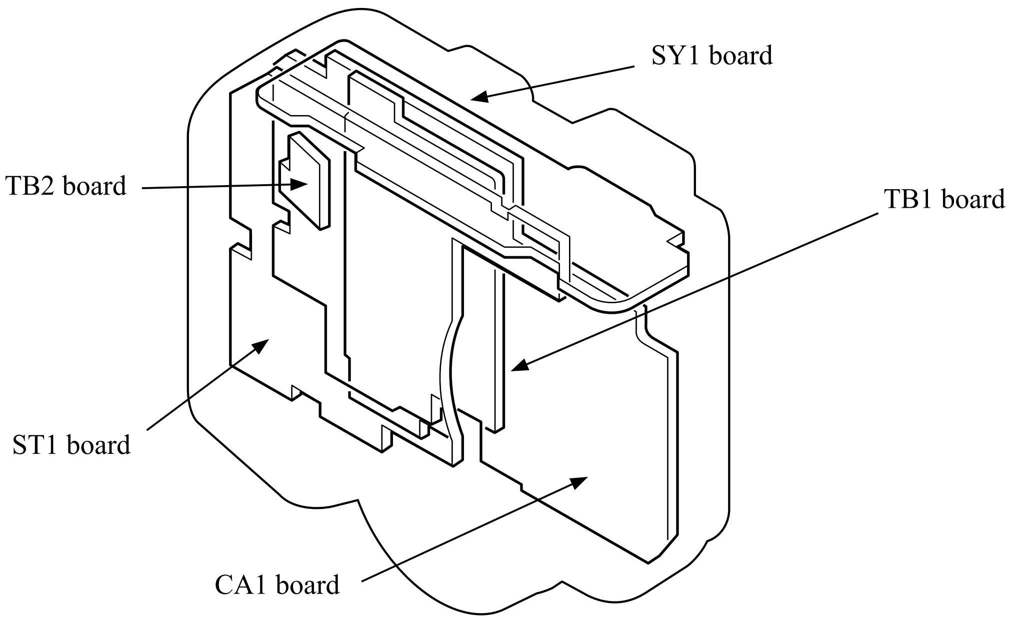
Grease: MZ-800S
To the sliding part
with the rear cover

REAR COVER, FRONT COVER

- Insert the FPC ① in the connector, and then attach the rear cover while inserting the stand ②.
- Insert the FPC ③ in the connector, and then attach the front cover.
- Attach the 6 pieces of the screws ④ (M1.7×4).
- Attach the 5 pieces of the screws ⑤ (M1.7×4.5).

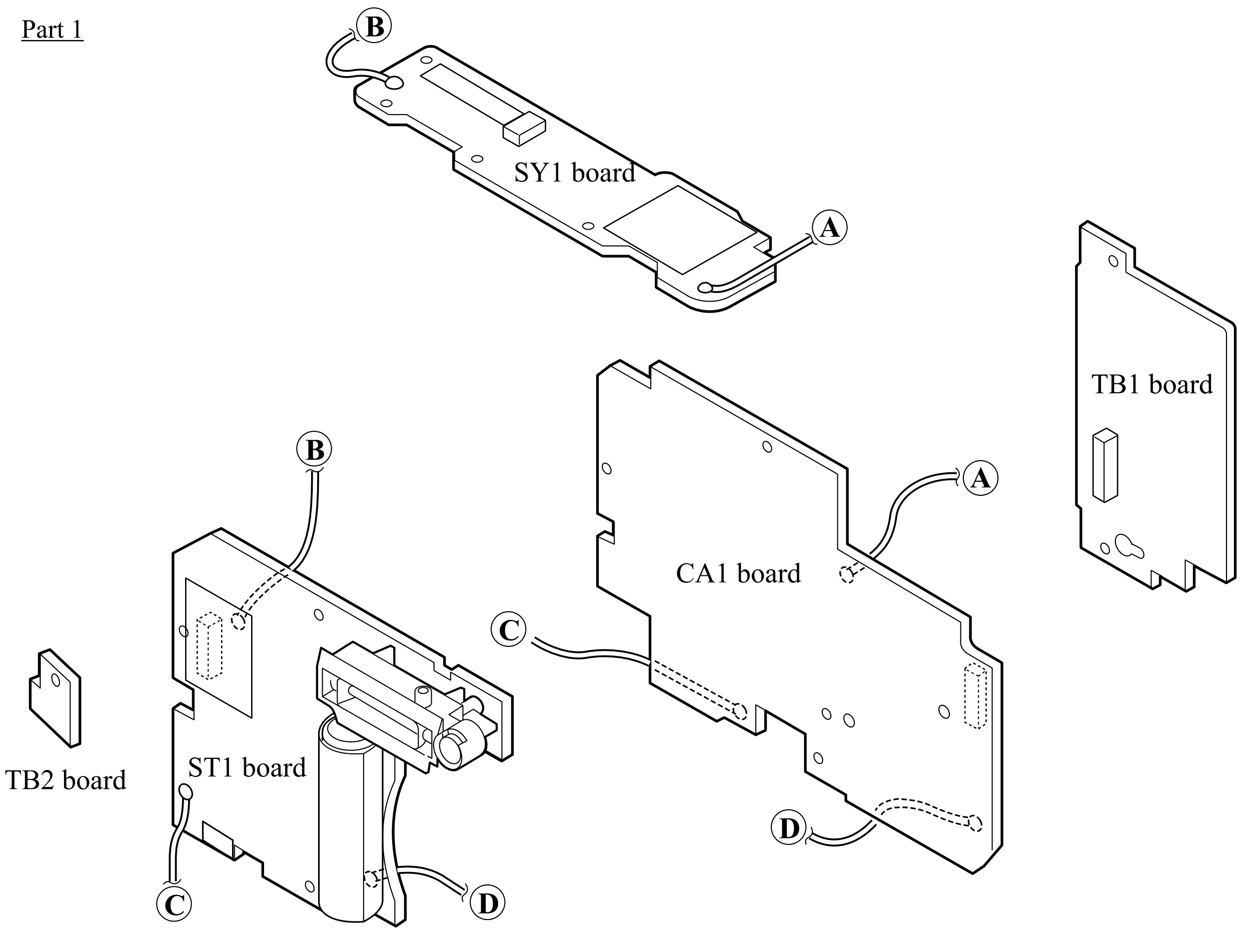


LOCATION OF EACH BOARD

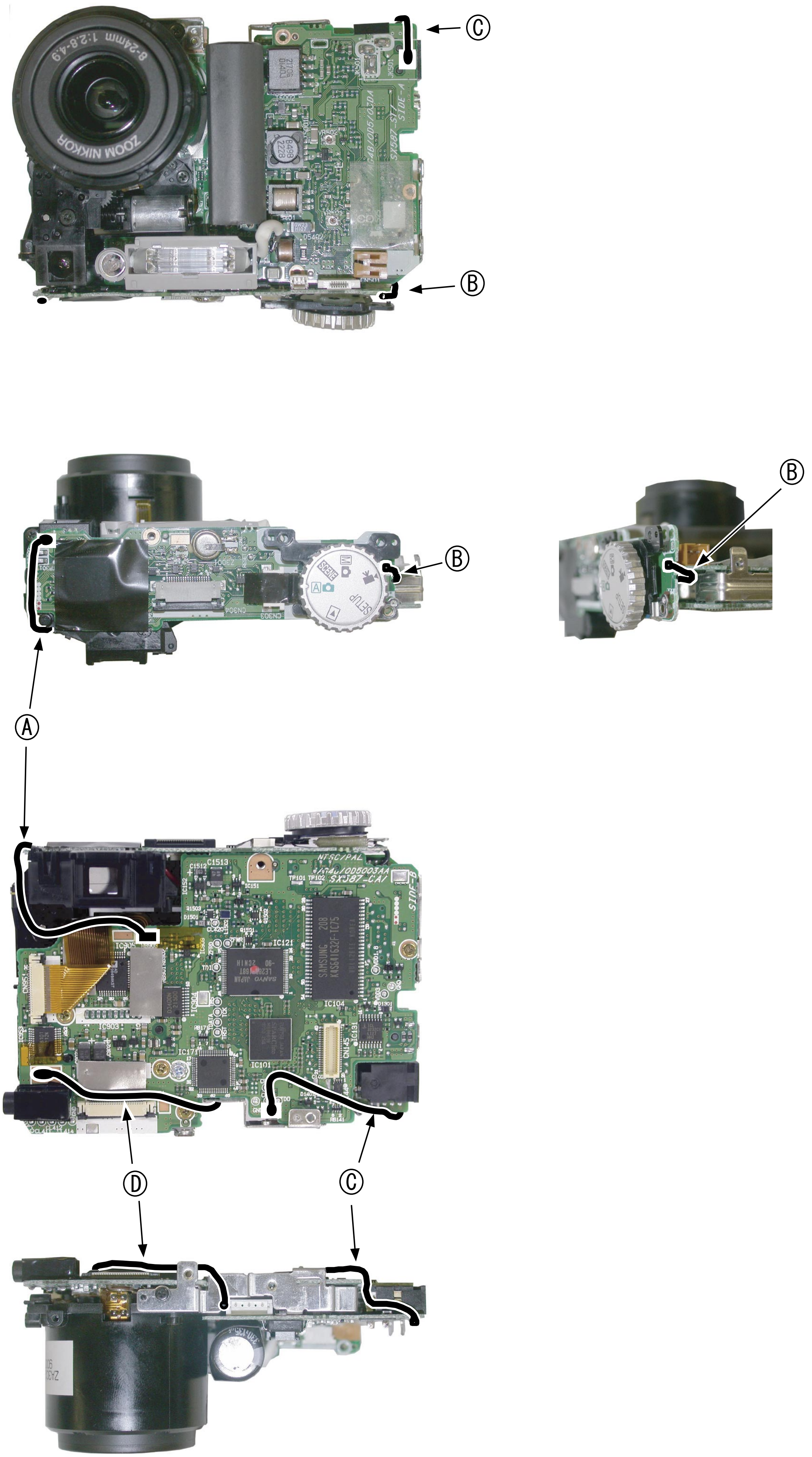


LOCATION OF EACH LEAD WIRES

Part 1



Part 2



CHECK THE PERFORMANCE AND RESOLUTION

Be sure to check when dissemble and repair the lens-barrel

(1) Check the performance

Repeat the following performance several times: After tuning the power switch ON and driving the zoom, turn it OFF.

Confirm that there is no abnormal operation by repeating to check the release performance several times.

(2) Check the resolution

By photographying the high-definition resolution chart (J63079), confirm that the TV lines are within the standard.

Standard for the TV lines: more than 1100 TV lines in the Center; more than 750 TVs in the 4 corners.

(ref. : The resolution is based on the unit of TV lines that are black-and-white strips distinguished in the TV screen.)

(a) The camera is set as follows to take photos: Shooting-mode: Auto, Image quality mode: FINE, Image size: 2272, Flash mode: Flash cancel

(b) The uneven pattern in luminance of the chart does not affect, but photograph with the luminance (ISO100, 1/15-1/250) by which the aperture is open.

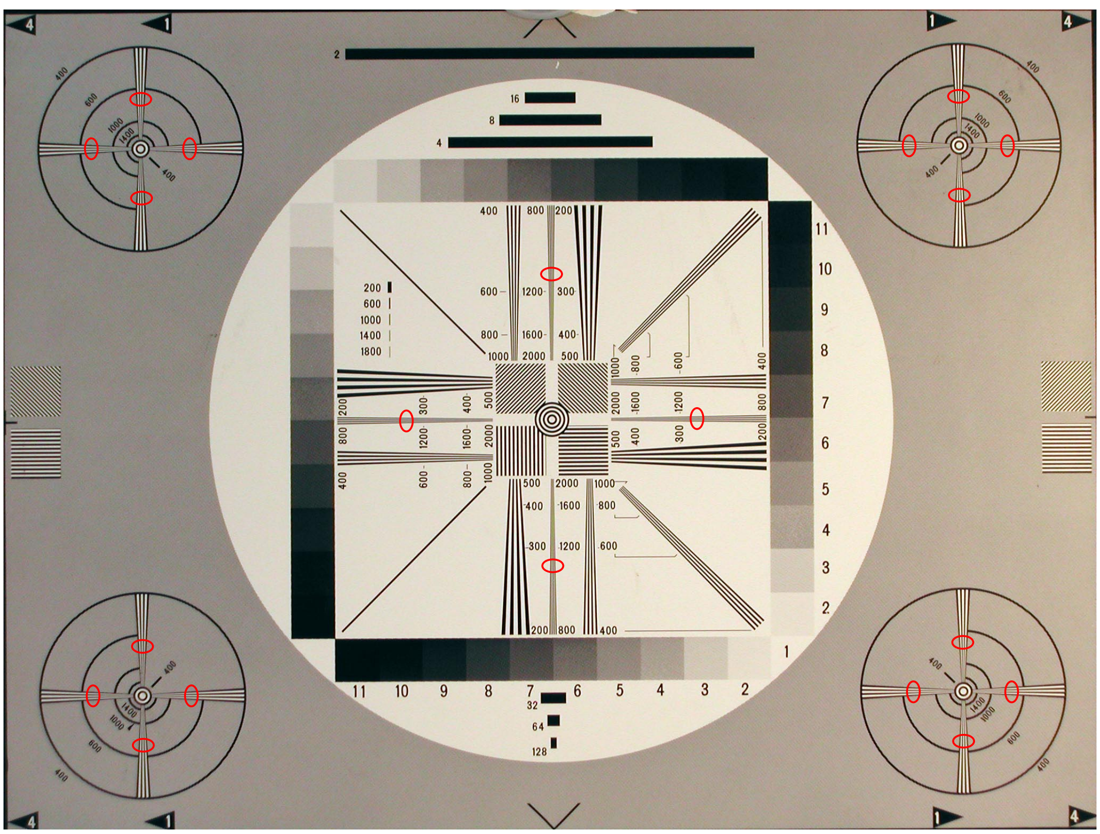
(c) Check the zoom position in the order of WIDE, MIDDLE (press the button 6 times starting from WIDE) and TELE.

The object distance is WIDE: approx.65cm, MIDDLE: approx.115cm, TELE: approx.185cm. Set the chart fully screened in the LCD of the camera, and fix on a tripod.

(d) Open the photographed image by Photoshop, and confirm it by the magnified display, e.g. 100%, etc.

(e) Regarding the resolution of the frame center and the 4 corners, check if it is clear in black and white in the position circled in red as shown in the below.

In case either (1) or (2) of the above fails, it is necessary to replace the lens-barrel group unit with the new one.



High-definition resolution chart (J63079)

ADJUSTMENT

1. Equipment

IBM compatible PC • AC adapter EH-21 • USB cable (UC-E1) • Oscilloscope

2. Servicing Tools

• Pattern Box •Color Meter •Luminance Meter • Siemens star chart • Calibration software

3. Adjustment Items and Order

1. Lens Adjustment
2. AWB Adjustment
3. CCD White Point Defect Detect Adjustment
4. CCD Black Point Defect Detect Adjustment
5. USB Storage information registration

6 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

Note) If replacing the lens, CCD, optical filter, CA-1 or CP-1 board, it is necessary to perform the above 1-5 adjustments. 2-5 adjustments other than these should be carried out in sequence.

4. Setup

1) System requirements
- Windows98® , Me, 2000 or XP
- 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 drive

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

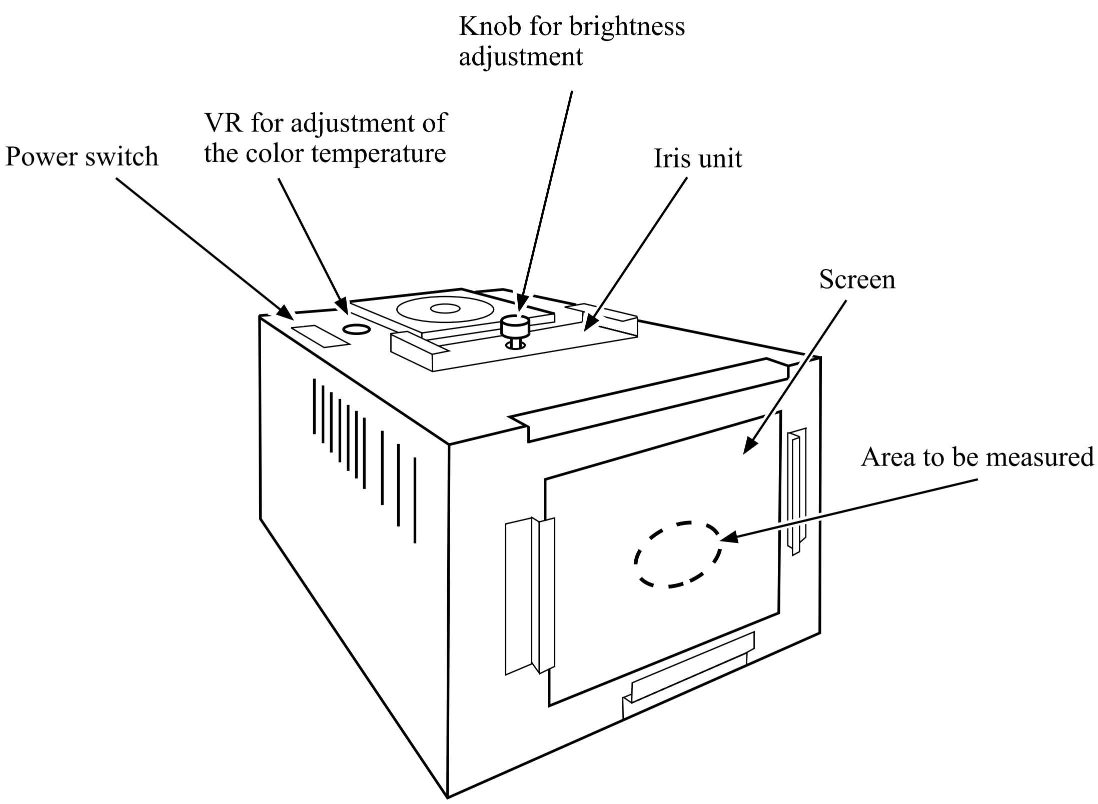
6. Pattern box

Turn on the switch and wait for 30 minutes for aging to take place before using Color Pure. It is used after adjusting the chroma meter (VJ8-0192) adjust color temperature to 3100 ± 20 K and luminosity to 900 ± 20 cd/m^2. Be careful of handling the lump and its circumference are high temperature during use and after power off for a while.

・Procedure for correcting Pattern Box

Note: Be sure to perform the aging correction.

1) Measure the center of screen with the Color Meter (J63081).
2) Adjust the pattern box so that the color temperature would be 3100±20K by using "VR for adjustment of the color temperature".
3) Measure the center of screen with the Luminance Meter BM-300 (J63068).
4) Adjust the pattern box so that the brightness would be 900±20cd/ m^2 by using "Knob for brightness adjustment".
5) Repeat process 1) to 4) until the color temperature would be 3100±20k and brightness would be 900±20cd/ m^2 .



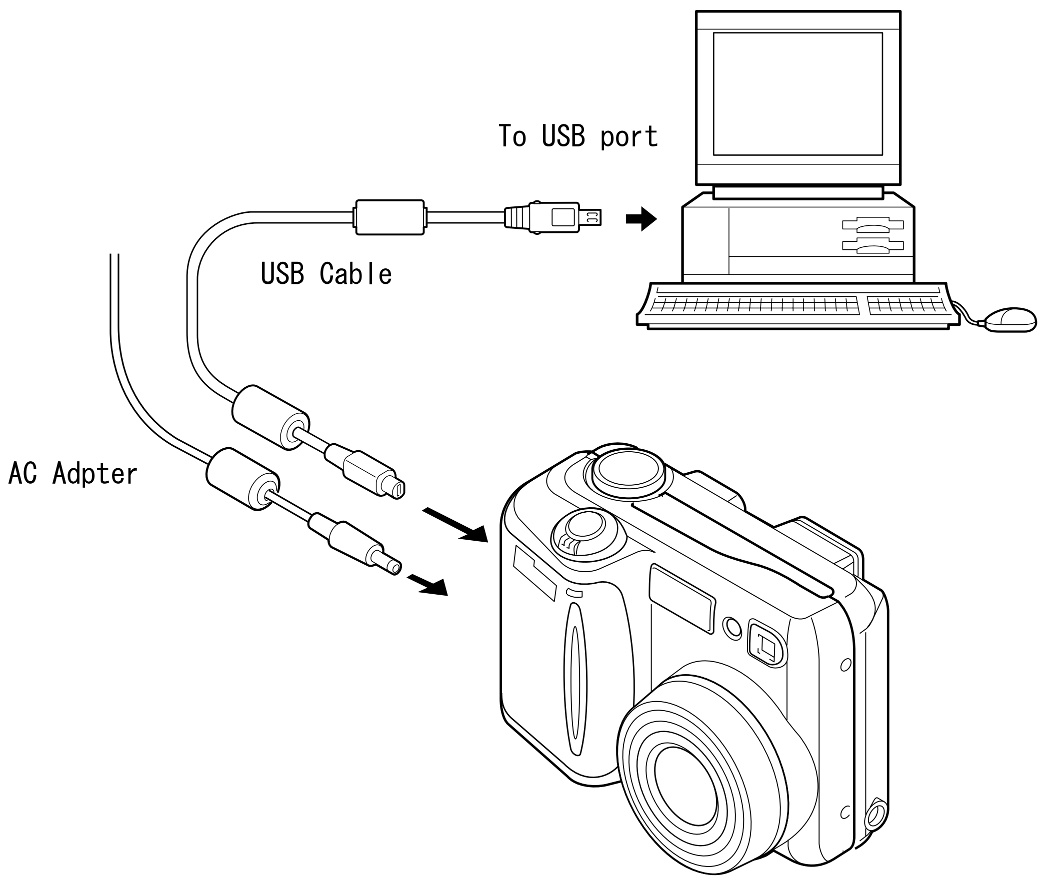
7. Adjustment items required at replacement of parts

	Lens Adj.	AWB	CCDDefect	LSDPanel	USB
Lens Unit	○	○	○	×	×
Optical filter	○	○	○	×	×
CCD	○	○	○	×	×
CA-1	○	○	○	△	○
ST-1	×	×	×	×	×
PW-1	×	×	×	×	×
TB-1	×	×	×	×	×

8. Connecting the camera to the computer

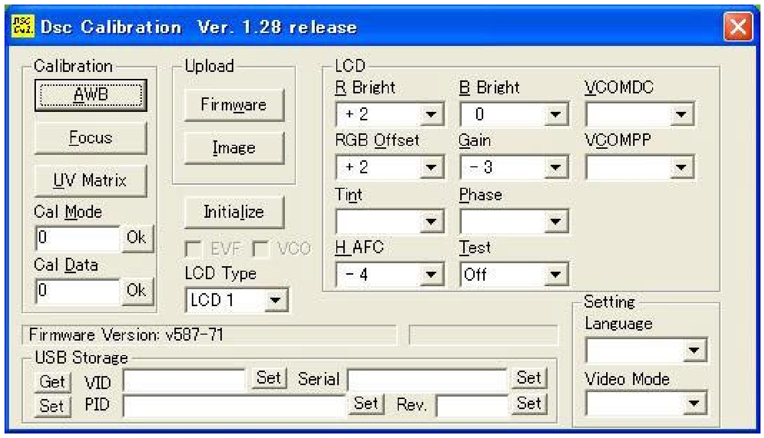
1) Line up the arrow on the cable connector with the notch on the camera's USB port. Insert the connector.

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]

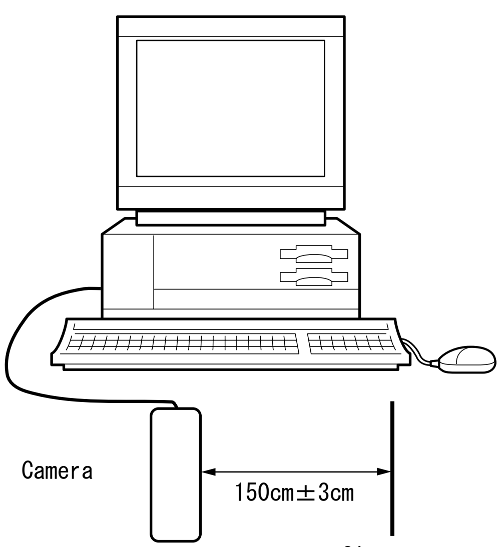
- Siemens star chart
- POWER switch: ON

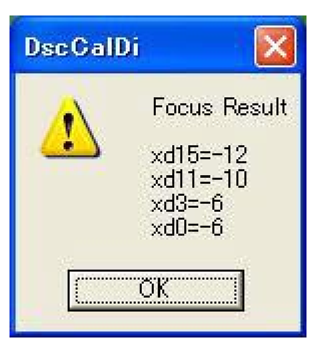
[Adjustment condition]

- 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.
   adjustment value is xd0 = 0±50 , xd3 = 0±50 , xd11 = 0±50, xd15 = 0±50
5. Click the OK.





11. AWB Adjustment

[Preparation]

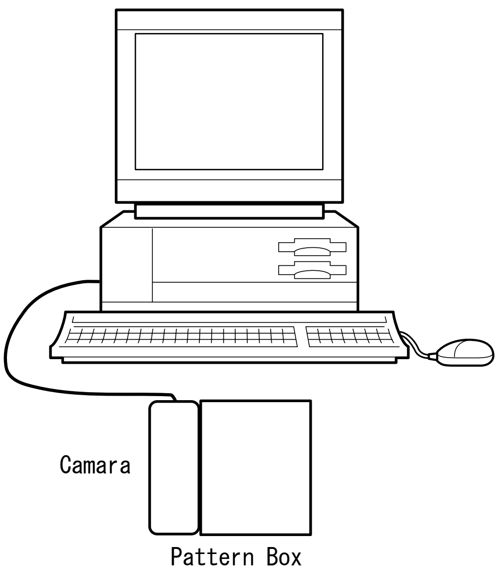
- Color viewer
- POWER switch: ON (set to Any MODE)

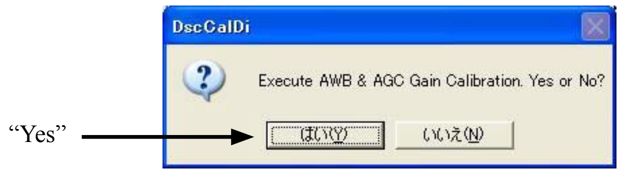
[Note]

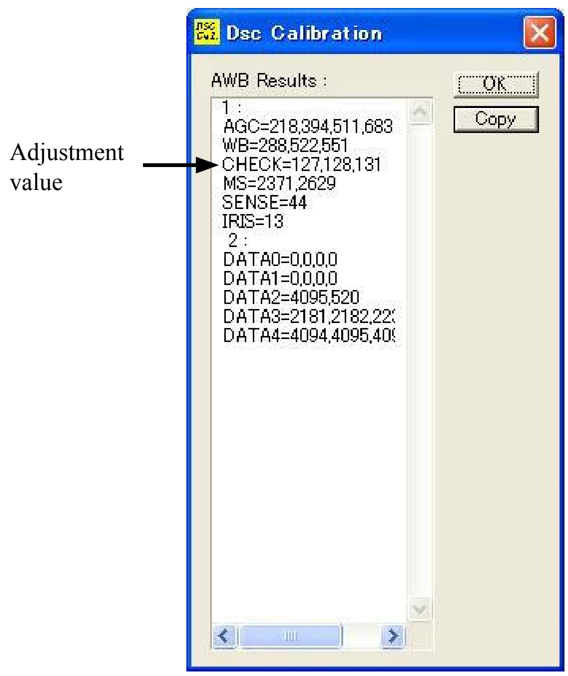
When setting the camera in place, set it to an angle so that nothing appears in any part of the color viewer except the white section. (Do not enter any light.)

[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.



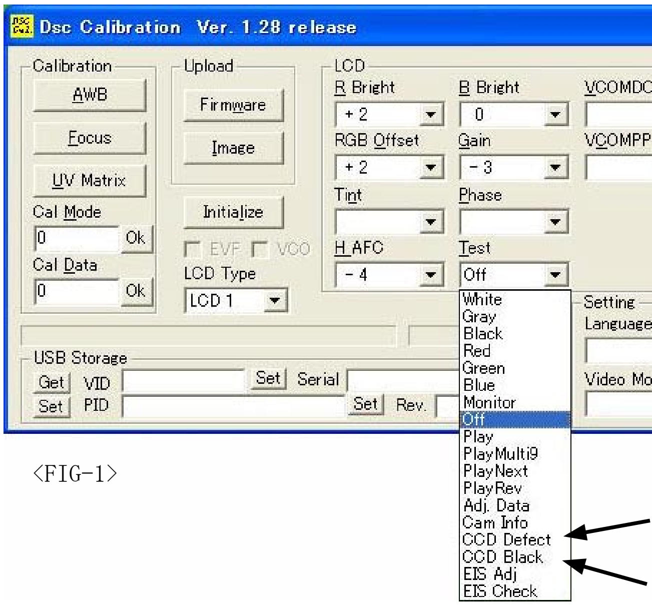




12. CCD White point Defect Detect Adjustment

[Adjustment method]

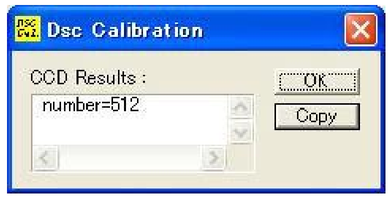
- Double-click on the DscCalDi128.
- Select the CCD Defect from Test menu of Calibration Soft and click the OK. Refer to FIG-1.
- After adjustment, An adjustment value will appear on the screen. Refer to FIG-2.



<FIG-1>

CCD Defect

CCD Black



<FIG-2>

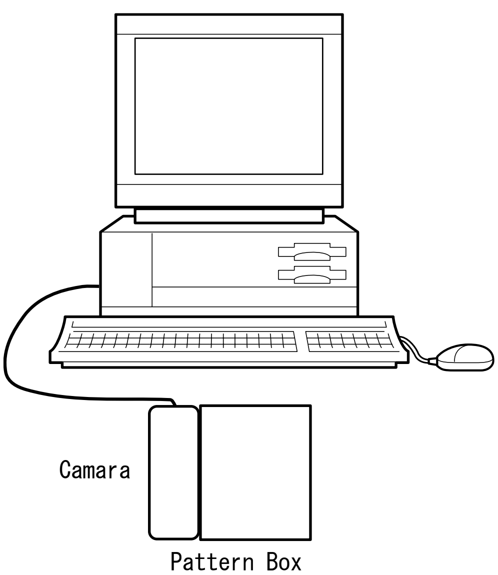
13. CCD Black point Defect Detect Adjustment

[Note]

When setting the camera in place, set it to an angle so that nothing appears in any part of the color viewer except the white section. (Do not enter any light.)

[Adjustment method]

- Double-click on the DscCalDi128.
- Select the CCD Black 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-3.



<FIG-3>

14. 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]

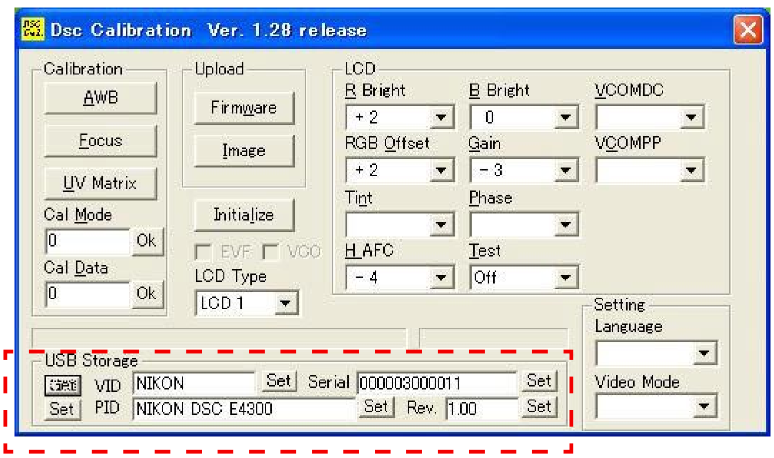
1. Connect the camera to a computer. (Refer to 8. Connecting the camera to the computer on the page 8.)
2. Double-click on the DscCalDi128.
3. Click on the Get button in the USB storage window and check the USB storage data.

   VID: NIKON

   PID: NIKON DSC E4300

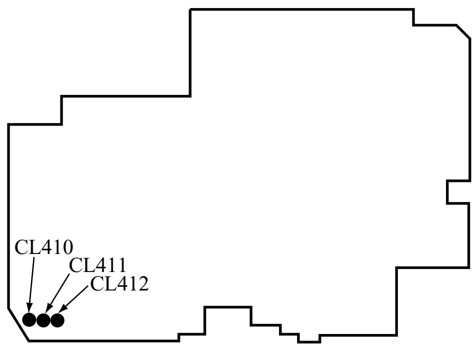
   Serial:

   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.

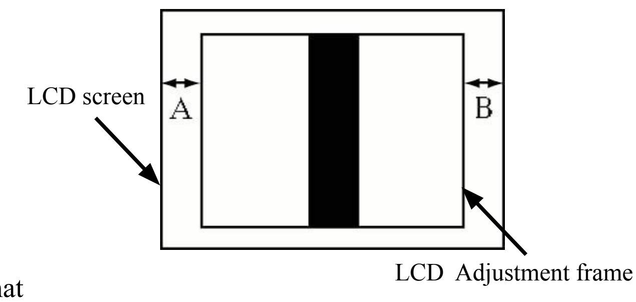


15. LCD Panel Adjustment

[CA1 board (Side B)]



15-1. LCD H AFC Adjustment



[Preparation]

- POWER switch: ON

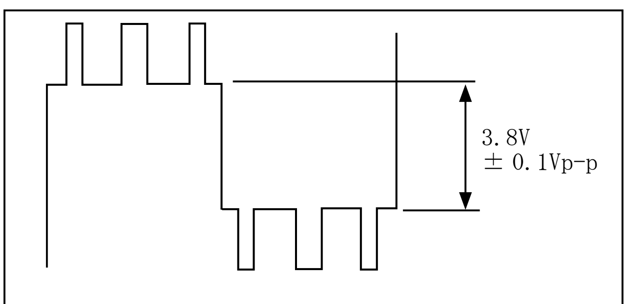
[Adjusting method]

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)

15-2. LCD RGB Offset Adjustment

[Adjusting method]

1. Adjust LCD “RGB Offset” so that the amplitude of the CL410 waveform is 3.8 V ±0.1 Vp-p.



CL410 Waveform

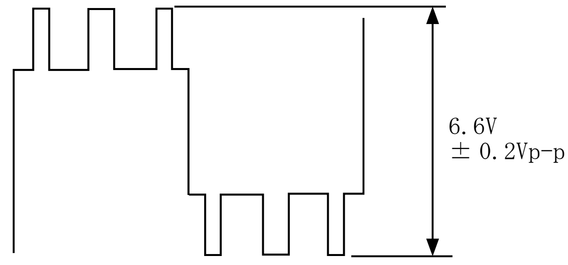
15-3. LCD Gain Adjustment

[Adjusting method]

1. Adjust LCD “Gain” so that the amplitude of the CL410 waveform is 6.6 V ± 0.2 Vp-p.

[Note]

15-2. LCD RGB Offset adjustment should always be carried out first.



CL410 Waveform

15-4. LCD Red Brightness Adjustment

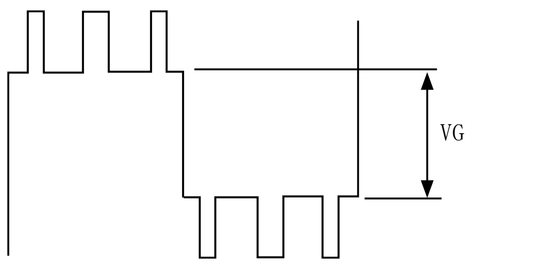
[Adjusting method]

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

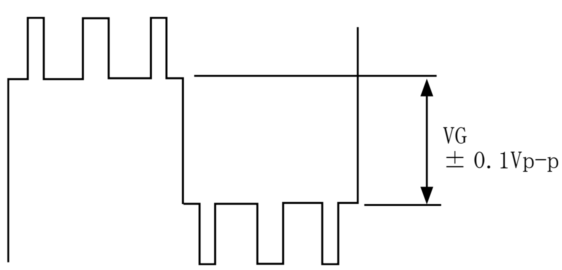
[Note]

15-2. LCD RGB Offset adjustment and

15-3. LCD Gain adjustment have done.



CL410 Waveform



CL411 Waveform

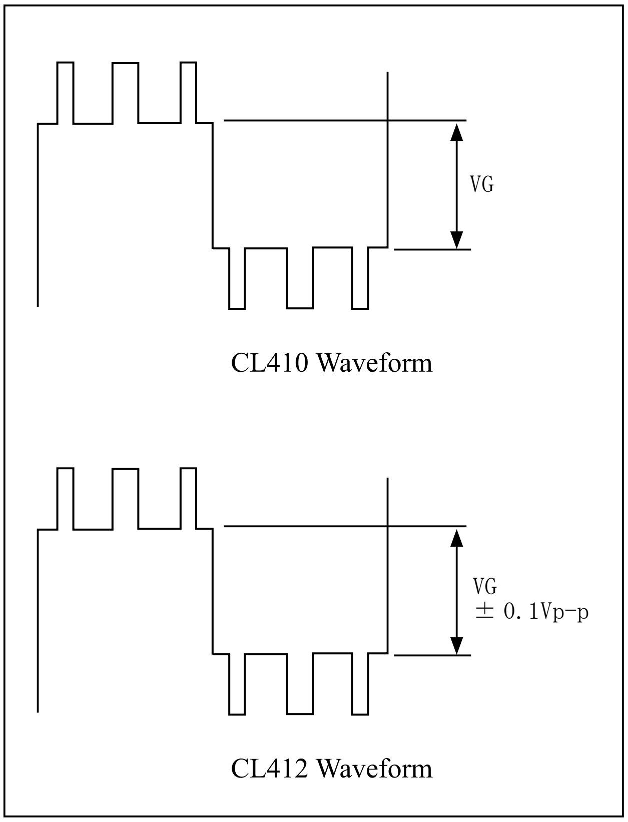
15-5. LCD Blue Brightness Adjustment

[Adjusting method]

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

[Note]

15-2. LCD RGB Offset adjustment and
15-3. LCD Gain adjustment should always
be carried out first



1. OUTLINE OF CIRCUIT DESCRIPTION

1-1. CA1 CIRCUIT DESCRIPTION

1. IC Configuration

IC903 (ICX411AQ) CCD imager
IC904 (CXD3400N) V driver
IC905 H driver, CDS, AGC and A/D converter

2. IC903 (CCD imager)

[Structure]

Interline type CCD image sensor

Image size	Diagonal 8.293 mm (1/1.8 type)
Pixels in total	2384 (H) x 1734 (V)
Recording pixels	288 (H) x 1712 (V)

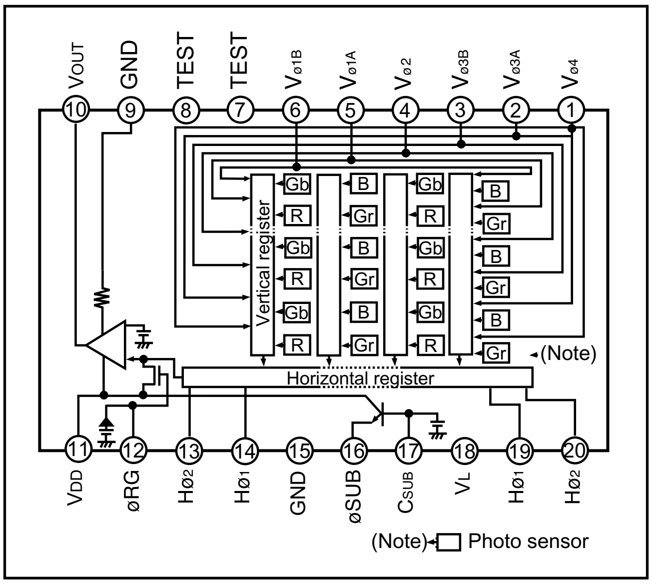


Fig. 1-2. CCD Block Diagram

Pin No.	Symbol	Pin Description	Waveform	Voltage
1	$V_{\phi 4}$	Vertical register transfer clock		-7.5 V, 0 V
2, 3	$V_{\phi 3A}$, $V_{\phi 3B}$	Vertical register transfer clock		-7.5 V, 0 V, 15 V
4	$V_{\phi 2}$	Vertical register transfer clock		-7.5 V, 0 V
5, 6	$V_{\phi 1A}$, $V_{\phi 1B}$	Vertical register transfer clock		-7.5 V, 0 V, 15 V
9, 15	GND	GND	GND	0 V
10	V_{OUT}	Signal output		Aprox. 10 V
11	V_{DD}	Circuit power	DC	15 V
12	øRG	Reset gate clock		12.5 V, 16 V
13, 20	$H_{\phi 2}$	Horizontal register transfer clock		0 V, 5 V
14, 19	$H_{\phi 1}$	Horizontal register transfer clock		0 V, 5 V
16	øSUB	Substrate clock	DC	Approx. 8 V
17	C_{SUB}	Substrate bias	DC	Approx. 8 V (Different from every CCD)
18	V_L	Protection transistor bias	DC	

Table 1-1. CCD Pin Description

---- When sensor read-out

3. IC904 (V Driver)

V driver is necessary in order to generate the clocks (vertical transfer clock, horizontal transfer clock and electronic shutter clock) which driver the CCD.
IC904 is V driver. In addition the XV1-XV4 signals which are output from IC102 are the vertical transfer clocks, and the 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.

4. IC905 (CDS, AGC Circuit, A/D Converter and H driver)

The video signal which is output from the CCD is input to Pin (29) of IC905. There are inside the sampling hold block, AGC block and A/D converter block.
The setting of sampling phase and AGC amplifier is carried out by serial data at Pin (37) of IC905. The video signal is carried out A/D converter, and is output by 12-bit. A H driver is inside IC905, and H1, H2 and RG clock are generated at IC905.

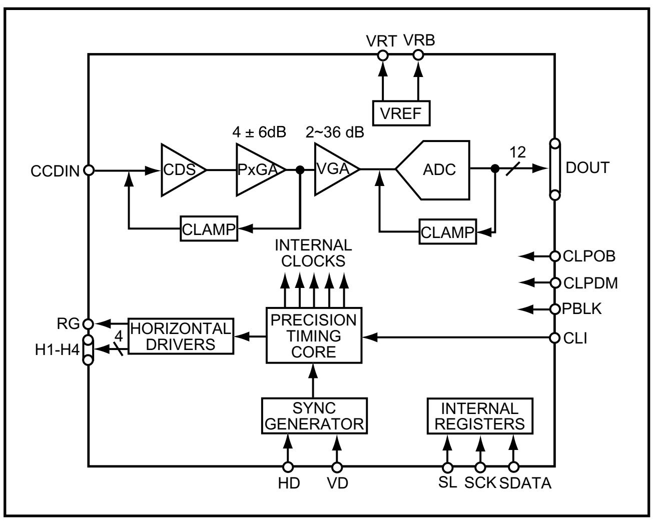


Fig. 1-2. IC905 Block Diagram

5. Lens drive block

5-1. Focus drive

The four control signals (FIN1, FIN2, FIN3 and FIN4) with different phases which are output from the ASIC expansion port (IC106) are converted into drive pulses (FOUT1, FOUT2, FOUT3 and FOUT4) by the motor driver (IC953), and are then used to drive the stepping motor for focusing operation. Detection of the standard focusing positions is carried out by means of the photo-interruptor (FOCUS PI) inside the lens block.

5-2. Iris and shutter drive

The two control signals (IIN1 and IIN2) which are output from the ASIC expansion port (IC106) are converted into drive pulses (SHUTTER 3, SHUTTER 4) by the motor driver (IC953), and are then iris opened/middle/little and moved.
The two control signals (SIN1 and SIN2) which is output from the ASIC expansion port (IC106) is converted into a drive pulse (SHUTTER 1 and SHUTTER 2) by the motor driver (IC953), and are then shutter opened and closed.

5-3. Zoom drive

The two control signals (ZIN1 and ZIN2) which are output from 8-bit micro-processor are converted into drive pulses (DC_M_P and DC_M_M) by the motor drive (IC951), and are then used to drive the DC motor for zoom operation.
Detection of the standard zoom positions is carried out by means of the photointerruptor (ZOOM RESET1) inside the lens block. Getting of the zoom positions is carried out by means of the two photo-interrupters (ZOOM PLUSE1 and ZOOM PLUSE2) by counting 8-bit micro-processor inside the lens block.

5. Circuit Description

5-1. Digital clamp

The optical black section of the CCD extracts averaged values from the subsequent data to make the black level of the CCD output data uniform for each line. The optical black section of the CCD averaged value for each line is taken as the sum of the value for the previous line multiplied by the coefficient k and the value for the current line multiplied by the coefficient 1-k.

5-2. Signal processor

1. γcorrection circuit

This circuit performs (gamma) correction in order to maintain a linear relationship between the light input to the camera and the light output from the picture screen.

2. Color generation circuit

This circuit converts the CCD data into RGB signals.

3. Matrix circuit

This circuit generates the Y signals, R-Y signals and B-Y signals from the RGB signals.

4. Horizontal and vertical aperture circuit

This circuit is used gemerate the aperture signal.

5-3. AE/AWB and AF computing circuit

The AE/AWB carries out computation based on a 64-segment screen, and the AF carries out computations based on a 6-segment screen.

5-4. SDRAM controller

This circuit outputs address, RAS, CAS and AS data for controlling the SDRAM. It also refreshes the SDRAM.

5-5. Communication control

1. UART

The RS-232C can be sued for both synchronous and asynchronous transmission.

2. SIO

This is the interface for the 8-bit microprocessor.

3. PIO/PWM/SIO for LCD

8-bit parallel input and output makes it possible to switch between individual input/output and PWM input/output.

5-6. TG/SG

Timing generated for 4 million pixels CCD control.

5-7. Digital encorder

It generates chroma signal from color difference signal.

5-8. JPEG encorder and decorder

It is compressed and elongated the data by JPEG system.

6. Outline of Operation

When the shutter opens, the reset signals (ASIC (IC102) and CPU (IC101)) and the serial signals ("take a picture" commands) from the 8-bit microprocessor are input and operation starts. When the TG/SG drives the CCD, picture data passes through the A/D and CDS, and is then input to the ASIC as 10-bit data. The AF, AE, AWB, shutter, and AGC value are computed from this data, and three exposures are made to obtain the optimum picture. The data which has already been stored in the SDRAM is read by the CPU and color generation is carried out. Each pixel is interpolated from the surrounding data as being either Ye, Cy, Mg and Gr primary color data to produce R, G and B data. At this time, correction of the lens distortion which is a characteristic of wide-angle lenses is carried out. After AWB and γ processing are carried out, a matrix is generated and aperture correction is carried out for the Y signal, and the data is then compressed by the JPEG method by (JPEG) and is then written to card memory (compact flash).

When the data is to be output to an external device, it is taken data from the memory and output via the UART. When played back on the LCD and monitor, data is transferred from memery to the SDRAM, and the data elongated by JPEG decorder is displayed over the SDRAM display area.

7. LCD Block

LCD Block is in the CA1 board, and it is constructed by LCD driver (IC171) and around circuits.

The video signal from the ASIC are converted into RGB signals by the LCD driver, and these RGB signals and the control signal which is output by the LCD driver are used to drive the LCD panel. The RGB signals are 1H transposed so that no DC component is present in the LCD element, and the two horizontal shift register clocks drive the horizontal shift registers inside the LCD panel so that the 1H transposed RGB signals are applied to the LCD panel. Because the LCD closes more as the difference in potential between the COM (common polar voltage: fixed at DC) and the R, G and B signals becomes greater, the display becomes darker; if the difference in potential is smaller, the element opens and the LCD become brighter.

1-2. ST1 POWER CIRCUIT DESCRIPTION

1. Outline

This is the main power circuit, and is comprised of the following blocks.
Switching controller (IC501)
Digital 5 V and analog system power output (T5001, Q5001)
Digital 1.85 V system power supply (Q5009)
Digital 3.35 V system power supply (Q5010)
LCD system power supply (Q5011)
Backlight power supply output (Q5014)
Inverter output (T5002, Q5018)

2. Switching Controller (IC501)

This is the basic circuit which is necessary for controlling the power supply for a PWM-type switching regulator, and is provided with five built-in channels, only CH1 (digital 5 V, analog system), CH4 (LCD system), CH3 (digital 3.35 V), CH2 (digital 1.85 V) and CH5 (backlight system) are used. Feedback from 3.35 V (D) (CH3), 5 V (D) (CH1) , 1.85 V (L) (CH2), 12.4 V (L) (CH4) and 9 V (L) (CH5) power supply outputs are received, and the PWM duty is varied so that each one is maintained at the correct voltage setting level.

2-1. Short-circuit protection circuit

If output is short-circuited for the length of time determined by the condenser which is connected to Pin (37) of IC501, all output is turned off. The control signal (P ON) are recontrolled to restore output.

3. Digital 5 V and Analog System Power Output

5.2 V (D) , 15.0 V (A), -7.0 V (A) and 5.1 V (A) are output. Feedback for the 5.1 V (D) is provided to the switching controller (Pins (40) of IC501) so that PWM control can be carried out.

4. Digital 1.85 V System Power Output

1.85 V (D) is output. Feedback is provided to the swiching controller (Pin (43) of IC501) so that PWM control can be carried out.

5. Digital 3.35 V Power Output

3.35 V (D) is output. Feedback is sent to pin (45) of the switching controller (IC501) for PWM control to be carried out.

6. LCD System Power Output

12.4 V (L) is output. Feedback for the 12.4 V (L) is provided to the switching controller (Pins (47) of IC501) so that PWM control can be carried out.

7. Backlight Power Supply output

9.0 V (L) is output. Feedback is sent to pin (2) of the switching controller (IC501) for PWM control to be carried out.

8. Inverter Output

The backlight uses a flat picture tube. When INV CLK is input, Q5018 carries out switching operations, so that T5003 is energized and a high-voltage pulse is generated between pins (5) and (8) of T5002. This high-voltage pulse is applied to the backlight to make it illuminate.

1-3. SY1 CIRCUIT DESCRIPTION

1. Configuration and Functions

For the overall configuration of the SY1 circuit board, refer to the block diagram. The SY1 circuit board centers around a 8-bit microprocessor (IC301), and controls camera system condition (mode).

The 8-bit microprocessor handles the following functions.

1. Operation key input, 2. Mode LCD display, 3. Clock control, 4. Power ON/OFF, 5. Storobe charge control, 6. Signal input and output for zoom and lens control.

Pin	Signal	I/O	Outline	
1~4	SCAN OUT 0~3	O	Key matrix output	
5	P ON	O	DC/DC converter ON/OFF signal	H : ON
6	PA ON	O	DC/DC converter (analog) ON/OFF signal	H : ON
7	LCD ON	O	LCD monitor power ON/OFF signal	H : ON
8	PI CTRL	O	Photo interrupter ON/OFF control	L : ON
9	VSS	-	GND	
10	VDD	-	Power supply terminal	
11	SELF	O	Self LED ON/OFF signal	L : LED lighting
12	LED 1 (VF LED R)	O	VF LED (red) ON/OFF signal	L : LED lighting
13	LED 1 (VF LED G)	O	VF LED (green) ON/OFF signal	L : LED lighting
14	(SCLK)	-	-	
15	SI	I	Serial communication data input (← ASIC)	
16	SO	O	Serial communication data output (→ ASIC)	
17	SCK	O	Serial communication clock output	
18	PRG SI	I	Flash rewrite serial communication data input	
19	PRG SO	O	Flash rewrite serial communication data output	
20	PRG SCK	O	Flash rewrite serial communication clock output	
21	V JACK	I	Video output cable connection detection signal	L : Connection
22	DIN CONNECT	I	Serial cable connection detection	
23	CHG ON	O	Flash charge ON/OFF signal	H : ON
24	VDD	-	Power supply terminal	
25	AVSS	-	A/D converter GND power terminal	
26~29	SCAN IN 3~0	I	Key matrix input	
30	NOT USED	-	-	
31	(TEMP)	-	-	
32	CHG VOL	I	Storobe charge voltage input (analog input)	
33	BATTERY	I	Battery voltage input	
34	AVREF	I	A/D converter standard voltage input terminal	
35	AVDD	-	A/D converter analog power terminal	
36	RESET	I	Reset input	
37	XCOUT	O	Sub clock oscillation terminal (32.768 kHz)	
38	XCIN	I	Sub clock oscillation terminal	
39	IC	-	Connect to VSS	
40	XOUT	O	Main clock oscillation terminal (4MHz)	
41	XIN	I	Main clock oscillation terminal	
42	VSS	-	GND	
43	BAT OFF	I	Battery off detection signal	
44	SREQ	I	Serial communication requirement signal	L : Requirement
45	SCAN IN 4	I	Key matrix input	
46	ZPULSE1	I	Zoom motor drive pulse count 1	
47	DC CHK	I	DC power detection terminal	L : Connection
48	COM REQ	I	ASIC serial communication requirement	

See next page →

49	ZM IN 1	O	Zoom drive pulse output (normal)
50	ZM IN 2	O	Zoom drive pulse output (reversal)
51	CARD	I	Expansion memory card attachment detection signal L : Attachment
52	(BUZZER)	-	-
53	SCAN IN 5	I	Key matrix input
54	AVREF ON	O	A/D standard voltage ON/OFF signal L : ON
55	ZRESET	I	Zoom reset
56	ZPULSE 2	I	Zoom moter drive pulse count 2
57	USB	I	USB cable connection detection signal
58	RXD	I	Host wake up input terminal
59	SELF BPS	O	Red-eye reduction, self, AF assistance luminous drive H : Lamp lighting
60	SCAN OUT4	O	Key matrix output
61	WAKE UP	O	SPARC wake up terminal
62	ASIC TEST	O	ASIC reset control signal
63	ASIC RESET	O	ASIC reset signal
64	MAIN RESET	O	SPARC reset signal

Table 4-1. 8-bit Microprocessor Port Specification

2. Internal Communication Bus

The SY1 circuit board carries out overall control of camera operation by detecting the input from the keyboard and the condition of the camera circuits. The 8-bit microprocessor reads the signals from each sensor element as input data and outputs this data to the camera circuits (ASIC) or to the LCD display device as operation mode setting data. Fig. 4-1 shows the internal communication between the 8-bit microprocessor, ASIC and SPARC lite circuits.

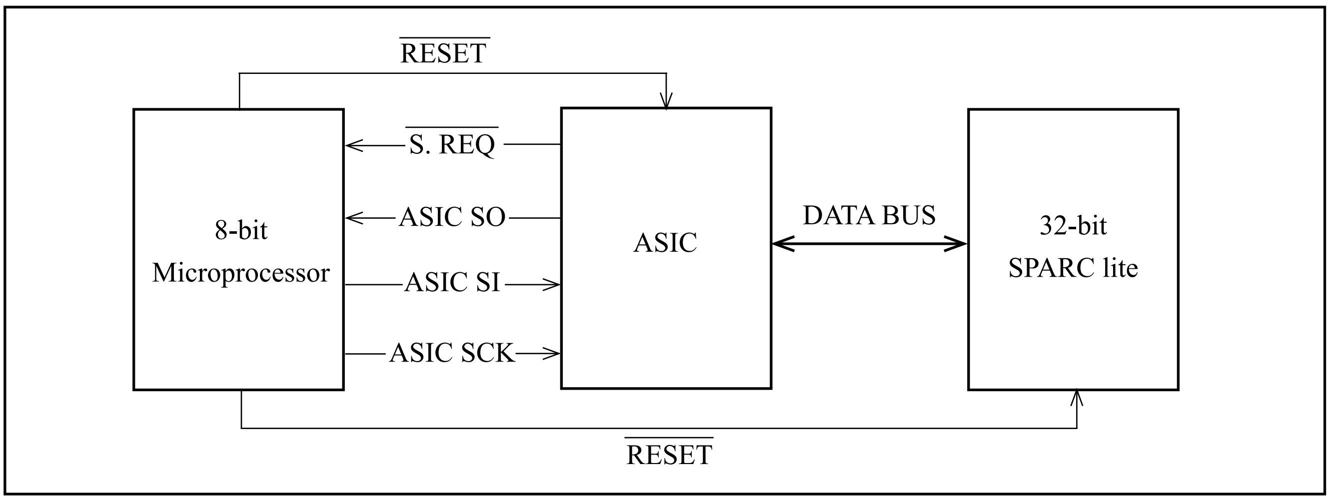


Fig. 4-1 Internal Bus Communication System

3. Key Operaiton

For details of the key operation, refer to the instruction manual.

SCAN IN / SCAN OUT	0	1	2	3	4	5
0	RIGHT	LEFT	UP	DOWN	POWER ON/OFF	TEST
1	AFM	SBM	NET	NET	RELEASE (S2)	HALF-PUSH (S1)
2	MENU	TELE	QUICK	+/–	WIDE	BAT SW
3	CSM	MOVIE	SET UP	PLAY	AUTO	SCENE

Table 4-2. Key Operation

4. Power Supply Control

The 8-bit microprocessor controls the power supply for the overall system.

The following is a description of how the power supply is turned on and off. When the battery is attached, a regulated 3.2 V voltage is normally input to the 8-bit microprocessor (IC301) by IC302, so that clock counting and key scanning is carried out even when the power switch is turned off, so that the camera can start up again. When the battery is removed, the 8-bit microprocessor opererates in sleep mode using the memory backup capacitor. At this time, the 8-bit microprocessor only carries out clock counting, and waits in standby for the battery to be attached again. When a switch is operated, the 8-bit microprocessor supplies power to the system as required.

The 8-bit microprocessor first sets both the $\overline{\text{P (A) ON}}$ signal at pin (6) and the $\overline{\text{P ON}}$ signal at pin (5) to High, and then turns on the DC/DC converter. After this, High signals are output from pins (64) and (63) so that the ASIC and the SPARC lite are set to the active condition. If the LCD monitor is on, the $\overline{\text{LCD ON}}$ signal at pin (7) set to High, and the DC/DC converter for the LCD monitor is turned on. Once SPARC lite processing is completed, the ASIC and the SPARC lite return to the reset condition, all DC/DC converters are turned off and the power supply to the whole system is halted.

<table>
<tr><th colspan="3"></th><th>SPARC
Lite</th><th>ASIC,
memory</th><th>RS232C
driver</th><th>CCD</th><th>8 bit
CPU</th><th>LCD
MONITOR</th></tr>
<tr><td colspan="3">Power voltage</td><td>3.3 V</td><td>3.3 V</td><td>3.3 V</td><td>5 V (A)
+15 V -7.5 V</td><td>3.3 V
(ALWAYS)</td><td>5V (L)
+12V etc.</td></tr>
<tr><td rowspan="6">SLD</td><td colspan="2">OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>32 KHz</td><td>OFF</td></tr>
<tr><td colspan="2">PLAY</td><td>ON</td><td>ON</td><td>ON</td><td>OFF</td><td>3 MHz</td><td>ON</td></tr>
<tr><td rowspan="4">M-REC
A-REC</td><td>Power switch ON-
Auto power OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>3 MHz</td><td>OFF</td></tr>
<tr><td>Shutter switch ON</td><td>ON</td><td>ON</td><td>ON</td><td>ON↔OFF</td><td>3 MHz</td><td>OFF</td></tr>
<tr><td>MOS, QSW, SBM etc. ON</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>3 MHz</td><td>OFF</td></tr>
<tr><td>LCD finder</td><td>ON</td><td>ON</td><td>ON</td><td>ON</td><td>3 MHz</td><td>ON</td></tr>
</table>

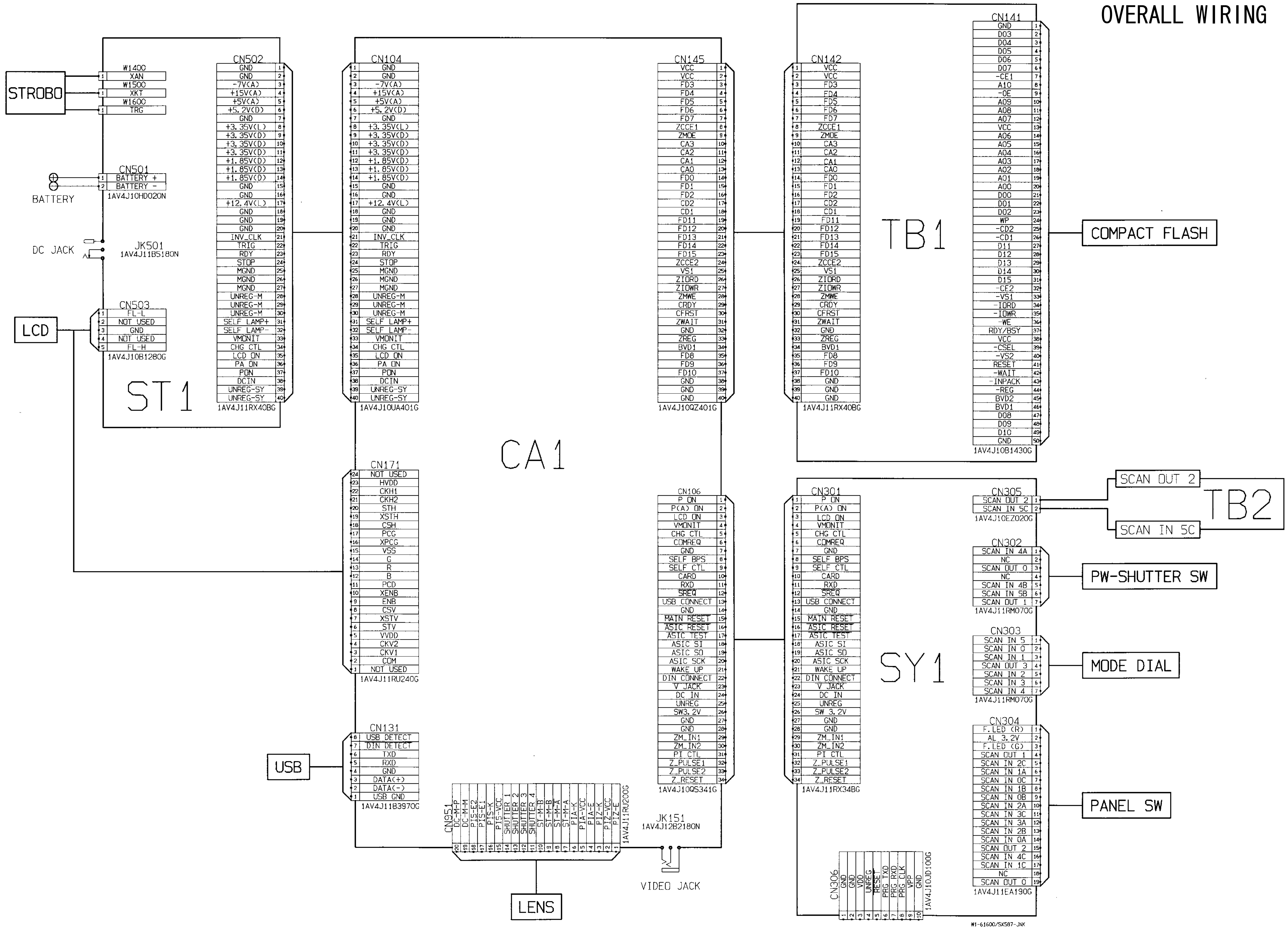
Table 4-3. Camera Mode

<table>
<tr><th colspan="3"></th><th>SPARC
Lite</th><th>ASIC,
memory</th><th>RS232C
driver</th><th>CCD</th><th>8 bit
CPU</th><th>LCD
MONITOR</th></tr>
<tr><td colspan="3">Power voltage</td><td>3.3 V</td><td>3.3 V</td><td>3.3 V</td><td>5 V (A)
+15 V -7.5 V</td><td>3.3 V
(ALWAYS)</td><td>5V (L)
+12V etc.</td></tr>
<tr><td rowspan="7">SLD</td><td colspan="2">OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>32 KHz</td><td>OFF</td></tr>
<tr><td rowspan="6">M-REC
A-REC
PLAY</td><td>Power switch ON-
Auto power OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>3 MHz</td><td>OFF</td></tr>
<tr><td>Take a picture</td><td>ON</td><td>ON</td><td>ON</td><td>ON↔OFF</td><td>3 MHz</td><td>OFF</td></tr>
<tr><td>Erase image</td><td>ON</td><td>ON</td><td>ON</td><td>OFF</td><td>3 MHz</td><td>OFF</td></tr>
<tr><td>Download image</td><td>ON</td><td>ON</td><td>ON</td><td>OFF</td><td>3 MHz</td><td>OFF</td></tr>
<tr><td>Continuous image</td><td>ON</td><td>ON</td><td>ON</td><td>ON</td><td>3 MHz</td><td>OFF</td></tr>
<tr><td>Message from host</td><td>ON</td><td>ON</td><td>ON</td><td>OFF</td><td>3 MHz</td><td>OFF</td></tr>
</table>

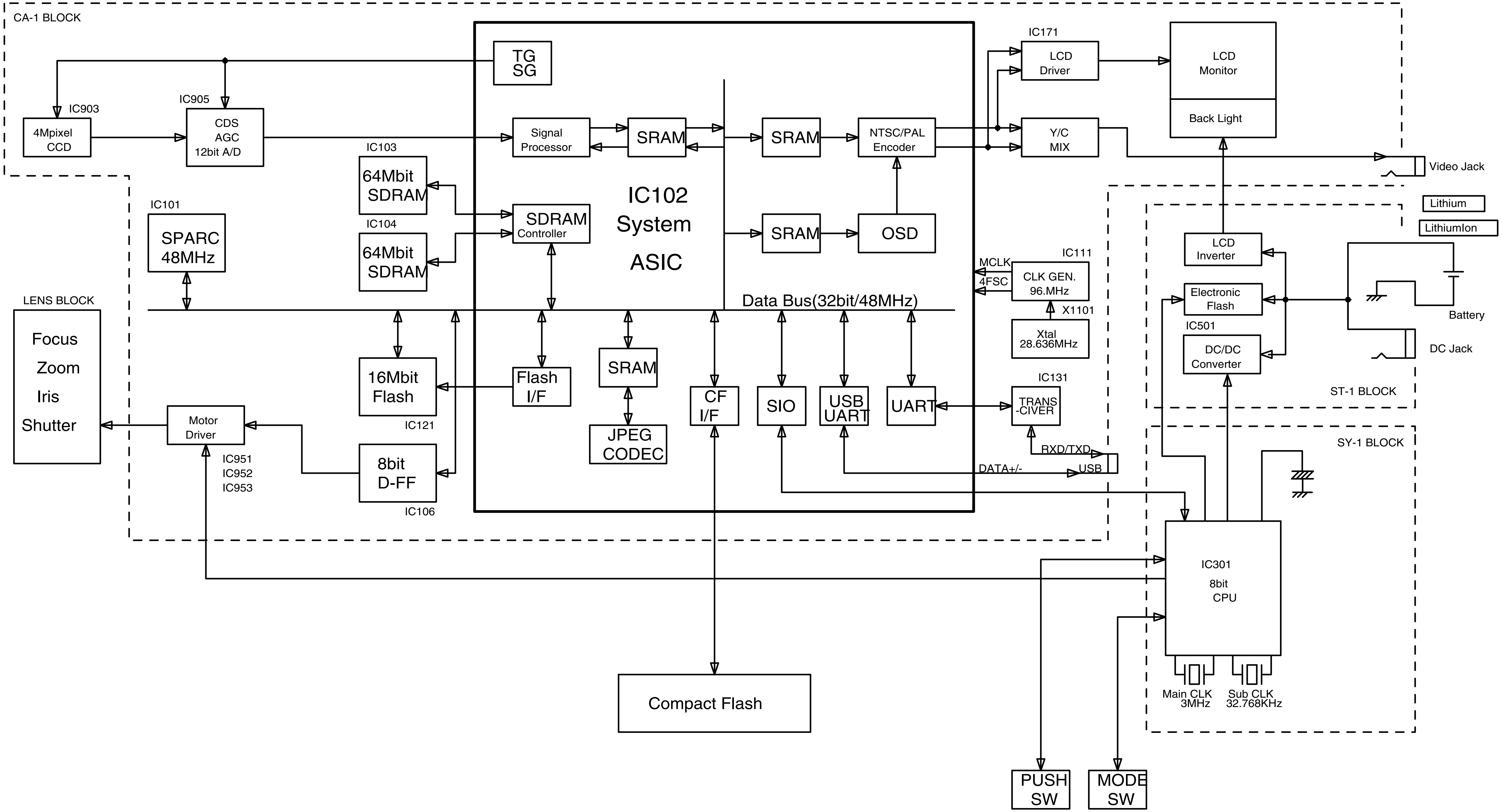
Note) 3 MHz = Main clock operation, 32 kHz = Sub clock operation

Table 4-4. Host Mode

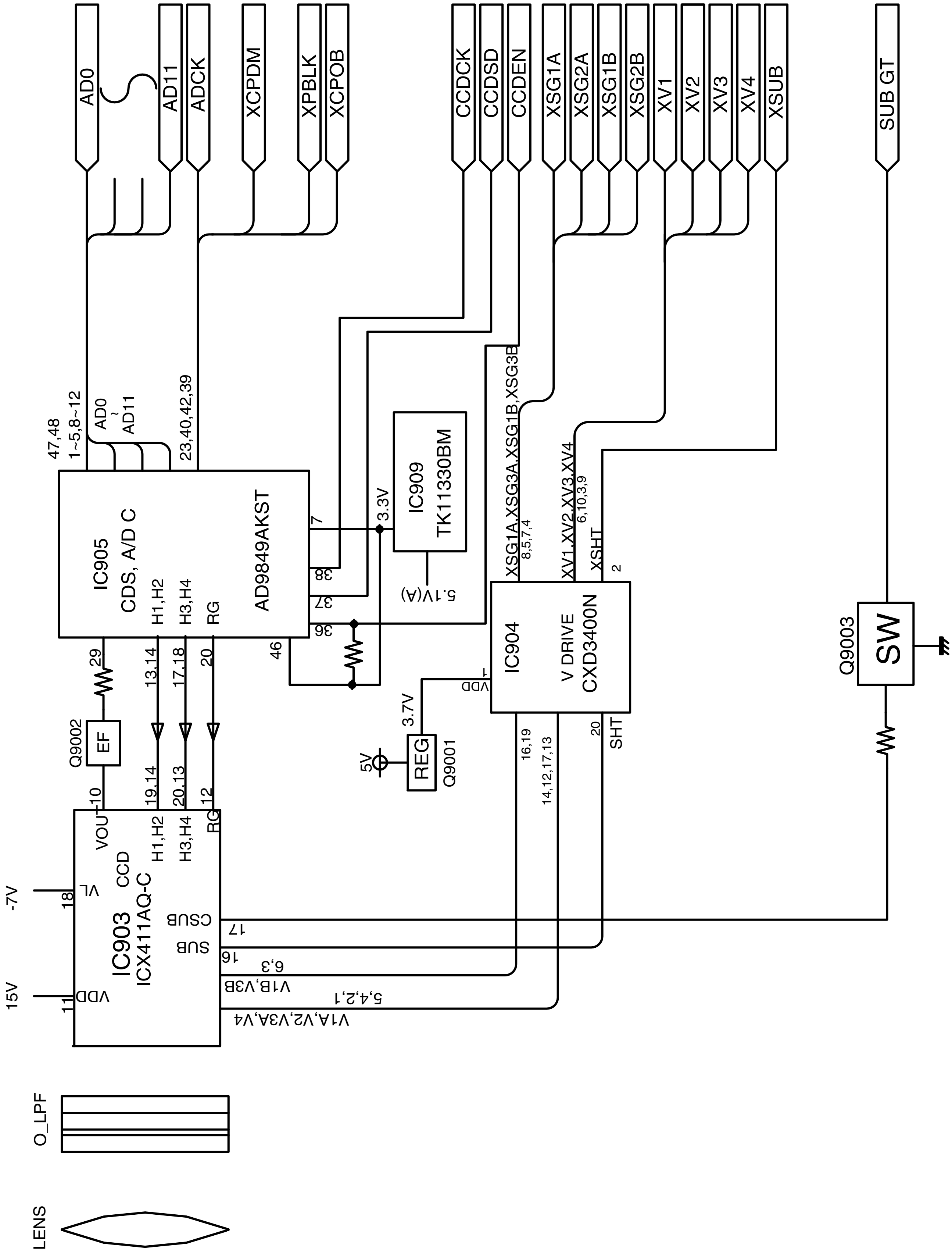
総合結線図
OVERALL WIRING



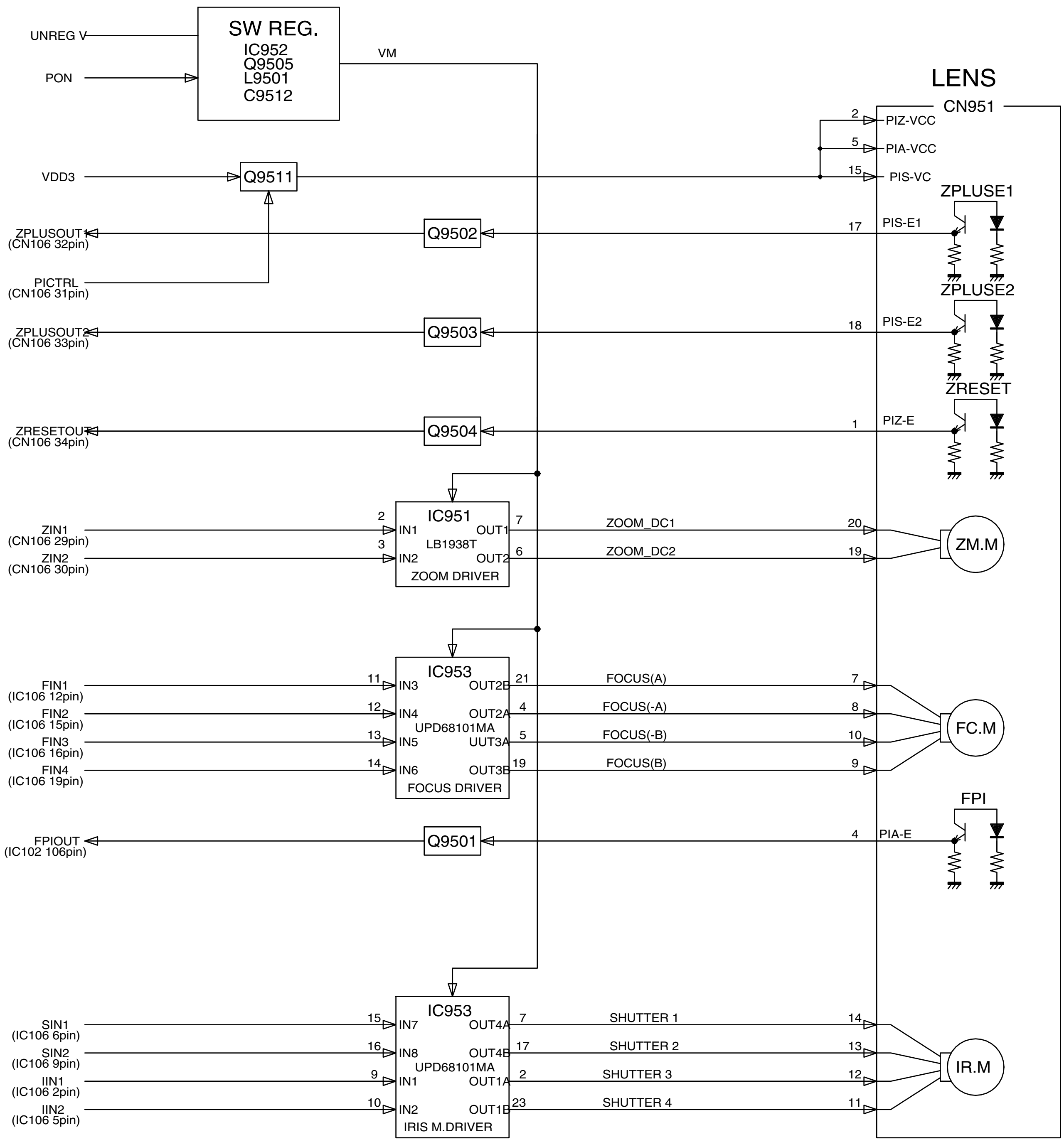
総合ブロック図
OVERALL BLOCK DIAGRAM



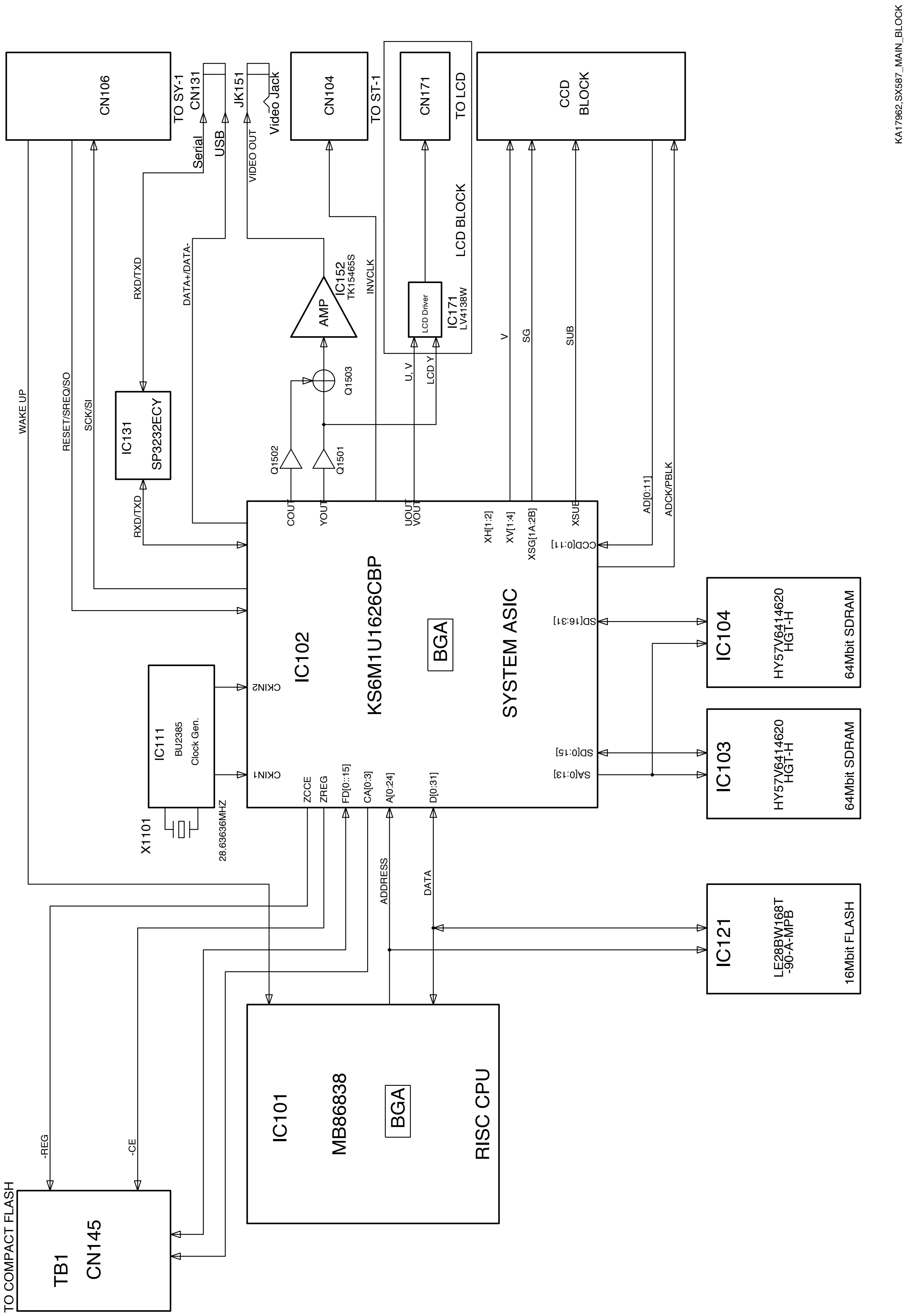
CA-1(CCD) ブロック図
CA1(CCD)BLOCK DIAGRAM



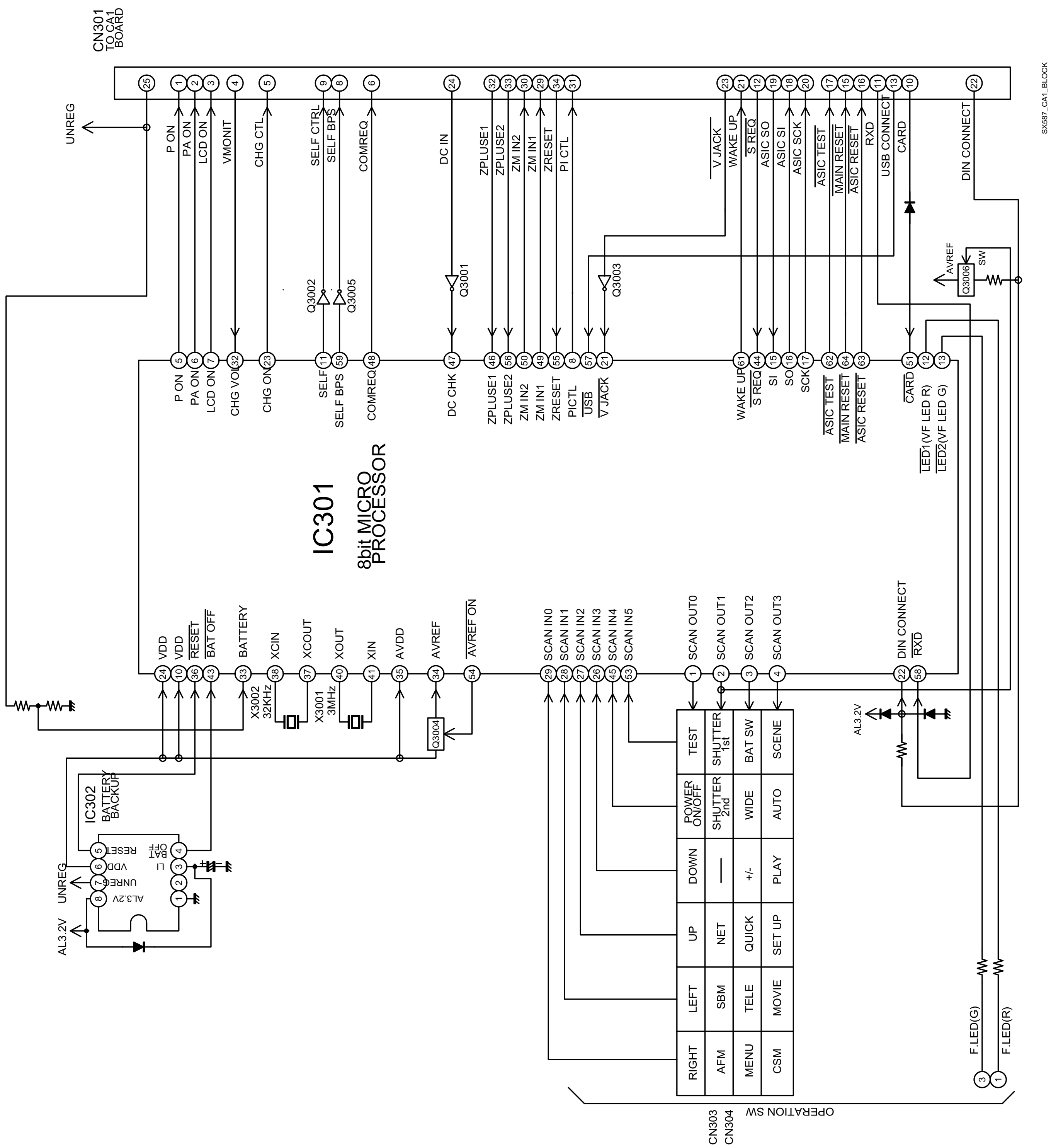
CA-1(Lens) ブロック図
CA1(Lens)BLOCK DIAGRAM



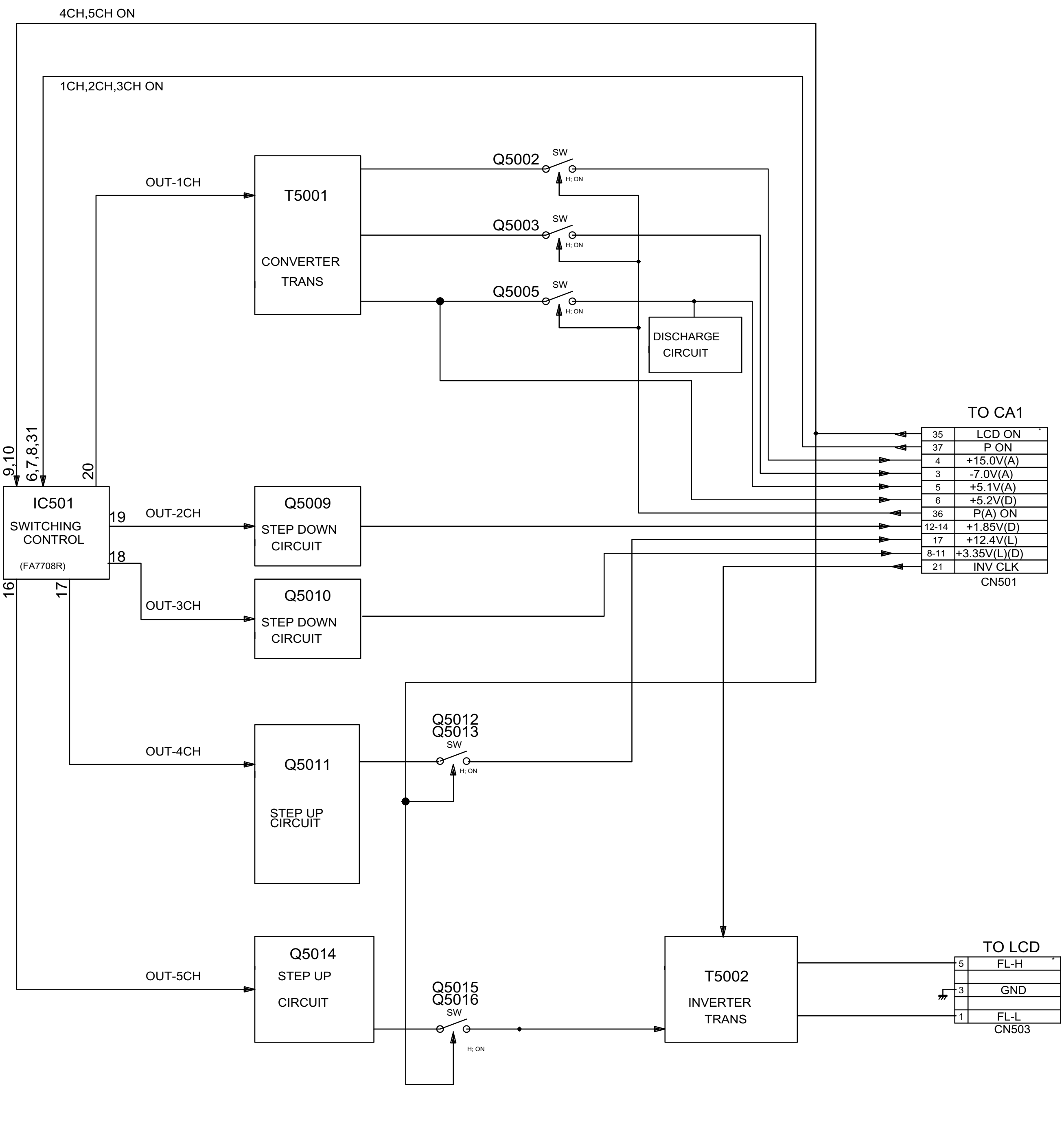
CA-1 ブロック図
CA1 BLOCK DIAGRAM



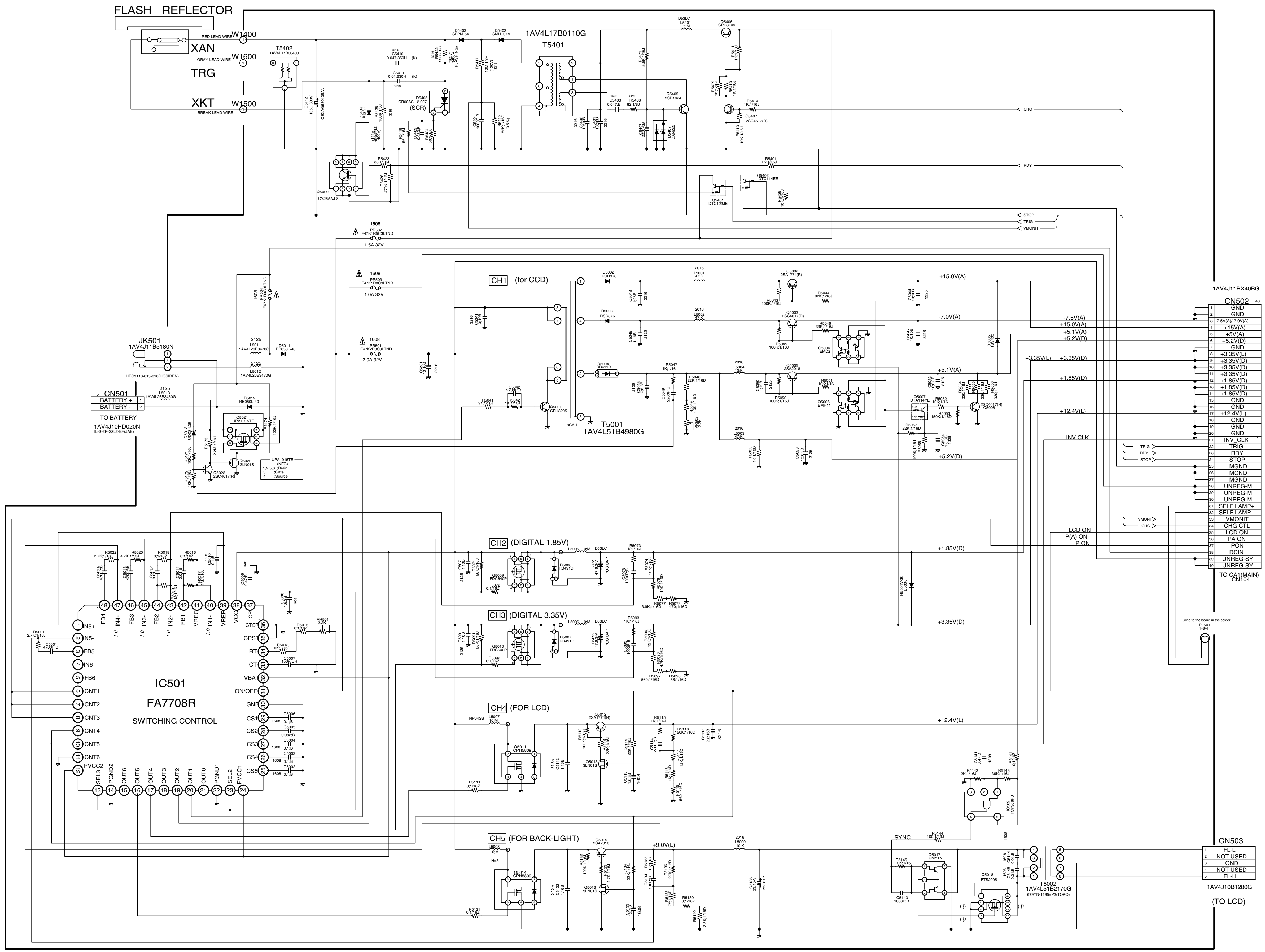
SY-1 ブロック図
SY1 BLOCK DIAGRAM



ST-1 ブロック図
ST1 BLOCK DIAGRAM



ST-1 回路図
ST1 CIRCUT DIAGRAM



The contents of inspection standards and tools for E4300

Conditions to be set and prepared for inspections

1. Physical stance to measure :
   On the applicable product, its lens shall be set flat and its monitor shall be set to vertically stand up.
2. Room temperature and constantly controlled humidity :
   25 ± 5℃ Relative humidity : 65 ± 20 %
3. Battery to be employed :
   Primary battery:
   Unless otherwise specified, us a Sanyo 2CR5 lithium battery
   (within four months of manufacture).
   When using various manufacturers, conduct the inspection using a Sanyo, Matsushita or Duracell 2CR5lithium battery.

   Secondary battery:
   Use the dedicated rechargeable battery EN-EL1.
   (Use after it has been fully charged with the dedicated AC adapter EH-21 or battery charger MH-53.)
4. Standard power supply :
   Specified AC power supply EH-21 shall be required.

Inspection standards

Item	Criteria	Applied tool(s)
External view		
Gap/Difference in height	• General components Gap: 0.3mm or less Difference in height: 0.15mm or less • When the battery cover is closed: Gap: 0.5mm or less (Difference between right and left must not be noticeable.)	
Outside and inside status	• There must be no noticeable damage and soil. • When pushing the main body, noticeable noise must not be heard. (Observe and check it by naked eyes under fluorescent lamp and natural sunshine.)	Visual observation
Operation/Operability		
Operation	• While operating, any irregularities or irregular noise shall not be required. (Check it by shaking the camera while operating. Lightly hit the camera onto the Linoleum-laid desk while operating.)	Primary battery/ Secondary battery
Operability of buttons	• No cave-ins of the buttons shall be required. • Malfunctions shall not be required. • Operator must feel "click" on each button. • "Click" must occur when or after a switch is ON. (Check it while operating normally.)	
Lever/Knob	• When clicking, normal touch shall be required. Any outstanding "caught-in-mechanism" touch or "rubbed-in-mechanism" touch or play shall not be required. (Check and observe the condition through normal operation.)	
Operation touch	• When operating a lever or knob by hand, any irregular conditions shall not be required. (Operate the camera in the actual photography procedure and check the operation touch.)	
Each cover	• When closed, there must not be an extreme play. • Each cover can be opened/closed without any outstanding "caught-in-mechanism" touch or "rubbed-in-mechanism" touch or abnormal noise. (Open and close each cover and check it.)	
Monitor		
Shooting image	・Inclined degree of image shall be 0.5 degree or less. ・PC monitor and print output (Output will be evaluated while the display range boundary of LCD unit is regarded as standard when the through-the-monitor image is made.)	Photoshop Printer

Item	Criteria	Applied tool(s)
Lens capacity		
Focal length	Wide-end position (Compelling∞) 8.24 mm ± 4% Tele-end position (Compelling∞) 23.20 mm ± 4%	Focal length Measuring instrument Lens drive tool
Open aperture F No.	Wide-end position (Compelling∞) F2.9 ± 4% Tele-end position (Compelling∞) F5.2 ± 4%	Focal length Measuring instrument Lens drive tool
Peripheral light reduction	• There must not be an extreme light reduction.	Visual observation
Ghost/Flare	• There must not be an outstanding malfunction.	
Surface ghost	• There must not be an outstanding flare at the center.	
Distortion	• There must not be an outstanding deformation.	
Dust in a picture	• There must not be an outstanding dust in a picture.	
Lens barrel		
Zoom	• There must not be an abnormal action (for example, the unit operates one-sidedly or its operation is not smooth or it is caught). (As changing the camera's posture, check it in all the directions.)	Visual observation
AF		
Distance measurement operation	• Focus must be fit in a selected area. (Select the AF area and check it.)	Visual observation
Shortest photograph distance	The focus of AF must be fit at the following distance.	Tape measure
Normal	• 30mm (Wide-end position) , 60cm (Tele-end position)	
Macro	• 4cm (Wide-end position) , 30cm (Tele-end position)	

Item	Criteria	Applied tool(s)
Shooting with a speed light		
Light adjustment accuracy	• Tele-end: 0.4 ~ 2.3m • Wide-end: 0.4 ~ 3.7m In the above range, ± 1Ev or less (ISO: AUTO , • Speed light: Compelling flash, • Exposure: A mode)	Standard reflection plate
Guide No. FULL (ISO100•m)	• 11.5 (+ 0.5/-0.6) EV (Charge for 18 seconds with the new battery and perform measurement within 1 second.)	Flash meter New battery
Recycling time	• Within 5.5 seconds (When the full-charged battery mark is displayed)	
Lock under uncharged condition	• While the shutter release button is lightly pressed, the speed light icon blinks and “release” cannot be accepted. (While the camera is under speed light pop-up condition and uncharged condition in the flash mode, press the release button.)	Visual observation
Wrong flash	• Wrong flash must not occur. (Check by loading/unloading a battery, giving a light shock and operating mode buttons except S2.)	New primary battery
Quality of image		
Resolution in AF	The resolution must be in compliance with the following values in all the postures of the EIA J chart evaluation. • Horizontal center: 1100 TV lines Vertical center: 1100 TV lines Horizontal line(s) at each corner: 750 TV lines Vertical line(s) at each corner: 750 TV lines • Set the conditions as follows: FINE, auto. white balance, center-weighted metering, P mode, sensitivity 100, gradation adjustment standard and profile emphasis standard • Wide-end position, aperture "open" , Distance more than 0.3m • Equip the 5100K viewer with the chart and shoot an object in the full range of angle of view. Then, open the recorded image data file through PHOTO-SHOP and check the resolution visually.	EIAJ chart PHOTOSHOP

Item	Criteria	Applied tool(s)

Quality of image

Reproduction of color — Applied tool(s): Color bar chart

B	R	G	B
W	200-240	200-240	185-225
Y e	170-210	175-215	35- 65
R	175-215	0- 30	0- 20

- Set the conditions as follows: FINE, auto. white balance, center-weighted metering, P mode, sensitivity 100, gradation adjustment standard and profile emphasis standard
- Equip the 5100K viewer with the chart and shoot an object in the full range of angle of view.
  Open the recorded image data file through PHOTOSHOP and pick up a measurement section with the corner color (its central area 64 × 64 pixels) with the rectangle selector tool.
- Read the histogram's RGB.

Finder — Applied tool(s): Visual observation

View Image
- There must be no blur, distortion, ghost, halation or other outstanding troubles in contrast, gradation, etc.

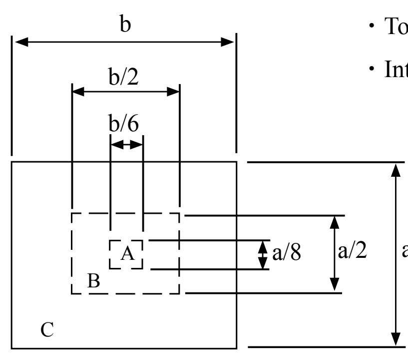
Visual field frame/ frame line
- Blur, dirt or difference in thickness must be within the proper range to operate the stamped line and visual field frame.

Shading
- You can check the whole finder visual field.

Operation
- The finder must be activated smoothly in a link operation with the lens barrel zooming action.

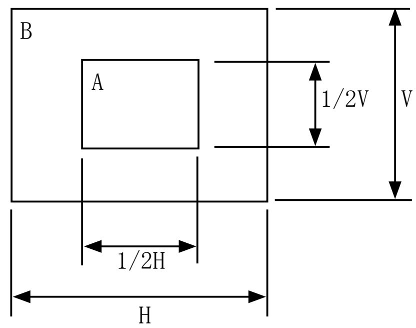
Dust, fluff and damage

Zone	A	B	C
Size	0 pc	2pcs or less	3pcs or less
Less than 10μm	0 pc	0 pc	1pcs or less
10 ～ 20μm	0 pc	0 pc	0 pcs
More than 20μm	0 pc	0 pc	0 pcs



・Total：3pcs or less

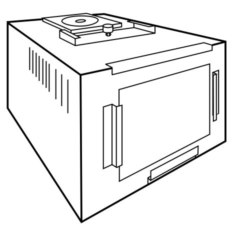
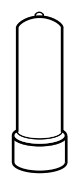
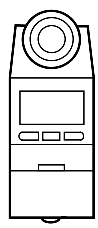
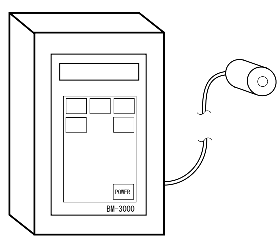
・Interval：Less than b/2

<table>
<tr><th>Item</th><th>Criteria</th><th>Applied tool(s)</th></tr>
<tr><td>LCD and others
Monitor LCD View</td><td>• There must be no shading in the LCD display range.
• Inclination between the monitor and the monitor frame must not be outstanding.</td><td>Visual observation</td></tr>
<tr><td>Visual field ratio</td><td>• Through-the-monitor image: 96 to 100%
• Play-back image: 98 to 100%</td><td>Visual observation</td></tr>
<tr><td>Bright pixels or dim pixels on LCD</td><td>

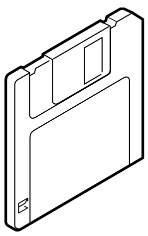
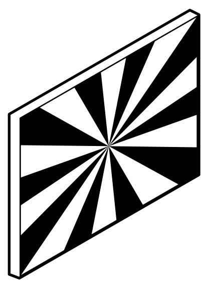
<table>
<tr><th>Zone</th><th>Bright pixel</th><th>Dim pixel</th></tr>
<tr><td>A</td><td>1</td><td>6</td></tr>
<tr><td>B</td><td>1</td><td>6</td></tr>
<tr><td>Total</td><td>3</td><td>6</td></tr>
</table>
Bright pixels: Visible normally through 5% ND filter
Dim pixels: Visible normally (Standard: Within the above quantity)</td><td>Visual observation</td></tr>
<tr><td>Self-timer
Operation time:
10 seconds
3 seconds
LED blinks/lights</td><td>• 10 ± 3 seconds
• 3 ± 1 seconds
• Blinks for 9 seconds and lights for 1 second.
• Blinks for 2 seconds and lights for 1 second.
(Measure the time until release is done since S2 was ON.)</td><td>Visual observation
Stop watch</td></tr>
<tr><td>Electric characteristics
Consumption current
Stand-by</td><td>• 0.15mA or less (when the power switch is OFF)
• 0.30mA or less (at "Sleep")
(Connect 6V from the constant-voltage power supply and perform measurement.)</td><td>Constant voltage power supply
Ammeter</td></tr>
<tr><td>Start (Photography)</td><td>• 1A or less (when the custom "0" start monitor is ON)</td><td></td></tr>
<tr><td>B. C voltage
Level 1</td><td>• 4.9 ± 0.2V (for battery), 7.4 ± 0.2V (for secondary battery)</td><td>Constant voltage power supply
Volt meter</td></tr>
<tr><td>Level 2</td><td>• 4.0 ± 0.25V (for battery), 6.7 ± 0.25V (for secondary battery)</td><td></td></tr>
<tr><td>Level 3</td><td>• 3.8 ± 0.2V (for battery), 6.3± 0.2V (for secondary battery)</td><td></td></tr>
</table>

［２］工具一覧表　　Tool List

※：新規工具
※：New tool

工具番号 Tool No.	名　称 Name	備　考 Remarks
J63080	パターンボックス　LV-1450DC Pattern Box　LV-1450DC 	※ E4300 ※ Exclusive
J63080A	交換用ハロゲンランプ（LV-1450DC 用） Spare Harogen Lamp (For LV-1450DC) 	※ LV-1450DC ※ Exclusive
J63081	カラーメータ（ミノルタカラーメータⅢ F） Color Meter (Minolta Color meter Ⅲ F) 	共通 Common
J63068	輝度計 BM-3000 Luminance Meter BM-3000 	共通 Common

※：新規工具
※：New tool

工具番号 Tool No.	名　　称 Name	備　考 Remarks
J65042	キャリブレーションソフト Calibration Software 	共通（E995,E775,E885 E5000,E2500,E4500 E5700,E4300 Common (E995,E775,E885 E5000,E2500,E4500 E5700,E4300
サービスマニュアル添付 Attached in Service Manual	ジーメンスチャート Siemens chart 	共通 Common