VAA14001-R.3603.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

COOLPIX5400

VAA14001

REPAIR MANUAL

Nikon | NIKON CORPORATION
Tokyo, Japan

Recycled paper
再生紙を使用しています

Printed in Japan July 2003

CONTENTS

SPECIFICATIONS

Model	Nikon Digital Camera E5400
Effective pixels	5.1 megapixels
Image pixels	1/1.8 type primary-color CCD Total pixels: 5.26 megapixels
Record pixels（pixel）	・2592 × 1944　・1280 × 960 ・2592 × 1728（3：2）　・1024 × 768 ・1600 × 1200　・640 × 480
Lens	4-times Zoom Nikkor Lens, f = 5.8~2.4mm (Conversion to 35mm size: 28~116mm), F2.8~F4.6 (8 groups, 9 lenses)
Electronic zoom	Max. 4 times (equivalent to approx. 460mm by conversion to 35mm size)
Automatic focus	Contrast detection TTL AF and multi-area auto-focus are possible.
Shooting distance	Approx. 50cm before lens ~ ∞, (Approx. 1cm~ ∞ in macro mode)
AF area	5 places: When the mode dial is set to **P**, **S**, **A** or **M**, 1 place can be selected.
Finder	Real image zoom finder, LED display
Magnification	0.26~0.92
Field of view	Approx. 80% in up and down, left and right directions
Diopter adjustment	$-3\sim+1m^{-1}$
LC monitor	1.5 type high transmission advanced LC, 134000 pixels with luminance/color tone adjustment
Field of view (when shooting)	Approx. 97% in up and down, left and right directions (against real object)
Record type	
Record media	Compact flash card (Type I/II), applied to micro-drive (1GB)
Image file	Complying with Design rule for Camera File system (DCF), Exif 2.2 and Digital Print Order Format (DPOF)
File type	Compression: Complying with JPEG-baseline. FINE (approx. 1/4), NORMAL (approx. 1/8) BASIC (approx. 1/16) Non-compression: HI (TIFF) Animation: QuickTime
Exposure	
Metering system	4-mode TTL metering system ・256 division multi-metering　・Spot metering ・Center emphasis metering　・AF spot metering
Exposure control	Program auto (program shift is possible), shutter prior auto, aperture prior auto, manual exposure and exposure correction (-2.0~+2.0EV, 1/3EV step) are possible, and auto-bracketing and AE-BSS are provided

Exposure	
Exposure coupling range	WIDE side: EV –1.0~+18.0 TELE side: EV+0.5~+18.0
Shutter	Mechanical shutter and CCD electronic shutter are used together.
Shutter speed	1~1/4000 sec.* (program auto, auto shooting mode, scene mode), 8~1/4000* (shutter speed prior auto, aperture prior auto), long-time exposure up to 10 minutes, 8~1/4000* (manual exposure), 1/30~1/8000* in UH continuous shooting *According to the aperture, the shutter speed at high speed side is limited to 1/2000 sec.
Aperture	6-blade iris diaphragm
Limited steps	10 (1/3 EV step [min. aperture to F8])
Shooting sensitivity	Equivalent to ISO50, sensitivity can be changed. (Equivalent to auto, ISO50, ISO100, ISO200 and ISO400)
Self-timer	Approx. 10 seconds and approx. 3 seconds
Built-in speed light	
Optical adjustment range	Approx. 0.5~4.5m (WIDE side), approx. 0.5~2.8m (TELE side) (When ISO Auto is set)
Optical adjustment method	Automatic optical adjustment control
Accessory shoe	Hot shoe contact, with safety lock mechanism
Sync contact	Only X contact
Interface	USB
Video output	NTSC/PAL can be selected.
Input/output terminal	・DC input terminal ・Audio video (AV) output terminal ・Digital terminal (USB)
Power supply	・Li-ion rechargeable battery EN-EL1 (accessory), 6V lithium battery 2CR5 (DL245) (sold separately) ・AC adapter EH-53 (sold separately) ・AC adapter/battery charger EH-21 (sold separately)
Continuous shooting time	Approx. 110 minutes (when EN-EL1 is used and LC monitor lights at 20°C) * Measurement conditions are specified by Nikon. (Zooming at each shooting, shooting with approx. 30% flash in NORMAL mode)
External dimensions	Approx. 108 (W) ×Approx. 73 (H) ×Approx. 69 (D) mm
Weight	Approx. 320g (excluding battery and CF card)
Operation environment	
Temperature	0 ~ 40°C
Humidity	85% or less (No dew 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 for the product in which the lead-free solder is used

- Lead-free solder is used in this product.
- When you perform soldering, special solder and special soldering iron are necessary.
- Don' mix the lead-free solder with the conventional solder.
- The solder and soldering iron exclusively for this product cannot be used for others.

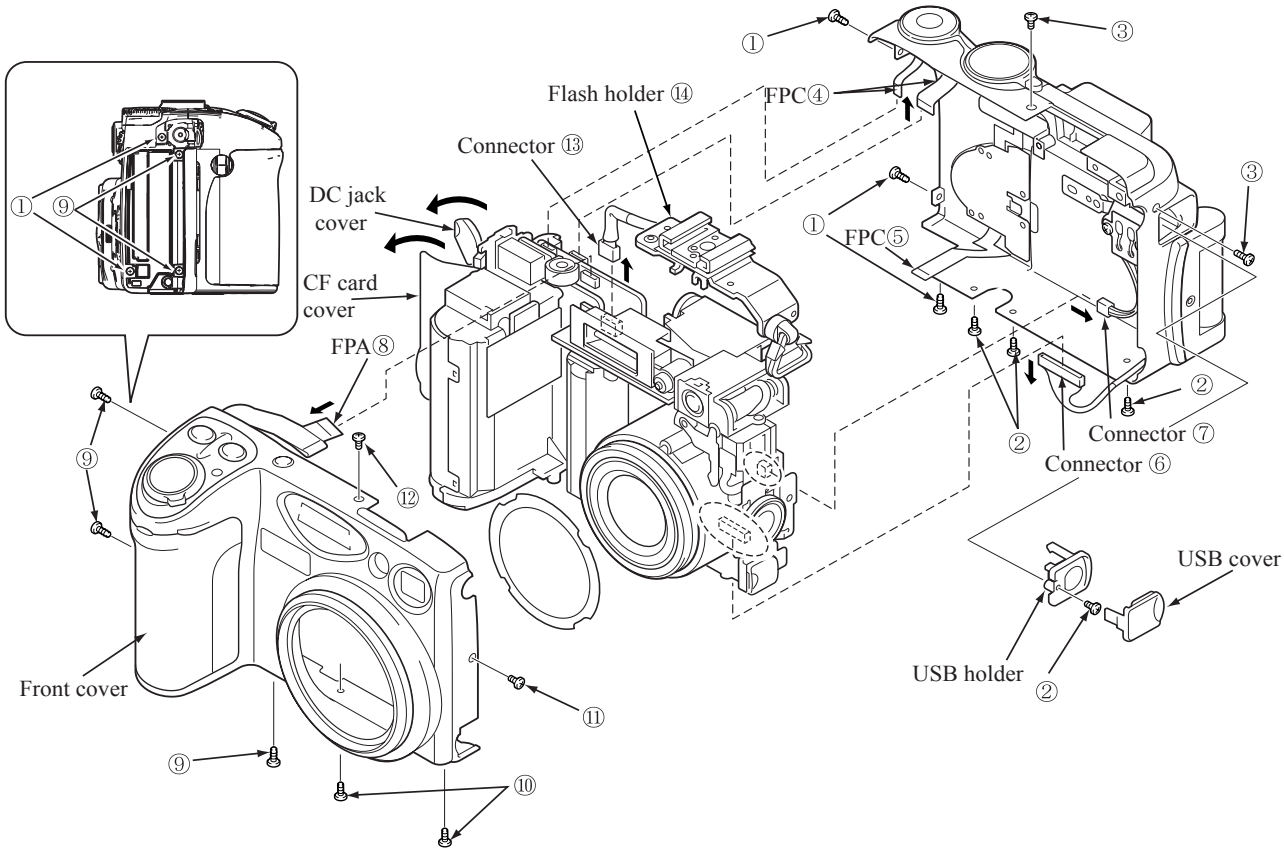
Notes:

① Remove the CF card and 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 UNIT/FRONT COVER

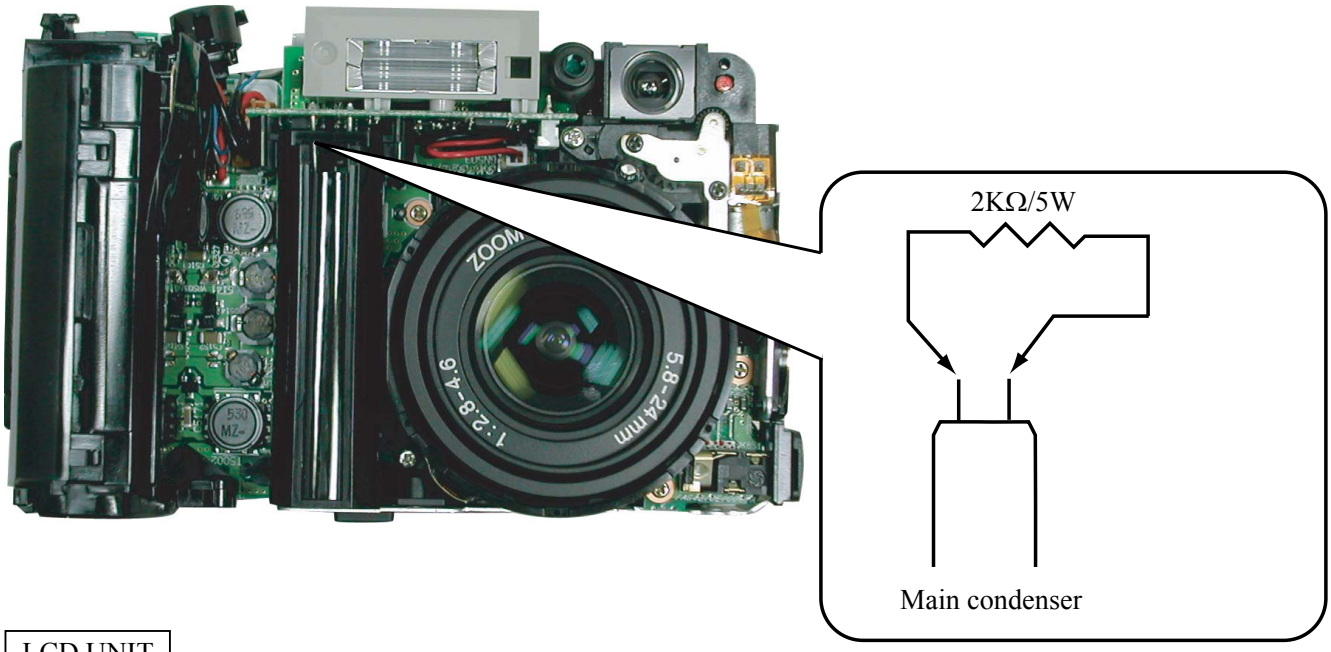


- Open the CF card cover.
- Open the DC jacket cover.
- Remove the 3 screws ① (M1.7×4).
- Open the I/O cover.
- Remove the 4 screws ② (M1.7×3.5).
- Remove the USB holder and cover.
- Remove the 2 screws ③ (M1.7×2.5).
- Separate the rear cover from the camera main unit slowly.
- Remove the FPC ④ from the connector.
- Remove the FPC ⑤ from the connector.
- Disconnect the connectors ⑥ and ⑦.
- Remove the rear cover.
- Remove the FPC ⑧.
- Remove the 3 screws ⑨ (M1.7×4).
- Remove the 2 screws ⑩ (M1.7×3.5).
- Remove the screw ⑪ (M1.7×2).
- Remove the screw ⑫ (M1.7×2.5).
- Remove the front cover.
- Disconnect the connector ⑬ and remove the flash holder ⑭.

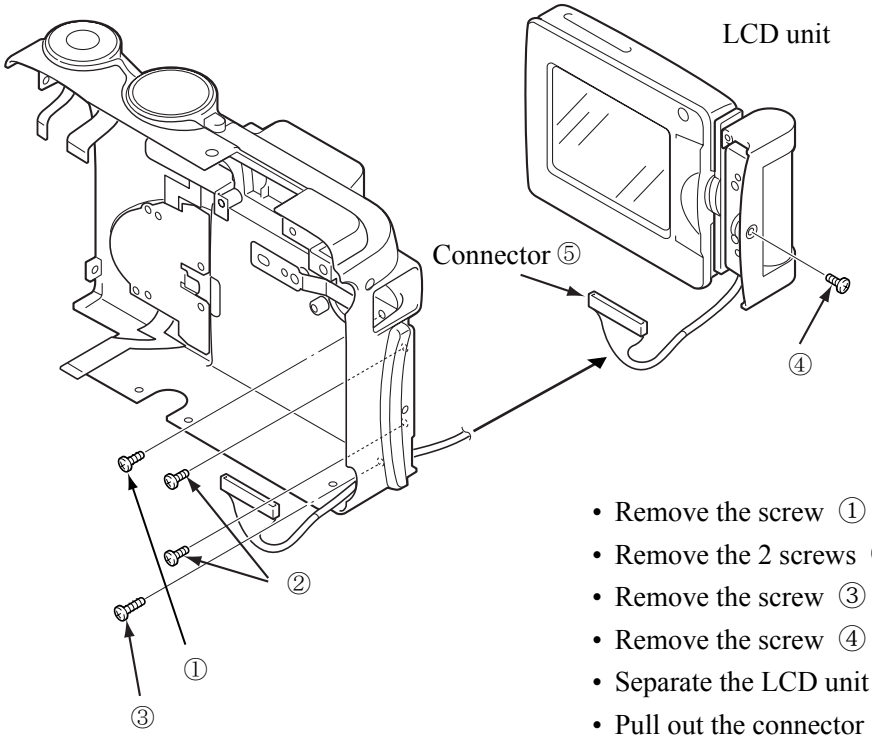
DISCHARGE OF MAIN CONDENSER

⚠ WARNING

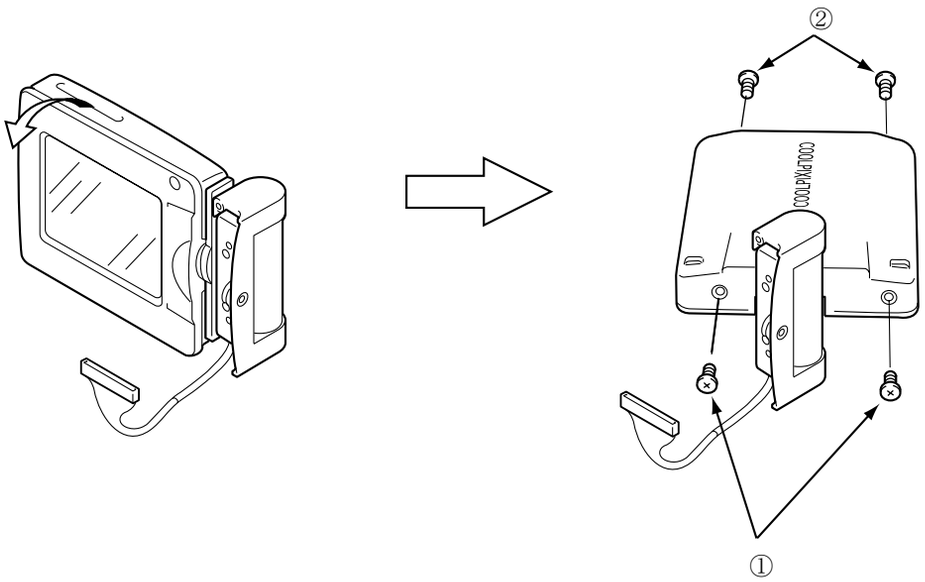
- There are high voltege parts inside. Be careful of this electric shock, when you remove the cover.
- You must discharge the main condenser according to the instruction of this repair manual before you remove the cover.



LCD UNIT



- Remove the screw ① (M1.7×4).
- Remove the 2 screws ② (M1.7×3).
- Remove the screw ③ (M1.7×8).
- Remove the screw ④ (M1.7×3.5).
- Separate the LCD unit from the rear cover slowly.
- Pull out the connector ⑤ from the rear cover.
- The LCD unit can be removed from the rear cover unit.



- Turn the LCD unit by 90° in the arrow mark direction.
- Remove the 2 screws ① (M2×3).
- Remove the 2 screws ② (large head).
- Remove the LCD rear cover.

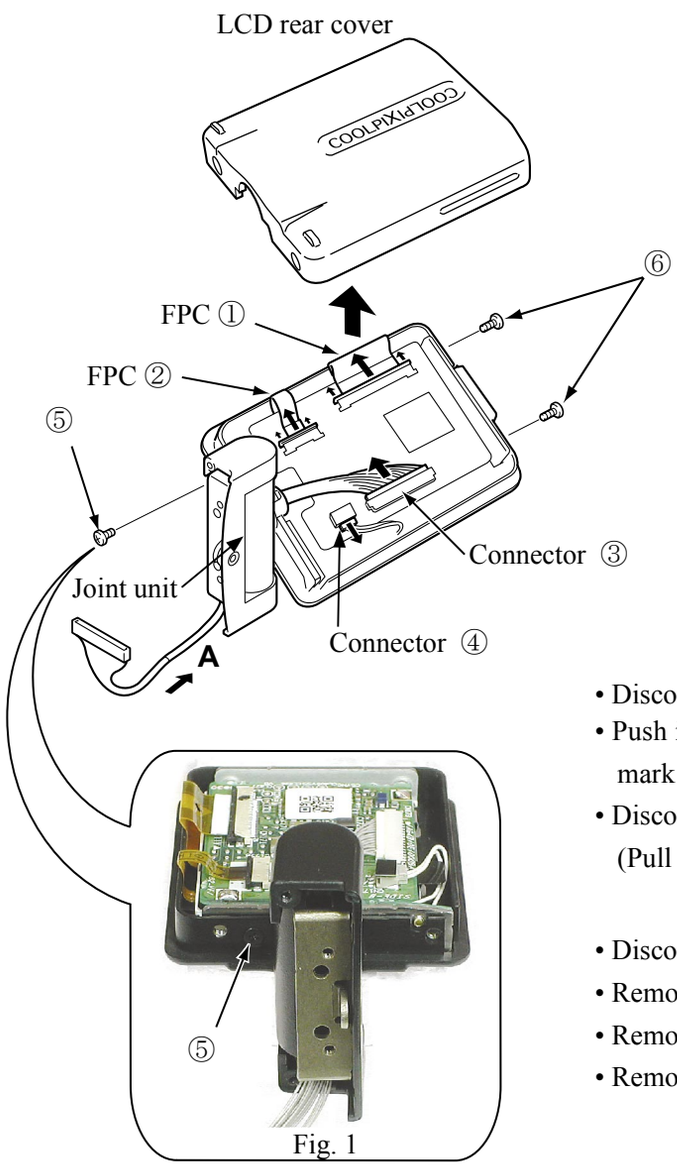


Fig. 1

- Disconnect the FPC ① and ② .
- Push in the cords of the connector ③ a little in the arrow mark "A" direction.
- Disconnect the connector ③ .
  (Pull out all the cords of the connector ③ .)

- Disconnect the connector ④ .
- Remove the screw ⑤ (M1.7×3). (Refer to Fig. 1.)
- Remove the joint unit.
- Remove the 2 screws ⑥ (M1.7×2).

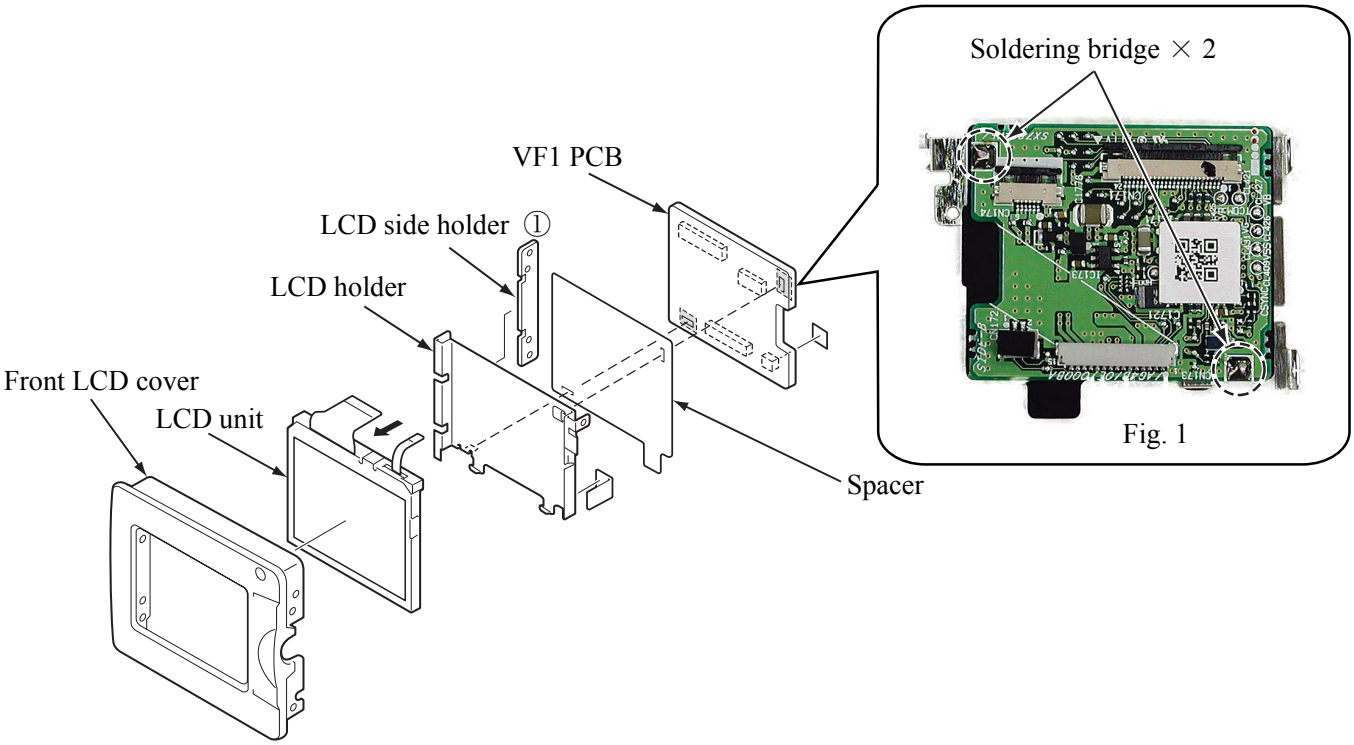
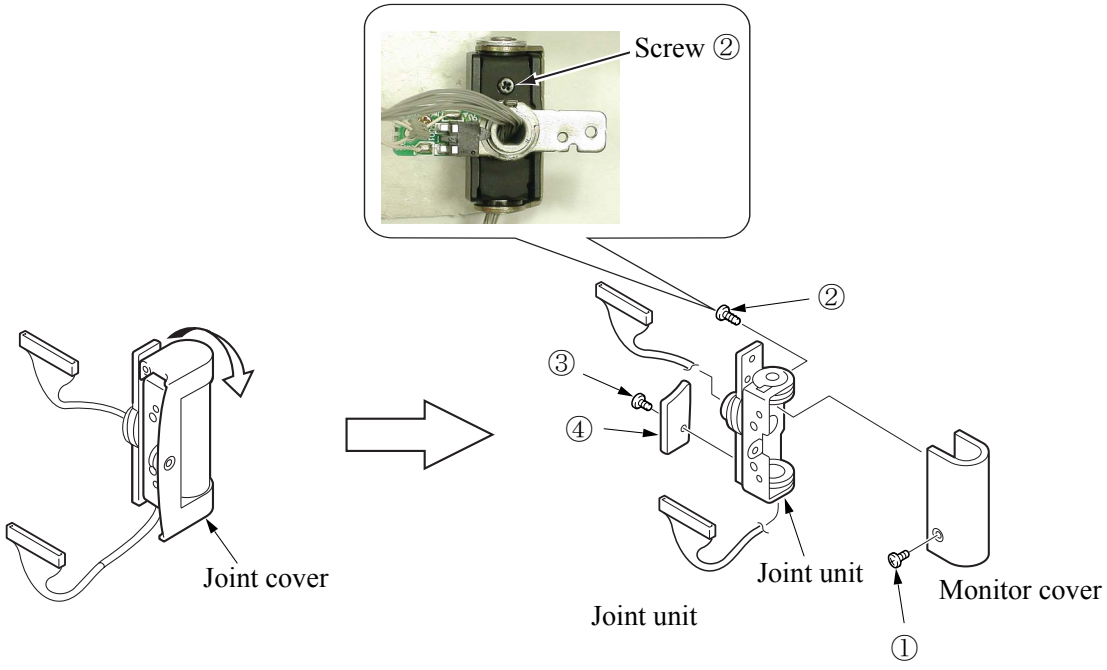


Fig. 1

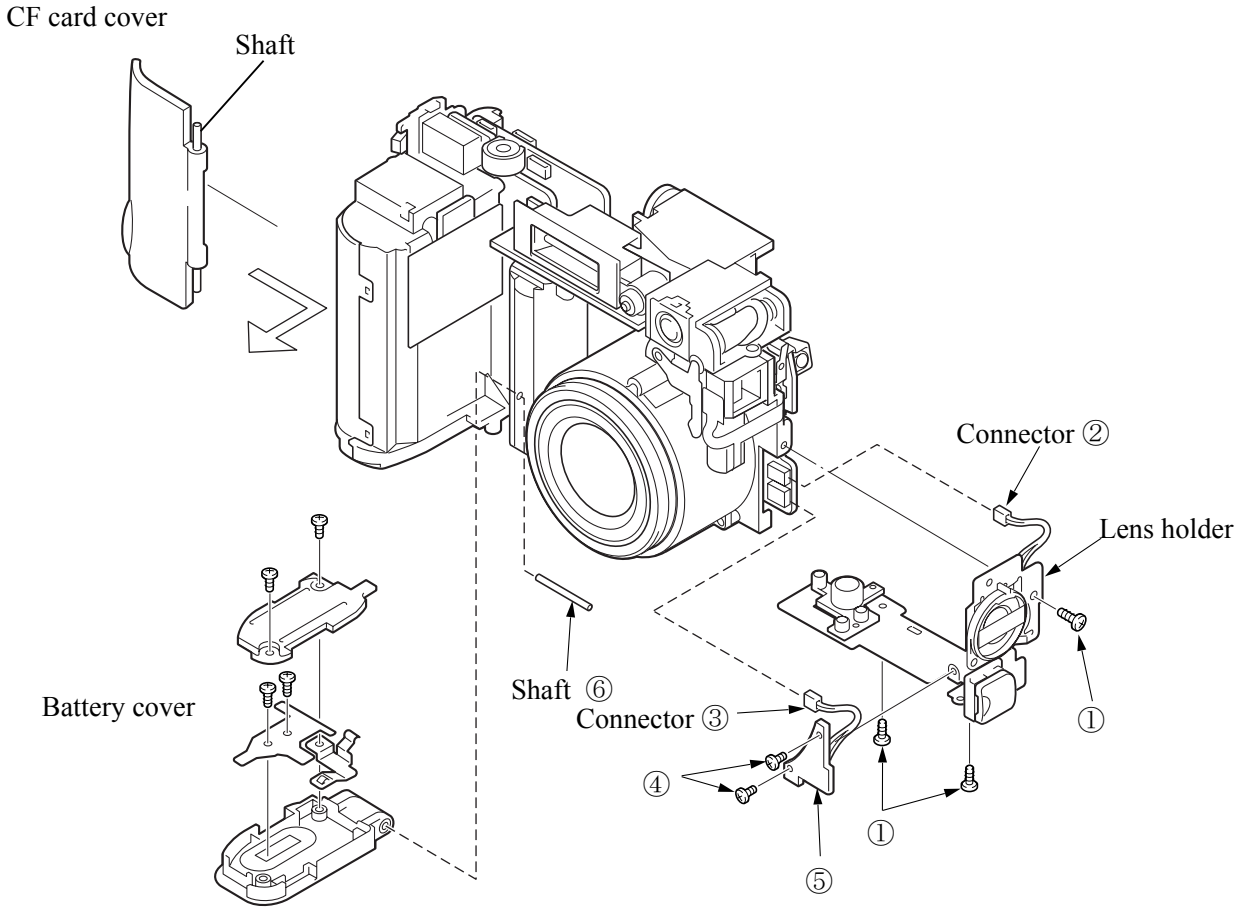
- Remove the LCD side holder ① .
- The VF1 PCB and LCD unit can be removed.
- When removing the LCD holder from the VF1 PCB, remove the 2 soldering bridges from the VF1 PCB. (Refer to Fig. 1.)

JOINT UNIT



- Float the upper side of the joint cover and then remove it from the joint unit.
- Remove the screw ① (M1.7×2).
- Remove the screw ② (M1.7×4) and then remove the monitor cover.
- Remove the screw ③ (M1.7×2.5).
- Remove the TB1 PCB.

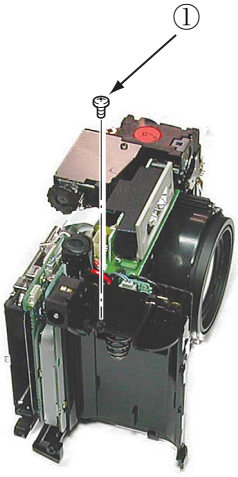
LENS HOLDER/BATTERY COVER/CF CARD COVER

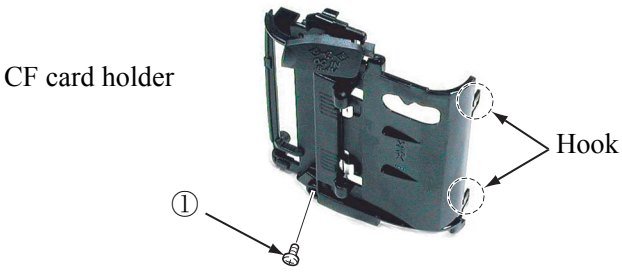


- Remove the 3 screws ① (M1.7×3).
- Disconnect the connectors ② and ③ and then remove the lens holder.
- Remove the 2 screws ④ (M1.7×2.5) and then remove the TB4 PCB ⑤.
- Remove the shaft ⑥ and then remove the battery cover.
- As pushing the CF card cover against the camera main unit, slide it forward and remove it.

CF CARD HOLDER

- Remove the 2 screws ① (M1.7×4).
- Float the hooks (2 places) and then remove the CF card holder.





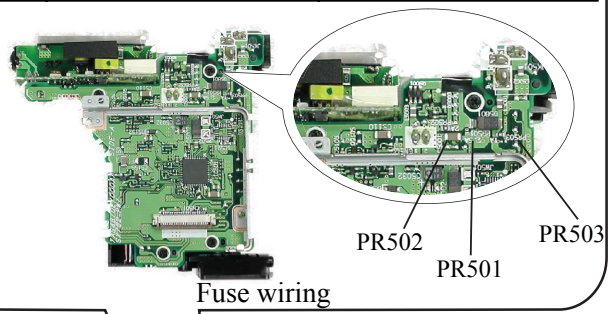
BATTERY HOLDER/SPEED LIGHT UNIT/PW1 PCB

① Separation from CP1 PCB

- Remove the FPC ① .
- Disconnect the connectors ② and ③ .
- Float the microphone ④ from the PCB. (Refer to Fig. 1.)
- Remove the screw ⑤ (M1.7×2.5). (Refer to Fig. 1.)
- Release the hook peg of the holder frame and then separate the battery holder and speed light unit slowly.
- Remove the FPC ⑥ . The battery holder and speed light unit can be removed from the CP1 PCB.

• Under this condition, 3 fuses can be changed.

	Function	Phenomena when a fuse has blown out
PR501	Protection when the DC/DC converter circuit malfunctions	Camera does not operate.
PR502	Protection when the speed light circuit malfunctions	The speed light condenser cannot be charged.
PR503	Protection of DC IN detection circuit	AC adapter detection is not possible.



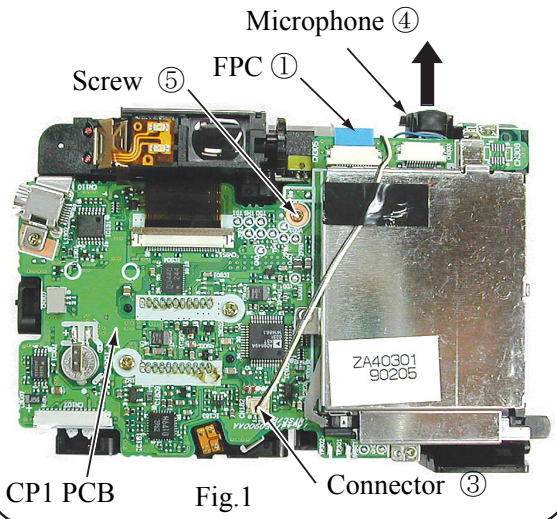
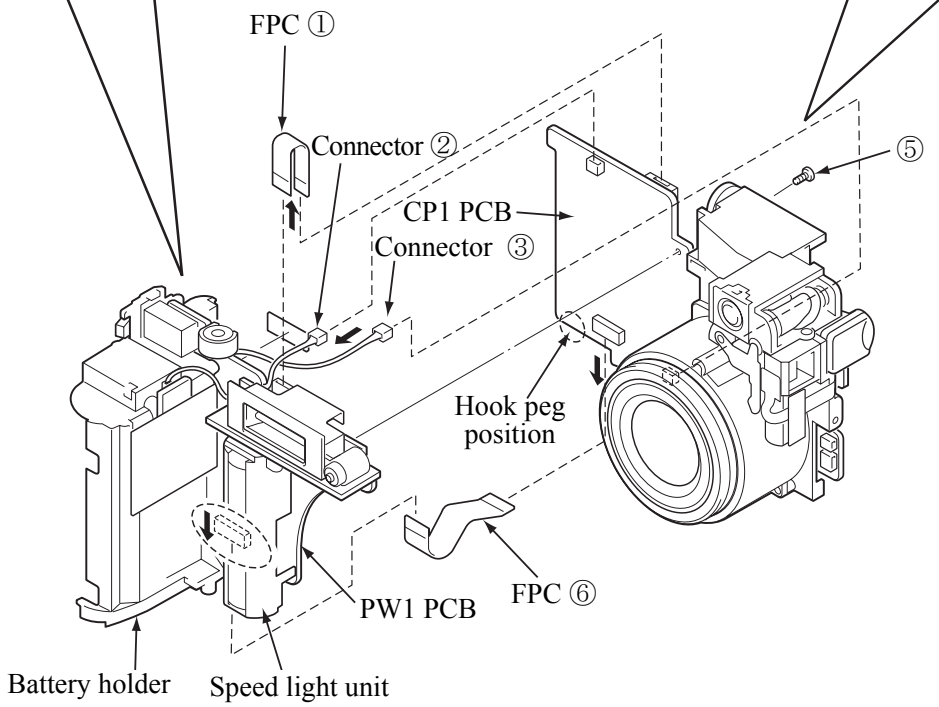
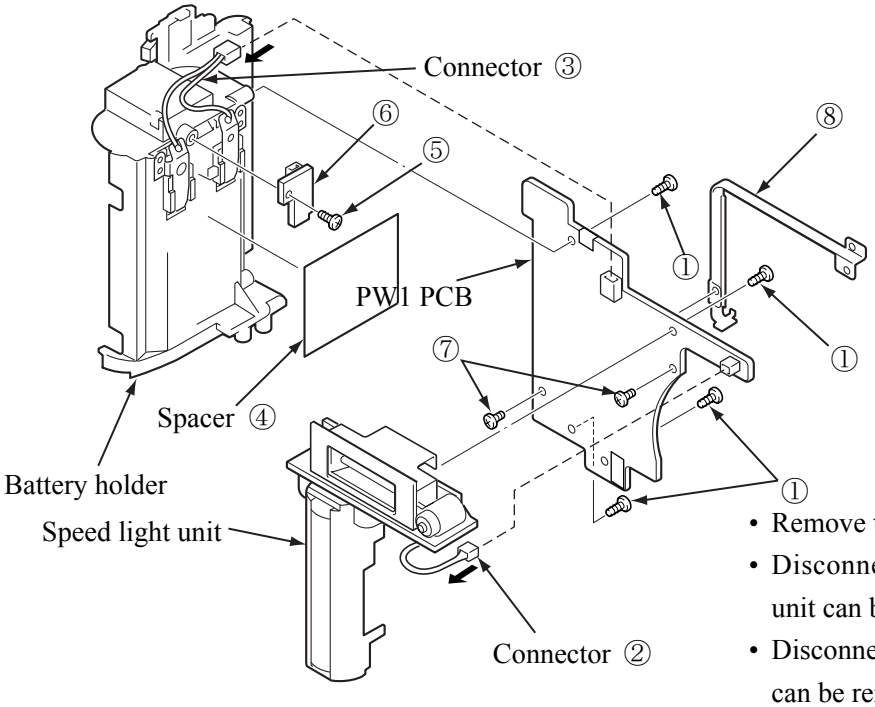


Fig.1

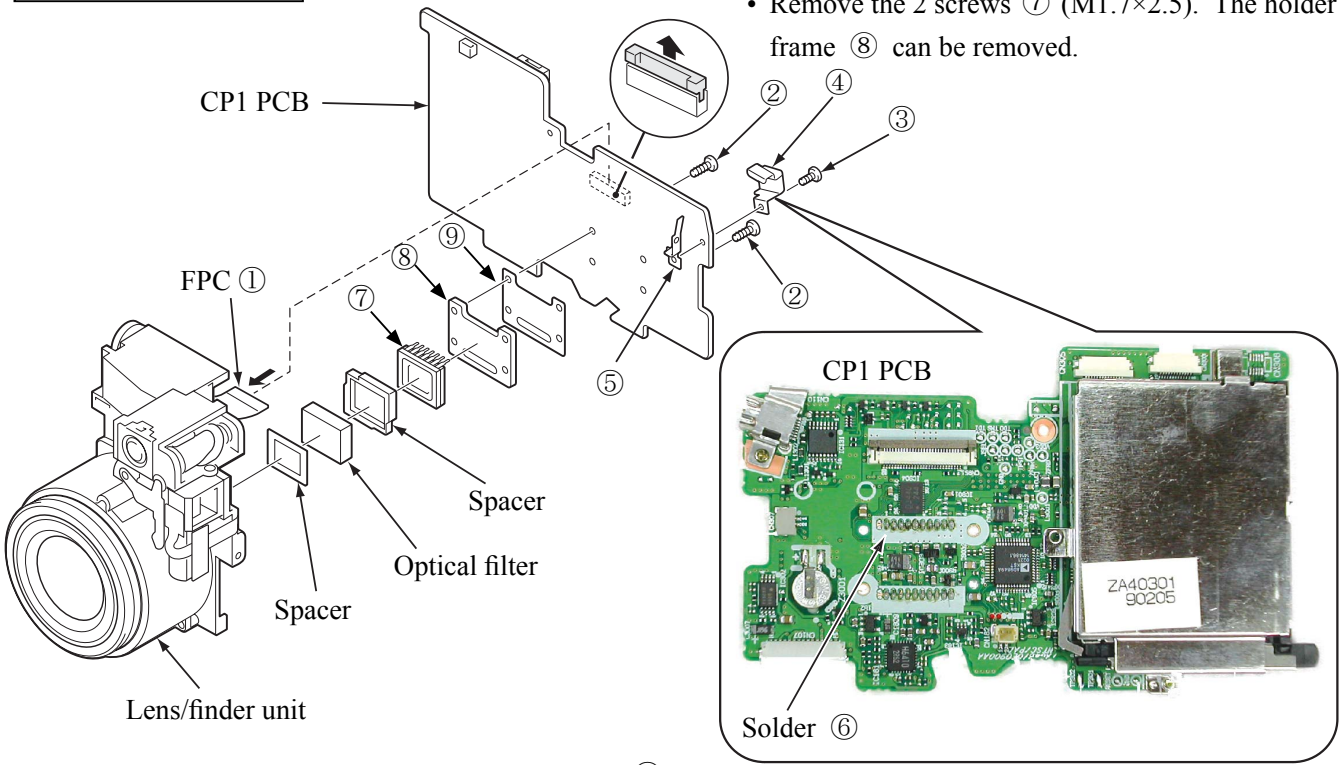


② Separation of the battery holder and speed light unit from PW1 PCB



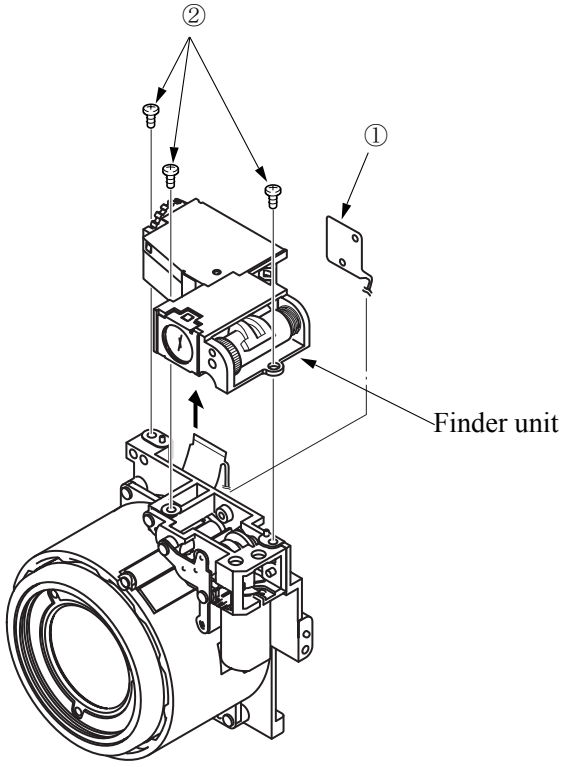
- Remove the 4 screws ① (M1.7×4).
- Disconnect the connector ② . The speed light unit can be removed.
- Disconnect the connector ③ . The battery holder can be removed.
- Take off the spacer ④ .
- Remove the screw ⑤ (M1.7×3). The PCB TB2 ⑥ can be removed.
- Remove the 2 screws ⑦ (M1.7×2.5). The holder frame ⑧ can be removed.

CCD, USB HOLDER



- Remove the FPC ①
- Remove the 2 screws ② (M1.7×6).
- Remove the lens/finder unit.
- Spacers and optical filter can be removed.
- Remove the screw ③ (M1.7×2.5). The USB holder ④ and USB holder base ⑤ can be removed.
- Remove the solder ⑥ from the CP1 PCB.
- Remove the CCD ⑦ , mounting lens ⑧ and spacer ⑨ .

FINDER UNIT



- Take off the FPC ① .
- Remove the 3 screws ② (M1.4×3.5).
- Remove the finder unit.

ASSEMBLY

FINDER UNIT

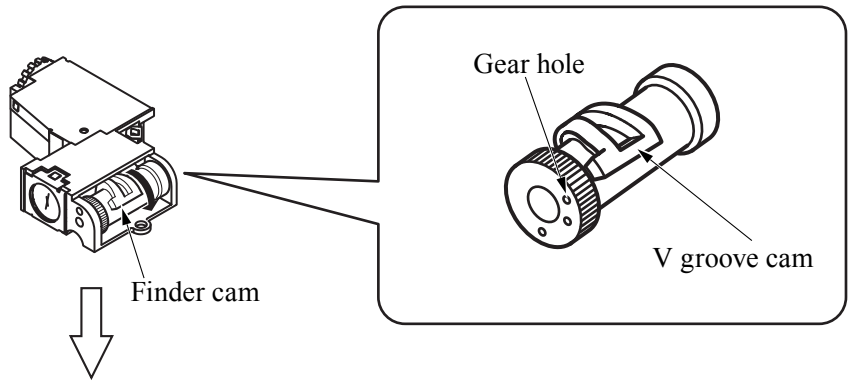


Fig.1

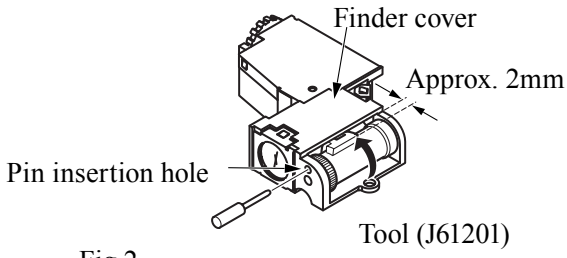
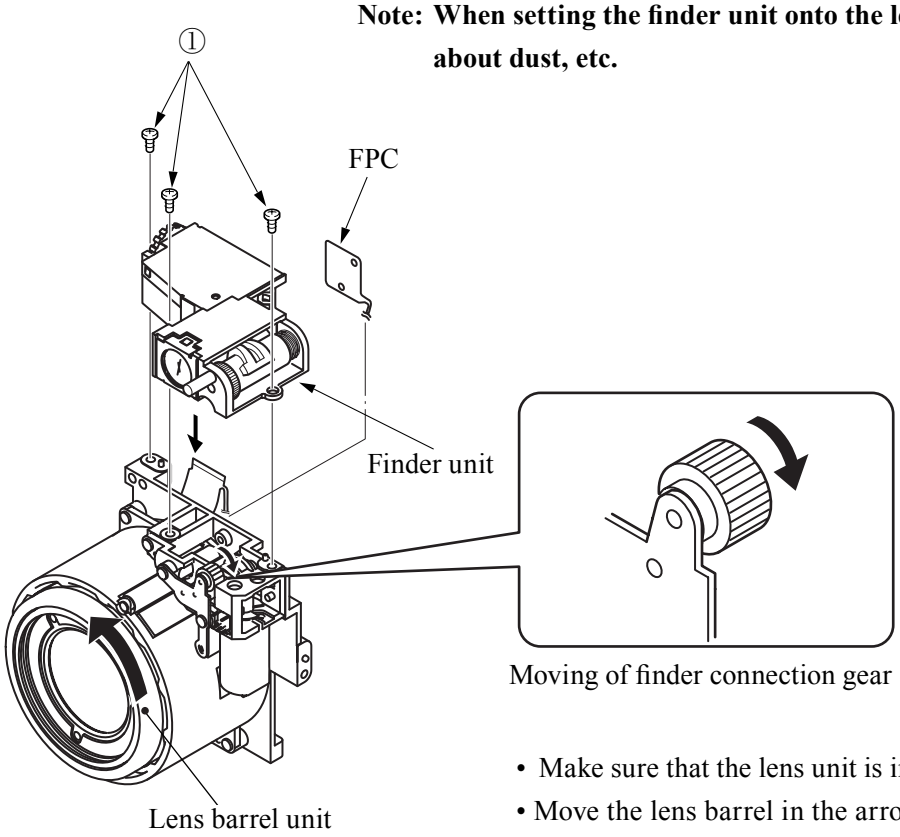


Fig.2

- Turn the finder cam in the arrow mark direction of Fig. 1 until it contacts with the stopper.
- Return the finder cam by half a turn. Where the distance is approx. 2mm between the end faces of the V groove cam and finder cover, stop the finder cam. (Refer to Fig. 2.)
- Fit the gear hole to the pin insertion hole and then insert the finder positioning pin (J61201).

Note: When setting the finder unit onto the lens unit, be careful about dust, etc.



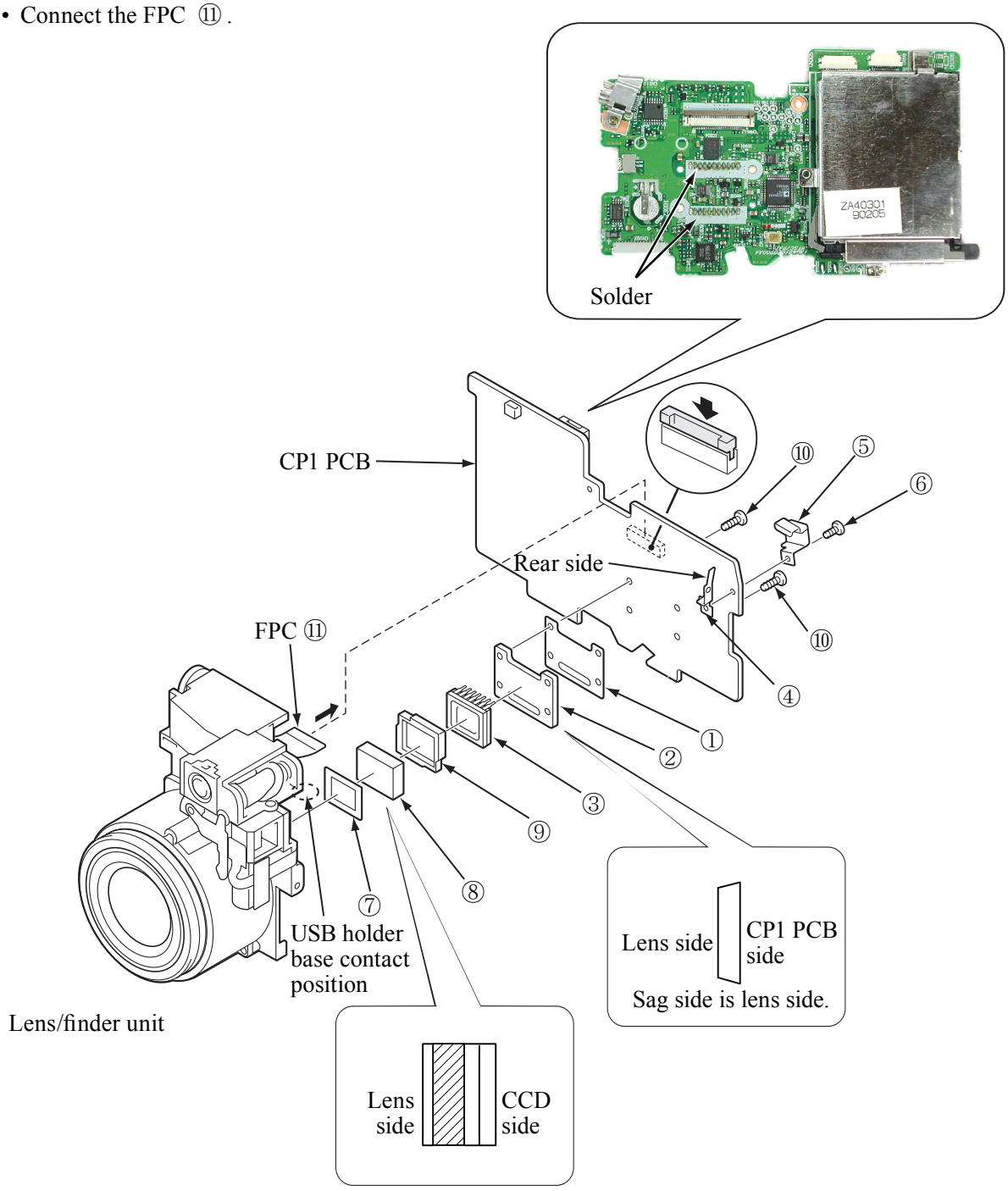
Lens unit

Moving of finder connection gear

- Make sure that the lens unit is in the stowed position.
- Move the lens barrel in the arrow mark direction (left). Move the finder connection gear in the arrow mark direction (right).
- Set the finder unit onto the lens unit.
- Attach the 3 screws [1] (M1.4×3.5) .
- Remove the pin.
- Adhere the FPC.

CCD/USB HOLDER, LENS/FINDER UNIT

- Set the spacer ① , mounting lens ② and CCD ③ to the CP1 PCB.
- Perform soldering on the CP1 PCB.
- Attach the USB holder base ④ and USB holder ⑤ with the screw ⑥ (M1.7 × 2.5). (Tighten the screw temporarily so that play can remain in the USB holder base ④ .)
- Set the spacer ⑦ , optical filter ⑧ and spacer ⑨ onto the lens unit.
- Attach the lens/finder unit to the CP1 PCB.
- Attach the 2 screws ⑩ (1.7 × 6).
- Connect the FPC ⑪ .

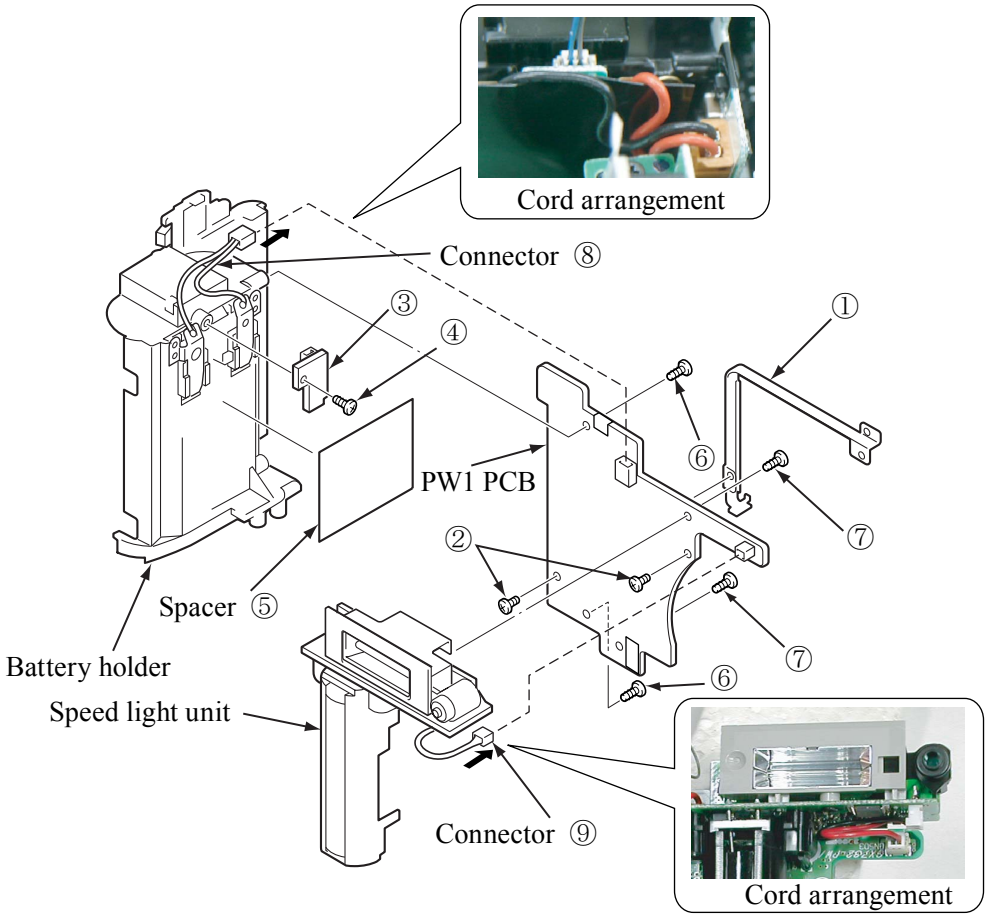


- Contact the rear of the USB holder base ④ with the ◌ mark section of finder and then tighten the screw ⑥ securely.

BATTERY HOLDER/SPEED LIGHT UNIT/PW1 PCB

① Set the battery holder and speed light unit onto the PW1 PCB.

- Attach the holder frame ① with the 2 screws ② (M1.7 × 2.5).



- Attach the TB2 PCB ③ with the screw ④ (M1.7 × 3).
- Adhere the spacer ⑤ to the battery holder.
- Set the battery holder to the PW1 PCB.
- Attach the 2 screws ⑥ (M1.7 × 4).
- Set the speed light unit onto the PW1 PCB.
- Attach the 2 screws ⑦ (M1.7 × 4).
- Connect the connector ⑧.
- Connect the connector ⑨.

② Setting to the CP1 PCB

- Connect the FPC ① to the PW1 PCB and CP1 PCB. (Refer to the figure for the direction of FPC ①.)

  Note: If you connect the FPC ① in the reversed direction, the power supply system will short-circuit. Be careful.
- Hitch the hook of the holder frame on the CP1 PCB to attach the PW1 PCB.
- Attach the screw ② (M1.7 × 2.5). (Refer to Fig. 1.)
- Insert the microphone ③ into the PW1 PCB. (Refer to Fig. 1.)
- Connect the connector ④.
- Connect the FPC ⑤.
- Fix the tape of microphone's code. (Refer to Fig. 1.)

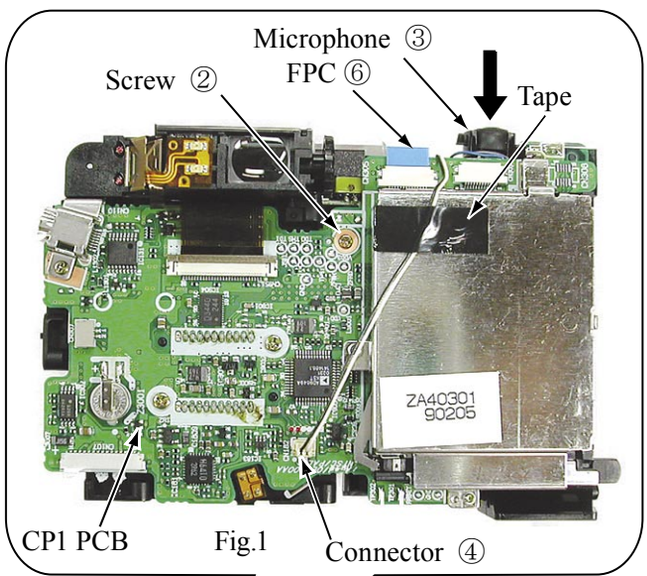
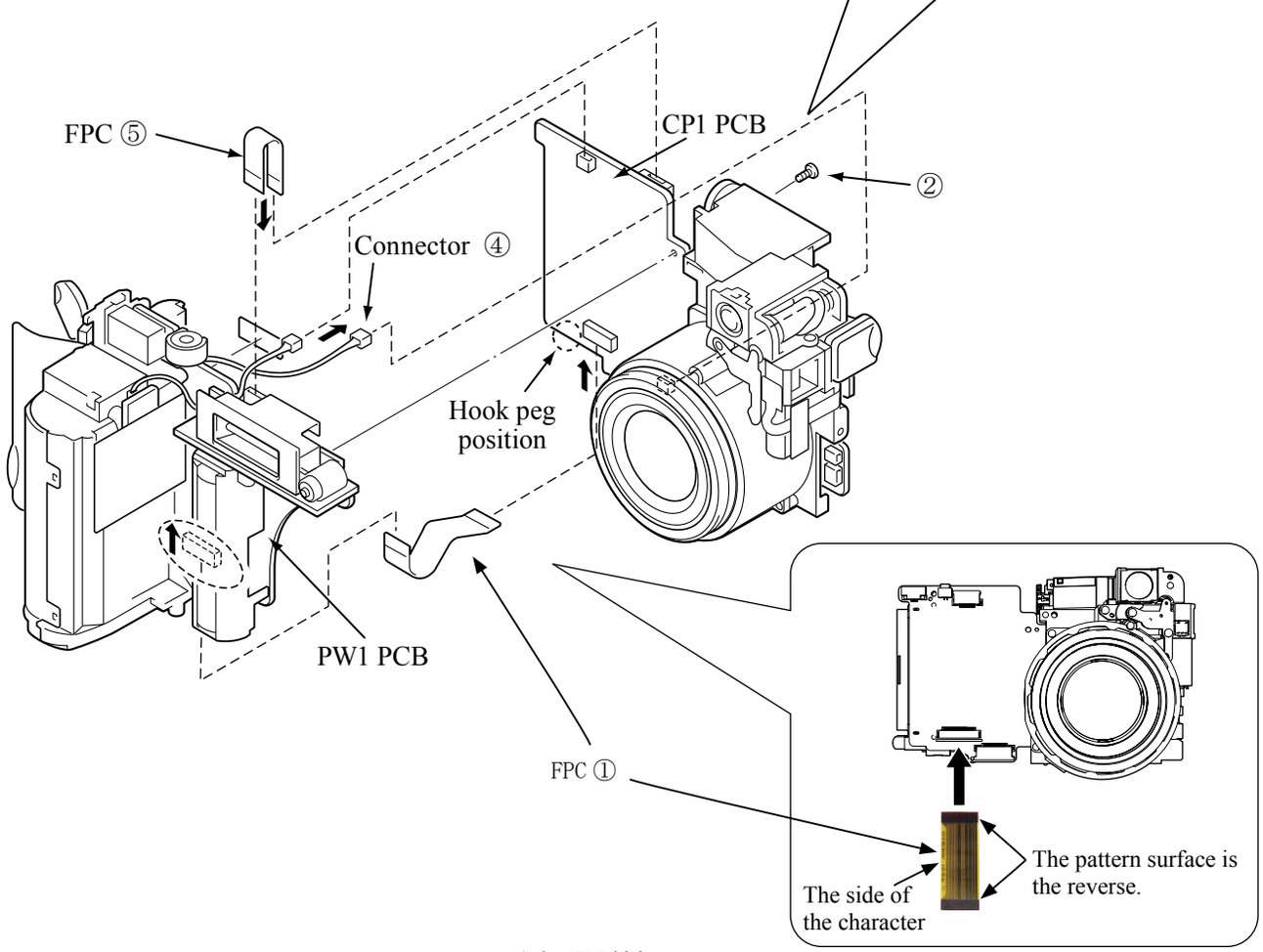
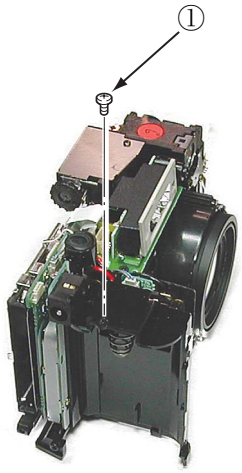


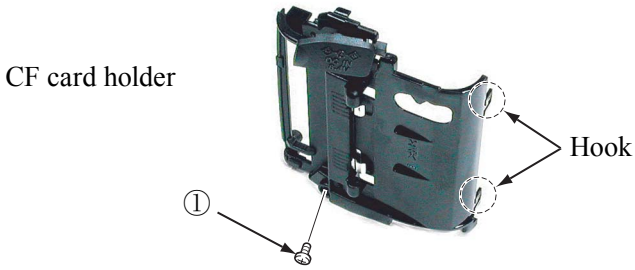
Fig.1



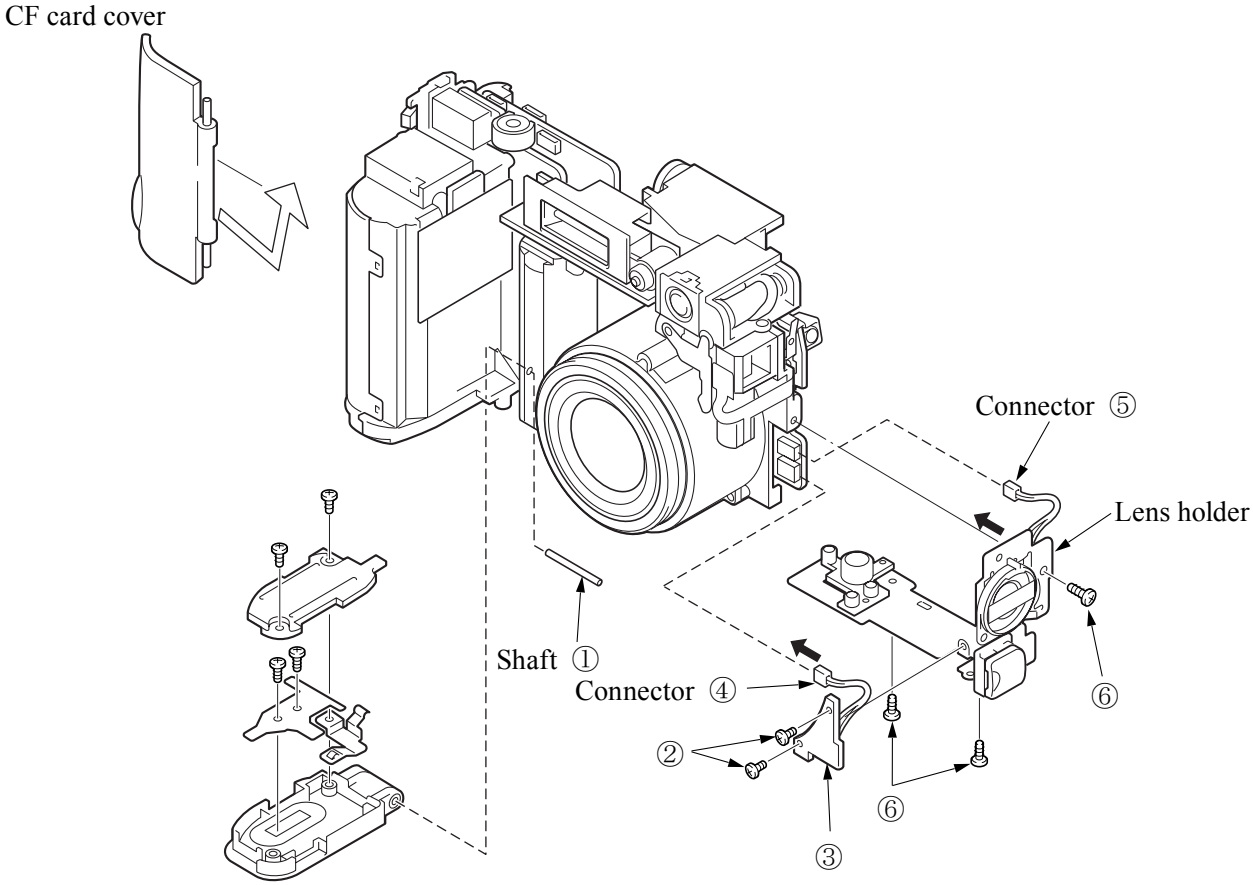
CF CARD HOLDER

- Set the CF card holder by hitching 2 hooks.
- Attach the 2 screws ① (M1.7 × 4).





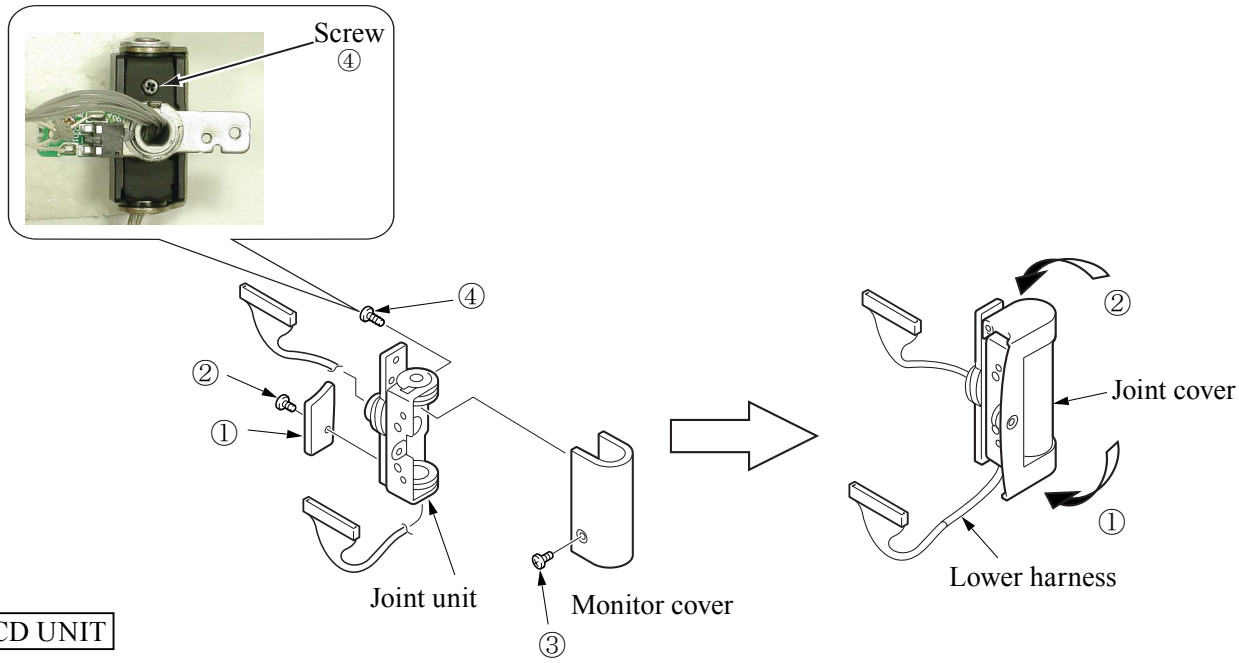
CF CARD HOLDER/BATTERY COVER/LENS HOLDER



- As pushing the CF card cover against the camera main unit, slide it in the arrow mark direction and attach it.
- Attach the battery cover with the shaft ①.
- Attach the TB4 PCB ③ with the 2 screws ② (M1.7 × 2.5).
- Connect the connectors ④ and ⑤.
- Set the lens holder and attach the 3 screws ⑥ (M1.7 × 3).

JOINT UNT

- Set the TB1 PCB ① and attach the screw ② (M1.7 × 2.5).
- Set the monitor cover.
- Attach the screw ③ (M1.7 × 2).
- Attach the screw ④ (M1.7 × 4).
- Fit the lower harness side of the joint cover first. (Arrow mark ①)
- Fit the upper side as floating. (Arrow mark ②)



LCD UNIT

- Set the spacer ① onto the LCD holder.
- Set the spacer ② and the VF1 PCB onto the LCD holder.
- Move the VF1 PCB in the arrow mark direction and perform soldering bridge (2 places).
- Set the LCD unit onto the LCD holder and then set them onto the front LCD cover.
- Adhere the spacer ③ onto the socket of the VF1 PCB.
- Fit the LCD side holder to the 2 convex sections of the front LCD cover and set it.
  (The even surface of LCD side holder is outside.)
- Attach the 2 screws ④ (M1.7 × 2).

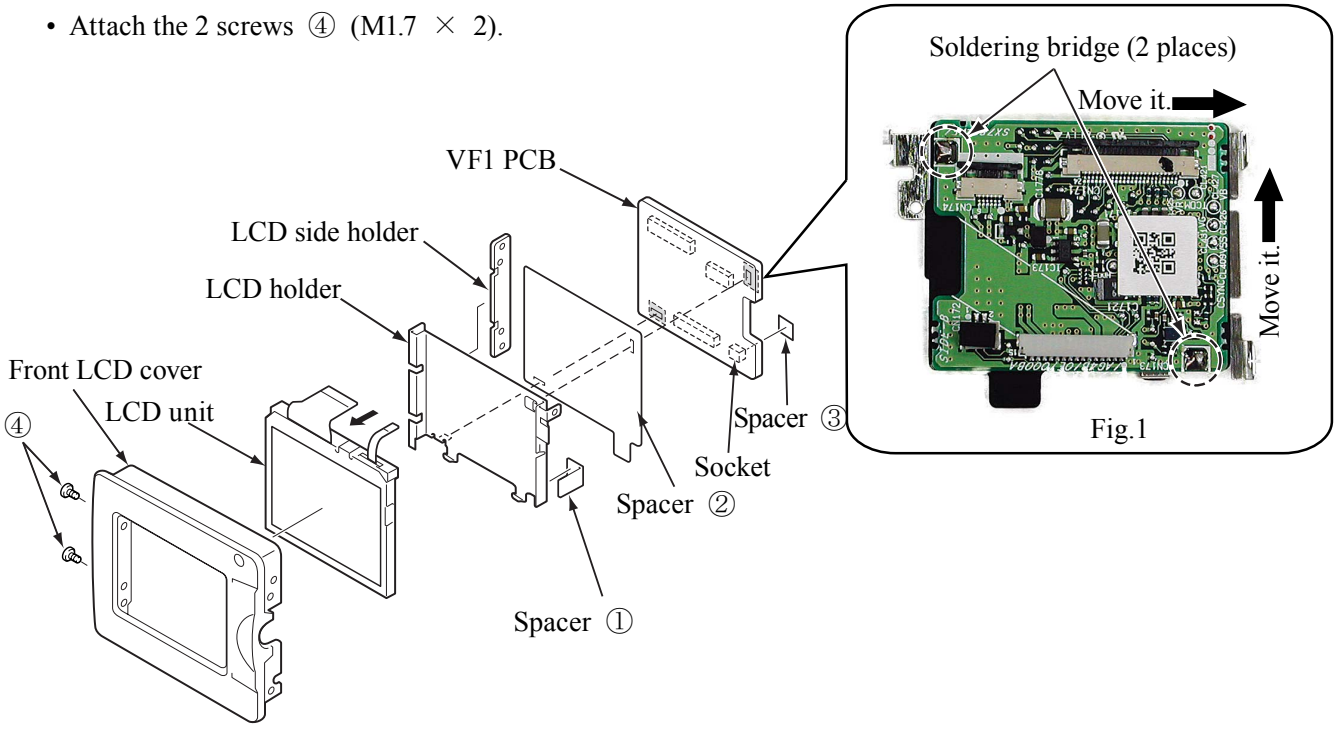


Fig.1

- Set the joint unit onto the front LCD cover.
- Attach the screw ① (M1.7 × 3).
- Connect the FPC ②.
- Connect the FPC ③.
- Connect the connector ④.
- Connect the connector ⑤.

Note: Treat the codes according to Fig. 1.

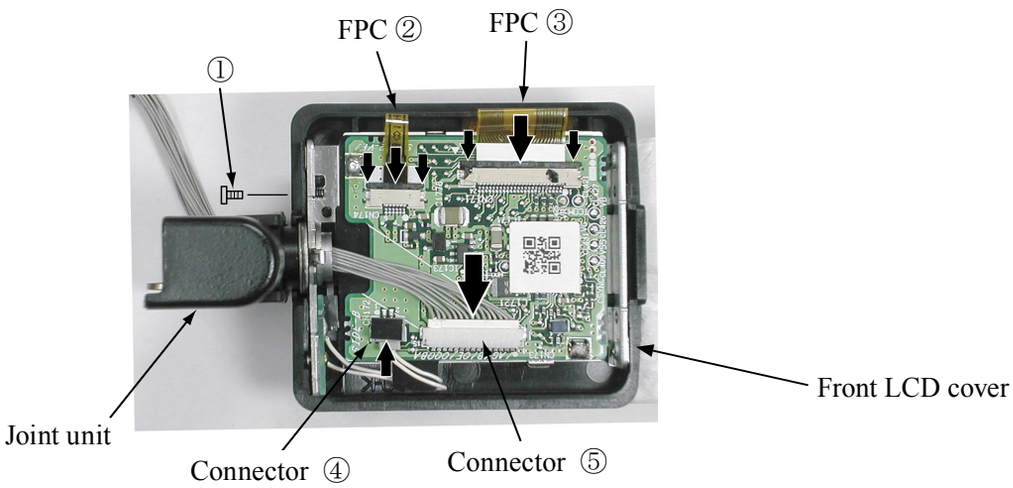
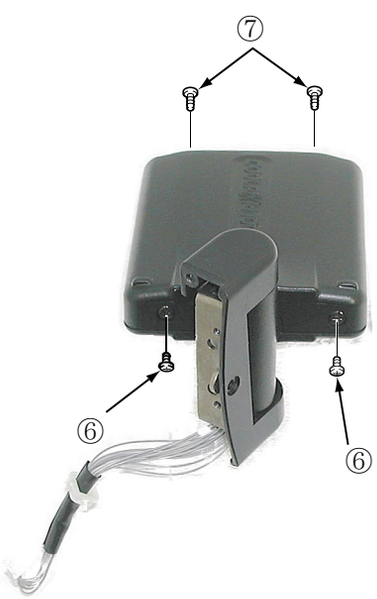
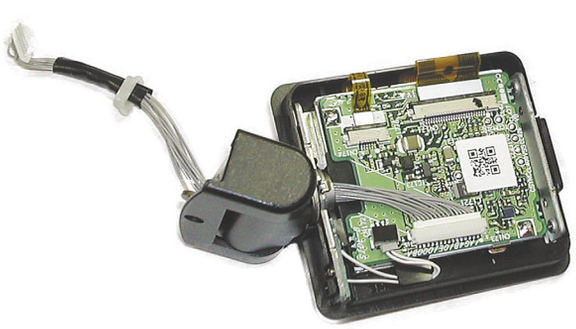


Fig.1

- Attach the LCD rear cover.
- Attach the 2 screws ⑥ (M2 × 3).
- Attach the 2 screws ⑦ (M2 × 3, large head).



LCD rear cover



- Pass the connector ① through the hole of the rear cover and pull it to the inside of the rear cover.
- Set the harness cover ② into the hole of the rear cover. (Refer to Fig. 1.)
- Set the LCD unit onto the rear cover.
- Attach the 2 screws ③ (M1.7 × 3).
- Attach the screw ④ (M1.7 × 4).
- Attach the screw ⑤ (M1.7 × 8).
- Attach the screw ⑥ (M1.7 × 3.5).

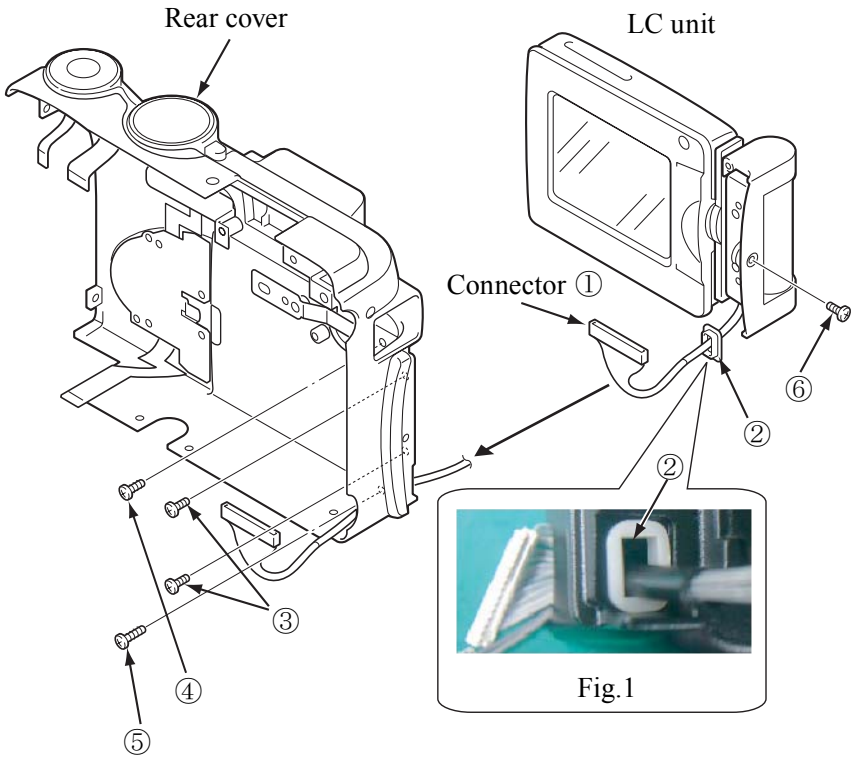


Fig.1

FRONT COVER

- Fit the notch of the lens spacer to the concave section of the lens barrel. Then, set the lens spacer onto the lens barrel. (Refer to Fig. 1.)
- Set the front cover. (Set it so that the TB2 PCB connector can come out from the top of the FPC ①.)
- Connect the FPC ①.
- Connect the connector ② and set the flash holder.
- Attach the screw ③ (M1.7 × 2.5).
- Attach the screw ④ (M1.7 × 2).
- Attach the 2 screws ⑤ (M1.7 × 3.5).
- Attach the 3 screws ⑥ (M1.7 × 4).
- Connect the connector from the TB2 PCB. (Refer to Fig. 2.)

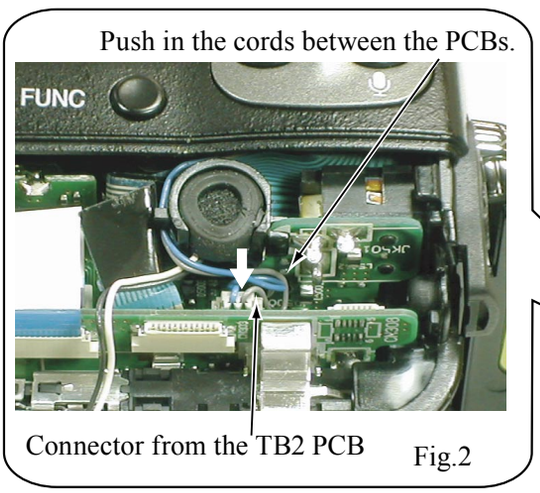
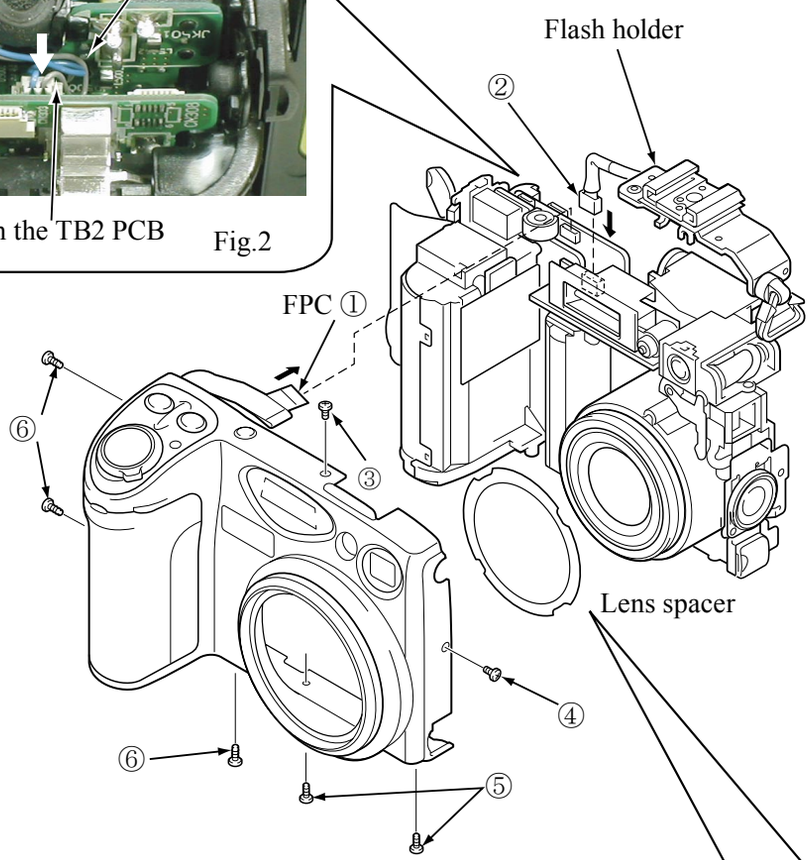


Fig.2



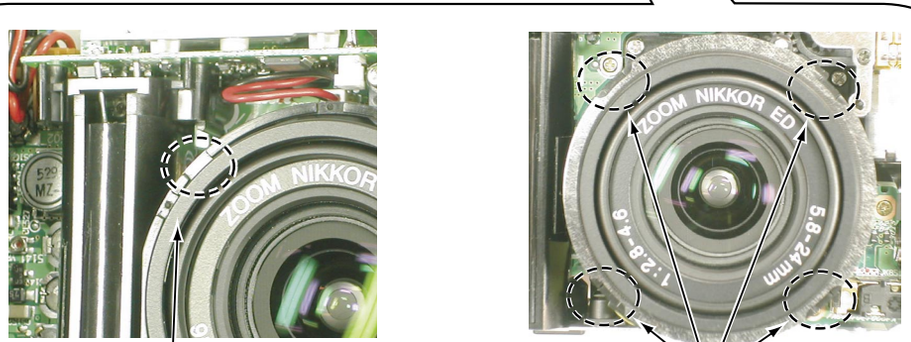
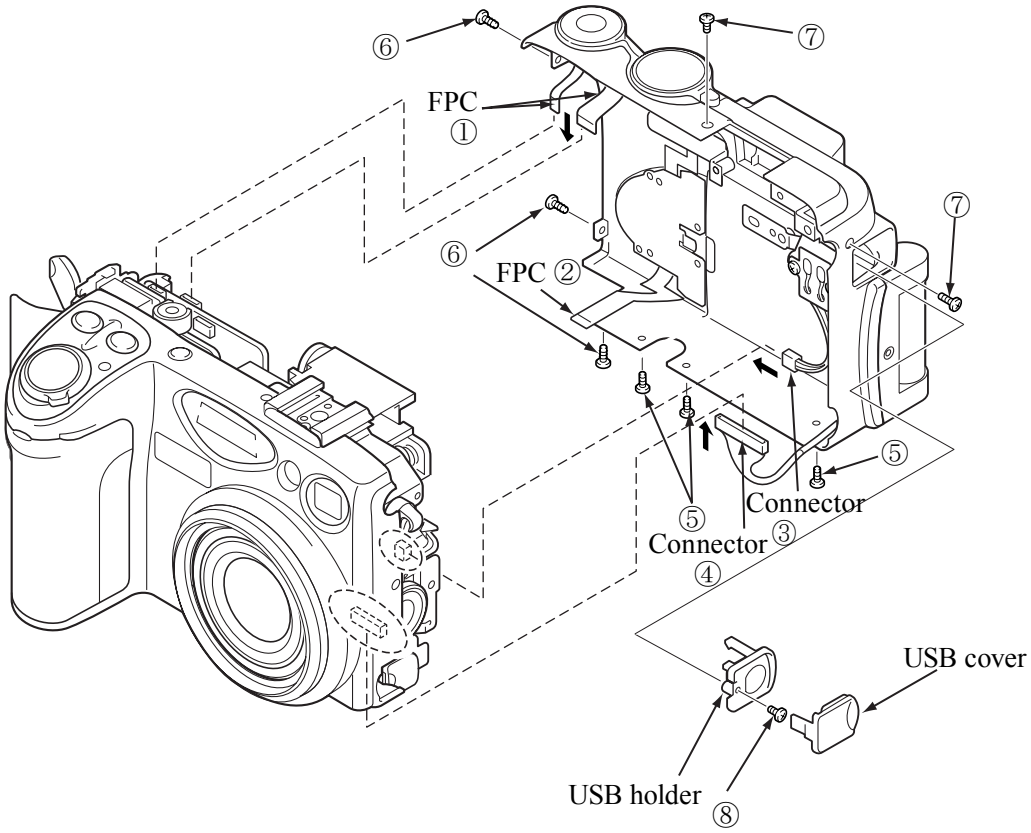


Fig.1

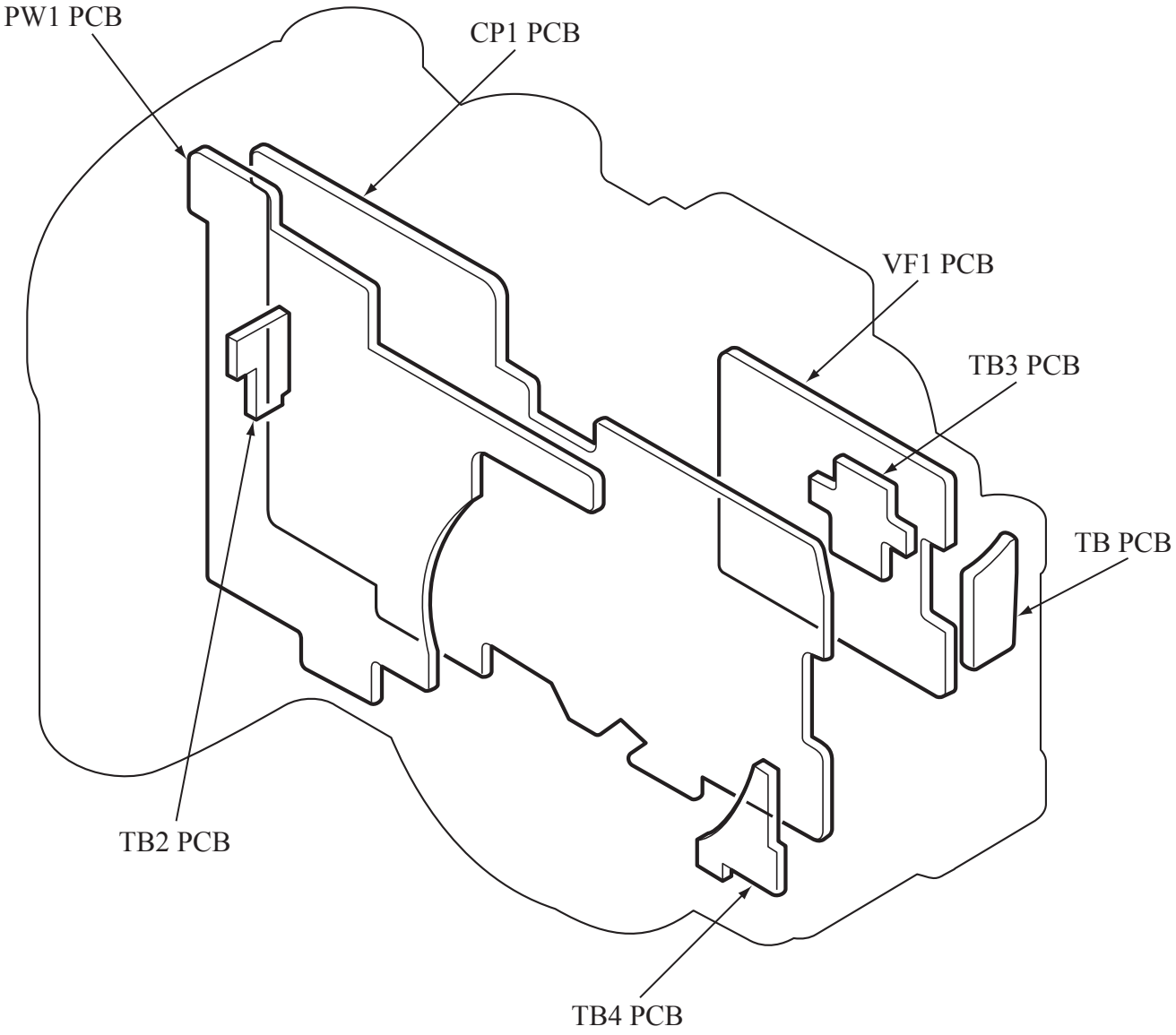
REAR COVER



- Connect the FPC ①.
- Connect the FPC ②.
- Connect the connector ③.
- Connect the connector ④.
- Set the rear cover onto the camera main unit. (Be careful not to catch the cords and FPC.)
- Attach the 3 screws ⑤ (M1.7 × 3.5).
- Attach the 3 screws ⑥ (M1.7 × 4).
- Attach the 2 screws ⑦ (M1.7 × 2.5).
- Set the USB holder and USB cover.
- Attach the screw ⑧ (M1.7 × 3.5).

Note: Not to make a clearance between the front and rear covers, tighten the screws as holding the both covers.

PCB ARRANGEMENT



ADJUSTMENT

1. Equipment

• Personal computer • 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

6-1. LCD H AFC Adjustment

6-2. LCD RGB Offset Adjustment

6-3. LCD Gain Adjustment

6-4. LCD Blue Brightness Adjustment

6-5. LCD Red Brightness Adjustment

6-6. LCD Red VcomPP Adjustment

Note: If replacing the lens, CCD, optical filter or CP-1 PCB, it is necessary to perform the above 1 ~ 5 adjustments again. Perform the 1 ~ 4 adjustments in this order.

4. Setup

① System requirements

- Windows® 98 or Me, 2000, XP
- PC/AT compatible machine with Pentium or higher processor
- CD-ROM drive
- 3.5-inch 2HD floppy disk drive
- USB port
- RAM with at least 40 MB
- 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 into the floppy disk drive.
- Open Explorer.
- Copy the DscCa1DI_130a folder on the floppy disk drive to a folder on the hard disk.

5. Installing USB driver

If the USB driver is necessary, install Nikon View packed together with the camera.

6. Pattern box

Before using the pattern box, carry out the following: Turn on the power switch and perform aging for about 30 minutes. Adjust the color temperature to 3100 ± 20K with the color meter and the luminance to 900 ± 20 cd/m^2 with the luminance meter. When you are using the pattern box and just after its power is OFF, the lamp and its vicinity are hot. Handle them very carefully.

- Pattern box calibration

  Note: Carry out aging calibration.

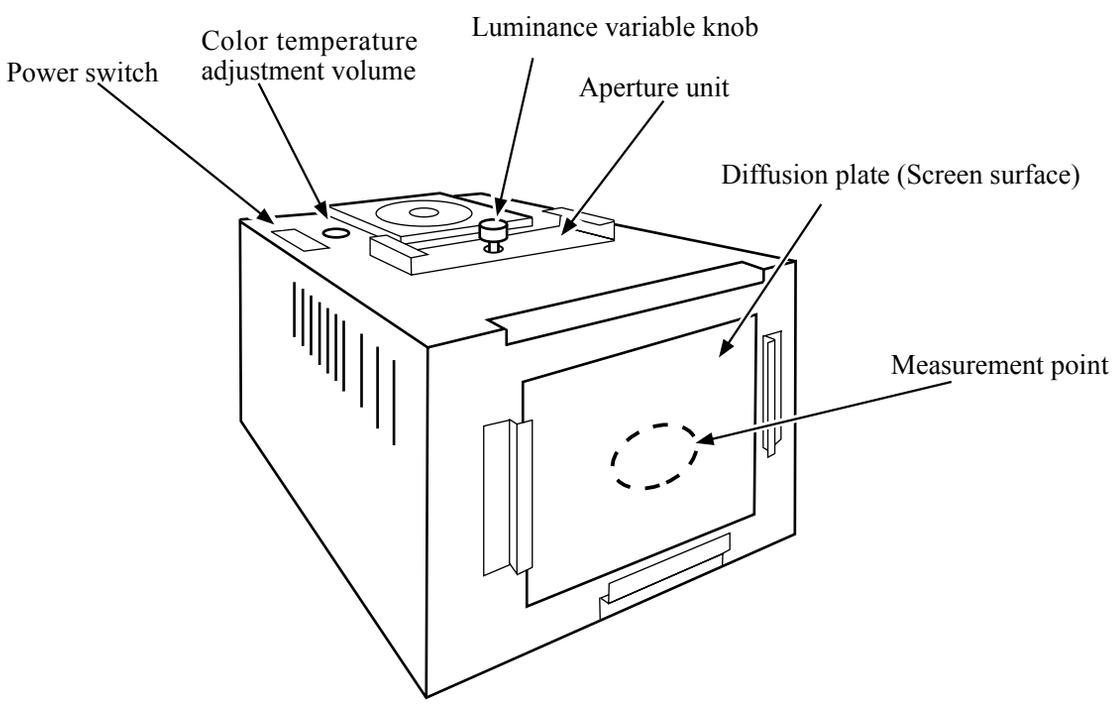
① Measure the measurement point (center of diffusion plate) with the color meter (J63081).

② Adjust the color temperature with "color temperature adjustment volume" to 3100 ± 20K.

③ Measure the measurement point (center of diffusion plate) with the luminance meter (J63068 BM3000).

④ Adjust the luminance with "luminance variable knob" to 900 ± 20 cd/m².

⑤ Repeat ① ~ ④ to calibrate to the color temperature 3100 ± 20K and the luminance 900 ± 20 cd/m² .



7. Adjustment items required at replacement of parts

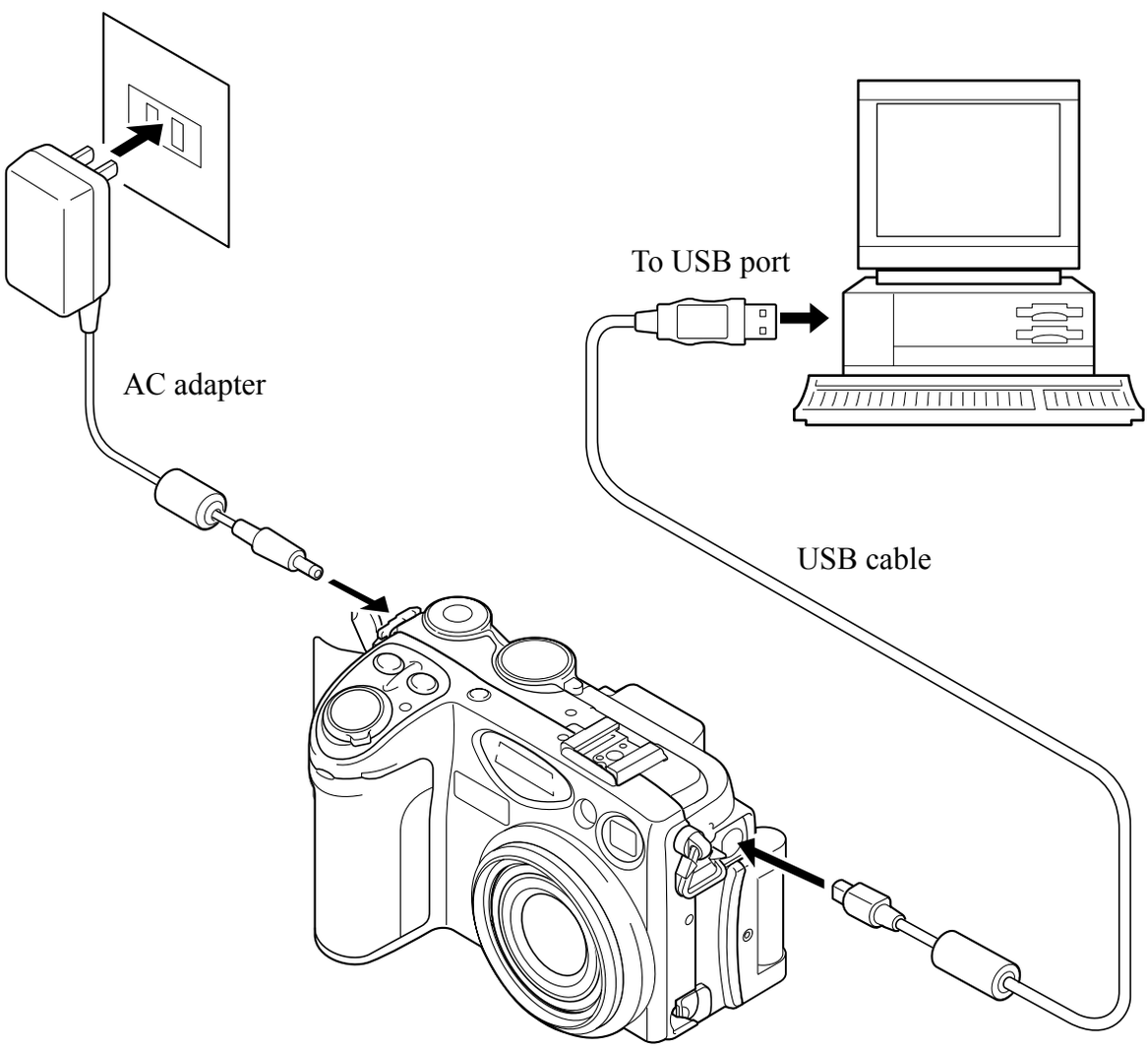
	Lens Adj.	AWB	CCD Defect	USB	LCD Panel
Lens unit	○	○	○	×	×
Optical filter	○	○	○	×	×
CCD	○	○	○	×	×
P-1 PCB	○	○	○	○	△
PW-1 PCB	×	×	×	×	×
VF-1 PCB	×	×	×	×	△

○ Adjustment required. × Adjustment not required. △ Adjustment as required

8. Connecting the camera to the personal computer

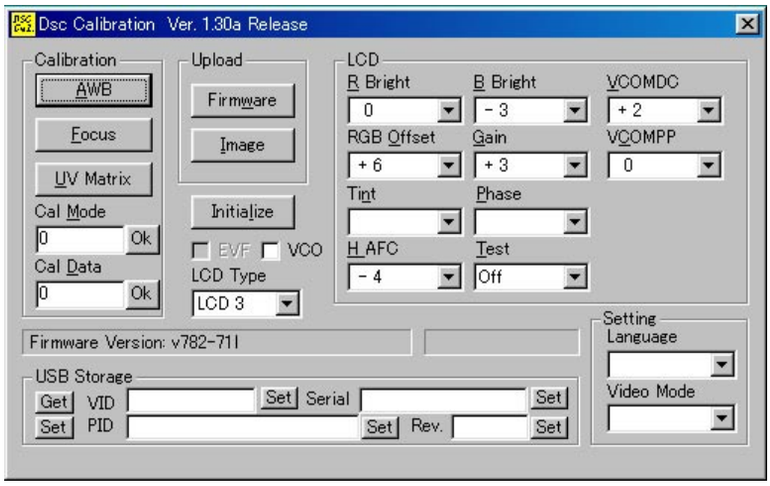
① Fit the camera connector of the cable to the USB port of the camera. Then, insert the connector.

② Connect the connector to the USB port of the personal computer.



9. Calibration software

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



10. Lens Adjustment

[Preparation]

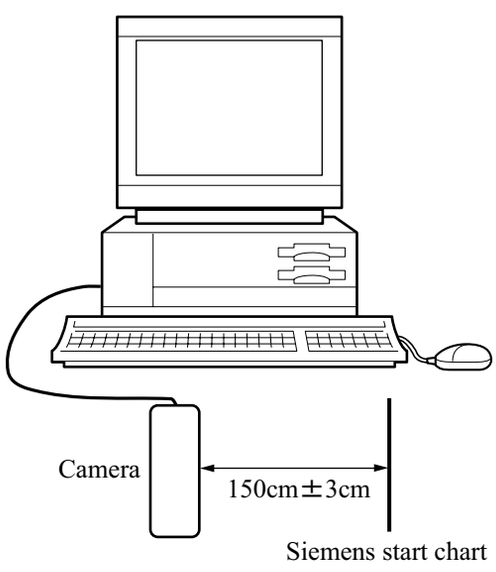
- Siemens star chart
- Turn on the power switch of camera.

[Adjustment condition]

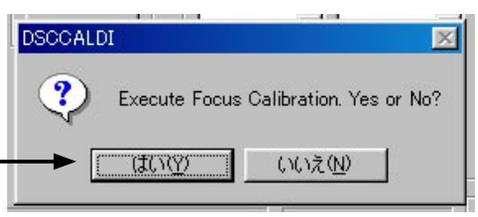
- Siemens start chart of A3 size or larger (Make a copy of A4 size siemens start chart which is attached to the service manual in enlarged A3 size or larger.)
- Illumination above the object should be 400 lux ± 10%.
- Set the distance to 150cm ± 3cm between the siemens star chart and camera (front of camera).

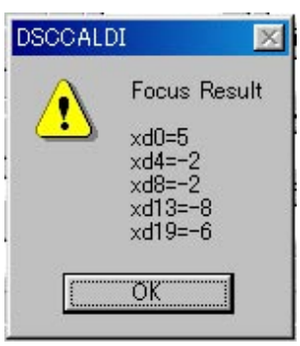
[Adjustment method]

- Double-click “DscCalDi130a”.
- Fit the center of siemens star chart to the center of camera screen through the finder.
- Click “Focus” and then click “Yes”.
- Judgment standard: xd0 = 0±40, xd4 = 0±40, xd8 = 0±40, xd13 = 0±40, xd19 = 0±40
- Click “OK”.



“Yes”





Result of adjustment

11. AWB Adjustment

[Preparation]

- Pattern box (Color temperature: 3100 ± 20K, Luminance: 900 ± 20 cd/m^2)

[Adjustment condition]

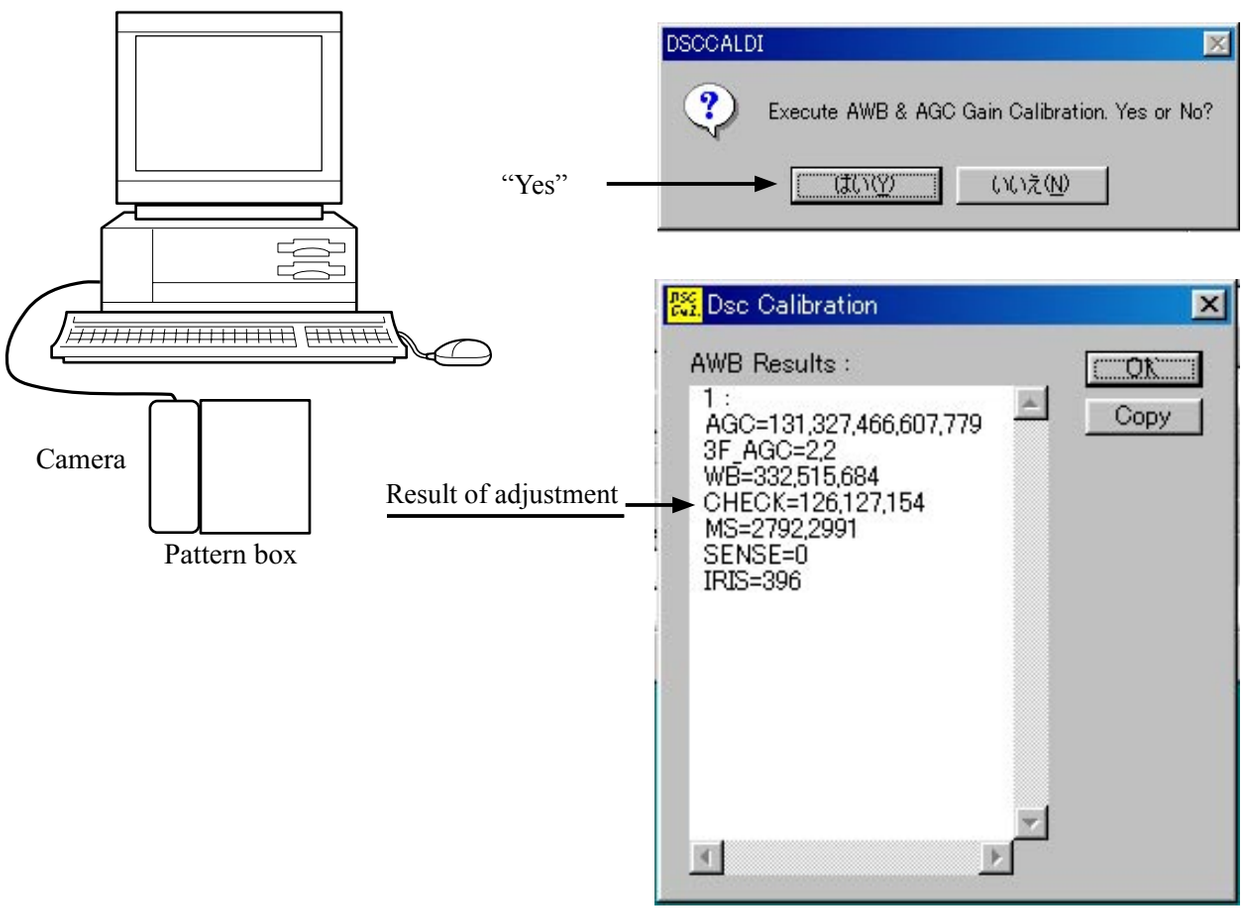
- Set the distance to 0cm between the pattern box and camera (front of camera).

Note: Be careful to prevent the disturbing light from entering.

[Adjustment method]

- Double-click “DscCalDi130a”.
- Click “AWB” and then click “Yes”.
- AWB adjustment value will appear on the screen.

  Judgment standard: CHECK = 128 ± 2, 128 ± 2, 130 ± 40
- Click “OK”.



12. CCD White Point Defect Detect Adjustment

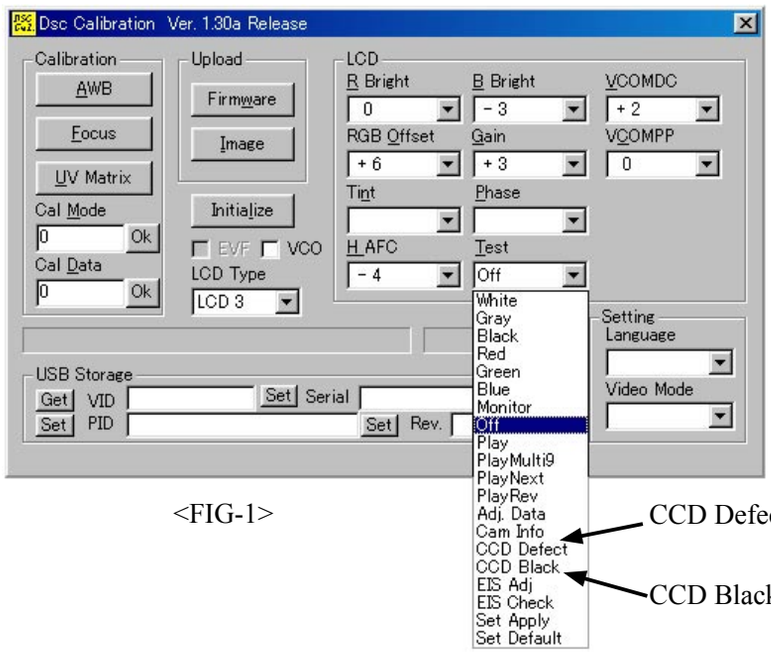
[Adjustment condition]

- While the shutter in the lens is closed, the defect of CCD pixels is read, the correction data are made and rewriting is done by the following procedure.
  The defect of CCD pixels is corrected for the upper 512 pixels.

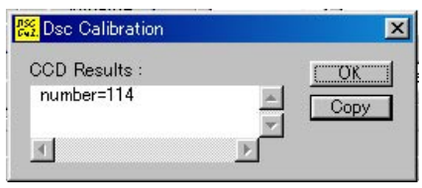
[Adjustment method]

- Double-click “DscCalDi130a”.
- Select “CCD Defect” from “Test” and then click “Yes”. Refer to FIG-1.

After adjustment, an adjustment value will appear on the screen. Refer to FIG-2.



<FIG-1>



<FIG-2>

13. CCD Black Point Defect Detect Adjustment

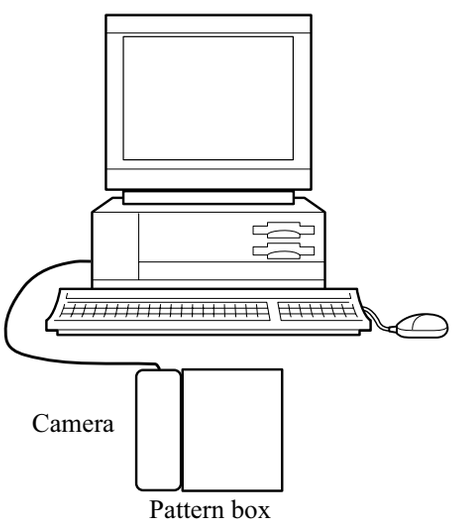
[Adjustment condition]

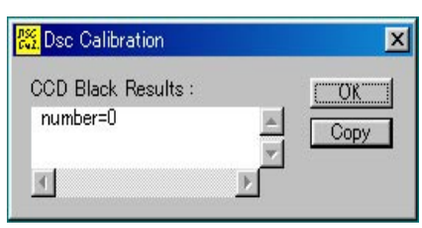
- Fix the camera so that only white section of pattern box may appear on the screen. (Remove the disturbing light as much as possible.)
- While the shutter in the lens is opened, the defect of CCD pixels (black point) is read, the correction data are made and rewriting is done by the following procedure.
- The defect of CCD pixels (black point) is corrected for the upper 30 pixels.

[Adjustment method]

- Double-click “DscCalDi128”.
- Select “CCD Black” from “Test” and then click “Yes”. 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 are important 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]

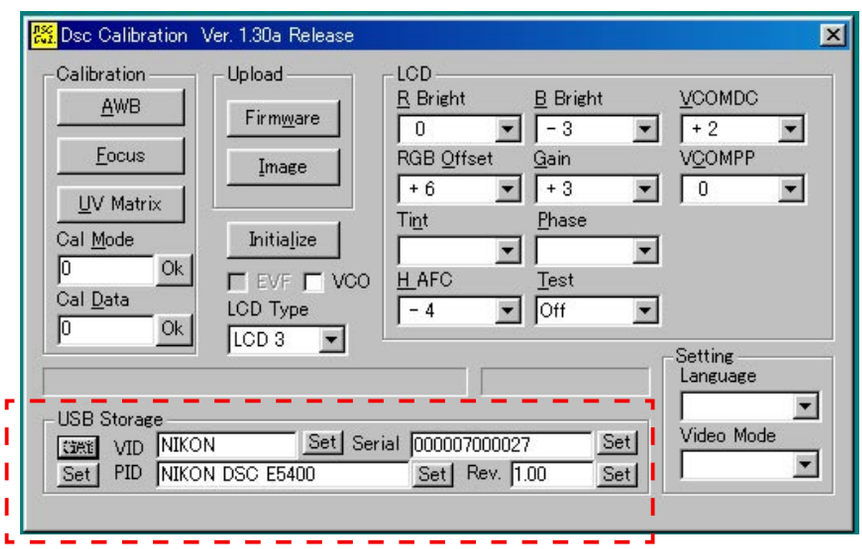
1. Connect the camera to the personal computer.
2. Double-click “DscCalDi130a”.
3. Click the Get button in the USB storage window and check the USB storage data.

   VID: NIKON

   PID: NIKON DSC E5400

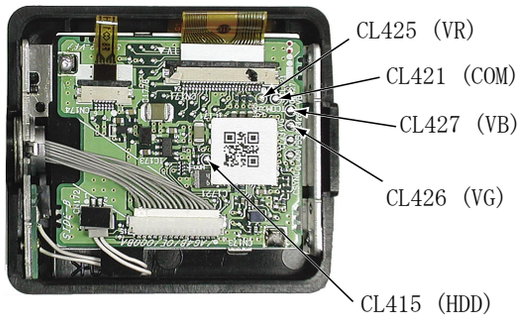
   Serial:

   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 camera, enter the number on the base of 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

[VF1 PCB (Side B): Measurement/adjustment place]



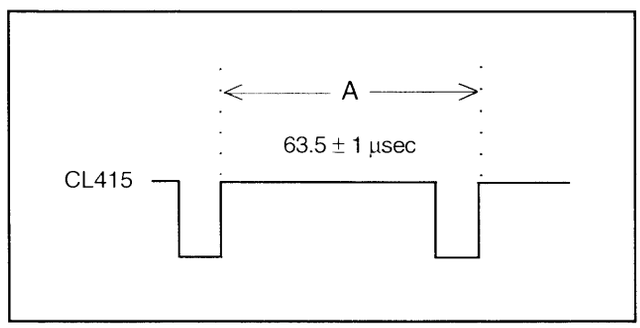
15-1 LCD H AFC Adjustment

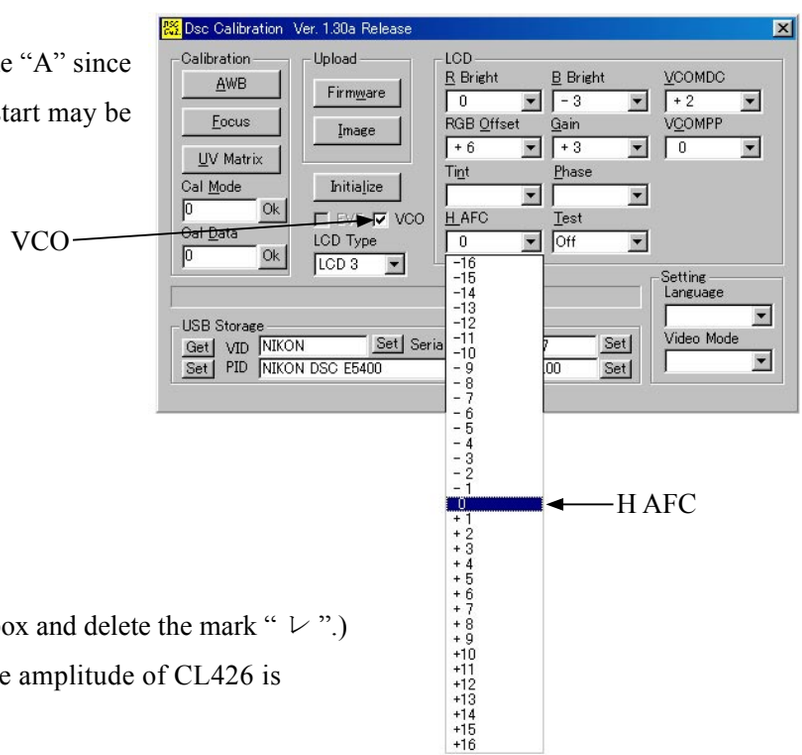
[Preparation]

- Oscilloscope
- Power switch: ON

[Adjustment method]

1. Double-click “DscCalDi130a”.
2. Set “VCO” to ON. (Click the check box to enter the mark “ レ ”.)
3. Select “0” on LCD “H AFC”.
4. Adjust LCD “H_AFC” so that the time “A” since the CL415 pulse start till next pulse start may be 63.5 ± 1 µsec.

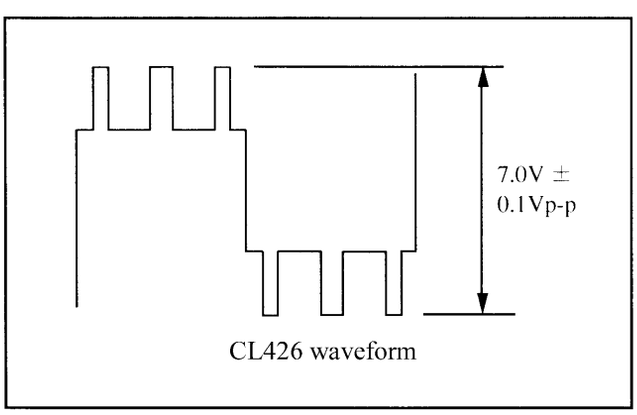




15-2. LCD RGB Offset Adjustment

[Adjustment method]

1. Set “VCO” to OFF. (Click the check box and delete the mark “ レ ”.)
2. Adjust LCD “RGB Offset” so that the amplitude of CL426 is 7.0V ± 0.1 Vp-p.



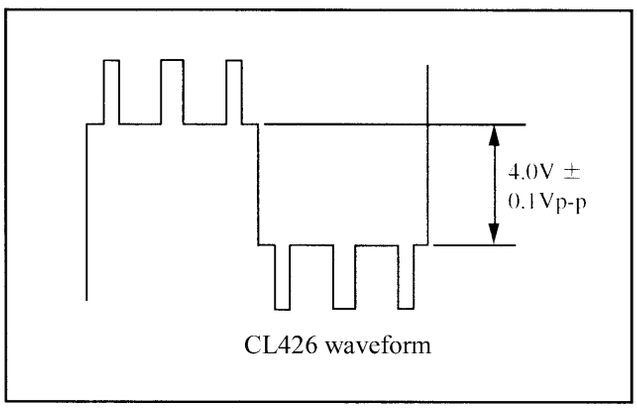
15-3. LCD Gain Adjustment

[Adjustment method]

1. Adjust LCD “Gain” so that the amplitude of CL426 is 4.0V ± 0.1Vp-p.

[Note]

“15-2. LCD RGB Offset Adjustment” should always be carried out first.



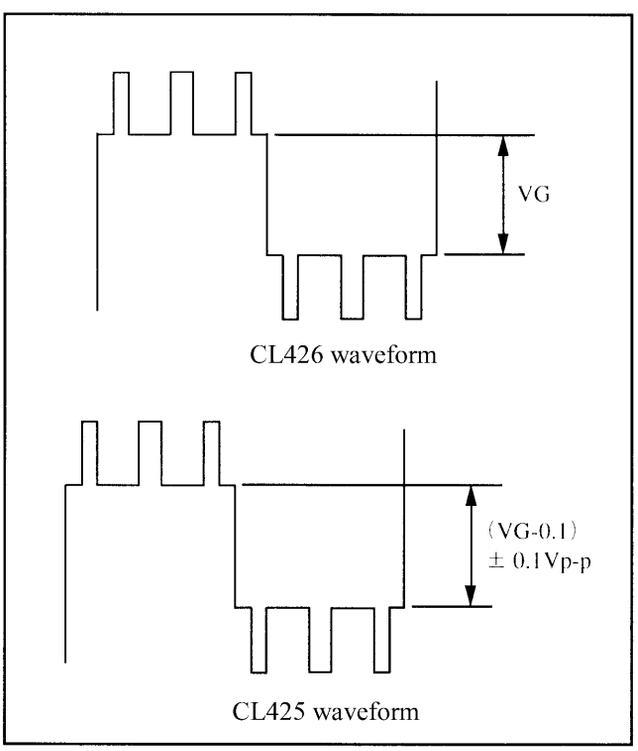
15-4. RED Brightness Adjustment

[Adjustment method]

1. Adjust LCD “R Bright” so that the amplitude of CL425 is (VG-0.1) ± 0.1Vp-p with respect to the amplitude of CL426, VG.

[Note]

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

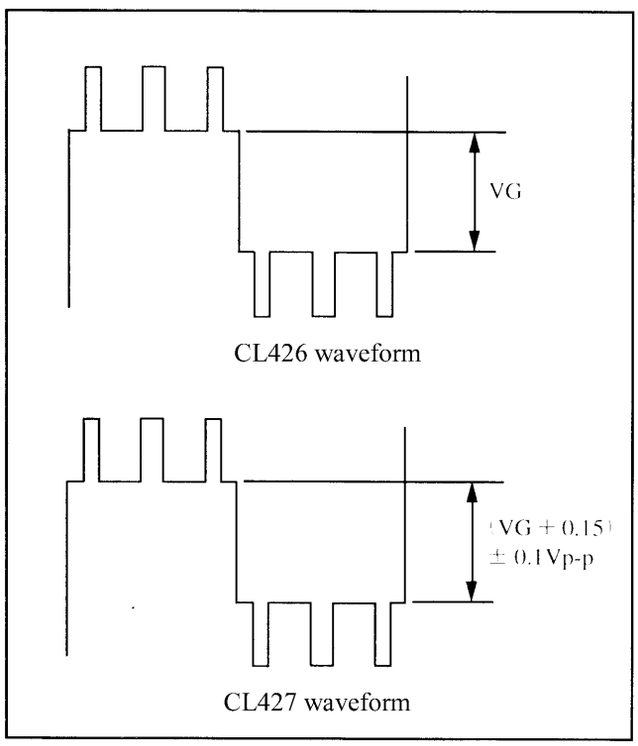


15-5. LCD Blue Brightness Adjustment

[Adjustment method]

1. Adjust LCD "B Bright" so that the amplitude of CL427 is (VG+0.15) ± 0.1Vp-p with respect to the amplitude of CL426, VG.

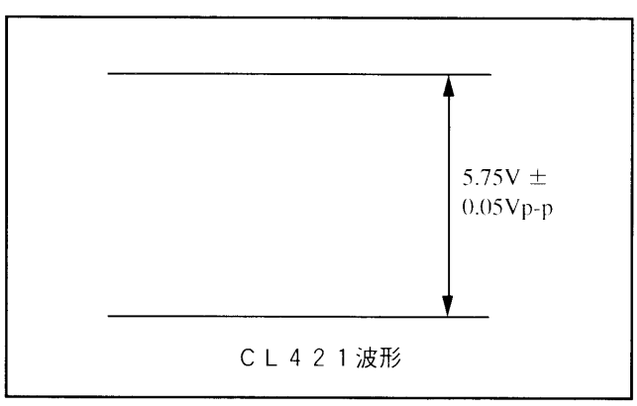
[Note]"15-2. LCD RGB Offset Adjustment" and "15-3. LCD Gain Adjustment" should always be carried out first.



15-6. LCD VcomDC Adjustment

[Adjustment method]

1. Change the oscilloscope to DC.
2. Adjust LCD “VCOMDC” so that the amplitude of CL421 is 5.75V ± 0.05 Vp-p.



1. CIRCUIT DESCRIPTION

1-1. OUTLINE OF CIRCUIT DESCRIPTION

1. Outline

The CP1 PCB is mainly composed of the following ICs:

IC903 (ICX452AQ) CCD imager

IC904 (CXD34400EN) V driver

IC905 (AD9849AKST) CDS, AGC, A/D converter, H driver

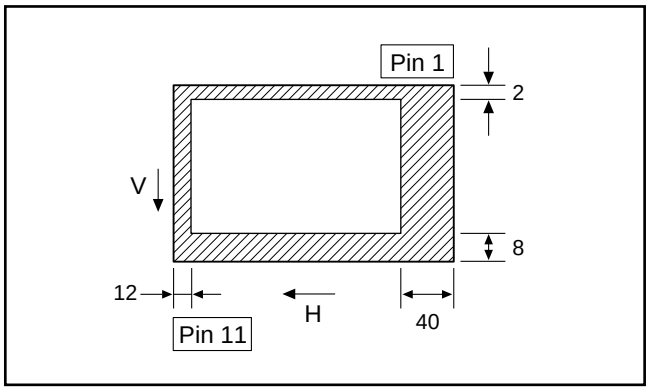


Fig. 1-1. Optical black arrangement (Top View)

2. IC903 (CCD)

[Structure]

- Interline type CCD image sensor
- Optical size: 1/1.8 type
- Effective pixels: 2616 (H) × 1960 (V)
- Total pixels: 2668 (H) × 1970 (V)
- Optical black
  Horizontal (H) direction: 12 pixels on front and 40 pixels on rear
  Vertical (V) direction: 8 pixels on front and 2 pixels on rear
- Dummy bits: Horizontal 28 Vertical 1 (only third field)

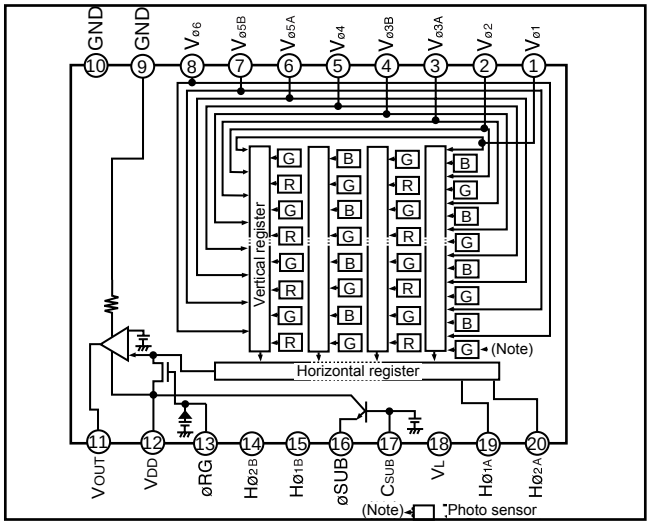


Fig. 1-2. CCD block diagram

Pin No.	Symbol	Pin Description	Waveform	Voltage
1, 3, 4	Vø1 Vø3A, Vø3B	Vertical register transfer clock		-7.5V, 0V, 15V
2, 5	Vø2, Vø4	Vertical register transfer clock		-7.5V, 0V
6, 7	Vø5A, Vø5B	Vertical register transfer clock		-7.5V ,0V, 15V
8	Vø6	Vertical register transfer clock		-7.5V, 0V
9, 10	GND	GND	GND	0V
11	VOUT	Signal output		Approx. 10V
12	VDD	Circuit power supply	DC	15V
13	øRG	Reset gate clock		12.5V, 16V
20, 14	Hø2A, Hø2B	Horizontal register transfer clock		0V, 3.3V
19, 15	Hø1A, Hø1B	Horizontal register transfer clock		0V, 3.3V
16	øSUB	PCB clock	DC	Approx. 8V
17	CSUB	PCB voltage bias	DC	Approx. 8V (Different from every CCD)
18	VL	Protection transistor bias	DC	-7.5V

Table 1-1. CCD Pin Description ----When sensor read-out

3. IC905 (H driver) and IC904 (V driver)

H driver (part of IC905) and V driver (IC904) are necessary to generate the clocks (vertical transfer clock, horizontal transfer clock and electronic shutter clock) which drive CCD. IC905 have the functions to generate the clocks which drive the horizontal CCD and to drive the CCD. These clocks are outputted from IC905 (13), (14), (17) and (18). XV1 ~ XV6 outputted from IC102 are the vertical transfer clocks. XSG1, XSG3A, XSG3B, XSG5A and XSG5B are superimposed onto XV1, XV3 and XV5 by IC904 to generate a ternary pulse. XSUB outputted from IC101 is used as the sweep pulse for the electronic shutter. RG outputted from IC905 (20) is the reset gate clock.

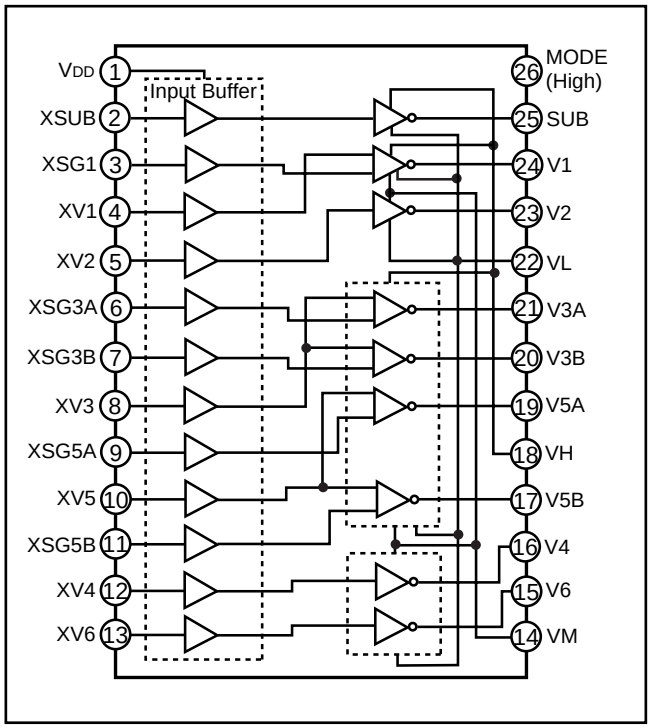


Fig. 1-3. IC904 Block Diagram

4. IC905 (CDS, AGC circuit and A/D converter)

The video signal outputted from CCD is inputted to Pin (29) of IC905. There are S/H block made by XSHP and ZSHD pulses. These carries out CDS (Correlated Double Sampling). After the video signal has passed through the CDS circuit, it goes through AGC amplifier (PGA: Programmable Gain Amplifier). In it, A/d conversion is done to be changed into 12 bits. Then, it is inputted to IC101 of the CP1 PCB. Gain of the AGC amplifier is controlled by Pins (36) ~ (38), using the serial signal outputted from IC101 of the CP1 PCB.

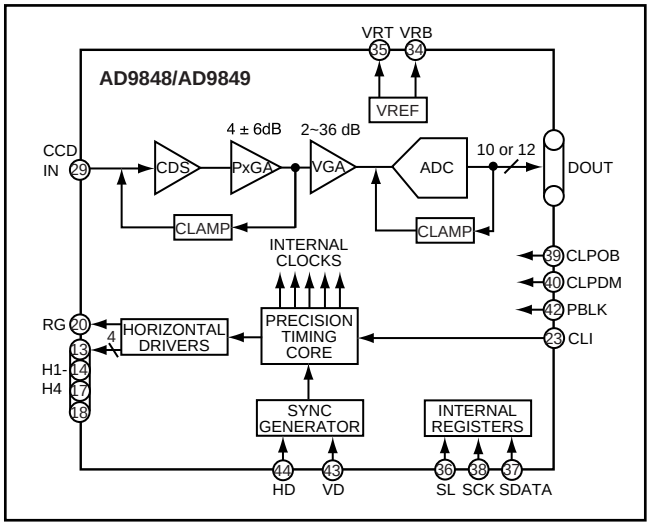


Fig. 1-4. IC905 Block Diagram

5. Lens drive block

5-1. Focus drive

Signals for driving the focus stepping motor (FRSTB, FCW, FCLK FOE and FMODE) are outputted from ASIC (IC101). Micro-step driving of these signals is done by the motor driver (IC953). Detection of the standard focusing position is carried out by the photo interrupter (FMPI) in the lens block.

5-2. Zoom drive

Signals for driving the DC motor (ZIN1 and ZIN2) are outputted from the 8-bit microprocessor (IC301). These signals are driven by the motor driver (IC951). Counting and detection of zoom position are carried out by the photo interrupter (ZPI) in the lens block.

5-3. Aperture drive

Signals for driving the aperture stepping motor (IIN1, IIN2, IIN3 and IIN4) are outputted from ASIC (IC101). These signals are driven by the motor driver (IC953) for aperture operation.

5-4. Shutter drive

Signals for driving the shutter motor (SIN1 and SIN2) are outputted from ASIC (IC101). Constant-current driving of these signals are done by the motor driver (IC953) for opening/closing the mechanical shutter.

6. Circuit Description

6-1. Digital clamp

By subtracting the averaged value of the CCD optical black section from the subsequent data, the black level of the CCD output data are made uniform. The averaged value of the CCD optical black section should be the sum of the following two values: the value for the previous line multiplied by the coefficient "k" and the value for the current line multiplied by the coefficient (k-1).

6-2. Signal processor

1. γ correction circuit

This circuit performs the γ correction to maintain a linear relationship between the light inputted to the camera and the light outputted from the picture screen.

2. Color signal 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/vertical aperture circuit

This circuit is used to generate the aperture signals.

6-3. AE/AWB and AF computing circuit

The AE/AWB carries out computation based on a 256-segment screen, and the AF carries out computation based on a 11-segment screen.

6-4. SDRAM controller circuit

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

6-5. Communication control

1. SIO

This is the interface for the 8-bit microprocessor.

2. SIO for PIO/PWM/LCD

8-bit parallel input and output makes it possible to input and output individually. It is possible to change 3-port PWM output. It is prepared for 16-bit parallel output.

6-6. TG/SG

Timing is generated for 2 million/3 million/4 million/5 million pixels CCD control.

6-7. Digital encoder

It generates chroma signal from color difference signal.

6-8. JPEG encoder and decoder

Picture data are compressed and extended by JPEG method.

7. Outline of Operation

When the shutter opens, the reset signals and the serial signals ("TAKE A PICTURE" command) from the 8-bit microprocessor are inputted to ASIC (IC101) and operation starts. When the TG/SG drives the CCD, picture data passes through the A/D and CDS, and is then inputted to the ASIC as 12-bit data. The inputted data passes through the digital clamp and is inputted to SDRAM. The AF, AE, AWB, shutter, and AGC values 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, which was Ye, Cy, Mg or Gr primary color data, is interpolated from the surrounding data to produce R, G and B data. After AWB and γ processing, matrix is generated to produce Y, R-Y and B-Y. Aperture correction is carried out for the Y signal, and the data is then compressed by JPEG and is written in the card memory (compact flash). When data is outputted to an external device, data is taken out from the memory and outputted via USB. When playback is done on the LCD and monitor, data is transferred from the memory to SDRAM, and the picture data extended by the JPEG decoder is displayed on the SDRAM display area.

8. LCD Block

The LCD display circuit is on the VF1 PCB, and is composed of the LCD driver (IC171) and its peripheral circuits.

The video signals from the ASIC are converted into RGB signals by the LCD driver, and these RGB signals and control signals which are outputted by the LCD driver are used to drive the LCD panel. The RGB signals are reversed by 1H so that no DC component is present in the LCD element. Two horizontal shift register clocks drive the horizontal shift registers inside the LCD panel and the RGB signals which are reversed by 1H are applied to the LCD panel.

As the difference in potential between COM (common polar voltage: Fixed at AC) and RGB is larger, the LCD elements are closed more securely. So, display is darker. As the difference is smaller, the elements are opened and display is brighter.

1-2. PW1 POWER SUPPLY CIRCUIT DESCRIPTION

1. Outline

The power supply circuit is mainly composed of the following blocks.

- Switching controller (IC501)
- Speed light control power supply, analog system power output (Q5101, T5001)
- Digital 1.8V power output (Q5131, L5131)
- Digital 3.3V power output (Q5141, L5141)
- LCD system power output (Q5151, L5151)
- Back light power output (Q5161, L5161)
- Lens drive power output (Q5171, T5002)

1-1. Switching controller (IC501)

This includes the 6 channels of basic circuits which are necessary to control the power supply for the PWM-type switching regulator. They are CH1 (digital 5.1V, analog system power output), CH2 (digital 1.8V power output), CH3 (digital 3.3V output), CH4 (LCD system power output), CH5 (back light power output) and CH6 (lens drive system power output). Feedback from 5.0V (D) (CH1), 1.80V (D) (CH2), 3.30V (D) (CH3), 12.0V (L) (CH4) and lens drive 4.2V (CH6) are received, and the PWM duty is varied so that each one is maintained at the correct voltage setting level. For the LCD back light power supply (CH5), feedback for the voltage at both ends of output resistance is provided so that the regular current can be controlled to be the current as set.

• 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.

1-2. Speed light control voltage, analog system power output

5.1V (VSB1), 15V (VSB2), 5.0V (A), 15.0V (A) and -7.6V (A) are outputted. 5.1V (VSB1) is fed back to the switching controller (IC501, Pin (40)) and is used for PWM control.

1-3. Digital 1.8V power output

1.8V (D) is outputted. 1.8V (D) is fed back to the switching controller (IC501, Pin (43)) and is used for PWM control.

1-4. Digital 3.3V power output

3.3V (D) is outputted. 3.3V (D) is fed back to the switching controller (IC501, Pin (45)) and is used for PWM control.

1-5. LCD system power output

12.0V (L) is outputted. 12.0V (L) is fed back to the switching controller (IC501, Pin (47)) and is used for PWM control.

1-6. Back light power output

Regular current (18mA) is being transmitted to LED for LCD back light. The voltage at both ends of the resistance which is positioned in series with LCD is fed back to the switching controller (IC501, Pin (2)) and is used for PWM control.

1-7. Lens drive output

4.2V is outputted. 4.2V is fed back to the switching controller (IC501, Pin (4)) and is used for PWM control.

1-3. SYA CIRCUIT DESCRIPTION

1. Configuration and Function

For the overall configuration of SYA block, refer to the block diagram. The 8-bit microprocessor (IC301) is the center of the SYA block, which controls the camera system condition (mode).

The 8-bit-microprocessor handles the following functions.

1. Input of operation keys, 2. Control and backup of clocks, 3. Power ON/OFF, 4. Charge control of speed light, 5. Signal input/output for zooming and lens control

Pin	Signal	I/O	Outline	
1	DC IN	I	External DC power detection	L: AC adapter
2	TEMP	I	A/D input (Lens temperature sensor)	
3	RDY	I	Speed light charge detection	L: Charge
4	BATTERY	I	Battery voltage detection	
5	AVREF	I	Analog reference voltage input terminal	
6	$\overline{\text{BAT OFF}}$	I	Battery OFF detection signal input	L: Without battery
7	SCAN IN0	I	Key matrix input (↓ detection)	
8	$\overline{\text{SREQ}}$	I	Serial communication request signal	L: Request
9	ZPULSE1	I	Zoom motor drive pulse count (Interruption)	
10	S2	I	S2 input (↓ interruption)	L : S2 ON
11	Q0225/295	I	Q0225/Q0295 judgment	L : Q0225
12	CMD IN2	O	Command dial input 2 (Interruption)	
13	BUZZER	O	BEEP output	
14	VPP	-	Internal connection (Direct connection to VSS terminal)	
15	XCOUT	O	Clock oscillation terminal	
16	XCIN	I	Clock oscillation terminal	
17	VSS1	-	GND	
18	VDD1	-	VDD	
19	XOUT	0	Main clock oscillation terminal	
20	XIN	I	Main clock oscillation terminal (3MHz)	
21	$\overline{\text{RESET}}$	I	Reset input	L : RESET
22	$\overline{\text{RXD}}$	I	Host wake up input terminal	
23	USB CONNECT	I	USB power detection terminal (↓ detection)	L: USB connection
24 ～ 25	NC	O	-	
26	CAPH	-	-	
27	CAPL	-	-	
28 ～ 30	VLC 0~2	-	-	
31 ～ 34	COM 1~4	O	-	
35	SCOM0	O	-	
36 ～ 47	S0~S11	O	-	
48 ～ 49	SCAN OUT4~5	O	Key matrix output	
50	SCAN IN2	I	Unused	
51	NC	O	-	
52	ZPLUSE2	I	Zoom motor drive pulse count	
53, 54	ZM IN1~2	O	Zoom motor drive signal 1 ~ 2	
55	ZRESET	I	Zoom reset input	
56 ～ 59	SCAN OUT 0~3	O	Key matrix output	
60	CMD IN1	I	Command dial input 1	
61	COMREQ	I	Command request signal	
62	SCAN IN1	I	Key matrix input	
63	CHG ON	O	Speed light charge control	H: Charge
64	P ON	O	DC/DC converter (Digital system) ON/OFF signal	H : ON
65	PA ON	O	DC/DC converter (Analog system) ON/OFF signal	H : ON
66	LCD ON	O	LCD back light ON/OFF	H : ON
67	BL ON	O	Back light ON/OFF	H : ON
68	NC	I/O	-	

(Continued on the following page.)

69	ASIC TEST	I	ASIC control signal	L : ASIC RESET
70	ADVREF ON	O	AD VREF ON/OFF signal	L : ON
71	BKUPCTL	O	Backup battery charge control	L: Charge
72	CLKSEL0	O	ARM system clock ON/OFF	H : ON
73	CLKSEL1	O	System clock selection	
74	PLLSEL0	O	System clock selection	
75	PLLEN	O	PLL oscillation ON/OFF	H : ON
76	VSS0	-	GND	
77	VDD0	-	VDD	
78	AF_LED	O	AF LED (Green)	L: ON
79	SB_LED	O	Speed light LED (Red)	L: ON
80	SELF_LED	O	Self LED (Red)	L: ON
81	PWR_LED	O	Power LED (Green)	L: ON
82	MAIN_RESET	O	ASIC reset	L: Reset
83	PICTL	O	Photo interrupter ON/OFF control	L : ON
84	F_ANA	O	PWM output for optical adjustment D/A	
85	$\overline{\text{EXTSB\_DET}}$	O	External flash detection	L: External flash
86	$\overline{\text{CARD}}$	I/O	Card detection	L: Card is used
87	ZAMUTE	O	AUDIO MUTE	L : MUTE
88 ～ 89	NC	O	-	
90	PRG SCK	I	Serial clock output for flash rewriting	
91	PRG SO	O	Serial data output for flash rewriting	
92	PRG SI	O	Serial data input for flash rewriting	
93	SCK	O	Serial clock output （→ASIC）	
94	SO	O	Serial data output（→ASIC）	
95	SI	I	Serial data input（←ASIC）	
96	AVSS	-	Analog GND input terminal	
97 ～ 100	SCAN IN6~3	I	Key matrix input	

Table 3-1. 8-bit Microprocessor Port Specifications

2. Setting of ASIC external port and communication

The SYA block carries out overall control of camera operation by detecting the input from the operation keys 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. 3-1 shows the internal communication between the 8-bit microprocessor and ASIC.

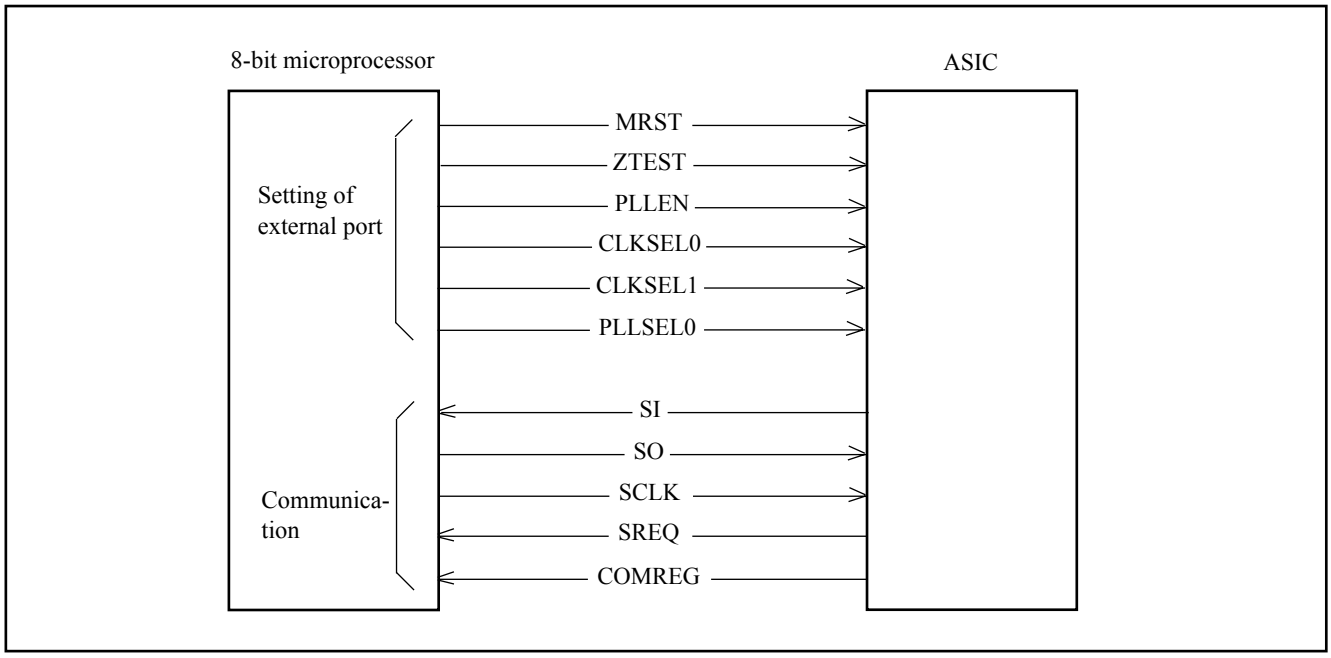


Fig. 3-1 Internal Communication Bus Connection

3. Key Operation

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

SCAN IN / SCAN OUT	0	1	2	3	4	5	6
0	PW_ON	FUNC	+/-	-	S1	SBS	-
1	MONITOR	MENU	QUICK	AFM	AE-L	TEST	-
2	OK	←	→	↑	↓	WIDE	TELE
3	-	M	A	S	P	AUTO	PLAY
4	-	SCENE	MOVIE	SET UP	QUAL	ISO	WB
5	-	DIN CONNECT	AV JACK	-	LCD 反転	LCD OPEN	BAT DET

Table 3-2. 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, 3.2V, which has been regulated by IC302, is supplied from the battery voltage (UNREG) to the 8-bit microprocessor (IC301). Even when the power switch is OFF, clock counting and key scanning are done to prepare so that the camera can start again. When the power is OFF, the microprocessor stops the main clock 3MHz and operates the subclock 32.768kHz.

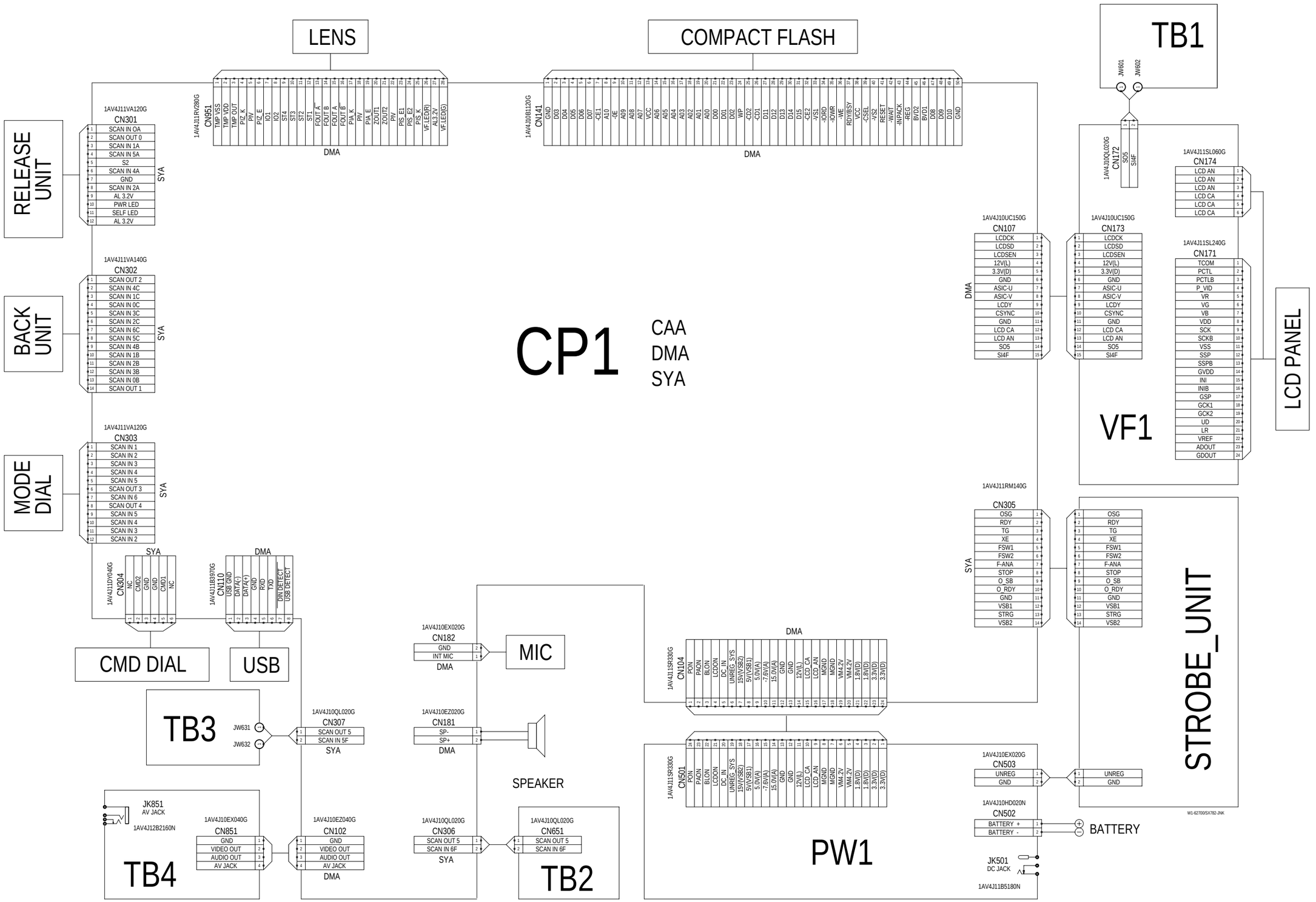
When the battery is removed, the 9-bit microprocessor power is changed to the secondary lithium battery for memory backup by IC302 and it operates at low consumption. At this condition, the 8-bit microprocessor stops the main clock 3MHz and operates only clock counting by the subclock 32.768kHz. The secondary battery for memory backup performs charging for 10 hours since it was attached. When the power switch is turned on, the microprocessor starts.

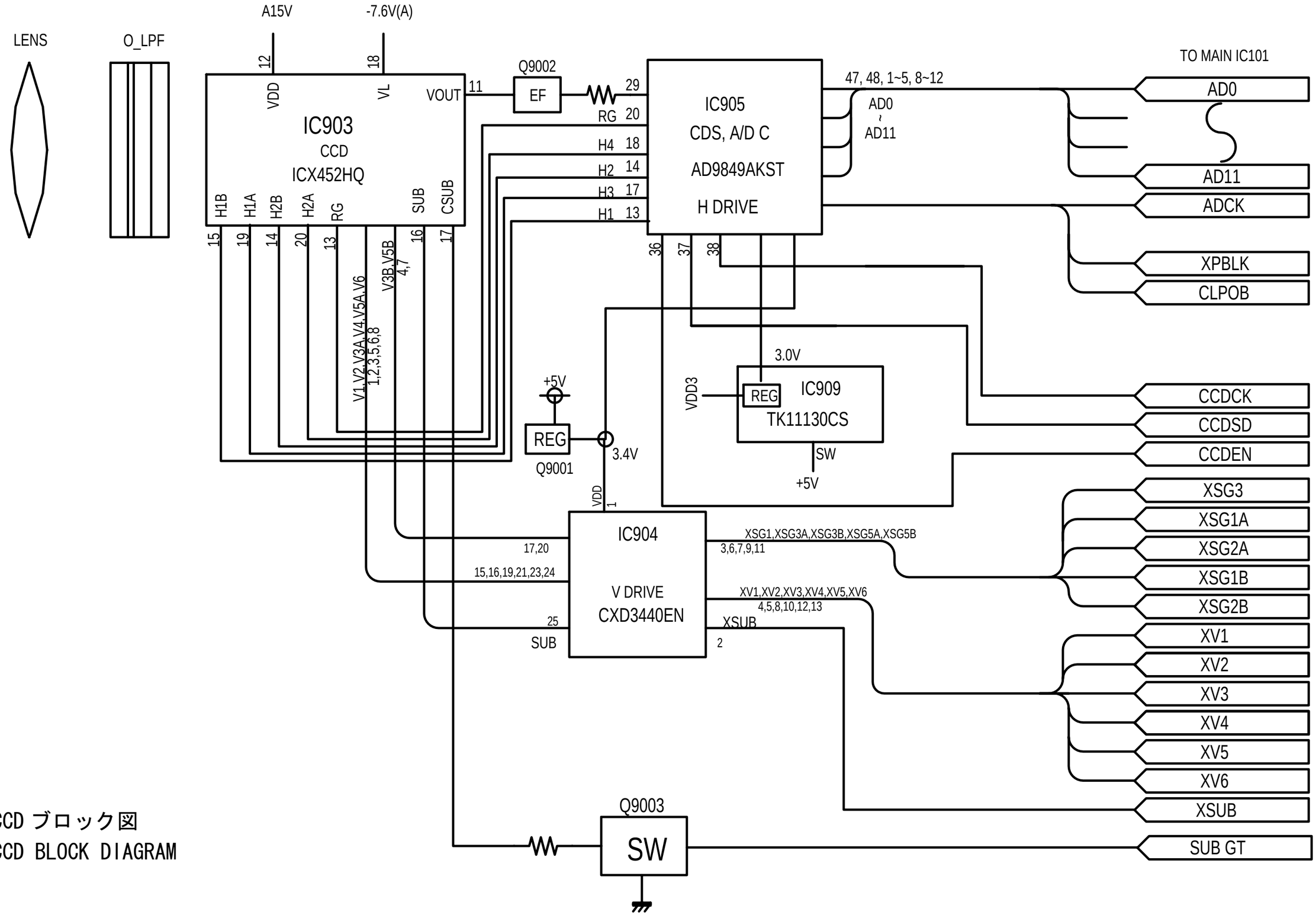
First, the 8-bit microprocessor sets PON signal at Pin 64 and PAON signal at Pin 65 to High and turns on the power circuit. After PON signal is set to High, after approx. 100ms, the external port of ASIC is set and resetting of ASIC (ASIC TEST, MAIN RESET) is done. According to setting of external port, the operation frequency is set and oscillation is controlled in ASIC. Communication with ASIC starts and the system is checked if it can operate.

When the through image is operating, PAON is set to High and the CCD power supply starts. When playback of data is done, PAON is set to Low and the CCD power supply is turned off. When the LCD panel lights up, the LCDON (Pin 66) is set to High, the panel power supply starts, the BLON (Pin 67) is set to High and the back light power supply starts.

When the power is turned off, the lens is stowed, PON, PAON, LCDON and BLON are set to Low and the power supply to the system stops. The microprocessor stops the oscillation of the main clock (3MHz) and sets the operation mode of clock oscillation (32.768kHz).

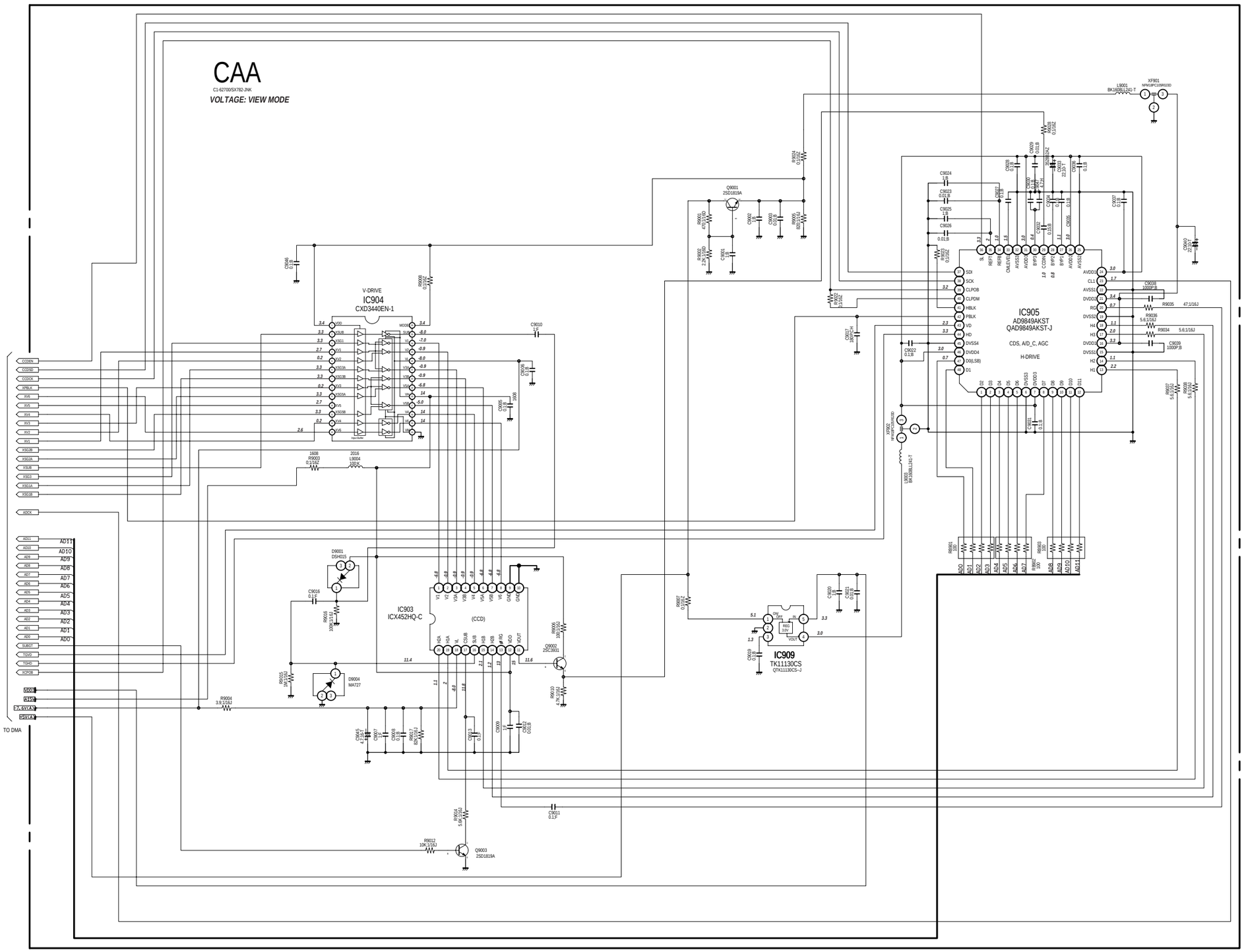
総合結線図
OVERALL WIRING



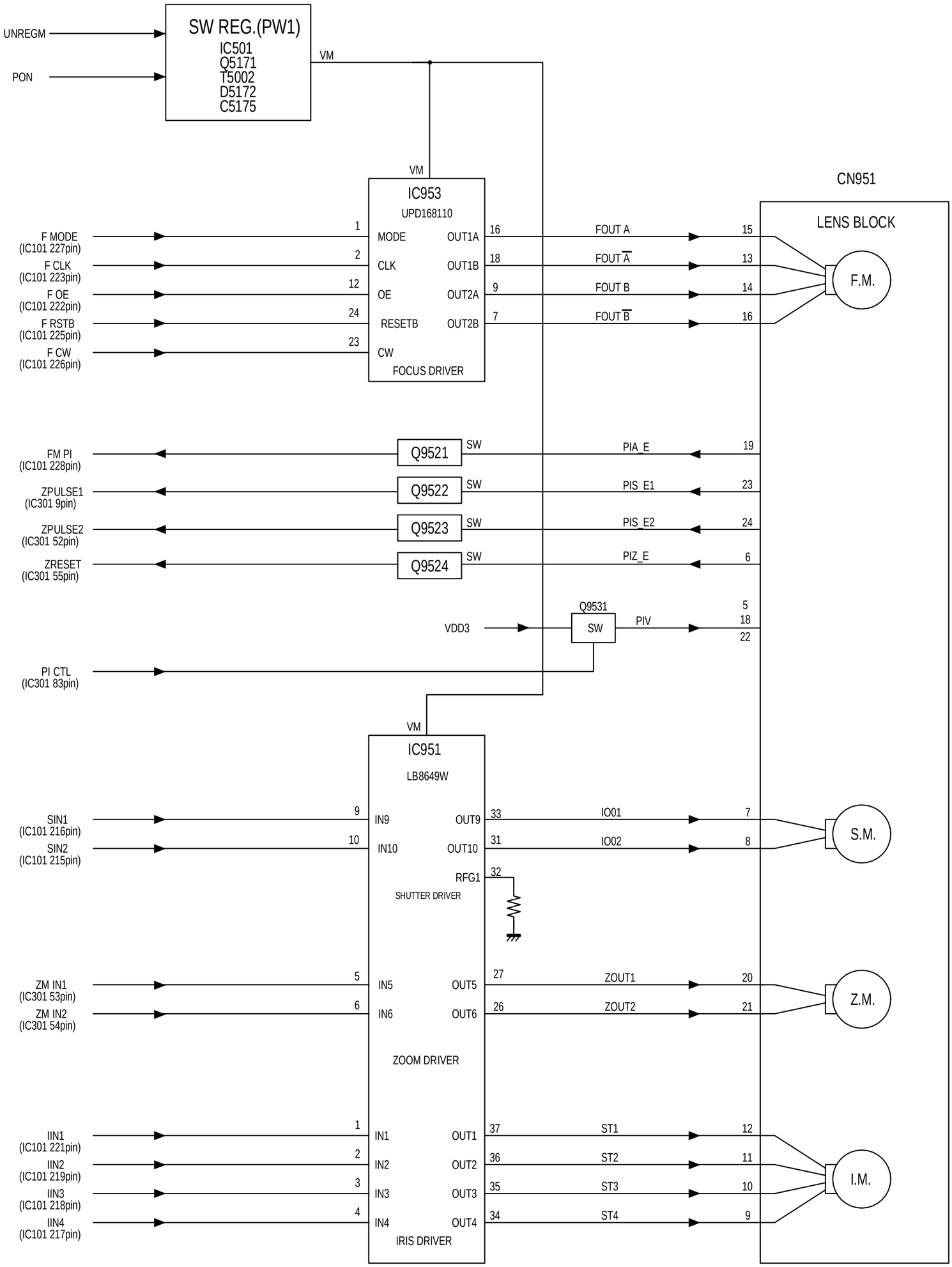


CCD ブロック図
CCD BLOCK DIAGRAM

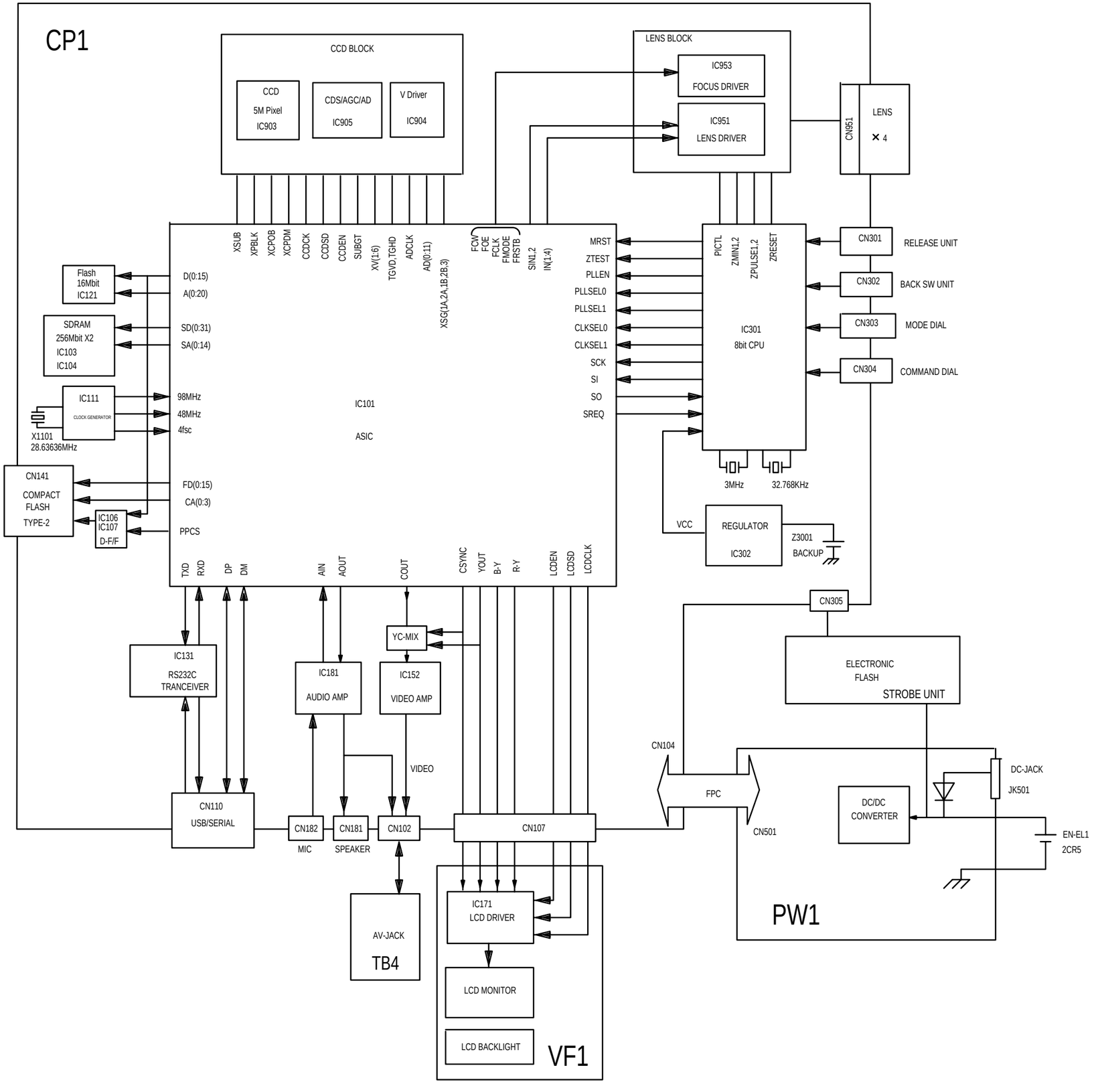
CAA 回路図
CAA CIRCUIT DIAGRAM



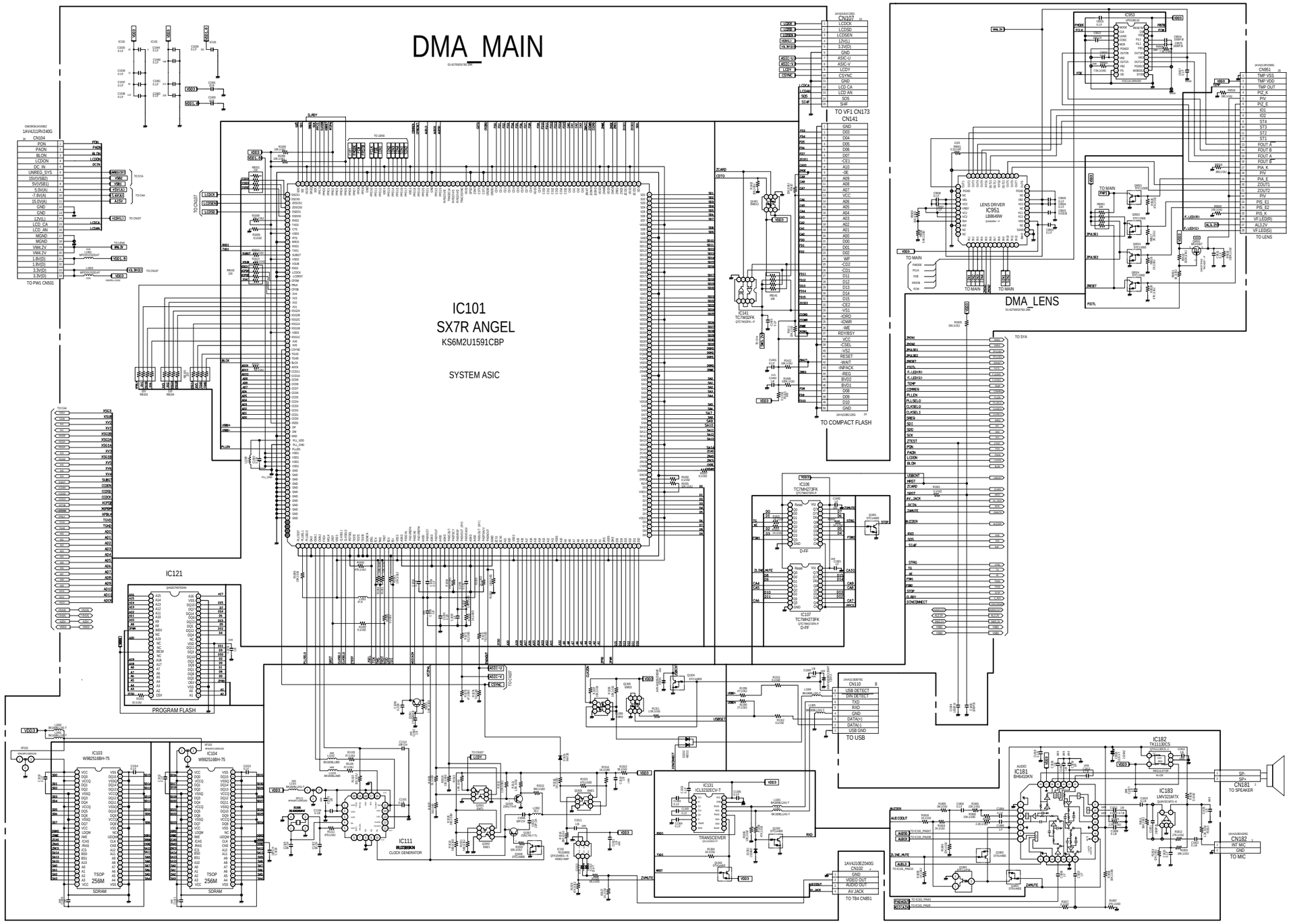
レンズ駆動ブロック図
LENS DRIVE BLOCK DIAGRAM



総合ブロック図
OVERALL BLOCK DIAGRAM



DMA 回路図
DMA CIRCUIT DIAGRAM



VF1

Z1-62700/SX782-JNK

2 CN172
SO5 1
SI4F 2
TO TB1

15 CN173
LCDCK 1
LCDSD 2
LCDSEN 3
12V(L) 4
3.3V(D) 5
GND 6
ASIC-U 7
ASIC-V 8
LCDY 9
CSYNC 10
GND 11
LCD CA 12
LCD AN 13
SO5 14
SI4F 15
TO CP1(DMA)CN107

6 CN174
LCD AN 1
LCD AN 2
LCD AN 3
LCD CA 4
LCD CA 5
LCD CA 6
TO LCD_PANEL

+12.3V(L)
+3.4V(L)

R1735 560;1/16J

L1704 10;J 2016
C1711 180P;CH

RB171 220
R1709 100K;1/16J

C1718 0.1;B
C1717 3216 10;F
R1717 100K;1/16J
C1719 0.1;B
C1721 47;6.3-T

R1711 33K;1/16D VREF
R1712 100K;1/16D

C1722 0.01;B
C1723 0.01;B
C1724 0.01;B

C1726 0.01;B
C1725 1;B 1608

R1702 15K;1/16D
C1702 560P;B
R1701 68K;1/16J
C1703 0.1;B

R1704 10K;1/16D

IC173
TK11130CS
ON/OFF IN
REG 3.0V
OUT
Hi-ON REGULATOR

C1746 1;B 1608
C1748 0.1;B
C1754 1;B 1608

+3.4V(L) TO CN173

LCD DRIVER
IC171
LRS57211

PCTL PCTLB TCOM P_VID SCK
GND4 SLOAD SCLK SDATA HDO CLR PCTL PCTLB TCOM P_VID_CIN P_VID SCK VCC2
VDD2 FOADJ VCOADJ REF VDO VDI R/R-Y G/Y B/B-Y TST1 TST2 VCC OPOUT
SIG.C VR VR_CIN VG VG_CIN VB VB_CIN GND2 SCKB SSP GND SSPB VDD1
OP/IN SYNCIN LR UD GCK1 GCK2 GSP INIB INI EXR EXG EXB GND3
LR UD GCK1 GCK2 GSP INIB INI

C1714 1;B 1608
C1715 0.1;B
C1716 0.68;F 1608
L12V

C1712 0.01;B
R1707 10;1/16J
C1709 0.68;F
R1706 10;1/16J
C1708 0.68;F
R1705 10;1/16J
C1707 0.68;F
C1706 0.01;B

VR 1608
VG 1608
VB 1608
SCKB
SSP
SSPB

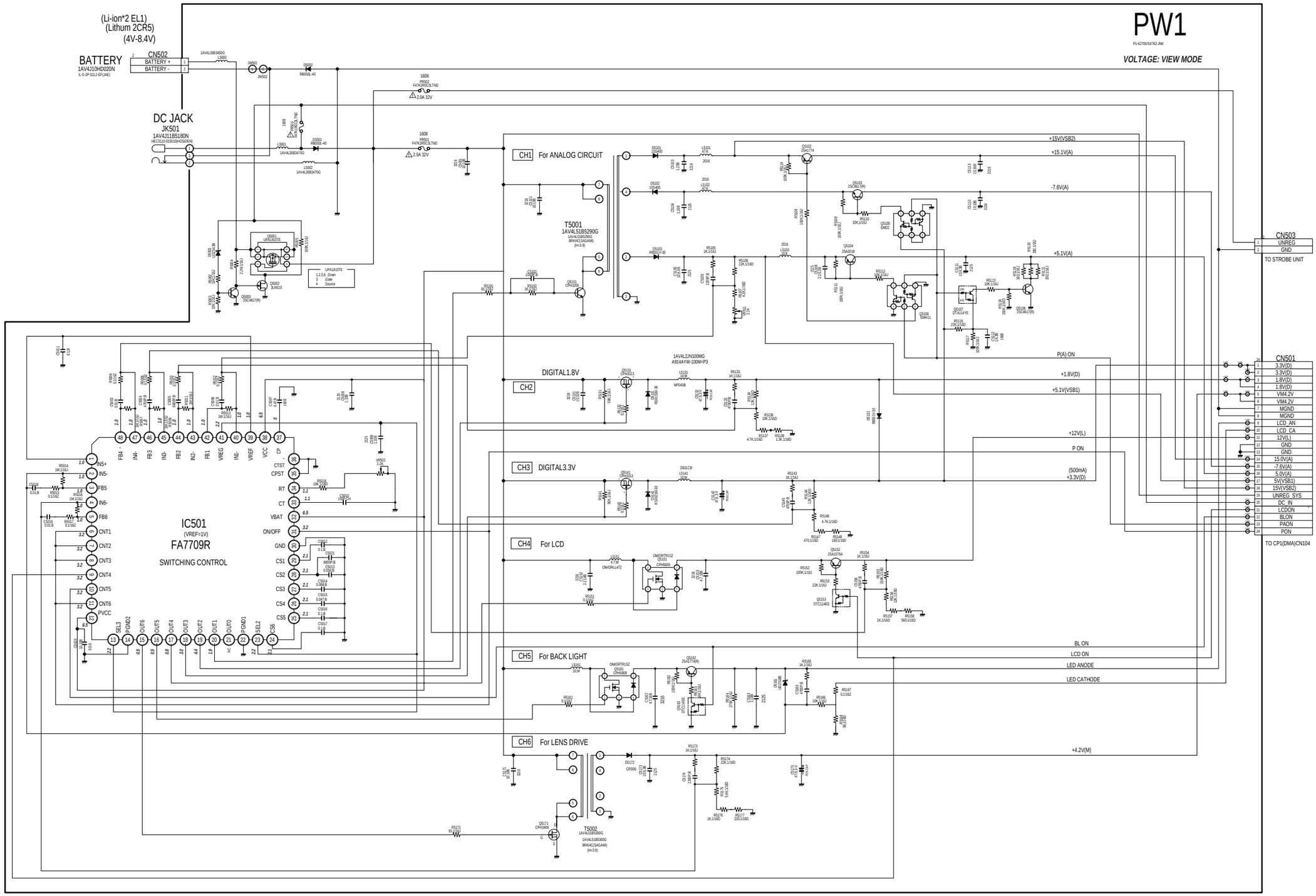
R1738 2.2;1/16J
C1758 0.1;B 1608
R1739 1M;1/16J
D1701 UDZS16B
C1759 1;B 1608

TCOM PCTL PCTLB P_VID VR VG VB SCK SCKB SSP SSPB INI INIB GSP GCK1 GCK2 UD LR VREF

CN171 24
1 TCOM
2 PCTL
3 PCTLB
4 P_VID
5 VR
6 VG
7 VB
8 VDD
9 SCK
10 SCKB
11 VSS
12 SSP
13 SSPB
14 GVDD
15 INI
16 INIB
17 GSP
18 GCK1
19 GCK2
20 UD
21 LR
22 VREF
23 ADOUT
24 GDOUT
TO LCD_PANEL

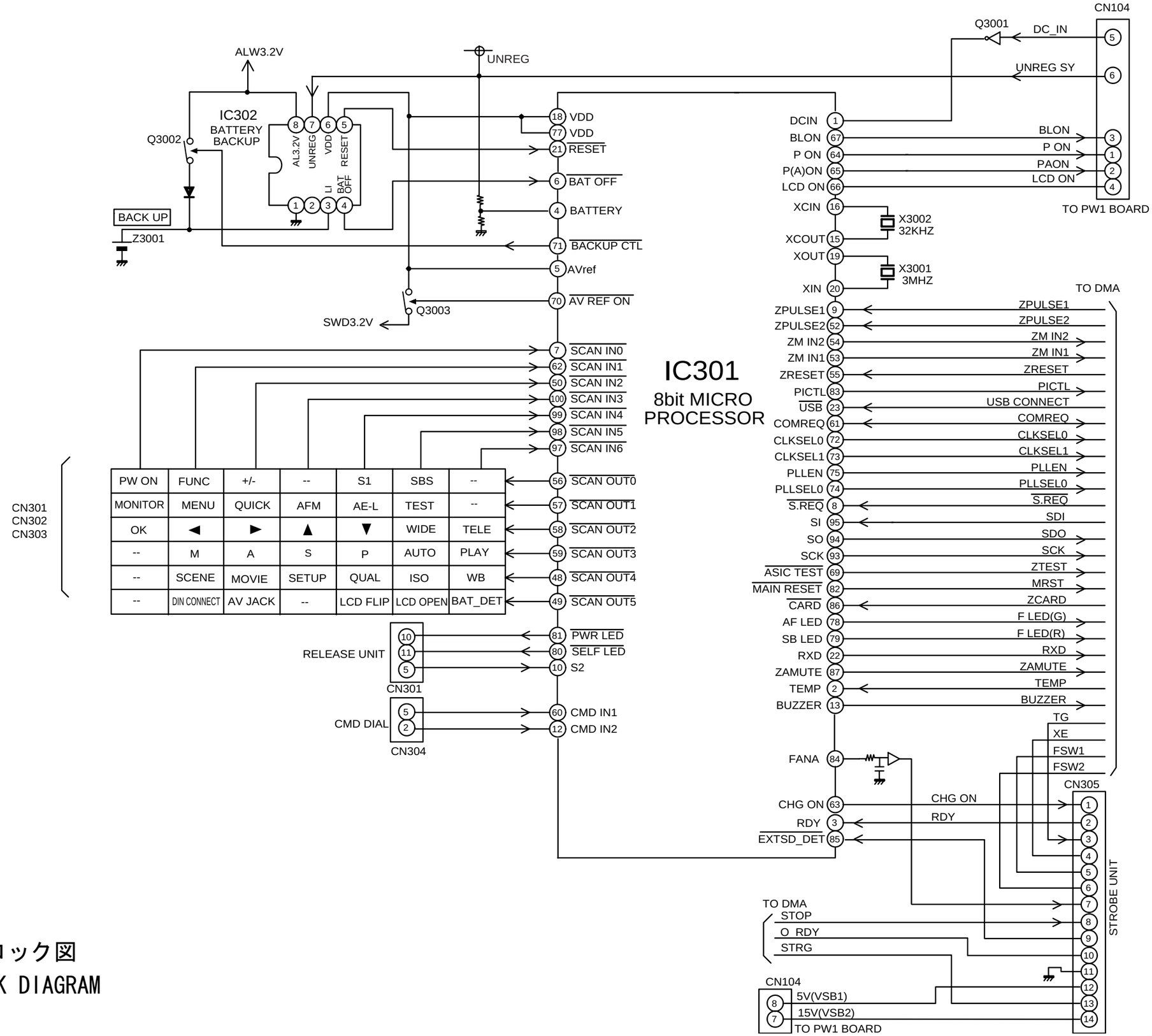
TO CN173 +12.3V(L)
L1702 2520 10;K
L12V
C1778 3225 3.3;B 16V

VF1 回路図
VF1 CIRCUIT DIAGRAM



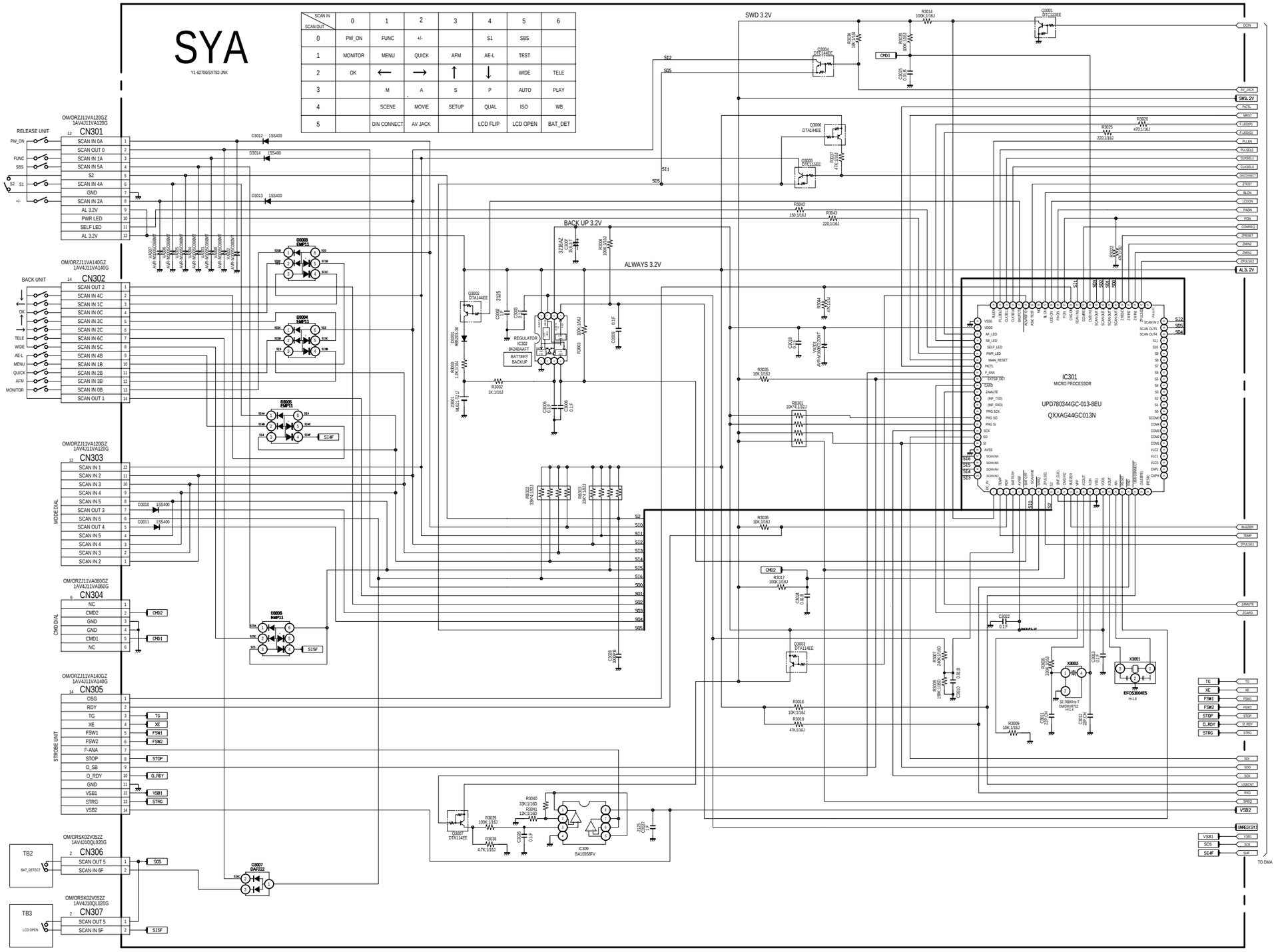
PW1 回路図

PW1 CIRCUIT DIAGRAM

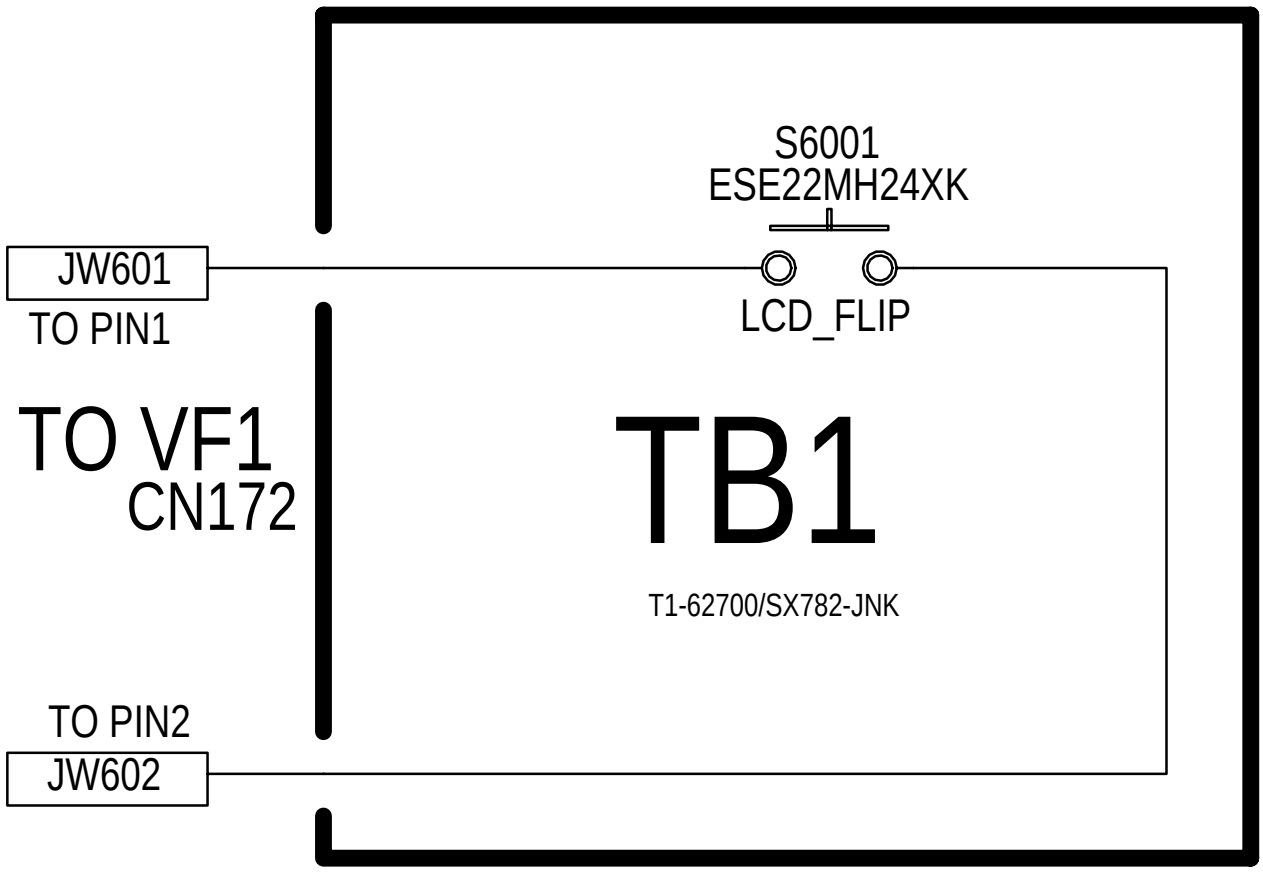


システムブロック図
SYSTEM BLOCK DIAGRAM

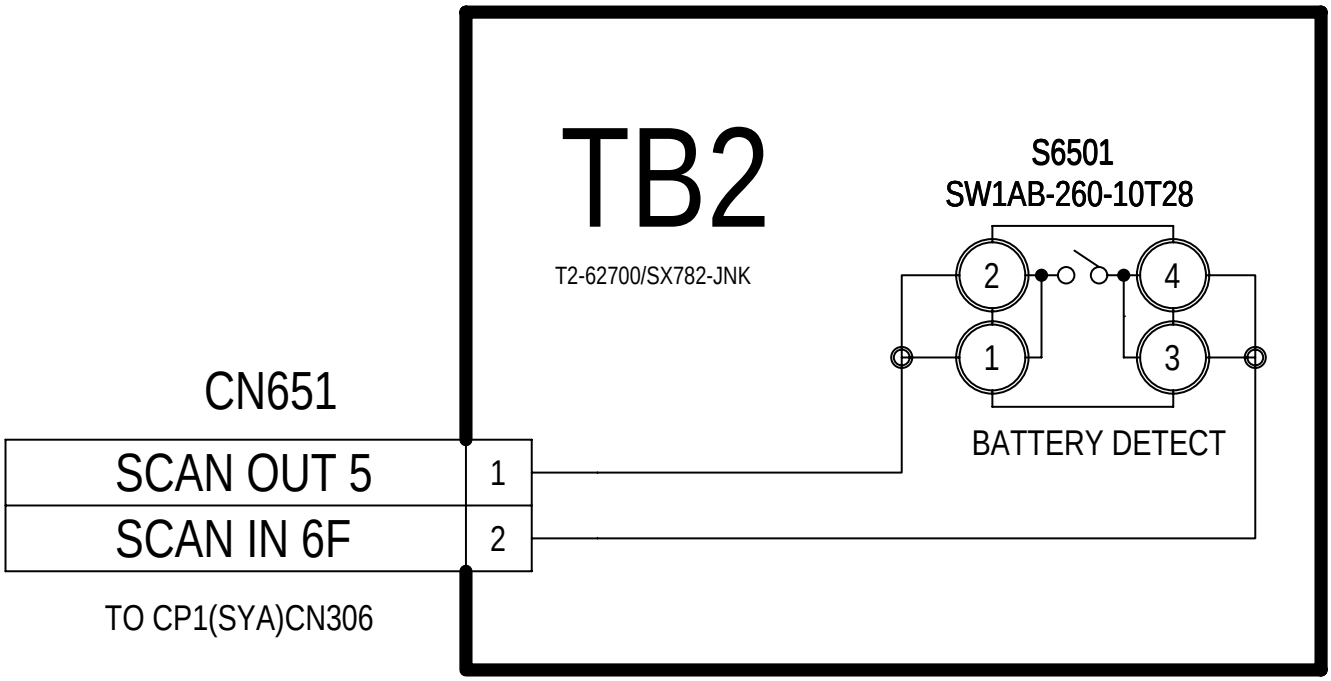
SYA 回路図
SYA CIRCUIT DIAGRAM



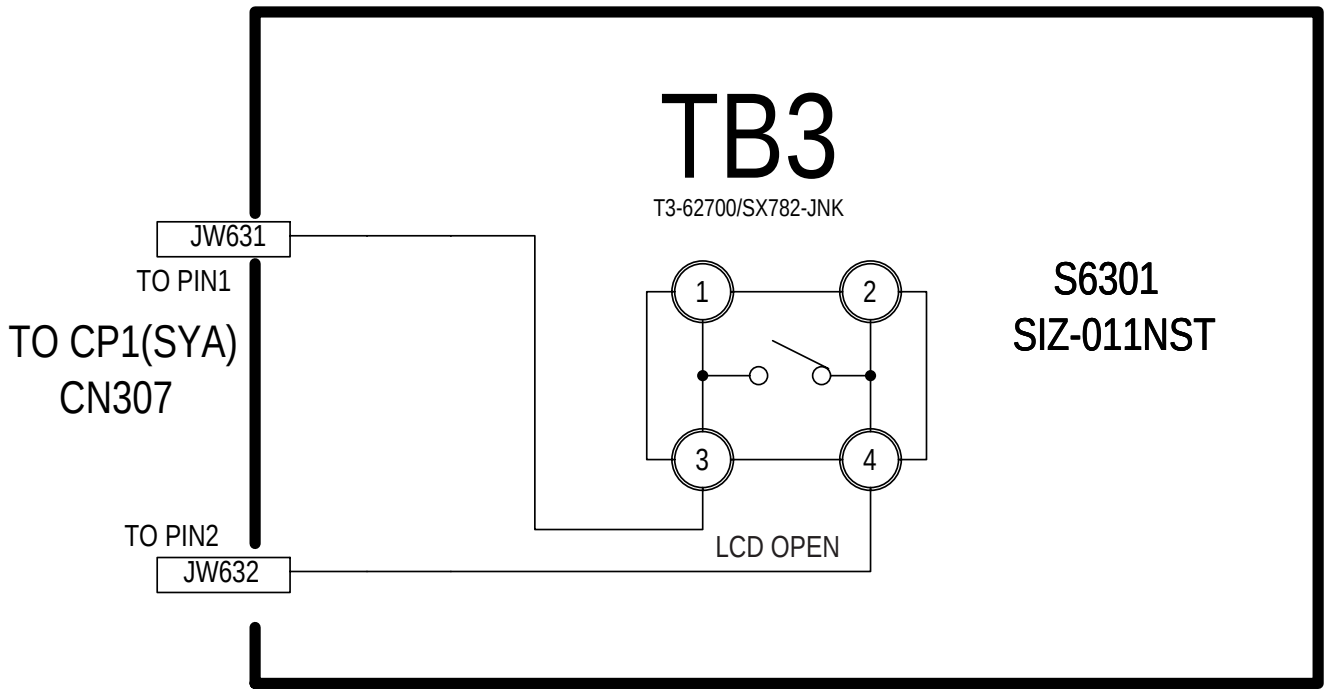
TB1 ブロック図
TB1 BLOCK DIAGRAM



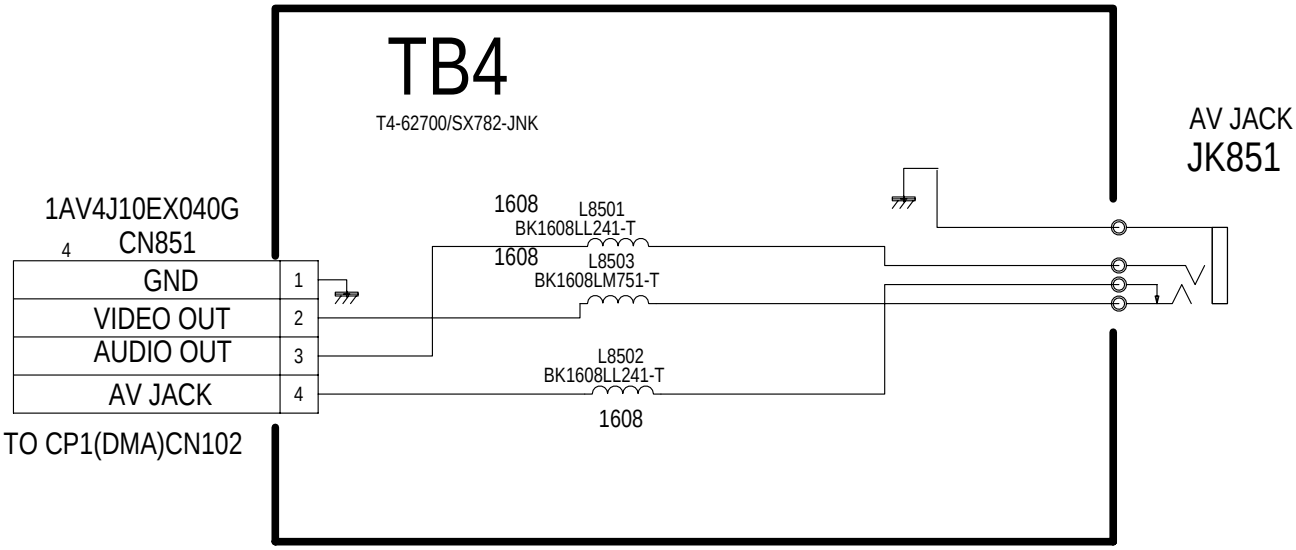
TB2 ブロック図
TB2 BLOCK DIAGRAM



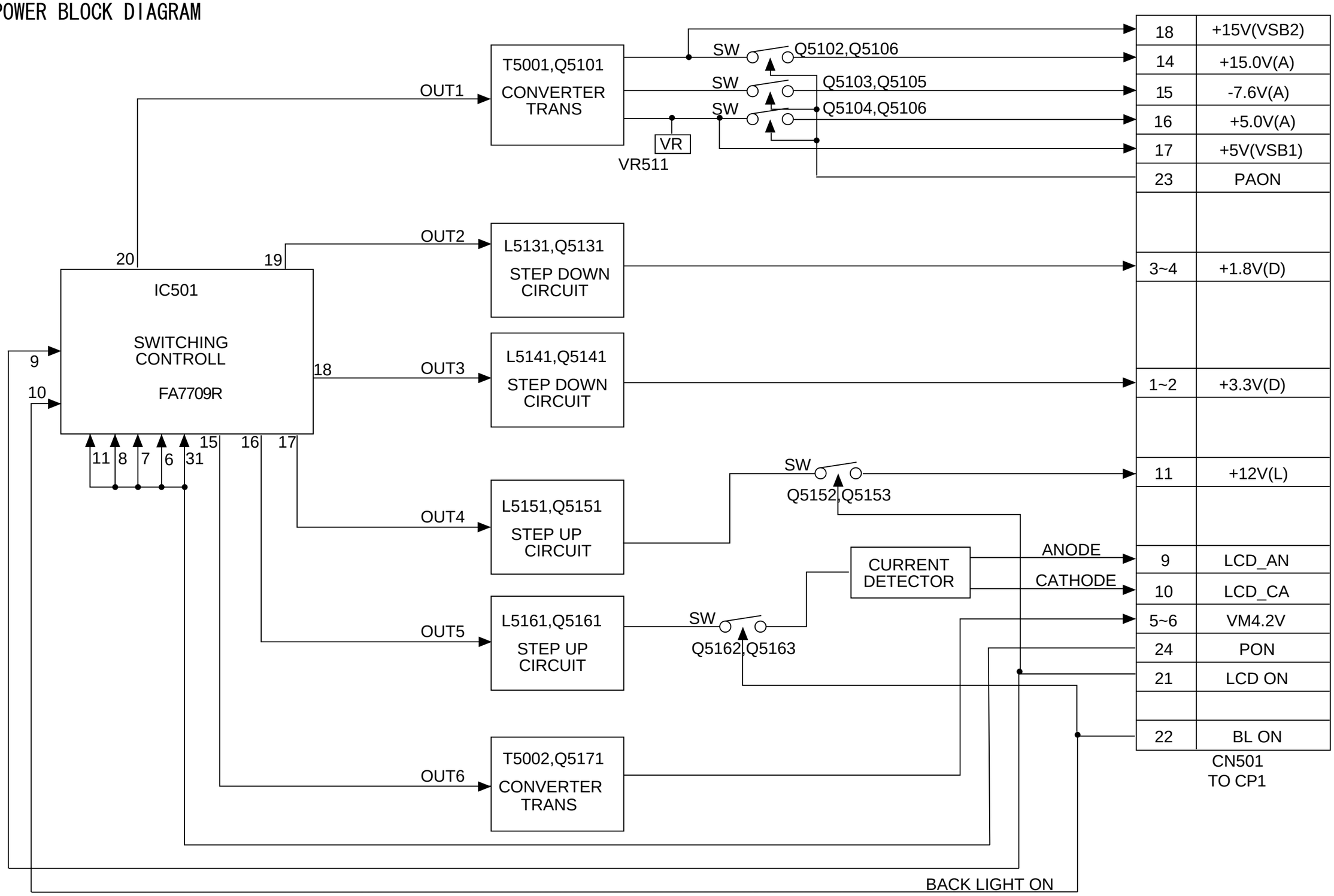
TB3 ブロック図
TB3 BLOCK DIAGRAM



TB4 ブロック図
TB4 BLOCK DIAGRAM



POWER ブロック図
POWER BLOCK DIAGRAM



The contents of inspection standards and tools for E5400

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, use a Sanyo 2CR5 lithium battery (within four months of manufacture).
   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-53 shall be required.

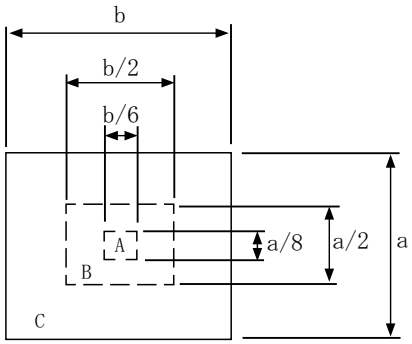
Inspection standards

Item	Criteria	Applied tool(s)
External view		
Clearance/Difference in height	• Clearance around the battery cover when it is closed at the bottom: 0.6mm or less • Clearance of general sections: 0.3mm or less Difference in height: 0.15mm or less	Vernier calipers
External/internal view	• There must not be noticeable scratches or soil. (Check it visually under the fluorescent lamp and natural sunshine.)	
Operation		
Operation	• While operating, any irregularities or irregular noise must not occur. (While operating, check it by shaking the camera. While each unit is operating, check it by hitting the camera lightly against the lithium-laid desk.)	Primary battery Secondary battery
Operability: Button	• Cave-ins of buttons must not occur. • Operation must be smooth.	
Lever/knob	• You must feel normal clicking. Any outstanding "caught-in-mechanism" or "rubbed-in-mechanism" touch must occur. (Check and observe the condition through normal operation.)	
Operation touch	• Operation touch must be normal.	
Covers	• Covers must be opened/closed smoothly.	
Monitor		
Shooting image	• Inclined degree of image: 0.5° or less (When the through image is operating for the PC monitor and print output, the output should be evaluated with the boundary of the LCD unit display range as reference.)	Photoshop Printer
Lens capacity		
Focal distance	WIDE end (Compelling ∞) 5.8 mm +7% -1% TELE end (Compelling ∞) 24.0 mm +1% -7%	Special tool (Focal distance measuring instrument) Visual check
Open aperture F No.	WIDE end (Compelling ∞) F2.8 mm +7.8% -1.2% TELE end (Compelling ∞) F4.6 mm +9.6% -0.5%	
Performance	• There must not be noticeable damage such as ghost, flare, distortion, etc.	
Zoom	• Abnormal actions (unbalanced movement, scratching, etc.) must not occur. (Check it by changing the camera posture.)	

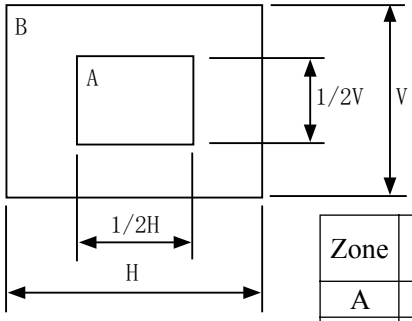
Item	Criteria	Applied tool(s)
AF		
Distance measurement	• Focus must be accurate in the selected area. (Select an AF area and check it.)	Visual check
Compelling ∞	• The distant view mark and flash prohibition mark must be displayed on LCD. (Set to "Compelling ∞" and then check it by lightly pressing the shutter release button.) • SB must not flash. (Check it by releasing in the "Compelling ∞" mode.)	
Focus lock	• Focus lock must be effective. (At an optional distance, lightly press the shutter release button. Under this condition, face the camera to an object at a different distance and check it by the monitor.)	Visual check
Distance measurement impossible display	• Lightly press the shutter release button, and LED8Hz must blink. (Check it by lightly pressing the shutter release button.)	
Shooting with speed light		
Optical adjustment accuracy	• TELE: 0.5 ～ 2.0m • WIDE: 0.5 ～ 3.5m In the above range, ±1EV or less Setting ISO: AUTO Speed light: Compelling flash Exposure: P mode	Standard reflection plate Flash meter New primary battery
Guide number (ISO100・m)	• FULL 9±0.5 EV (After charging for 18 sec. by a fully charged fresh battery, measure the guide No. within 1 sec.)	
Red-eye reduction lamp	• Just before exposure, carry out small-light flash three times and then main flash. By changing the mode, make sure that the pre-flash does not work.	
Recycling time	• Within 8 sec. (when the battery full mark is displayed)	
Lock for insufficient charging	• While you are lightly pressing the shutter release button, the red LED must blink and the shutter release lock must not work.	
Wrong flash	• Wrong flash must not occur. (Flash must not occur when the battery is inserted/removed, a slight shock is given and mode buttons are operated except the release button.)	

<table>
<tr><th>Item</th><th>Criteria</th><th>Applied tool(s)</th></tr>
<tr><td>Quality of image
Resolution</td><td>The resolution must be in compliance with the following values in EIAJ chart evaluation.
• Horizontal center: 1250 lines
Vertical center: 1250 lines
Horizontal periphery: 850 lines
Vertical periphery: 850 lines
Set the conditions as follows:
FINE, Auto-white balance, P mode, sensitivity 50, gradation correction: standard, outline emphasis: standard and center emphasis metering, WIDE end, aperture: open and distance: 0.4m or more (Use the macro mode.)
Set a chart onto the 5100K viewer and take a picture in the full range of angle of view.
Open the file with PHOTOSHOP and read the resolution visually.</td><td>EIAJ chart
Photoshop
Fisheye-converter (FC-E9)</td></tr>
<tr><td>Incorrect centering of image</td><td>When taking a picture with Fisheye, keep the range of 183°.
On the monitor LCD, the circle must not be shaded.</td><td></td></tr>
<tr><td>Color reproduction</td><td><table><tr><th></th><th>R</th><th>G</th><th>B</th></tr><tr><td>W</td><td>195-235</td><td>195-235</td><td>195-235</td></tr><tr><td>Ye</td><td>185-225</td><td>205-240</td><td>30-70</td></tr><tr><td>R</td><td>185-215</td><td>5-30</td><td>1-15</td></tr></table>• Set the conditions as follows:
FINE, Auto-white balance, P mode, sensitivity 50, gradation correction: standard, outline emphasis: standard and center emphasis metering
• Set a chart onto the 5100K viewer and take a picture in the full range of angle of view.
Open the file with PHOTOSHOP and select the measurement section (center 64 × 64 pixels) of corner color with the rectangular selection tool.
• Read the histogram’s RGB.</td><td>Visual check
Photoshop
Color bar chart</td></tr>
</table>

Item	Criteria	Applied tool(s)
Finder		
Visual quality	• Image There must not be noticeable trouble in blur, flare, distortion, contrast, ghost, halation, color tone, etc. • Shading You can check the whole angle of view in finder.	Visual check
Operation	• Zoom Operation must be smooth. Linkage operation with the lens barrel zooming must be correct.	
Dust/Fluff/Scratch	Position and number must be as follows. • Total: 3 pieces or less • Distance: Apart b/2 or more • For the size and quantity of blur, obey the limit samples.	



	Area A	Area B	Area C
Less than 10 μm	0 pc.	2 pcs. or less	3 pcs. or less
10 ～ 20μm	0 pc.	0 pc.	1 pc. or less
20 μm or more	0 pc.	0 pc.	0 pc.

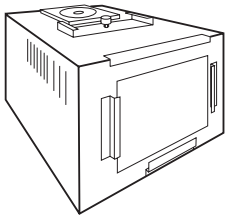
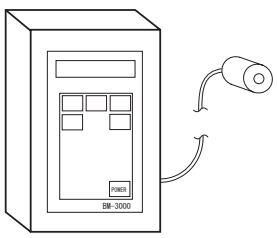
<table>
<tr><th>Item</th><th>Criteria</th><th>Applied tool(s)</th></tr>
<tr><td>LCD and others
Monitor LCD</td><td>View, etc.
• No shading in the LCD display range
• Inclination of image and monitor frame must be within 75°.
Field of view
• Through image: 96 ～ 100%
• Playback image:98 ～ 100%
Bright pixels or dim pixels
 

<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>3</td><td>6</td></tr>
<tr><td>Total</td><td>3</td><td>6</td></tr>
</table>
(Standard: Within the above quantity)
Bright pixels: Visible normally through 5% ND filter
Dim pixels: Dark pixels</td><td></td></tr>
<tr><td>Self</td><td>Operation time
• 10 (3) ± 3 (1) sec. ( ): When 3-second self is set
(Measure the time since the shutter release button was lightly pressed till release is done.)
Lamp blinking/lighting
• Blinking for 9 sec. and lighting for 1 sec.
• Blinking for 2 sec. and lighting for 1 sec.</td><td>Visual check
Stop watch</td></tr>
<tr><td>Electrical characteristics
Consumption current</td><td>Standby
• 0.2mA or less (when the power is OFF)
0.3mA or less (when “sleep” is set)
(Connect 6.0V from the constant-voltage power supply and measure.)
Start (shooting)
• 1A or less
Under AUTO start and monitor ON condition, wait for 15 seconds or more and then measure.)</td><td>Constant-voltage power supply
Ammeter</td></tr>
</table>

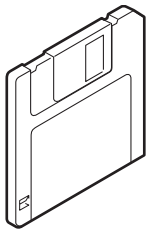
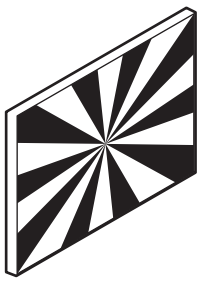
Item	Criteria	Applied tool(s)
Electrical characteristics Battery check voltage	Level 1 (Half battery mark) • 4.8 ± 0.2V (Primary battery) 7.3 ± 0.2V (Secondary battery) (While lowering the power supply voltage, lightly press the shutter release button. Then, when the battery mark appears on the LCD, measure the voltage.) Level 2 (The battery mark blinks.) • 4.0 ± 0.25V (Primary battery) 6.7 ± 0.25V (Secondary battery) (While lowering the power supply voltage, lightly press the shutter release button. Then, when the battery mark blinks on the LCD, measure the voltage.) Level 3 (The LCD is turned off/The shutter release mode is locked.) • 3.5 ± 0.2V (Primary battery) 5.5 ± 0.2V (Secondary battery) 5.7 ± 0.2V (External battery) (While lowering the power supply voltage, lightly press the shutter release button. Then, when the LCD is turned off, measure the voltage.)	

［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 	共通（E4300, E3500, E3100, E2100,E5400） Common
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（Ver.1.30a） Calibration Software (Ver.1.30a) 	共通 (E995,E775,E885 E5000, E2500, E4500 E5700, E4300, E3500 E3100, E2100,E5400) Common(E995,E775,E885 E5000, E2500, E4500 E5700, E4300, E3500 E3100, E2100,E5400)
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
※ J61201	ファインダー位置出しピン Finder positioning pin 	

Siemens chart