

作成承認印	配布許可印

Nikon **COOLPIX8400**

REPAIR MANUAL

Nikon | **NIKON CORPORATION**
Tokyo, Japan

Copyright © 2004 by Nikon Corporation.
All Rights Reserved.
無断転載を禁ず !!

CONTENTS

SPECIFICATIONS	M 1 – M 2
----------------------	-----------

DISASSEMBLY

WARNING	D 1
REAR COVER	D 2
DIAL UNIT	D 6
REAR SW	D 6
LCD	D 7
EVF UNIT	D 1 0
DISASSEMBLY OF EVF UNIT	D 1 1
FRONT COVER	D 1 3
LIGHT-SHIELD RING	D 1 4
MAIN CONDENSER	D 1 4
DISASSEMBLY OF FRONT COVER	D 1 5
CF CARD COVER	D 1 6
PW1 PCB	D 1 7
BATTERY CHAMBER	D 1 8
SPEAKER	D 2 0
TB1 PCB	D 2 1
CP1 PCB	D 2 2
PAF SENSOR UNIT	D 2 3
CCD MOUNT	D 2 4
3RD LENS GROUP	D 2 6
DRIVE GEAR	D 2 7
FIXED BARREL	D 2 9
2ND LENS GROUP BARREL UNIT	D 3 0
SHUTTER	D 3 1
1ST LENS GROUP	D 3 2

ASSEMBLY

1ST LENS GROUP	A 1
SHUTTER	A 3
2ND LENS GROUP BARREL UNIT	A 4
FIXED BARREL	A 5
DRIVE GEAR	A 7
PAF SENSOR UNIT	A 8
3RD LENS GROUP	A 9
CCD MOUNT	A 1 0
RESOLUTION INSPECTION	A 1 2
CP1 PCB	A 1 3
TB1 PCB	A 1 4
SPEAKER	A 1 5
BATTERY CHAMBER	A 1 6
PW1 PCB	A 1 8
CF CARD COVER	A 1 9
ASSEMBLY OF FRONT COVER	A 2 0
LIGHT-SHIELD RING	A 2 1

FRONT COVER	A 2 2
ASSEMBLY OF EVF UNIT	A 2 3
EFV UNIT	A 2 5
LCD	A 2 6
DIAL UNIT	A 2 9
REAR SW	A 2 9
REAR COVER	A 3 0
ADJUSTMENT	A 3 5 – A 4 9
DISCRIPTION OF CIRCUIT.....	E 1 – E 9
ELECTRICITY	
OVERALL WIRING	E 1 0
OVERALL BLOCK DIAGRAM	E 1 1
ASIC BLOCK DIAGRAM	E 1 2
CP-1 (LENS) BLOCK DIAGRAM.....	E 1 3
CP-1 (8bit MICRO PROCESSOR) BLOCK DIAGRAM.....	E 1 4
CA-1 BLOCK DIAGRAM	E 1 5
PW-1 BLOCK DIAGRAM.....	E 1 6
PW-2 BLOCK DIAGRAM.....	E 1 7
PW-3 BLOCK DIAGRAM.....	E 1 8
VF-1 CIRCUIT DIAGRAM	E 1 9
TB-1 BLOCK DIAGRAM	E 2 0
TB-2 BLOCK DIAGRAM	E 2 1
TB-3 BLOCK DIAGRAM	E 2 2
DMA CIRCUIT DIAGRAM.....	E 2 3
VFA CIRCUIT DIAGRAM.....	E 2 4
SYA CIRCUIT DIAGRAM.....	E 2 5
SYB CIRCUIT DIAGRAM	E 2 6
CAA CIRCUIT DIAGRAM	E 2 7
CAB CIRCUIT DIAGRAM	E 2 8
FUSE configuration (PW-1)	E 2 9
INSPECTION STANDARDS.....	R 1 – R 7
TOOI LIST	T 1 – T 5

SPECIFICATIONS



Type	E8400 digital camera
Effective pixels	8.0 million
CCD Image size (pixels)	2/3" CCD; total pixels: 8.31 million • 3,264 × 2,448 (8M) • 3,264 × 2,176 (3 : 2) • 2,592 × 1,944 (5M) • 2,048 × 1,536 (3M) • 1,600 × 1,200 (2M) • 1,280 × 960 (1M) • 1,024 × 768 (PC) • 640 × 480 (TV)
Lens Focal length Construction	3.5 × Zoom Nikkor ED F=6.1-21.6 mm (35-mm [135] camera-format equivalent: 24 - 85 mm) 10 elements in 7 groups (includes 2 glass-molded ED lens elements)
Digital zoom	Up to 4 × (35-mm [135] camera-format equivalent: 340 mm)
Auto focus (AF) Focus range Focus-area selection AF-assist illuminator	The following functions are usable: Phase difference detection AF by using the AF distance measurement sensor/Contrast detection TTL AF/Multi-area automatic focus. 50 cm (1'8")8 — ∞ ; 3 cm (1.2 ") — ∞ (W) / 20 cm (7.9") — ∞ (T) in macro and manual focus modes Center; auto 5-area multi AF; manual 9-area multi AF Class 1 LED product (IEC60825-1 Edition 1.2-2001); max. output: 1900 μ W
Viewfinder Magnification Frame coverage Diopter adjustment	0.44., 235,000-dot, polysilicon TFT color LCD viewfinder Approximately 0.2 . 0.7 × Approximately 97% horizontal and 97% vertical -3- +1 m ⁻¹
Monitor Frame coverage	1.8., 134,000-dot, High Transmissive Advanced TFT LCD monitor with brightness and hue adjustment Approximately 97% horizontal and 97% vertical (shooting)
Exposure Metering Exposure control Range	Four mode through-the-lens (TTL) metering: • 256-segment matrix • Spot • Center-weighted • Spot AF area Programmed auto exposure with flexible program, shutter-priority auto, aperture-priority auto, manual, exposure compensation (.2.0 . +2.0 EV in 1/3 EV steps), autoexposure bracketing, AE-BSS W: 0 — + 18.5EV T: +1.5 — + 18.5EV
Storage Media File system File format	SD (Secure Digital) memory cards, internal memory Compliant with Design rule for Camera File systems (DCF), Exif 2.2, and Digital Print-Order Format (DPOF) Compressed: JPEG-baseline-compliant Movies: QuickTime
Shutter Speed	Mechanical and charge-coupled electronic shutter 2 — 1/3,000 s (auto and exposure mode P), 8 — 1/3,000 s (exposure modes S and A), BULB / TIME (max. 10 min.) and 8 — 1/3,000 s (exposure mode M), 1/30 — 1/8,000s (Ultra HS). Maximum at some apertures is 1/1,500 s.

Aperture Range	Seven-blade iris diaphragm. Ten settings in steps of 1/3 EV (to minimum of f/7)
Sensitivity	Approximately equivalent to ISO 50, 100, 200, 400; Auto
Self-timer	10 s or 3 s; can be used with supplied ML-L3 remote control
Built-in Speedlight Range (approx) Sync method	W: 0.5 . 6.0 m/1' 8" – 19'8" T: 0.5 . 3.0 m/1' 8" – 9'10" Standard i-TTL flash for digital SLR
Accessory shoe Sync contact	Standard ISO hot-shoe contact with safety lock X-contact only
Storage Media File system File formats	Type I and II CompactFlash. (CF) and Microdrive cards Compliant with Design Rule for Camera File System (DCF) *, Exif 2.2, and Digital Print Order Format (DPOF) Uncompressed: RAW (NEF), TIFF-RGB Compressed: JPEG-baseline-compliant (1 : 2, 1 : 4, 1 : 8, 1 : 16) Movies: QuickTime Sound files: WAV
Interface	USB 2.0 high speed
Video output	Can be selected from NTSC and PAL
Supported languages	Chinese (Simplified and Traditional), Dutch, English, French, German, Italian, Japanese, Korean, Spanish, Swedish
I/O terminals	DC in; digital I / O (audio-visual out and USB)
Power sources	<ul style="list-style-type: none"> • One rechargeable Nikon EN-EL7 lithium-ion battery (supplied) • MB-CP10 battery pack (available separately) with six AA (LR6) alkaline, lithium, NiCad, or NiMH batteries • EH-54 AC adapter (available separately)
Battery life	Approximately 260 shots (EN-EL7; based on CIPA standard *)
Dimensions	113 × 82 × 75 mm/4.4. × 3.2. × 3.0. (W × H × D)
Approximate weight	400 g (14 oz) without battery or memory card
Operating environment Temperature Humidity	0 - 40° C (32 – 104° F) Less than 85% (no condensation)

* Industry standard for measuring life of camera batteries. Measured at 25 ° C (77 ° F); zoom adjusted with each shot, built-in Speedlight fired with every other shot, image mode set to NORMAL / 8M

Unless otherwise stated, all figures are for a camera with a fully-charged EN-EL7 battery operated at an ambient temperature of 25 ° C (77 ° F).

Disassembly

 WARNING	
	<ul style="list-style-type: none">● There are high voltage 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.

- Lead-free solder is used for this product.
- For soldering work, the special solder and soldering iron are required.
- Do NOT mix up lead-free solder with traditional solder.
- Use the special soldering iron respectively for lead-free solder and lead solder. They cannot be used in common.

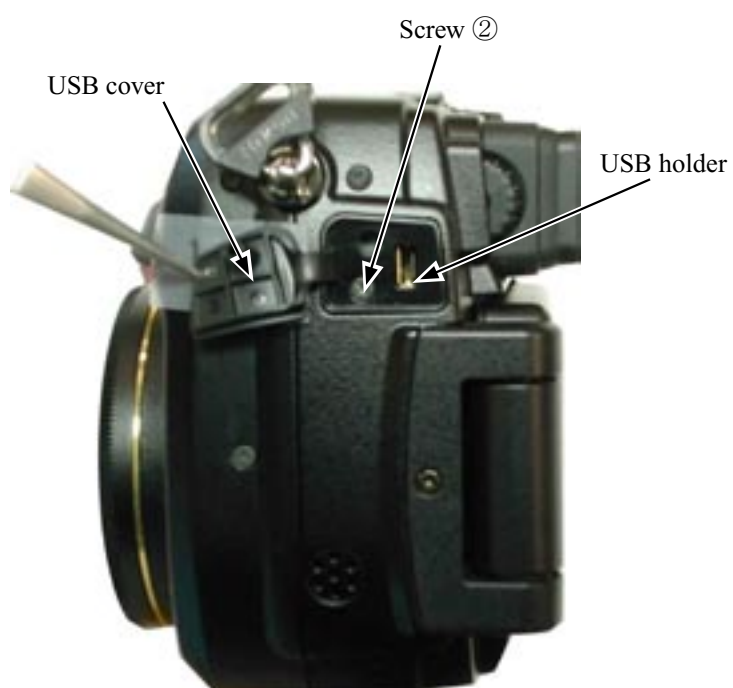
- Note :
- ① Remove the battery and the CF card prior to disassembly.
 - ② When disassembling, make sure to memorize the processing state of wires, screws to be fixed and their types, etc.
 - ③ Because electrical parts are easily damaged by static electricity, make sure that you are well earthed/grounded.

REAR COVER**1. Removal of screws**

- Remove the screw ① (M1.7 × 3).



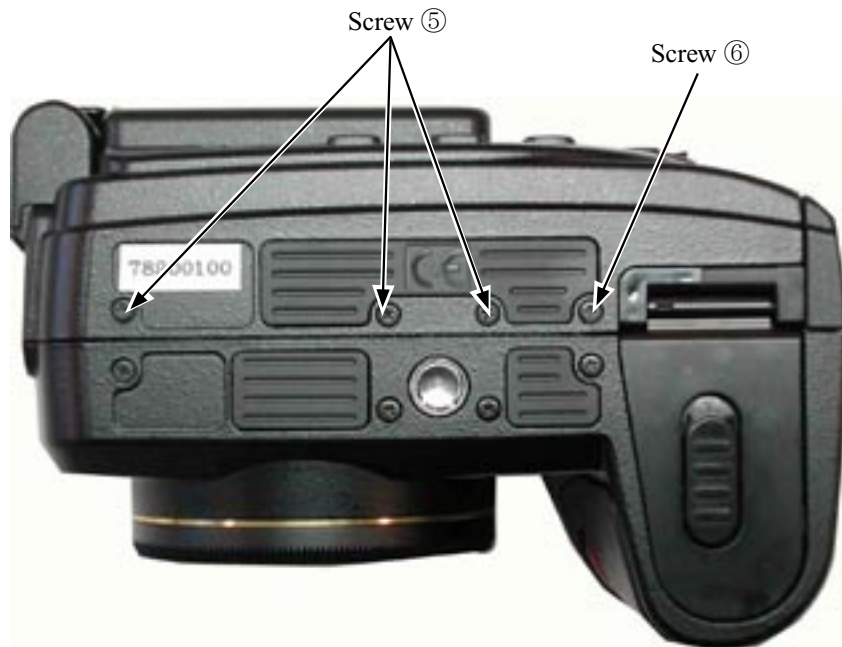
- Open the USB cover and remove the screw ② (M1.7 × 3.5).
- The USB cover and the USB holder can be removed.



- Open the DC cover and remove the screw ③ (M1.7 × 4).
- Open the CF card cover and remove the screw ④ (M1.7 × 3).

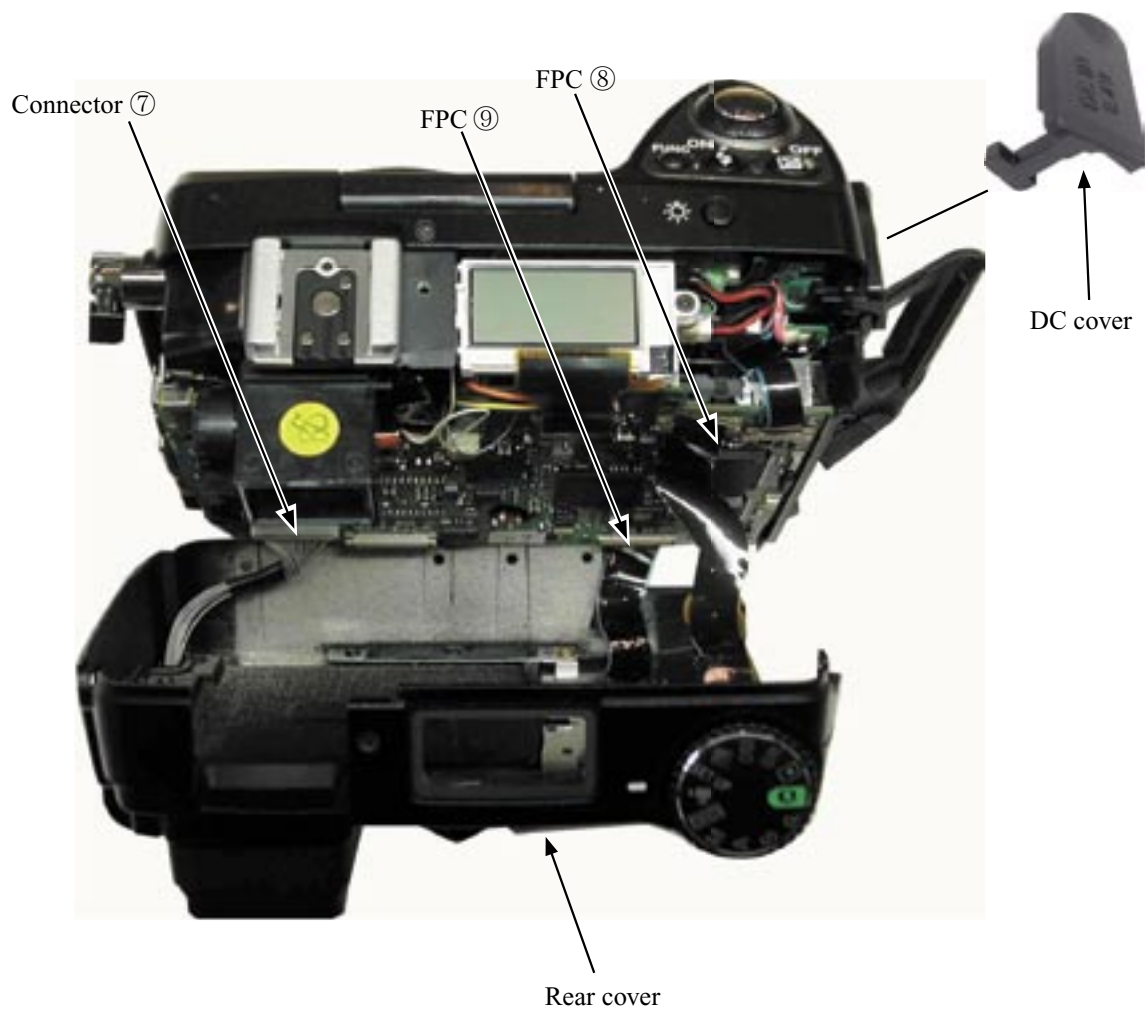


- Remove the four screws ⑤ (M1.7 × 3.5).
- Remove the screw ⑥ (M1.7 × 3.5).



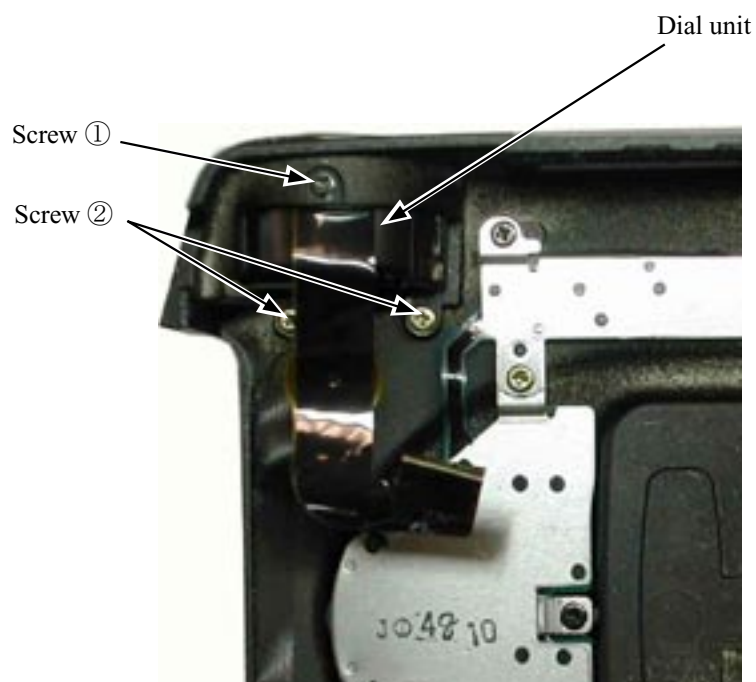
2. Removal of rear cover

- Remove the rear cover to the position as shown below.
- ※ Remove the rear cover in parallel with the front cover (because the spacer at the rear cover side may interfere with the one at the EVF side).
- Remove the connector ⑦ .
- Remove the FPC ⑧ .
- Remove the FPC ⑨ .
- Remove the rear cover.
- The DC cover can be removed.



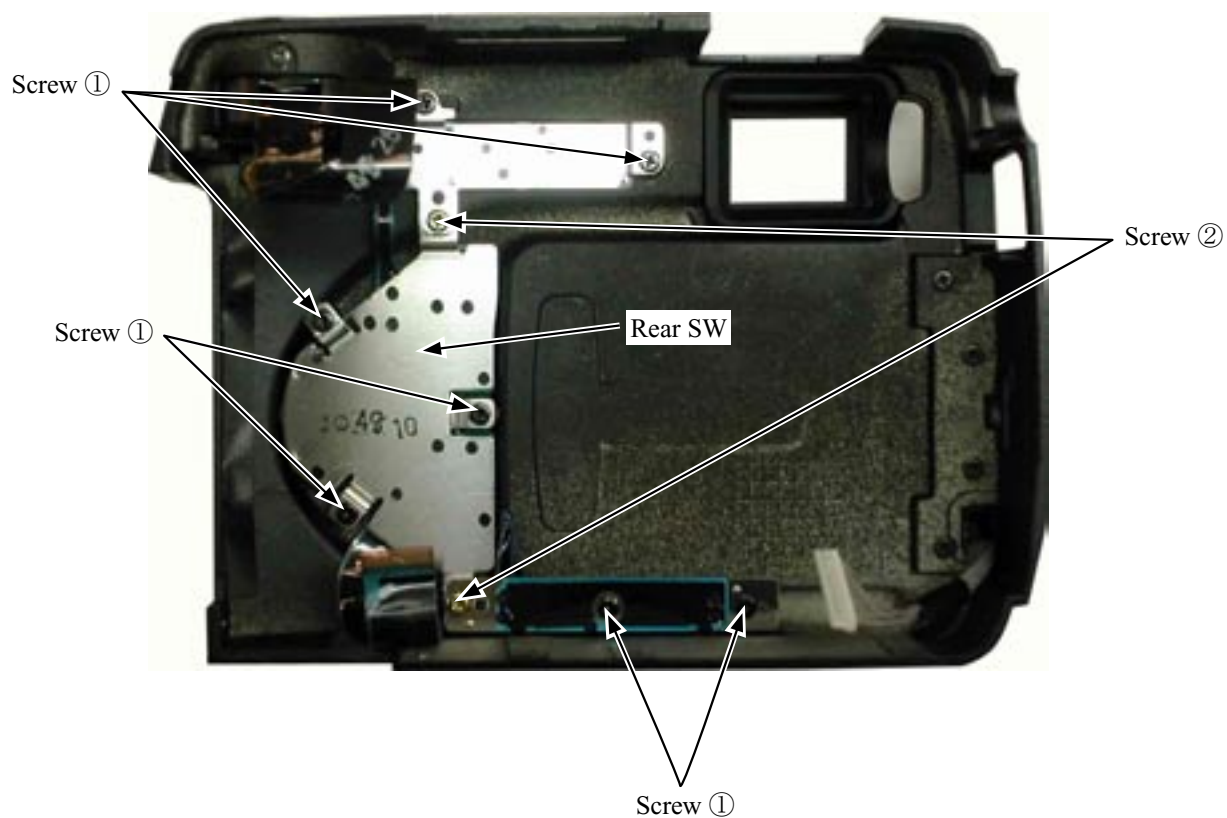
DIAL UNIT

- Remove the screw ① (M1.4 × 3.5).
- Remove the two screws ② (M1.7 × 2.5).
- Remove the dial unit.



REAR SW

- Remove the seven screws ① (M1.7 × 3).
- Remove the two screws ② (M1.7 × 3.5).
- Remove the rear SW.



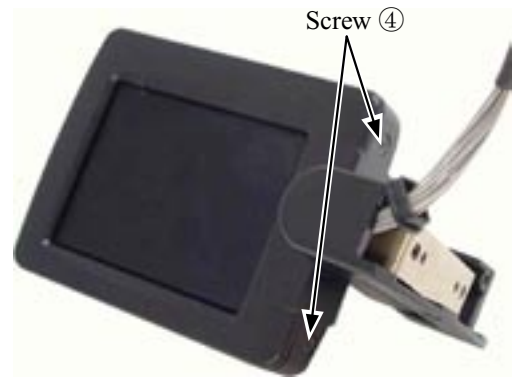
LCD MONITOR UNIT**1. Removal of LCD monitor unit**

- Remove the screw ① (M1.7 × 3).
- Remove the two screws ② (M1.7 × 4).
- Remove the two screws ③ (M1.7 × 3).
- Remove the LCD monitor unit.

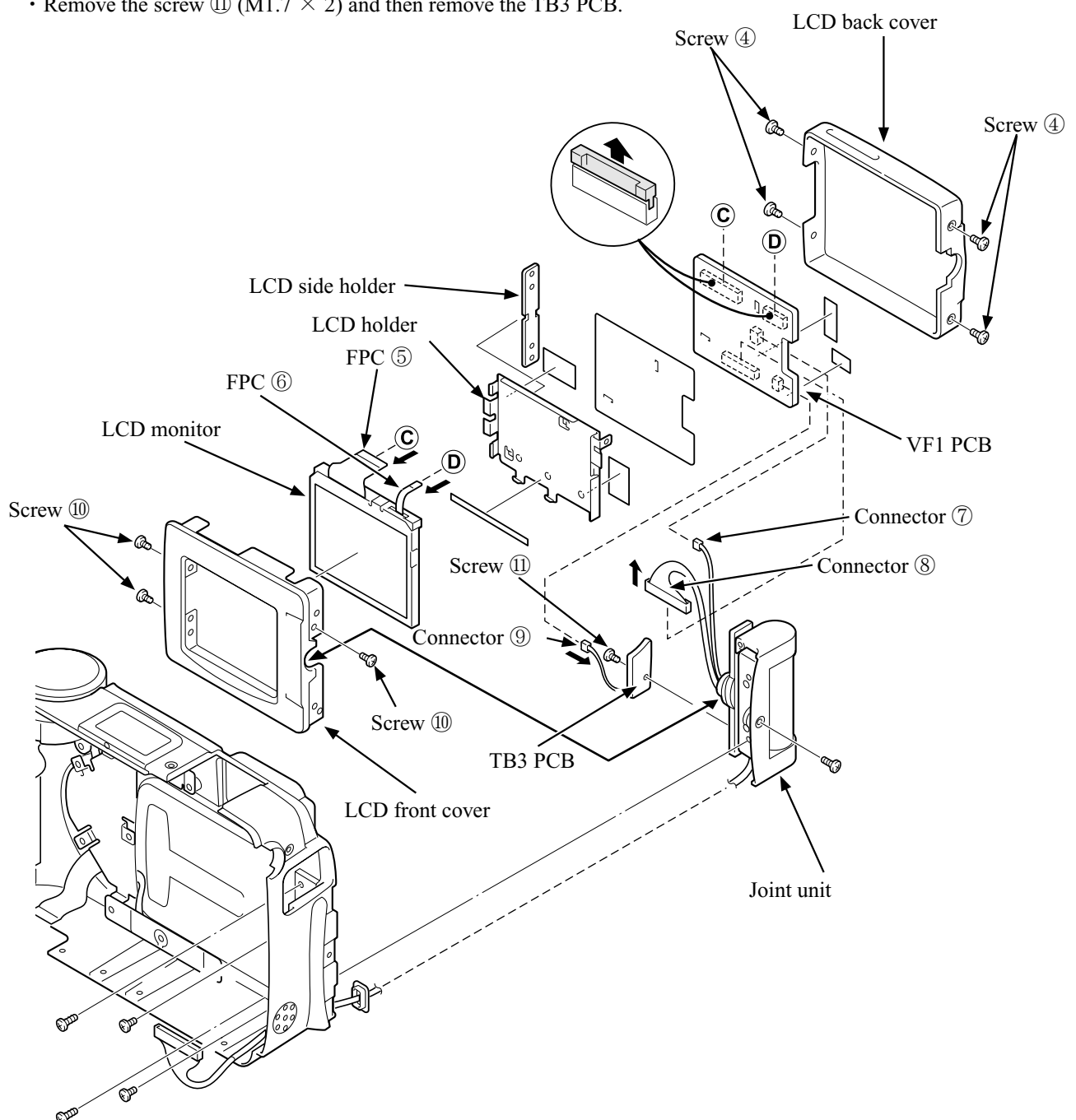


2. Disassembly of LCD monitor unit

- Put the LCD monitor unit as shown at the right (Fig. 1) and remove the four screws (4) (M1.7 × 3).
- Remove the LCD back cover.
- Remove the FPC's (5) and (6).
- Remove the connectors (7), (8) and (9).
- Remove the three screws (10) (M1.7 × 2).
- Remove the LCD front cover.
- Remove the LCD side holder.
- Remove the joint unit.
- Remove the LCD holder.
- Unhook the LCD holder and remove the LCD monitor.
- Unsolder the VF1 PCB at 2 places.
- Remove the screw (11) (M1.7 × 2) and then remove the TB3 PCB.

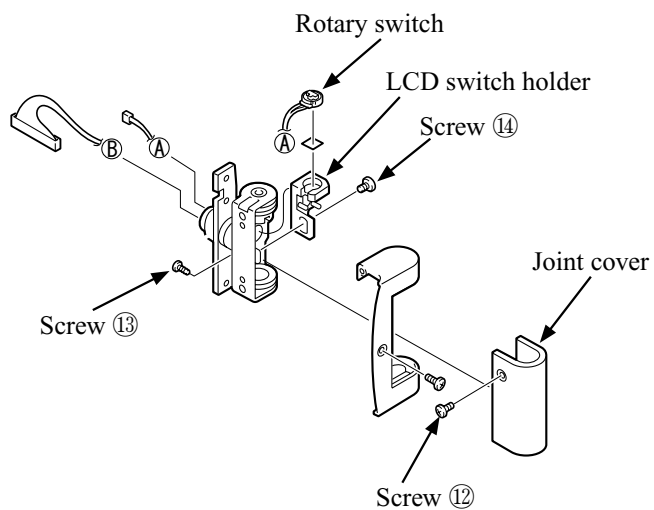


(Fig.1)



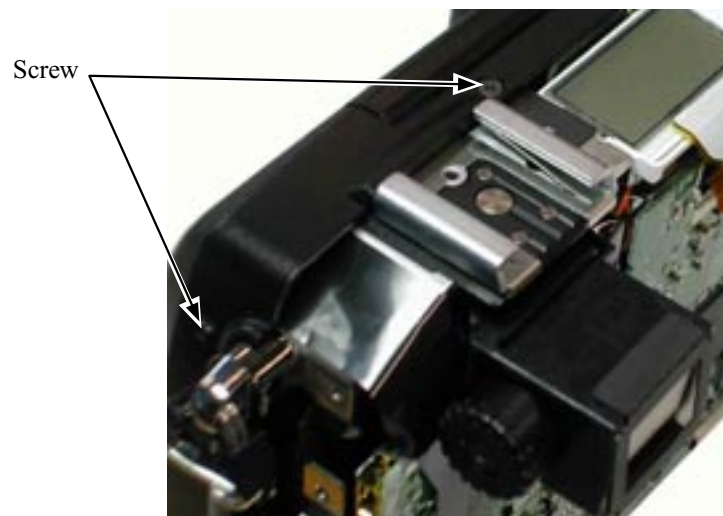
3. Disassembly of joint unit

- Remove the screw ⑫ (M1.7 × 2).
- Remove the screw ⑬ (M1.4 × 4) and then remove the joint cover.
- Remove the screw ⑭ (M1.7 × 2) and then remove the LCD switch holder.
- Remove the rotary switch.

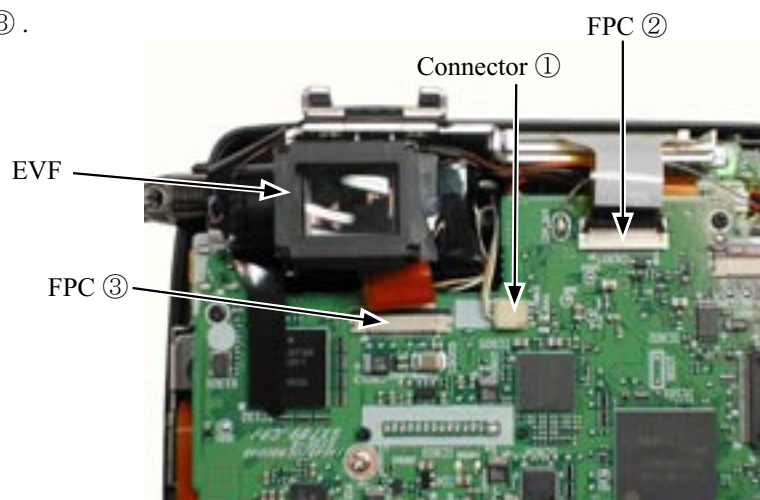


EVF UNIT

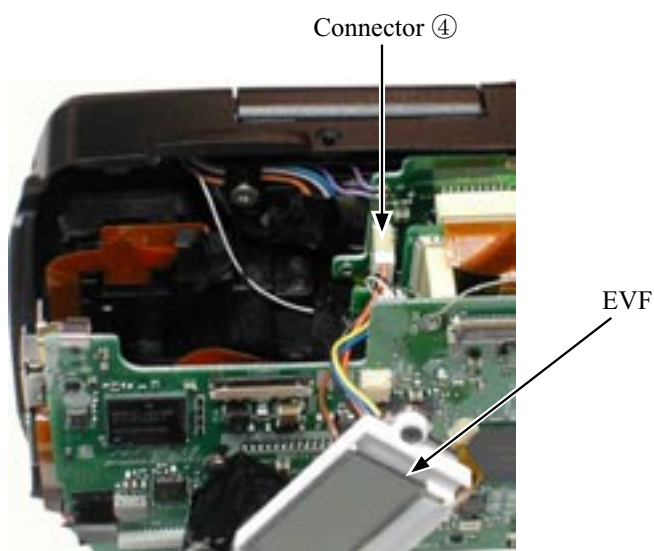
- Remove the two screws (M1.7 × 3).



- Remove the connector ① .
- Remove the FPC ② .
- Remove the FPC ③ .



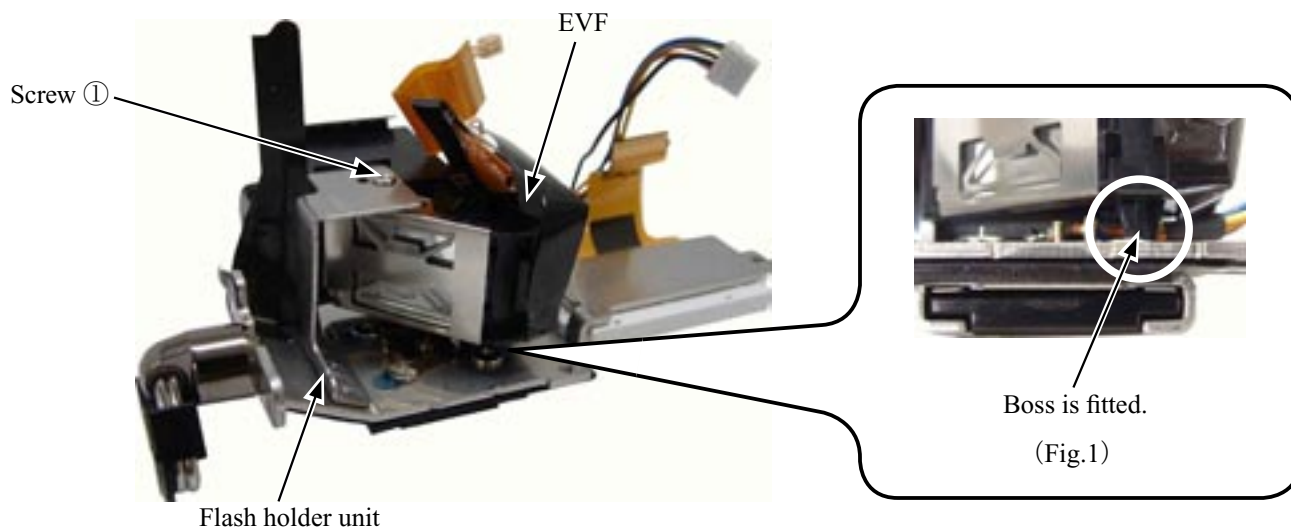
- Remove the connector ④ .
- The EVF unit can be removed.



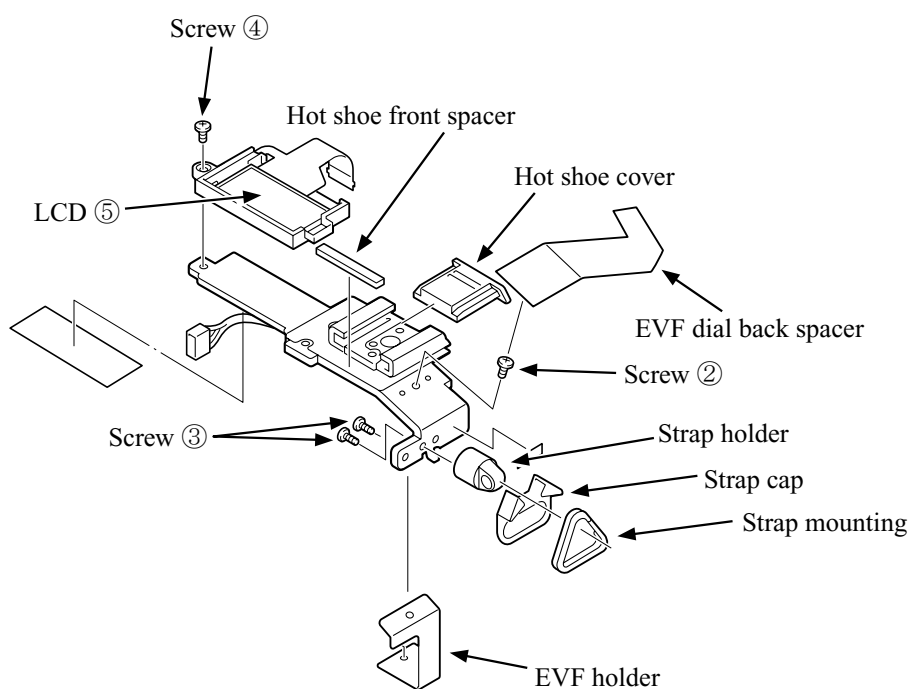
DISASSEMBLY OF EVF UNIT

1. Flash holder unit

- Remove the screw ① (M1.7 × 2.5).
- Remove the EVF.
- ※ Remove the boss of the EVF from the hole on the flash holder unit. (Fig. 1)

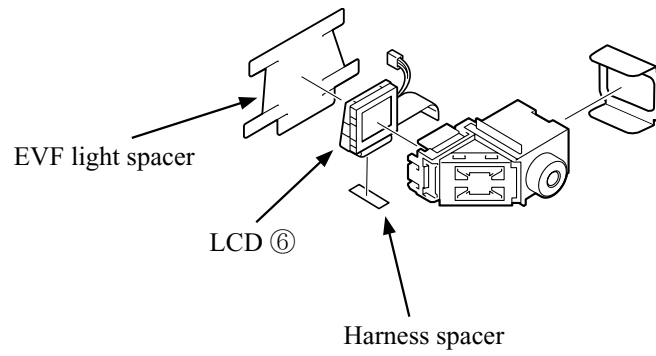


- Take off the EVF dial back spacer.
- Remove the screw ② (M1.7 × 3) and then remove the EVF holder.
- Remove the two screws ③ (M1.7 × 4) and then remove the strap mounting, the strap cap and the strap holder.
- Remove the screw ④ (M1.7 × 3) and then remove the LCD ⑤ .
- Remove the hot shoe front spacer.
- Remove the hot shoe cover.



2.EVF

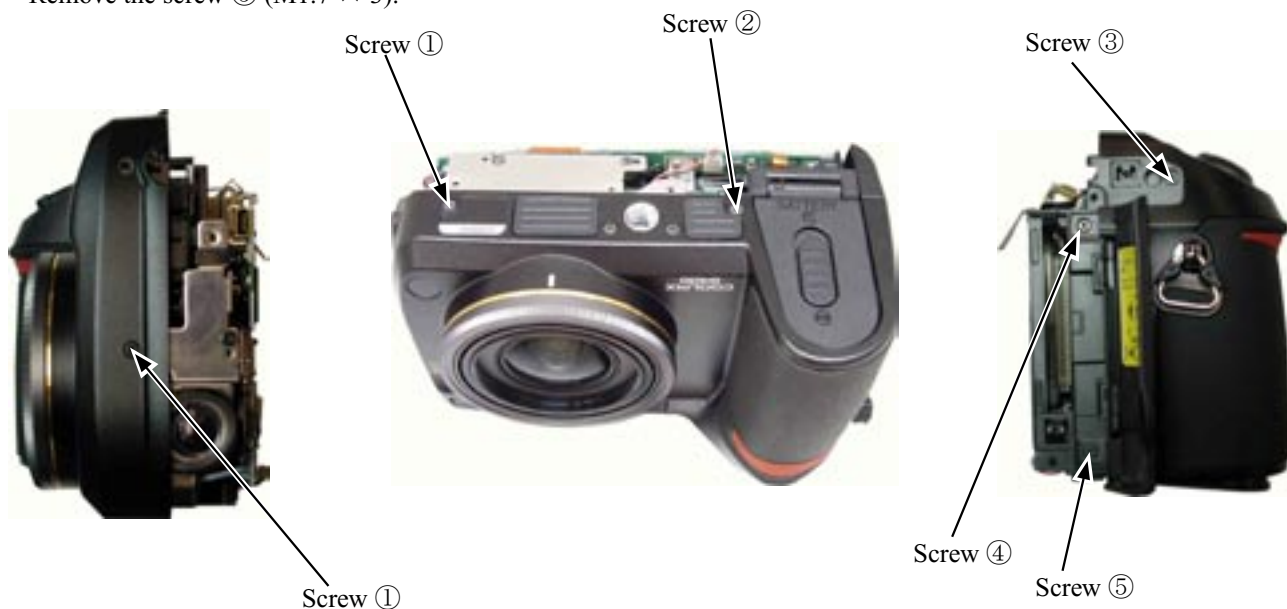
- Take off the EVF light spacer.
- Take off the harness spacer.
- Remove the LCD ⑥ .



FRONT COVER

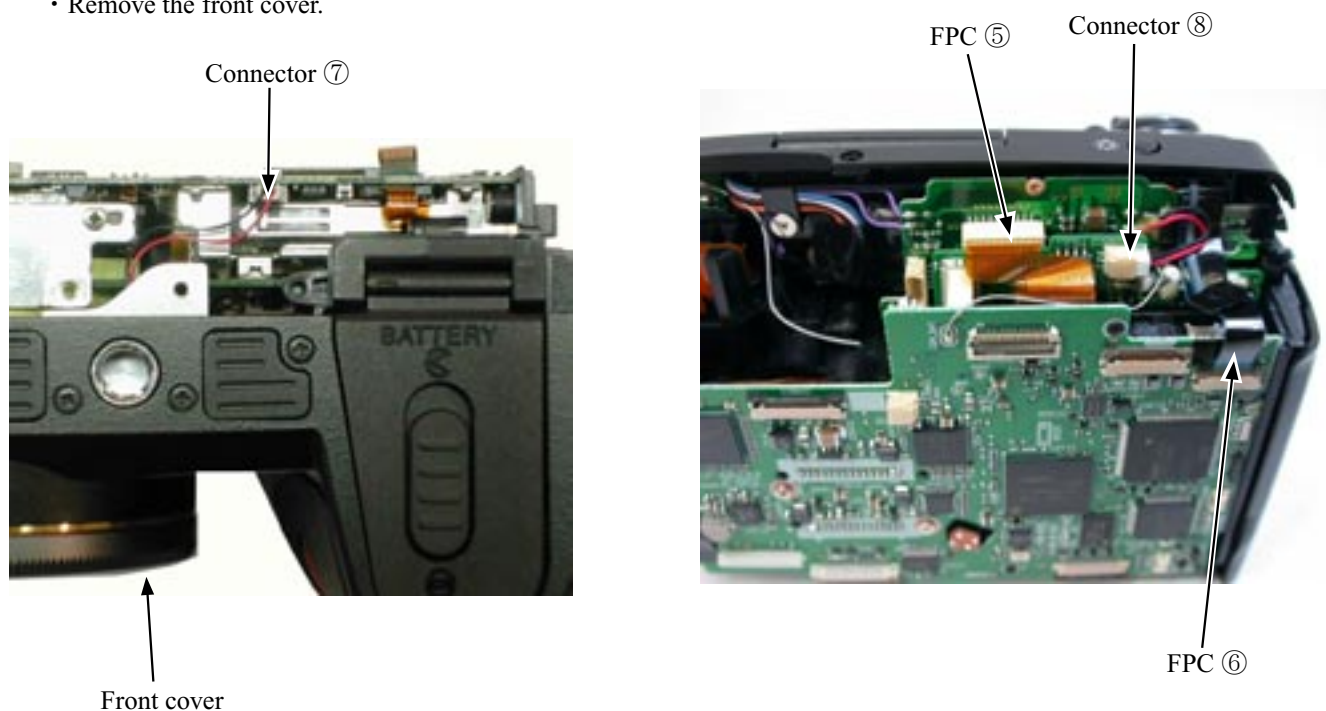
1. Removal of screws

- Remove the two screws ① (M1.7 × 3.5).
- Remove the screw ② (M1.7 × 3.5).
- Remove the screw ③ (M1.7 × 4).
- Remove the screw ④ (M1.7 × 4).
- Remove the screw ⑤ (M1.7 × 3).



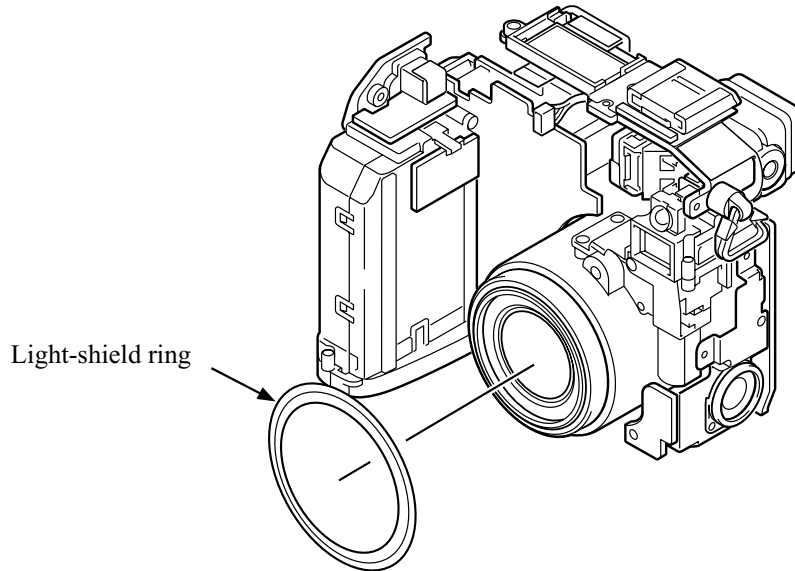
2. Removal of front cover

- Remove the FPC ⑤ .
- Remove the FPC (6).
- Remove the connector ⑦ .
- Remove the connector ⑧ .
- Remove the front cover.



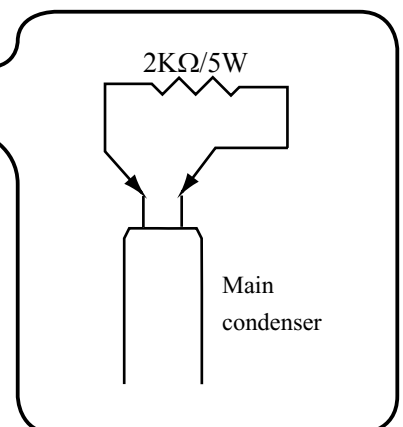
LIGHT-SHIELD RING

- Remove the light-shield ring.



DISCHARGE OF MAIN CONDENSER

⚠ WARNING	
	<ul style="list-style-type: none"> ● There are high voltage 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.



DISASSEMBLY OF FRONT COVER

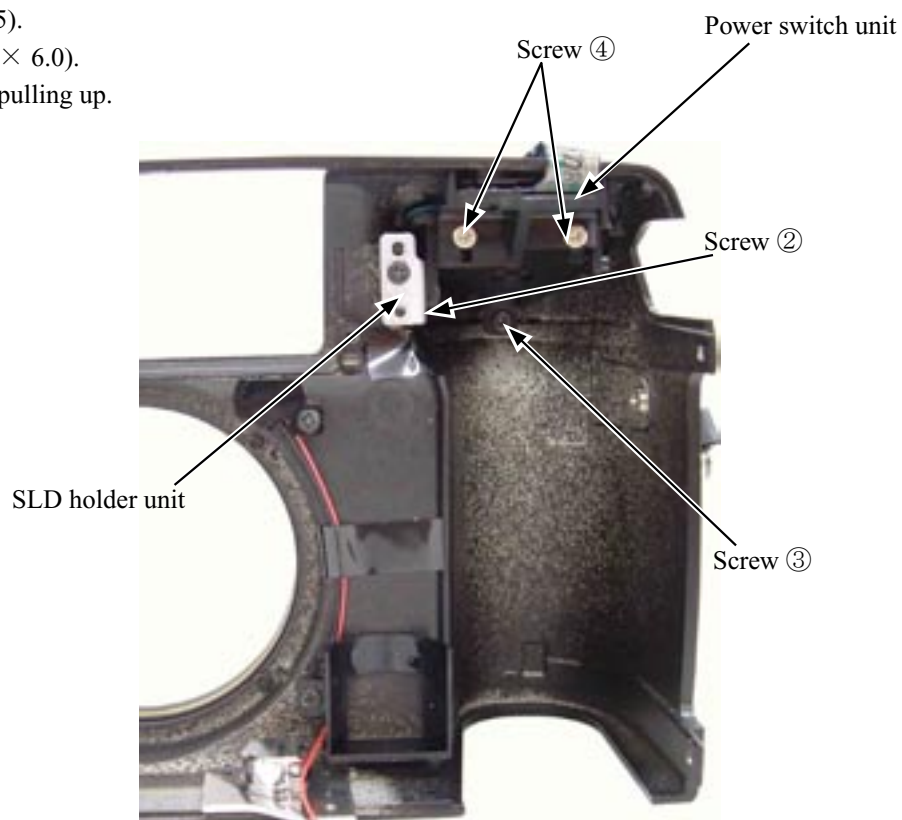
1. Removal of flash unit

- Remove the two screws ① (M1.4 × 4).
- Remove the flash unit.



2. Removal of power switch unit

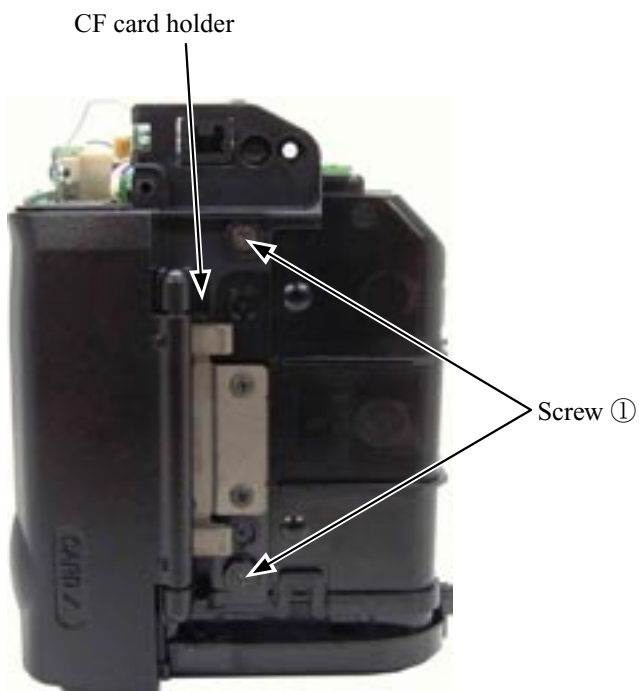
- Remove the screw ② (M1.7 × 3).
- Remove the screw ③ (M1.7 × 3.5).
- Remove the two screws ④ (M1.7 × 6.0).
- Remove the power switch unit by pulling up.



CF CARD COVER

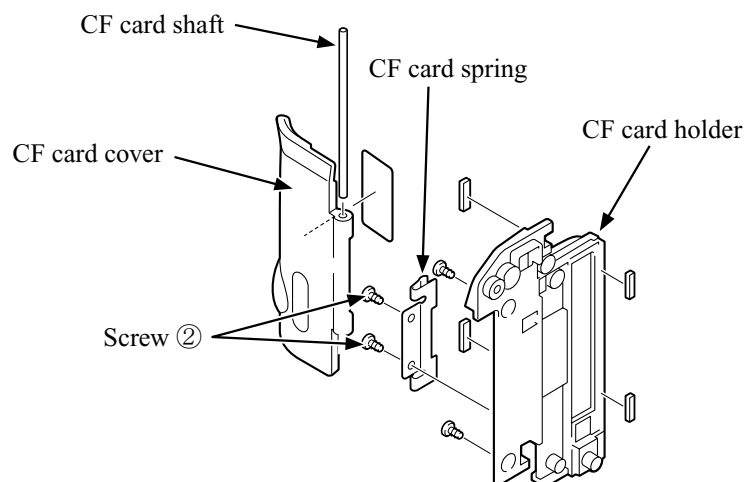
1. Removal of CF card cover

- Remove the two screws ① (M1.7 × 3.5).
- Remove the CF card holder.



2. Disassembly of CF card cover

- Remove the CF card cover.
- Remove the CF card shaft.
- Remove the two screws ② (M1.7 × 3).
- Remove the CF card spring.



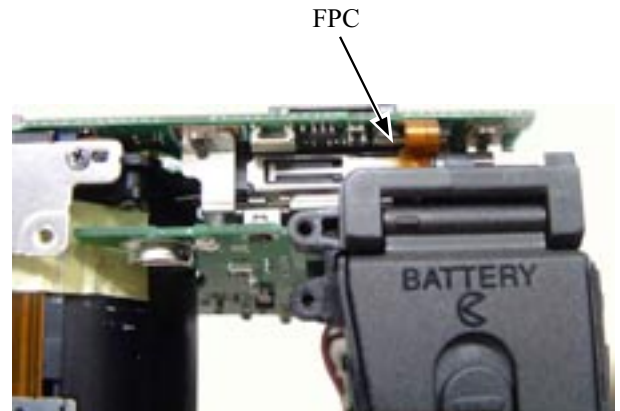
PW1 PCB

1. Removal of PW1 PCB

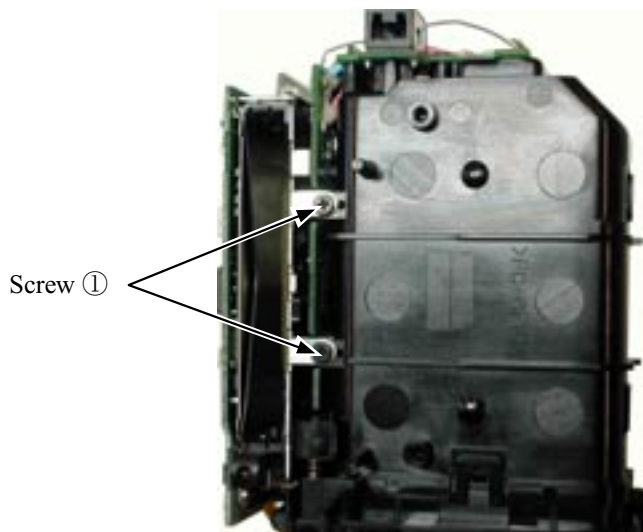
- Remove the connector.
- Remove the FPC.



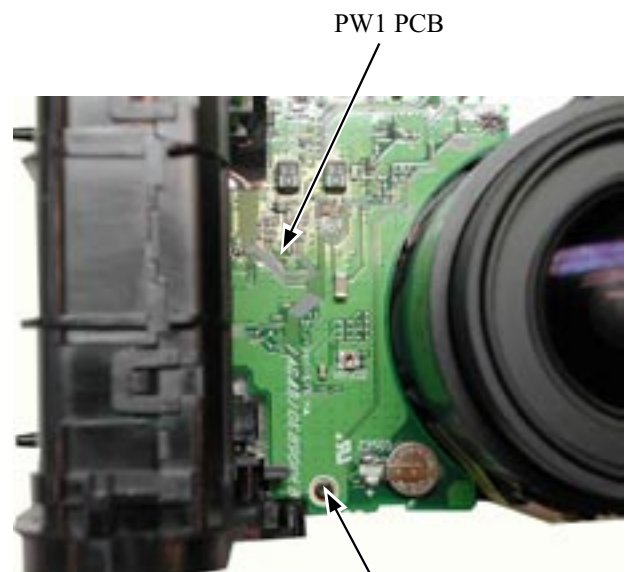
Connector



- Remove the two screws ① (M1.7 × 3).
- Remove the screw ② (M1.7 × 2.5).
- Remove the PW1 PCB from the connector of the main PCB.



Screw ①

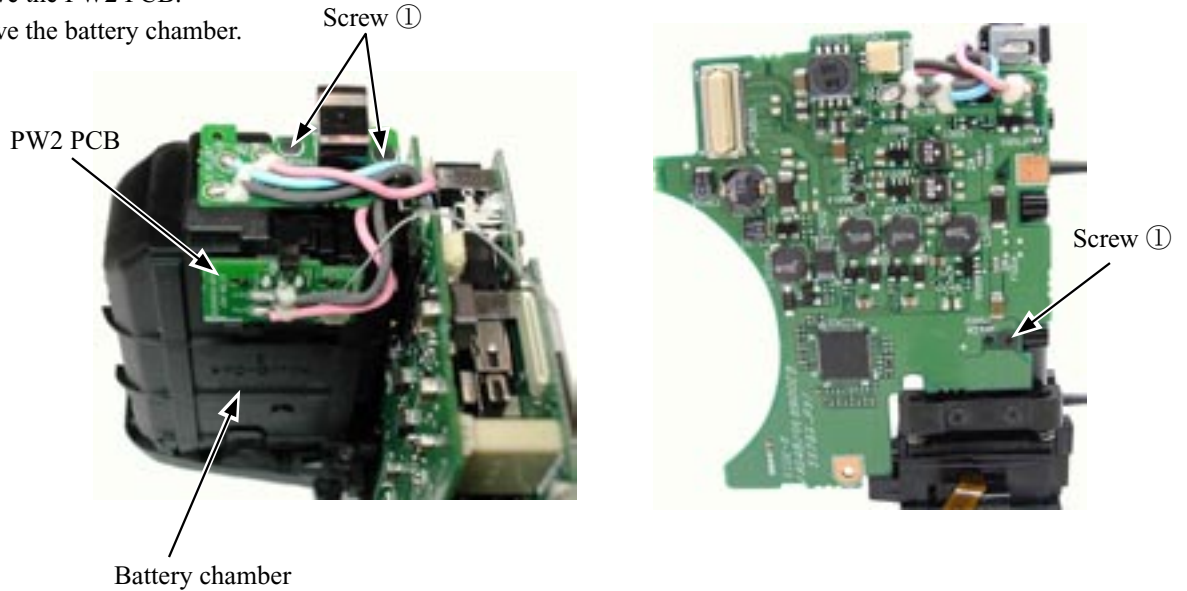


Screw ②

BATTERY CHAMBER

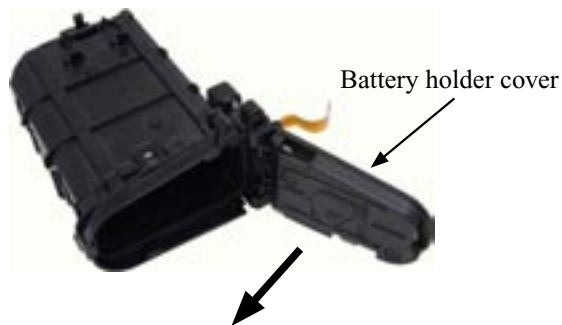
1. Removal of battery chamber

- Remove the three screws ① (M1.7 × 3).
- Remove the PW2 PCB.
- Remove the battery chamber.

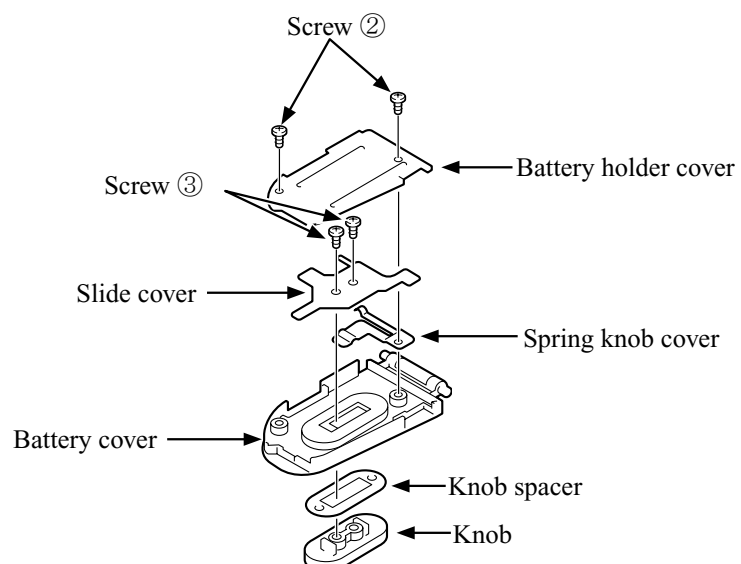


2. Disassembly of battery holder cover

- Remove the battery holder cover.

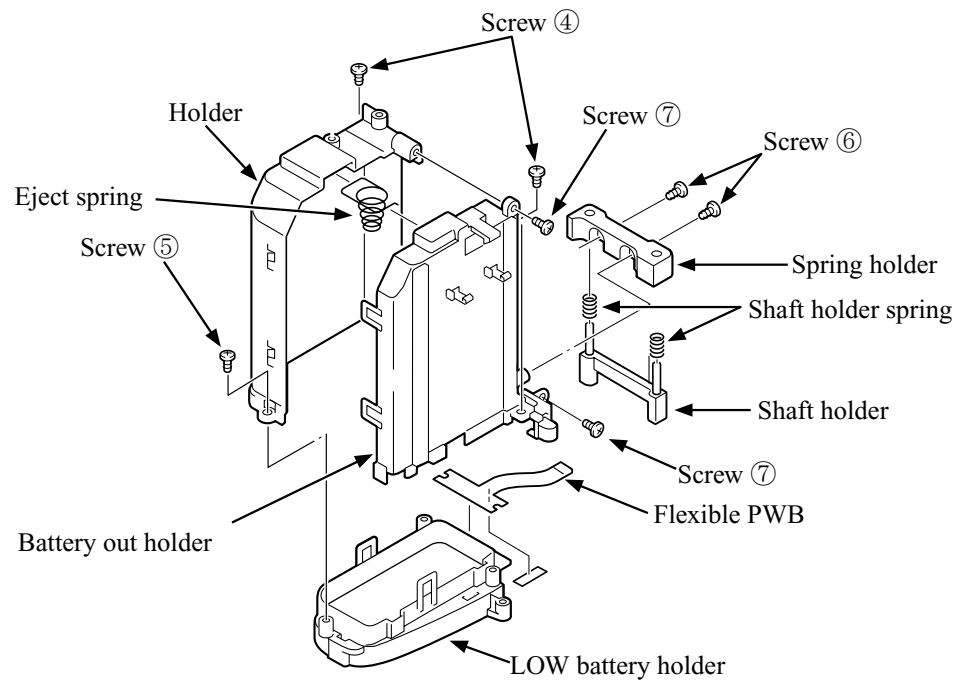


- Remove the two screws ② (M1.7 × 3).
- Remove the holder cover.
- Remove the two screws ③ (M1.7 × 2.5).
- Remove the slide cover.
- Remove the spring knob cover.
- Remove the battery cover.
- Remove the knob spacer.
- Remove the knob.



3. Disassembly of battery chamber

- Remove the two screws ④ (M1.7 × 3.5).
- Remove the screw ⑤ (M1.4 × 3).
- Unhook and remove the LOW battery holder.
- Remove the flexible PWB.
- Remove the two screws (6) (M1.7 × 3.5).
- The shaft holder, the shaft holder springs (2 pcs.) and the spring holder can be removed.
- Remove the two screws ⑦ (M1.7 × 3.5).
- Unhook and remove the holder.
- The eject spring can be removed.

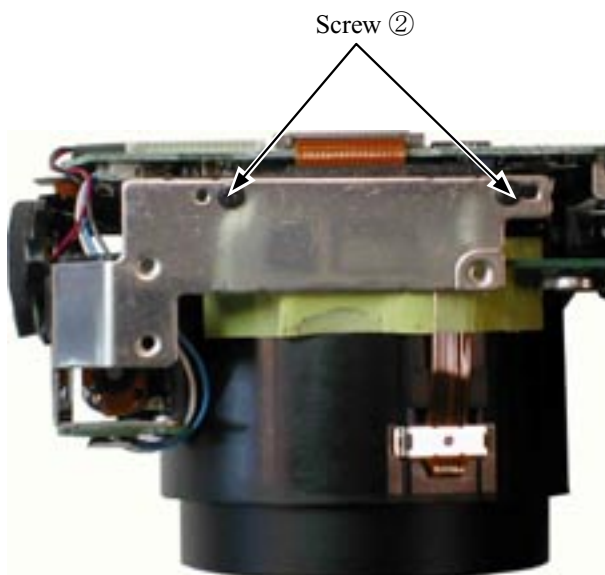


SPEAKER

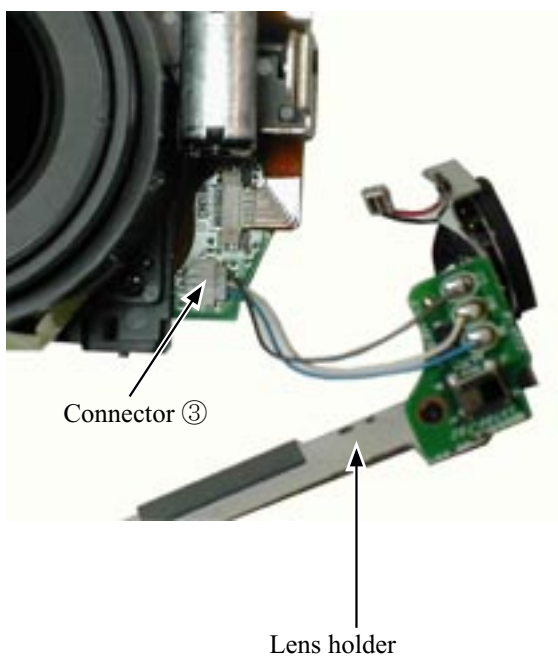
- Turn over the harness spacer and remove the connector ① .



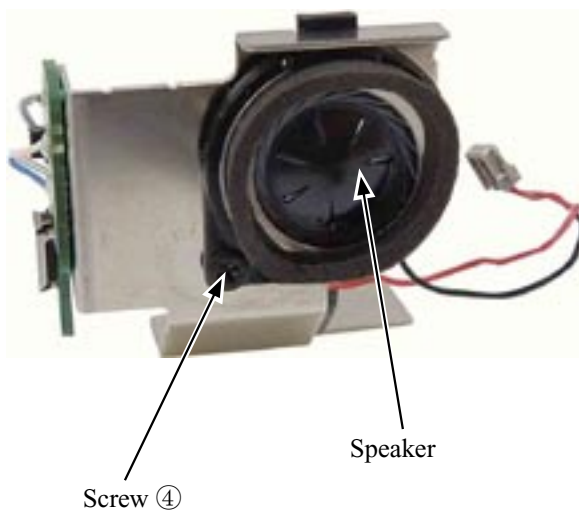
- Remove the two screws ② (M1.7 × 3).



- Remove the lens holder and then remove the connector ③ .

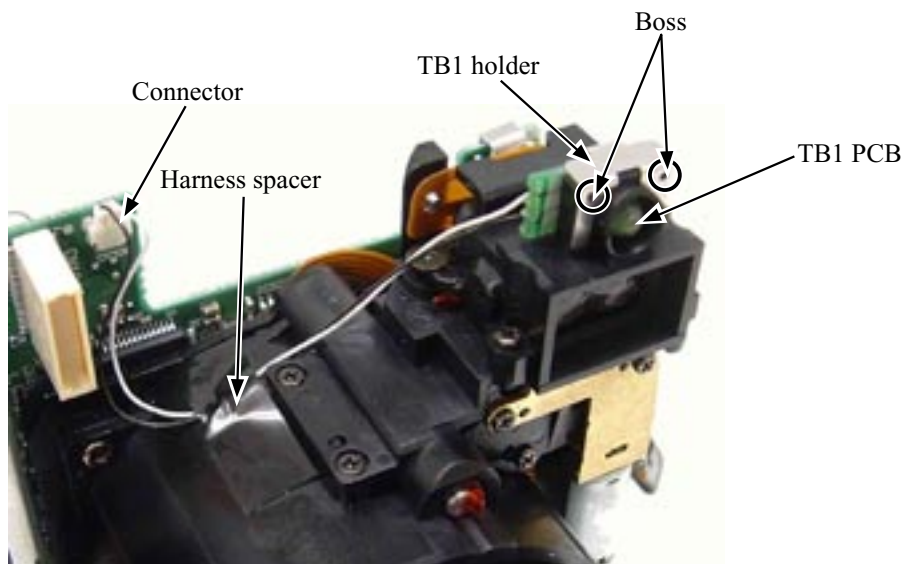


- Remove the screw ④ (M1.7 × 3).
- Remove the speaker.



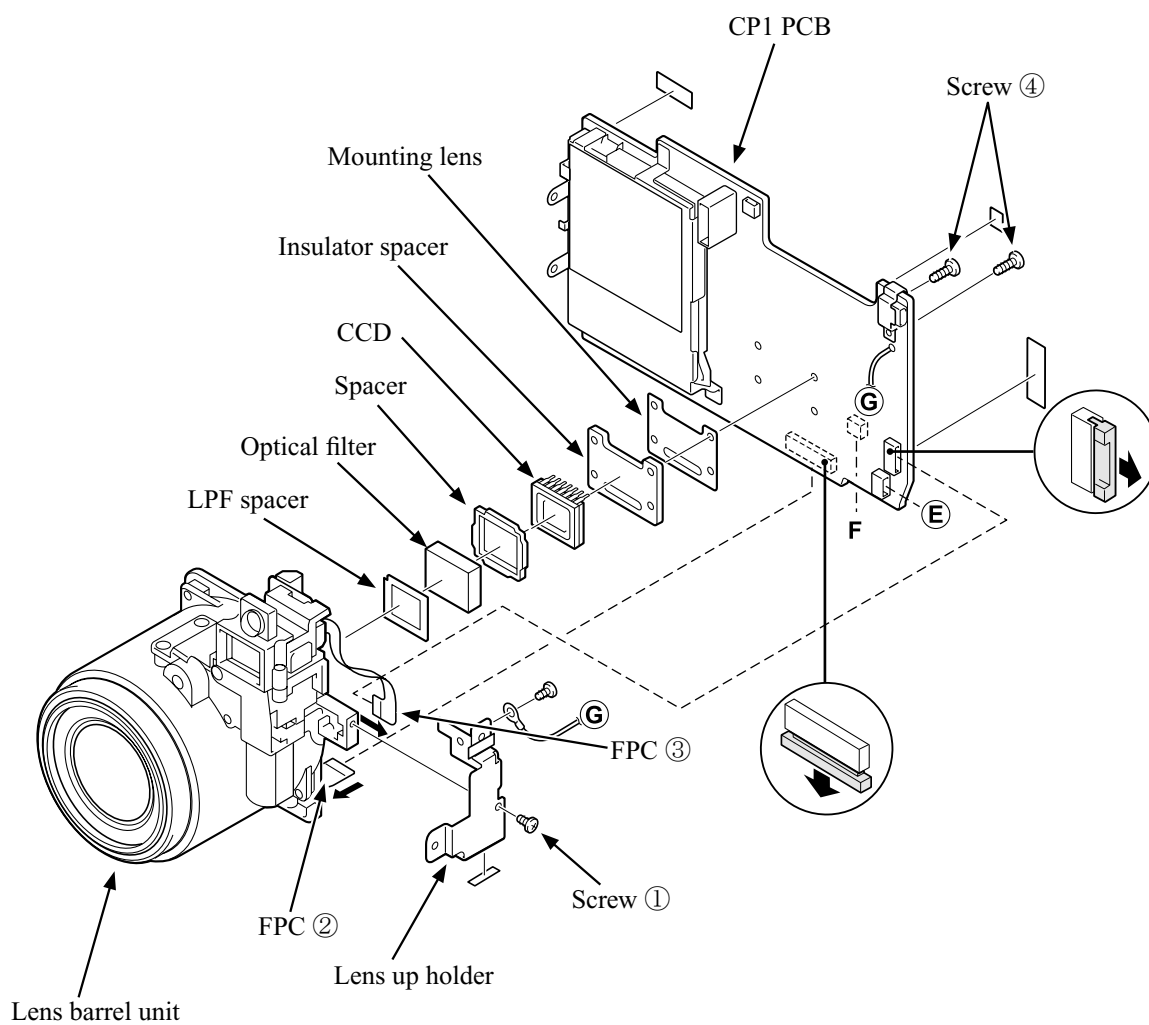
TB1 PCB

- Remove the connector.
- Remove the TB1 holder.
- Turn over the harness spacer and remove the TB1 PCB.



CP1 PCB

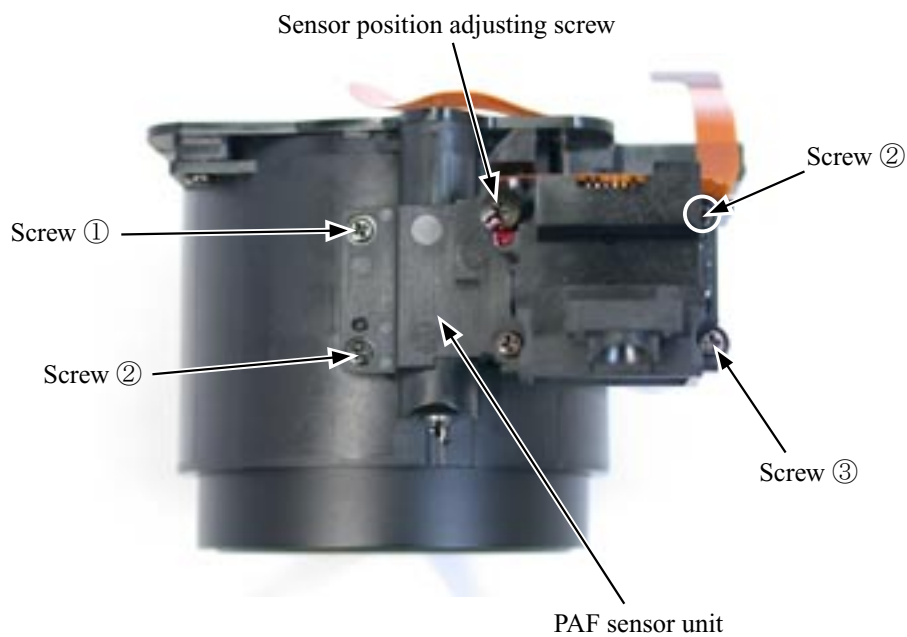
- Remove the screw ① (M1.7 × 3).
- Remove the lens up holder.
- Remove the FPC ② .
- Remove the FPC ③ .
- Remove the two screws ④ (M1.7 × 6).
- Remove the CP1 PCB.
- Remove the LPF spacer.
- Remove the optical filter.
- Remove the spacer.
- Remove the CCD.
- Remove the mounting lens.
- Remove the insulator spacer.



※ When disassembling the lens barrel unit, it is not necessary to disassemble the PAF sensor and the drive gear unit.
Note: When removing the PAF sensor, replacing it with a new one or turning its position adjusting screw, adjustment is necessary. Perform the PAF sensor position adjustment among the adjustment items.

PAF SENSOR UNIT

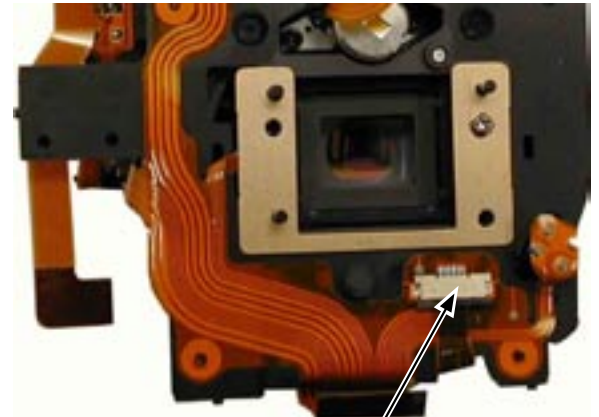
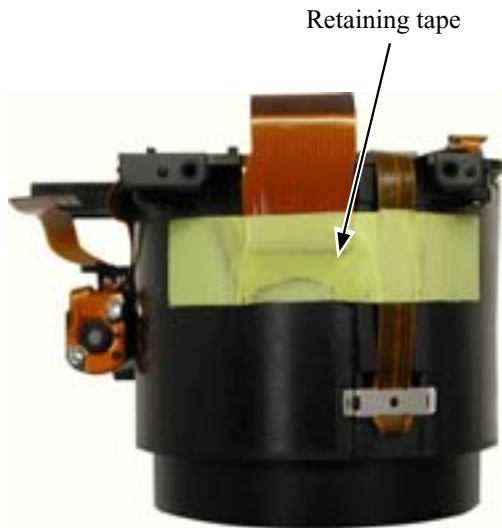
- Remove the screw ① (M1.4 × 4.5).
- Remove the two screws ② (M1.4 × 3).
- Remove the screw ③ (M1.4 × 6.5).
- Remove the PAF sensor unit.



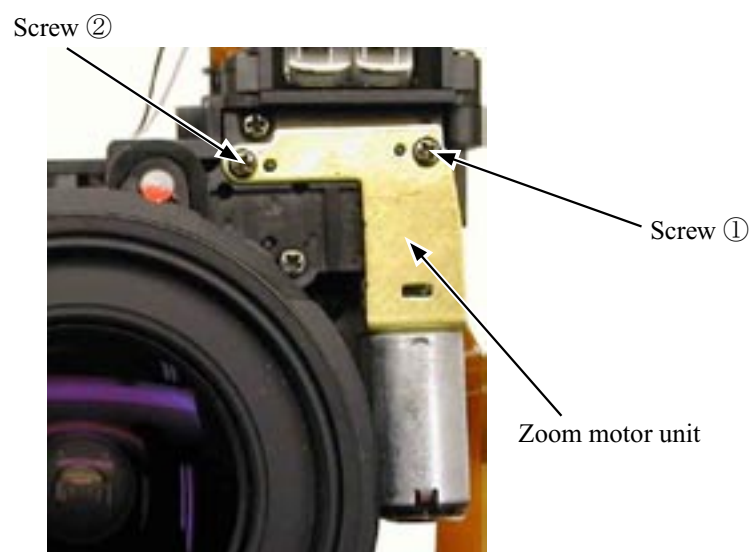
Note: All of the tools for the FFD adjustment are not prepared. So, the lens barrel can be disassembled and assembled but each unit (lens) of the 1st, 2nd and 3rd lens groups cannot be replaced with a new one.

CCD MOUNT

- Turn over the retaining tape and remove the shutter FPC.



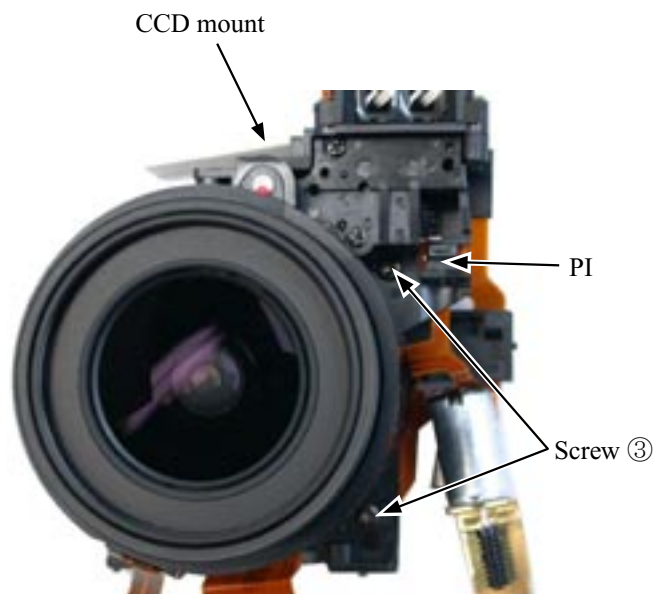
- Remove the screw ① (M1.4 × 5.5).
- Remove the screw ② (M1.4 × 3).
- Remove the zoom motor unit.



- Remove the PI. (Fig. 1)
- Remove the two screws ③ (M1.7 × 5.5).



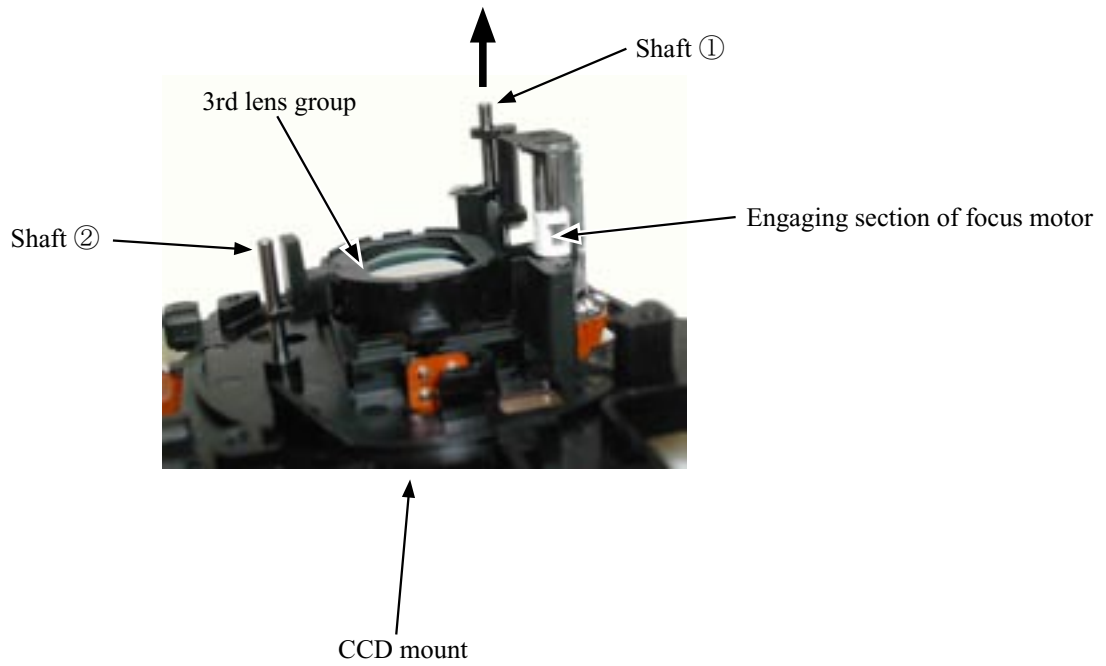
- Remove the two screws ③ (M1.7 × 5.5).
- Remove the CCD mount.



(Fig.1)

3RD LENS GROUP

- Pull out the shaft ① in the arrow direction.
- Raise the engaging section of the focus motor and then raise the 3rd lens group.
- Remove the 3rd lens group from the shaft ② .
- The 3rd lens group can be removed.



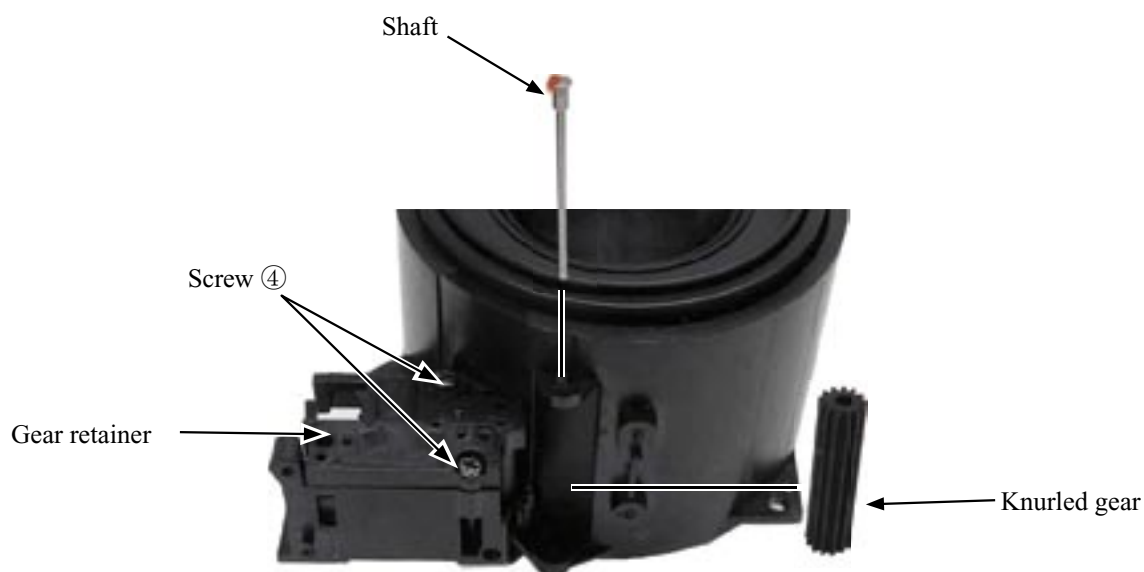
DRIVE GEAR

- Remove the screw ① (M1.4 × 4.5).
- Remove the two screws ② (M1.4 × 3).
- Remove the screw ③ (M1.4 × 6.5).
- Remove the PAF sensor unit.

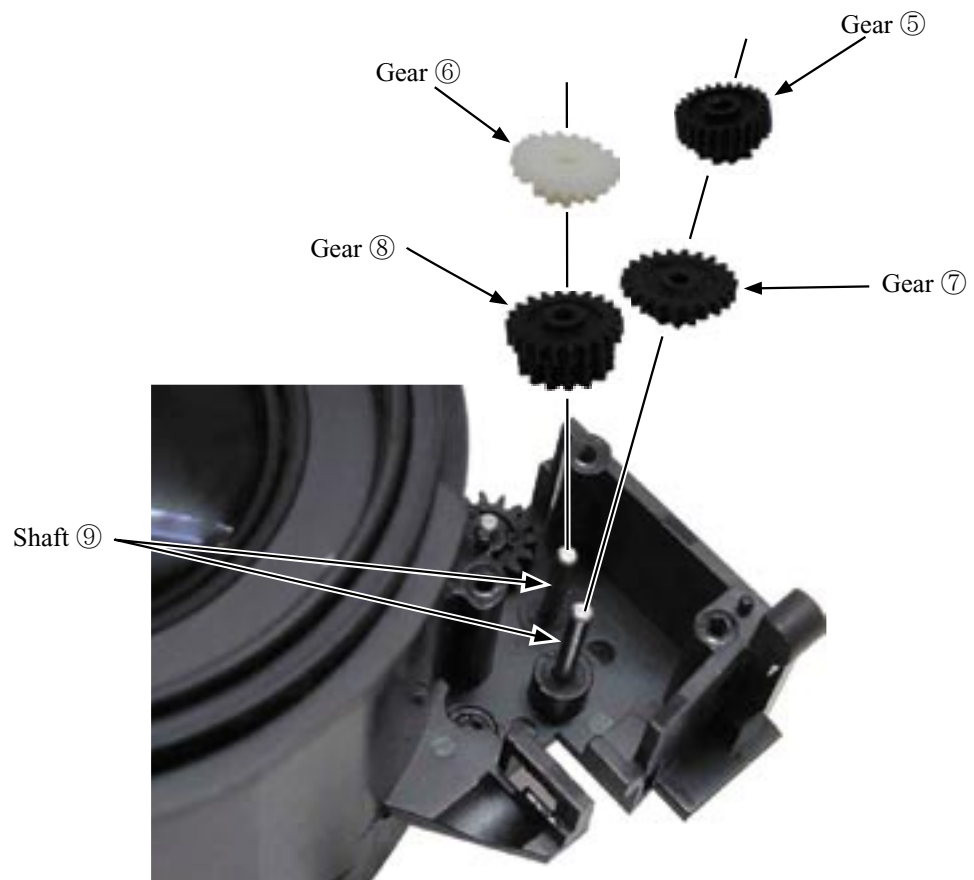
※ When assembling, it is necessary to adjust the PAF sensor position. If you do not disassemble the drive gear unit, carry out the work from P. D29.



- Remove the shaft.
- Remove the knurled gear.
- Remove the two screws ④ (M1.4 × 4).
- Remove the gear retainer.



- Remove the gears ⑤ to ⑧ .
- Remove the two shafts ⑨ .

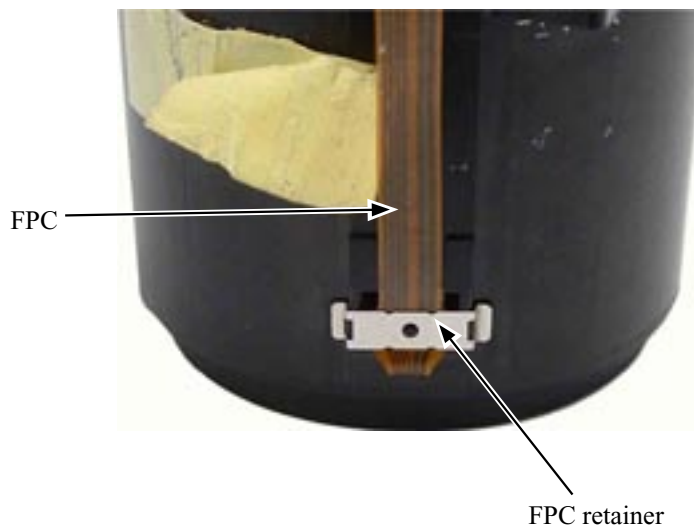


- Remove the gear ⑩ .
- Remove the shaft ⑪ .



FIXED BARREL

- Remove the FPC retainer and pull out the FPC from the fixed barrel.

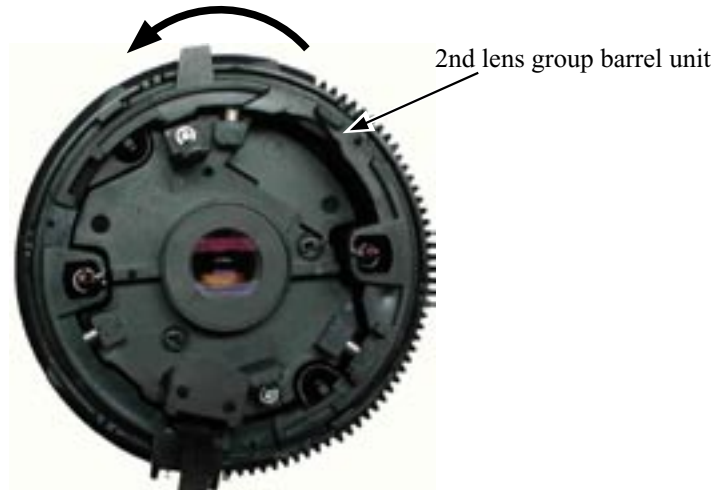


- Turn the fixed barrel in the arrow direction to remove it.
- The light-shield ring can be removed from the fixed barrel.



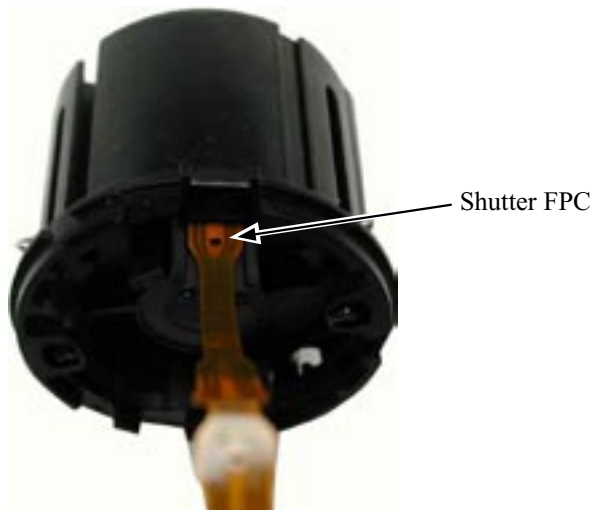
2ND LENS GROUP BARREL UNIT

- Turn the straight barrel unit to the stopper in the arrow direction.
- The 2nd lens group barrel unit can be removed upward.

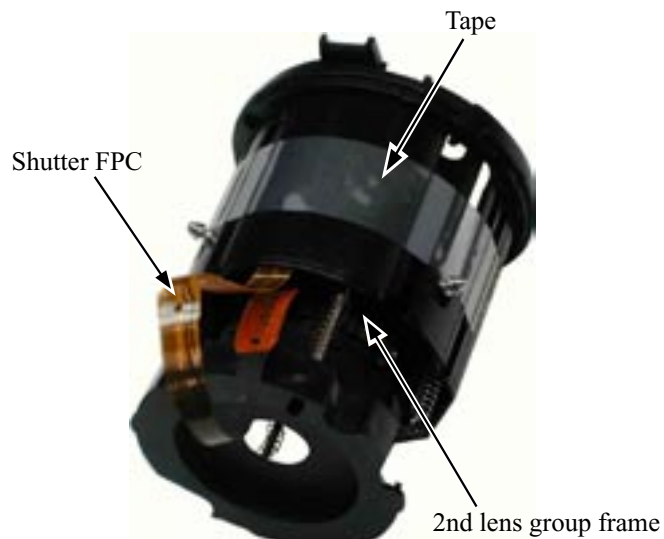


SHUTTER

- Remove the double-adhesive tape from the shutter FPC.



- Push down the 2nd lens group frame and fix it with tape, etc.
- Pull out the shutter FPC.



- Remove the two screws (M1.4 × 3).



- Remove the shutter between the 2nd lens group frame and the aperture frame.



1ST LENS GROUP

- Take off the name plate. (It is adhered with the double-adhesive tape.)



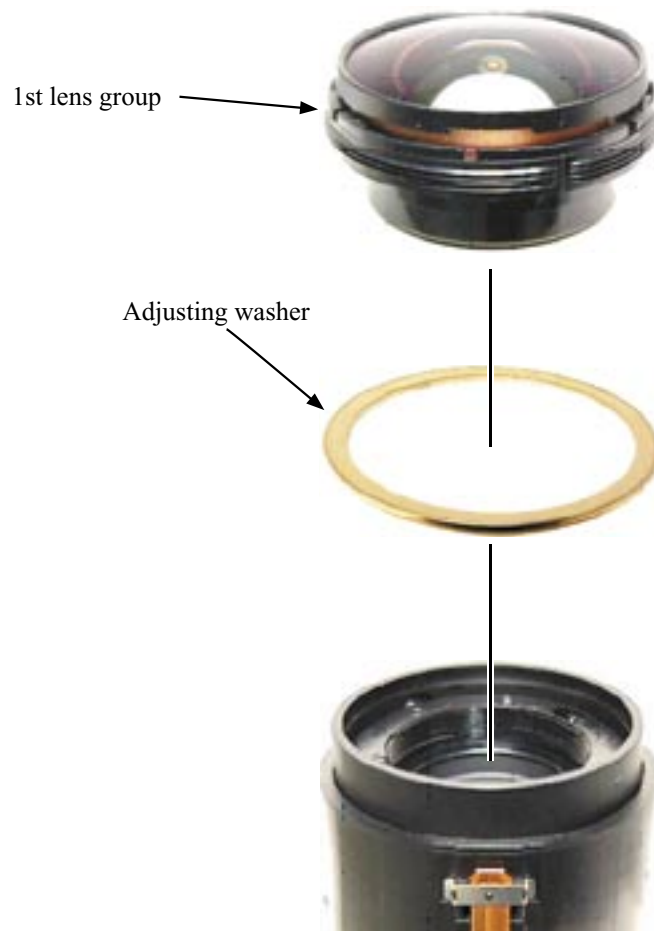
- Remove the three screws (M1.4 × 4).
- Remove the cover ring.



- The light-shield ring can be removed.
- Turn the 1st lens group counterclockwise to remove it.



- Remove the adjusting washer.



ASSEMBLY

1ST LENS GROUP

- Set the adjusting washer.



- Set the 1st lens group. Turn the 1st lens group frame clockwise and move it down.
 - Set the light-shield ring #648 onto #603.
 - Draw out the 1st lens group frame and fix the light-shield ring.
- ※ Be careful not to catch the light-shield ring.



- Set the cover ring.
- Tighten the three screws (M1.4 × 4).



- Adhere the name plate.



SHUTTER

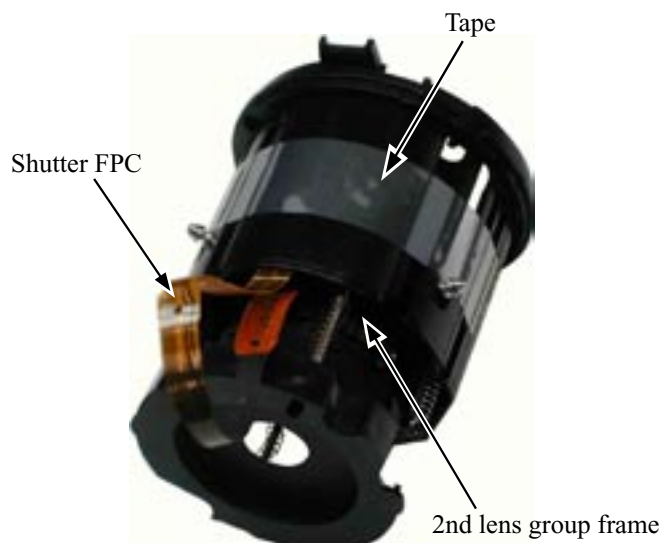
- When the aperture frame is at the front position, adhere the tape to fix it.
- Set the shutter between the aperture frame and the 2nd lens group frame.



- Tighten the two screws (M1.4 × 3).

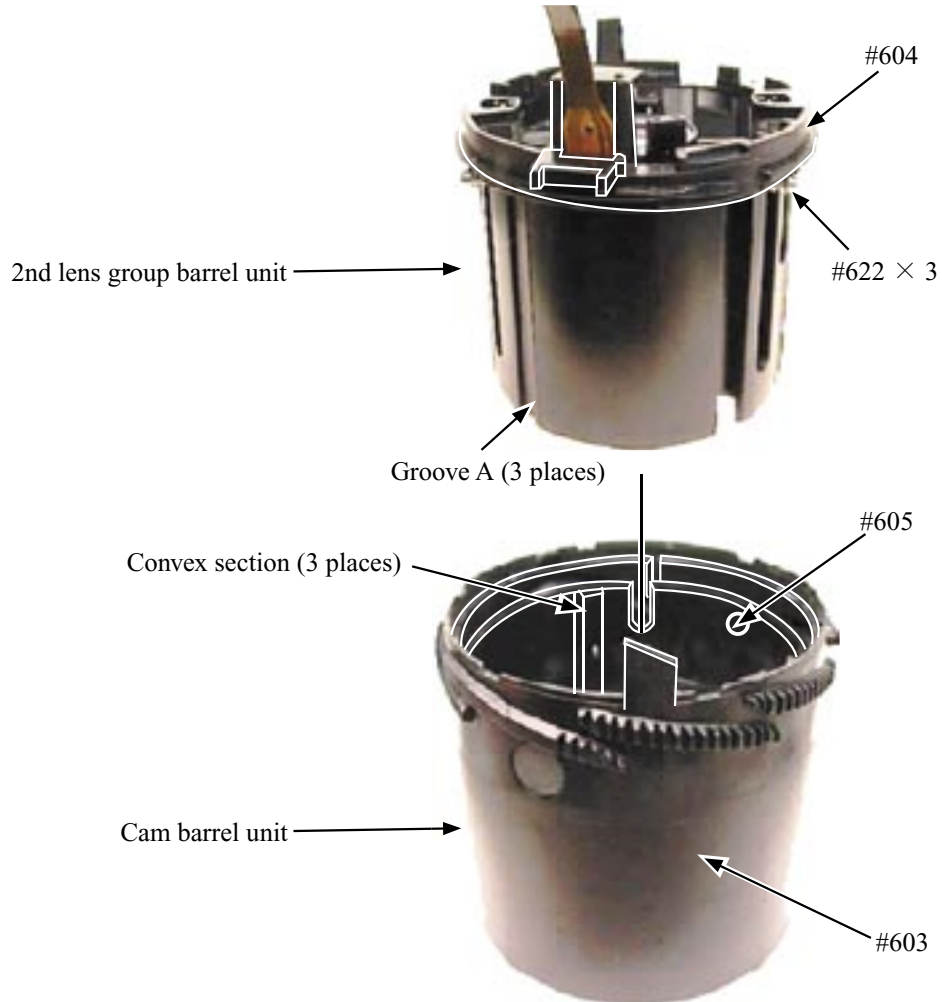


- Take off the tape fixing the 2nd lens group frame.
- Insert the shutter FPC, fit the hole position on the FPC to the boss and adhere the FPC with the double-adhesive tape.

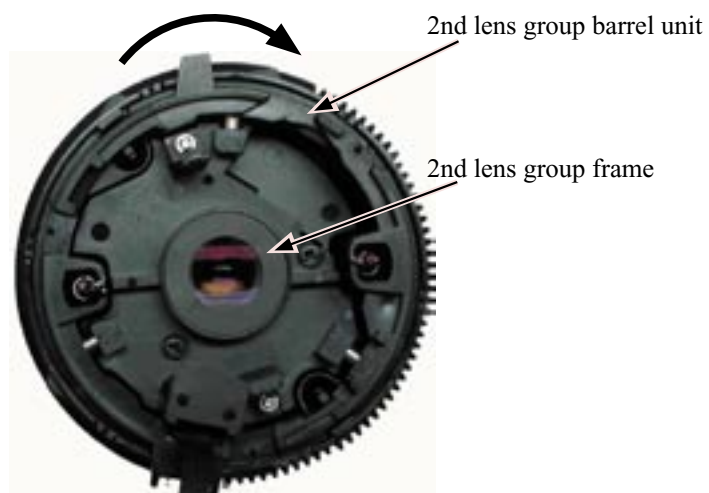


2ND LENS GROUP BARREL UNIT

- Fit the inner diameter convex sections of #605 (3 places) to the grooves A of #604 (3 places) and set them to each other.
- Fit #622 (3 places) to the cam grooves of #603 (3 places).

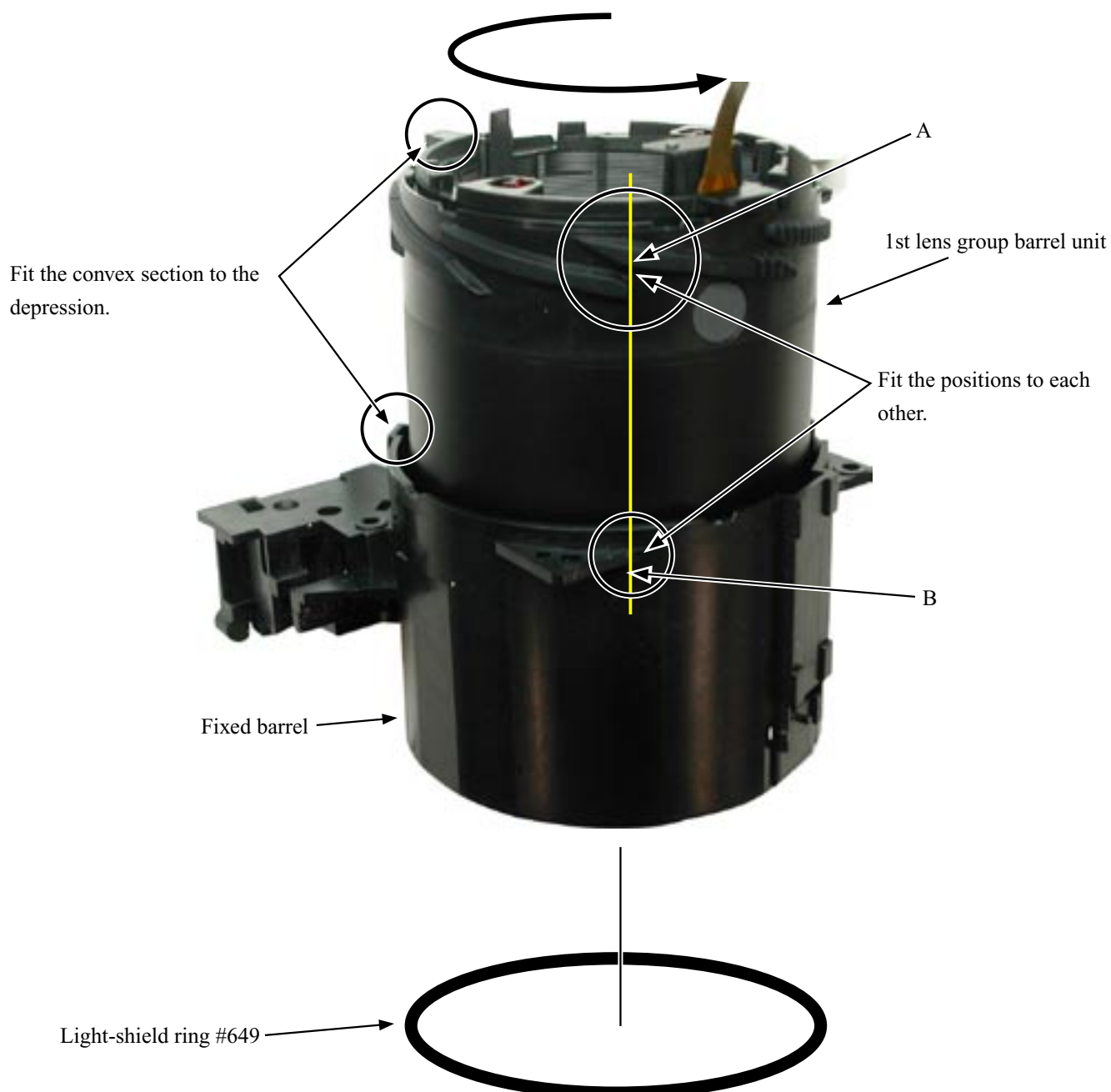


- As pushing the 2nd lens group frame, turn and fit the 2nd lens group barrel unit.

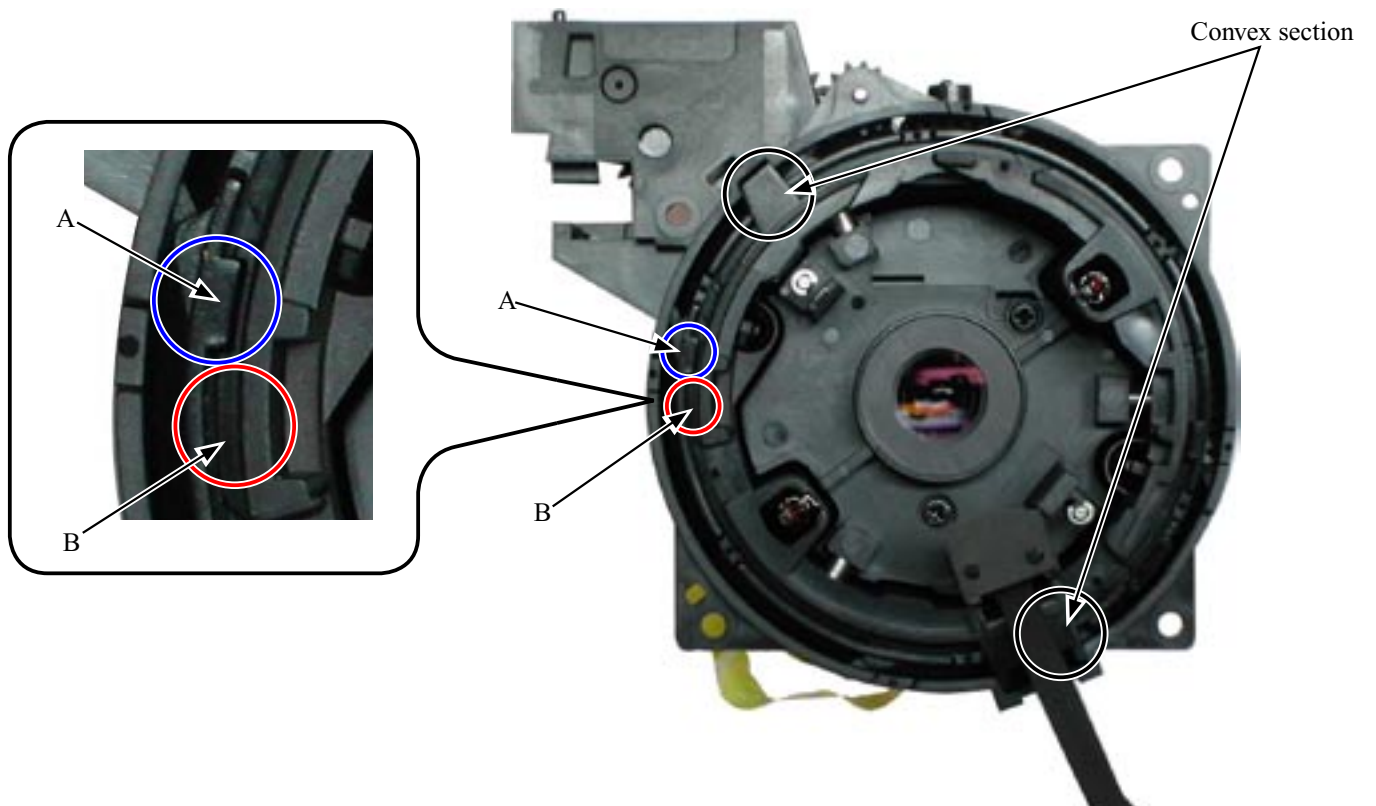


FIXED BARREL

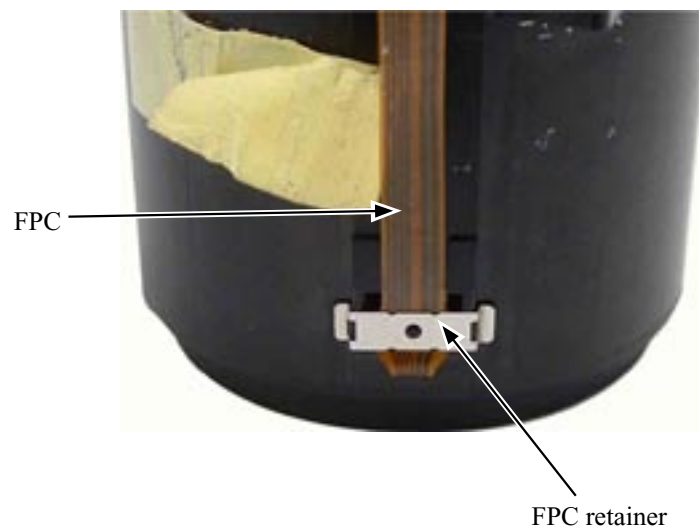
- Set the light-shield ring #649.
- Fit the position A on the 1st lens group barrel unit to the position B on the fixed barrel and set them to each other by turning the 1st lens group barrel unit in the arrow direction.
- ※ Fit the convex section of the 1st lens group barrel unit to the depression of the fixed barrel.



- Make sure that the hook A is above the end face B of the lens barrel unit.
- The convex section must be fitted in the fixed barrel.



- Insert the FPC and set the FPC retainer.

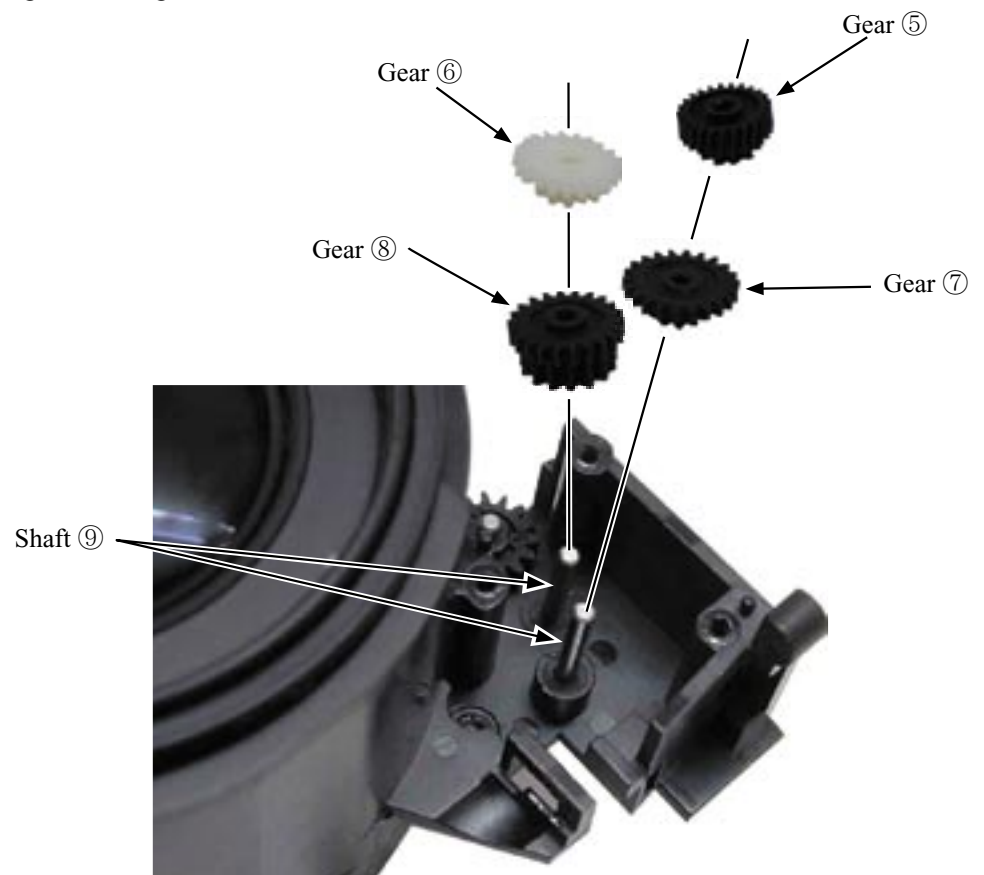


DRIVE GEAR

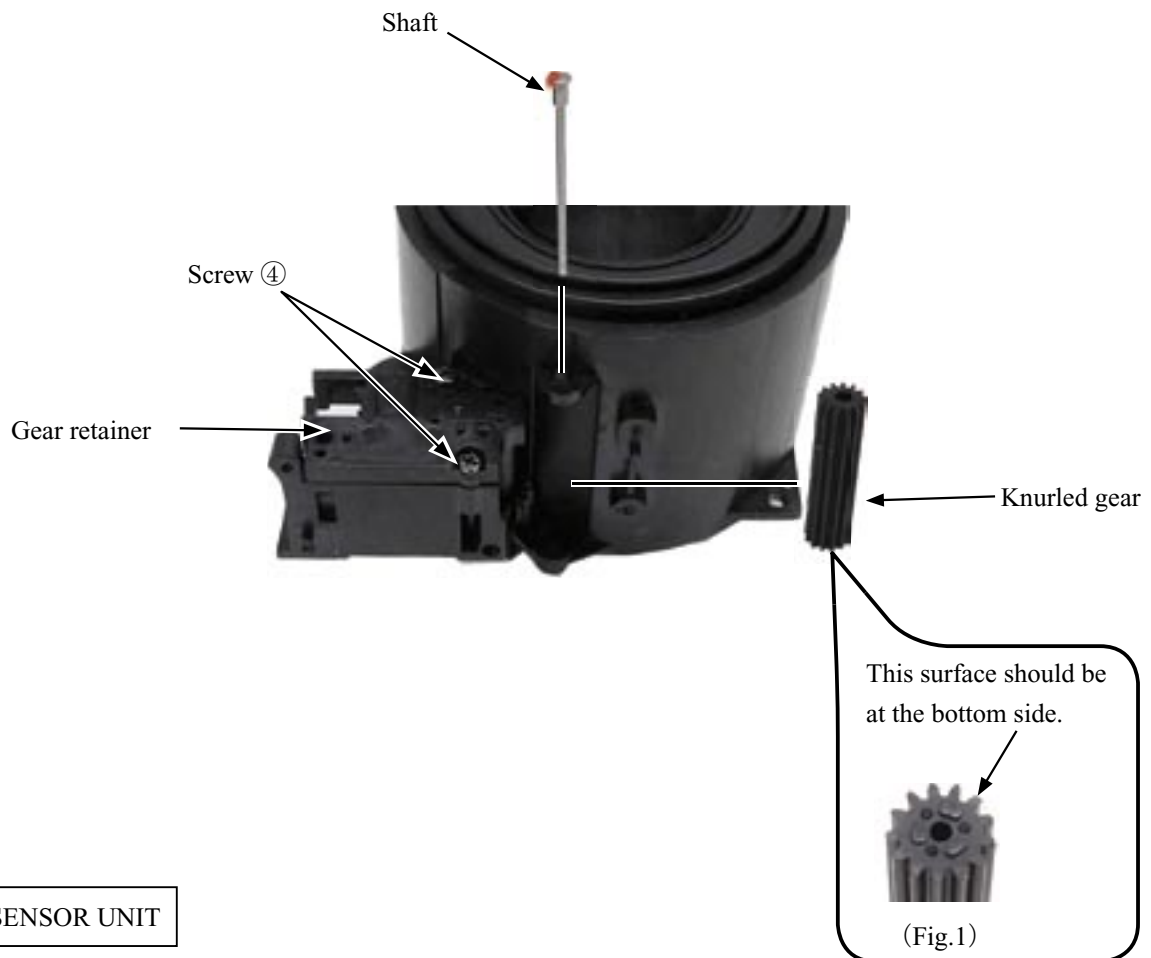
- Set the shaft ⑪ .
- Set the gear ⑩ .



- Set the two shafts ⑨ .
- Set the gear ⑧ , gear ⑦ , gear ⑥ and gear ⑤ in this order.

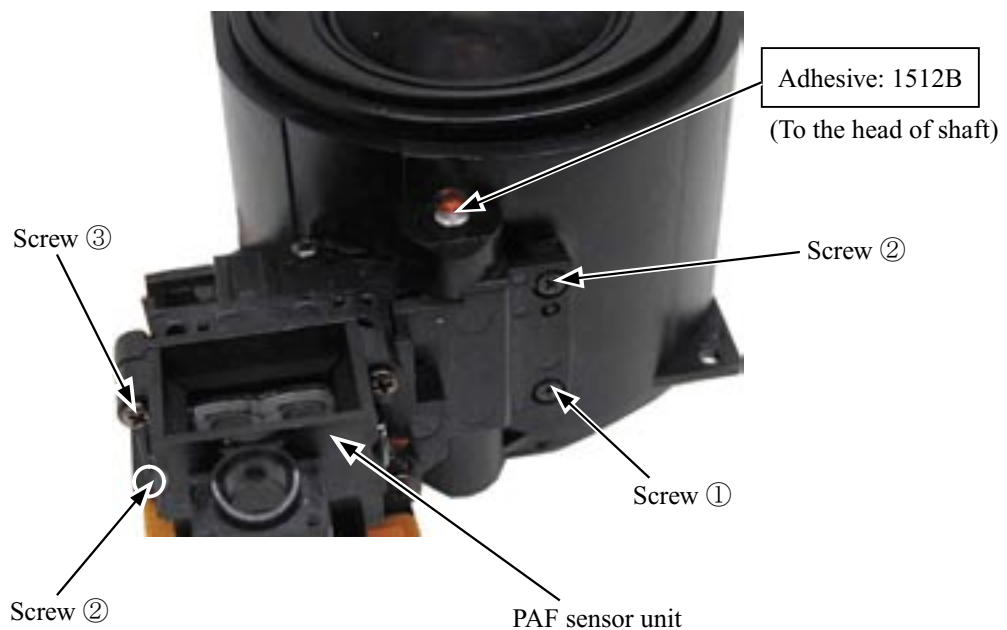


- Set the gear retainer.
 - Tighten the two screws ④ (M1.4 × 4).
 - Set the knurled gear, insert the shaft and adhere them with 1512B. (Fig. 2)
- ※ Be careful for the direction of the gear #673. (Fig. 1)



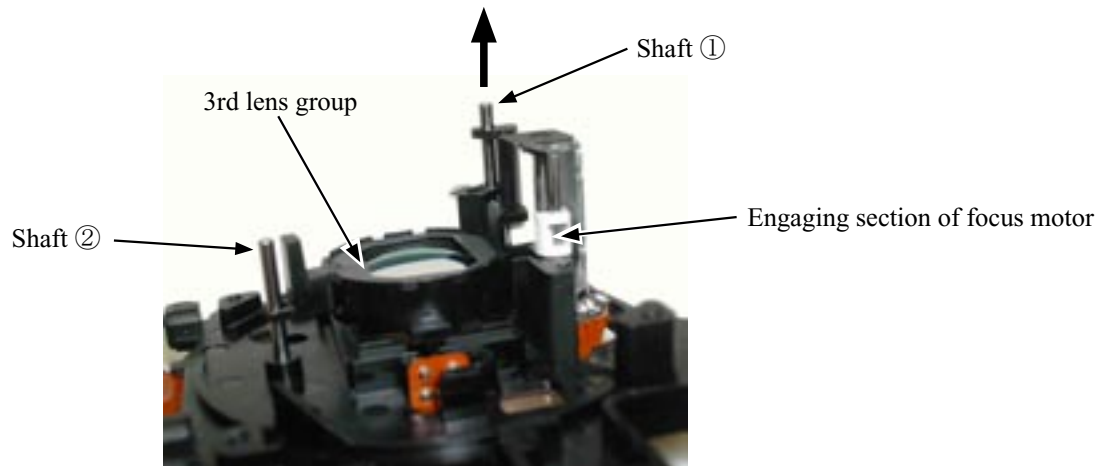
PAF SENSOR UNIT

- Set the PAF sensor unit.
- Tighten the screw ③ (M1.4 × 6.5).
- Tighten the two screws ② (M1.4 × 3).
- Tighten the screw ① (M1.4 × 4.5).



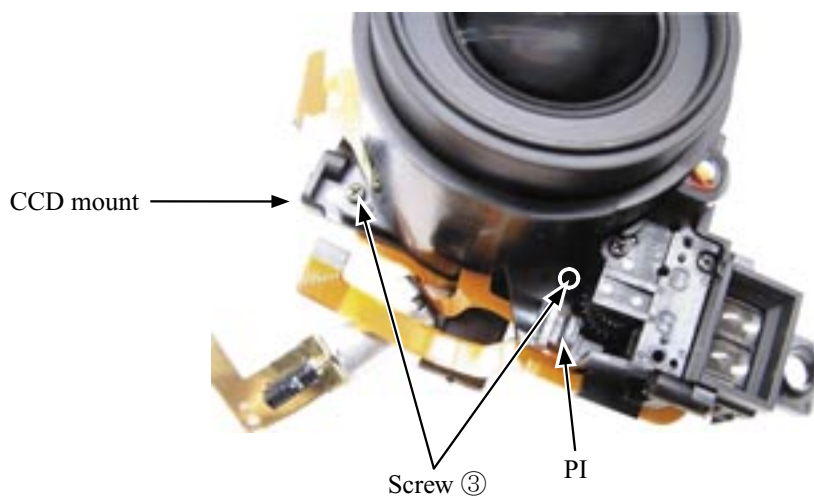
3RD LENS GROUP

- Set the 3rd lens group into the focus motor and the shaft ② .
- Insert the shaft ① in the arrow direction.



CCD MOUNT

- Set the CCD mount.
- Tighten the two screws ③ (M1.7 × 5.5).



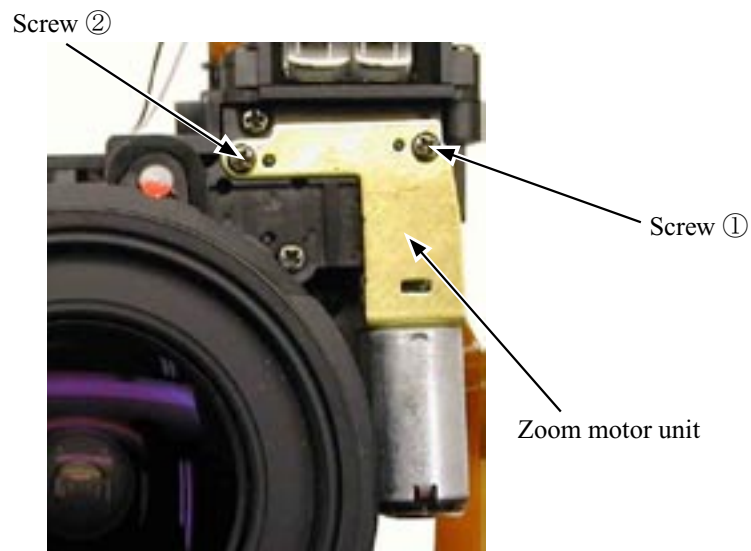
(Fig.1)

- Tighten the two screws ③ (M1.7 × 5.5).
- Apply the adhesive (1512B) to the top surface of the PI. (Applied quantity: size of sesame grain) (Fig. 2: Section A)
- Set the PI. (Fig. 1)
- After setting the PI, apply the adhesive (1512B) to its side. (Fig. 2: Section B)

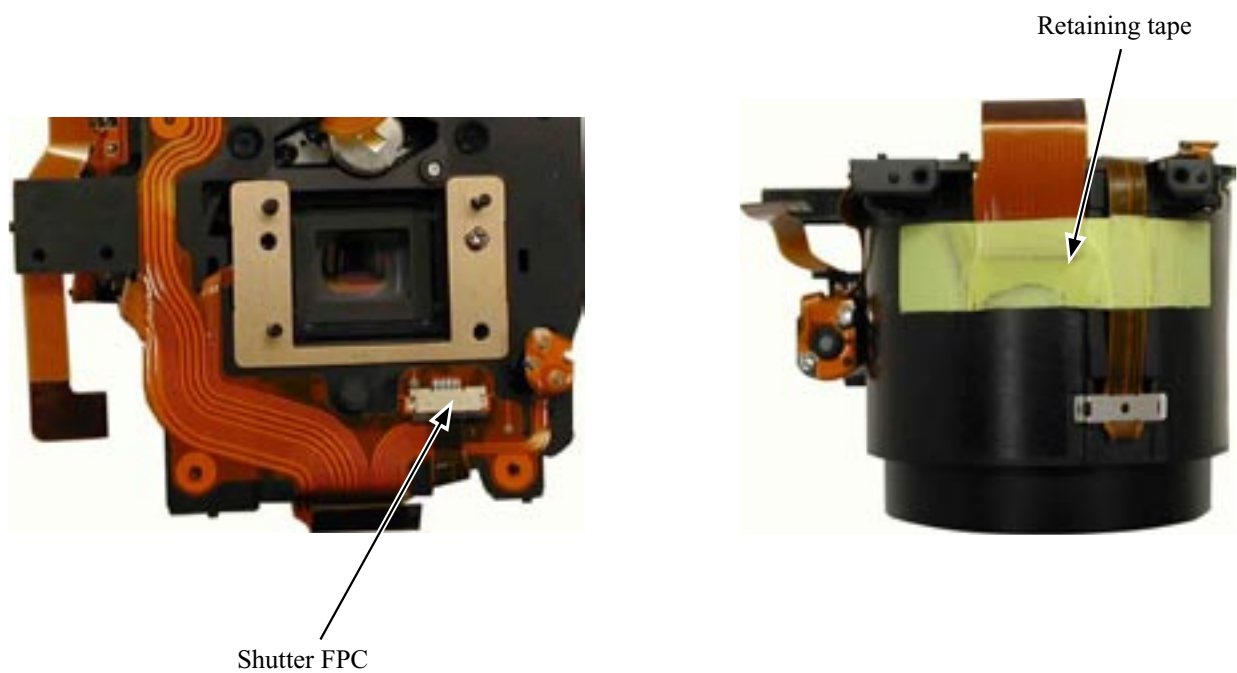


(Fig.2)

- Set the zoom motor unit.
- Tighten the screw ② (M1.4 × 3).
- Tighten the screw ① (M1.4 × 5.5).



- Set the shutter FPC and adhere the retaining tape as shown below.



Resolution inspection

When disassembling and repairing the lens-barrel, be sure to check the following after assembling it into the camera body.

• Resolution inspection

By shooting the high-definition resolution chart (J63079), confirm that the number of TV lines is within the standard.

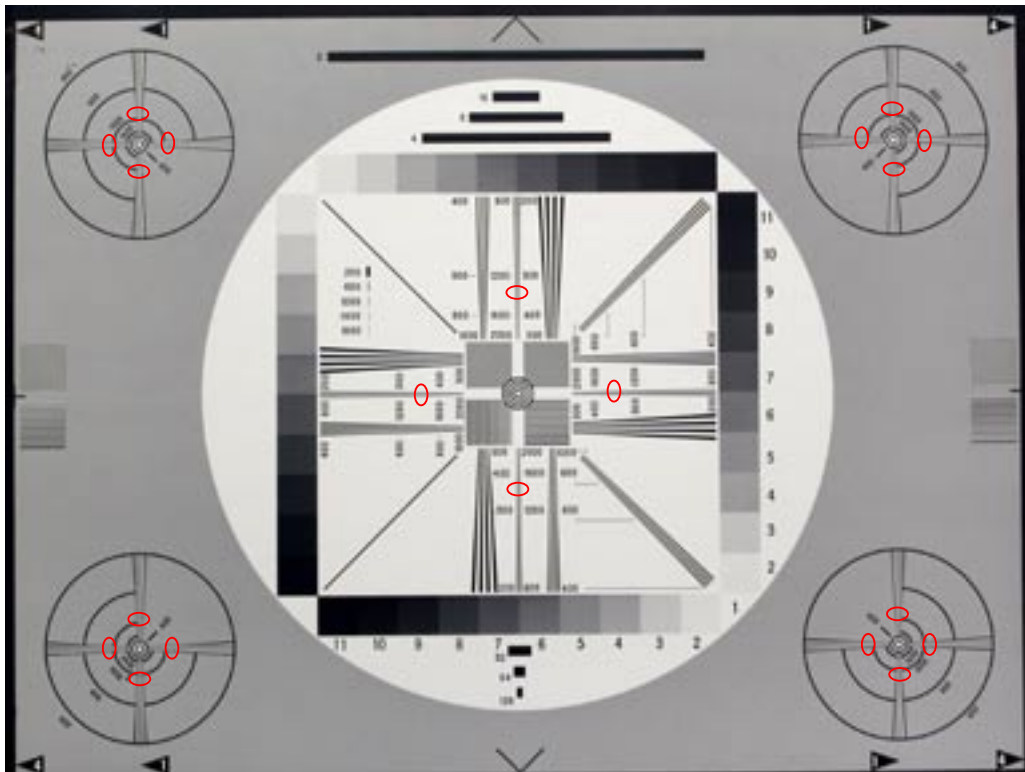
TV lines (standard):

1450 TV lines or more in the center; 900 TV lines or more at the periphery

(ref. The resolution is represented by “TV lines” , which are total number of black-and-white strips distinguishable on the TV screen.)

- (a) To take pictures, set the camera as follows: Shooting-mode (AUTO), Image quality mode (High), Flash mode (Flash cancel)
- (b) Check the zoom position at WIDE, MIDDLE and TELE.
The object distance: WIDE (approx. 0.36 m), MIDDLE (approx. 0.7 m), and TELE (approx.1.3 m). Set the chart fully screened in the LCD of the camera and fix it on a tripod.
- (c) Open the shot image by Photoshop, and confirm it by the magnified display, e.g. 100%, etc.
- (d) Check if the resolution in the center and the 4 corners of the periphery is identifiable in black and white at the position circled in red as below.

In case the resolution is defective, it is necessary to replace the lens-barrel group unit with the new one.

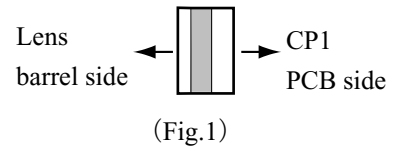


High-definition resolution chart (J63079)

CP1 PCB

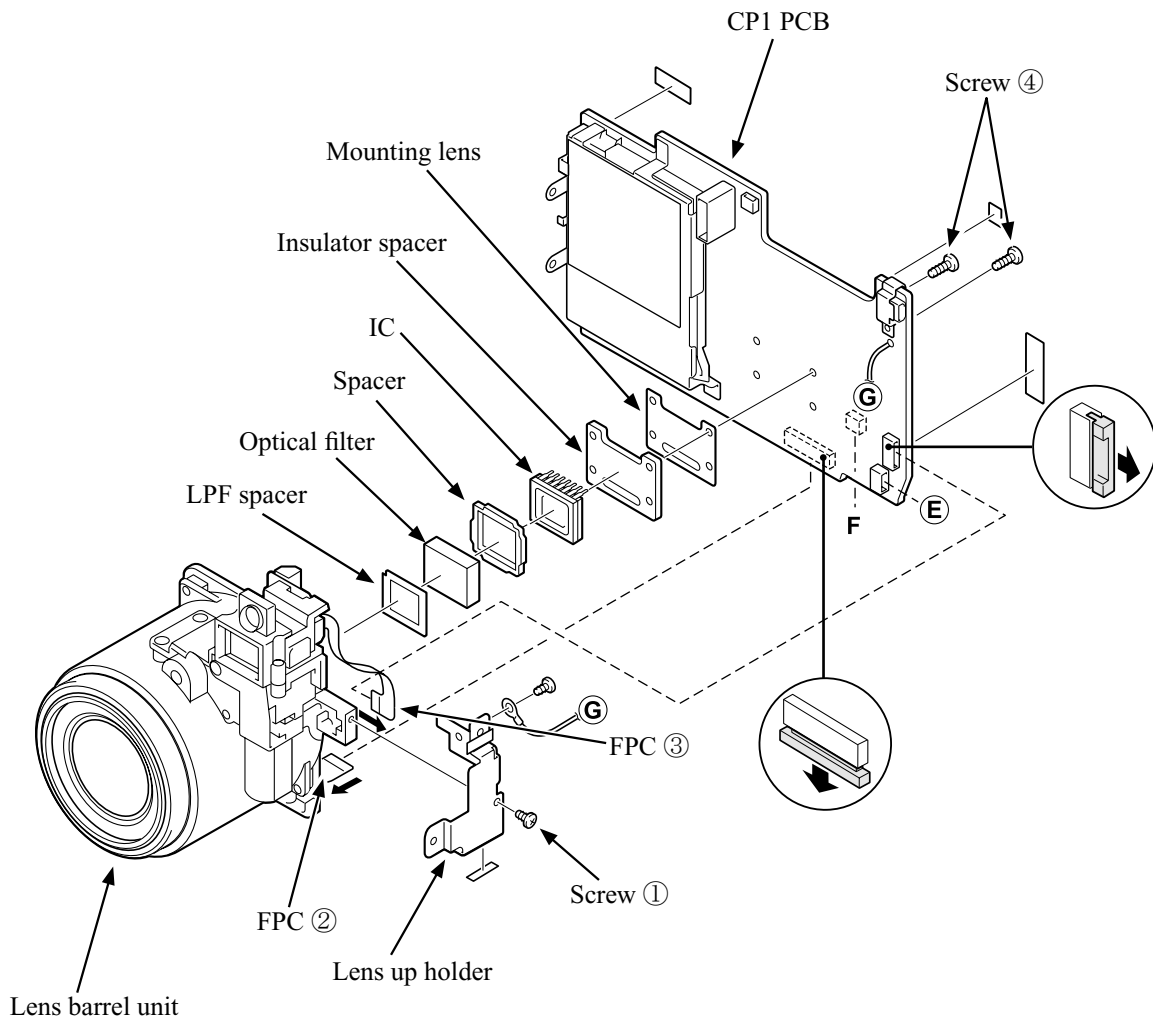
- Set the mounting lens.
- Set the insulator spacer.
- Set the IC.
- Set the spacer.
- Set the optical filter.
- ※ Be careful for its setting direction. (Fig. 1)
- Set the LPF spacer.
- ※ Be careful for its setting direction. (Fig. 2)
- Set the lens barrel unit into the CP1 PCB.
- Tighten the two screws ④ (M1.7 × 6).
- Set the FPC ③ .
- Set the FPC ② .
- Set the lens up holder.
- Tighten the screw ① (M1.7 × 3).

Setting direction of optical filter



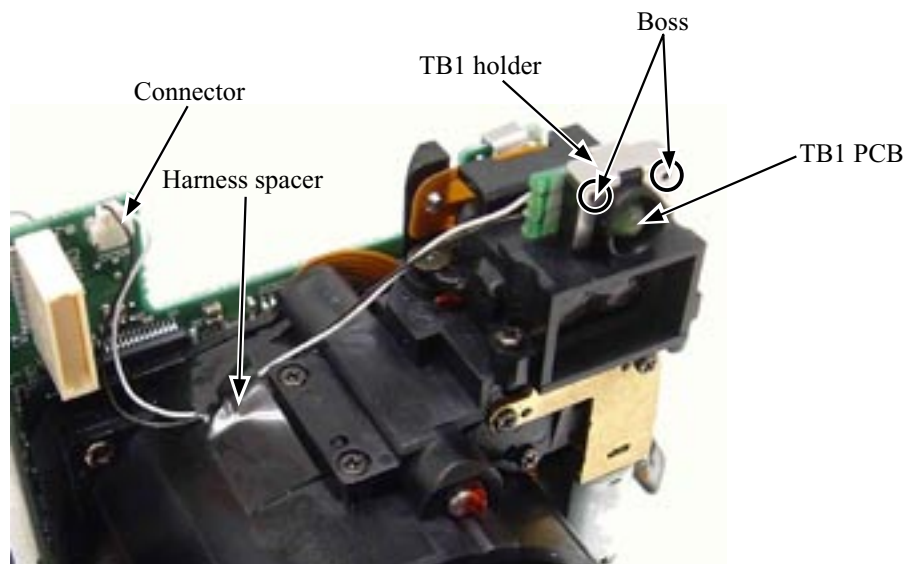
LPF spacer setting direction as viewed from the PCB side.

(Fig.2)



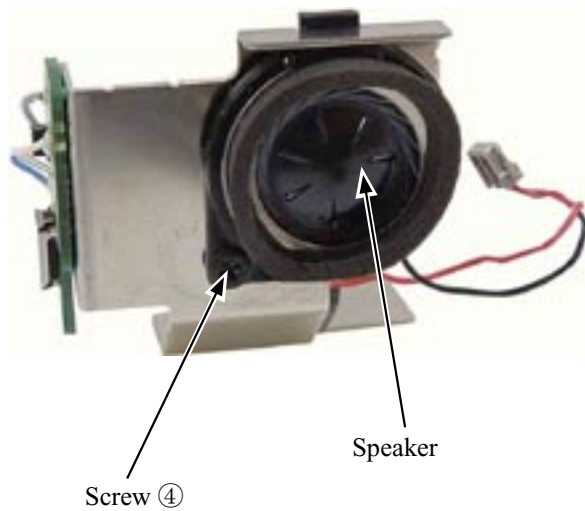
TB1 PCB

- Set the TB1 PCB and then set the TB1 holder.
- Set the connector.
- Adhere the harness spacer as shown below.

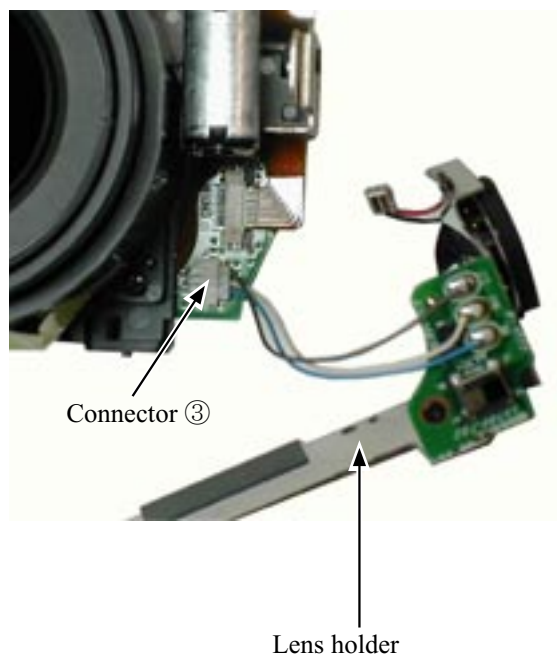


SPEAKER

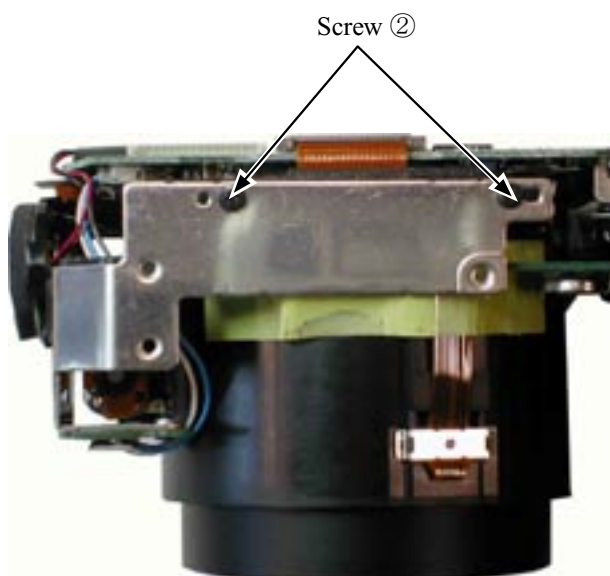
- Set the speaker and tighten the screw ④ (M1.7 × 3).



- Set the connector ③ and then set the lens holder.



- Tighten the two screws ② (M1.7 × 3).



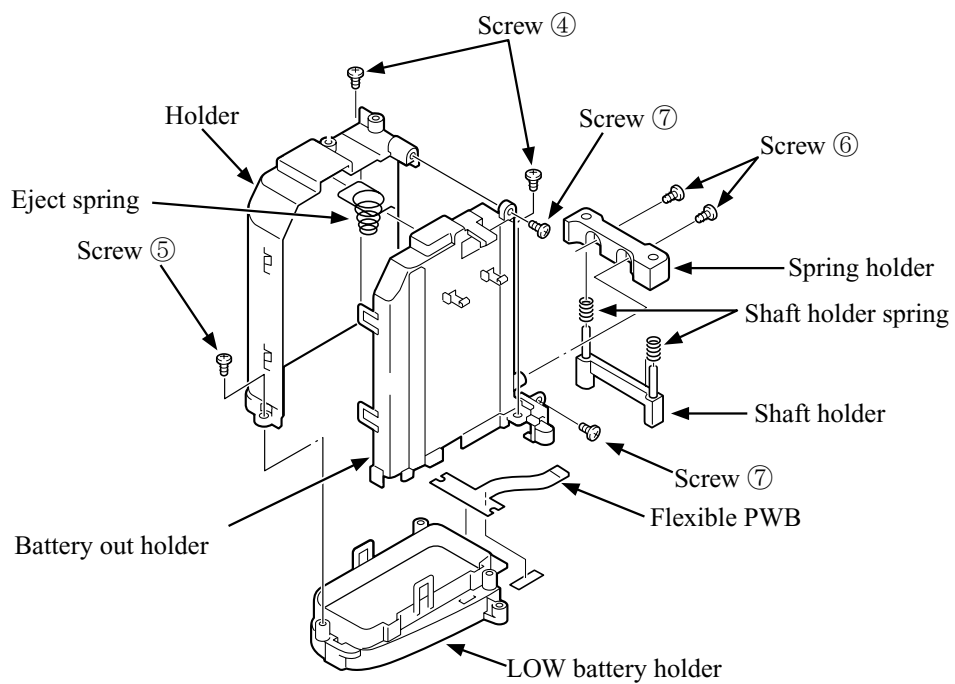
- Set the connector ① and adhere the harness spacer.



BATTERY CHAMBER

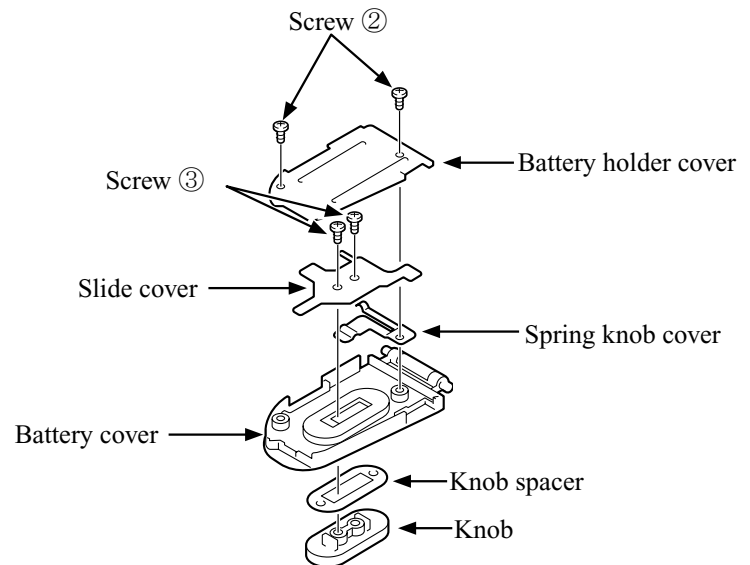
1. Assembly of battery chamber

- Set the eject spring into the battery out holder.
- Set the holder.
- Tighten the two screws ⑦ (M1.7 × 3.5).
- Set the spring holder, the shaft holder springs (2 pcs.) and the shaft holder.
- Tighten the two screws ⑥ (M1.7 × 3.5).
- Set the flexible PWB and then set the LOW battery holder.
- Tighten the screw ⑤ (M1.4 × 3).
- Tighten the two screws ④ (M1.7 × 3.5).

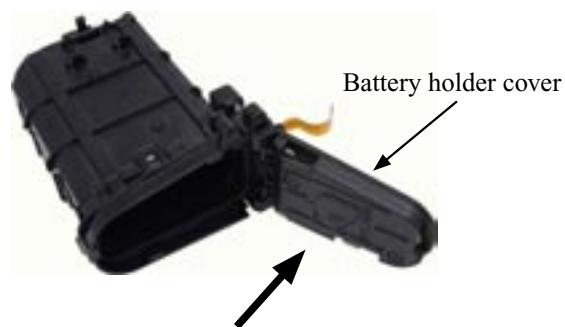


2. Assembly of battery holder cover

- Set the knob spacer and the knob onto the battery cover.
- Set the spring knob cover.
- Set the slide cover.
- Tighten the two screws ③ (M1.7 × 2.5).
- Set the holder cover.
- Tighten the two screws ② (M1.7 × 3).

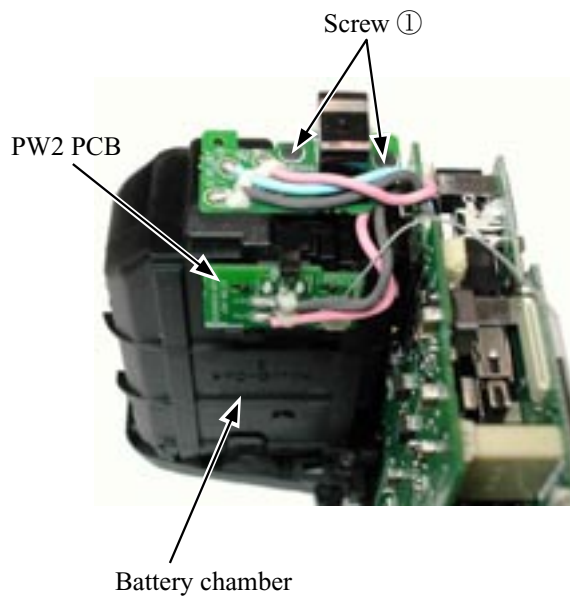


- Set the battery holder cover.



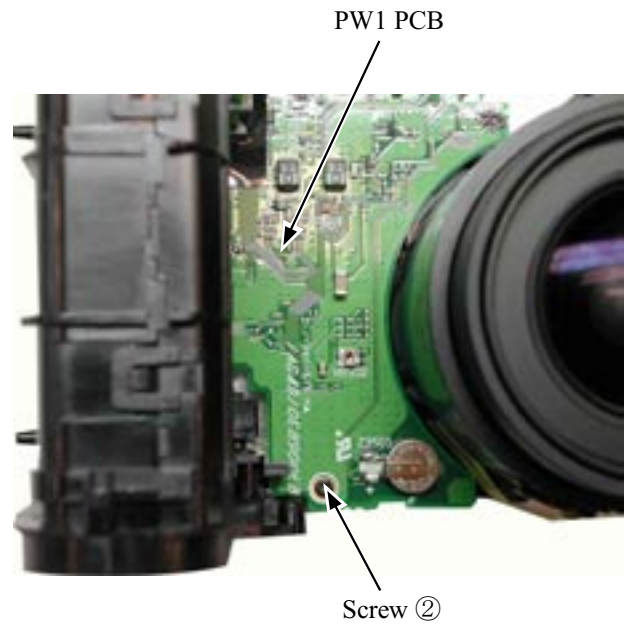
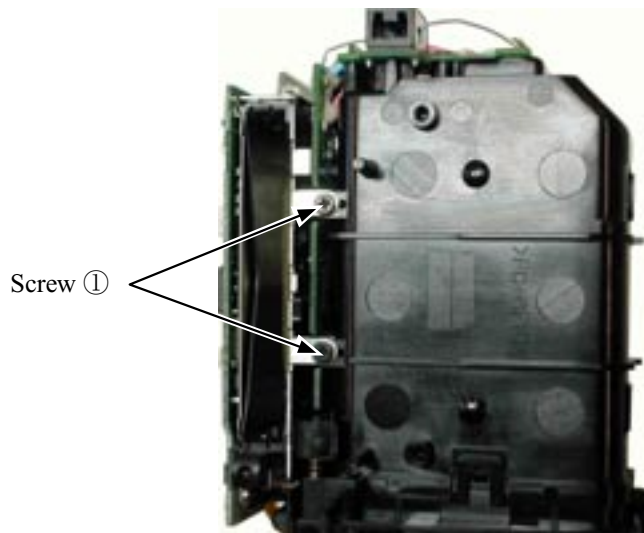
3. Installation of battery chamber

- Fit the PW2 PCB onto the battery chamber.
- Set the PW3 PCB and tighten the three screws ① (M1.7 × 3).

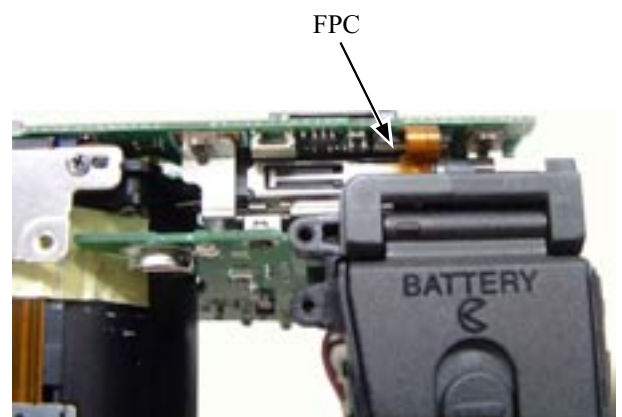
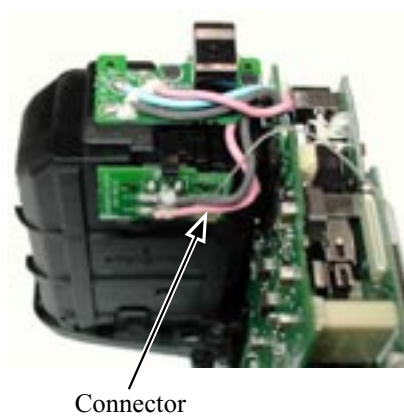


PW1 PCB

- Set the PW1 PCB onto the connector of the main PCB.
- Tighten the screw ② (M1.7 × 2.5).
- Tighten the two screws ① (M1.7 × 3).



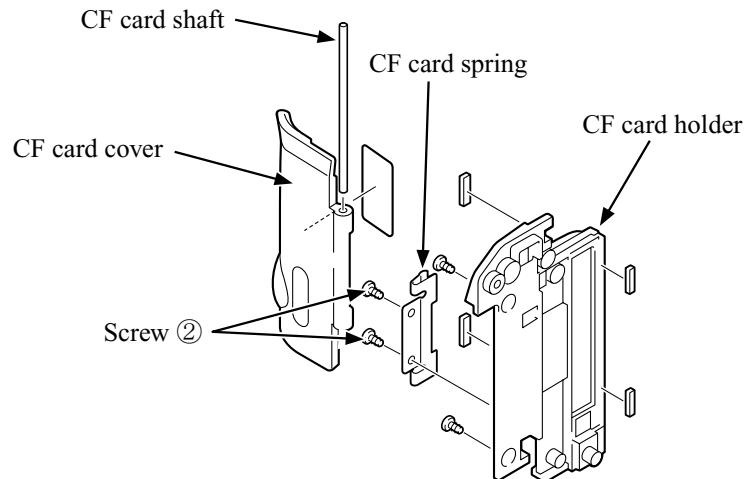
- Set the FPC.
- Set the connector.



CF CARD COVER

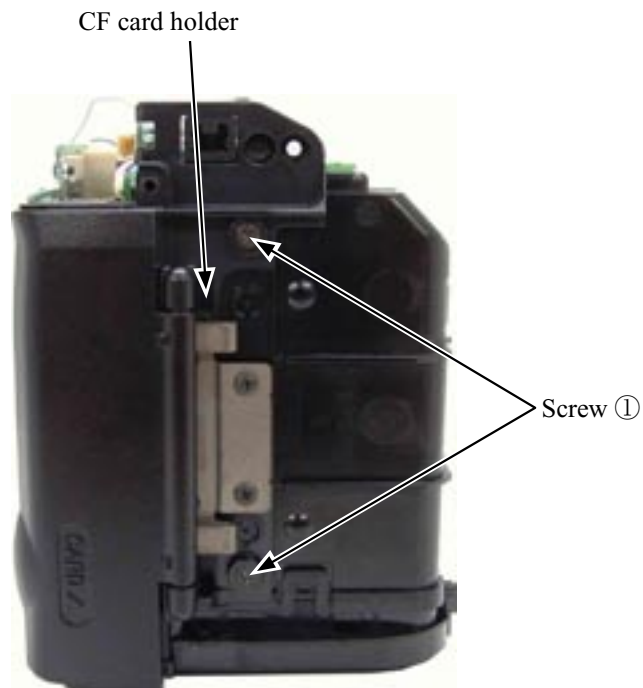
1. Assembly of CF card cover

- Set the CF card spring onto the CF card holder and tighten the two screws ② (M1.7 × 3).
- Insert the CF card shaft into the CF card cover. Then, set the CF card cover onto the CF card holder.



2. Setting of CF card cover

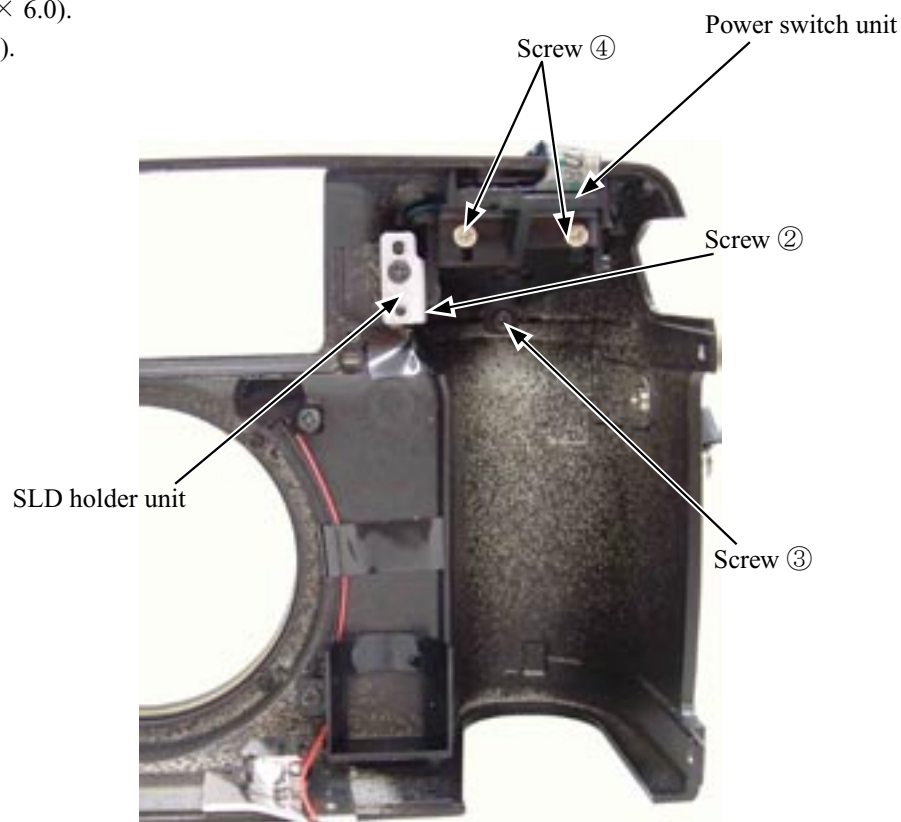
- Set the CF card holder.
- Tighten the two screws ① (M1.7 × 3.5).



ASSEMBLY OF FRONT COVER

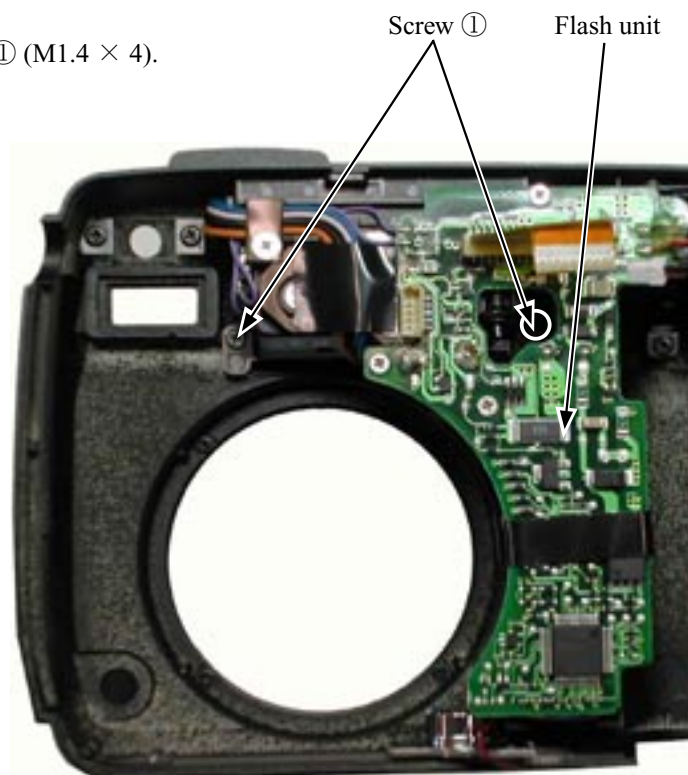
1. Installation of power switch unit

- Set the power switch unit from above.
- Tighten the two screws ④ (M1.7 × 6.0).
- Tighten the screw ③ (M1.7 × 3.5).
- Tighten the screw ② (M1.7 × 3).



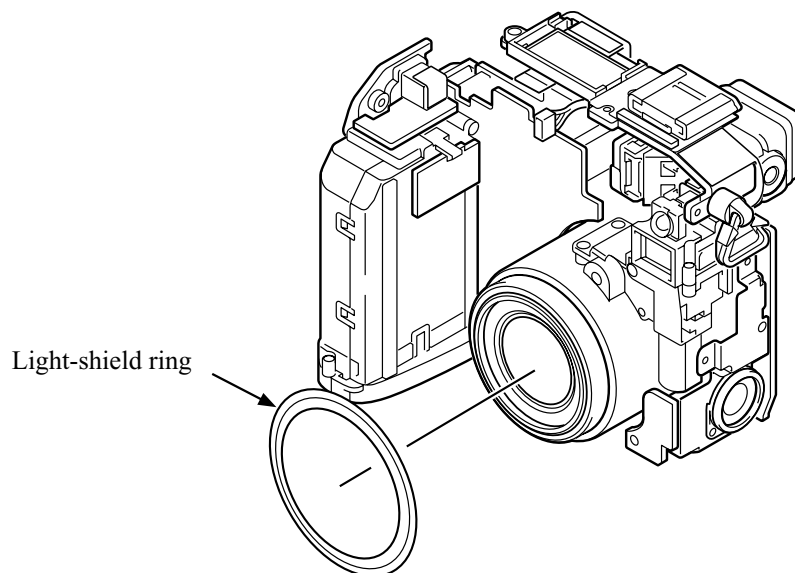
2. Installation of flash unit

- Set the flash unit.
- Tighten the two screws ① (M1.4 × 4).



LIGHT-SHIELD RING

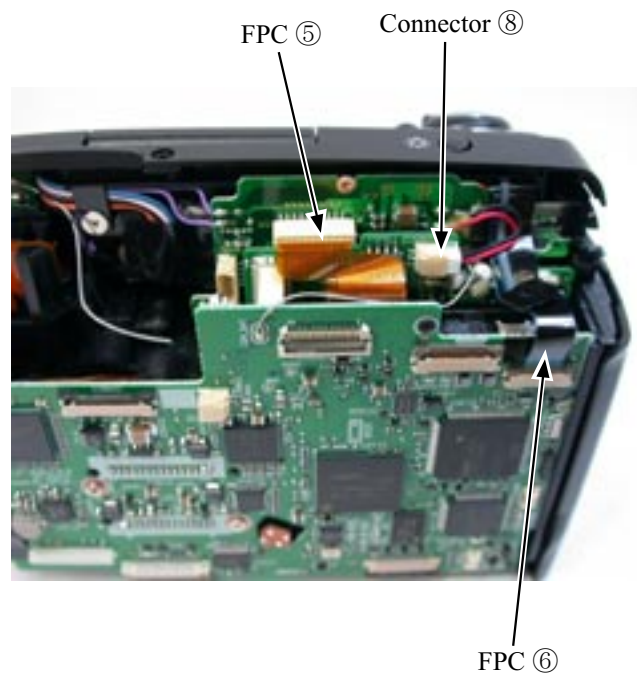
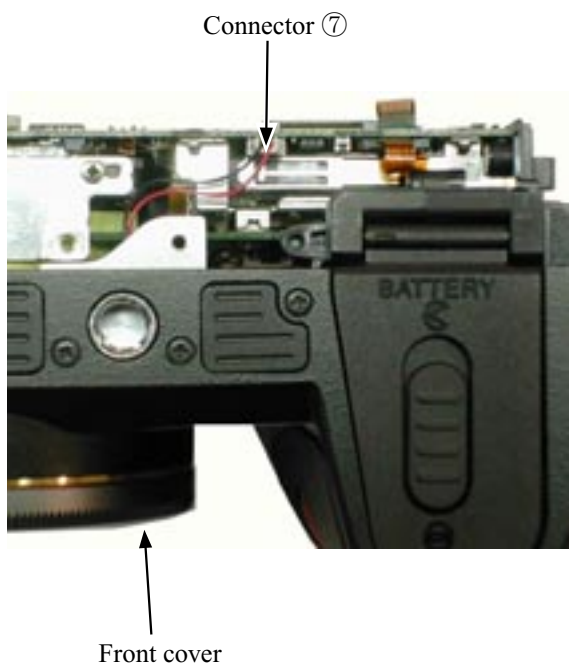
- Set the light-shield ring. (When setting, the gloss surface of the light-shield ring must face the front cover side.)



FRONT COVER

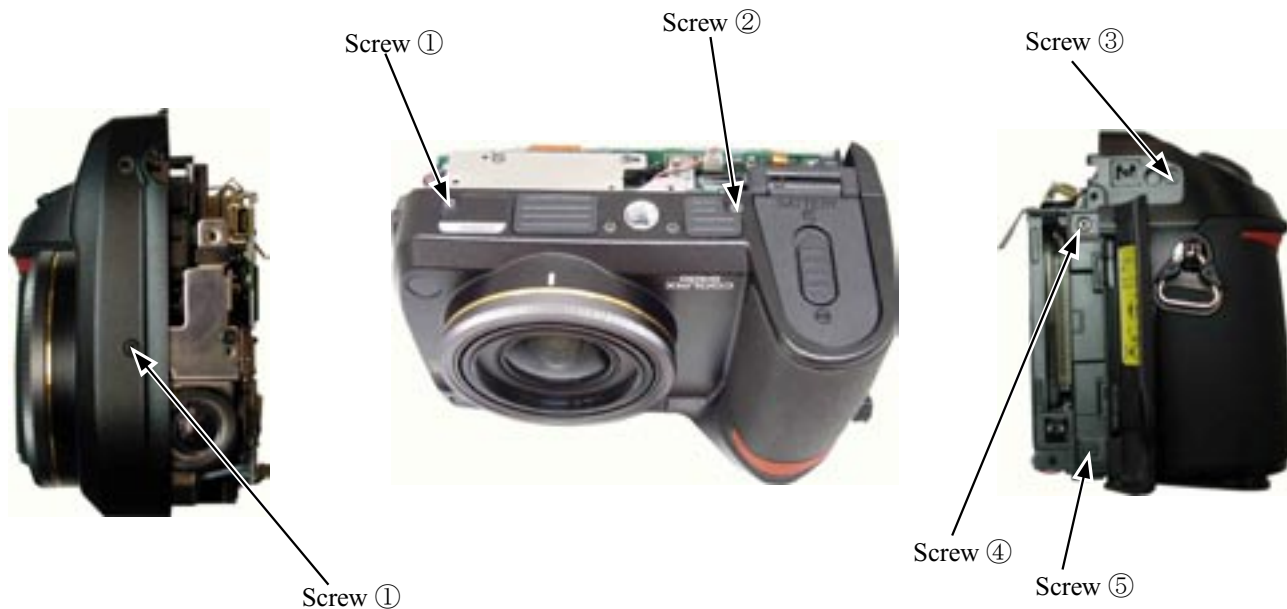
1. Setting of front cover

- Set the front cover.
- Set the connector ⑧ .
- Set the connector ⑦ .
- Set the FPC ⑥ .
- Set the FPC ⑤ .



2. Attaching of screws

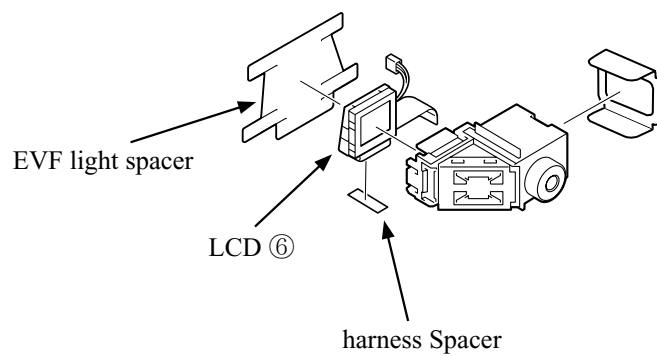
- Tighten the screw ⑤ (M1.7 × 3).
- Tighten the screw ④ (M1.7 × 4).
- Tighten the screw ③ (M1.7 × 4).
- Tighten the screw ② (M1.7 × 3.5).
- Tighten the two screws ① (M1.7 × 3.5).



ASSEMBLY OF EVF UNIT

1. EVF

- Set the LCD ⑥ .
- Adhere the harness spacer.



- Adhere the EVF light spacer in the order as shown below.

(1)



(2)



(3)



(4)



(5)

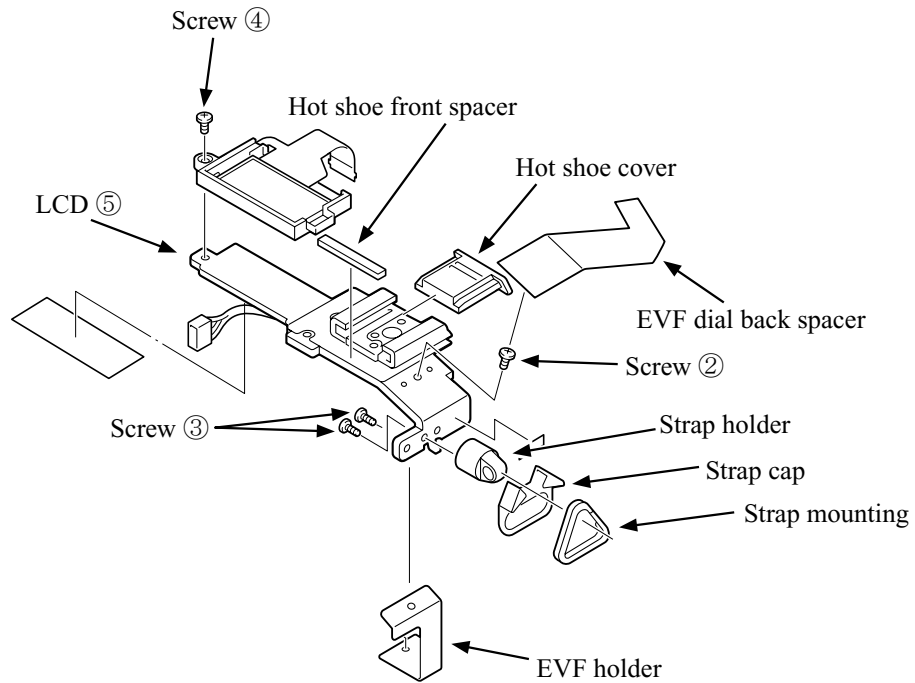


(6)

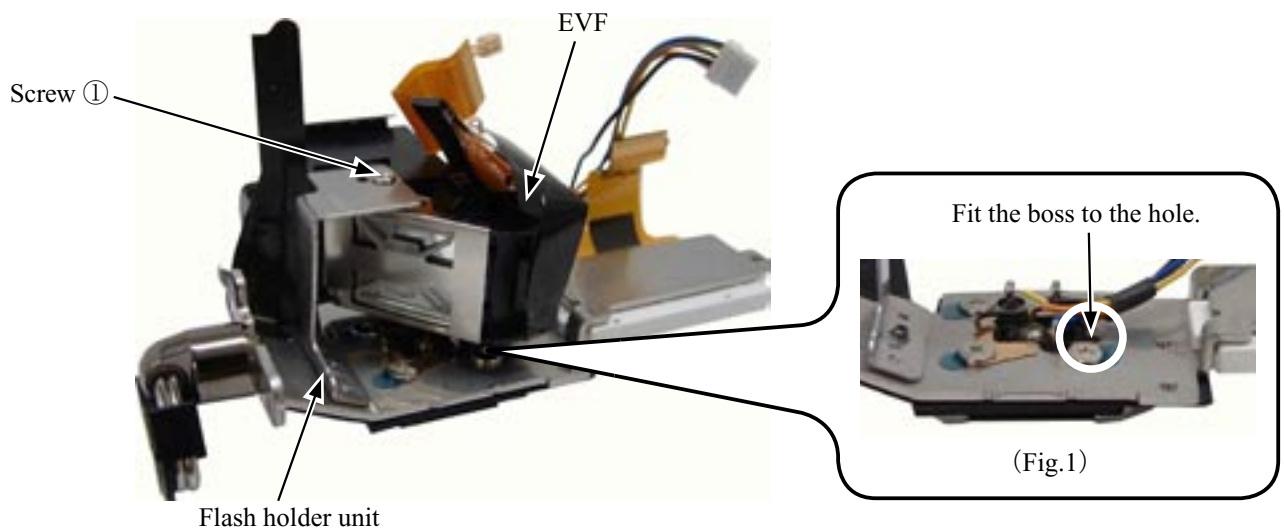


2. Flash holder unit

- Set the hot shoe cover.
- Set the hot shoe front spacer.
- Set the LCD ⑤ and tighten the screw ④ (M1.7 × 3).
- Set the strap holder, and the strap cap and the strap mounting and tighten the two screws ③ (M1.7 × 4).
- Set the EVF holder and tighten the screw ② (M1.7 × 2.5).
- Adhere the EVF dial back spacer.
- Fit the boss of the EVF to the hole on the flash holder unit. Then, set the EVF. (Fig. 1)

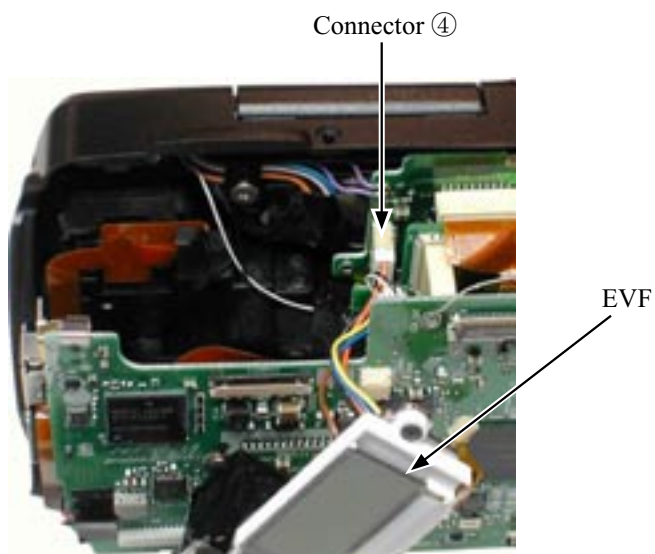


- Tighten the screw ① (M1.7 × 2.5).

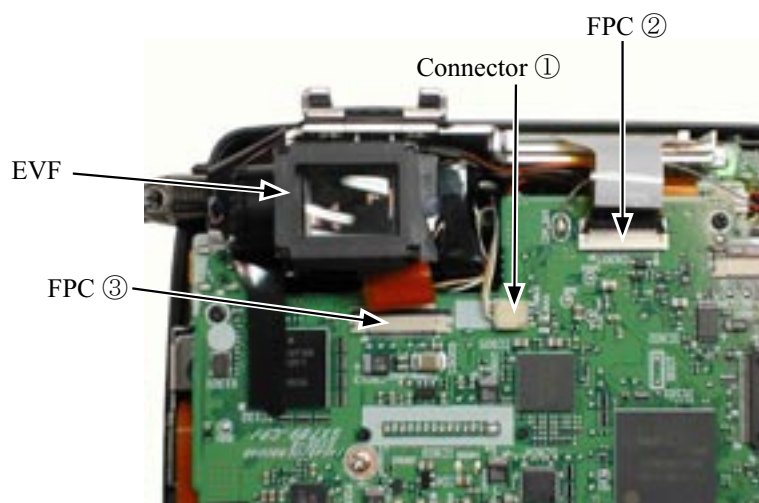


EVF UNIT

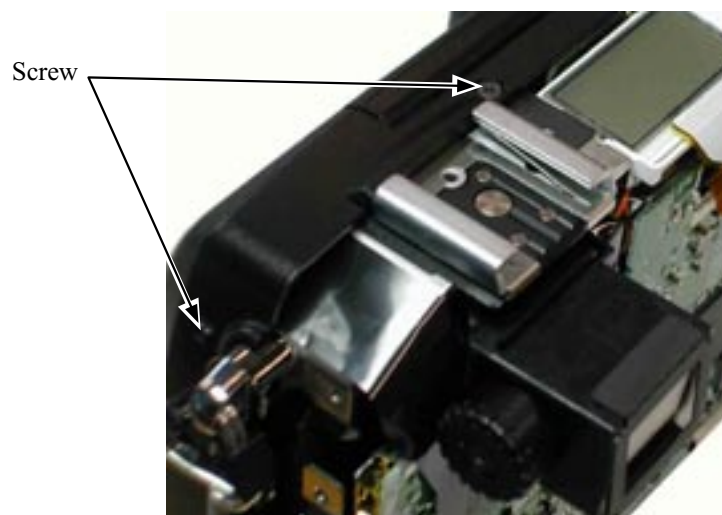
- Set the connector ④ and then set the EVF.



- Set the FPC ③ .
- Set the FPC ② .
- Set the connector ① .



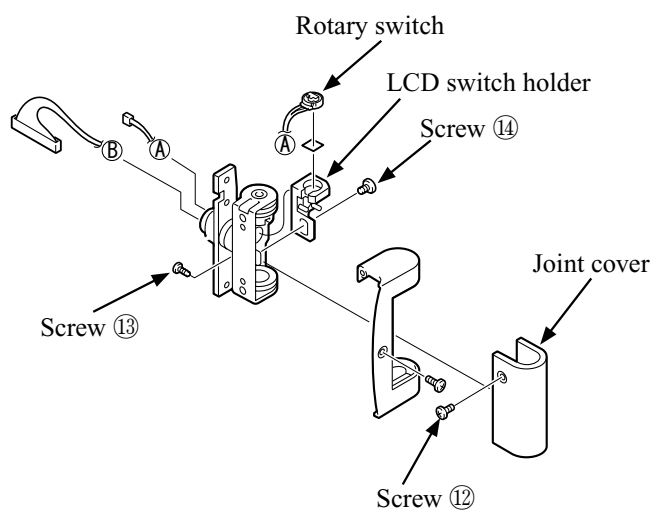
- Tighten the two screws (M1.7 × 3).



LCD

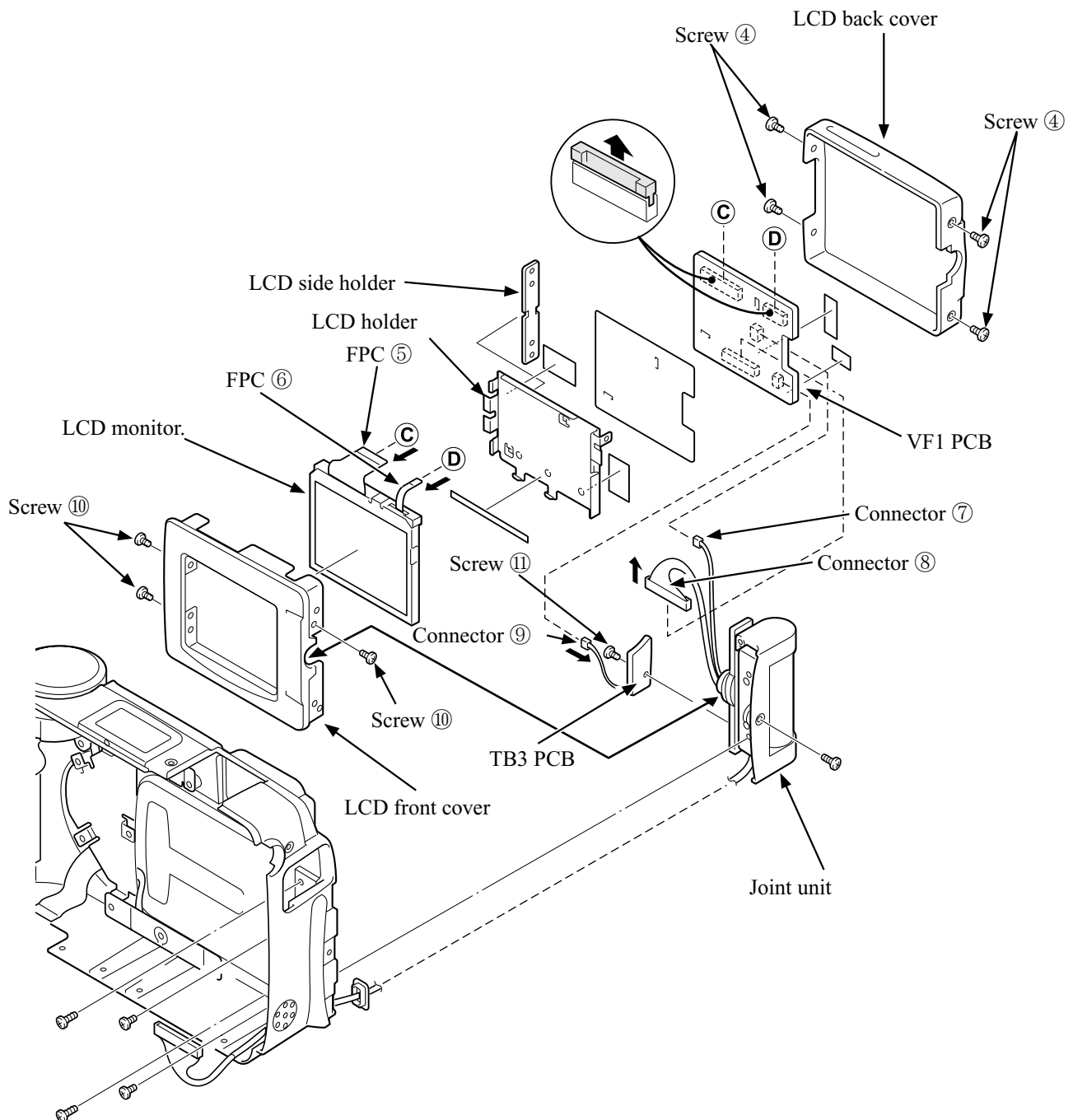
1. Assembly of joint unit

- Set the rotary switch.
- Set the LCD switch holder and tighten the screw ⑭ (M1.7 × 2).
- Set the joint cover and tighten the screw ⑬ (M1.4 × 4) and the screw ⑫ (M1.7 × 2).



2. Assembly of LCD monitor unit

- Set the TB3 PCB and tighten the screw ⑪ (M1.7 × 2).
- Set the VF1 PCB onto the LCD holder and perform soldering (at 2 places).
- Set the LCD monitor.
- Set the LCD front cover.
- Set the LCD side holder.
- Set the joint unit.
- Tighten the three screws ⑩ (M1.7 × 2).
- Set the connectors ⑦, ⑧ and ⑨.
- Set the FPC's ⑥ and ⑤.
- Set the LCD back cover and tighten the four screws ④ (M1.7 × 3).

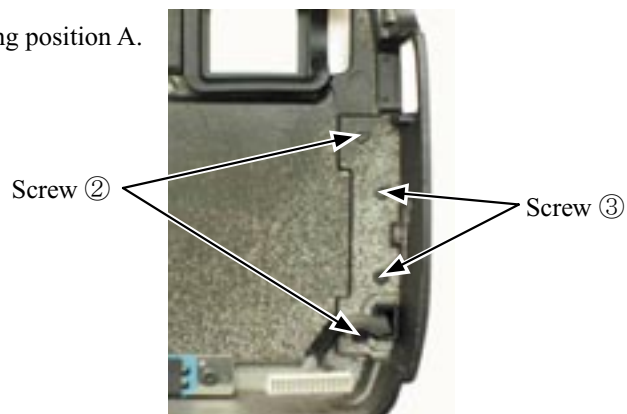


3. Setting of LCD monitor unit

- Insert the connector of the LCD monitor unit into the hole of the rear cover unit. (The arrow position)

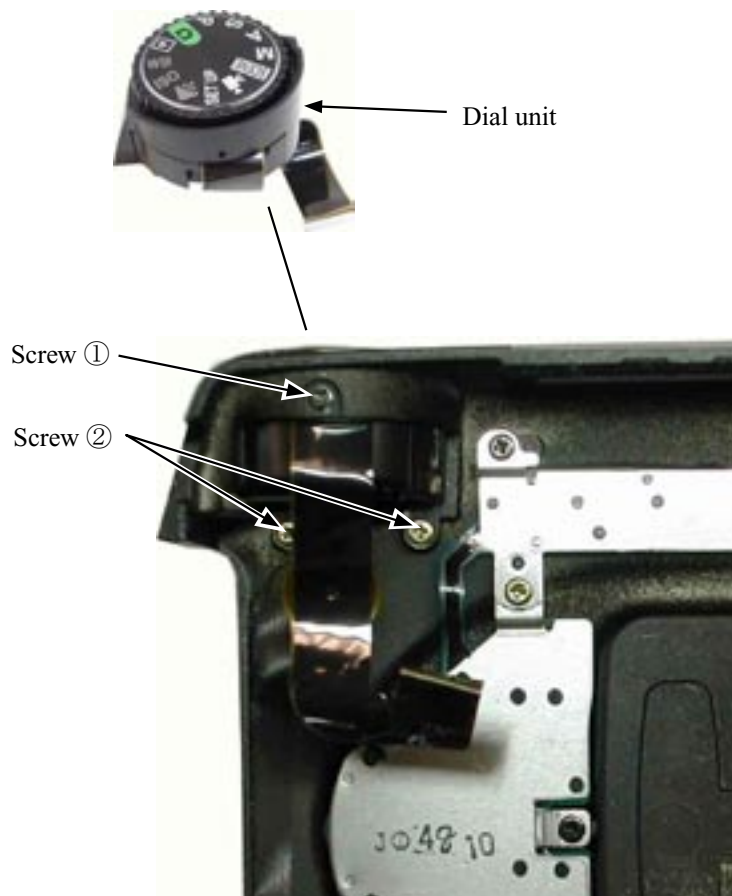
※ When inserting the connector, be careful for the connecting position A.

- Set the LCD monitor unit.
- Tighten the two screws ③ (M1.7 × 3).
- Tighten the two screws ② (M1.7 × 4).
- Tighten the screw ① (M1.7 × 3).



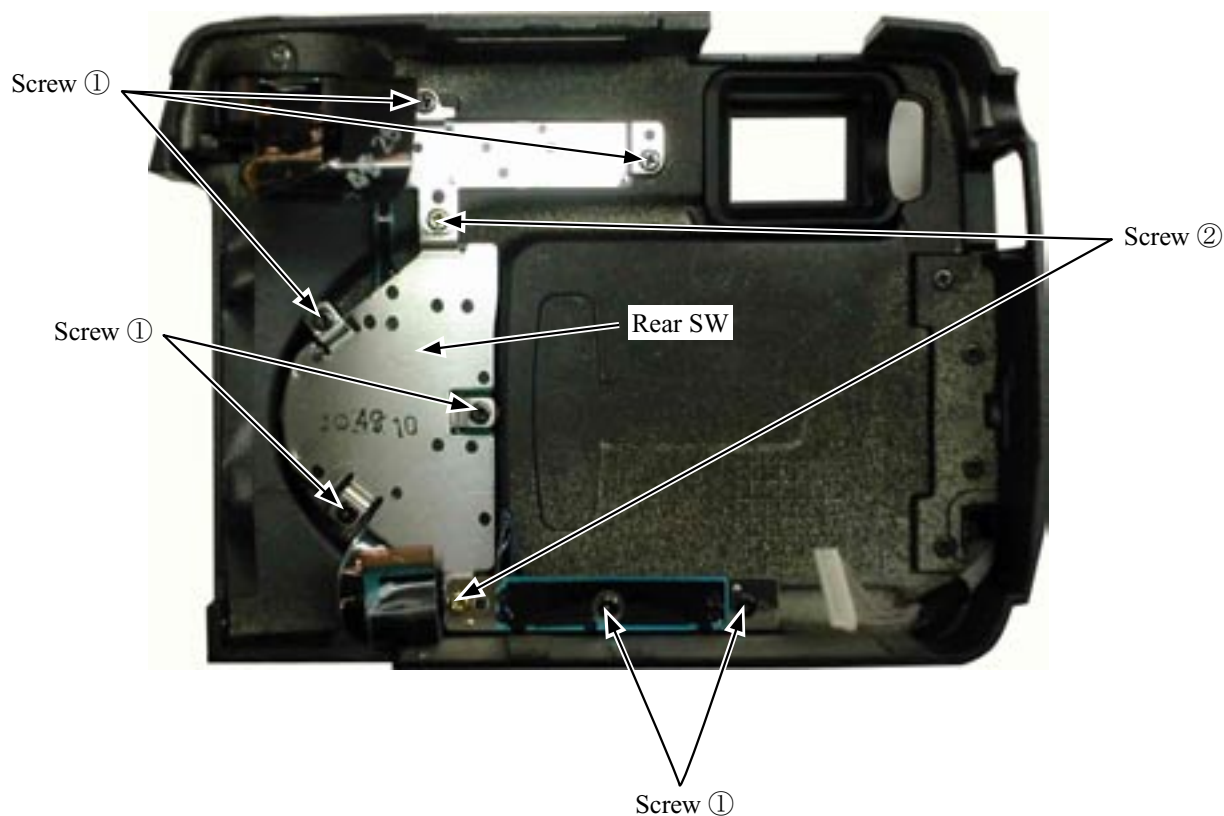
DIAL UNIT

- Set the dial unit.
- Tighten the two screws ② (M1.7 × 2.5).
- Tighten the screw ① (M1.4 × 3.5).



REAR SW

- Set the rear SW.
- Tighten the seven screws ① (M1.7 × 3).
- Tighten the two screws ② (M1.7 × 3.5).



REAR COVER

1. Setting of rear cover

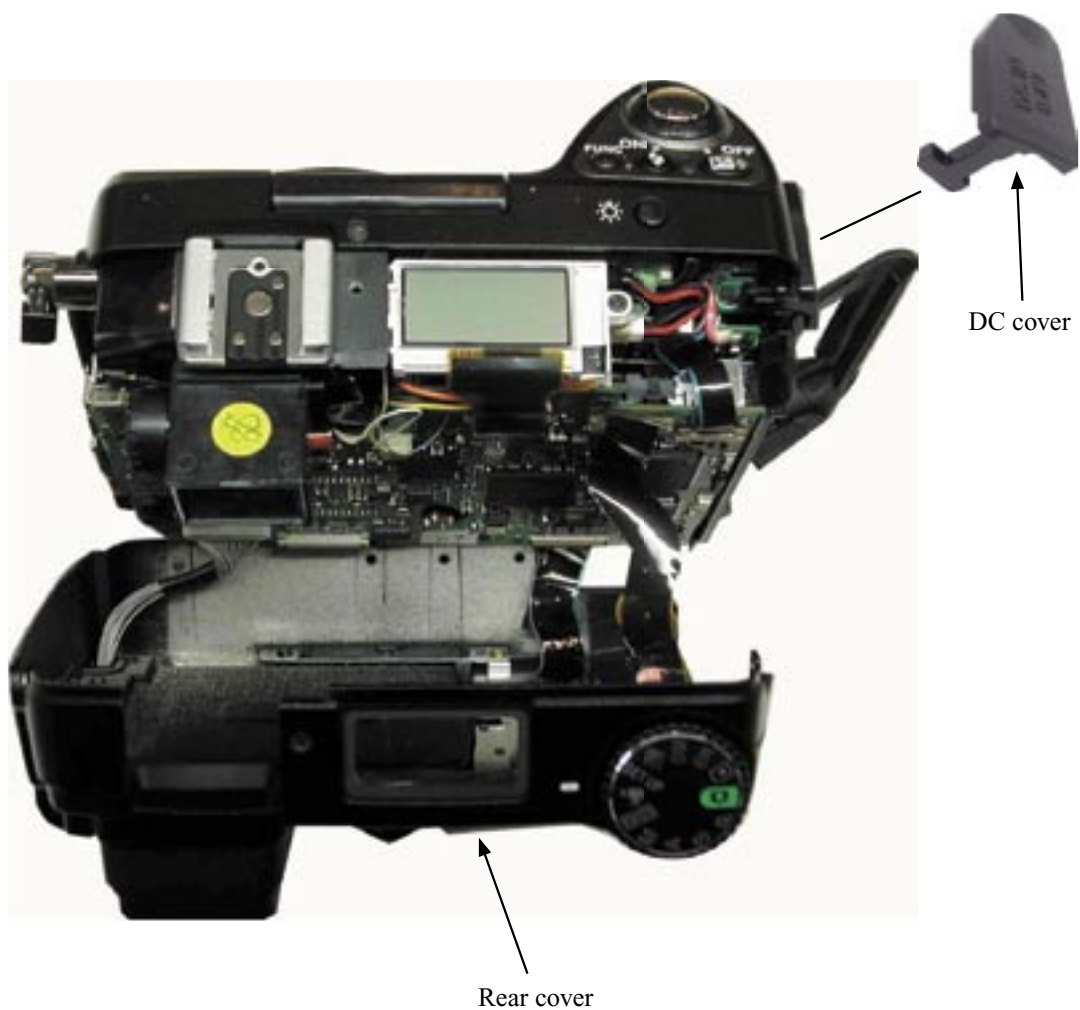
- Set the FPC ⑨ .
- Set the connector ⑦ .



- Set the FPC ⑧ .

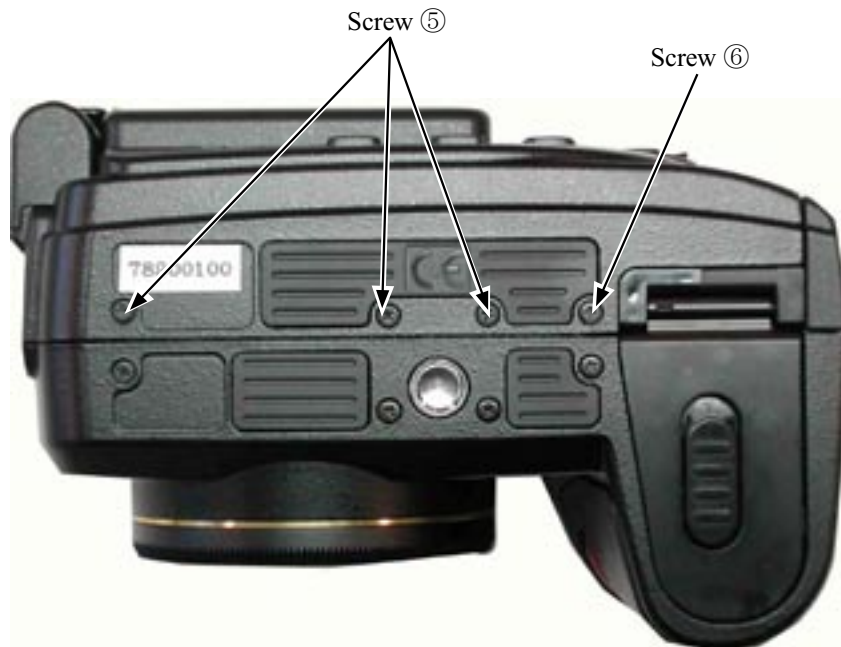


- Set the DC cover.
- Set the rear cover.



2. Attaching of screws

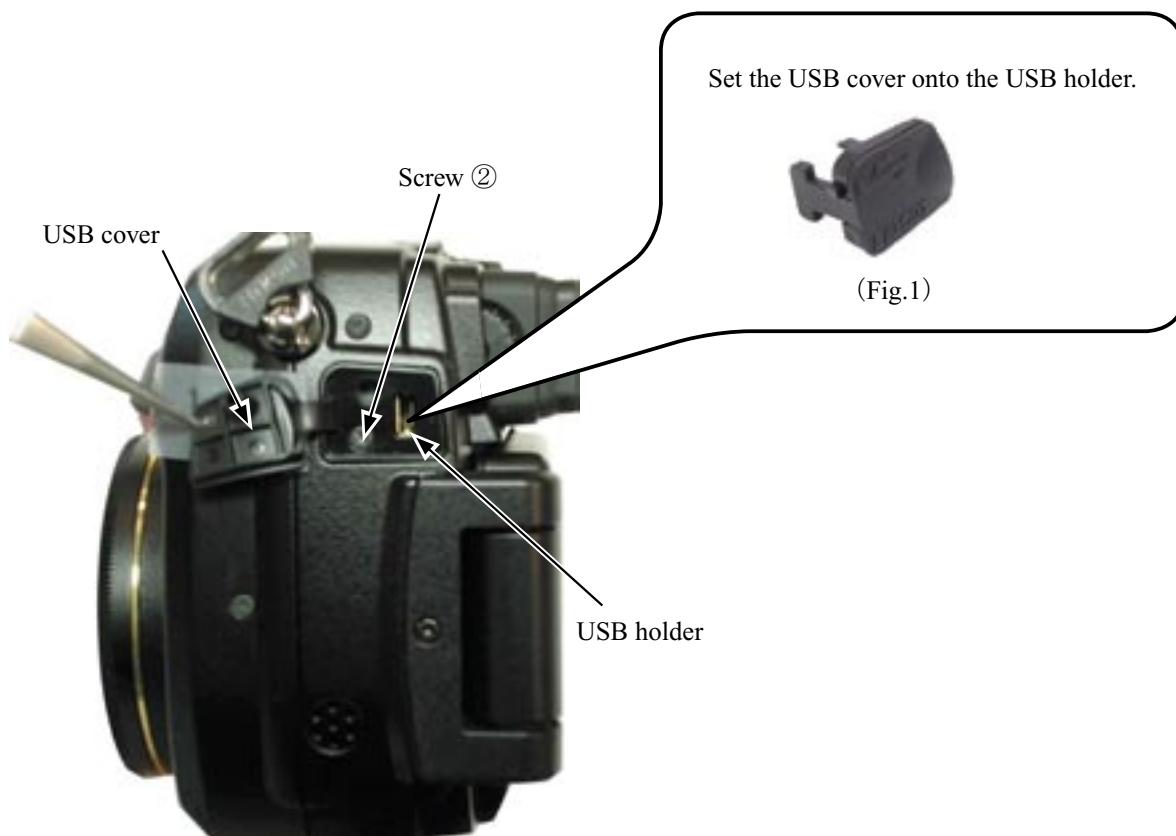
- Tighten the screw ⑥ (M1.7 × 3.5).
- Tighten the four screws ⑤ (M1.7 × 3.5).



- Tighten the screw ④ (M1.7 × 3).
- Tighten the screw ③ (M1.7 × 4).



- Set the USB holder and the USB cover. (Fig. 1)
- Open the USB cover and tighten the screw ② (M1.7 × 3.5).



- Tighten the screw ① (M1.7 × 3).



ADJUSTMENT

1. Equipment

Personal computer (PC), AC adapter EH-54, USB cable (UC-E6) and CF card

2. Servicing tools

Pattern box, color meter, luminance meter, siemens star chart, PAF adjustment software (J18368), calibration software (J65066) and oscilloscope

3. Adjustment items and order

1.PAF inspection/adjustment

1-1.PAF sensor position adjustment

1-2.PAF accuracy inspection • adjustment

2. Lens adjustment

3.AWB adjustment

4.CCD white dot defect compensation

5.CCD black dot defect compensation

6.Built-in speed light adjustment

7.USB storage information registration

8.LCD Panel Adjustment

8-1.LCD H AFC Adjustment

8-2.LCD RGB Offset Adjustment

8-3.LCD Gain Adjustment

8-4.LCD Blue Brightness Adjustment

8-5.LCD Red Brightness Adjustment

8-6.LCD Vcom Adjustment

Note 1: **When removing the front cover or the rear cover from the camera, perform the PAF accuracy inspection (adjustment).**

Note 2: **Perform not only the PAF accuracy adjustment but also the lens adjustment. If you perform only one of them, it is not sufficient for adjusting the camera function.**

Note 3: Set "Mass Storage" for USB of the camera.

Note 4: When the lens, the CCD, the optical filter or the CP-1 PCB is replaced with a new one, the adjustments of "1-2" to "5" as mentioned above must be performed again. Perform the adjustments of "3" to "5" in the order.

4. Setup

① System requirements

- WindowsR 98 or Me, 2000, XP
- IBM-compatible PC/AT with Pentium or higher processor
- CD-ROM drive
- 3.5-inch 2HD diskette drive
- USB port
- 40 MB or more RAM
- Hard disk drive with 15 MB or more memory space
- VGA or SVGA monitor with 256 or more color display

② Installation of the PAF inspection/adjustment software

- Insert the PAF inspection/adjustment software into the floppy disk drive.
- Copy the folder "PE8400" on the floppy disk drive into an optional folder of HD.
- (Example) C: /E8400
- Double-click the copied file "PE8400", and the folder to be unfrozen is displayed. Press the [OK] button, and unfreezing starts.
- When unfreezing is finished, two files "E8400PAF.EXE" and "camapi32.dll" are made. The installation is finished.

③ Outline of the adjustment software

- Double-click and execute "E8400.EXE", and the inspection/adjustment software starts.
- To select a desirable language, press the button in "Language" at the lower right on the main menu.



- Press the [HISTORY] button at the lower left on the screen, and the version of the adjustment software is displayed.



- Select the button for the adjustment or inspection to be executed. After pressing the item button, follow the instructions on each displayed menu.

Note: Japanese is not displayed correctly in the English OS.

③ Making of the PAF position adjustment chart

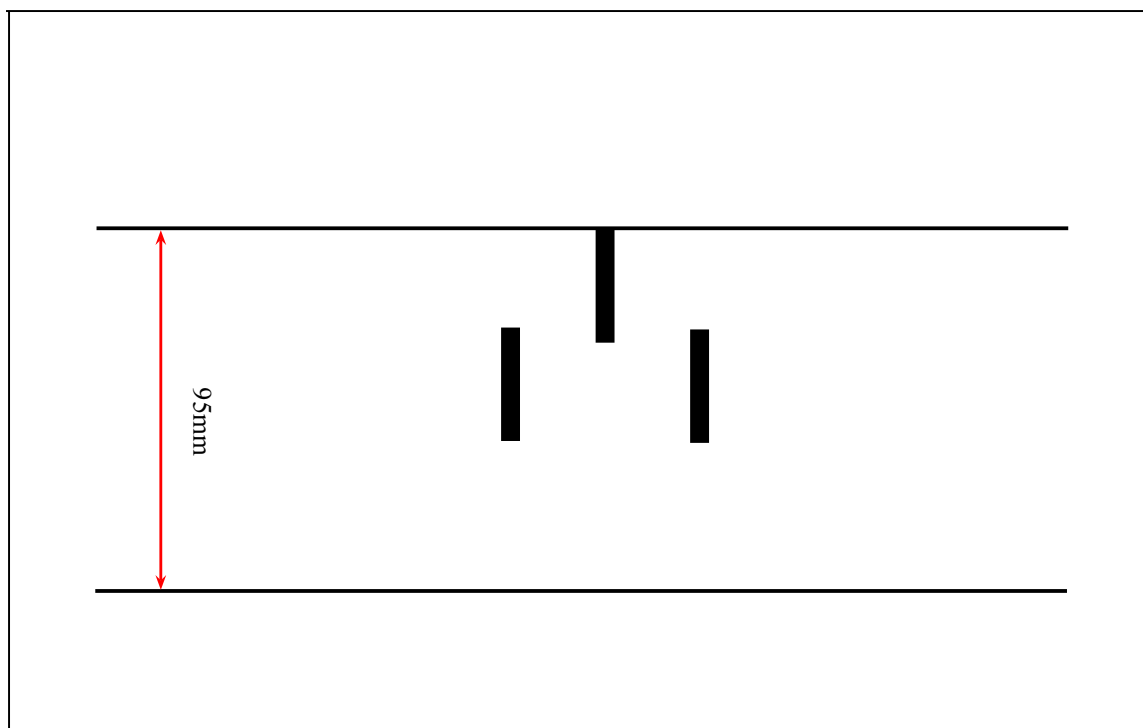
A chart is attached to the repair manual in the PDF form. Print this chart to make the PAF position adjustment chart.

For the paper size, use "A4" or "letter size 11 × 8.5".

The chart size can affect the accuracy. Print the chart by setting as follows in the printing menu of "Adobe(r)Reader(r)" and then use it.

- [Enlargement/reduction of page] must not be set.
- [Print according to paper] must not be set.

Note: The expression of the above two items may not be same in all of "Adobe(r)Reader(r)".



※ After printing, make sure that the interval between the upper and lower two lines in the chart is "95mm ± 5mm". Then, use the chart.

④ Installation of the calibration software

- Insert the calibration software into the floppy disk drive.
- Open "Explorer".
- Copy the folder "DscCalDI.exe" on the floppy disk drive into an optional folder of HD.

5. Installing USB driver

If the USB driver is necessary, install Nikon View via CD-ROM packed with the camera.

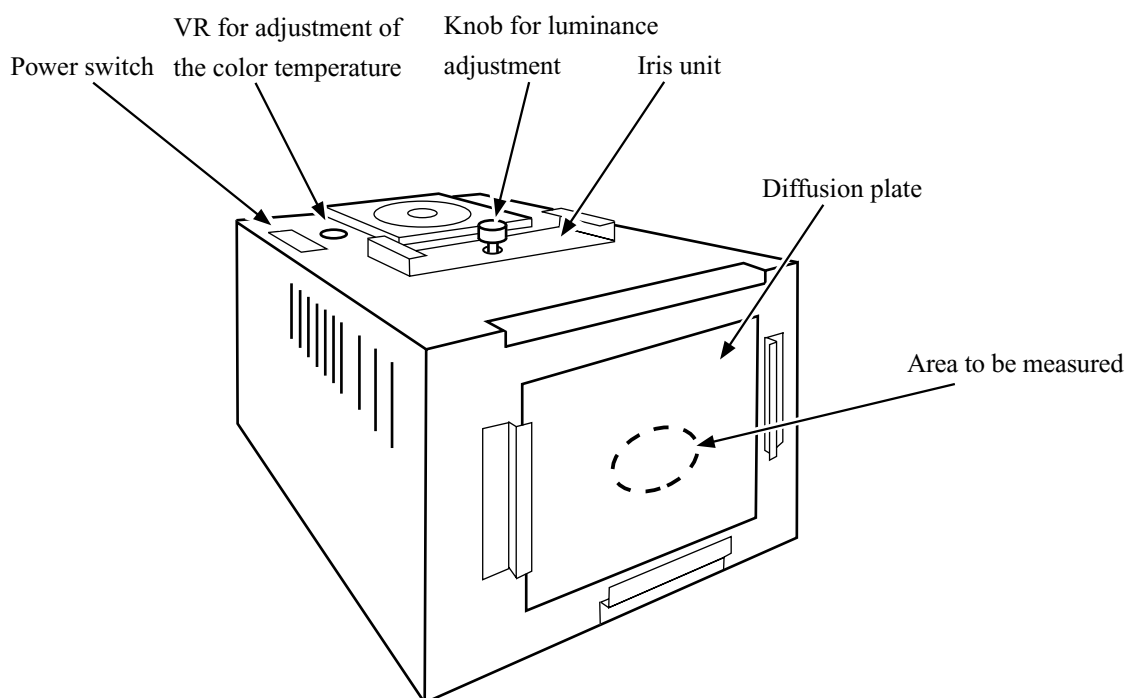
6. Pattern box

Before using the pattern box, turn its power on to carry out "Aging" approx. 30 minutes: the color temperature should be $3100 \pm 20K$ by the adjustment with the color meter, and the luminance should be $900 \pm 20cd/m^2$ by thetheadjustment with the luminance meter. When using the pattern box and for a while after its power turns off, the lamp and its surroundings are subject to high temperatures, so care should be taken when

• Procedure for correcting Pattern Box

Note: Be sure to perform the aging correction.

- ① Measure the measuring point (center of diffusion plate) with the Color Meter (J63081).
- ② Adjust the pattern box so that the color temperature should be $3100 \pm 20K$ by using "VR for adjustment of the color temperature".
- ③ Measure the center of the diffusion plate with the Luminance Meter BM-3000 (J63068).
- ④ Adjust the pattern box so that the luminance should be $900 \pm 20cd/m^2$ by using "Knob for luminance adjustment".
- ⑤ Repeat from ① to ④ So that the color temperature should be $3100 \pm 20k$ and luminance should be $900 \pm 20cd/m^2$.



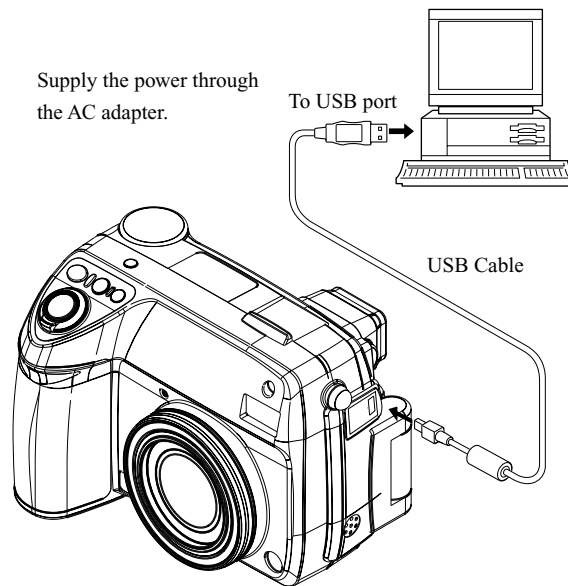
7. Adjustments required when parts are replaced

	PAF sensor position adjustment	PAF accuracy adjustment	Lens	AWB	CCD black/white dot defect	Built-in speed light	LCD adjustment	USB	Firmware up
Lens unit	○	○	○	○	○	×	×	×	×
OFLF	×	○	○	○	○	×	×	×	×
CCD	×	○	○	○	○	×	×	×	×
CP-1 PCB	×	○	○	○	○	×	○	○	○
VF-1 PCB	×	○	○	×	×	×	○	×	×
PW-1 PCB	×	○	○	×	×	×	×	×	×
SB unit	×	○	○	×	×	○	×	×	×

○ Adjustment is necessary. × Adjustment is not necessary.

8. Connecting the camera to the computer

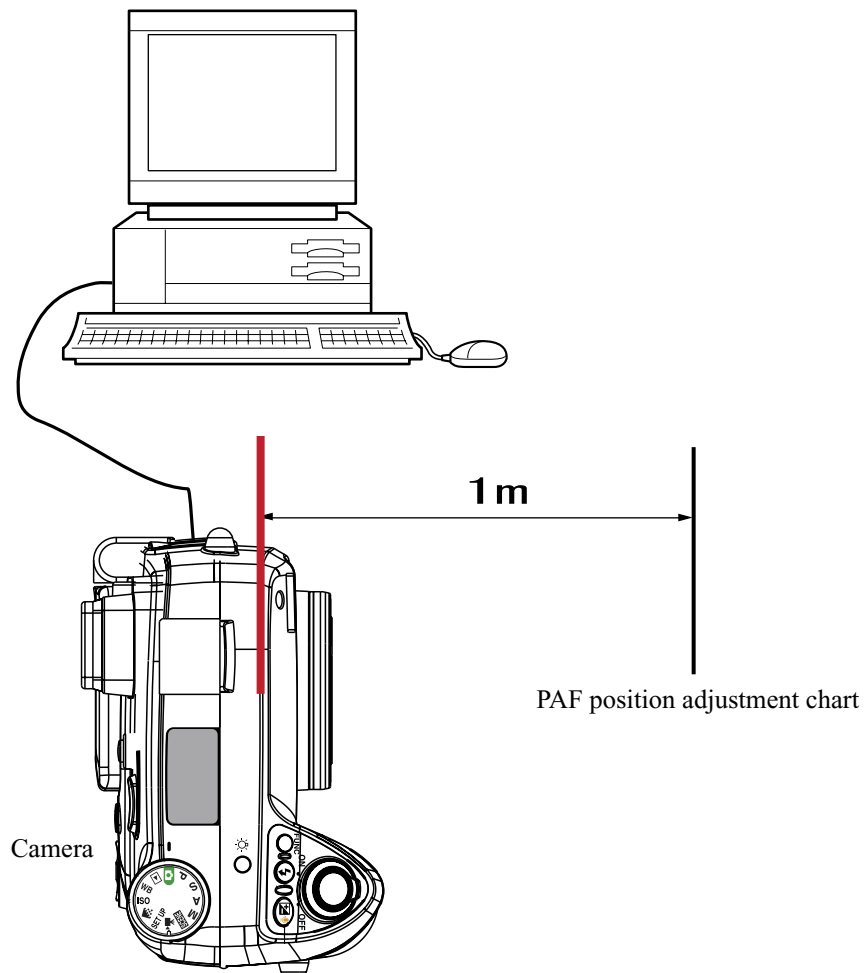
- ① Insert the camera connector of USB cable in the notch of the camera's USB port.
- ② Connect the cable to the USB port on PC.



Adjustment items

1-1.PAF sensor position adjustment

- ① Camera condition
 - Make adjustment while the rear cover is opened and the EVF/hot shoe unit is already removed from the camera. (Fig. 1 on page A41)
 - Set the camera so that the PAF sensor position (as shown below) is 1m away from the chart.



- ② Set the PAF position adjustment chart and the camera correctly.
- Insert the CF card into the camera.
 - Turn on the power in the photography mode.
 - Press the [DISP] button on the camera to display the guideline.
 - Set the camera lens to the optical zoom TELE end.
 - Fit the guideline (yellow) of the camera monitor to the horizontal line (black) of the chart correctly not to be deviated or inclined. (Fig. 1)

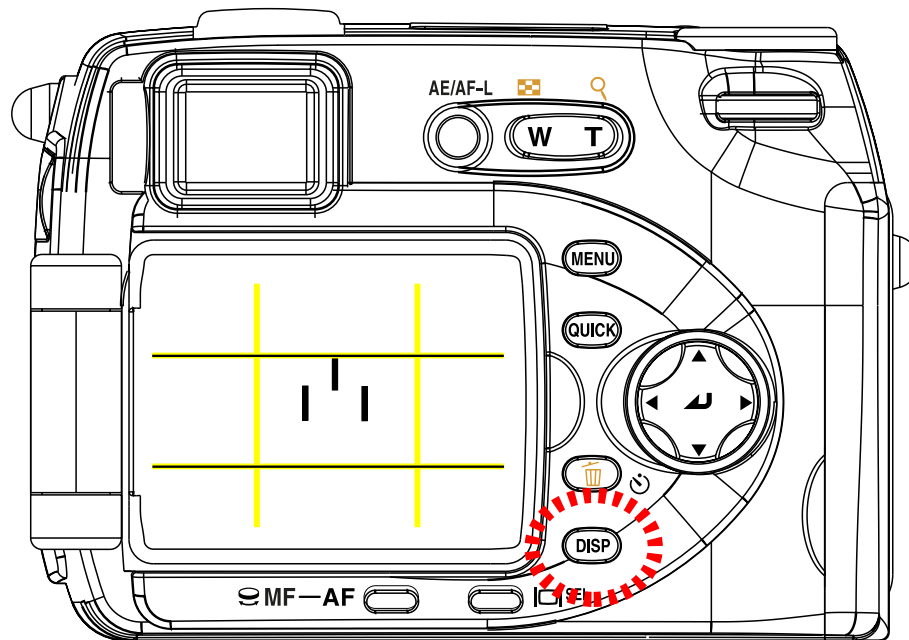


Fig.1

③ PAF position adjustment

- Start the PAF inspection/adjustment software and execute "PAF POSITION ADJUSTMENT" in the adjustment menu. Adjust the position according to the instructions of the adjustment software.
- To adjust the position, adjust the sensor height with the adjusting screw. (Fig. 1)
- After the adjustment, fix the adjusting screw and the PAF sensor unit with the adhesive. (Fig. 2)
- After finishing the adjustment, take out the CF card.

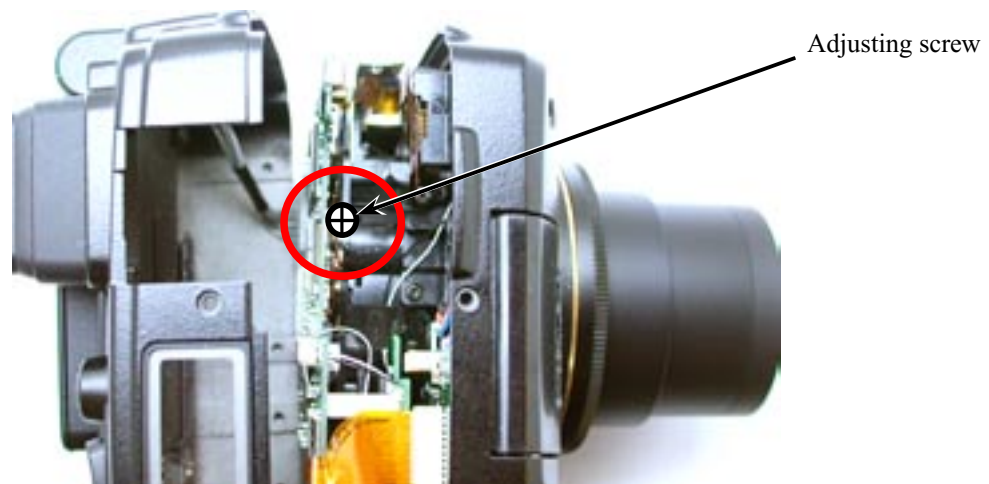


Fig.1

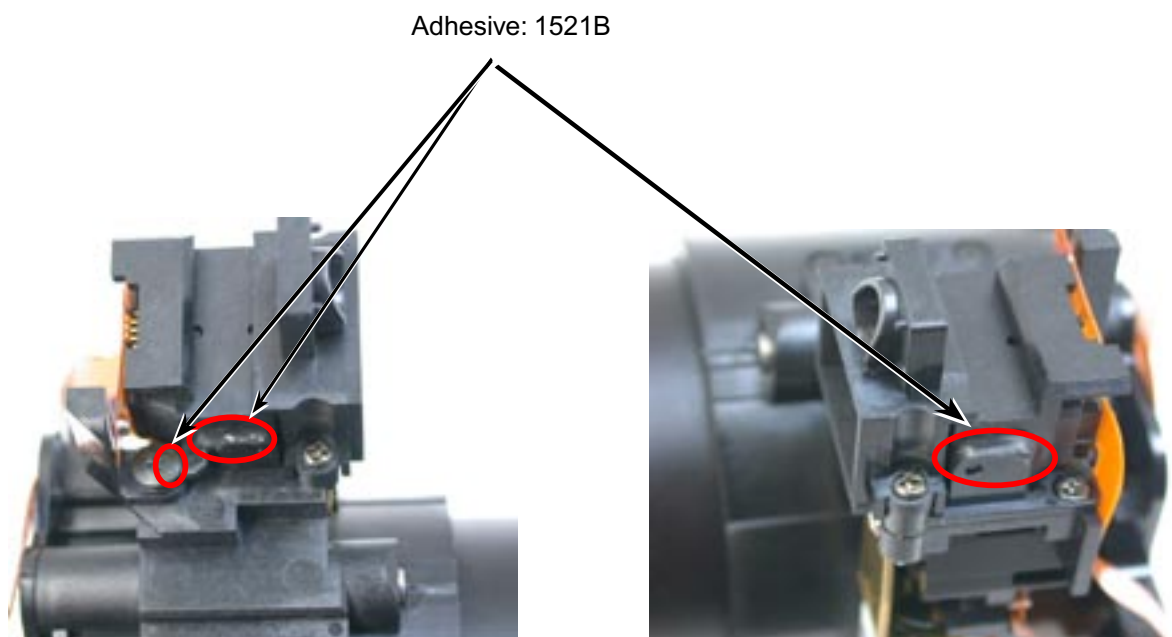


Fig.2

1-2.PAF accuracy inspection • adjustment

- Perform the inspection and adjustment while the camera is in the assembled condition.
- Insert the CF card into the camera.
- Set each chart to be at the center on the screen. (Fig. 1)
- Start the PAF inspection/adjustment software and select "PAF ACCURACY INSPECTION" or "PAF ACCURACY ADJUSTMENT" in the menu. Make adjustment according to the instructions of the adjustment software.
- Make sure that the accuracy is within the standard. The adjustment is finished.
- After finishing the adjustment, take out the CF card.

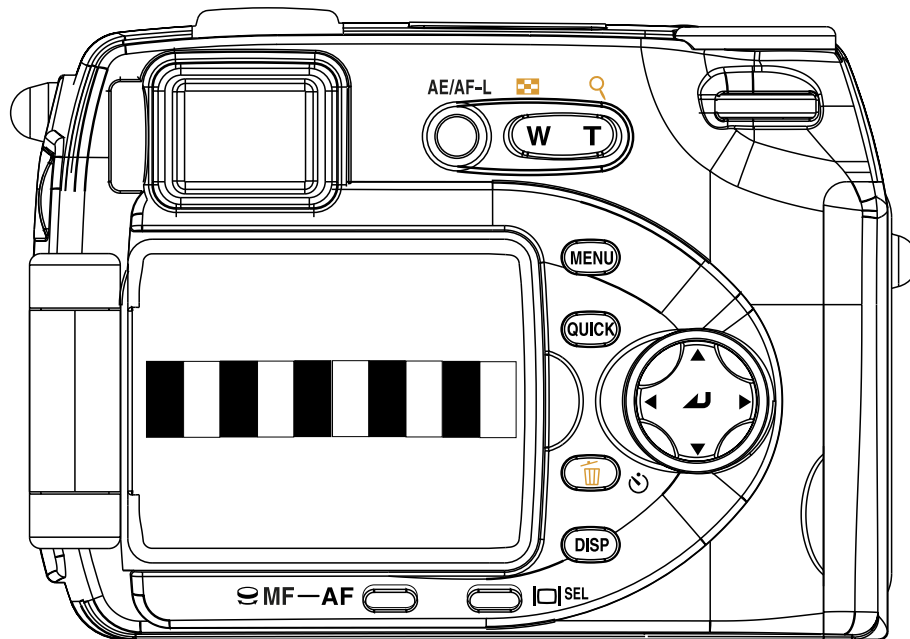
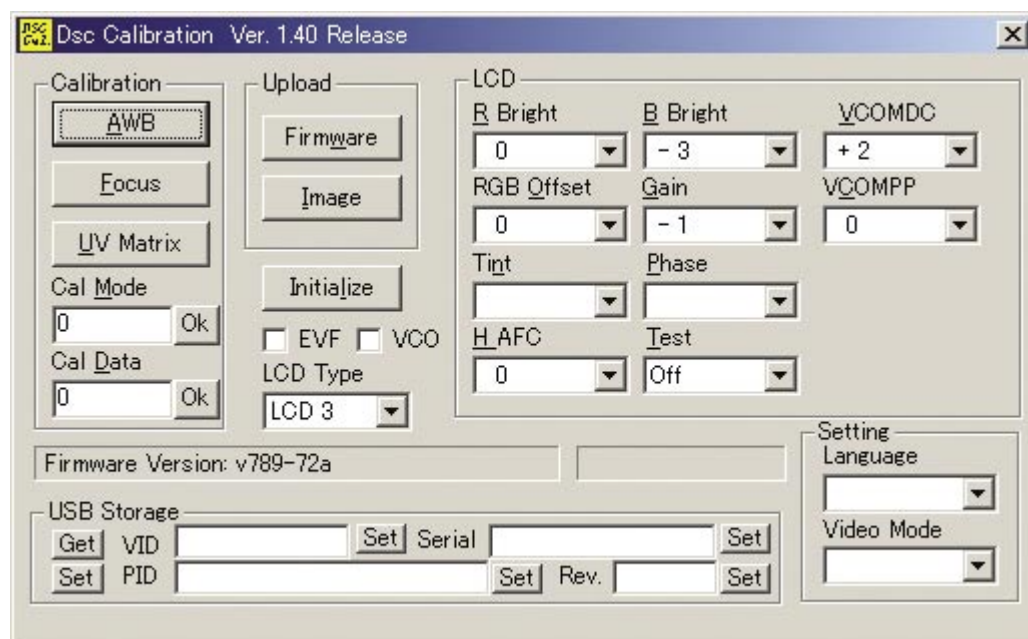


Fig.1

Calibration software

- Connect the camera to PC and turn on the power of the camera.
- When the calibration software starts, the following is displayed on the PC monitor.



2. レンズ調整

[Preparations]

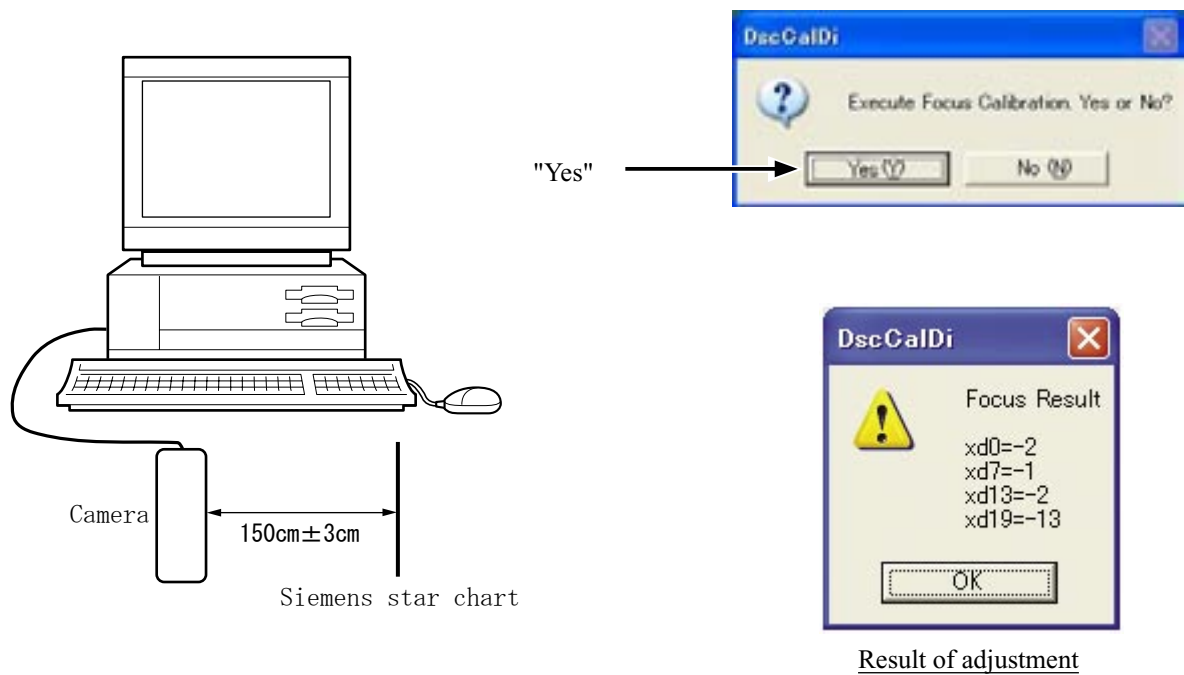
- Set the Siemens star chart.
- Turn the power switch of the camera to on.
- Make sure that the center of the siemens star chart is at the center on the camera screen.

[Conditions]

- The siemens star chart should be A3-size or larger (Copy and enlarge A4-size siemens chart included in the service manual for the usage.)
- Illumination over the object should be $400 \text{ lux} \pm 10\%$
- Set the siemens star chart and the camera (front surface of lens) at $150 \text{ cm} \pm 3 \text{ cm}$ distance between them.

[How-to]

- Double click on "DscCalDi.exe".
- Click "Focus" then "Yes".
- Lens adjustment values will appear on the screen.
Judgment standard: $xd0 = 0 \pm 50$, $xd12 = 0 \pm 50$, $xd19 = 0 \pm 50$, $xd31 = 0 \pm 50$
- Click "OK".



3 .AWB adjustment

[Preparations]

- Pattern Box (Color temperature: $3100 \pm 20\text{K}$, Luminance: $900 \pm 20\text{cd/m}^2$)

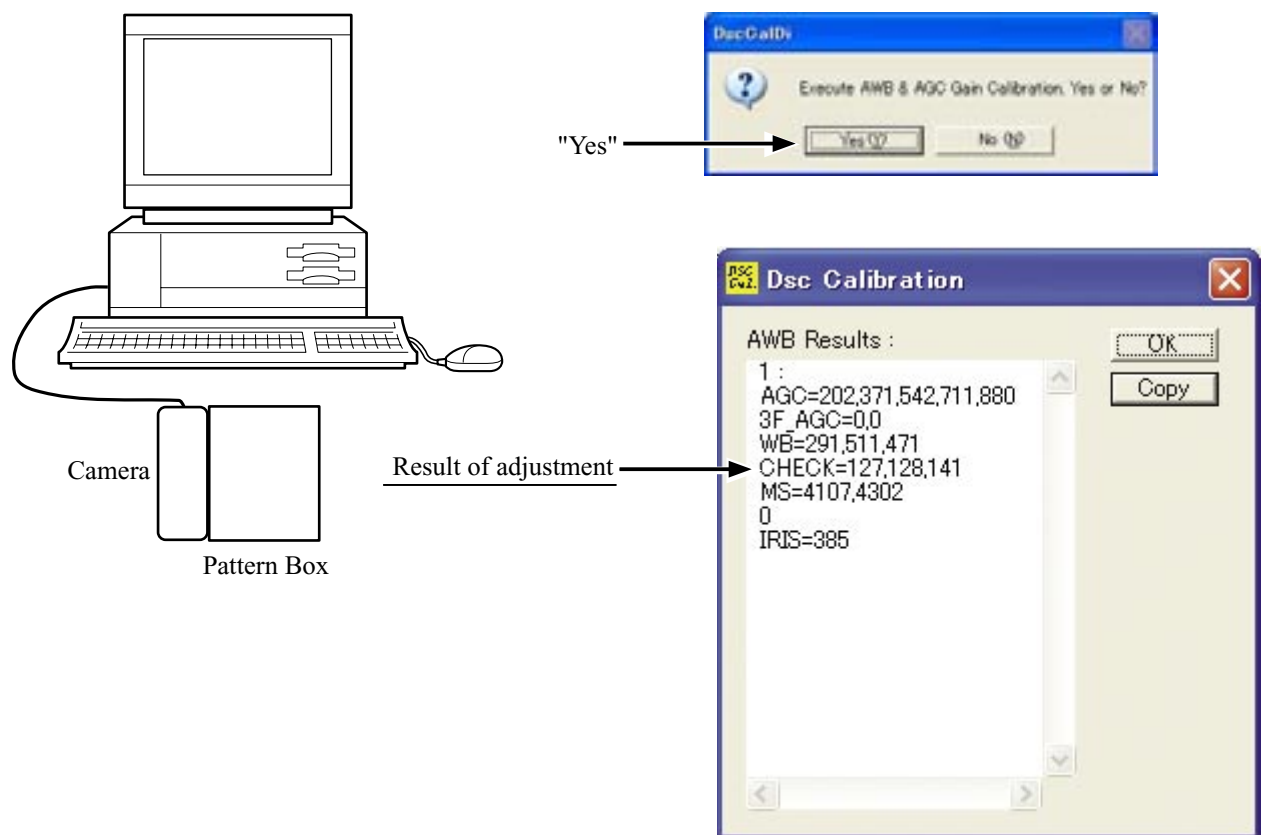
[Conditions]

- Set the pattern box and camera (lens front) at "0cm" distance between them.

Note) Do not allow outside light to enter in.

[How to]

- Double-click on "DscCalDi.exe".
- Click "AWB", then "Yes".
- AWB adjustment values will appear on the screen.
Judgment standard: CHECK= 128 ± 2 , 128 ± 2 , 130 ± 30
- Click "OK".



4 .CCD white dot defect compensation

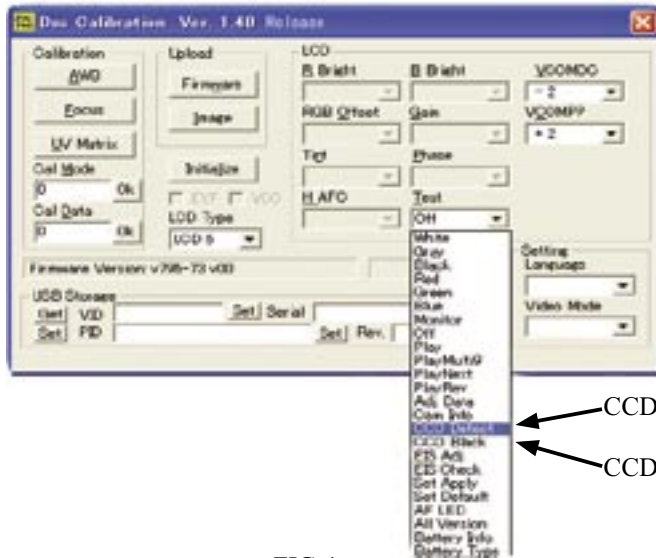
[Conditions]

- With the lens shutter being closed, read the defect of CCD pixels. Then, make the correction data and rewrite the data by the following procedure.

Correct the upper level of defective 1300 pixels from the brightest number of CCD pixels.

[How to]

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



<FIG-1>



<FIG-2>

5 .CCD black dot defect compensation

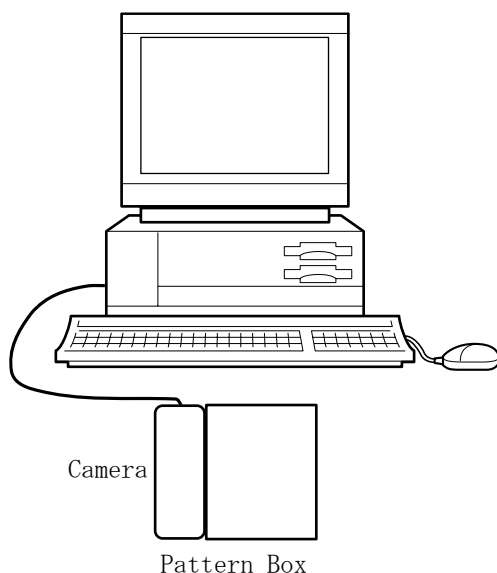
[Conditions]

- Fix the camera so that only the white part of the pattern box should be displayed on the screen. (Do not allow outside light to enter in as much as possible.)
- With the lens shutter being open, read the defect (black dots) of CCD pixels. Then, make the correction data and rewrite the data by the following procedure.

Correct the upper level of defective 30 pixels (black dots in bright place) of CCD pixels.

[How to]

- Double-click on "DscCalDi.exe".
- Select "CCD Black" from Test menu of Calibration Software and click "OK". Refer to FIG-1. After adjustment, the adjustment value will appear on the screen. Refer to FIG-3.

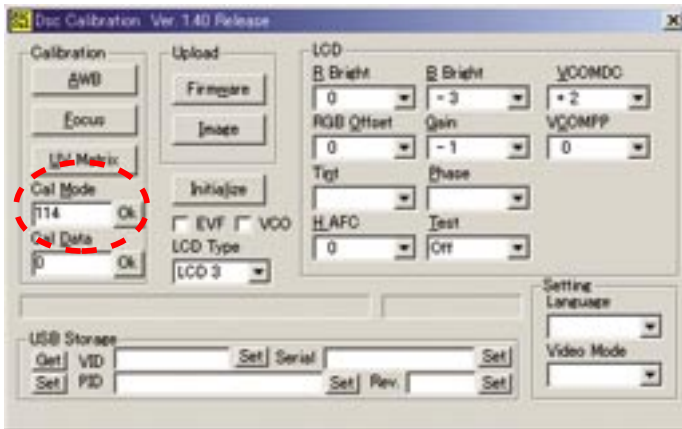


<FIG-3>

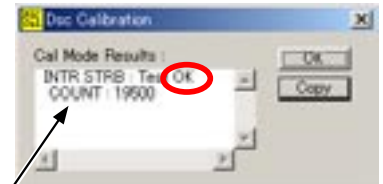
6. Built-in speed light adjustment

[Adjustment]

- Double-click "DscCalDi.exe".
- Input "114" into "Cal Mode" and click "OK". Refer to <FIG-1>.
- The speed light flashes automatically and the adjustment is finished. Then, the adjustment result is displayed. If "OK" is displayed, the speed light unit operates within the standard. If "NG" is displayed, perhaps the speed light unit malfunctions. Refer to <FIG-2>.
- Click the [OK] button. The adjustment is finished.



<FIG-1>



<FIG-2>

Result of adjustment

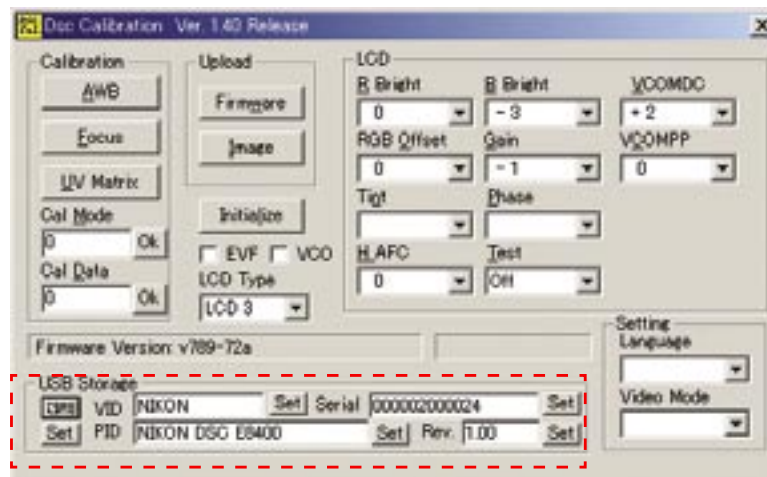
7. USB storage information registration

USB storage data is 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 specifications will not be satisfied, so always check and save the USB storage data.

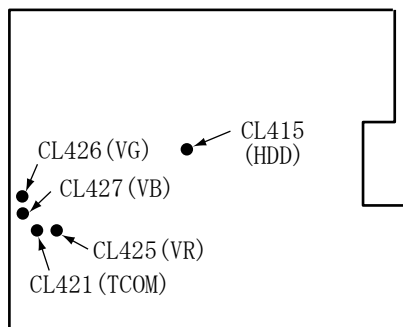
[How to]

1. Connect the camera to a computer.
2. Double-click on the "DscCalDi.exe".
3. Click on the "Get" button in the USB storage window and check the USB storage data.
 VID : NIKON
 PID : NIKON DSC E8400
 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, and click the "Set" button.
5. Check VID and Rev. entries in the USB storage data. If any of them are different from the values in 3. above, enter the details of 3. and click the "Set" button.



8. LCD Panel Adjustment

【VF1 board (Side B) Point to be measured / adjustment】



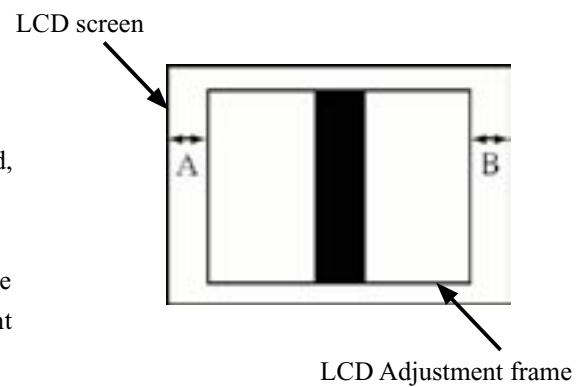
8 - 1. LCD H AFC Adjustment

[Preparations]

Turn the power switch ON.

[How to]

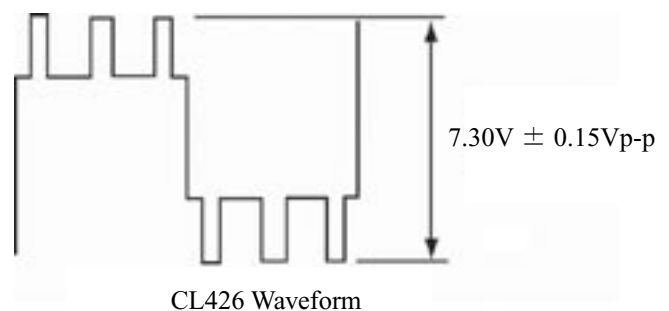
1. Double-click on "DscCalDi.exe".
2. Set "VCO" to "ON". (After the H AFC adjustment is completed, set to "OFF".)
3. Select "0" on the LCD H AFC.
4. By checking the LCD monitor, adjust H AFC so that the difference between the LCD screen and the LCD adjustment frame can become the same distance and symmetrical ($A = B$).



8 - 2. LCD RGB Offset Adjustment

[How to]

1. Adjust LCD "RGB Offset" so that the amplitude of the CL426 waveform is $7.30\text{ V} \pm 0.15\text{ V}_{\text{p-p}}$.



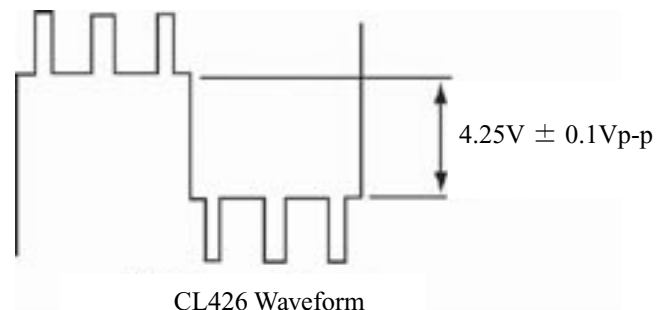
8 - 3. LCD Gain Adjustment

[How to]

1. Adjust LCD "Gain" so that the amplitude of the CL426 waveform is $4.25\text{ V} \pm 0.1\text{ V}_{\text{p-p}}$.

[Note]

This adjustment should be made after completing 8-2. LCD "RGB Offset" adjustment.



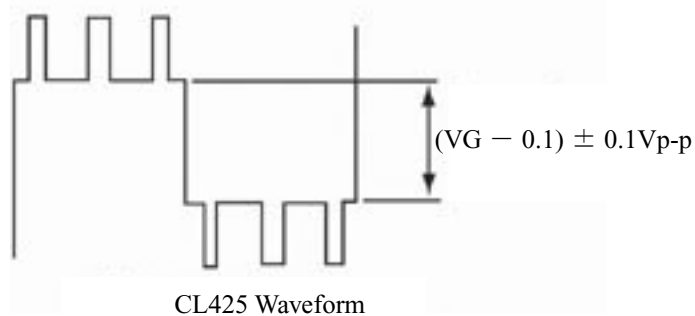
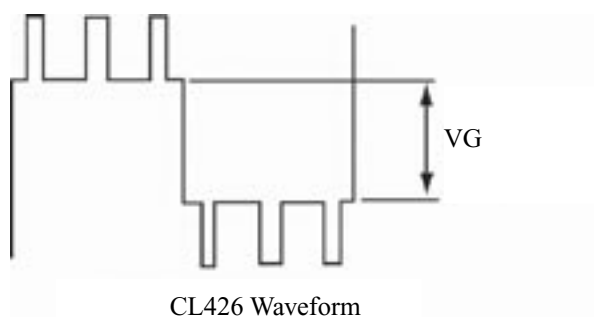
8 - 4. LCD Red Brightness Adjustment

[How to]

1. Adjust LCD "B Bright" so that the amplitude of the CL425 waveform is $(\text{VG} - 0.1) \pm 0.1\text{ V}_{\text{p-p}}$ with respect to the CL426 (VG) waveform.

[Note]

This adjustment should be made after completing 15-2. LCD RGB Offset adjustment and 15-3. LCD Gain adjustment.



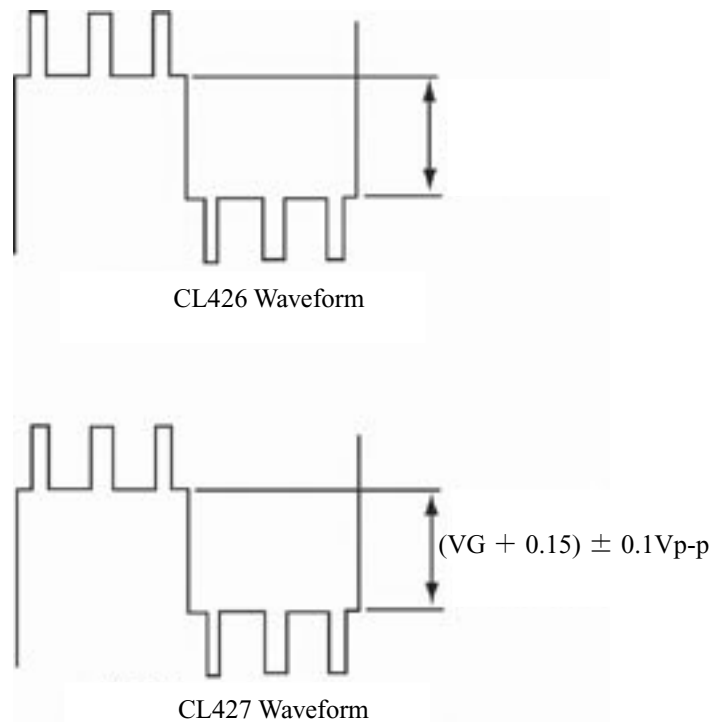
8 - 5. LCD Blue Brightness Adjustment

[How to]

1. Adjust LCD "R Bright" so that the amplitude of the CL427 waveform is $(VG+0.15) \pm 0.1 V_{p-p}$ with respect to the CL426 (VG) waveform.

[Note]

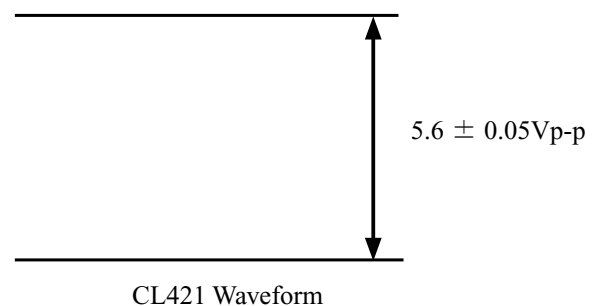
This adjustment should be made after completing 8-2. LCD RGB Offset adjustment and 8-3. LCD Gain adjustment.



8 - 6. LCD Vcom Adjustment

[How to]

1. Switch the oscilloscope to DC.
2. Adjust LCD "VCOMDC" so that the amplitude of the CL421 waveform is $5.6V \pm 0.05V_{p-p}$.



1. OUTLINE OF CIRCUIT DESCRIPTION

1-1. CP1 CIRCUIT DESCRIPTION

1. IC Configuration

IC903 (ICX456AQ) CCD imager
 IC904 (AD9945) CDS, AGC, A/D converter
 IC905 (CXD3622GA) TG

2. IC903 (CCD)

[Structure]

Interline type CCD image sensor

Optical size Diagonal 11 mm (2/3 type)
 Effective pixels 3280 (H) x 2454 (V)
 Pixels in total 3350 (H) x 2482 (V)
 Optical black
 Horizontal (H) direction: Front 12 pixels, Rear 50 pixels
 Vertical (V) direction: Front 8 pixels, Rear 2 pixels

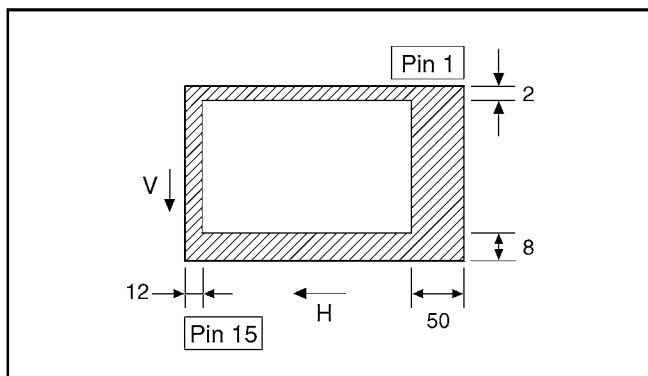


Fig. 1-1. Optical Black Location (Top View)

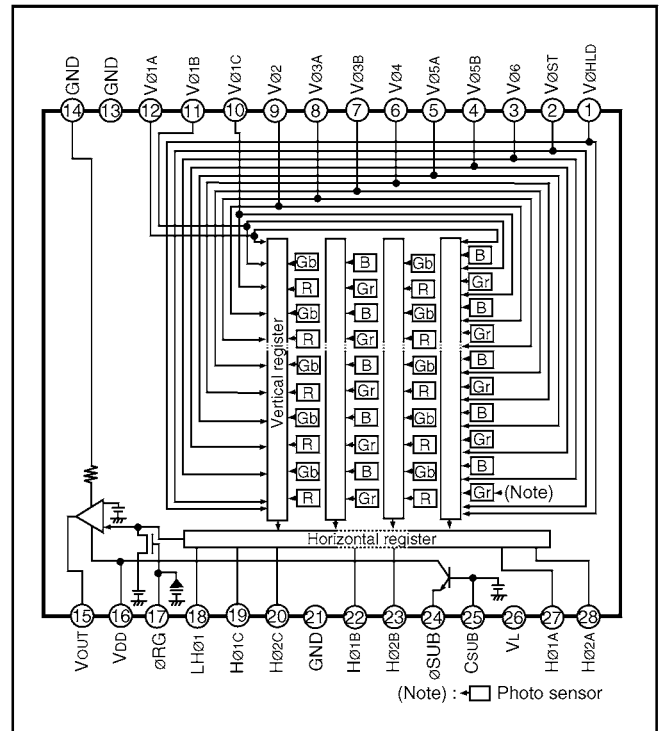


Fig. 1-2. CCD Block Diagram

Pin No.	Symbol	Pin Description	Pin No.	Symbol	Pin Description
1	V _{0HLD}	Horizontal addition control clock	15	V _{OUT}	Signal output
2	V _{0ST}	Horizontal addition control clock	16	V _{DD}	Circuit power
3	V ₀₆	Vertical register transfer clock	17	øRG	Reset gate clock
4	V _{05B}	Vertical register transfer clock	18	LH ₀₁	Horizontal register last step transfer clock
5	V _{05A}	Vertical register transfer clock	19	H _{01C}	Horizontal register transfer clock
6	V ₀₄	Vertical register transfer clock	20	H _{02C}	Horizontal register transfer clock
7	V _{03B}	Vertical register transfer clock	21	GND	GND
8	V _{03A}	Vertical register transfer clock	22	H _{01B}	Horizontal register transfer clock
9	V ₀₂	Vertical register transfer clock	23	H _{02B}	Horizontal register transfer clock
10	V _{01C}	Vertical register transfer clock	24	øSUB	Substrate clock
11	V _{01B}	Vertical register transfer clock	25	C _{SUB}	Substrate bias
12	V _{01A}	Vertical register transfer clock	26	V _L	Protection transistor bias
13	GND	GND	27	H _{01A}	Horizontal register transfer clock
14	GND	GND	28	H _{02A}	Horizontal register transfer clock

Table 1-1. CCD Pin Description

3. IC905 (TG)

IC905 is timing generator for image sensor. This is equipped with H driver and V driver.

4. IC904 (CDS, AGC and A/D converter)

IC904 contains the functions of CDS, AGC and A/D converter. The video signal which is output from the CCD is input to pins (22) of IC904. There are sample hold blocks inside IC904 generated from the SHP and SHD pulses, and it is here that CDS (correlated double sampling) is carried out.

After passing through the CDS circuit, the signal passes through the AGC amplifier (PGA: Programmable Gain Amplifier). It is A/D converted internally into a 12-bit signal, and is then input to ASIC (IC102). The gain of the AGC amplifier is controlled by pin (25)-(27) serial signal which is output from ASIC (IC102).

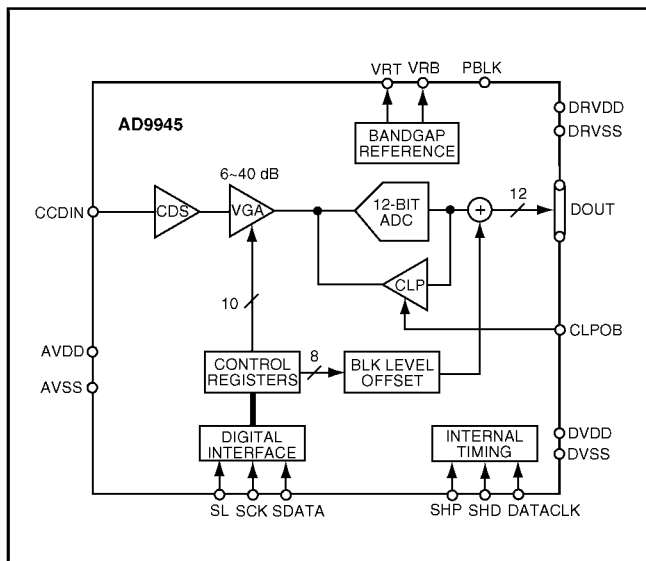


Fig. 1-3. IC904 Block Diagram

5. Lens drive block

5-1. Focus drive

The focus stepping motor drive signals (FCLK, FOE, FMODE, FRSTB and FCW) which are output from ASIC (IC101) are used to drive micro step by the motor driver (IC952). Detection of the standard focusing positions is carried out by means of the photointerruptor (FPI) inside the lens block.

5-2. Zoom drive

The DC motor drive signals (ZMIN1 and ZMIN2) which are output from 8-bit microprocessor (IC301) are used to drive by the motor driver (IC951). Counting and detection of the standard zoom positions is carried out by means of photoreflector (ZPULSE1, ZPULSE2 and ZRESET) inside the lens block.

5-3. Iris drive

The iris stepping motor drive signals (IIN1, IIN2, IIN3 and IIN4) which are output from the ASIC (IC101) are converted into drive by the motor drive (IC951), and are then used to drive the iris steps.

5-4. Shutter drive

The two shutter motor drive signals (SIN1, SIN2) which are output from the ASIC (IC101) are converted into drive pulses by the motor drive (IC951), and the mecha shutter is opened and closed by regular current drive.

6. Circuit Description

6-1. 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 $1-k$.

6-2. Signal processor

1. γ correction 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 generate the aperture signal.

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 computations based on a 11-segment screen.

6-4. SDRAM controller

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. PIO/PWM/SIO for LCD

8-bit parallel input and output makes it possible to input and output individually, and three ports of them PWM output makes it possible to switch. It is prepared for 16-bit parallel output.

6-6. TG

Timing generated for 8 million pixels CCD control.

6-7. Digital encoder

It generates chroma signal from color difference signal.

6-8. JPEG encoder and decoder

It is compressed and elongated the data by JPEG system.

7. Outline of Operation

When the shutter opens, the reset signals and the serial signals ("take a picture" commands) from the 8-bit microprocessor are input 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 input to the ASIC as 12-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. After AWB and γ processing are carried out from R, G and B, 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 USB. When played back on the LCD and monitor, data is transferred from memory to the SDRAM, and the data elongated by JPEG decoder is displayed over the SDRAM display area.

8. LCD and EVF Block

LCD Block is in the VF1 board, and it is constructed by LCD driver (IC171) and around circuits.

The video signal (Y color difference 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) 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.

Also, EVF Block is in the CP1 board, and it is constructed by EVF driver (IC801) and around circuits. The operation is the same as the LCD block.

1-2. PW1 POWER CIRCUIT DESCRIPTION

1. Outline

This is the main power circuit, and is comprised of the following blocks.

Switching power controller (IC501, IC502, IC504)

Analog system power output (+15 V, -7.5 V) (Q5001, T5001)

Digital 1.58 V power supply output (Q5005, L5003)

Digital 3.25 V power supply output (Q5006, L5004)

LCD system power supply output (Q5011, L5006)

Backlight power supply output (Q5015, L5007)

AF LED power supply output (Q5009, L5005)

Lens drive power supply output (Q9601, L9601)

Analog system power supply output (3.45 V) (Q5018, L5008)

EVF backlight power supply output (IC504, C5172, C5173)

2. Switching Power 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 six built-in channels, only CH1 (digital 15 V, analog system power output (+15 V, -7.5 V)), CH2 (digital 1.58 V power supply output), CH3 (digital 3.25 V power supply output), CH4 (LCD system power supply output), CH5 (backlight power supply output) and CH6 (AF LED power supply output) are used. Feedback from 15 V (A) (CH1), 1.58 V (D) (CH2), 3.25 V (D) (CH3), 12.0 V (L) (CH4) and AF LED 6.0 V (CH6) power supply outputs are received, and the PWM duty is varied so that each one is maintained at the correct voltage setting level.

Feedback for the LCD backlight power (CH5) is provided to the both ends voltage of resistance so that regular current can be controlled to be current that was setting.

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. Switching Power Controller (IC502)

This is the basic circuit which is necessary for controlling the power supply for a PWM-type switching regulator, and is provided with two built-in channels, only CH1 (lens drive 4.5 V) and CH2 (analog system power supply output (3.45 V)) are used. Feedback from lens drive 3.7 V (CH1), analog system power supply output (3.45 V) (CH2) power supply outputs are received, and the PWM duty is varied so that each one is maintained at the correct voltage setting level.

4. Charge Pump Regulator

Carry out as the charge pump regulator by C5172 and C5173, and feedback for the charge pump regulator is provided to the both ends voltage of resistance SET-GND so that regular current can be controlled to be current that was setting.

5. Analog System Power Output

15.0 V (A) and -7.5 V (A) are output. Feedback for the 15 V (A) is provided to the switching controller (Pin (40) of IC501) so that PWM control can be carried out.

6. Digital 1.58 V System Power Output

1.58 V (D) is output. Feedback for the 1.58 V (D) is provided to the switching controller (Pin (43) of IC501) so that PWM control can be carried out.

7. Digital 3.25 V System Power Output

3.25 V (D) is output. Feedback for the 3.25 V (D) is provided to the switching controller (Pin (45) of IC501) so that PWM control can be carried out.

8. LCD System Power Output

12.0 V (L) is output. Feedback for the 12.0 V (L) is provided to the switching power controller (Pin (47) of IC501) so that PWM control can be carried out.

9. Backlight Power Output

Regular current (18 mA) is being transmitted to LED for LCD backlight. Feedback for the both ends voltage of resistance that is being positioned to in series LED are provided to the switching controller (Pin (2) of IC501) so that PWM control to be carried out.

10. AF LED Power Output

7.0 V is output. Feedback for the 7.0 V is provided to the switching power controller (Pin (4) of IC501) so that PWM control can be carried out.

11. Analog System Power Output (3.45 V (A))

3.45 V (A) is output. Feedback for the 3.45 V (A) is provided to the switching power controller (Pin (8) of IC502) so that PWM control can be carried out.

12. Lens Drive Power Output

4.5 V (VM) is output. Feedback for the 4.5 V (VM) is provided to the switching power controller (Pin (3) of IC502) so that PWM control can be carried out.

13. EVF Backlight Power Output

Regular current (15 mA) is being transmitted to LED for EVF backlight. Feedback for the both ends voltage of resistance that is being positioned to in series LED are provided to the charge pump regulator (Pin (10) of IC504) so that PWM control to be carried out.

1-3. SYA CIRCUIT DESCRIPTION

1. Configuration and Functions

For the overall configuration of the SYA block, refer to the block diagram. The configuration of the SYA block centers around a 8-bit microprocessor (IC301).

The 8-bit microprocessor handles the following functions.

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

Pin	Signal	I/O	Outline
1	SCAN IN4	I	Keymatrix input
2	SCAN IN5	I	Keymatrix input
3	NOT USED	-	-
4	NOT USED	-	-
5	SELF LED	O	Self-timer LED H : Lighting
6	RXD/PRG SI	I	Battery communication reception data/flash ROM serial data input
7	TXD/PRG SO	O	Battery communication transmission data/flash ROM serial data output
8	PRG SCK	O	Flash ROM serial clock output
9	SI	I	Serial communication data input (←ASIC)
10	SO	O	Serial communication data output (→ASIC)
11	SCK	O	Serial communication clock output
12	BAT OFF	I	Battery off detection signal L : BATTERY OFF
13	SCAN IN6	I	Keymatrix input
14	SREQ	I	Serial communication requirement signal L : Requirement
15	ZPULSE1	I	Zoom motor drive pulse count
16	CMD IN2	I	Command dial signal
17	IR IN	I	Remote control detection signal
18	IC	-	Program writing power
19	XCOUT	O	Sub clock oscillation terminal (32.768 kHz)
20	XCIN	I	Sub clock oscillation terminal
21	VSS1	-	GND
22	VDD1	-	Power supply terminal
23	XOUT	O	Main clock oscillation terminal (4MHz)
24	XIN	I	Main clock oscillation terminal
25	RESET	I	Reset input
26	ADVREF	I	A/D converter standard voltage input
27	DC IN	I	DC power detection terminal L : Detection
28	ZRESET	I	Zoom standard position input
29	ZPULSE2	I	Zoom motor drive pulse count
30	POP UP SW	I	Pop up detection
31	CARD	I	Card detection
32	NOT USED	-	-
33	CMD IN1	I	Command dial signal
34, 35	NOT USED	-	-
36	BATTERY	I	Battery voltage input (analog input)
37	AVSS0	-	GND
38	SEL 794/789	I	794 (E8800)/789 (E8400) switching signal L : 789 (E8400)
39	DAVREF	I	D/A converter standard voltage input
40	CAPH	-	LCD drive voltage step-up capacitor connection terminal
41	CAPL	-	LCD drive voltage step-up capacitor connection terminal
42	VLCDC	-	LCD controller/driver standard voltage adjustment terminal
43~45	VLC0-VLC2	-	LCD drive voltage terminal (external capacitor connection)

See next page

46~49	COM0~COM3	O	LCD common output terminal 1~4 (dynamic display)
50	SCOM0	-	LCD common output terminal (static display)
51~74	S0~S23	O	LCD segment output 0~23
75	P ON	O	DC/DC converter ON/OFF signal H : ON
76	PA ON	O	DC/DC converter (analog) ON/OFF signal H : ON
77	LCD ON	O	DC/DC converter (LCD system) ON/OFF signal
78	LCD BL	O	LCD backlight ON/OFF signal
79	EVF ON	O	D/D converter (EVF system)
80	EVF_BL	O	EVF backlight ON/OFF signal
81	CLKSEL0	O	ARM system clock ON/OFF signal H : ON
82	PLLEN	O	PLL oscillation ON/OFF signal H : ON
83	ASIC TEST	O	ASIC reset control signal
84	TG_RST	O	CCD reset signal
85	NOT USED	-	-
86	EL ON	O	Mode panel backlight H : Lighting
87	ZM IN1	O	Zoom motor drive signal 1
88	ZM IN2	O	Zoom motor drive signal 2
89	NOT USED	-	-
90	PAF ON	O	PAF ON/OFF signal H : ON
91	VSS0	-	GND
92	VDD0	-	Power supply terminal
93	NOT USED	-	-
94	MAIN RESET	I	System reset (MRST)
95	AVREF ON	O	A/D standard voltage ON/OFF signal L : ON
96	SB RESET	O	Strobe reset signal
97	COMREQ	I	ASIC serial communication requirement
98	PICTL	O	Photo interrupter ON/OFF signal L : ON
99	BKUPCTL	O	Backup battery charge control L : Charge
100	NOT USED	-	-
101	SHUTTER	I	Shutter 2nd
102	USB CONNECT	I	USB cable connection detection signal
103	BAT PULLUP	O	Battery communication control signal
104	NOT USED	-	-
105	SB 5V	O	Strobe 5 V power ON/OFF signal
106	SB 3V	O	Strobe 3 V power ON/OFF signal
107, 108	NOT USED	-	-
109~114	SCAN OUT 0~5	O	Key matrix output
115	POP OUT	O	Pop up output signal
116	SCAN IN2	I	Keypad input
117	SCAN IN0	I	Keypad input
118	SCAN IN1	I	Keypad input
119	BEEP	O	Buzzer (4kHz)
120	SCAN IN3	I	Keypad input

Table 3-1. 8-bit Microprocessor Port Specification

2. Internal Communication Bus

The SYA block 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. 3-1 shows the internal communication between the 8-bit microprocessor and ASIC.

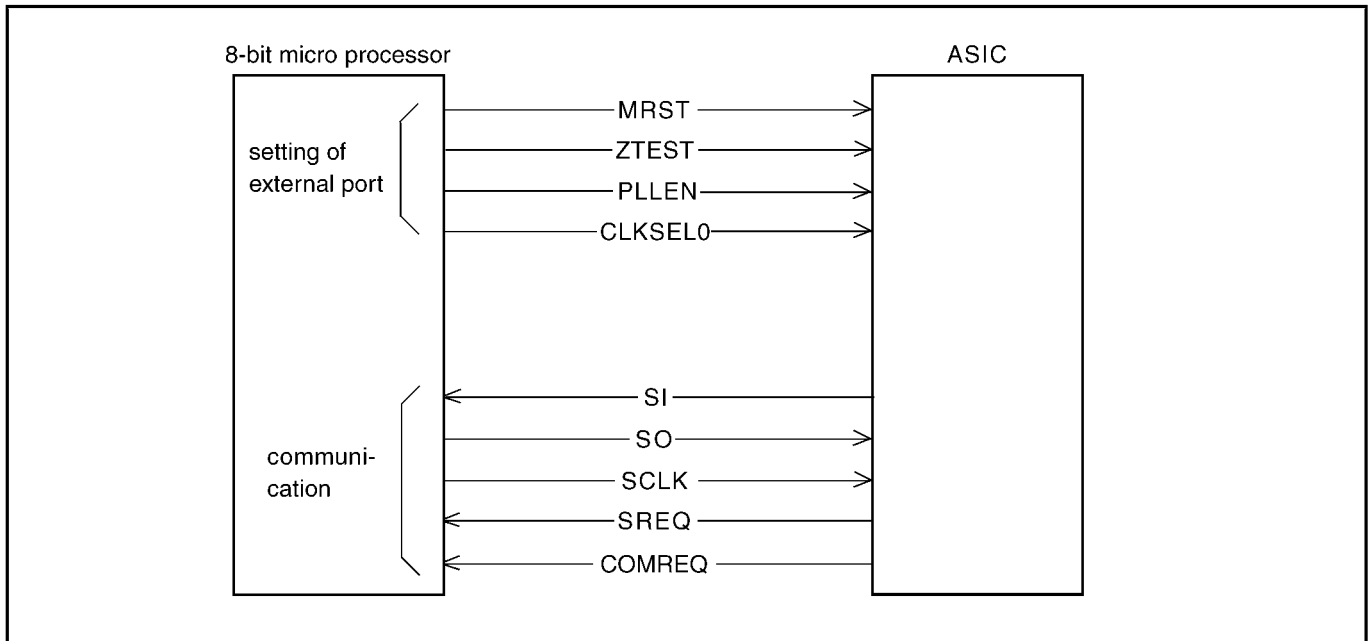


Fig. 3-1 Internal Bus Communication System

3. Key Operaiton

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

SCAN OUT \ SCAN IN	0	1	2	3	4	5	6
0	M	A	S	P	AUTO	PLAY	TEST
1	SCENE	MOVIE	SETUP	QUAL	ISO	WB	
2	FUNC	EL ON	+/-	SBS	1st	EXT_DET	AFM
3	DISP	QuickView	DEL	AF-L/AE-L	WIDE	TELE	LCD/EVF
4	↑	↓	←	→	OK	MENU	PW_ON
5	LCD_OPEN	LCD_REV			AV JACK		

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, power voltage is supplied to IC302, a regulated 3.2 V voltage is normally input to the 8-bit microprocessor (IC301) by IC302, 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 power switch is off, the 8-bit microprocessor halts 4 MHz of the main clock, and operates 32.768 kHz of subclock.

When the battery is removed, the 8-bit microprocessor power switches the battery for memory backup by IC302, and operates at low consumption. At this condition, the 8-bit microprocessor halts the main clock, and operates clock counting by sub clock.

Also, the secondary battery for backup is charged 10 hours from it to be attached.

When the power switch is on, the 8-bit microprocessor starts processing. The 8-bit microprocessor first sets both the PON signal at pin (75) and the PAON signal at pin (76) to High, and then turn on the power circuit. After PON signal is to High, sets external port of ASIC after approximately 100 ms. According to setting of this external port, carry out setting of the operating frequency and oscillation control in the ASIC. Also, it starts communication with ASIC, and confirms the system is operative.

When the through image is operating, set the PAON signal to High and then turn on the CCD. When playing, set the PAON signal to Low and then turn off the CCD. When LCD panel turns on, set LCD ON signal at pin (77) to High, and then turn on the power. Set LCD BL signal at pin (78) to High, and turn on the backlight power.

When the power switch is off, the lens will be stowed, and PON, PAON, LCDON and LCDBL signals to Low and the power supply to the whole system is halted. The 8-bit microprocessor halts oscillation of the main clock, and set operation mode of clock oscillation.

		ASIC	Memory	CCD	8 bit CPU	MODE LCD	LCD MONITOR	EVF MONITOR	
MODE	Power voltage	3.25 V, 1.58 V	3.3 V	15 V (A), -7.5 V (A) 3.45 V (A)	3.2 V (ALWAYS)	3.2 V	12V (L)	12V (E)	
OFF SLEEP		OFF	OFF	OFF	32 KHz	OFF	OFF	OFF	
PLAY	Display mode	LCD	ON	ON	OFF	4 MHz 32 kHz	ON	ON	OFF
		EVF	ON	ON	OFF	4 MHz 32 kHz	ON	OFF	ON
		Video output	ON	ON	OFF	4 MHz 32 kHz	ON	OFF	OFF
REC	Display mode	LCD	ON	ON	ON	4 MHz 32 kHz	ON	ON	OFF
		EVF	ON	ON	ON	4 MHz 32 kHz	ON	OFF	ON
		Video output	ON	ON	ON	4 MHz 32 kHz	ON	OFF	OFF

Table 3-3. Power

1-4. SYB CIRCUIT DESCRIPTION

1. Configuration and Functions

These below tables are port configuration of IC351.

IC351 is controlled Passive Auto Focus (PAF). IC351 operates frequency of 10 MHz (X3501).

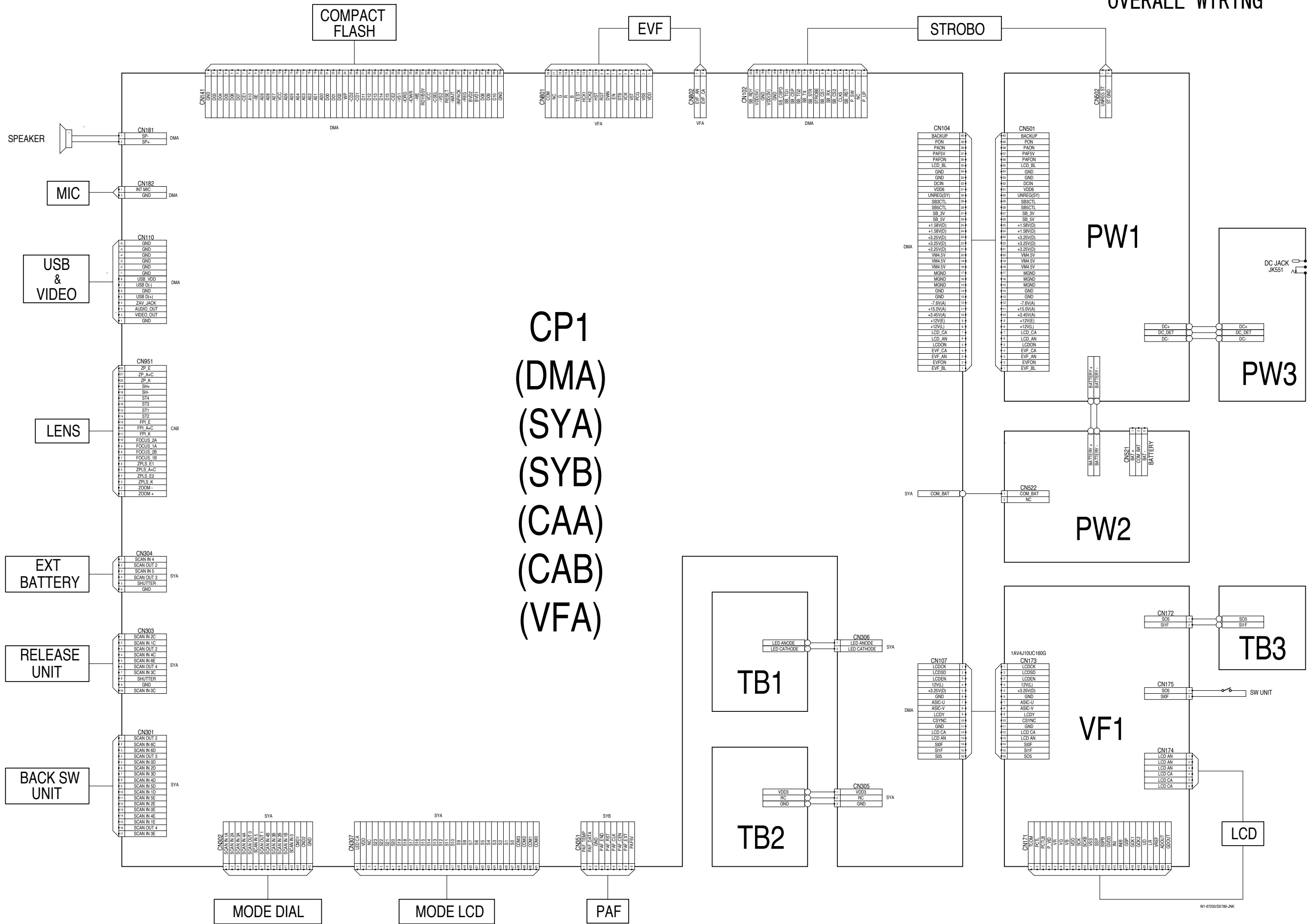
IC352 is the level converter (5 V → 3 V). IC353 is the level converter (3 V → 5 V).

IC354 creates 3.25 V of analog standard voltage.

Pin	Signal	I/O	Outline
1	AVREF	I	Analog standard voltage input terminal
2	AVSS	-	GND
3	IC (FLMD0)	I	Program writing power
4	VDD	I	VDD
5	REGC	-	Regulator output stability capacity connection
6	VSS	-	GND
7	XIN	I	Main clock oscillation terminal (10 MHz)
8	XOUT	O	Main clock oscillation terminal
9	RESET	I	Reset input
10	XT1	-	VDD connection
11	XT2	-	-
12~16	NOT USED	-	-
17	SREQ	I	Serial communication requirement signal
18~19	NOT USED	-	-
20	FLMD1	O	Program writing power
21~24	NOT USED	-	-
25	PRG SO	O	Flash serial data output
26	PRG SI	I	Flash serial data input
27	PRG SCK	O	Flash serial clock output
28~31	NOT USED	-	-
32	VSS	-	GND
33	VDD	I	VDD
34, 35	NOT USED	-	-
36	SCK	O	Serial clock output
37	SI	I	Serial data input
38	SO	O	Serial data output
39~49	NOT USED	-	-
50	LED_CA	O	AF LED control port 1 H : Lighting
51	LED_AN	O	AF LED control port 2 H : Lighting
52	PAF_CLK	O	Ranging sensor setting data writing clock, Ranging sensor cell data reading clock
53	PAF_RST	O	Ranging sensor reset (output)
54	PAF_CEN	O	Ranging sensor chip enable (output)
55	PAF_EXT	O	Ranging sensor setting data integral forced termination (output)
56	PAF_END	I	Ranging sensor integral terminal (input)
57~62	NOT USED	-	-
63	PAF_TEMP	I	Ranging sensor temperature output (A/D)
64	PAF_DATA	I	Ranging sensor cell output (A/D)

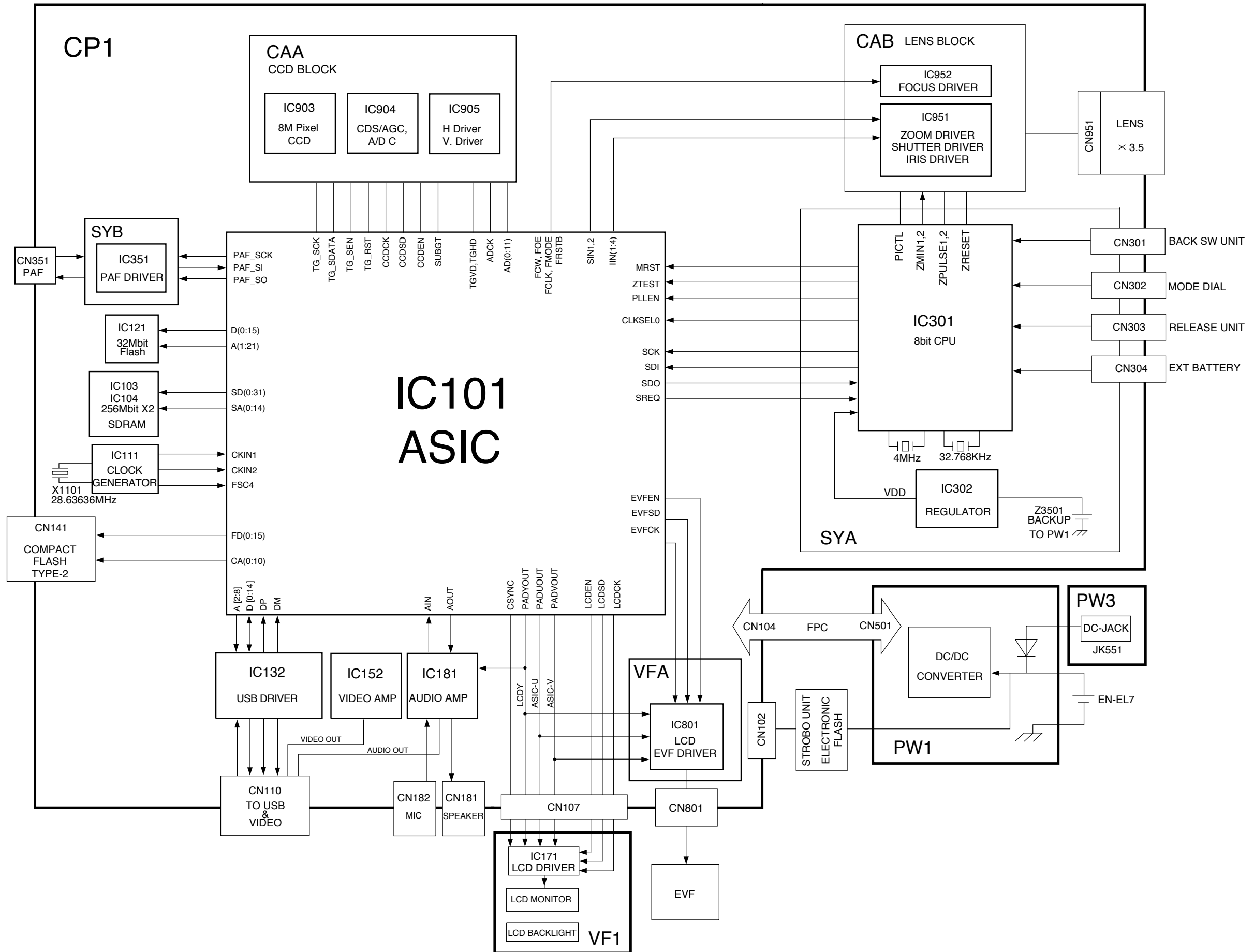
Table 4-1. 8-bit Microprocessor Port Specification

総合結線図 OVERALL WIRING

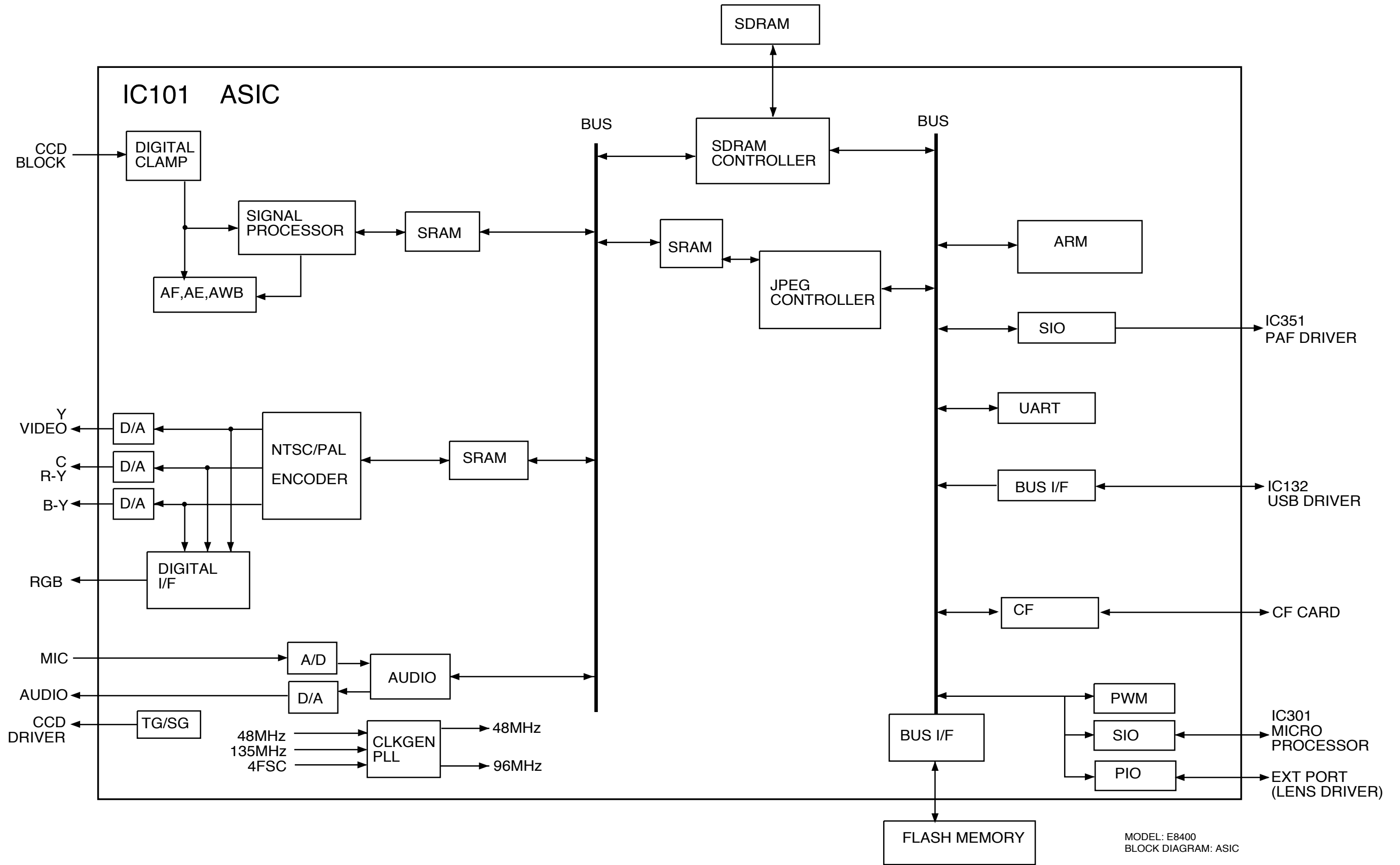


W1-6720/SK78-JNK

総合ブロック図 OVERALL BLOCK DIAGRAM

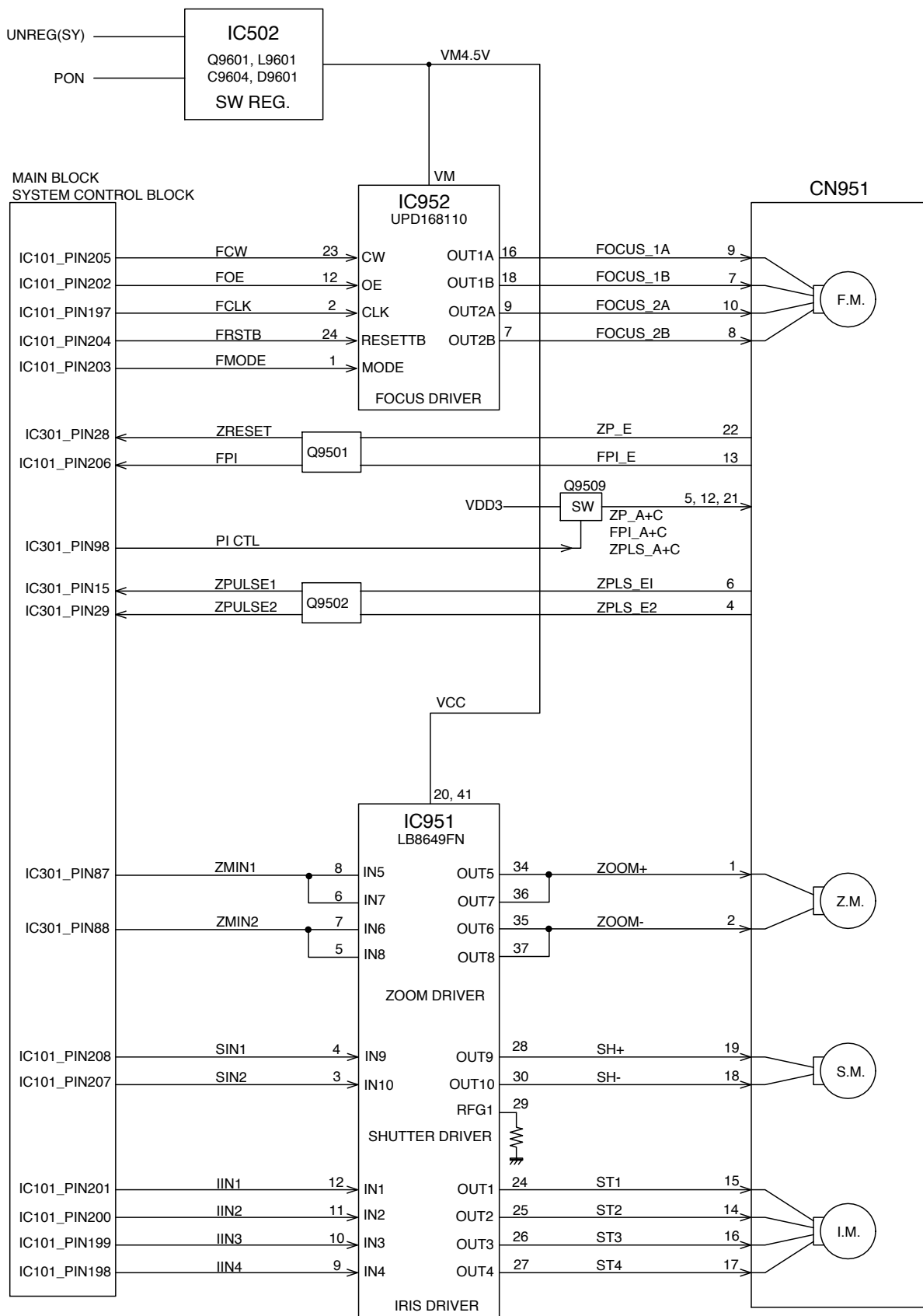


ASIC ブロック図 ASIC BLOCK DIAGRAM

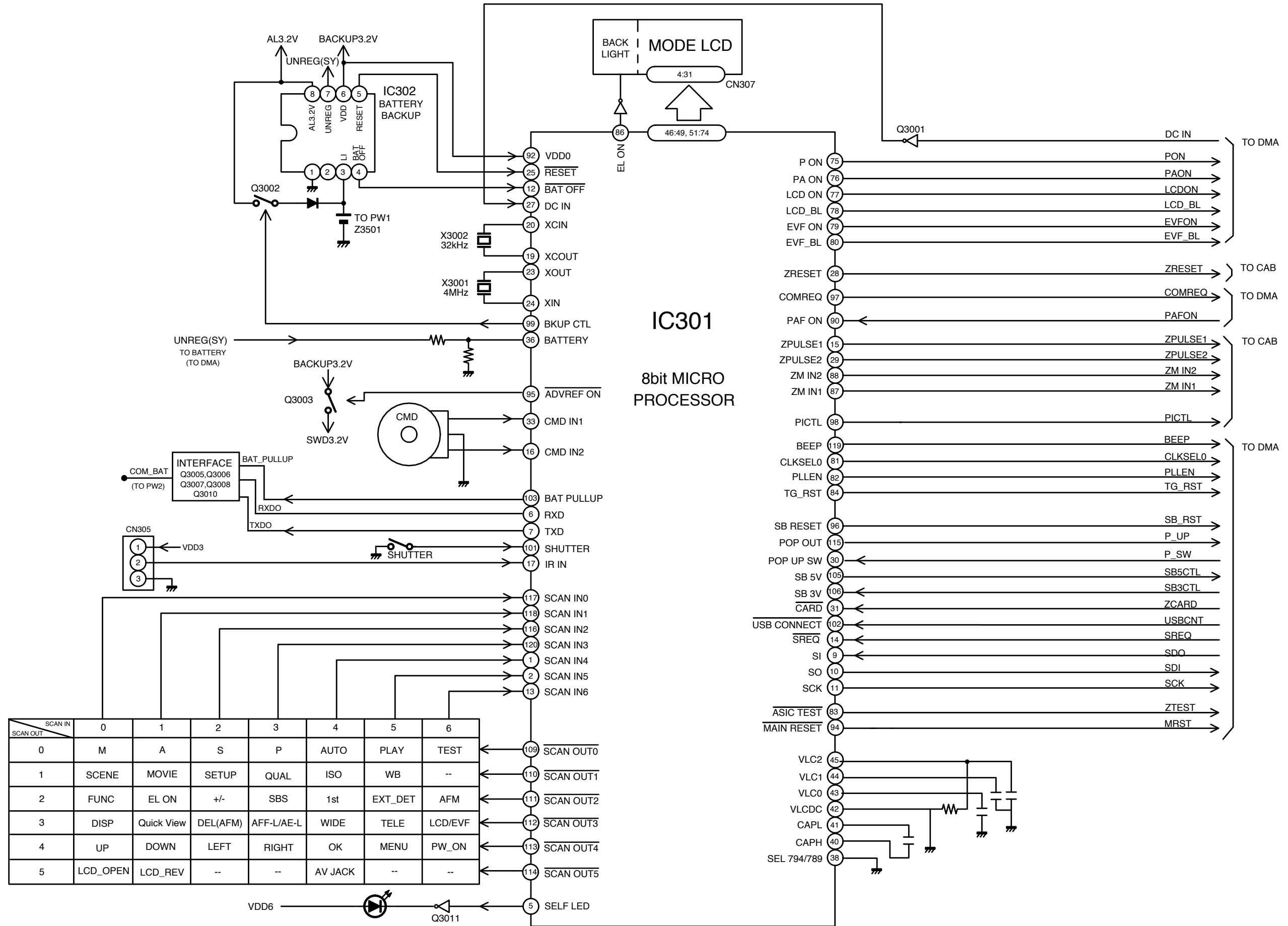


CP-1 (レンズ部) ブロック図

CP-1 (LENS) BLOCK DIAGRAM

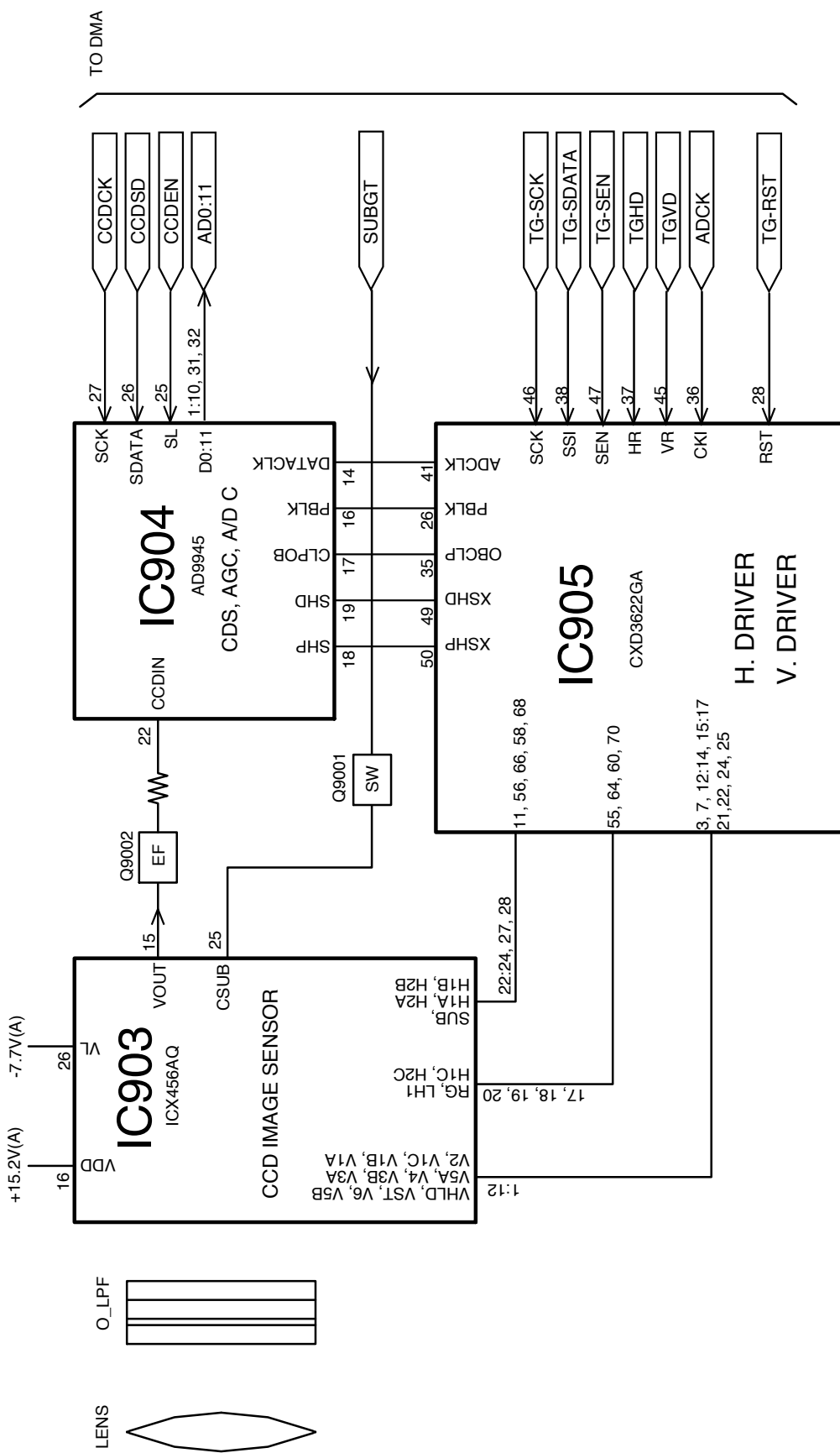


CP-1 (8bit MICRO PROCESSOR) ブロック図
 CP-1 (8bit MICRO PROCESSOR) BLOCK DIAGRAM



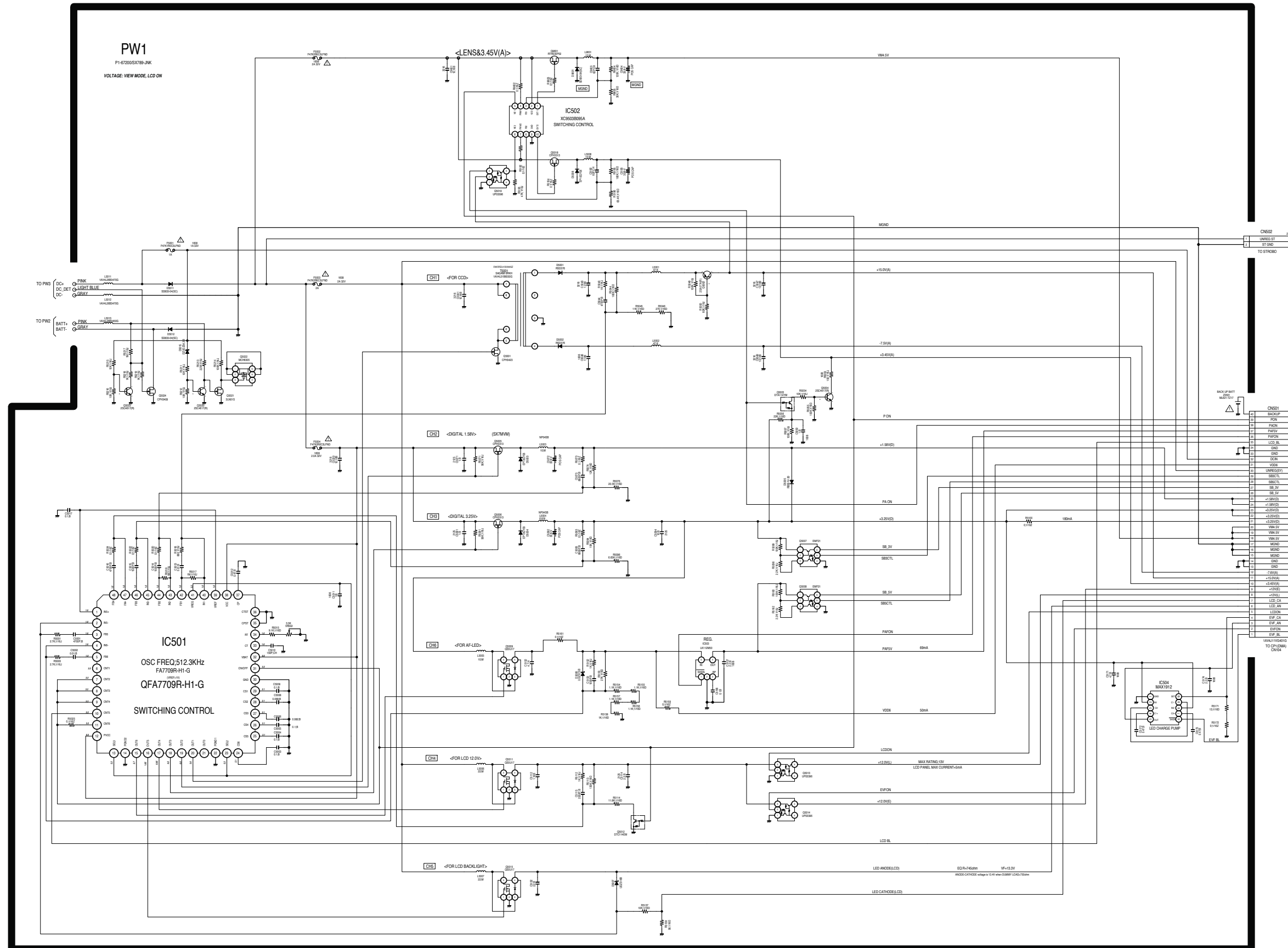
CA-1 ブロック図

CA-1 BLOCK DIAGRAM



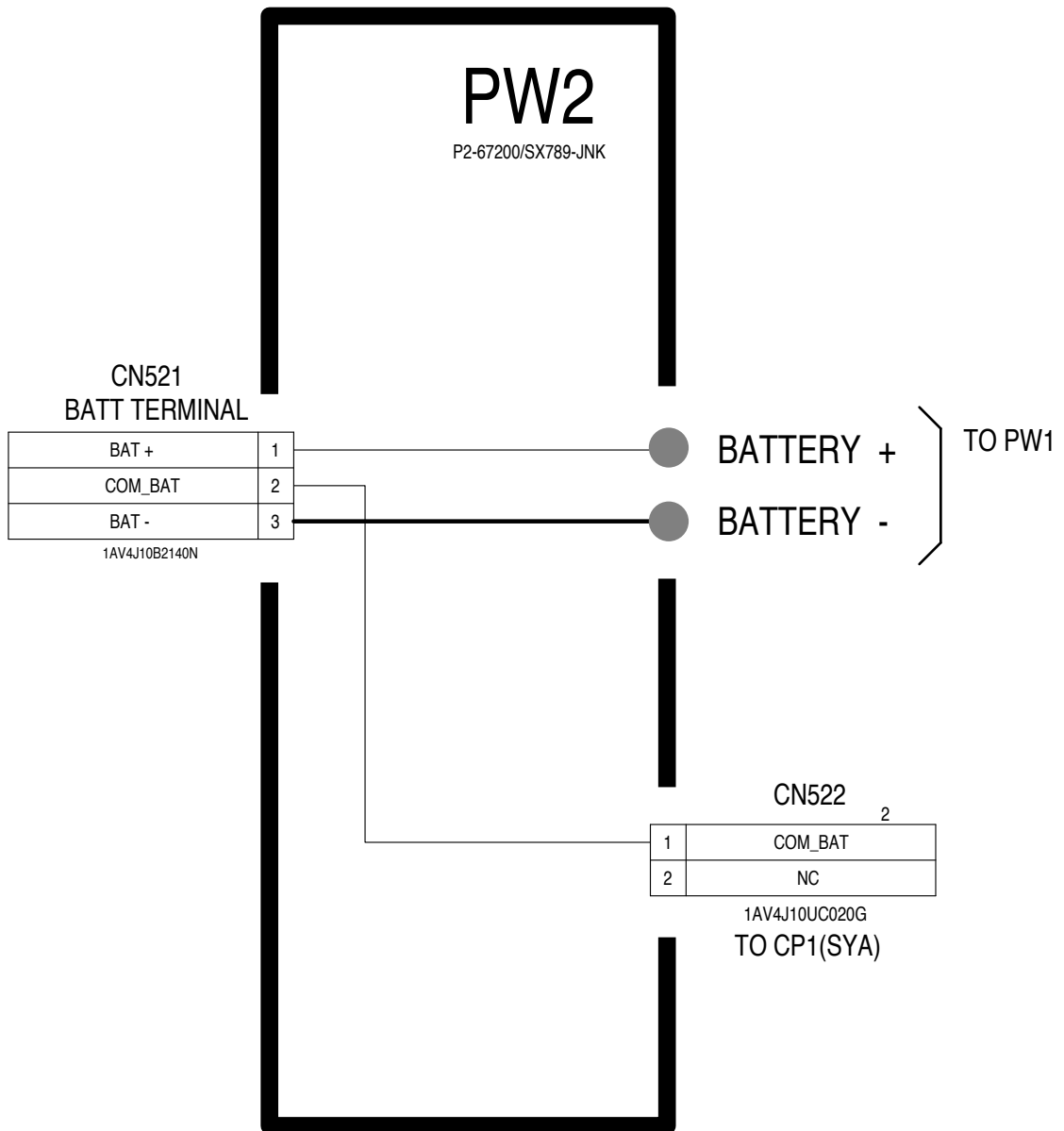
PW-1 ブロック図

PW-1 BLOCK DIAGRAM



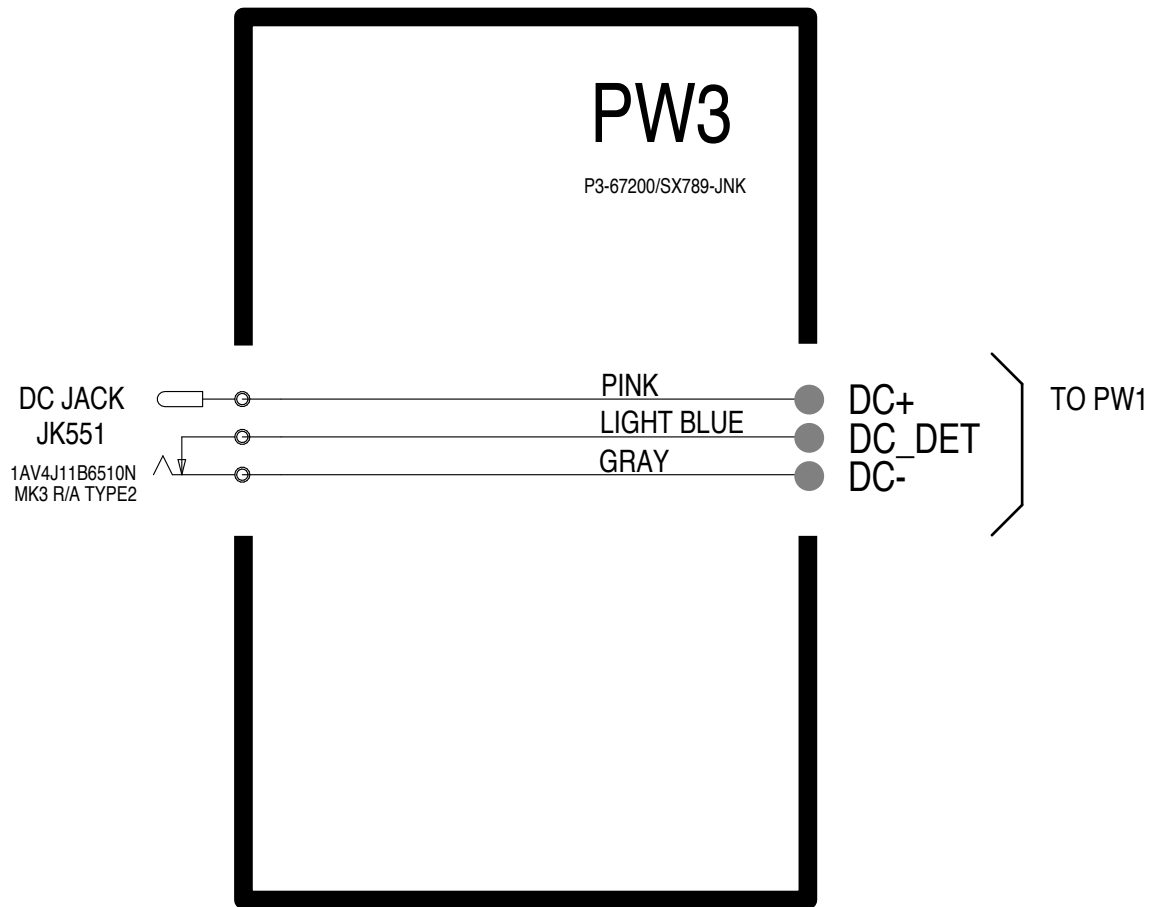
PW-2 ブロック図

PW-2 BLOCK DIAGRAM

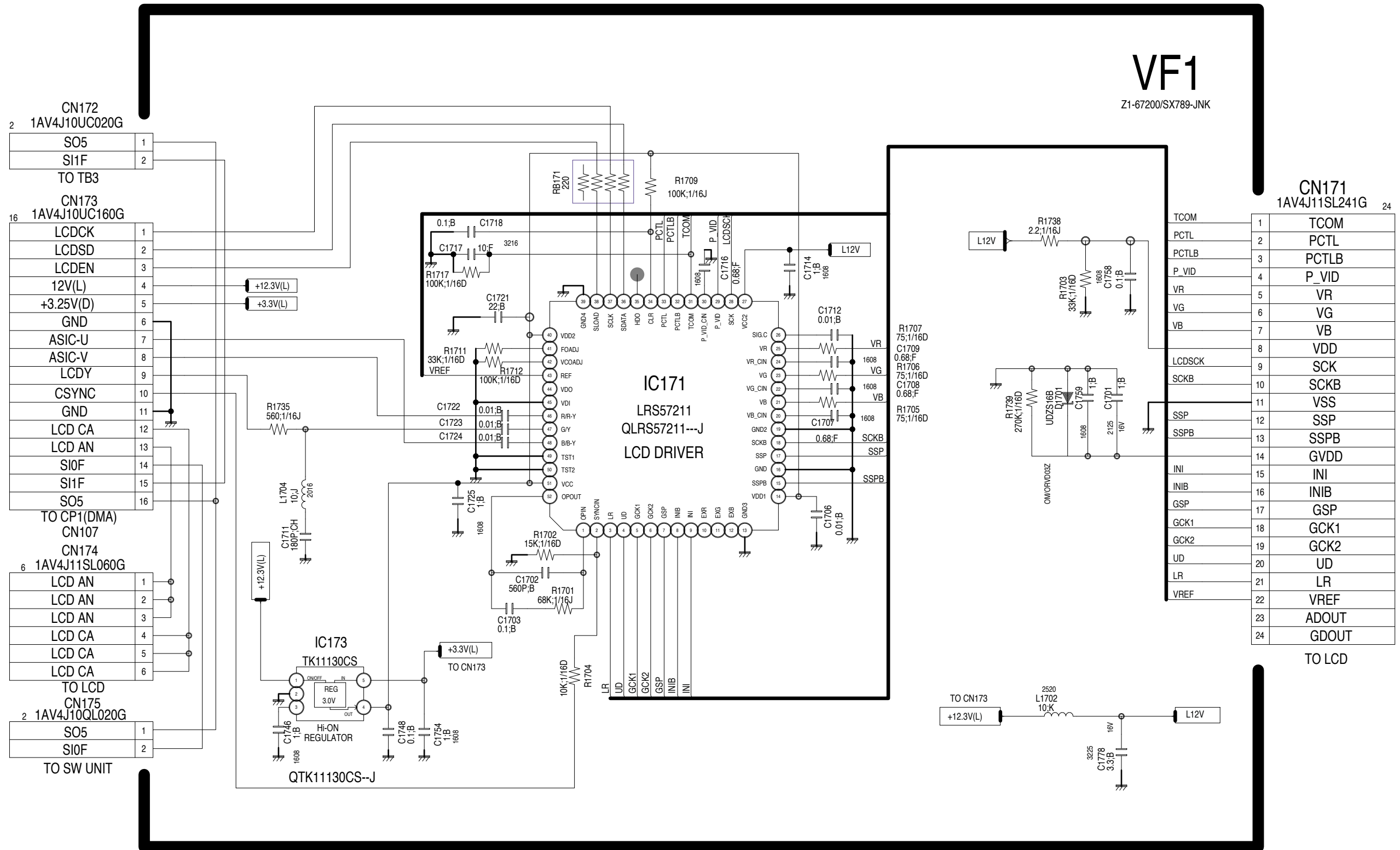


PW-3 ブロック図

PW-3 BLOCK DIAGRAM

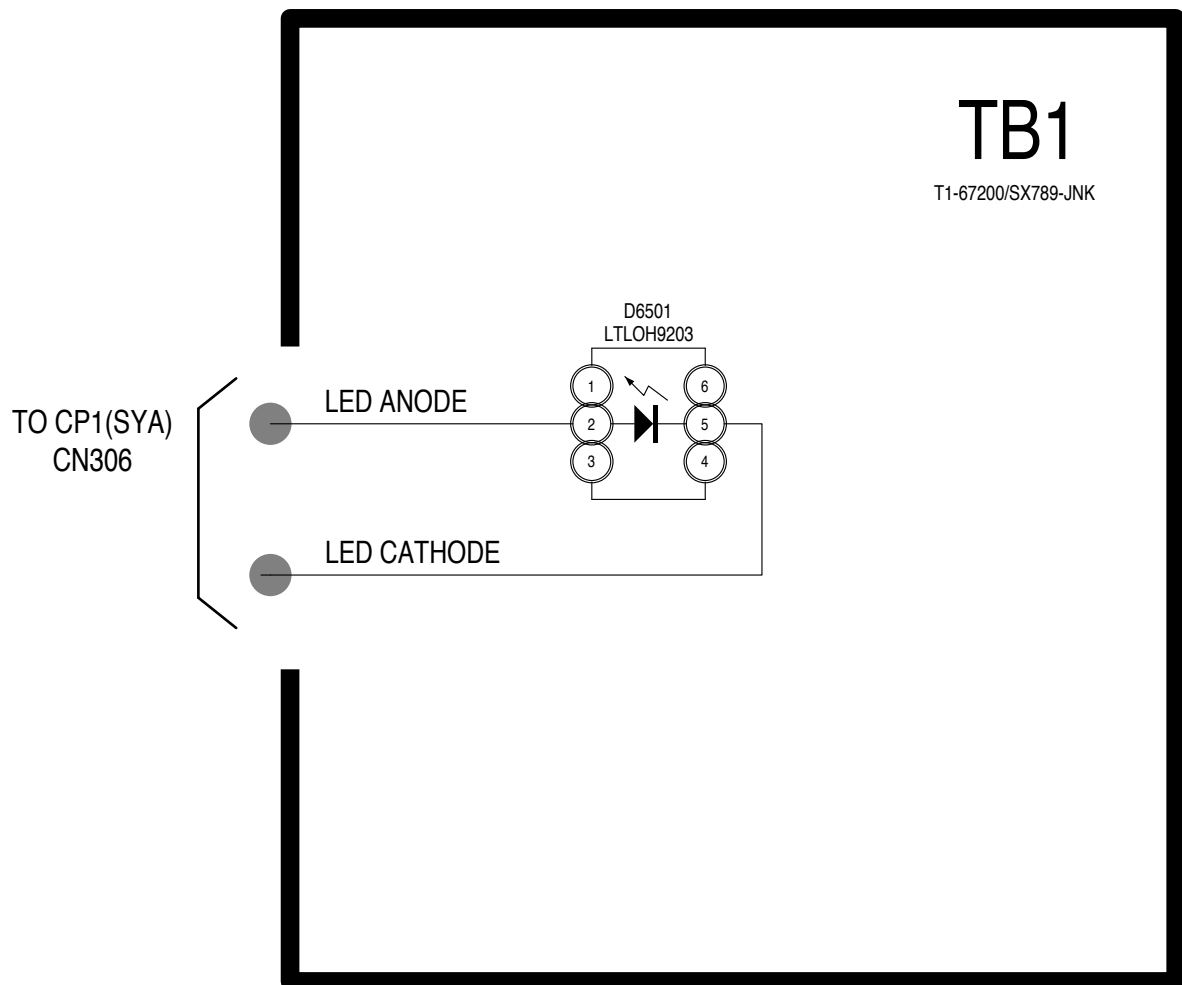


VF-1 回路図
VF-1 CIRCUIT DIAGRAM



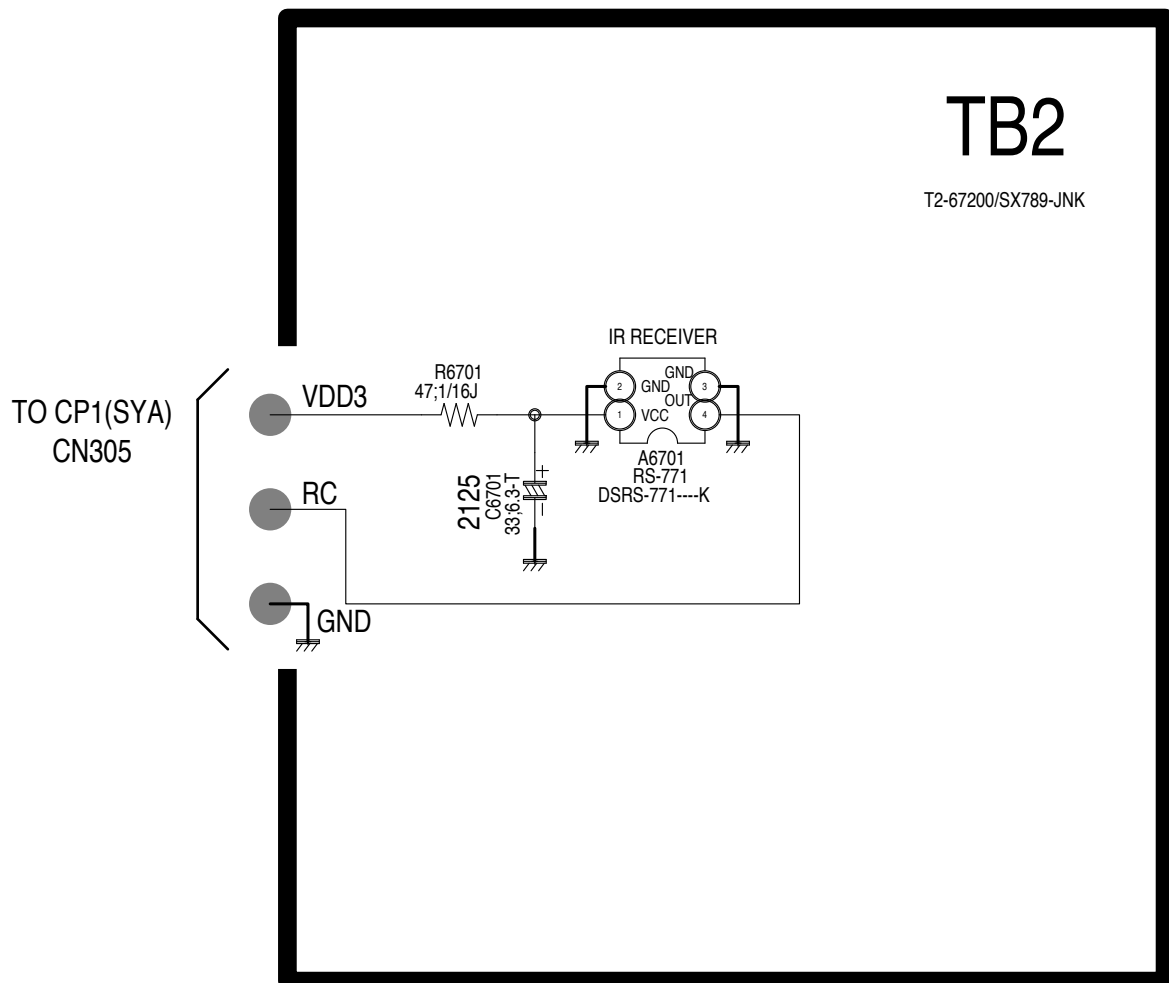
TB-1 ブロック図

TB-1 BLOCK DIAGRAM



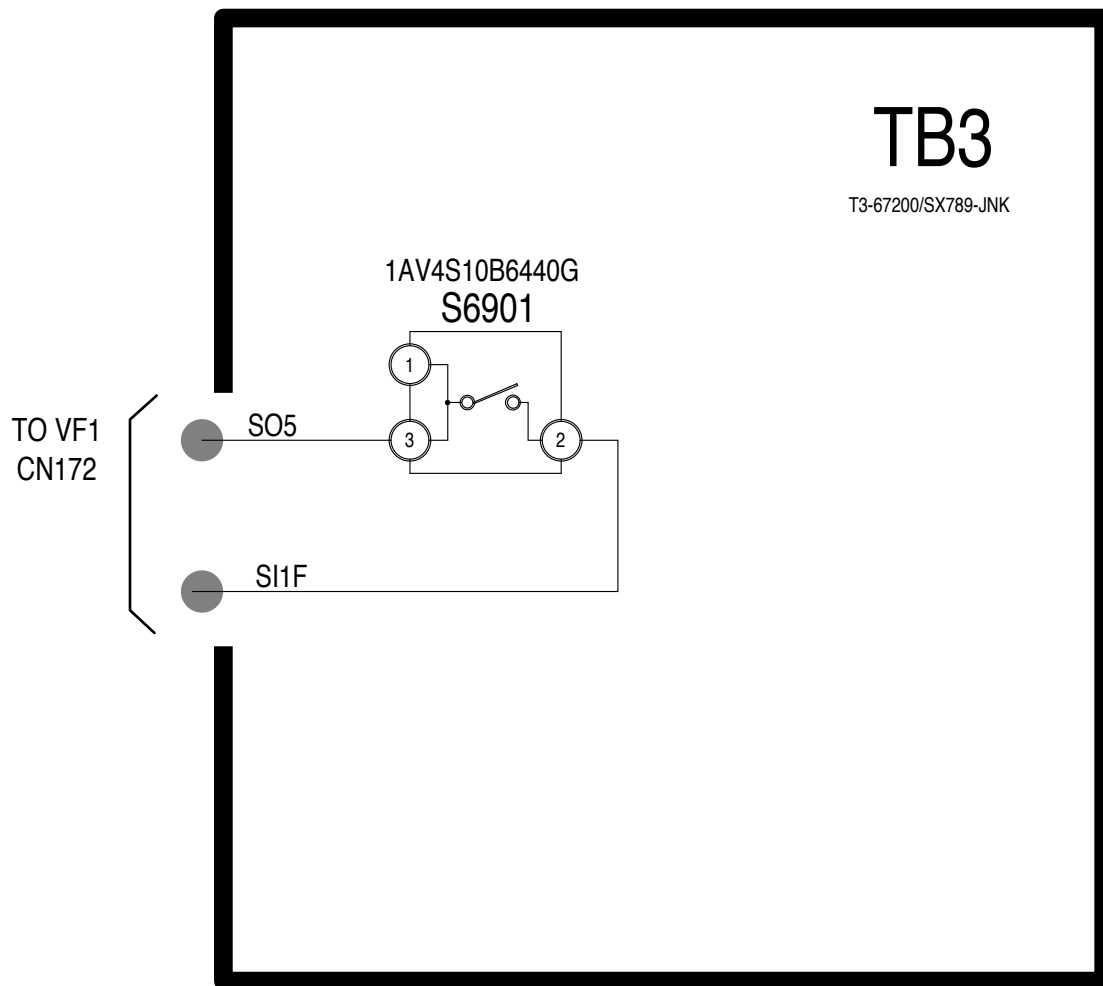
TB-2 ブロック図

TB-2 BLOCK DIAGRAM

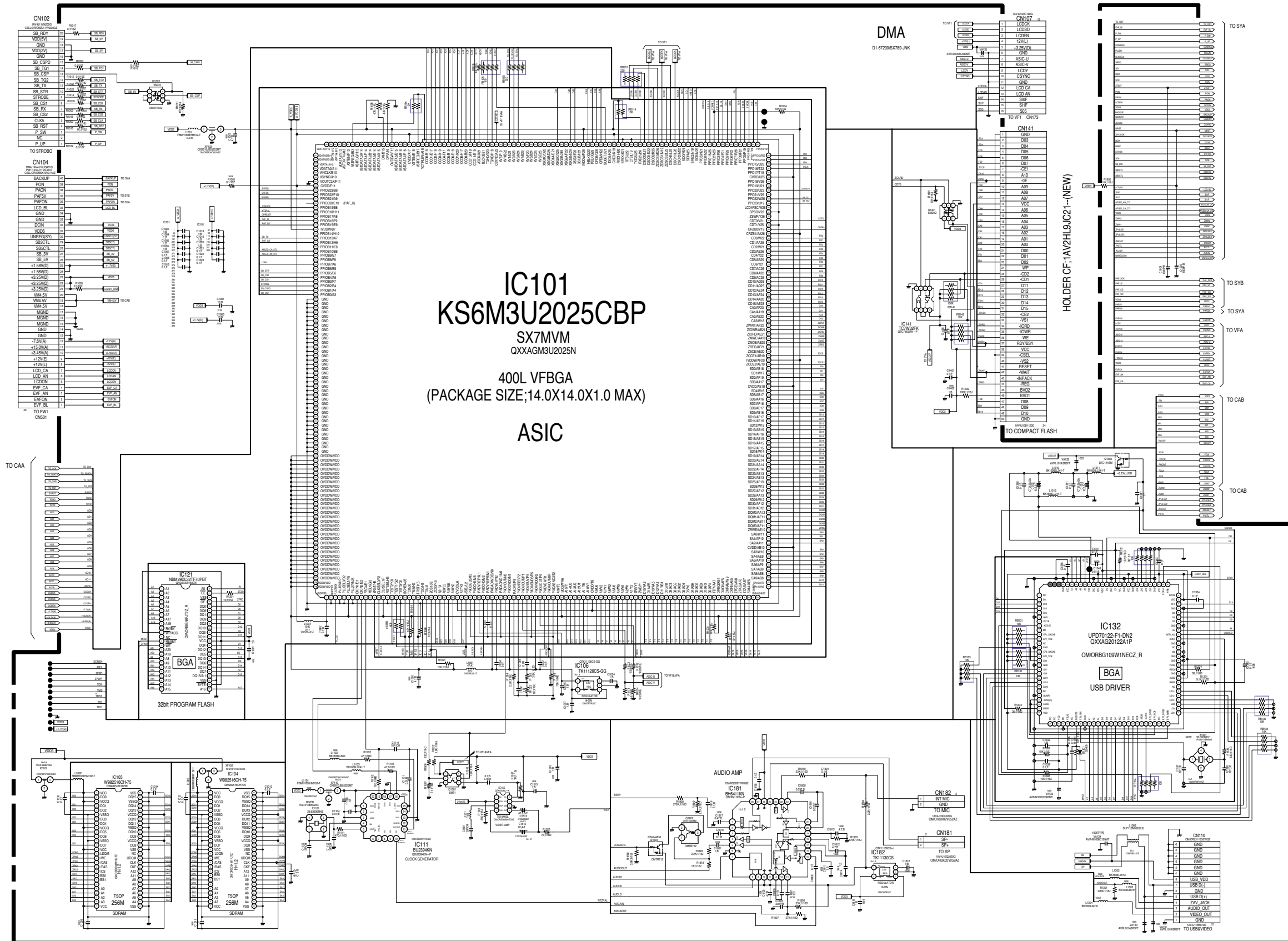


TB-3 ブロック図

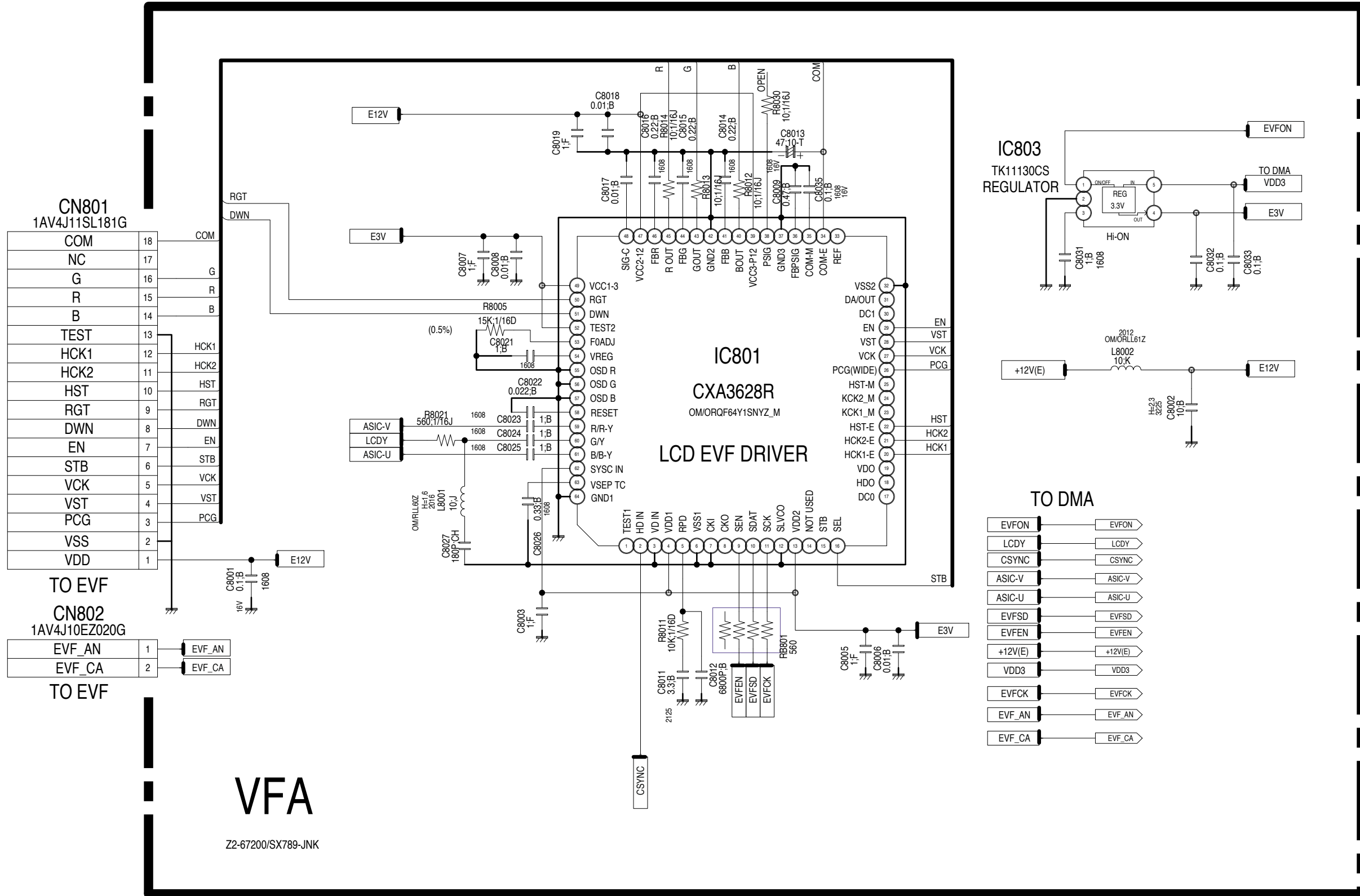
TB-3 BLOCK DIAGRAM



DMA 回路图 DMA CIRCUIT DIAGRAM



VFA 回路图
VFA CIRCUIT DIAGRAM

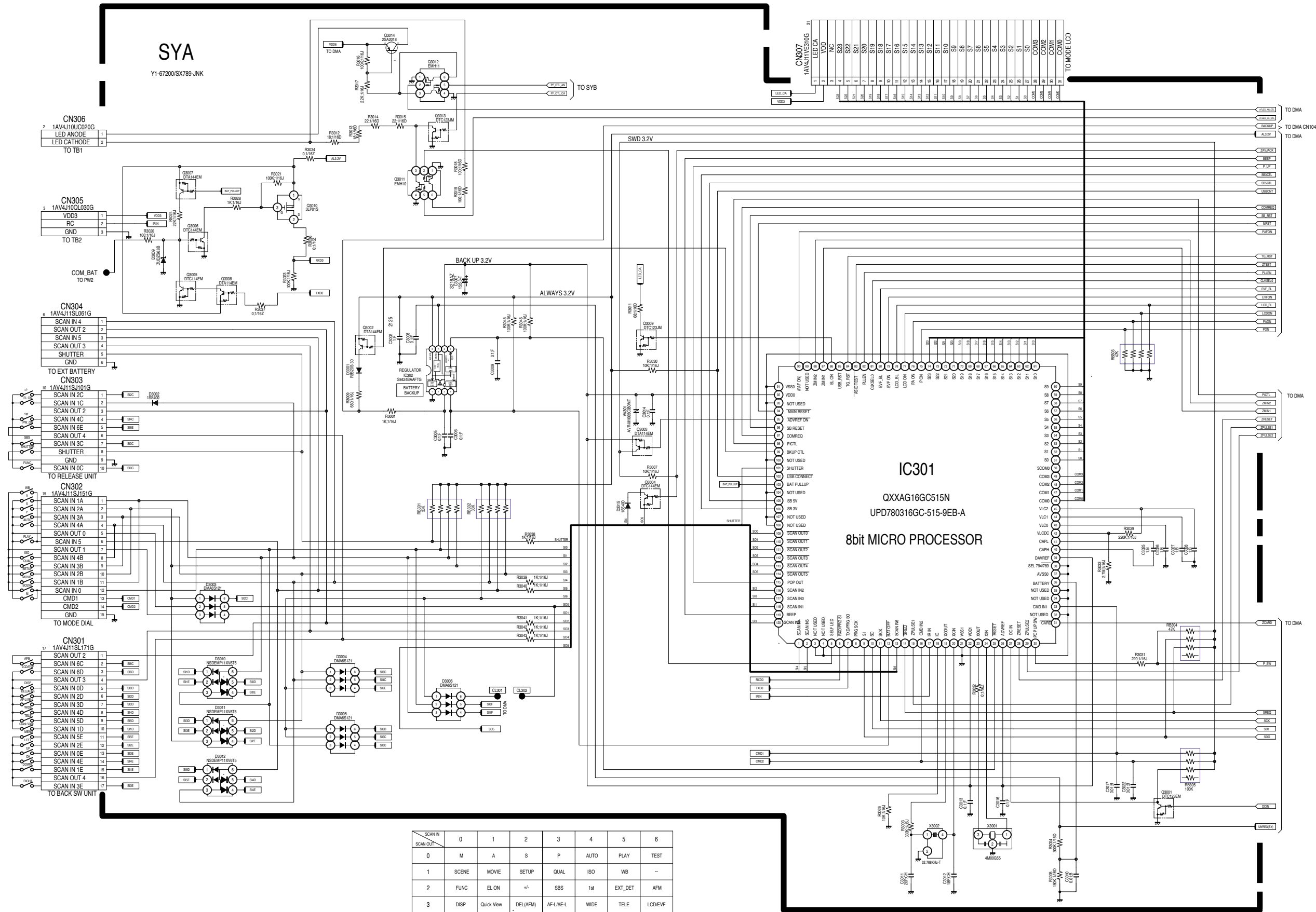


CN801 1AV4J11SL181G			
COM	18	COM	
NC	17		
G	16	G	
R	15	R	
B	14	B	
TEST	13		
HCK1	12	HCK1	
HCK2	11	HCK2	
HST	10	HST	
RGT	9	RGT	
DWN	8	DWN	
EN	7	EN	
STB	6	STB	
VCK	5	VCK	
VST	4	VST	
PCG	3	PCG	
VSS	2		
VDD	1		

CN802 1AV4J10EZ020G			
EVF_AN	1	EVF_AN	
EVF_CA	2	EVF_CA	

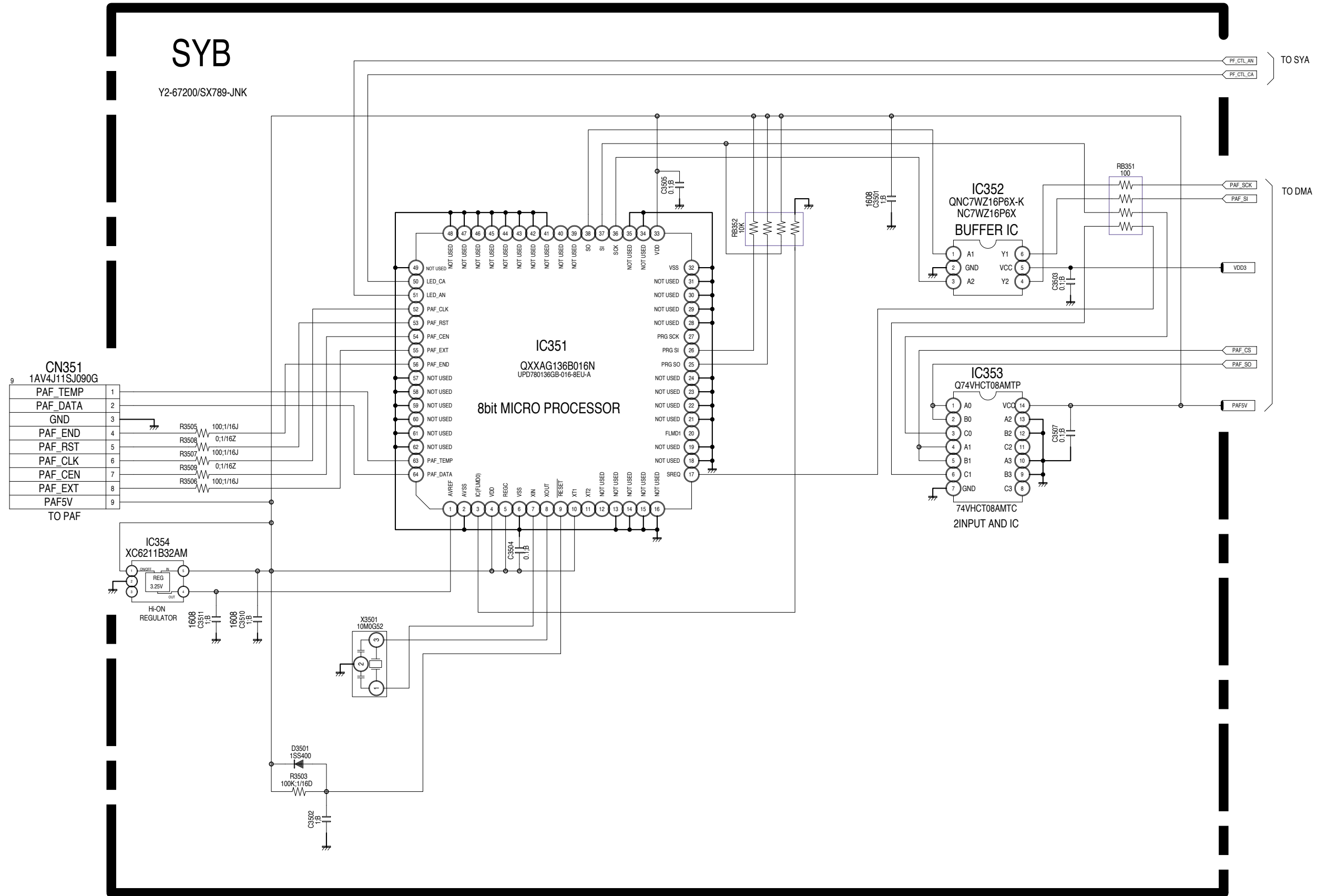
TO DMA			
EVFON	EVFON	EVFON	
LCDY	LCDY	LCDY	
CSYNC	CSYNC	CSYNC	
ASIC-V	ASIC-V	ASIC-V	
ASIC-U	ASIC-U	ASIC-U	
EVFSD	EVFSD	EVFSD	
EVFEN	EVFEN	EVFEN	
+12V(E)	+12V(E)	+12V(E)	
VDD3	VDD3	VDD3	
EVFCK	EVFCK	EVFCK	
EVF_AN	EVF_AN	EVF_AN	
EVF_CA	EVF_CA	EVF_CA	

SYA 回路图
SYA CIRCUIT DIAGRAM

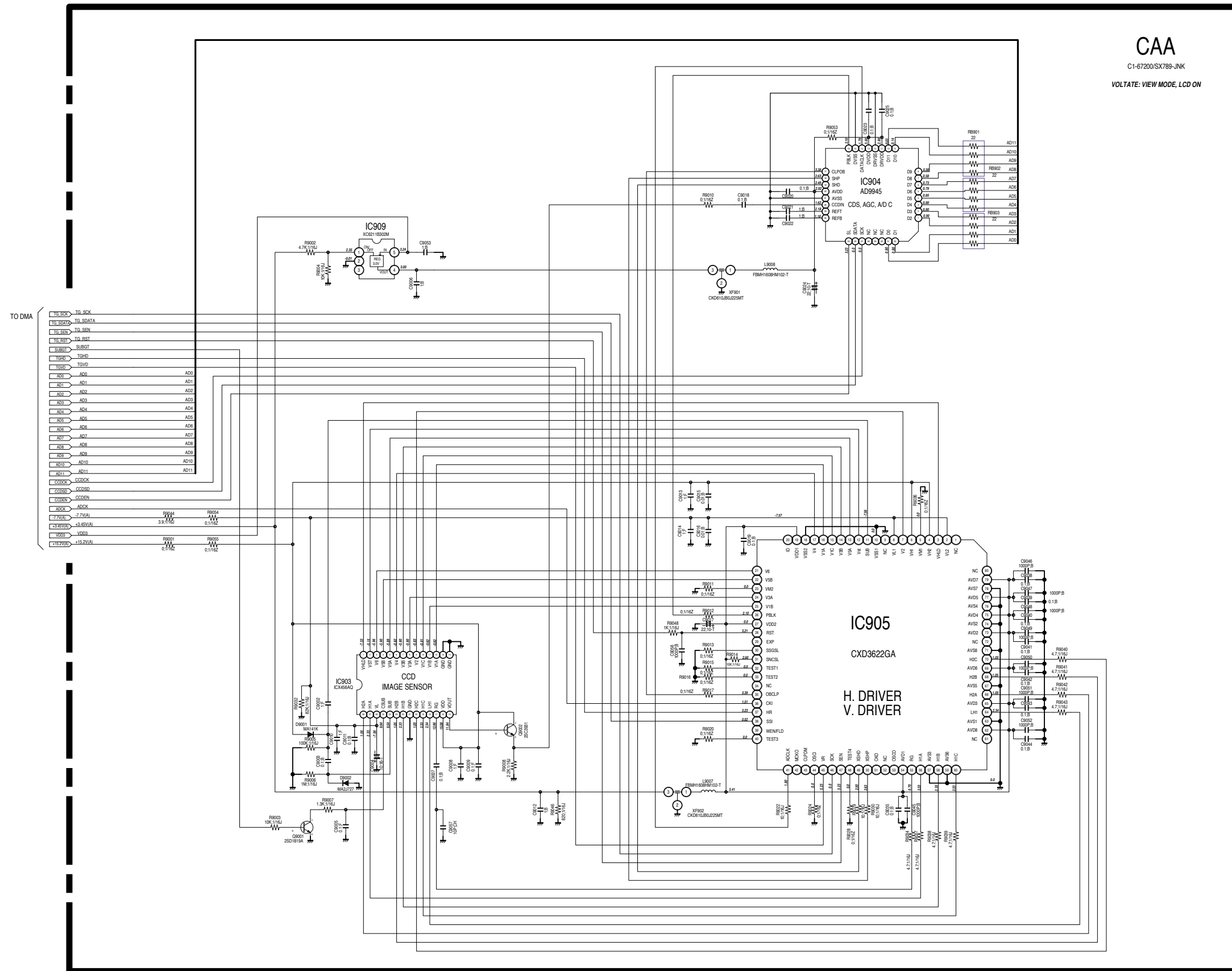


SCAN IN	0	1	2	3	4	5	6
SCAN OUT	M	A	S	P	AUTO	PLAY	TEST
1	SCENE	MOVIE	SETUP	QUAL	ISO	WB	-
2	FUNC	EL ON	+/-	SBS	1st	EXT_DET	AFM
3	DISP	Quick View	DEL(AFM)	AF-L/AE-L	WIDE	TELE	LCDEVF
4	UP	DOWN	LEFT	RIGHT	OK	MENU	PW_ON
5	LCD_OPEN	LCD_REV	-	-	AVJACK	-	-

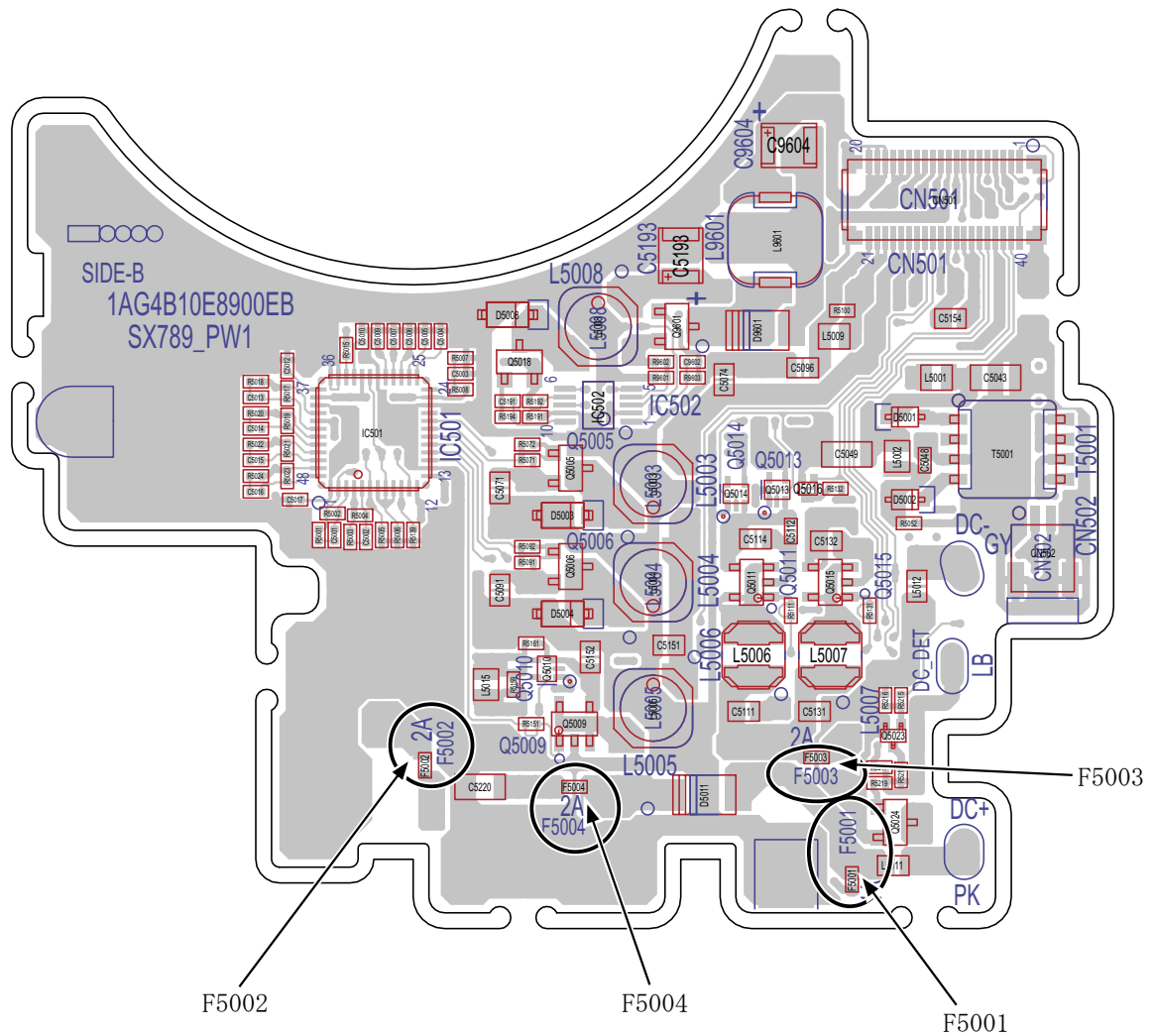
SYB 回路图 SYB CIRCUIT DIAGRAM



CAA 回路図
CAA CIRCUIT DIAGRAM



FUSE 配置图 (PW1 基板) FUSE configuration (PW-1)



Fuse	Function	Phenomenon when only the fuse has blown out	Rating
F5001	Protects the system control IC input unit.	Auto power is OFF when the AC adapter operates.	1 . 0 A 3 2 V
F5002	Protects the lens power supply • drive circuit.	The lens does not operate.	2 . 0 A 3 2 V
F5003	Protects the DC/DC converter.	The power supply of camera is not ON.	2 . 0 A 3 2 V
F5004	Protects the DC/DC converter.	The power supply of camera is not ON.	2 . 0 A 3 2 V

The contents of inspection standards and tools for E8400

[1] Inspection standards	R1 to R7
[2] Tools	T1 to T5

Inspection standards

Item	Criteria	Applied tool(s)
<p>External view</p> <p>Gap/Difference in height</p> <p>Outside and inside status</p>	<ul style="list-style-type: none"> • General components Gap: 0.3mm or less Difference in height: 0.15mm or less • When the battery cover is closed: Gap: 0.6mm or less (Difference between right and left must not be noticeable.) • Difference in height: 0.3mm or less (Perform measurement under free condition with battery.) • 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.) 	<p>Visual observation</p>
<p>Operation/Operability</p> <p>Operation</p> <p>Operability of buttons</p> <p>Lever/Knob</p> <p>Operation touch</p> <p>Each cover</p>	<ul style="list-style-type: none"> • 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.) • 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.) • 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.) • 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.) • 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.) 	<p>Primary battery/ Secondary battery</p>

Item	Criteria	Applied tool(s)
Monitor Shooting image	<ul style="list-style-type: none"> • 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
Lens capacity Focal length Open aperture F No. Peripheral light reduction Ghost/Flare Surface ghost Distortion Dust in a picture	<p>Wide-end position (Compelling ∞) 6.1 mm + 7% - 2%</p> <p>Tele-end position (Compelling ∞) 21.6 mm + 2% - 7%</p> <p>Wide-end position (Compelling ∞) F2.6 + 8% - 2%</p> <p>Tele-end position (Compelling ∞) F4.9 + 10% 0%</p> <ul style="list-style-type: none"> • Against the center of the screen, the luminance of the screen's outermost circumference must be 35% or more. • When an image is 70% of the screen, the luminance of the image height must be 60% or more against the center of the screen. • When the light is reduced, the difference must be 25% or less in luminance between right and left. • Take a picture of the 5100K viewer and check the image. • Check at Wide end and Tele end. • Check at the near distance position and the ∞ position. • Check in full aperture condition. • There must not be an outstanding malfunction. • There must not be an outstanding flare at the center. • There must not be an outstanding deformation. • There must not be an outstanding dust in a picture. 	Focal length Measuring instrument Lens drive tool Focal length Measuring instrument Lens drive tool Visual observation
Lens barrel Zoom	<ul style="list-style-type: none"> • 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

Item	Criteria	Applied tool(s)
AF Distance measurement operation Shortest photograph distance Normal Macro	<ul style="list-style-type: none"> • Focus must be fit in a selected area. (Select the AF area and check it.) <p>The focus of AF must be fit at the following distance.</p> <ul style="list-style-type: none"> • 500mm (Check at each zoom position.) • Within 30mm from the protection glass surface (Set to the "Macro" mode.) (Check at each zoom position in the range where the "Macro" mode display (tulip) color is changed into yellow.) 	Visual observation Tape measure
Shooting with a speed light Light adjustment accuracy Guide No. FULL (ISO100 • m) Recycling time Lock under uncharged condition Wrong flash Speed light pop-up operation	<ul style="list-style-type: none"> • Tele-end: 0.5~2m • Wide-end: 0.5~3.6m <p>In the above range, $\pm 0.5\text{Ev}$ or less (ISO: AUTO , • Speed light: Compelling flash, • Exposure: P mode)</p> <ul style="list-style-type: none"> • $10 \pm 0.5\text{EV}$ (Charge for 18 seconds with the new battery and perform measurement within 1 second.) • Within 8 seconds (When the full-charged battery mark is displayed) <ul style="list-style-type: none"> • 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.) <ul style="list-style-type: none"> • Wrong flash must not occur. (Check by loading/unloading a battery, giving a light shock and operating mode buttons except S2.) <ul style="list-style-type: none"> • When stored or during storing action, the speed light shall not have an outstanding "caught-in-mechanism" touch, "rubbed-in-mechanism" touch, play, etc. • Latch must be accurately effective. • When luminance is low, pop-up operation must be done by lightly pressing the shutter release button. (Push the speed light in each direction and check it.) 	Standard reflection plate Flash meter New battery Visual observation New primary battery Visual observation

Item	Criteria	Applied tool(s)																																
<p>Quality of image</p> <p>Resolution in AF</p>	<p>The resolution must be in compliance with the following values in all the postures of the EIA J chart evaluation.</p> <ul style="list-style-type: none"> • Horizontal center: 1450 TV lines Vertical center: 1450 TV lines • Horizontal line(s) at each corner: 900 TV lines Vertical line(s) at each corner: 900 TV lines • 10m-Near distance (including “macro near distance”) Center Horizontal : 1250 TV pcs. or more Vertical : 1250 TV pcs. or more • Set the conditions as follows: FINE, auto. white balance, center-weighted metering, A mode, sensitivity 50, gradation adjustment standard and profile emphasis standard • Wide-end position, aperture "open" • Take a picture of the chart with a full angle of view. Then, open the recorded image data file through PHOTO-SHOP and check the resolution visually. 	<p>EIAJ chart</p> <p>PHOTOSHOP</p> <p>Color bar chart</p>																																
<p>Reproduction of color</p>	<p>AUTO mode</p> <p>Histogram RGB</p> <table border="1" data-bbox="507 1153 970 1299"> <thead> <tr> <th></th> <th>R</th> <th>G</th> <th>B</th> </tr> </thead> <tbody> <tr> <td></td> <td>205 ± 20</td> <td>205 ± 20</td> <td>205 ± 20</td> </tr> <tr> <td></td> <td>205 ± 20</td> <td>205 ± 20</td> <td>20 ± 15</td> </tr> <tr> <td></td> <td>205 ± 20</td> <td>10 ± 10</td> <td>10 ± 10</td> </tr> </tbody> </table> <p>P, A, S, M mode</p> <p>Histogram RGB</p> <table border="1" data-bbox="507 1422 970 1568"> <thead> <tr> <th></th> <th>R</th> <th>G</th> <th>B</th> </tr> </thead> <tbody> <tr> <td>W</td> <td>210 ± 20</td> <td>210 ± 20</td> <td>210 ± 20</td> </tr> <tr> <td>Ye</td> <td>210 ± 20</td> <td>210 ± 20</td> <td>25 ± 15</td> </tr> <tr> <td>R</td> <td>205 ± 20</td> <td>15 ± 10</td> <td>15 ± 10</td> </tr> </tbody> </table> <ul style="list-style-type: none"> • Set the conditions as follows: FINE, auto. white balance, center-weighted metering, P mode, sensitivity 50, 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. 		R	G	B		205 ± 20	205 ± 20	205 ± 20		205 ± 20	205 ± 20	20 ± 15		205 ± 20	10 ± 10	10 ± 10		R	G	B	W	210 ± 20	210 ± 20	210 ± 20	Ye	210 ± 20	210 ± 20	25 ± 15	R	205 ± 20	15 ± 10	15 ± 10	
	R	G	B																															
	205 ± 20	205 ± 20	205 ± 20																															
	205 ± 20	205 ± 20	20 ± 15																															
	205 ± 20	10 ± 10	10 ± 10																															
	R	G	B																															
W	210 ± 20	210 ± 20	210 ± 20																															
Ye	210 ± 20	210 ± 20	25 ± 15																															
R	205 ± 20	15 ± 10	15 ± 10																															

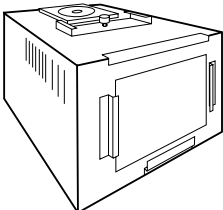

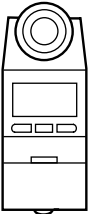
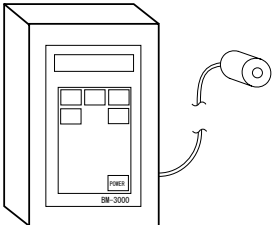
Item	Criteria	Applied tool(s)								
Finder • EVF										
View / Image	<ul style="list-style-type: none"> • There must be no blur, distortion, ghost, halation or other outstanding troubles in contrast, gradation, etc. 	Visual observation								
Defective pixels	<ul style="list-style-type: none"> • This should comply with the LCD specification. 	Visual observation								
View Field of view	<ul style="list-style-type: none"> • In each of upward, downward, rightward and leftward directions: 	Scale								
	Through-the-monitor image: 96 ~ 100%									
	Play-back image: 98 ~ 100%									
	(Trace the range which can be checked with the finder on the picture which was taken at the 3m position.)									
Dust, fluff and damage										
• Eyepiece unit	<table border="1" data-bbox="507 734 1152 958"> <thead> <tr> <th>Size of dust</th> <th>Quantity</th> </tr> </thead> <tbody> <tr> <td>100µm or more</td> <td>0</td> </tr> <tr> <td>50µm or more and less than 100µm</td> <td>3 or less</td> </tr> <tr> <td>Less than 50µm</td> <td>Not collected in one point nor outstanding</td> </tr> </tbody> </table>	Size of dust	Quantity	100µm or more	0	50µm or more and less than 100µm	3 or less	Less than 50µm	Not collected in one point nor outstanding	Visual observation
Size of dust	Quantity									
100µm or more	0									
50µm or more and less than 100µm	3 or less									
Less than 50µm	Not collected in one point nor outstanding									
• EVF unit	<table border="1" data-bbox="507 1003 1152 1227"> <thead> <tr> <th>Size of dust</th> <th>Quantity</th> </tr> </thead> <tbody> <tr> <td>50µm or more</td> <td>0</td> </tr> <tr> <td>30µm or more and 50µm or less</td> <td>2 or less</td> </tr> <tr> <td>Less than 30µm</td> <td>Not collected in one point nor outstanding</td> </tr> </tbody> </table>	Size of dust	Quantity	50µm or more	0	30µm or more and 50µm or less	2 or less	Less than 30µm	Not collected in one point nor outstanding	Visual observation
Size of dust	Quantity									
50µm or more	0									
30µm or more and 50µm or less	2 or less									
Less than 30µm	Not collected in one point nor outstanding									

Item	Criteria	Applied tool(s)
B. C voltage Level 1 Level 2 Level 3 Level 4	<ul style="list-style-type: none"> • 7.4 ± 0.2 V(for battery), 6.7 ± 0.2 V(for secondary battery) • 7.15 ± 0.2 V(for battery), 6.1 ± 0.2 V(for secondary battery) • 6.3 ± 0.2 V(for battery), 5.4 ± 0.2 V(for secondary battery) • 5.5 ± 0.2 V(for battery), 4.2 ± 0.2 V(for secondary battery) 	Constant voltage power supply Volt meter
When voltage is returned (increased) Level 1 Level 2 Level 3	<ul style="list-style-type: none"> • 8.0 ± 0.2 V(for battery), 7.3 ± 0.2 V(for secondary battery) • 7.75 ± 0.2 V(for battery), 6.7 ± 0.2 V(for secondary battery) • 6.5 ± 0.2 V(for battery), 5.6 ± 0.2 V(for secondary battery) 	
	<ul style="list-style-type: none"> • Connect the constant-voltage power supply to MB-CP10. Decrease the power supply voltage 1 second before measurement and, under the following conditions, measure the voltage. (Note: Do not perform measurement when increasing the voltage.) • When the voltage is decreased <ul style="list-style-type: none"> Level 1: The battery low power mark lights up on the monitor LCD. Level 2: The battery half power mark lights up on the monitor LCD. Level 3: The "consumed battery" warning appears on the monitor LCD. Level 4: The monitor LCD is turned off. (When 30 seconds have passed since Level 3, the monitor LCD is automatically turned off. Measure the voltage before it is automatically turned off.) • When the voltage is increased (returned), connect the constant-voltage power supply to MB-CP10 and check the voltage at Level 3 (when the "consumed battery" warning appears). Then, turn off the power, increase the voltage by 0.1V and set the power switch from "OFF" to "ON". Under the following conditions, measure the voltage. (When changing the voltage, turn off the power.) <ul style="list-style-type: none"> Level 1: The battery mark does not appear on the monitor LCD. Level 2: The battery low power mark lights up on the monitor LCD. Level 3: The battery half power mark lights up on the monitor LCD. • At each level, the B. C voltage when the voltage is returned must be at least 0.1V higher than when the voltage is decreased. <p>MB-CP10 in the market can be used.</p> <p>※ Perform inspection with MB-CP10 (external battery). The data for the secondary battery should be regarded as reference values.</p>	

[2] 工具一覧表 Tool List

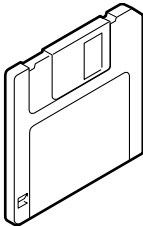
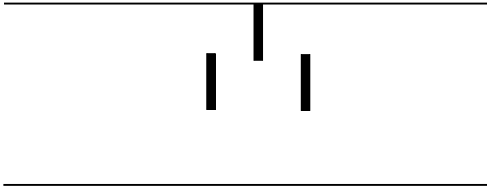
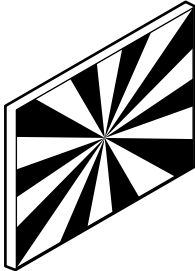
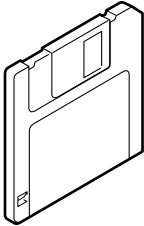
※：新規工具

※：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, E3700, E3200, E2200, E8700, E4100, E8400) Common(E4300, E3500, E3100, E2100, E5400, E3700, E3200, E2200, E8700, E4100, E8400)
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



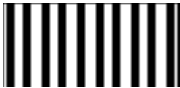
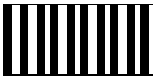
※：新規工具

※：New tool

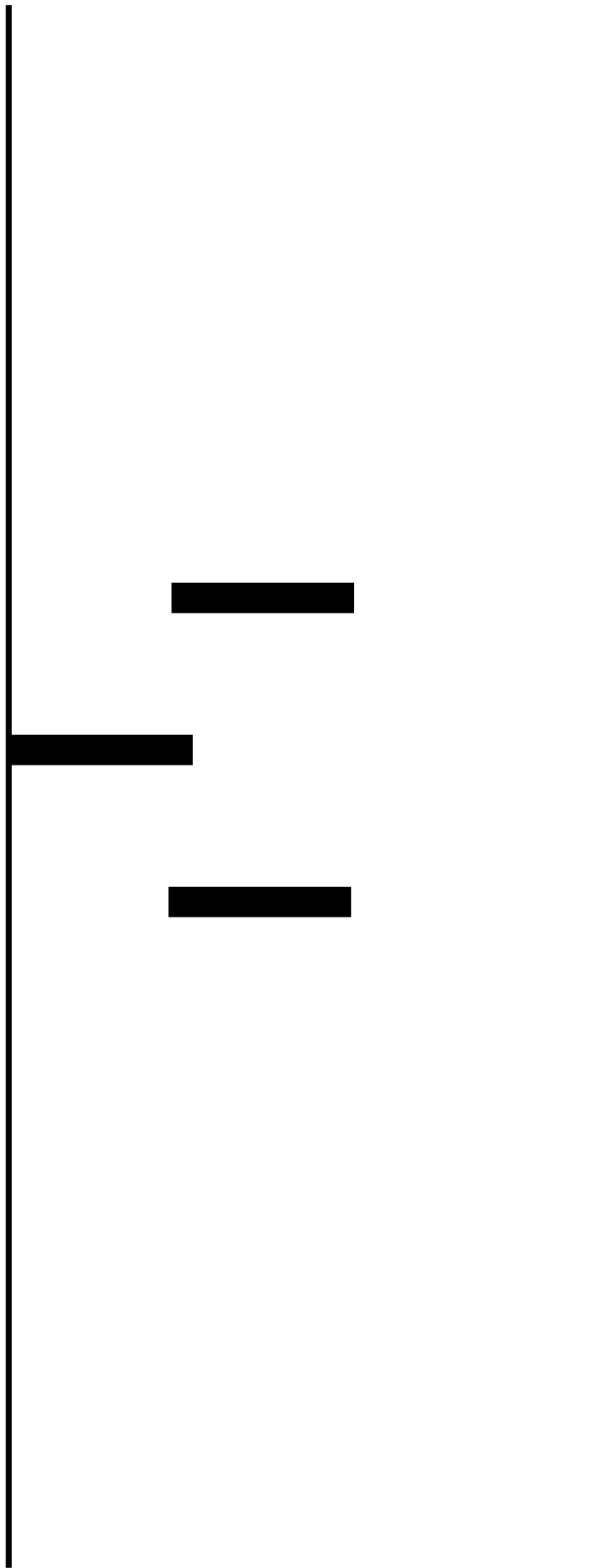
工具番号 Tool No.	名 称 Name	備 考 Remarks
J65066	キャリブレーションソフト Calibration Software 	共通 (E995,E775,E885 E5000, E2500, E4500 E5700, E4300, E3500 E3100, E2100, E5400 E3700, E3200, E2200 E8700, E4100, E8400) Common(E995,E775,E885 E5000, E2500, E4500 E5700, E4300, E3500 E3100, E2100, E5400 E3700, E3200, E2200 E8700, E4100, E8400)
サービスマニュアル添付 Attached in Service Manual	E8400 PAF Position chart 	E8400
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
※J18368	E8400 PAF 点検・調整ソフト E8400 PAF Inspection & Adjustment software 	E8400

※：新規工具

※：New tool

工具番号 Tool No.	名 称 Name	備 考 Remarks
※J61208	E8400 AF チャート (3 枚組 J61208-1,-2,-3) AF CHART FOR E8400 (3 Charts J61208-1,-2,-3) 	E8400
※J61208-1	E8400 AF チャート (3m 用) AF CHART FOR E8400 (For 3m) 	E8400
※J61208-2	E8400 AF チャート (2m 用) AF CHART FOR E8400 (For 2m) 	E8400
※J61208-3	E8400 AF チャート (1 m用) AF CHART FOR E8400 (For 1m) 	E8400

E8400 PAF Position



ジ-メンスタ-チャ-ト

